

# Treadwell&Rollo

24 February March 2003  
Project 3433.04

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Subject: Human Health Risk Assessment  
Mandela Gateway Redevelopment Site  
Oakland, California

Dear Mr. Chan:

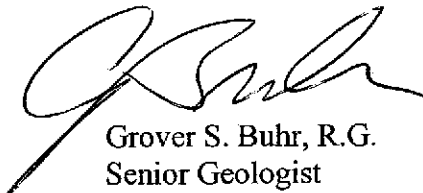
Attached please find our Human Health Risk Assessment report, dated 24 March 2003, for the Mandela Gateway Redevelopment Site in Oakland, California. The report has been prepared on behalf of BRIDGE Housing and is intended to document the human health risks based on a pre-development scenario (a theoretical "baseline" evaluation) and a post-development scenario (consistent with much of the planned development of the Site). Separate evaluations were performed for the west block, east block, and Parcel A of the west block.

Please let us know if you have any questions or comments regarding the report.

Sincerely yours,  
TREADWELL & ROLLO, INC.



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**HUMAN HEALTH RISK ASSESSMENT  
MANDELA GATEWAY REDEVELOPMENT SITE  
SEVENTH STREET AND MANDELA GATEWAY  
Oakland, California**

**BRIDGE Housing Corporation  
San Francisco, California**

**24 March 2003  
Project No. 3433.04**

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## ACRONYMS AND TERMS

|                     |  |
|---------------------|--|
| 95% UCL             | 95 Percent Upper Confidence Limit on the Arithmetic Mean |
| ABS <sub>gi</sub>   | Gastrointestinal Absorption                              |
| ADD                 | Average Daily Dose                                       |
| ARB                 | Air Resources Board                                      |
| bgs                 | Below Ground Surface                                     |
| Cal EPA             | California Environmental Protection Agency               |
| COPC                | Chemical of Potential Concern                            |
| CSM                 | Conceptual Site Model                                    |
| DTSC                | Department of Toxic Substances Control                   |
| EPC                 | Exposure Point Concentration                             |
| HEAST               | Health Effects Assessment Summary Tables                 |
| HHRA                | Human Health Risk Assessment                             |
| HI                  | Hazard Index   |
| IRIS                | Integrated Risk Information System                       |
| LADD                | Lifetime Average Daily Dose                              |
| LBNL                | Lawrence Berkeley National Laboratory                    |
| m <sup>3</sup> /day | Cubic Meters per Day                                     |
| MCL                 | Maximum Contaminant Level                                |
| mg/kg               | Milligrams per Kilogram                                  |
| mg/kg-day           | Milligrams per Kilogram-Day                              |
| NCEA                | National Center for Environmental Assessment             |

## ACRONYMS AND TERMS

|                   |  |
|-------------------|--|
| NCP               | National Contingency Plan                              |
| OSHA              | Occupational Safety and Health Administration          |
| ORNL              | Oak Ridge National Laboratory                          |
| PEF               | Particulate Emission Factor                            |
| PRG               | Preliminary Remediation Goals                          |
| REL               | Reference Exposure Level                               |
| RfD               | Verified Reference Dose                                |
| RME               | Reasonable Maximum Exposure                            |
| RWQCB             | San Francisco Bay Regional Water Quality Control Board |
| SQL               | Sample Quantitation Limit                              |
| SF                | Slope Factor   |
| TPH               | Total Petroleum Hydrocarbons                           |
| U.S. EPA          | United State Environmental Protection Agency           |
| ug/dl             | Micrograms per Deciliter                               |
| ug/L              | Micrograms per Liter                                   |
| ug/m <sup>3</sup> | Micrograms per Cubic Meter                             |
| VOC               | Volatile Organic Compound                              |

**HUMAN HEALTH RISK ASSESSMENT  
MANDELA GATEWAY REDEVELOPMENT SITE  
SEVENTH STREET AND MANDELA GATEWAY  
Oakland, California**

## **1.0 INTRODUCTION**

Treadwell & Rollo, Inc. on behalf of BRIDGE Housing Corporation, have prepared this Human Health Risk Assessment (HHRA) for the Mandela Gateway Redevelopment Site (the Site). The Site is a two-block area bounded by Seventh Street, Center Street, and Eighth Street (Figure 1). Various residual chemicals have been found in subsurface soils and shallow groundwater at the Site. This HHRA is intended to evaluate potential exposure and risks from the residual chemicals, assuming future redevelopment and subsequent residential and commercial use of the Site. This HHRA should be considered a supplement to existing environmental information and reports developed for the Site.

### **1.1 Site Background**

The Site is in an area of Oakland that historically has been a mixture of residential, commercial and light industrial land use. Adjacent property uses are residential to the north, residential and commercial to the west, commercial to the east, and parking, automotive repair and a BART station to the south.

The Site encompasses an area of approximately 5.2 acres and is relatively flat. The Site consists of two primary areas: the block bordered by Seventh Street, Center Street, Eighth Street and Mandela Parkway ("west block"), and the partial block bordered by Seventh Street, Mandela Parkway and Eighth Street ("east block"), as shown on Figure 2. The Site was previously a combination of residential and commercial properties and parking lots located in a mixed commercial and residential area in West Oakland, but is currently under construction. The proposed site redevelopment consists of the removal of the existing structures and parking lots and the construction of multi-story at-grade structures that will include parking garages, mixed commercial/ multi-family residential land use over most of the west block (except for the

northern section) and all of the east block. The northern section of the west block ("Parcel A of the west block") is to include multi-level townhouses with front and back yards. The residential units in the remainder of the west block will not include front or back yard areas. The residential units in the northern half of the east block will include front and back yards, but no gardening will be permitted. The residential units of the southern half of the east block will not include front or back yards.

The west block was previously occupied by the Westwood Gardens apartment complex. The east block is currently occupied by J&A Truck Repair (J&A) and previously included a CalTrans Park and Ride parking lot (CalTrans lot) and a portion of a parking lot owned by Armored Transport Systems, Inc. (AT Systems). The J&A lot consists of a main service building and several sheds, with concrete or asphalt pavement covering the remainder of the lot. The CalTrans and AT Systems lots were mostly asphalt-paved lots, with minor curbed landscaped areas. A portion of the former Cypress Freeway (Highway 980) previously passed over the east block, with supporting piles for the freeway previously installed through the center of the east block.

The Site is at an elevation of approximately 11 to 16 feet above Mean Sea Level. The ground surface at the site vicinity is relatively flat. Previous investigations in the site vicinity indicate regional groundwater flows to the southwest, toward the Oakland Inner Harbor. Groundwater at the Site has been encountered as shallow as 8 feet below ground surface (bgs).

## **1.2 Risk Assessment Objectives**

Although the redevelopment plans indicate that much of the Site will be covered with concrete for building foundations, walkways, a subsurface parking garage, and a surface parking lots, there are selected areas of landscaping planned for the redevelopment, including an outdoor plaza known as the "Town Square" located within the east block and the front and back yards in the east block and Parcel A of the west block. Soil with residual chemicals will either be removed to risk-based levels in several areas of the Site, including the landscaped areas and the

front and back yards of the residential units, or capped by building slabs or pavement in certain areas of the east block, precluding direct contact with subsurface soils. Details of the soil removal are discussed in the Soil Management and Removal Plan (T&R 2003b). This HHRA includes an evaluation of exposure based on two different Site scenarios:

- Pre-Development
- Post-Development

The Pre-Development scenario evaluation is theoretical because it assumes that soil with residual chemicals is available for direct contact, which is not consistent with the redevelopment plans for the Site. The Pre-Development scenario evaluation provides a point of reference for future conditions and is considered a type of “baseline” evaluation. The Post-Development scenario includes an assumption of a combination of soil coverage by buildings slabs or pavement, as well as removal of soil with residual chemicals to risk-based levels in the landscaped areas of the Site, the front and back yards of the residential units in Parcel A of the west block, and the northern half of the east block. Therefore, the objectives of this HHRA are to evaluate the potential exposures and risks from residual chemicals in soil and groundwater based on a theoretical “baseline” scenario known as “Pre-Development” and on a future “Post-Development” scenario.

### 1.3 Approach and Organization of the Report

Because the Site is currently under construction for the redevelopment, the HHRA takes a redevelopment completion/theoretical baseline approach to evaluate noncancer hazards and excess cancer risks. The HHRA is organized to describe the following four-step process:

- Data Evaluation and Selection of Chemicals of Potential Concern (COPC) (Section 2.0). The available data are identified and COPCs are selected for the HHRA.
- Exposure Assessment (Section 3.0). The exposure assessment includes an evaluation of current and future land uses, as well as subsurface conditions. The sources of chemicals, potential receptors and representative concentrations of chemicals are identified. The

exposure assessment also characterizes the nature and magnitude of potential exposures to the COPCs at the Site. A Conceptual Site Model (CSM) is prepared and presents the components of theoretically complete exposure pathways and routes of exposure.

Assumed receptor-specific exposure parameters are also identified. The identification of potential exposure scenarios integrates the various exposure parameters into a generalized exposure setting. Estimates of chemical intakes are also calculated based on receptor-specific exposure parameters.

- Toxicity Assessment (Section 4.0). The toxicity assessment consists of compiling toxicity criteria (slope factors [SF] and reference doses [RFD]) for the COPCs for the evaluation of chronic risks.
- Risk Characterization (Section 5.0). The Site-related health risks are characterized using estimates of potential excess cancer risks and hazard indices (HI) for adverse noncancer health effects associated with potential exposure to COPCs at the Site.

The four steps of this HHRA are discussed in more detail in Section 2.0 through Section 5.0 of this report, followed by the conclusions of the HHRA (Section 6.0). Figures, tables, and appendices as identified in the Table of Contents follow the reference section of this report.

## **2.0 DATA EVALUATION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN**

The evaluation of risks in this HHRA uses the data derived from the chemical analysis of soil and groundwater samples. The analytical data are the basis for selecting chemicals of potential concern and estimating exposure point concentrations, and were derived from several sources.

### **2.1 Data Evaluation**

The soil and groundwater chemical data considered for the HHRA were from the following source:



- Treadwell & Rollo (T&R). 2003a. Data Summary, Mandela Gateway Redevelopment Site, Seventh Street and Mandela Parkway, Oakland, California. Letter to Barney Chan of Division of Environmental Protection of the Department of Environmental Health of the Alameda County Health Care Services Agency. March 10.

This document included data from the following sources:

- Department of Transportation – District 04, Memorandum from Celia McCuaig to Doug Sibley, *Hazardous Waste Investigation, Existing 7<sup>th</sup> and Mandela Park and Ride Lot*, 21 March 2002,
- Professional Service Industries, Inc., *Draft Hazardous Waste Preliminary Site Investigation Workplan To Number 04-44680K-GL Contract Number 43A0078, 7th & Mandela, Park & Ride Lot, Oakland, California*, 19 February 2002,
- Ward & Associates, *Phase I Environmental Site Assessment, 1370 7th Street, Oakland, California*, 20 June 2001,
- Blymyer Engineers, Inc., *Limited Subsurface Investigation Letter Report, D.K. Green Property, 1370 7th Street, Oakland, California*, 31 July 1995,
- Tetra Tech, *Site Investigation for Kelly's Truck Repair, Oakland, CA*, February 1993.
- Treadwell& Rollo, 2002, *Phase I and II Environmental Site Assessment, Mandela Gateway Redevelopment Site, Seventh Street and Mandela Parkway, Oakland, California*, 2 August 2002.

Sampling and analysis of soil during investigations at the Site indicated metals and pesticides were detected in selected locations of the soil in the west block. In the east block, metals were detected in selected locations in soil. No volatile organic compounds (VOCs) have been detected in soil samples collected from the Site. Soil samples have not been collected at the J&A area of the east block. Sampling and analysis of groundwater collected from temporary wells

indicated trace levels of selected VOCs (1,2-dichloroethane, toluene, ethylbenzene, and xylenes), petroleum hydrocarbons and metals were detected. Figure 2 indicates sample locations.

Although chromium has been detected in samples collected from the Site, hexavalent chromium has not been detected in any samples. Therefore, all chromium detections were considered to be trivalent chromium for this HHRA.

## 2.2 Selection of Chemicals of Potential Concern

The chemicals of potential concern (COPCs) were selected for evaluation in the HHRA based on the media in which they were found and the exposure scenarios to be evaluated (Section 3.2.4).

The media of concern at the Site are soil, groundwater, and air. Air was selected as a medium of concern due to potential fugitive dust emissions from exposed soil with residual chemicals and potential volatile emissions from trace level volatile organic compounds (VOCs) in groundwater. No VOCs have been detected in soil samples collected from the Site. Dust emissions into air are considered a potential exposure pathway only if exposed soil containing residual chemicals is present at the Site following redevelopment. Because the west block and the east block are separated by Mandela Parkway and Parcel A of the west block includes residential units with front and back yards, the soil data were delineated into three sets:

- West block (excluding Parcel A)
- East block
- Parcel A of the west block.

Table A-1 through A-3 (of Appendix A) present a summary of the detected preliminary soil COPCs at the west block excluding Parcel A (hereafter referred to as the west block). Tables A-4 through A-6 (of Appendix A) present a summary of the detected preliminary soil COPCs at the east block. Tables A-7 through A-9 (of Appendix A) present a summary of the detected preliminary soil COPCs at the Parcel A of the west block. Tables A-10 and A-11 (of Appendix A) presents a summary of the detected preliminary groundwater COPCs at the Site.

With the exception of total petroleum hydrocarbon (TPH) mixtures (e.g., diesel and motor oil), media-specific chemicals detected in at least one sample were initially selected as COPCs.

Potential human health effects from exposure to TPH mixtures were evaluated by considering detections of individual chemicals to represent the toxic components of those mixtures.

Chemicals detected in at least one soil sample included selected metals and pesticides.

Chemicals detected in at least one groundwater sample included metals and VOCs.

Because Site-specific background metals in soil data for the Site were not available, the Site metals in soil data were compared to background metals data determined by the Lawrence Berkeley National Laboratory (LBNL). The lower of the 95% upper confidence levels (95% UCLs) of the arithmetic mean of each of the three areas evaluated in the HHRA, assuming a normal distribution using the Student-t statistic, or the maximum concentrations, were used as the representative exposure point concentrations for the receptors evaluated in this HHRA. In calculating the 95% UCL, the use of sample results reported as not detected was conducted according to U.S. EPA protocols. One-half of the sample quantitation limit (SQL) was used as a proxy concentration for samples reported as not detected (U.S. EPA 1989). According to U.S. EPA (1992), "sampling data from Superfund Sites have shown that data sets with fewer than 10 samples per exposure area provide poor estimates of the mean concentration (i.e., there is a large difference between the sample mean and the 95 percent UCL)." Consequently, if the number of samples for a given chemical was less than 10, then the maximum concentration was used in the background data comparison. The same protocol was applied to developing exposure point concentrations for the remainder of the HHRA (discussed further in Section 3.4.1).

The 95<sup>th</sup> percentile level was selected as the representative LBNL background level for comparison. If the 95<sup>th</sup> percentile was not developed, then the 99<sup>th</sup> percentile level was used. Tables A-1, A-2 present the LBNL levels used, as well as whether the value was a 95<sup>th</sup> percentile or 99<sup>th</sup> percentile. For the west block, arsenic, beryllium, cadmium, chromium, cobalt, copper, nickel, and vanadium were below background levels and were excluded from further evaluation in the HHRA. For the east block, arsenic, cadmium, chromium, cobalt, mercury, nickel, and vanadium were below background levels and were excluded from further evaluation in the

HHRA. For Parcel A of the west block, arsenic, beryllium, cadmium, chromium, cobalt, copper, nickel, and zinc were below background levels and were excluded from further evaluation in the HHRA. The remaining detected metals for each of the three areas, as well as the detected pesticides, were retained as COPCs for soil. All detected metals and VOCs in groundwater samples were retained as COPCs for groundwater.

### **3.0 EXPOSURE ASSESSMENT**

Following the selection of the COPCs, an exposure assessment was conducted as the next step in the risk assessment. U.S. EPA (1989) defines "exposure" as the contact of an organism with a chemical or physical agent. The magnitude of exposure is determined by measuring or estimating the amount of an agent available at the exchange boundaries (i.e., lungs, gut, skin) for a specific time period. U.S. EPA characterizes the exposure assessment phase of a risk assessment as consisting of three components: (1) characterization of the exposure setting, (2) identification of the exposure pathways, and (3) quantification of exposure. The exposure setting characterization includes a discussion of current and future land use.

#### **3.1 Exposure Setting and Land Use**

This subsection of the HHRA briefly characterizes the Site by describing the current and future use of the Site, and a brief description of subsurface conditions. This HHRA was developed to assess potential exposure and risks from the residual chemicals assuming Pre-Development scenario and Post-Development scenario. The Pre-Development scenario includes a theoretical assumption that soil with residual chemicals is available for direct contact. The Post-Development scenario includes an assumption that soil with residual chemicals is not available for direct contact. The development is to include mixed commercial/multi-family residential land use at the west block, and residential (townhouses with front and back yards) at the northern half of the east block and Parcel A of the west block. Current use of the Site is limited to construction-related redevelopment activities, as well as activities by J&A at the east block. J&A will be vacating the Site in the near future. Figures 2 and 3 illustrate an approximation of

the future Site configuration layout. An outdoor plaza is planned for a portion of the east block. This plaza will consist primarily of lawn area. Soil with residual chemicals will either be removed to risk-based levels in several areas of the Site, including the landscaped areas and the front and back yards of the residential units, or capped by building slabs or pavement in certain areas of the east block, precluding direct contact with subsurface soils. Domestic water supply for the Site will continue to be provided by the East Bay Municipal Utility District from off-site sources. Shallow groundwater will not be used as a source of domestic water for the Site.

### **3.2 Subsurface Conditions**

Based upon available information to date, the Site is generally underlain by about 2 to 6 feet of fill, except in the eastern part of the former CalTrans area, where fill may be up to eight feet thick. The fill generally consists of loose to medium dense sand with silt and silty sand with varying amounts of debris, including bricks, and shells. On the east block, the fill may contain debris from the former Cypress overpass and Kirkham Street, including abandoned utilities, concrete foundations, and other debris.

The fill is underlain by native sand with varying amounts of silt and clay (referred to as Merritt sand) to the maximum depth of the test borings (16 feet). The sand contains clayey fines (particles passing the No. 200 sieve) and is lightly cemented below the water table.

Groundwater was measured in the borings at depths ranging from about 8 to 12 feet bgs, which corresponds to elevations of about +3.5 to -3 feet (City of Oakland datum). These do not represent stabilized groundwater measurements. Regional groundwater generally flows toward the southwest.

### **3.3 Potential Exposure Pathways**

U.S. EPA (1989) describes exposure pathways in terms of four primary components:

- A source and mechanism of chemical release

- A retention or transport medium (or media, in cases involving media transfer of chemicals)
- A point of human (receptor) contact with the contaminated medium (known as the exposure point)
- An exposure route (such as ingestion) at the contact point

All four of these components must be present for a potential exposure pathway to be considered complete and for exposure to occur.

### **3.3.1 Chemical Sources, and Affected Media**

The source and mechanism of chemical release is related to historical activities at the Site. The retention or transport media include soil, groundwater and air. Air is a transport media for potential volatile emissions of trace levels of VOCs from groundwater through soil to the air. If exposed soil with residual chemicals is present, fugitive dust emissions in air are potentially created. Shallow groundwater will not be used as a source of domestic water for the Site.

### **3.3.2 Potential Receptors**

This assessment used hypothetical exposure cases called “receptors”. In general terms, receptors are representative types of potentially exposed populations. Each receptor is evaluated based upon hypothetical exposures developed from an assumed combination of Site conditions, potential population activity patterns, chemical properties, chemical distribution and concentrations, and exposure to the chemical(s).

In formal terms, receptors are sets of assumptions that describe “what if” scenarios, but are not actual persons. The assumptions were intended to describe what EPA terms reasonable maximum exposure (RME). Each receptor addresses several “what if” questions that are

unlikely to all apply to a single individual. In this way, receptors provide a useful tool for addressing a number of issues at once; however, they are not representative of what exposures might actually happen to any one individual and are considered conservative points of reference.

Potentially exposed populations (i.e., receptors) under the future use setting include:

- Construction Worker (during redevelopment activities only)
- Resident (residential units with front and back yards in the northern half of the east block and in Parcel A of the west block and multi-family residential units with no front or back yards in the west block)
- Commercial/Industrial Workers (east and west block only)

The construction worker, commercial/industrial worker, and resident receptors are evaluated further in the HHRA. Further detail regarding the receptors and assumed activities and exposure pathways is presented in Section 3.3.4. Although non-residents may visit retail stores at the site following redevelopment, their potential exposure is considered to be much less than the commercial/industrial worker receptor due to their infrequent use of the site. Therefore, the commercial/industrial worker receptor is considered to conservatively represent non-resident retail visitors.

### **3.3.3 Exposure Points**

The identification of exposure points for the HHRA was based on assumed future receptor activity in relation to the distribution of contaminants at the Site. Rather than estimate potential exposure at multiple locations, three soil "exposure points" were assumed to provide a conservative estimate of potential exposure for the west block, east block, and Parcel A of the west block. For groundwater, a single exposure point was assumed for the three areas.

### 3.3.4 Exposure Routes and Pathways and Related Exposure Parameters

The evaluation of risk includes the relevant potential routes of exposure associated with the receptors (i.e., inhalation, ingestion, and direct dermal contact). Because each type of receptor is assumed to be engaged in unique activities, media-specific complete exposure pathways are receptor-specific. Figure 4 presents the conceptual Site model that visually indicates the various relevant potential exposure pathways. Table B-1 of Appendix B presents a summary of the exposure pathways evaluated for each receptor.

The following subsections present a description of each potential receptor. Exposure parameters used in the development of the estimates of exposure and intake are discussed in Section 3.4. Potentially exposed populations include construction workers (during redevelopment construction only), commercial/industrial workers, and residents.

#### 3.3.4.1 Construction Worker Receptor

Construction activities are assumed to occur over less than a 2-year period. Although a Soil Management and Removal Plan (T&R 2003b) has been developed and Site-specific health and safety protocols and engineering controls will be implemented during the construction activities, potential construction worker exposures were evaluated. The construction worker exposures were assumed to occur under the Pre-Development scenario that includes short-term exposure to Site soils and groundwater, without reduction of exposure from implementation of health and safety protocols.

As noted in Section 2.2, the soil COPCs are limited to metals and pesticides. Pesticides are considered semivolatile organic compounds, with the inhalation of VOC emissions from soil not considered to be a complete exposure pathway. Trace levels of VOCs were detected in groundwater at the Site. Because trace levels of VOCs have been detected in groundwater, potential outdoor air exposure from inhalation of VOC emissions from standing water in an excavation and exposure from dermal contact with groundwater are considered to be potentially complete. For soil, only direct contact exposure pathways are considered to be potentially



complete. Therefore, the exposure pathways considered complete for the construction worker receptor under the Pre-Development scenario include:

- Incidental ingestion of soil
- Direct dermal contact with soil
- Inhalation of airborne particles as dust
- Short-term dermal contact with groundwater during excavation operations
- Short-term inhalation of volatile emissions from standing groundwater during excavation operations.

As noted in Section 3.1, shallow groundwater will not be used as a source of domestic water for the Site. Although excavations may be de-watered, indicating that potential short-term dermal contact with groundwater and inhalation of VOC vapors from standing water is not likely, the inclusion of these pathways is considered very conservative. The construction worker was not evaluated under the Post-Development scenario.

#### 3.3.4.2 Resident Receptor

For the resident receptor, it is assumed that there will be multi-family housing (without front or back yards) mixed with commercial/retail at the Site following redevelopment in the west block. On the northern half of the east block, multi-family housing is to be developed, with the units having front and back yard areas. **Although gardening will not be permitted in the front and back yards, the front and back yards of the residential units in the northern half of the east block were conservatively assumed to include gardens.** At Parcel A of the west block, multi-family housing is to be developed, with each of the units having a front and back yard.

Selected exposure assumptions are common to the resident receptors evaluated. The resident is a 30-year receptor consisting of 6-years as a child and 24 years as an adult. As noted in Section

3.1, shallow groundwater will not be used as a source of domestic water for the Site. Because the groundwater COPCs include trace levels of VOCs, the inhalation of volatile emissions from VOCs in groundwater to indoor air is considered to be a complete exposure pathway.

For COPCs in soil, the resident receptor was evaluated under two different Site scenarios:

- Pre-Development (i.e., baseline conditions)
- Post-Development

Because the redevelopment plans for the Site indicate that soil with residual chemicals will either be removed to risk-based levels in several areas of the Site, including the landscaped areas and the front and back yards of the residential units, or capped by building slabs or pavement in certain areas of the east block, precluding direct contact with subsurface soils, the Pre-Development scenario is not considered to be realistic, but provides a point of reference. As noted in Section 2.2, the soil COPCs are limited to metals and pesticides. Pesticides are considered semivolatile organic compounds, with the inhalation of VOC emissions from soil not considered to be a complete exposure pathway. Because the chemicals detected in soil are limited to chemicals not considered to be volatile organic compounds (i.e., Henry's Law Constants less than less than  $1E-5 \text{ atm}\cdot\text{m}^3/\text{mol}$ ), potential indoor air exposure is precluded and indoor air exposure not considered to be a complete exposure pathway for COPCs in soil. Only direct contact exposure pathways are considered to be potentially complete for soil. The exposure pathways considered complete for the resident receptor under the Pre-Development scenario includes:

- Incidental ingestion of soil
- Direct dermal contact with soil
- Inhalation of airborne particles as dust
- Inhalation of volatile emissions from groundwater to indoor air

Due to the presence of front and back yards in the northern half of the east block and Parcel A of the west block, the following exposure pathway was considered to be complete for the resident receptor at the northern half of the east block and Parcel A of the west block:

- Ingestion of homegrown produce

Under the Post-Development scenario, direct contact with chemicals in soil is precluded, which results in a lack of complete soil COPC exposure pathways for the resident receptor. Therefore, only the inhalation of volatile emissions from trace levels of VOCs in groundwater to indoor air exposure pathway is considered to be complete for the resident receptor under the Post-Development scenario at the west block, the entire east block, and Parcel A of the west block.

#### 3.3.4.3 Commercial/Industrial Worker Receptor

The commercial/industrial worker receptor may work indoors in an office or retail setting in the west block or the east block. Although commercial development is not planned for Parcel A of the west block, the commercial/industrial worker receptor was evaluated in Parcel A of the west block to provide a point of reference. As noted in Section 3.1, shallow groundwater will not be used as a source of domestic water for the Site. Because the groundwater COPCs include VOCs, the inhalation of volatile emissions from trace levels of VOCs in groundwater to indoor air is considered to be a complete exposure pathway.

For COPCs in soil, the commercial/industrial worker receptor was evaluated under two different Site scenarios:

- Pre-Development (i.e., baseline conditions)
- Post-Development

As with the residential receptor, the Pre-Development scenario is not considered to be realistic, but provides a point of reference. As noted in Section 2.2, the soil COPCs are limited to metals

and pesticides. Pesticides are considered semivolatile organic compounds, with the inhalation of VOC emissions from soil not considered a complete exposure pathway. Because the chemicals detected in soil are limited to chemicals not considered to be volatile organic compounds (i.e., Henry's Law Constants less than less than  $1E-5 \text{ atm}\cdot\text{m}^3/\text{mol}$ ), potential indoor air exposure is precluded and indoor air exposure not considered to be a complete exposure pathway for COPCs in soil. Only direct contact exposure pathways are considered to be potentially complete for soil. Therefore, the exposure pathways considered complete for the commercial/industrial worker receptor at the west block, east block, and Parcel A of the west block under the Pre-Development scenario includes:

- Incidental ingestion of soil
- Direct dermal contact with soil
- Inhalation of airborne particles as dust
- Inhalation of volatile emissions from groundwater to indoor air

Under the Post-Development scenario, direct contact with chemicals in soil is precluded, which results in a lack of complete soil COPC exposure pathways for the commercial/industrial worker receptor. Therefore, only the inhalation of volatile emissions from groundwater to indoor air exposure pathway is considered to be complete for the commercial/industrial worker receptor under the Post-Development scenario at the west block, east block, and Parcel A of the west block.

### **3.4 Exposure Point Concentrations**

The exposure point concentration (EPC) is the chemical concentration to which receptors are assumed to be exposed.

## 3.4.1 Representative Concentrations

Representative chemical-specific concentrations were developed from the chemical data to identify soil and groundwater EPCs for estimating exposures. The EPCs of COPCs in air were modeled from the soil and groundwater EPCs.

The lower of the 95% upper confidence level (95% UCL) of the arithmetic mean assuming a normal distribution using the Student-t statistic or the maximum concentration was used as the representative exposure point concentration for the west block and the east block. According to U.S. EPA (1992), "sampling data from Superfund Sites have shown that data sets with fewer than 10 samples per exposure area provide poor estimates of the mean concentration (i.e., there is a large difference between the sample mean and the 95 percent UCL)." Consequently, if the number of samples for a given chemical was less than 10, then the maximum concentration was selected as the representative concentration. The use of sample results reported as not detected was conducted according to U.S. EPA. One-half of the sample quantitation limit (SQL) was used as a proxy concentration for samples reported as not detected (U.S. EPA 1989).

For Parcel A of the west block, the maximum soil concentrations were used as the representative soil exposure point concentrations. Due to the number of groundwater sample available for the HHRA, the maximum concentrations were used as the representative groundwater exposure point concentrations for all three areas evaluated in the HHRA.

## 3.4.2 Breathing Zone Air Exposure Point Concentrations

EPCs in air were developed based upon soil fugitive dust emissions, volatile emissions of trace levels of VOCs from standing groundwater in excavations, and volatile emissions of trace levels of VOCs from groundwater through soil to indoor air.

### 3.4.2.1 Fugitive Dust Emissions

In order to derive the EPCs in air from fugitive dust emissions, a particulate emission factor (PEF) was applied to the soil EPCs for each of the three areas evaluated. The PEF is intended to relate the concentration of a chemical in soil to the concentration of the chemical in airborne dust. For the residential receptor and the commercial/industrial worker receptor, a PEF of  $8.7E+08 \text{ m}^3/\text{kg}$  was used. This value is derived from the methods presented in the U.S. EPA Soil Screening Guidance (U.S. EPA 1996) and incorporates a San Francisco-area factor. Table B-2 of Appendix B presents the derivation of the PEF. The emission part of the PEF is based on the "unlimited reservoir" model from Cowherd (1985) developed to conservatively estimate particulate emissions due to wind erosion, for a typical hazardous waste site where surface contamination provides a relatively continuous and constant potential for emission over an extended period of time. The fugitive dust EPCs were calculated by dividing the soil EPC by the PEF.

For the construction worker receptor, a different PEF was used to derive the EPCs in air from fugitive dust emissions. The construction worker receptor PEF ( $1.44E+06 \text{ m}^3/\text{kg}$ ) is derived from a "Dust Emission Factor" of 1.2 tons per month per acre developed by U.S. EPA (1974, 1985a,b). The Dust Emission Factor is based on field studies at apartment complex and commercial center developments in semiarid areas. Table B-2 of Appendix B also presents the derivation of the construction worker particulate emission factor.

### 3.4.2.2 Outdoor Air EPCs from Standing Groundwater in an Excavation

Air EPC for VOCs that may be released to the air from standing groundwater to outdoor air (for the construction worker receptor) were estimated by using a mass transfer equation (U.S. EPA 1995) to estimate the standing water emission rate to the air and estimating the vapor concentrations in outdoor air. The emission rate was calculated as follows:

$$ER = SA \times C_{water} \times K \times CF \quad (3-1)$$

where:

- ER = Emission rate at the surface (milligrams per second)
- SA = Surface area of water, assumed to be 20 square meters (a trench of 2 meters wide by 10 meters long)
- C<sub>water</sub> = Groundwater EPC (milligrams per liter)
- CF = Conversion factor 1E+01 liters per cubic centimeter multiplied by square centimeters per square centimeters
- K = Overall mass transfer coefficient (centimeters per second), calculated as follows:

$$1/K = 1/kl + ((R \times T)/(H \times Kg)) \quad (3-2)$$

where:

- kl = liquid mass transfer coefficient of compound (centimeters per second), calculated
- R = Ideal gas constant 8.2E-05 atmospheres- cubic meters per mol-degrees Kelvin
- T = Temperature in degrees Kelvin, assumed to be 293
- H = Chemical-specific Henry's constant (atmospheres per cubic meter per mole)
- K<sub>g</sub> = Gas phase mass transfer coefficient of all compounds (centimeters per second) (default of 0.83)

$$kl = (M_{W_{O_2}}/M_{W_i})^{0.5} \times (T/298) \times k_{l_{O_2}} \quad (3-3)$$

where:

- kl = liquid-phase mass transfer coefficient of compound (centimeters per second)
- M<sub>W<sub>O<sub>2</sub></sub></sub> = Molecular weight of oxygen (32.0) (grams per mole)
- M<sub>W<sub>i</sub></sub> = Chemical-specific molecular weight (grams per mole)
- T = Temperature in degrees Kelvin, assumed to be 293

klo2 = Liquid-phase mass transfer coefficient of oxygen at 25°C (0.002 centimeters per second [U.S. EPA 1995])

$$Kg = (MWH2o/MWi)^{0.335} \times (T/298)^{1.005} \times kgH2o \quad (3-4)$$

where:

Kg = Gas-phase mass transfer coefficient of compound (centimeters per second)

MWH2o = Molecular weight of water (18.0) (grams per mole)

MWi = Chemical-specific molecular weight (grams per mole)

T = Temperature in degrees Kelvin, assumed to be 293

kgH2o = Gas-phase mass transfer coefficient of water vapor at 25°C (0.833 centimeters per second [U.S. EPA 1995])

The vapor concentration in the breathing zone was estimated by using a near field box model (GRI 1988). The near field box model is a representation of the space within which vapor emissions from a source area are mixed with ambient air. The calculation of the vapor concentration in the breathing zone was as follows:

$$Ca = ER / (W \times H \times W) \quad (3-5)$$

where:

Ca = Vapor concentration in the breathing zone in milligrams per cubic meter (calculated)

ER = Emission rate to the surface (milligrams per second), calculated from Equation 3-2

W = Width of the area parallel to wind direction (assumed to be 10 meters of the trench assumed to be 2 meters wide by 10 meters long)

H = Mixing height, assumed to be 1.5 meters



W = Average wind speed in the mixing zone (assumed to be 4.69 meters per second [U.S. EPA 2002])

Table B-3 of Appendix B presents the calculation of outdoor air EPCs from volatile emissions of VOCs in standing water in an excavation for the construction worker receptor.

### 3.4.2.3 Indoor Air EPCs from Groundwater Emissions

An electronic version (U.S. EPA 2001a) of the Johnson and Ettinger model (1991) was used to estimate indoor ambient air concentrations of VOC vapors from soil and groundwater. The Groundwater Advanced Model (Version 2.3) was used. Although the models provide a calculation of the excess cancer risk and noncancer hazard, the models were only used to derive the estimated air concentrations in a building (the indoor ambient air EPC for VOCs). Site-specific key parameters used in the models are presented in Table B-4 of Appendix B. The building ventilation rate was varied in the calculations to account for different indoor air exchange rates for commercial and residential buildings. Consequently, separate indoor air EPCs were developed for the commercial/industrial worker receptor and the residential receptor. The building ventilation rates were revised as follows:

- $Q_{\text{Bldg-c}}$  = Building ventilation rate for a commercial building assumed to be 6.26E+05 cubic centimeters per second, equivalent to 5 indoor air exchanges per hour (RWQCB 2001 and City of Oakland 1999)
- $Q_{\text{Bldg-r}}$  = Building ventilation rate for a residential building assumed to be 2.5E+05 cubic centimeters per second, equivalent to 2 indoor air exchanges per hour (RWQCB 2001 and City of Oakland 1999)

Groundwater EPCs were used as the initial model input concentrations for the modeling, and the calculated infinite source building concentrations were used as the indoor ambient air EPCs.

## 3.5 Chemical Intake Estimates

Quantified estimates of exposure (chemical daily intake) were based on the exposure point concentrations (Table B-5 for soil and Table B-6 for groundwater) and scenario-specific assumptions and intake variable values for the evaluation of chronic risks. The chemical daily intakes were used to estimate potential cancer risks and risk of adverse noncancer health effects.

A chemical intake is expressed as milligrams of chemical per kilogram body weight per day (mg/kg-day) and is derived for each exposure scenario. EPA-derived exposure algorithms were used to estimate the chemical intakes for each route of exposure.

The exposure variable values used in the pathway-specific equations were based on a series of reported and assumed factors regarding potential land use patterns at the Site. Exposure variables also accounted for a number of physiological factors such as daily breathing rate and surface area of exposed skin. The exposure variables used for this evaluation are consistent with DTSC (1992) and EPA (1989 and 1999) guidance.

Empirical data (i.e., Holmes et. al. 1999 and Kissel, et. al. 1996) were used to select the values for soil adherence factors. For example, the soil adherence factor for children was based upon a geometric mean of the soil loading observed in children in daycare facilities. Chemical-specific soil dermal absorption factors are presented in Table B-7 of Appendix B. The scenario-specific assumptions and exposure variables used to estimate the chemical daily intakes for each hypothetical receptor are included in Table B-8 of Appendix B. The assumptions and exposure variables were used to calculate intake factors for each receptor (presented in Table B-9 of Appendix B). Table B-10 presents the formulae used to develop the factors, as well as to estimate lifetime average daily doses (LADD) for excess cancer risks and average daily doses (ADD) for noncancer hazards.

For the Pre-Development scenario, estimates of doses for the residential receptor at the northern half of the east block and Parcel A of the west block included contributions from ingestion of fruits and vegetables cultivated in Site soils and assuming that the fruits and vegetables were

subject to chemical uptake. Separate vegetable and fruit ingestion rates for consumer intake of homegrown produce in the urban areas (U.S. EPA 1997) were identified (Table B-11 of Appendix B). The fruit and vegetable intake rates were reported in units of grams of produce per kilogram of body weight-day. Intake factors for a child and an adult for fruit and vegetable ingestion exposure based upon the fruit and vegetable intake rates were developed to estimate overall produce ingestion exposure. Table B-11 of Appendix B presents the formulae used to derive the intake factors. Soil EPCs for the east block and Parcel A of the west block were used to estimate theoretical residential doses. Chemical-specific soil-to-plant uptake rates (ORNL 2002) were used to estimate the concentrations of chemicals of potential concern (COPC) in fruits and vegetables. Table B-12 of Appendix B presents the chemical-specific soil-to-plant uptake rates (in units of kilogram of produce per kilogram of soil). While estimates of chemical uptake by fruit were based upon use of the uptake rates (assumed to be a root-zone uptake), estimates of chemical uptake by vegetables included both root-zone uptake and uptake through deposition of chemicals in soil on the surface of vegetables ("resuspension") as a result of wind-blown dust or soil splashing from irrigation. A resuspension multiplier of 0.261 (ORNL 2002) was assumed for vegetables (in units of kilogram of vegetable per kilogram of soil). The calculated intake factors were multiplied by the soil EPCs and the soil-to-plant uptake factors to estimate LADDs for excess cancer risks and ADDs for noncancer hazards. Table B-11 presents the formulae used to estimate LADDs and ADDs for ingestion of homegrown produce. Due to the conservative assumptions used in the calculation of LADDs and ADDs for the ingestion of homegrown produce exposure pathway (i.e., inclusion of both fruit and vegetables under relatively high plant uptake rates), the exposure and associated estimated risks for the ingestion of homegrown produce are likely to be overestimated.

#### 4.0 TOXICITY ASSESSMENT

The toxicity assessment for the HHRA included the identification of the toxicity values (reference doses and slope factors) used to characterize noncancer health effects and cancer risk, respectively for the evaluation of chronic risks. Table B-13 of Appendix B presents the toxicity

values used for the Site. Sections 4.1 through 4.3 outline the sources and methods for selecting toxicity values.

## 4.1 Reference Doses

The potential for noncancer health effects resulting from exposure to chemicals was assessed by comparing a quantified estimate of exposure (chemical daily intake) with a reference dose (RfD). RfDs are expressed in milligrams of chemical per kilogram of body weight-day (mg/kg-day). Inhalation criteria equivalent to RfDs are known as reference concentrations (RfCs), expressed as micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). RfCs were converted to RfDs in the absence of RfDs by dividing the RfC by 70 kilograms (an assumed body weight), multiplying by the assumed inhalation rate of 20 cubic meters per day ( $\text{m}^3/\text{day}$ ), and converting the chemical mass units from micrograms to milligrams. The following are the primary sources of RfDs, presented in order of preference:

- U.S. EPA's Integrated Risk Information System (IRIS), an on-line database that contains current health risk and regulatory information for a large number of chemicals (U.S. EPA, 2003)
- U.S. EPA Region 9 table of Preliminary Remediation Goals (PRG) (U.S. EPA, 2002), where the sources of additional values is the National Center for Environmental Assessment (NCEA)
- Health Effects Assessment Summary Tables (HEAST), published periodically by the U.S. EPA (1997b)
- Cal EPA's chronic reference exposure levels (RELs) (Cal EPA 1997)

Cal EPA RELs are air concentrations expressed as micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). The RELs were converted to RfDs by dividing the REL by 70 kilograms (an assumed body weight), multiplying by the assumed inhalation rate of 20 cubic meters per day ( $\text{m}^3/\text{day}$ ), and converting the chemical mass units from micrograms to milligrams.

## 4.2 Slope Factors

The following are the primary sources of slope factors (SFs), presented in order of preference:

- Cal EPA cancer potency factors on-line at <http://www.oehha.ca.gov/risk/ChemicalDB/index.asp>
- U.S. EPA's Integrated Risk Information System (IRIS), an on-line database that contains current health risk and regulatory information for a large number of chemicals (U.S. EPA 2003)
- U.S. EPA Region 9 table of Preliminary Remediation Goals (PRG) (U.S. EPA 2002), U.S. EPA Region 9 lists the sources of these additional values as the National Center for Environmental Assessment (NCEA)
- Health Effects Assessment Summary Tables (HEAST), published periodically by the U.S. EPA (1997b)

In cases in which SFs were available from both Cal EPA (1994) and IRIS (U.S. EPA 2001a), the Cal EPA value was used. SFs are expressed in units equal to one over milligrams of chemical per kilogram of body weight-day ( $1/[\text{mg}/\text{kg}\cdot\text{day}]$ ).

## 4.3 Route-to-Route Extrapolation

Toxicity criteria have been developed for some chemicals for either the oral or inhalation exposure route but not for both. In these cases, route-to-route extrapolations were performed. This process involves using a toxicity value developed for one route of exposure (e.g., ingestion) and applying it to another (e.g., inhalation). Under this approach, it is assumed that the toxicity between the two pathways of exposure is identical. Route-to-route extrapolations were performed as follows:

- When an oral RfD or SF was available but no inhalation RfD or SF was available, the oral RfD or SF was adopted as the inhalation RfD or SF

- When an inhalation RfD or SF was available but no oral RfD or SF was available, the inhalation RfD or SF was adopted as the oral RfD or SF
- Route-to-route extrapolations were performed for organic compounds only, not metals

Oral RfDs were converted to dermal RfDs by multiplying the oral RfD with the percent gastrointestinal absorption values ( $ABS_{GI}$ ). Oral cancer slope factors were converted to dermal cancer slope factors by dividing the oral cancer slope factor by the  $ABS_{GI}$  value. Chemical-specific  $ABS_{GI}$  values were obtained from U.S. EPA (2001b). When no  $ABS_{GI}$  values were available, a 100%  $ABS_{GI}$  value was used (as recommended [U.S. EPA 2001b]).

## 5.0 RISK CHARACTERIZATION

Risks were evaluated based on estimates of potential excess lifetime cancer risks and the likelihood of adverse noncancer health effects attributable to potential exposures to COPCs in soil for each of the receptors. For reference purposes, an excess cancer risk of one in a million ( $1 \times 10^{-6}$ ) is considered by the Department of Toxic Substances Control (DTSC) of the California Environmental Protection Agency (Cal EPA) as “a point of departure “for making remedial decisions. DTSC does not require remedial actions for excess cancer risks less than the one in a million level. Remedial decisions based on excess cancer risks greater than one in million are made by them on a Site-specific basis.

In addition, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (U.S. EPA, 1990a) states that “for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between  $10^{-4}$  and  $10^{-6}$  using information on the relationship between dose and response”. In the evaluation of remedial alternatives of a Site, the excess cancer risks range of one in ten thousand ( $10^{-4}$ ) to one in a million ( $10^{-6}$ ) is considered a “risk management range”. Excess cancer risks within the risk management range may require some form of risk management, including remedial action to mitigate potential chemical exposures.

Construction worker exposures are regulated by the Occupational Safety and Health Administration (OSHA), which utilizes Permissible Exposure Limits to evaluate worker safety. The exposure assessment and risk characterization methodologies incorporated into this risk assessment are not typically utilized in an OSHA evaluation of construction worker exposures. Notwithstanding, it should be noted that construction worker exposures will be mitigated through implementation of Site-specific health and safety protocols and engineering controls during the construction activities.

The west block excess cancer risks and noncancer hazard indices for Pre-Development soil scenario are presented in Tables C-1 through C-9 of Appendix C and summarized in Table 1. Table 1 also includes the results for the Post-Development scenario (groundwater exposures only) at the west block. The east block excess cancer risks and noncancer hazard indices for Pre-Development scenario are presented in Tables D-1 through D-11 of Appendix D and summarized in Table 2. Table 2 also includes the results for the Post-Development scenario (groundwater exposures only) at the east block. Parcel A of west block excess cancer risks and noncancer hazard indices for Pre-Development scenario are presented in Tables E-1 through E-11 of Appendix E and summarized in Table 3. Table 3 also includes the results for the Post-Development scenario (groundwater exposures only) at Parcel A of the west block.

Section 5.1 presents the cancer risk calculation methodology. Section 5.2 presents the noncancer health effects calculation methodology. Sections 5.3, 5.4, and 5.5 present the results of the west block, while Sections 5.6, 5.7, and 5.8 present the results of the east block. Sections 5.9, 5.10, and 5.11 present the results of Parcel A of the west block. Lead in soil was evaluated separately from the estimates of excess cancer risks and noncancer hazards (Section 5.12). The potential for human health effects from exposure to lead is typically estimated based on blood-lead concentrations.

## 5.1 Cancer Risk Calculation Methodology

Cancer risks associated with exposure to COPCs classified as carcinogens were characterized as an estimate of the probability (risk) that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens (EPA 1989). This estimated theoretical excess risk was expressed as a unitless probability. For example, a cancer risk of  $1 \times 10^{-5}$  indicates an individual has a one-in-one hundred thousand probability of developing cancer during a 70-year lifetime as a result of the assumed exposure conditions. For COPCs that are classified as carcinogens, the cancer risks resulting from exposure to area COPCs were estimated using the following three steps:

First, to derive a cancer risk estimate for a single chemical and pathway, the chemical intake was multiplied by the chemical-specific SF:

$$\text{Chemical - Specific Cancer Risk} = \text{Intake (mg / kg / day)} \times \text{SF (mg / kg / day)}^{-1} \quad (5-1)$$

Second, to estimate the cancer risk associated with exposure to multiple carcinogens for a single exposure pathway, the individual chemical-specific cancer risk was assumed to be additive, as follows:

$$\text{Pathway - Specific Cancer Risk} = \sum \text{Chemical - Specific Cancer Risk} \quad (5-2)$$

Third, pathway-specific risks were then summed to estimate the total cancer risk.

$$\text{Total Cancer Risk} = \sum \text{Pathway - Specific Cancer Risk} \quad (5-3)$$

## 5.2 Noncancer Health Effects Calculation Methodology

The potential for exposure to result in noncancer adverse health effects was evaluated by comparing the intake estimate with an RfD. When calculated for a single chemical, this comparison yielded a ratio termed the HQ:



$$\text{Pathway-Specific Hazard Quotient (HQ)} = \frac{\text{Intake (mg/kg-day)}}{\text{RfD (mg/kg-day)}} \quad (5-4)$$

To evaluate the potential for noncancer, adverse health effects from exposure to multiple chemicals, the HQs for all chemicals were summed, yielding an HI as follows:

$$\text{Pathway - Specific Hazard Index (HI)} = \sum \text{Pathway - Specific HQ} \quad (5-5)$$

Pathway-specific HIs were then summed to estimate a total HI for each receptor.

$$\text{Total Hazard Index (HI)} = \sum \text{Pathway - Specific HI} \quad (5-6)$$

The total HI reflects an assumption, generally considered to be conservative, that the effects of the different chemicals are additive. When the total HI exceeds 1, further evaluation in the form of a segregation of HI analysis would be performed to determine whether noncancer health hazards are a concern at the area (EPA, 1989). This is done because the noncancer adverse health effects of chemicals with different target organs are generally not additive. The exception to implementation of a segregation of HI is when individual hazard quotients exceed a value of 1. For the residential evaluation, although an HI is calculated for an adult and child, the child HI is used to evaluate the resident because the child HI is much higher than the adult HI due to relatively low body weight of the child. The lower body weight of the child resident increases the calculated intake per mass of body weight, resulting in a higher estimate of noncancer hazard than the adult resident.

### 5.3 Construction Worker Receptor – Pre-Development Scenario at the West Block

The total excess cancer risk for the construction worker receptor for the west block was slightly greater than one in one million (i.e.,  $1.3 \times 10^{-6}$ ) and was primarily from aldrin and dieldrin (both pesticides) in soil. The total construction worker noncancer HI was 0.4, which is less than the threshold value of 1.

## 5.4 Resident Receptor – West Block

### 5.4.1 Resident Receptor – Pre-Development Scenario at the West Block

The total excess cancer risk for the resident receptor for the west block was slightly greater than one in one hundred thousand (i.e.,  $1.7 \times 10^{-5}$ ) and was primarily from aldrin in soil, with a lesser contribution from dieldrin. The total child noncancer HI was 0.3, which is less than the threshold value of 1.

### 5.4.2 Resident Receptor – Post-Development Scenario at the West Block

Under the Post-Development scenario, the only exposures evaluated for the residential receptor were from inhalation of volatile emissions into indoor air from trace levels of VOCs in groundwater. Under this scenario, the total excess cancer risk for the resident receptor for the west block was much less than one in one million (i.e.,  $6.9 \times 10^{-9}$ ). The total child noncancer HI was 0.00028, which is less than the threshold value of 1.

## 5.5 Commercial/Industrial Worker Receptor – West Block

### 5.5.1 Commercial/Industrial Worker Receptor – Pre-Development Scenario at the West Block

The total excess cancer risk for the commercial/industrial worker receptor for the west block was slightly greater than one in one million (i.e.,  $1.8 \times 10^{-6}$ ) and was primarily from aldrin in soil, with a lesser contribution from dieldrin. The total noncancer HI for the commercial/industrial worker was 0.032, which is less than the threshold value of 1.

### 5.5.2 Commercial/Industrial Worker Receptor – Post-Development Scenario at the West Block

Under the Post-Development scenario, the only exposures evaluated for the commercial/industrial receptor were from inhalation of volatile emissions into indoor air from trace levels of VOCs in groundwater. Under this scenario, the total excess cancer risk for the

commercial/industrial worker receptor for the west block was much less than one in one million (i.e.,  $1.2 \times 10^{-12}$ ). The total noncancer HI for the indoor commercial/industrial worker was 0.000000034, which is less than the threshold value of 1.

## **5.6 Construction Worker Receptor – Pre-Development Scenario at the East Block**

The total excess cancer risk for the construction worker receptor for the east block was much less than one in one million (i.e.,  $3.3 \times 10^{-9}$ ). The total construction worker noncancer HI was 0.16, which is less than the threshold value of 1.

## **5.7 Resident Receptor –East Block**

### **5.7.1 Resident Receptor – Pre-Development Scenario at the East Block**

The total excess cancer risk for the resident receptor for the east block was much less than one in one million (i.e.,  $6.4 \times 10^{-9}$ ). The total child noncancer HI was 0.054, which is less than the threshold value of 1.

### **5.7.2 Resident Receptor – Post-Development Scenario at the East Block**

Under the Post-Development scenario, the only exposures evaluated for the residential receptor were from inhalation of volatile emissions into indoor air from trace levels of VOCs in groundwater. Under this scenario, the total excess cancer risk for the resident receptor for the east block was much less than one in one million (i.e.,  $6.4 \times 10^{-9}$ ). The total child noncancer HI was 0.00028, which is less than the threshold value of 1.

## **5.8 Commercial/Industrial Worker Receptor –East Block**

### **5.8.1 Commercial/Industrial Worker Receptor – Pre-Development Scenario at the East Block**

The total excess cancer risk for the commercial/industrial worker receptor for the east block was much less than one in one million (i.e.,  $1.2 \times 10^{-12}$ ). The total noncancer HI for the commercial/industrial worker was 0.006, which is less than the threshold value of 1.

### **5.8.2 Commercial/Industrial Worker Receptor – Post-Development Scenario at the East Block**

Under the Post-Development scenario, the only exposures evaluated for the commercial/industrial receptor were from inhalation of volatile emissions into indoor air from trace levels of VOCs in groundwater. Under this scenario, the total excess cancer risk for the commercial/industrial worker receptor for the east block was much less than one in one million (i.e.,  $1.2 \times 10^{-12}$ ). The total noncancer HI for the commercial/industrial worker was 0.000000003 which is less than the threshold value of 1.

## **5.9 Construction Worker Receptor – Post-Development Scenario at Parcel A of the West Block**

The total excess cancer risk for the construction worker receptor for Parcel A of the west block was slightly greater than one in one hundred thousand (i.e.,  $1.7 \times 10^{-5}$ ) and was primarily from **aldrin in soil**. The total construction worker noncancer HI was 1.5, which exceeds the threshold value of 1.

## **5.10 Resident Receptor – Parcel A of the West Block**

### **5.10.1 Resident Receptor – Pre-Development Scenario at Parcel A of the West Block**

The total excess cancer risk for the resident receptor for Parcel A of the west block was greater than 3 in one hundred (i.e.,  $3.4 \times 10^{-2}$ ) and was primarily from aldrin and dieldrin in soil. The

ingestion of homegrown produce exposure pathway ( $3.3 \times 10^{-2}$ ) was the primary contributor to total excess cancer risk, although the contribution of aldrin and dieldrin through soil contact was still high ( $2.2 \times 10^{-4}$ ). The total child noncancer HI was 2.8, which exceeds the threshold value of 1. Because the hazard from aldrin in soil was 2.2, a segregation of hazard based upon target organs was not performed.

## **5.10.2 Resident Receptor – Post-Development Scenario at Parcel A of the West Block**

Under the Post-Development scenario, the only exposures evaluated for the residential receptor were from inhalation of volatile emissions into indoor air from trace levels of VOCs in groundwater. Under this scenario, the total excess cancer risk for the resident receptor for the Parcel A of the west block was much less than one in one million (i.e.,  $6.4 \times 10^{-9}$ ). The total child noncancer HI was 0.00028, which is less than the threshold value of 1.

## **5.11 Commercial/Industrial Worker Receptor – Parcel A of the West Block**

Although commercial land use is not planned for Parcel A of the west block, the commercial/industrial receptor was included as a point of reference.

### **5.11.1 Commercial/Industrial Worker Receptor – Pre-Development Scenario at Parcel A of the West Block**

The total excess cancer risk for the commercial/industrial worker receptor for Parcel A of the west block was slightly greater than two in one hundred thousand (i.e.,  $2.3 \times 10^{-5}$ ) and was primarily aldrin and dieldrin in soil. The total noncancer HI for the indoor commercial/industrial worker was 0.28, which is less than the threshold value of 1.

### **5.11.2 Commercial/Industrial Worker Receptor – Post-Development Scenario at Parcel A of the West Block**

Under the Post-Development scenario, the only exposures evaluated for the commercial/industrial receptor were from inhalation of volatile emissions into indoor air from

trace levels of VOCs in groundwater. Under this scenario, the total excess cancer risk for the commercial/industrial worker receptor for Parcel A of the west block was much less than one in one million (i.e.,  $1.2 \times 10^{-12}$ ). The total noncancer HI for the indoor commercial/industrial worker was 0.000000034, which is less than the threshold value of 1.

## 5.12 Lead in Soil Evaluation

Lead in soil was evaluated by comparing individual soil concentrations to target lead concentrations developed using the Lead Spread 7 Model developed by the Department of Toxic Substances Control (DTSC). The model incorporates Site-specific and default assumptions in the calculation of predicted human blood-lead concentrations, as well as back-calculating soil concentrations based upon a target blood-lead concentration. The target blood-lead concentration of concern in children and adults is 10 micrograms per deciliter (ug/dl) of whole blood, and the point of departure for risk management is a 0.01 risk of exceeding this value (DTSC, 1992). Site-specific input parameters used in the model include the following:

- Lead in water value of 5 ug/l (the 90th percentile lead concentration for East Bay Municipal Utility District Water Quality Data for 2001 was reported as < 5 ug/l) rather than default value of 15 ug/l, which is the California Maximum Contaminant Level (MCL) for drinking water.
- Lead in air value of 0.019 ug/m<sup>3</sup> (the 2001 maximum ambient lead level for samples collected at the Air Resources Board [ARB] (2003) sampling location at Arkansas Street in San Francisco was 0.019 ug/m<sup>3</sup>) rather than the default value of 0.028 ug/m<sup>3</sup>, which is the highest ARB 1997 monthly average for any location in California.
- For the west block and southern half of the east block, homegrown produce percentage value of 0.00% (assumption that no produce cultivation will occur at the Site) rather than the default value of 7%, which is an assumed value for percentage of diet related to homegrown produce under a rural setting.

- For the northern half of the east block and Parcel A of the west block, homegrown produce percentage value of 3% rather than the default value of 7%, which is an assumed value for percentage of diet related to homegrown produce under a rural setting. For an urban setting, U.S. EPA (1997) indicates a value of 2.7%, which was rounded up to 3% for the Parcel A of west block evaluation.

Based on the Site-specific input parameters, a soil concentration of 347 mg/kg will yield a 99th percentile estimate of blood-lead equal to 10 ug/dl for a child resident assuming no ingestion of homegrown produce at the west block under a Pre-Development scenario (Table F-1). The 347 mg/kg soil concentration assumes direct contact with soil. Because lead is not a VOC, exposure to lead is limited to direct contact with soil. Consequently, under the Post-Development scenario, there is no target soil concentration for lead because there is no soil exposure. Under the Pre-Development scenario, soil concentrations greater than 347 mg/kg may represent a potential risk to residential receptors who will not have front and back yards. Only one location in the west block (B-11 at 0.5 feet bgs) had a lead concentration higher than the 347 mg/kg level. Several locations in the southern half of the east block had lead concentrations higher than the 347 mg/kg level.

Based on the Site-specific input parameters, a soil concentration of 261 mg/kg will yield a 99th percentile estimate of blood-lead equal to 10 ug/dl for a child resident additionally assuming ingestion of homegrown produce at the east block and Parcel A of the west block under the Pre-Development scenario (Table F-2). The 261 mg/kg soil concentration assumes direct contact with soil. Because lead is not a VOC, exposure to lead is limited to direct contact with soil. Consequently, under the Post-Development scenario, there is no target soil concentration for lead because there is no soil exposure. Under the Pre-Development scenario at the east block and Parcel A of the west block, soil concentrations greater than 261 mg/kg may represent a potential risk to residential receptors that have front and back yards. Lead in soil was less than the 261 mg/kg level at Parcel A of the west block and the northern half of the east block.

## 6.0 CONCLUSIONS

This HHRA included an evaluation of potential human health risks from exposure to residual chemicals in soil and groundwater at the Site under two development scenarios. The Site includes two blocks (west block and east block) to be developed to include a mixture of multi-family residential and commercial/retail land use. Additionally, the northern section of the west block ("Parcel A of the west block") is to include multi-level townhouses with front and back yards. Gardening will not be permitted in the front and back yards in the residential units of the northern half of the east block. This HHRA included a conservative assumption that gardening would be conducted in the front and back yards of the northern half of the east block. The residential units in the east block and the southern half of the east block will not include front or back yard areas. Therefore, the HHRA included the evaluation of three areas:

- West block (excluding Parcel A)
- East block
- Parcel A of the west block.

Soil with residual chemicals will either be removed to risk-based levels in several areas of the Site, including the landscaped areas and the front and back yards of the residential units, or capped by building slabs or pavement in certain areas of the east block, precluding direct contact with subsurface soils. Details of the soil removal are discussed in the Soil Management and Removal Plan (T&R 2003b). This HHRA includes an evaluation of exposure based on two development Site scenarios:

- Pre-Development
- Post-Development

The Pre-Development soil scenario evaluation is theoretical because it assumes that soil with residual chemicals is available for direct contact, which is not consistent with the redevelopment plans for the Site. The Pre-Development evaluation provides a point of reference and is



considered a type of "baseline" evaluation. The receptors evaluated included a construction worker receptor, a residential receptor and a commercial/industrial worker receptor. Under the Pre-Development scenario for the northern half of the east block and Parcel A of the west block, the proposed presence of front and back yards in the townhouses to be built resulted in inclusion of potential exposures from ingestion of homegrown produce cultivated in soil with residual chemicals in the residential evaluation. Due to the presence of trace levels of VOCs in groundwater, risks for the residential and commercial/industrial receptors under the Post-Development scenario are based only on inhalation exposures from volatile emissions into indoor air from trace levels of VOCs in groundwater. The construction worker receptor was not evaluated under Post-Development scenario. Tables 1, 2, and 3 present a summary of the excess cancer risks and noncancer hazards for the west block, east block, and Parcel A of the west block, respectively. The J&A portion of the east block is currently occupied. Soil samples will be collected in this area in the near future following J&A leaving the Site (T&R 2003b). Based upon the results of the sampling, an addendum to this HHRA will be developed to address potential risks at the J&A area of the east block.

## 6.1 Predevelopment Scenario

Under the Pre-Development scenario, the estimated excess cancer risks for the construction worker for the west block and Parcel A of the west block were greater than  $1 \times 10^{-6}$ . Excess cancer risks for the east block were much less than  $1 \times 10^{-6}$ . Noncancer hazards were greater than the threshold value of 1 for Parcel A of the west block, but less than 1 for the west and east blocks. Construction worker exposures are regulated by the Occupational Safety and Health Administration (OSHA), which utilizes Permissible Exposure Limits to evaluate worker safety. The exposure assessment and risk characterization methodologies incorporated into this risk assessment are not typically utilized in an OSHA evaluation of construction worker exposures. Notwithstanding, it should be noted that construction worker exposures will be mitigated through implementation of Site-specific health and safety protocols and engineering controls during the construction activities.

The estimated excess cancer risks for the residential receptor for the west block were greater than  $1 \times 10^{-6}$  (primarily from aldrin and dieldrin in soil), indicating mitigation measures would be required to reduce the risks. Residential receptor noncancer hazards for the west block were less than the threshold value of 1.

The estimated excess cancer risks for the residential receptor for the east block were less than  $1 \times 10^{-6}$ . Residential receptor noncancer hazards for the east block were less than the threshold value of 1.

The total excess cancer risks for the residential receptor for Parcel A of the west block were greater than  $1 \times 10^{-6}$  (primarily from aldrin and dieldrin in soil). The ingestion of homegrown produce exposure pathway contribution to the total excess cancer risk much of the risk, although the contribution of aldrin and dieldrin through soil contact was still greater than  $1 \times 10^{-6}$ . The total child noncancer HI was greater than the threshold value of 1. Mitigation measures would be required to reduce the risks for the residential receptor for Parcel A of the west block.

The estimated excess cancer risks for the commercial/industrial receptor for the west block were greater than  $1 \times 10^{-6}$  (primarily from aldrin in soil), indicating mitigation measures would be required to reduce the risks. Commercial/industrial receptor noncancer hazards for the west block were less than the threshold value of 1.

The estimated excess cancer risks for the commercial/industrial receptor for the east block were less than  $1 \times 10^{-6}$ . Commercial/industrial receptor noncancer hazards for the east block were less than the threshold value of 1.

The total excess cancer risks for the commercial/industrial receptor for Parcel A of the west block were much greater  $1 \times 10^{-6}$  (primarily from aldrin and dieldrin in soil). The commercial/industrial receptor noncancer HI was less than the threshold value of 1.

## 6.2 Post-Development Scenario

Under the Post-Development scenario, estimated excess cancer risks were much less than  $1 \times 10^{-6}$  for the residential and commercial/industrial receptors at the west block, east block, and Parcel A of the west block. Noncancer hazards were less than the threshold value of 1 for the residential and commercial/industrial receptors at the west block, east block, and Parcel A of the west block

## 6.3 Lead in Soil

Lead was evaluated separately from excess cancer risks and noncancer hazards. Under the Pre-Development scenario, soil concentrations greater than 347 mg/kg may represent a potential risk to residential receptors, assuming no ingestion of homegrown produce (applicable to the west block and the southern half of the eastern block). Lead in soil concentrations at only one location in the west block (B-11 at 0.5 feet bgs) was higher than the 347 mg/kg level, while several locations in the southern half of the eastern block had lead concentrations higher than the 347 mg/kg level. Additionally assuming ingestion of homegrown produce exposure (applicable to the northern half of the east block and Parcel A of the west block), soil concentrations greater than 261 mg/kg may represent a potential risk to residential receptors. Lead in soil concentrations at Parcel A of the west block and the northern half of the east block did not exceed the 261 mg/kg level, but did exceed the 261 mg/kg level at the east block. Under the Post-Development scenario, there is no target soil concentration for lead because there is no soil exposure.

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TABLE 1. WEST BLOCK EXCESS CANCER RISK AND NONCANCER HAZARD SUMMARY  
Mandela Gateway Redevelopment Site  
Oakland, California

|  | West Block Soil<br>EPC<br>(mg/kg) | Groundwater EPC<br>(mg/L) | Total Constuction<br>Worker Excess<br>Cancer Risk | Total Residential<br>Excess Cancer<br>Risk | Total Commercial/<br>Industrial Worker<br>Excess Cancer<br>Risk | Total Construction<br>Worker Noncancer<br>Hazard | Total Residential<br>(Child) Noncancer<br>Hazard | Total Commercial/<br>Industrial Worker<br>Noncancer Hazard |
|--|-----------------------------------|---------------------------|---|--|---|--|--|--|
| Arsenic                                | BKG                               | NA                        | --  | --   | --  | --   | --   | --   |
| Barium                                 | 3.00E+02                          | 1.12E-01                  | --  | --   | --  | 3.09E-01   | 6.81E-02   | 9.21E-03   |
| Beryllium                              | BKG                               | NA                        | --  | --   | --  | --   | --   | --   |
| Cadmium                                | BKG                               | ND                        | --  | --   | --  | --   | --   | --   |
| Chromium                               | BKG                               | ND                        | --  | --   | --  | --   | --   | --   |
| Cobalt                                 | BKG                               | 7.60E-02                  | --  | --   | --  | 1.96E-05   | --   | --   |
| Copper                                 | BKG                               | NA                        | --  | --   | --  | --   | --   | --   |
| Lead                                   | 1.17E+02                          | ND                        | --  | --   | --  | --   | --   | --   |
| Mercury                                | 2.20E+00                          | NA                        | --  | --   | --  | 3.47E-03   | 1.89E-05   | 5.77E-06   |
| Molybdenum                             | ND                                | NA                        | --  | --   | --  | --   | --   | --   |
| Nickel                                 | BKG                               | 6.50E-02                  | --  | --   | --  | 2.51E-04   | --   | --   |
| Selenium                               | ND                                | NA                        | --  | --   | --  | --   | --   | --   |
| Vanadium                               | BKG                               | NA                        | --  | --   | --  | --   | --   | --   |
| Zinc                                   | 1.10E+02                          | 2.70E-02                  | --  | --   | --  | 1.75E-03   | 4.76E-03   | 3.86E-04   |
| Aldrin                                 | 3.09E-01                          | NA                        | 7.80E-07  | 1.01E-05                                   | 1.06E-06  | 5.35E-02   | 1.41E-01   | 1.39E-02   |
| Alpha-BHC (Lindane)                    | 2.20E-03                          | NA                        | 8.83E-10  | 1.14E-08                                   | 1.20E-09  | 2.29E-05   | 6.05E-05   | 5.94E-06   |
| DDD                                    | 2.20E-03                          | NA                        | 7.85E-11  | 1.01E-09                                   | 1.07E-10  | --   | --   | --   |
| DDE                                    | 4.32E-01                          | NA                        | 2.18E-08  | 2.82E-07                                   | 2.97E-08  | --   | --   | --   |
| DDT                                    | 9.02E-01                          | NA                        | 4.56E-08  | 5.89E-07                                   | 6.21E-08  | 9.38E-03   | 2.48E-02   | 2.43E-03   |
| Dieldrin                               | 1.94E-01                          | NA                        | 4.62E-07  | 5.97E-06                                   | 6.30E-07  | 2.02E-02   | 5.34E-02   | 5.25E-03   |
| Endrin                                 | 2.16E-01                          | NA                        | --  | --   | --  | 3.75E-03   | 9.91E-03   | 9.73E-04   |
| Endrin Ketone                          | ND                                | NA                        | --  | --   | --  | --   | --   | --   |
| 1,2-Dichloroethane                     | ND                                | 2.10E-03                  | 4.36E-09  | 6.43E-09                                   | 1.21E-12  | 1.08E-04   | 2.74E-04   | 3.36E-08   |
| Toluene                                | ND                                | 1.80E-03                  | --  | --   | --  | 1.09E-04   | 5.19E-06   | 6.35E-10   |
| Ethylbenzene                           | ND                                | 1.00E-03                  | --  | --   | --  | 1.86E-04   | 1.11E-06   | 1.35E-10   |
| Xylenes                                | ND                                | 1.60E-03                  | --  | --   | --  | 1.73E-05   | 2.45E-07   | 3.00E-11   |
| <b>Pre-Development Scenario Total</b>  |                                   |                           | <b>1.3E-06</b>                                    | <b>1.7E-05</b>                             | <b>1.8E-06</b>  | <b>4.0E-01</b>                                   | <b>3.0E-01</b>                                   | <b>3.2E-02</b>   |
| 1,2-Dichloroethane                     | ND                                | 2.10E-03                  | NA  | 6.43E-09                                   | 1.21E-12  | 1.08E-04   | 2.74E-04   | 3.36E-08   |
| Toluene                                | ND                                | 1.80E-03                  | NA  | --   | --  | 1.09E-04   | 5.19E-06   | 6.35E-10   |
| Ethylbenzene                           | ND                                | 1.00E-03                  | NA  | --   | --  | 1.86E-04   | 1.11E-06   | 1.35E-10   |
| Xylenes                                | ND                                | 1.60E-03                  | NA  | --   | --  | 1.73E-05   | 2.45E-07   | 3.00E-11   |
| <b>Post-Development Scenario Total</b> |                                   |                           | <b>NA</b>   | <b>6.4E-09</b>                             | <b>1.2E-12</b>  | <b>4.2E-04</b>                                   | <b>2.8E-04</b>                                   | <b>3.4E-08</b>   |

Notes:

-- = Not Applicable

EPC = Exposure point concentration

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

TABLE 2. EAST BLOCK EXCESS CANCER RISK AND NONCANCER HAZARD SUMMARY  
Mandela Gateway Redevelopment Site  
Oakland, California

|  | East Block Soil EPC (mg/kg) | Groundwater EPC (mg/L) | Total Constuction Worker Excess Cancer Risk | Total Soil and Groundwater Residential Excess Cancer Risk | Total Homegrown Produce Residential Excess Cancer Risk | Total Residential Excess Cancer Risk | Total Commercial/Industrial Worker Excess Cancer Risk | Total Construction Worker Noncancer Hazard | Total Soil and Groundwater Residential (Child) Noncancer Hazard | Total Homegrown Produce Residential (Child) Noncancer Hazard | Total Residential (Child) Noncancer Hazard | Total Commercial/Industrial Worker Noncancer Hazard |
|--|-----------------------------|------------------------|---|---|--|--------------------------------------|---|--|---|--|--|---|
| Arsenic                                | BKG                         | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Barium                                 | 1.50E+02                    | 1.12E-01               | --  | --  | --   | --                                   | --  | 1.55E-01                                   | 3.41E-02  | 3.24E-04   | 3.44E-02                                   | 4.62E-03  |
| Beryllium                              | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Cadmium                                | BKG                         | ND                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Chromium                               | BKG                         | ND                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Cobalt                                 | BKG                         | 7.60E-02               | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Copper                                 | 3.69E+01                    | NA                     | --  | --  | --   | --                                   | --  | 4.40E-03                                   | 1.20E-02  | 7.71E-05   | 1.21E-02                                   | 9.72E-04  |
| Lead                                   | 2.11E+02                    | ND                     | --  | --  | --   | --                                   | --  | --   | --  | --   | --   | --  |
| Mercury                                | BKG                         | NA                     | --  | --  | --   | --                                   | --  | --   | --  | --   | --   | --  |
| Molybdenum                             | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Nickel                                 | BKG                         | 6.50E-02               | --  | --  | --   | --                                   | --  | 2.51E-04                                   | --  | 0.00E+00   | --   | --  |
| Selenium                               | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Vanadium                               | BKG                         | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Zinc                                   | 1.66E+02                    | 2.70E-02               | --  | --  | --   | --                                   | --  | 2.64E-03                                   | 7.18E-03  | 5.10E-03   | 1.23E-02                                   | 5.83E-04  |
| Aldrin                                 | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Alpha-BHC (Lindane)                    | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| DDD                                    | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | --   | --   | --  |
| DDE                                    | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | --   | --   | --  |
| DDT                                    | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Dieldrin                               | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Endrin                                 | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| Endrin Ketone                          | ND                          | NA                     | --  | --  | --   | --                                   | --  | --   | --  | 0.00E+00   | --   | --  |
| 1,2-Dichloroethane                     | ND                          | 2.10E-03               | 4.36E-09                                    | 6.43E-09  | --   | 6.43E-09                             | 1.21E-12  | 1.08E-04                                   | 2.74E-04  | 0.00E+00   | 2.74E-04                                   | 3.36E-08  |
| Toluene                                | ND                          | 1.80E-03               | --  | --  | --   | --                                   | --  | 1.09E-04                                   | 5.19E-06  | 0.00E+00   | 5.19E-06                                   | 6.35E-10  |
| Ethylbenzene                           | ND                          | 1.00E-03               | --  | --  | --   | --                                   | --  | 1.86E-04                                   | 1.11E-06  | 0.00E+00   | 1.11E-06                                   | 1.35E-10  |
| Xylenes                                | ND                          | 1.60E-03               | --  | --  | --   | --                                   | --  | 1.73E-05                                   | 2.45E-07  | 0.00E+00   | 2.45E-07                                   | 3.00E-11  |
| <b>Pre-Development Scenario Total</b>  |                             |                        | <b>4.4E-09</b>                              | <b>6.4E-09</b>  | <b>0.0E+00</b>   | <b>6.4E-09</b>                       | <b>1.2E-12</b>  | <b>1.6E-01</b>                             | <b>5.4E-02</b>  | <b>5.5E-03</b>   | <b>5.9E-02</b>                             | <b>6.2E-03</b>                                      |
| 1,2-Dichloroethane                     | ND                          | 2.10E-03               | NA  | 6.43E-09  | --   | 6.43E-09                             | 1.21E-12  | 1.08E-04                                   | 2.74E-04  | 0.00E+00   | 2.74E-04                                   | 3.36E-08  |
| Toluene                                | ND                          | 1.80E-03               | NA  | --  | --   | --                                   | --  | 1.09E-04                                   | 5.19E-06  | 0.00E+00   | 5.19E-06                                   | 6.35E-10  |
| Ethylbenzene                           | ND                          | 1.00E-03               | NA  | --  | --   | --                                   | --  | 1.86E-04                                   | 1.11E-06  | 0.00E+00   | 1.11E-06                                   | 1.35E-10  |
| Xylenes                                | ND                          | 1.60E-03               | NA  | --  | --   | --                                   | --  | 1.73E-05                                   | 2.45E-07  | 0.00E+00   | 2.45E-07                                   | 3.00E-11  |
| <b>Post-Development Scenario Total</b> |                             |                        | <b>NA</b>                                   | <b>6.4E-09</b>  | <b>0.0E+00</b>   | <b>6.4E-09</b>                       | <b>1.2E-12</b>  | <b>4.2E-04</b>                             | <b>2.8E-04</b>  | <b>0.0E+00</b>   | <b>2.8E-04</b>                             | <b>3.4E-08</b>                                      |

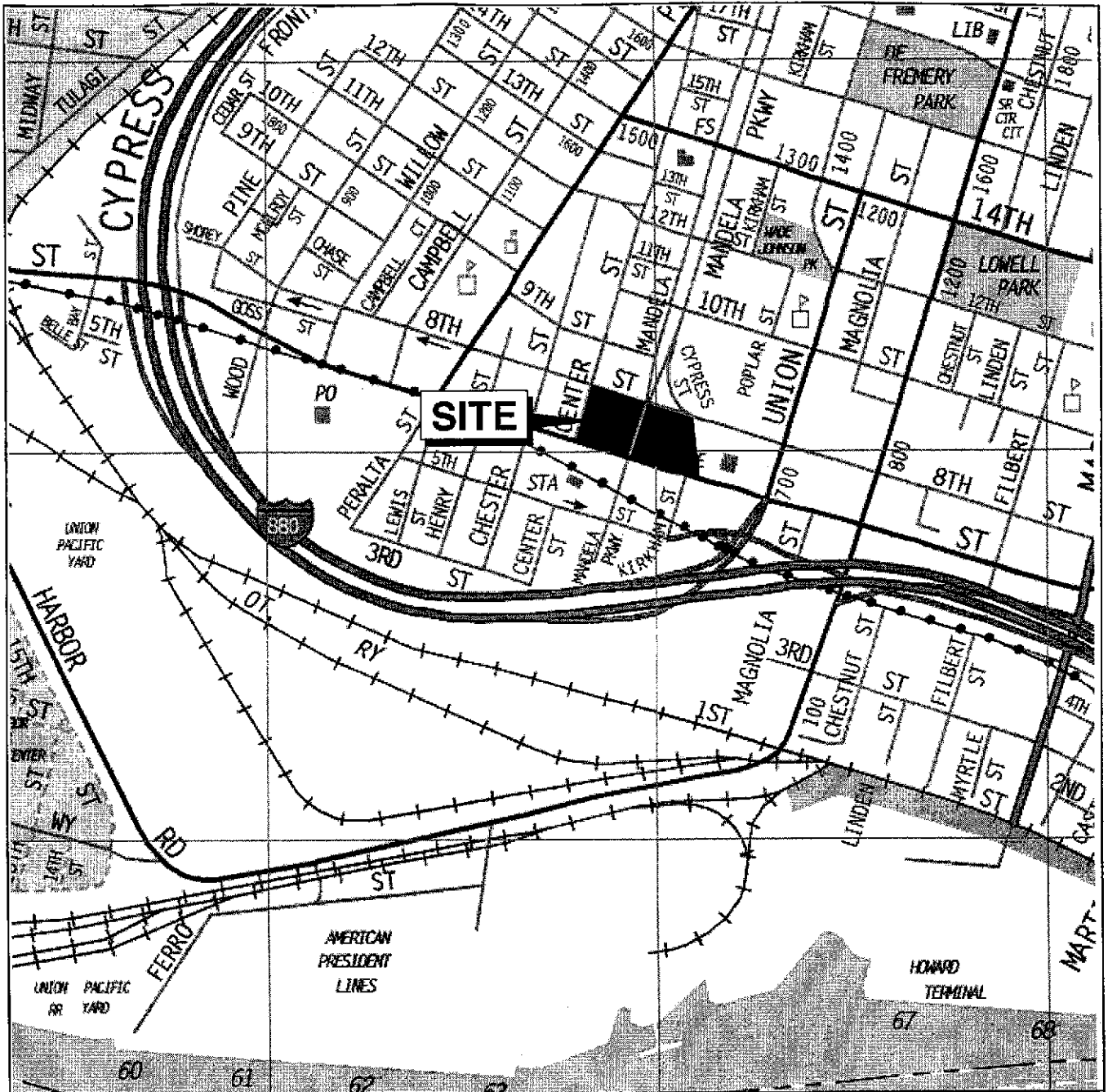
Notes:  
-- = Not Applicable  
EPC = Exposure point concentration  
mg/kg = milligrams per kilogram



TABLE 3. PARCEL A OF THE WEST BLOCK EXCESS CANCER RISK AND NONCANCER HAZARD SUMMARY  
Mandela Gateway Redevelopment Site  
San Francisco, California

|  | West Block Parcel<br>A Soil EPC<br>(mg/kg) | Groundwater EPC<br>(mg/L) | Total Constuction<br>Worker Excess<br>Cancer Risk | Total Soil and<br>Groundwater<br>Residential Excess<br>Cancer Risk | Total Homegrown<br>Produce<br>Residential Excess<br>Cancer Risk | Total Residential<br>Excess Cancer<br>Risk | Total Commercial/<br>Industrial Worker<br>Excess Cancer<br>Risk | Total Construction<br>Worker Noncancer<br>Hazard | Total Soil and<br>Groundwater<br>Residential (Child)<br>Noncancer Hazard | Total Homegrown<br>Produce<br>Residential (Child)<br>Noncancer Hazard | Total Residential<br>(Child) Noncancer<br>Hazard | Total Commercial/<br>Industrial Worker<br>Noncancer Hazard |
|--|--|---------------------------|---|--|---|--|---|--|--|---|--|--|
| Arsenic                                | BKG  | NA                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Barium                                 | 2.50E+02                                   | 1.12E-01                  | --  | --   | --  | --   | --  | 2.57E-01   | 5.67E-02   | 5.38E-04  | 5.73E-02   | 7.67E-03   |
| Beryllium                              | BKG  | NA                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Cadmium                                | BKG  | ND                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Chromium                               | BKG  | ND                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Cobalt                                 | BKG  | 7.60E-02                  | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Copper                                 | BKG  | NA                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Lead                                   | 1.80E+02                                   | ND                        | --  | --   | --  | --   | --  | --   | --   | --  | --   | --   |
| Mercury                                | 9.70E-01                                   | NA                        | --  | --   | --  | --   | --  | 1.53E-03   | 8.31E-06   | --  | 8.31E-06   | 2.54E-06   |
| Molybdenum                             | ND   | NA                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Nickel                                 | BKG  | 6.50E-02                  | --  | --   | --  | --   | --  | 2.51E-01   | --   | 0.00E+00  | --   | --   |
| Selenium                               | ND   | NA                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Vanadium                               | BKG  | NA                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Zinc                                   | 1.40E+02                                   | 2.70E-02                  | --  | --   | --  | --   | --  | 3.06E-03   | 6.06E-03   | 4.30E-03  | 1.04E-02   | 4.91E-04   |
| Aldrin                                 | 4.80E+00                                   | NA                        | 1.21E-05  | 1.57E-04   | 2.81E-02  | 2.83E-02                                   | 1.65E-05  | 8.32E-01   | 2.20E+00   | 9.93E-09  | 2.20E+00   | 2.16E-01   |
| Alpha-BHC (Lindane)                    | ND   | NA                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| DDD                                    | ND   | NA                        | --  | --   | --  | --   | --  | --   | --   | --  | --   | --   |
| DDE                                    | 1.50E-02                                   | NA                        | 7.58E-10  | 9.79E-09   | 7.90E-07  | 8.00E-07                                   | 1.03E-09  | --   | --   | --  | --   | --   |
| DDT                                    | 2.20E-02                                   | NA                        | 1.11E-09  | 1.44E-08   | 1.14E-06  | 1.15E-06                                   | 1.51E-09  | 2.29E-04   | 6.05E-04   | 3.34E-10  | 6.05E-04   | 5.94E-05   |
| Dieldrin                               | 1.90E+00                                   | NA                        | 4.52E-06  | 5.84E-05   | 5.27E-03  | 5.33E-03                                   | 6.16E-06  | 1.98E-01   | 5.22E-01   | 3.29E-09  | 5.22E-01   | 5.13E-02   |
| Endrin                                 | ND   | NA                        | --  | --   | --  | --   | --  | --   | --   | 0.00E+00  | --   | --   |
| Endrin Ketone                          | 5.80E-02                                   | NA                        | --  | --   | --  | --   | --  | 1.01E-03   | 2.66E-03   | 6.03E-10  | 2.66E-03   | 2.61E-04   |
| 1,2-Dichloroethane                     | ND   | 2.10E-03                  | 4.36E-09  | 6.43E-09   | --  | 6.43E-09                                   | 1.21E-12  | 1.08E-04   | 2.74E-04   | 0.00E+00  | 2.74E-04   | 3.36E-08   |
| Toluene                                | ND   | 1.80E-03                  | --  | --   | --  | --   | --  | 1.09E-04   | 5.19E-06   | 0.00E+00  | 5.19E-06   | 6.35E-10   |
| Ethylbenzene                           | ND   | 1.00E-03                  | --  | --   | --  | --   | --  | 1.86E-04   | 1.11E-06   | 0.00E+00  | 1.11E-06   | 1.35E-10   |
| Xylenes                                | ND   | 1.60E-03                  | --  | --   | --  | --   | --  | 1.73E-05   | 2.45E-07   | 0.00E+00  | 2.45E-07   | 3.00E-11   |
| <b>Pre-Development Scenario Total</b>  |  |                           | <b>1.7E-05</b>                                    | <b>2.2E-04</b>   | <b>3.3E-02</b>  | <b>3.4E-02</b>                             | <b>2.3E-05</b>  | <b>1.5E+00</b>                                   | <b>2.8E+00</b>   | <b>4.8E-03</b>  | <b>2.8E+00</b>                                   | <b>2.8E-01</b>   |
| 1,2-Dichloroethane                     | ND   | 1.80E-03                  | NA  | 6.43E-09   | --  | 6.43E-09                                   | 1.21E-12  | 1.08E-04   | 2.74E-04   | 0.00E+00  | 2.74E-04   | 3.36E-08   |
| Toluene                                | ND   | 1.00E-03                  | NA  | --   | --  | --   | --  | 1.09E-04   | 5.19E-06   | 0.00E+00  | 5.19E-06   | 6.35E-10   |
| Ethylbenzene                           | ND   | 1.60E-03                  | NA  | --   | --  | --   | --  | 1.86E-04   | 1.11E-06   | 0.00E+00  | 1.11E-06   | 1.35E-10   |
| Xylenes                                | 0.00E+00                                   | 0.00E+00                  | NA  | --   | --  | --   | --  | 1.73E-05   | 2.45E-07   | 0.00E+00  | 2.45E-07   | 3.00E-11   |
| <b>Post-Development Scenario Total</b> |  |                           | <b>NA</b>   | <b>6.4E-09</b>   | <b>0.0E+00</b>  | <b>6.4E-09</b>                             | <b>1.2E-12</b>  | <b>4.2E-04</b>                                   | <b>2.8E-04</b>   | <b>0.0E+00</b>  | <b>2.8E-04</b>                                   | <b>3.4E-08</b>   |

Notes:  
 -- = Not Applicable  
 EPC = Exposure point concentration  
 mg/kg = milligrams per kilogram  
 mg/L = milligrams per liter



Base map: The Thomas Guide  
Alameda County  
1999



No scale





**MANDELA GATEWAY**  
Oakland, California

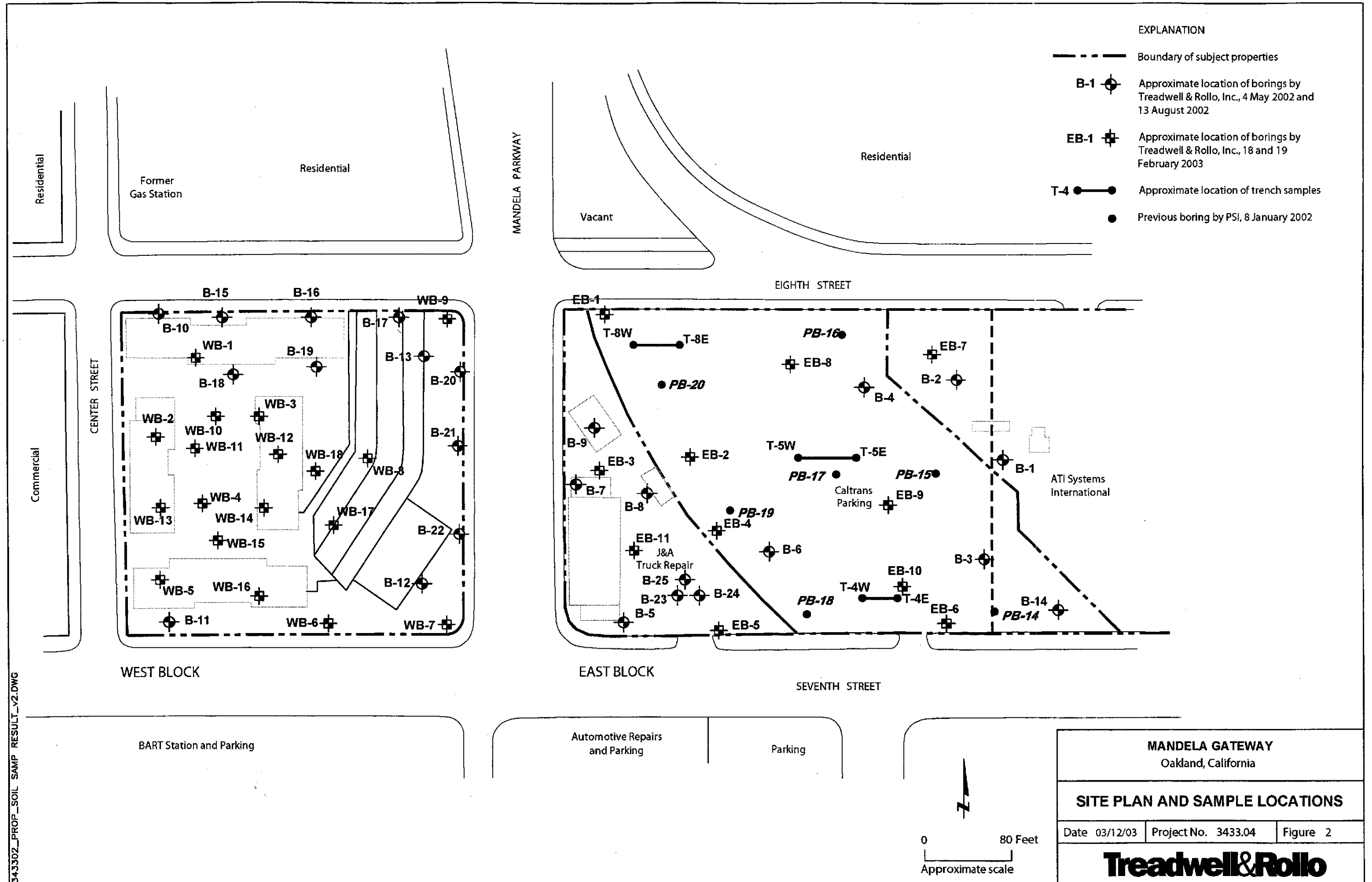
**SITE LOCATION MAP**

**Treadwell&Rollo**

|               |                     |          |
|---------------|---------------------|----------|
| Date 03/12/03 | Project No. 3433.04 | Figure 1 |
|---------------|---------------------|----------|

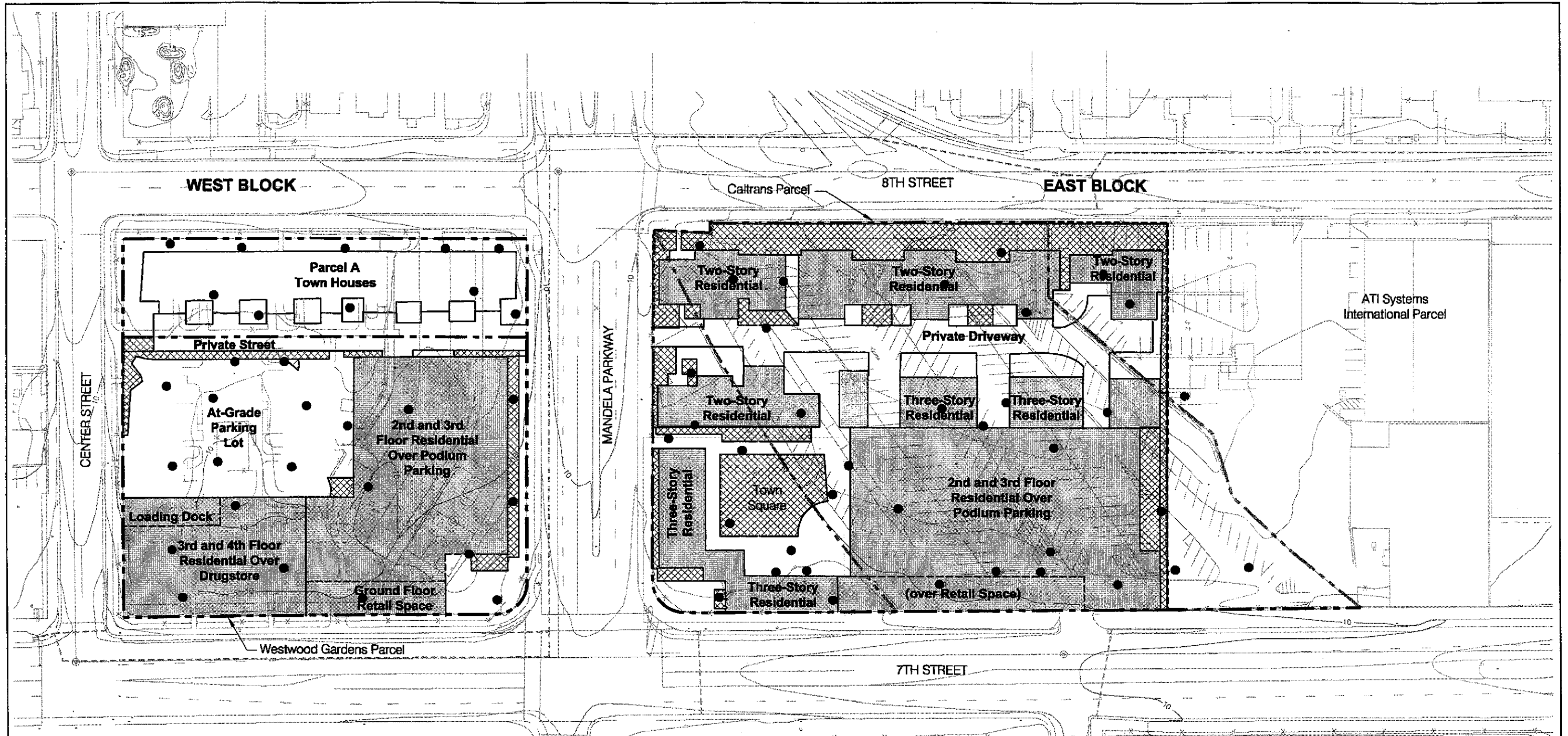
EXPLANATION

- Boundary of subject properties
- B-1  Approximate location of borings by Treadwell & Rollo, Inc., 4 May 2002 and 13 August 2002
- EB-1  Approximate location of borings by Treadwell & Rollo, Inc., 18 and 19 February 2003
- T-4  Approximate location of trench samples
-  Previous boring by PSI, 8 January 2002



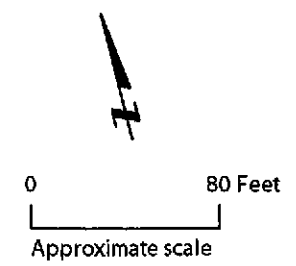
343302\_PROP\_SOIL\_SAMP\_RESULT\_V2.DWG

|   |                     |          |
|---|---------------------|----------|
| <b>MANDELA GATEWAY</b><br>Oakland, California |                     |          |
| <b>SITE PLAN AND SAMPLE LOCATIONS</b>         |                     |          |
| Date 03/12/03                                 | Project No. 3433.04 | Figure 2 |
| <b>Treadwell &amp; Rollo</b>                  |                     |          |



EXPLANATION

- Existing property line
- - - Proposed lot line adjustment
- ▨ Proposed building
- ▩ Landscaped Areas or Mixed Landscape and Walkways
- Soil sample locations



|   |                     |          |
|---|---------------------|----------|
| <b>MANDELA GATEWAY</b><br>Oakland, California |                     |          |
| <b>PROPOSED DEVELOPMENT</b>                   |                     |          |
| Date 03/12/03                                 | Project No. 3433.04 | Figure 3 |
| <b>Treadwell&amp;Rollo</b>                    |                     |          |

Reference: 1. DK Associates, "Topographic Survey - Mandela Gateway", May 30, 2002.  
2. Site plan prepared by Michael Willis Architects, dated 11 July 2002.

343304\_PROPOSED DEVELOPMENT.DGW

**Primary Source**

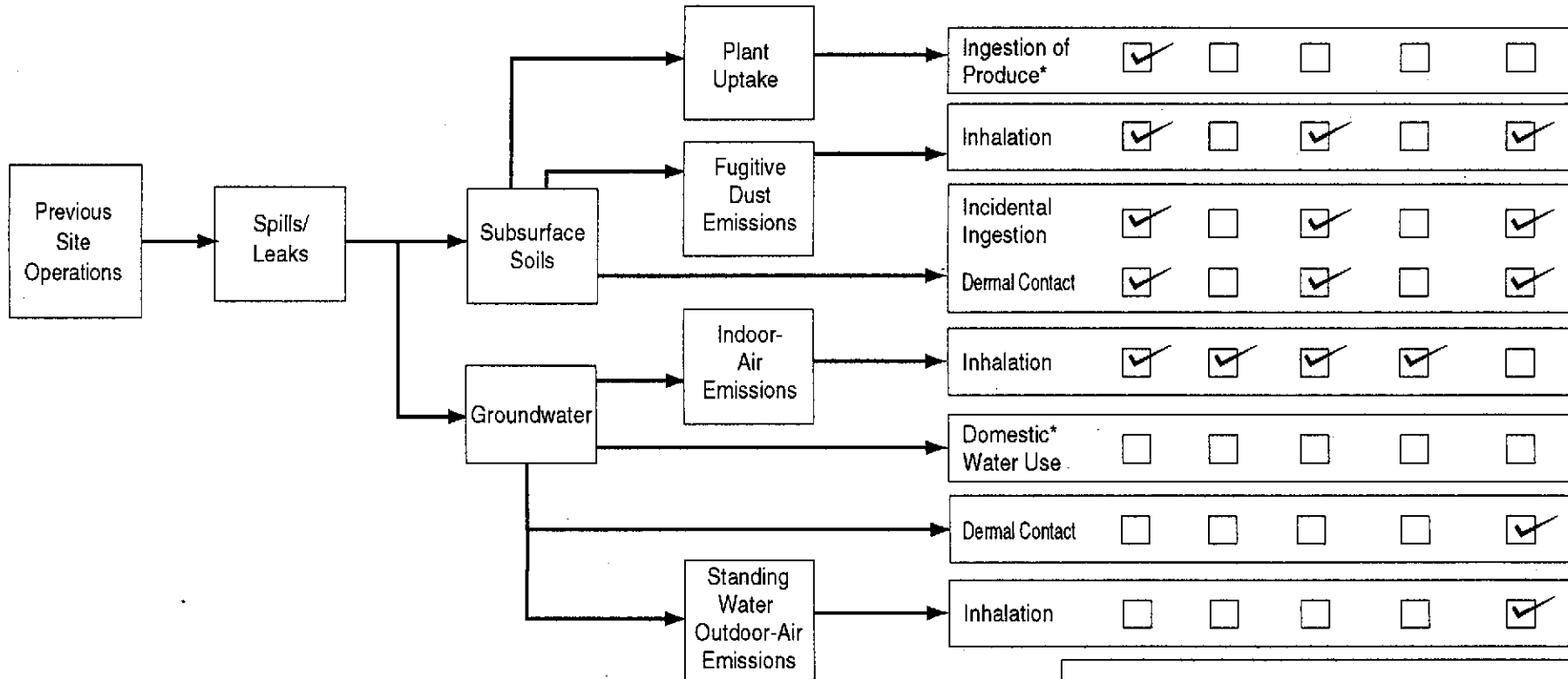
**Primary Release Mechanism**

**Secondary Source**

**Secondary Release Mechanism**

**Exposure Route**

| Potential Receptors             |                                  |   |  |   |
|---------------------------------|----------------------------------|---|--|---|
| Future Resident-Pre-Development | Future Resident-Post-Development | Future Commercial/Industrial Worker-Pre-Development | Future Commercial/Industrial Worker-Post-Development | Current Construction Worker-Pre-Development |



= Pathway Quantified

Domestic water will be supplied from off-site sources by East Bay Municipal Utility District.

\* Only for the East Block and Parcel A of the West Block.

**MANDELA GATEWAY**  
Oakland, California

**CONCEPTUAL SITE MODEL**

Date 03/11/03 | Project No. 3433.02 | Figure 4

**Treadwell&Rollo**

**APPENDIX A**  
**Soil and Groundwater Data Summary Tables**

Table A-1. Soil Analytical Results, LUFT 5 Metals  
West Block

| Sample ID | Sample Date | LEAD<br>(Total)<br>mg/kg | Cadmium<br>mg/kg | Chromium<br>mg/kg | Nickel<br>mg/kg | Zinc<br>mg/kg |
|-----------|-------------|--------------------------|------------------|-------------------|-----------------|---------------|
| B-11-0.5  | 5/4/02      | 1,400                    | --               | --                | --              | --            |
| B-11-1.5  | 5/4/02      | 11                       | --               | --                | --              | --            |
| B-11-2.5  | 5/4/02      | < 5.0                    | --               | --                | --              | --            |
| B-12-0.5  | 5/4/02      | 210                      | --               | --                | --              | --            |
| B-12-1.5  | 5/4/02      | 12                       | --               | --                | --              | --            |
| B21-0     | 8/13/02     | 220                      | --               | --                | --              | --            |
| B21-1.5   | 8/13/02     | 3.5                      | --               | --                | --              | --            |
| B22-0     | 8/13/02     | 220                      | --               | --                | --              | --            |
| B22-1.5   | 8/13/02     | 190                      | --               | --                | --              | --            |
| WB-2-1.0  | 2/18/03     | 11                       | 1.8              | 7.8               | 22              | 40            |
| WB-2-2.5  | 2/18/03     | 55                       | --               | --                | --              | --            |
| WB-2-5.0  | 2/18/03     | 4.1                      | --               | --                | --              | --            |
| WB-3-1.0  | 2/18/03     | 15                       | 1.6              | 10                | 18              | 39            |
| WB-3-2.5  | 2/18/03     | 94                       | --               | --                | --              | --            |
| WB-3-5.0  | 2/18/03     | 8.0                      | --               | --                | --              | --            |
| WB-4-1.0  | 2/19/03     | 320                      | 1.8              | 20                | 15              | 110           |
| WB-4-2.5  | 2/19/03     | 2.3                      | --               | --                | --              | --            |
| WB-4-5.0  | 2/19/03     | 2.3                      | --               | --                | --              | --            |
| WB-5-1.0  | 2/18/03     | 14                       | 1.5              | 8.8               | 17              | 40            |
| WB-5-2.5  | 2/18/03     | 15                       | --               | --                | --              | --            |
| WB-5-5.0  | 2/18/03     | 2.5                      | --               | --                | --              | --            |
| WB-6-1.0  | 2/18/03     | 65                       | 1.2              | 22                | 16              | 83            |
| WB-6-2.5  | 2/18/03     | 3.4                      | --               | --                | --              | --            |
| WB-6-5.0  | 2/18/03     | 2.9                      | --               | --                | --              | --            |
| WB-7-1.0  | 2/18/03     | 220                      | --               | --                | --              | --            |
| WB-7-2.5  | 2/18/03     | 3.3                      | --               | --                | --              | --            |
| WB-7-5.0  | 2/18/03     | 1.5                      | --               | --                | --              | --            |
| WB-8-0.5  | 2/18/03     | 15                       | 1.6              | 11                | 19              | 41            |
| WB-8-1.5  | 2/18/03     | 2.7                      | --               | --                | --              | --            |
| WB-8-5.0  | 2/18/03     | 1.7                      | --               | --                | --              | --            |
| WB-10-1.0 | 2/18/03     | --                       | --               | --                | --              | --            |
| WB-10-2.5 | 2/18/03     | 37                       | --               | --                | --              | --            |
| WB-10-5.0 | 2/18/03     | 44                       | --               | --                | --              | --            |
| WB-11-1.0 | 2/18/03     | 5.7                      | --               | --                | --              | --            |
| WB-11-2.5 | 2/18/03     | 150                      | --               | --                | --              | --            |
| WB-11-5.0 | 2/18/03     | 2.3                      | --               | --                | --              | --            |
| WB-12-1.0 | 2/18/03     | 94                       | --               | --                | --              | --            |
| WB-12-5.0 | 2/18/03     | 1.9                      | --               | --                | --              | --            |
| WB-13-1.0 | 2/18/03     | 11                       | --               | --                | --              | --            |
| WB-13-2.5 | 2/18/03     | 47                       | --               | --                | --              | --            |
| WB-13-5.0 | 2/18/03     | 2.7                      | --               | --                | --              | --            |

Table A-1. Soil Analytical Results, LUFT 5 Metals  
West Block

| Sample ID                            | Sample Date | LEAD<br>(Total)<br>mg/kg | Cadmium<br>mg/kg | Chromium<br>mg/kg | Nickel<br>mg/kg | Zinc<br>mg/kg |
|--------------------------------------|-------------|--------------------------|------------------|-------------------|-----------------|---------------|
| WB-14-1.0                            | 2/19/03     | 81                       | --               | --                | --              | --            |
| WB-14-2.5                            | 2/19/03     | 130                      | --               | --                | --              | --            |
| WB-14-5.0                            | 2/19/03     | 1.6                      | --               | --                | --              | --            |
| WB-15-1.0                            | 2/19/03     | 20                       | --               | --                | --              | --            |
| WB-15-2.5                            | 2/19/03     | 1.9                      | --               | --                | --              | --            |
| WB-15-5.0                            | 2/19/03     | 2.3                      | --               | --                | --              | --            |
| WB-16-1.0                            | 2/18/03     | 11                       | --               | --                | --              | --            |
| WB-16-2.5                            | 2/18/03     | 24                       | --               | --                | --              | --            |
| WB-16-5.0                            | 2/18/03     | 1.3                      | --               | --                | --              | --            |
| WB-17-0.5                            | 2/18/03     | 8.5                      | --               | --                | --              | --            |
| WB-17-1.5                            | 2/18/03     | 29                       | --               | --                | --              | --            |
| WB-17-5.0                            | 2/18/03     | 2.8                      | --               | --                | --              | --            |
| WB-18-1.0                            | 2/18/03     | 45                       | --               | --                | --              | --            |
| WB-18-2.5                            | 2/18/03     | 100                      | --               | --                | --              | --            |
| WB-18-5.0                            | 2/18/03     | 11                       | --               | --                | --              | --            |
| Maximum                              |             | 1400                     | 1.8              | 22                | 22              | 110           |
| Average                              |             | 72.59455                 | NA               | NA                | NA              | NA            |
| Standard Deviation                   |             | 196.7378                 | NA               | NA                | NA              | NA            |
| Sample Count                         |             | 55                       | 5                | 6                 | 6               | 6             |
| Detected Count                       |             | 54                       | 6                | 6                 | 6               | 6             |
| t-value                              |             | 1.675                    | 2.132            | 2.015             | 2.015           | 2.015         |
| 95% UCL                              |             | 117.0                    | NA               | NA                | NA              | NA            |
| Exposure Point Concentration (mg/kg) |             | 117.0                    | 1.8              | 22.0              | 22.0            | 110.0         |
| Background (mg/kg)*                  |             | 27                       | 5.6              | 100               | 100             | 100           |
| Background Basis**                   |             | 95th                     | 99th             | 95th              | 95th            | 95th          |
| Soil EPC > Background Concentrations |             | Yes                      | No               | No                | No              | Yes           |
| Final Soil EPC                       |             | 117.0292                 | BKG              | BKG               | BKG             | 110           |

Notes:

If sample count <10, then maximum value used for exposure point concentration and 95% UCL, Exposure point concentration is lower of 95% UCL and maximum, unless 95% UCL was not  
 \* = Lawrence Berkeley National Laboratory. 2002. Analysis of Background Distributions of  
 \*\* = 95th Percentile used if available. 99th Percentile used if 95th Percentile was not available.

BKG = EPC value is less than background value

EPC = Exposure Point Concentration

-- = Not analyzed

< = Not detected, less detection limit noted

UCL = Upper confidence limit of the arithmetic mean, assuming a normal data distribution

mg/kg = milligrams per kilogram



Table A-2. Soil Analytical Results, CAM 17 Metals  
West Block

| Sample ID                            | Sample Date | Antimony<br>mg/kg | Arsenic<br>mg/kg | Barium<br>mg/kg | Beryllium<br>mg/kg | Cobalt<br>mg/kg | Copper<br>mg/kg | Molybdenum<br>mg/kg | Selenium<br>mg/kg | Silver<br>mg/kg | Thallium<br>mg/kg | Vanadium<br>mg/kg | Mercury<br>mg/kg |
|--------------------------------------|-------------|-------------------|------------------|-----------------|--------------------|-----------------|-----------------|---------------------|-------------------|-----------------|-------------------|-------------------|------------------|
| WB-2-1.0                             | 2/18/03     | < 2.0             | 3.4              | 300             | 0.7                | 9.6             | 11              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 15                | 2.2              |
| WB-3-1.0                             | 2/18/03     | < 2.0             | 3.6              | 180             | 0.69               | 9.5             | 19              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 19                | 1.5              |
| WB-4-1.0                             | 2/19/03     | < 2.0             | 4.5              | 83              | < 0.5              | 4.2             | 17              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 19                | 0.22             |
| WB-5-1.0                             | 2/18/03     | < 2.0             | 3.8              | 160             | 0.72               | 8.7             | 16              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 19                | 0.88             |
| WB-6-1.0                             | 2/18/03     | < 2.0             | 2.8              | 90              | < 0.5              | 3.9             | 17              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 19                | 0.21             |
| WB-8-0.5                             | 2/18/03     | < 2.0             | 3.4              | 180             | 0.65               | 7.7             | 12              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 19                | 2.2              |
| Maximum                              |             | ND                | 4.5              | 300             | 0.72               | 9.6             | 19              | ND                  | ND                | ND              | ND                | 19                | 2.2              |
| Sample Count                         |             | 0                 | 6                | 6               | 4                  | 6               | 6               | 0                   | 0                 | 0               | 0                 | 6                 | 6                |
| Exposure Point Concentration (mg/kg) |             | ND                | 4.5              | 300.0           | 0.7                | 9.6             | 19.0            | ND                  | ND                | ND              | ND                | 19.0              | 2.2              |
| Background (mg/kg)*                  |             | 10                | 14               | 14              | 0.9                | 22              | 53              | 5                   | 5.1               | 3               | 10                | 77                | 0.5              |
| Background Basis**                   |             | 99th              | 95th             | 95th            | 95th               | 95th            | 95th            | 99th                | 99th              | 99th            | 99th              | 95th              | 95th             |
| Soil EPC > Background Concentrations |             | ND                | No               | Yes             | No                 | No              | No              | ND                  | ND                | ND              | ND                | No                | Yes              |
| Final Soil EPC                       |             | ND                | BKG              | 300             | BKG                | BKG             | BKG             | ND                  | ND                | ND              | ND                | BKG               | 2.2              |

If sample count <10, then maximum value used for exposure point concentration and 95% UCL, average, and standard deviation were not calculated

Exposure point concentration is lower of 95% UCL and maximum, unless 95% UCL was not calculated

\* = Lawrence Berkeley National Laboratory. 2002. Analysis of Background Distributions of Metals in the Soil at the Lawrence Berkeley National Laboratory. Environmental Restoration Program. June.

\*\* = 95th Percentile used if available. 99th Percentile used if 95th Percentile was not available.

BKG = EPC value is less than background value

EPC = Exposure Point Concentration

Table A-3. Soil Analytical Results, Organic Compounds  
West Block

| Sample ID                            | Sample Date | Aldrin ug/kg | Dieldrin ug/kg | Endrin ug/kg | Endrin Ketone ug/kg | 4,4 -DDD ug/kg | 4,4 -DDT ug/kg | 4,4 -DDE ug/kg | alpha-BHC ug/kg |
|--------------------------------------|-------------|--------------|----------------|--------------|---------------------|----------------|----------------|----------------|-----------------|
| B-11-0.5                             | 5/4/02      | < 10         | 28             | < 10         | --                  | < 10           | < 10           | < 10           | < 10            |
| B-11-2.5                             | 5/4/02      | < 2.5        | < 2.0          | < 2.0        | --                  | < 2.0          | < 2.0          | < 2.0          | < 2.5           |
| B-12-0.5                             | 5/4/02      | < 500        | < 500          | 1,300        | --                  | < 500          | 5,400          | 2,500          | < 500           |
| B-12-1.5                             | 5/4/02      | < 2.0        | < 2.0          | 6.4          | --                  | 2.2            | 29             | 24             | < 2.0           |
| B21-0                                | 8/13/02     | <10          | <10            | <10          | --                  | < 10           | 150            | 170            | <10             |
| B21-1.5                              | 8/13/02     | <10          | <10            | <10          | --                  | < 10           | <10            | <10            | <10             |
| B22-0                                | 8/13/02     | <10          | <10            | <10          | --                  | < 10           | 25             | 10             | <10             |
| B22-1.5                              | 8/13/02     | <10          | <10            | <10          | --                  | < 10           | 10             | <10            | <10             |
| WB-2-1.0                             | 2/18/03     | 4.0          | 3.5            | < 2.0        | < 2.0               | < 2.0          | < 2.0          | < 2.0          | < 2.0           |
| WB-3-1.0                             | 2/18/03     | 220          | 360            | < 50         | < 50                | < 50           | < 50           | < 50           | < 50            |
| WB-3-2.5                             | 2/18/03     | 3.1          | < 2.0          | < 2.0        | < 2.0               | < 2.0          | < 2.0          | < 2.0          | < 2.0           |
| WB-5-1.0                             | 2/18/03     | 1,700        | 910            | < 100        | < 100               | < 100          | < 100          | < 100          | < 100           |
| WB-5-2.5                             | 2/18/03     | 50           | 15             | < 2          | < 2                 | < 2            | < 2            | < 2            | < 2             |
| WB-6-1.0                             | 2/18/03     | 2.5          | 11             | < 2.0        | < 2.0               | < 2.0          | < 2.0          | 4.3            | < 2.0           |
| WB-7-1.0                             | 2/18/03     | < 10         | < 10           | < 10         | < 10                | < 10           | 240            | 200            | < 10            |
| WB-8-0.5                             | 2/18/03     | < 2.0        | < 2.0          | < 2.0        | < 2.0               | < 2.0          | < 2.0          | < 2.0          | < 2.0           |
| WB-8-1.5                             | 2/18/03     | --           | --             | --           | --                  | --             | --             | --             | --              |
| WB-8-5.0                             | 2/18/03     | --           | --             | --           | --                  | --             | --             | --             | --              |
| WB-10-1.0                            | 2/18/03     | 27           | 23             | < 2.0        | < 2.0               | < 2.0          | 2.3            | 2.7            | 2.2             |
| WB-17-0.5                            | 2/18/03     | --           | --             | --           | --                  | --             | --             | --             | --              |
| Maximum                              |             | 1700         | 910            | 1300         | ND                  | 2.2            | 5400           | 2500           | 2.2             |
| Average                              |             | 134.7        | 95.9           | 83.4         | NA                  | 21.4           | 349.8          | 176.8          | 21.4            |
| Standard Deviation                   |             | 410.5        | 232.6          | 313.7        | NA                  | 60.2           | 1303.0         | 601.6          | 60.2            |
| Sample Count                         |             | 17           | 17             | 17           | 9                   | 17             | 17             | 17             | 17              |
| Detected Count                       |             | 7            | 7              | 2            | 0                   | 1              | 7              | 7              | 1               |
| t-value                              |             | 1.746        | 1.746          | 1.746        | 1.833               | 1.746          | 1.746          | 1.746          | 1.746           |
| 95% UCL                              |             | 308.5        | 194.4          | 216.3        | --                  | 46.9           | 901.6          | 431.6          | 46.9            |
| Exposure Point Concentration (ug/kg) |             | 308.5        | 194.4          | 216.3        | ND                  | 2.2            | 901.6          | 431.6          | 2.2             |

Notes:

Exposure point concentration is lower of 95% UCL and maximum, unless 95% UCL was not calculated

EPC = Exposure Point Concentration

-- = Not analyzed

ND = Not detected, less detection limit noted

UCL = Upper confidence limit of the arithmetic mean, assuming a normal data distribution

ug/kg = micrograms per kilogram

Table A-4. Soil Analytical Results, LUFT 5 Metals  
East Block

| Sample ID | Sample Date | LEAD<br>(Total)<br>mg/kg | Cadmium<br>mg/kg | Chromium<br>mg/kg | Nickel<br>mg/kg | Zinc<br>mg/kg |
|-----------|-------------|--------------------------|------------------|-------------------|-----------------|---------------|
| B-1-0.5   | 5/4/02      | 19                       | --               | --                | --              | --            |
| B-1-2.5   | 5/4/02      | <5.0                     | --               | --                | --              | --            |
| B-2-0.5   | 5/4/02      | 550                      | --               | --                | --              | --            |
| B-2-2.5   | 5/4/02      | 91                       | --               | --                | --              | --            |
| B-3-0.5   | 5/4/02      | 110                      | --               | --                | --              | --            |
| B-3-2.5   | 5/4/02      | 66                       | --               | --                | --              | --            |
| B-4-0.5   | 5/4/02      | 8.5                      | --               | --                | --              | --            |
| B-4-2.5   | 5/4/02      | <5.0                     | --               | --                | --              | --            |
| B-5-0.5   | 5/4/02      | 130                      | 3.2              | 10                | 12              | 120           |
| B-5-1.5   | 5/4/02      | 33                       | --               | --                | --              | --            |
| B-5-3.5   | 5/4/02      | 5.2                      | 1                | 21                | 13              | 16            |
| B-6-0.5   | 5/4/02      | 830                      | --               | --                | --              | --            |
| B-6-2.5   | 5/4/02      | <5.0                     | --               | --                | --              | --            |
| B-7-0.5   | 5/4/02      | 21                       | 2.4              | 4.7               | 7.4             | 65            |
| B-7-1.5   | 5/4/02      | 960                      | 1.6              | 20                | 16              | 290           |
| B-8-0.5   | 5/4/02      | 150                      | 2.3              | 21                | 19              | 140           |
| B-8-1.5   | 5/4/02      | 1,700                    | --               | --                | --              | --            |
| B-8-2.5   | 5/4/02      | 3.4                      | 0.91             | 20                | 13              | 19            |
| B-9-0.5   | 5/4/02      | 1.5                      | 1.7              | <1.0              | 1.5             | 25            |
| B-9-1.5   | 5/4/02      | 150                      | --               | --                | --              | --            |
| B-9-2.5   | 5/4/02      | 2.1                      | 0.97             | 22                | 14              | 13            |
| B-14-0.5  | 5/4/02      | 7.0                      | --               | --                | --              | --            |
| B-14-2.5  | 5/4/02      | 2.2                      | --               | --                | --              | --            |
| B-23-0.5  | 8/13/02     | 48                       | 3.2              | --                | --              | --            |
| B-23-1.5  | 8/13/02     | 18                       | --               | --                | --              | --            |
| B-24-0.5  | 8/13/02     | 520                      | 3                | --                | --              | --            |
| B-24-1.5  | 8/13/02     | 62                       | --               | --                | --              | --            |
| B-25-0.5  | 8/13/02     | 47                       | 2.1              | --                | --              | --            |
| B-25-1.5  | 8/13/02     | 49                       | --               | --                | --              | --            |
| EB-1-1.0  | 2/18/03     | 73                       | 2.7              | 12                | 12              | 100           |
| EB-1-2.5  | 2/18/03     | 230                      | --               | --                | --              | --            |
| EB-1-5.0  | 2/18/03     | 2.4                      | --               | --                | --              | --            |
| EB-2-0.0  | 2/18/03     | 4.9                      | 0.86             | 25                | 17              | 21            |
| EB-2-1.5  | 2/18/03     | 2.3                      | --               | --                | --              | --            |
| EB-2-5.0  | 2/18/03     | 3.1                      | --               | --                | --              | --            |
| EB-3-1.0  | 2/19/03     | 1.6                      | --               | --                | --              | --            |
| EB-3-2.5  | 2/19/03     | 37                       | --               | --                | --              | --            |
| EB-3-5.0  | 2/19/03     | 2.6                      | --               | --                | --              | --            |
| EB-4-0.0  | 2/18/03     | 280                      | --               | --                | --              | --            |
| EB-4-1.5  | 2/18/03     | 320                      | --               | --                | --              | --            |
| EB-4-5.0  | 2/18/03     | 4.4                      | --               | --                | --              | --            |
| EB-5-1.0  | 2/19/03     | 81                       | --               | --                | --              | --            |
| EB-5-2.5  | 2/19/03     | 2.0                      | --               | --                | --              | --            |
| EB-5-5.0  | 2/19/03     | 2.4                      | --               | --                | --              | --            |
| EB-6-1.0  | 2/19/03     | 170                      | 1.9              | 47                | 54              | 80            |
| EB-6-2.5  | 2/19/03     | 21                       | --               | --                | --              | --            |
| EB-6-5.0  | 2/19/03     | 1.6                      | --               | --                | --              | --            |
| EB-7-1.0  | 2/19/03     | 53                       | --               | --                | --              | --            |
| EB-7-2.5  | 2/19/03     | 120                      | --               | --                | --              | --            |
| EB-7-5.0  | 2/19/03     | 2.2                      | --               | --                | --              | --            |
| EB-8-1.0  | 2/18/03     | 14                       | --               | --                | --              | --            |
| EB-8-2.5  | 2/18/03     | 4.0                      | --               | --                | --              | --            |
| EB-8-5.0  | 2/18/03     | 1.7                      | --               | --                | --              | --            |
| EB-9-1.0  | 2/18/03     | 300                      | --               | --                | --              | --            |
| EB-9-2.5  | 2/18/03     | 350                      | --               | --                | --              | --            |
| EB-9-5.0  | 2/18/03     | 1.9                      | --               | --                | --              | --            |
| EB-10-1.0 | 2/19/03     | 5.3                      | 2.6              | 2.3               | 5.8             | 72            |
| EB-10-2.5 | 2/19/03     | 60                       | --               | --                | --              | --            |
| EB-10-5.0 | 2/19/03     | 2.1                      | --               | --                | --              | --            |
| EB-11-1.0 | 2/19/03     | 24                       | --               | --                | --              | --            |
| EB-11-2.5 | 2/19/03     | 420                      | --               | --                | --              | --            |
| EB-11-5.0 | 2/19/03     | 2.0                      | --               | --                | --              | --            |
| PB-14-2   | 1/8/02      | 98                       | <2.0             | 38.3              | 33.5            | 179           |

Table A-4. Soil Analytical Results, LUFT 5 Metals  
East Block

| Sample ID                            | Sample Date | LEAD<br>(Total)<br>mg/kg | Cadmium<br>mg/kg | Chromium<br>mg/kg | Nickel<br>mg/kg | Zinc<br>mg/kg |
|--------------------------------------|-------------|--------------------------|------------------|-------------------|-----------------|---------------|
| PB-14-5                              | 1/8/02      | 2.0                      | < 2.0            | 27.4              | 18.8            | 14            |
| PB-14-8                              | 1/8/02      | 7.0                      | < 2.0            | 44.4              | 29.4            | 24            |
| PB-15-5                              | 1/8/02      | < 2.0                    | < 2.0            | 22                | 11.9            | 11            |
| PB-15-8                              | 1/8/02      | 2.0                      | < 2.0            | 26.6              | 27              | 18            |
| PB-16-3                              | 1/8/02      | 6.0                      | < 2.0            | 24                | 14.3            | 16            |
| PB-16-10                             | 1/8/02      | 3.0                      | < 2.0            | 54.2              | 32.5            | --            |
| PB-17-2                              | 1/8/02      | 485                      | < 2.0            | 21.7              | 14.7            | 314           |
| PB-17-5                              | 1/8/02      | 2.0                      | < 2.0            | 22.9              | 13.6            | 11            |
| PB-17-8                              | 1/8/02      | 21                       | < 2.0            | 24.8              | 15.7            | 35            |
| PB-18-5                              | 1/8/02      | < 2.0                    | < 2.0            | 20.5              | 13.2            | 11            |
| PB-18-8                              | 1/8/02      | 172                      | < 2.0            | 32.1              | 20.4            | 237           |
| PB-19-2                              | 1/8/02      | 2,280                    | 2.5              | 27.6              | 22.1            | 995           |
| PB-19-5                              | 1/8/02      | 3.0                      | < 2.0            | 20.3              | 12              | 15            |
| PB-19-8                              | 1/8/02      | 2.0                      | < 2.0            | 25.7              | 25.4            | 17            |
| PB-20-5                              | 1/8/02      | 3.0                      | < 2.0            | 22.8              | 12.8            | 14            |
| PB-20-12                             | 1/8/02      | 2.0                      | < 2.0            | 31.6              | 27.7            | 20            |
| T-4E-0.5                             | 7/1/02      | 180                      | --               | --                | --              | --            |
| T-4E-1.5                             | 7/1/02      | 380                      | --               | --                | --              | --            |
| T-4W-0.5                             | 7/1/02      | 220                      | --               | --                | --              | --            |
| T-4W-1.5                             | 7/1/02      | 140                      | --               | --                | --              | --            |
| T-5E-0.5                             | 7/2/02      | 150                      | --               | --                | --              | --            |
| T-5E-1.5                             | 7/3/02      | 570                      | --               | --                | --              | --            |
| T-5W-0.5                             | 7/2/02      | 24                       | --               | --                | --              | --            |
| T-5W-1.5                             | 7/3/02      | 520                      | --               | --                | --              | --            |
| T-8E-0.5                             | 7/1/02      | 130                      | --               | --                | --              | --            |
| T-8E-1.5                             | 7/1/02      | 50                       | --               | --                | --              | --            |
| T-8W-0.5                             | 7/1/02      | 71                       | --               | --                | --              | --            |
| T-8W-1.5                             | 7/1/02      | 160                      | --               | --                | --              | --            |
| Maximum                              |             | 2280                     | 3.2              | 54.2              | 54              | 995           |
| Average                              |             | 152.4824                 | 1.529375         | 23.8758621        | 18.26552        | 103.2857      |
| Standard Deviation                   |             | 335.508                  | 0.7820772        | 12.0236866        | 10.312          | 195.1201      |
| Sample Count                         |             | 91                       | 32               | 29                | 29              | 28            |
| Detected Count                       |             | 86                       | 16               | 28                | 29              | 28            |
| t-value                              |             | 1.663                    | 1.697            | 1.701             | 1.701           | 1.703         |
| 95% UCL                              |             | 211.0                    | 1.8              | 27.7              | 21.5            | 166.1         |
| Exposure Point Concentration (mg/kg) |             | 211.0                    | 1.8              | 27.7              | 21.5            | 166.1         |
| Background (mg/kg)*                  |             | 27                       | 5.6              | 100               | 170             | 110           |
| Background Basis**                   |             | 95th                     | 99th             | 95th              | 95th            | 95th          |
| Soil EPC > Background Concentrations |             | Yes                      | No               | No                | No              | Yes           |
| Final Soil EPC                       |             | 210.9714                 | BKG              | BKG               | BKG             | 166.0825      |

Notes:

If sample count <10, then maximum value used for exposure point concentration and 95% UCL, average, and standard deviation were not calculated

Exposure point concentration is lower of 95% UCL and maximum, unless 95% UCL was not calculated

\* = Lawrence Berkeley National Laboratory. 2002. Analysis of Background Distributions of Metals in the Soil at the Lawrence Berkeley National Laboratory. Environmental Restoration Program. June.

\*\* = 95th Percentile used if available. 99th Percentile used if 95th Percentile was not available.

BKG = EPC value is less than background value

EPC = Exposure Point Concentration

-- = Not analyzed

< = Not detected, less detection limit noted

UCL = Upper confidence limit of the arithmetic mean, assuming a normal data distribution

mg/kg = milligrams per kilogram

Table A-5. Soil Analytical Results, CAM 17 Metals  
East Block

| Sample ID                            | Sample Date | Antimony<br>mg/kg | Arsenic<br>mg/kg | Barium<br>mg/kg | Beryllium<br>mg/kg | Cobalt<br>mg/kg | Copper<br>mg/kg | Molybdenum<br>mg/kg | Selenium<br>mg/kg | Silver<br>mg/kg | Thallium<br>mg/kg | Vanadium<br>mg/kg | Mercury<br>mg/kg |
|--------------------------------------|-------------|-------------------|------------------|-----------------|--------------------|-----------------|-----------------|---------------------|-------------------|-----------------|-------------------|-------------------|------------------|
| EB-1-1.0                             | 2/18/03     | < 2.0             | 6.9              | 82              | < 0.5              | 6.2             | 23              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 26                | 0.45             |
| EB-2-0.0                             | 2/18/03     | < 2.0             | 2.6              | 72              | < 0.5              | 5.4             | 6.3             | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 18                | < 0.5            |
| EB-6-1.0                             | 2/19/03     | < 2.0             | 4.8              | 65              | < 0.5              | 7.6             | 150             | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 24                | 0.19             |
| EB-10-1.0                            | 2/19/03     | < 2.0             | 6.5              | 77              | < 0.5              | 5.4             | 13              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 22                | 0.17             |
| PB-14-2                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 50.7            | < 5.0               | < 2.0             | < 4.0           | < 4.0             | < 20              | < 0.3            |
| PB-14-5                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 4.9             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | 22                | < 0.3            |
| PB-14-8                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 6               | < 5.0               | < 2.0             | < 4.0           | < 4.0             | 27                | < 0.3            |
| PB-15-5                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 4.8             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | < 20              | < 0.3            |
| PB-15-8                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 5.6             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | 22                | < 0.3            |
| PB-16-3                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 5.6             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | < 20              | < 0.3            |
| PB-16-10                             | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 7.3             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | 28                | < 0.3            |
| PB-17-2                              | 1/8/02      | < 4.0             | 4.5              | 210             | < 2.0              | < 10.0          | 50.2            | < 5.0               | < 2.0             | < 4.0           | < 4.0             | < 20              | 0.4              |
| PB-17-5                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 5               | < 5.0               | < 2.0             | < 4.0           | < 4.0             | < 20              | < 0.3            |
| PB-17-8                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 9.6             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | < 20              | < 0.3            |
| PB-18-5                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 4.7             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | < 20              | < 0.3            |
| PB-18-8                              | 1/8/02      | < 4.0             | 4.7              | 124             | < 2.0              | < 10.0          | 46.8            | < 5.0               | < 2.0             | < 4.0           | < 4.0             | 20                | 0.9              |
| PB-19-2                              | 1/8/02      | < 4.0             | 4.6              | 744             | < 2.0              | < 10.0          | 76.3            | < 5.0               | < 2.0             | < 4.0           | < 4.0             | 32                | < 0.3            |
| PB-19-5                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 5.1             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | < 20              | < 0.3            |
| PB-19-8                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 5.3             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | 20                | < 0.3            |
| PB-20-5                              | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 8.3             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | < 20              | < 0.3            |
| PB-20-12                             | 1/8/02      | < 4.0             | < 4.0            | < 80            | < 2.0              | < 10.0          | 6.2             | < 5.0               | < 2.0             | < 4.0           | < 4.0             | 25                | < 0.3            |
| Maximum                              |             | ND                | 6.9              | 744             | ND                 | 7.6             | 150             | ND                  | ND                | ND              | ND                | 32                | 0.9              |
| Average                              |             | --                | 2.98             | 92.10           | --                 | 5.22            | 23.56           | --                  | --                | --              | --                | 17.90             | 0.21             |
| Standard Deviation                   |             | --                | 1.62             | 154.82          | --                 | 0.61            | 35.49           | --                  | --                | --              | --                | 7.61              | 0.18             |
| Sample Count                         |             | 21                | 21               | 21              | 21                 | 21              | 21              | 21                  | 21                | 21              | 21                | 21                | 21               |
| Detected Count                       |             | 0                 | 7                | 7               | 0                  | 4               | 21              | 0                   | 0                 | 0               | 0                 | 12                | 5                |
| t-value                              |             | NA                | 1.725            | 1.725           | 1.725              | 1.725           | 1.725           | 1.725               | 1.725             | 1.725           | 1.725             | 1.725             | 1.725            |
| 95% UCL                              |             | --                | 3.6              | 150.4           | --                 | 5.4             | 36.9            | --                  | --                | --              | --                | 20.8              | 0.3              |
| Exposure Point Concentration (mg/kg) |             | ND                | 3.6              | 150.4           | ND                 | 5.4             | 36.9            | ND                  | ND                | ND              | ND                | 20.8              | 0.3              |
| Background (mg/kg)*                  |             | 27                | 27               | 27              | 27                 | 27              | 27              | 27                  | 27                | 27              | 27                | 27                | 27               |
| Background Basis**                   |             | 95th              | 95th             | 95th            | 95th               | 95th            | 95th            | 95th                | 95th              | 95th            | 95th              | 95th              | 95th             |
| Soil EPC > Background Concentrations |             | ND                | No               | Yes             | ND                 | No              | Yes             | ND                  | ND                | ND              | ND                | No                | No               |
| Final Soil EPC                       |             | ND                | BKG              | 150.372         | ND                 | BKG             | 36.9153         | ND                  | ND                | ND              | ND                | BKG               | BKG              |

Notes:

If sample count <10, then maximum value used for exposure point concentration and 95% UCL, average, and standard deviation were not calculated  
Exposure point concentration is lower of 95% UCL and maximum, unless 95% UCL was not calculated

\* = Lawrence Berkeley National Laboratory. 2002. Analysis of Background Distributions of Metals in the Soil at the Lawrence Berkeley National Laboratory. Environmental Restoration Program. June.

\*\* = 95th Percentile used if available. 99th Percentile used if 95th Percentile was not available.

BKG = EPC value is less than background value

EPC = Exposure Point Concentration

-- = Not analyzed

< = Not detected, less detection limit noted

UCL = Upper confidence limit of the arithmetic mean, assuming a normal data distribution

mg/kg = milligrams per kilogram

Table A-6. Soil Analytical Results, Organic Compounds  
East Block

| Sample ID                            | Sample Date | Aldrin<br>ug/kg | Dieldrin<br>ug/kg | Endrin*<br>ug/kg | 4,4 -DDD<br>ug/kg | 4,4 -DDT<br>ug/kg | 4,4 -DDE<br>ug/kg | alpha-<br>BHC<br>ug/kg |
|--------------------------------------|-------------|-----------------|-------------------|------------------|-------------------|-------------------|-------------------|------------------------|
| B-1-0.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-1-2.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-2-3.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-3-2.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-5-0.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-5-1.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-5-3.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-6-0.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-7-0.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-7-1.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-8-0.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-8-2.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-9-0.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-9-2.5                              | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-14-3.5                             | 5/4/02      | --              | --                | --               | --                | --                | --                | --                     |
| B-23-1.5                             | 8/13/02     | --              | --                | --               | --                | --                | --                | --                     |
| B-24-1.5                             | 8/13/02     | --              | --                | --               | --                | --                | --                | --                     |
| B-25-1.5                             | 8/13/02     | --              | --                | --               | --                | --                | --                | --                     |
| EB-1-1.0                             | 2/18/03     | < 2.0           | < 2.0             | < 2.0            | < 2.0             | < 2.0             | < 2.0             | < 2.0                  |
| EB-1-2.5                             | 2/18/03     | --              | --                | --               | --                | --                | --                | --                     |
| EB-3-2.5                             | 2/19/03     | --              | --                | --               | --                | --                | --                | --                     |
| EB-3-5.0                             | 2/19/03     | --              | --                | --               | --                | --                | --                | --                     |
| EB-5-2.5                             | 2/19/03     | --              | --                | --               | --                | --                | --                | --                     |
| EB-5-5.0                             | 2/19/03     | --              | --                | --               | --                | --                | --                | --                     |
| EB-6-1.0                             | 2/19/03     | < 2.0           | < 2.0             | < 2.0            | < 2.0             | < 2.0             | < 2.0             | < 2.0                  |
| EB-7-1.0                             | 2/19/03     | --              | --                | --               | --                | --                | --                | --                     |
| EB-7-2.5                             | 2/19/03     | --              | --                | --               | --                | --                | --                | --                     |
| EB-11-1.0                            | 2/19/03     | --              | --                | --               | --                | --                | --                | --                     |
| PB-14-2                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-14-5                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-14-8                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-15-5                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-15-8                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-16-2                              | 1/8/02      | nd              | nd                | nd               | nd                | nd                | nd                | nd                     |
| PB-16-3                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-16-10                             | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-17-2                              | 1/8/02      | nd              | nd                | nd               | nd                | nd                | nd                | nd                     |
| PB-17-5                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-17-8                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-18-5                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-18-8                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-19-2                              | 1/8/02      | nd              | nd                | nd               | nd                | nd                | nd                | nd                     |
| PB-19-5                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-19-8                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-20-5                              | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| PB-20-12                             | 1/8/02      | --              | --                | --               | --                | --                | --                | --                     |
| Maximum                              |             | ND              | ND                | ND               | ND                | ND                | ND                | ND                     |
| Average                              |             | --              | --                | --               | --                | --                | --                | --                     |
| Standard Deviation                   |             | --              | --                | --               | --                | --                | --                | --                     |
| Sample Count                         |             | NA              | NA                | NA               | NA                | NA                | NA                | NA                     |
| Detected Count                       |             | 0               | 0                 | 0                | 0                 | 0                 | 0                 | 0                      |
| t-value                              |             | --              | --                | --               | --                | --                | --                | --                     |
| 95% UCL                              |             | --              | --                | --               | --                | --                | --                | --                     |
| Exposure Point Concentration (ug/kg) |             | ND              | ND                | ND               | ND                | ND                | ND                | ND                     |

Notes:

Exposure point concentration is lower of 95% UCL and maximum, unless 95% UCL was not calculated

EPC = Exposure Point Concentration

-- = Not analyzed

ND = Not detected, less detection limit noted

UCL = Upper confidence limit of the arithmetic mean, assuming a normal data distribution

ug/kg = micrograms per kilogram

Table A-7. Soil Analytical Results, LUFT 5 Metals  
Parcel A of the West Block

| Sample ID                            | Sample Date | LEAD<br>(Total)<br>mg/kg | Cadmium<br>mg/kg | Chromium<br>mg/kg | Nickel<br>mg/kg | Zinc<br>mg/kg |
|--------------------------------------|-------------|--------------------------|------------------|-------------------|-----------------|---------------|
| B-10-0.5                             | 5/4/02      | 140                      | --               | --                | --              | --            |
| B-10-1.5                             | 5/4/02      | 99                       | --               | --                | --              | --            |
| B-10-2.5                             | 5/4/02      | < 5.0                    | --               | --                | --              | --            |
| B-13-0.5                             | 5/4/02      | 140                      | --               | --                | --              | --            |
| B-13-1.5                             | 5/4/02      | 43                       | --               | --                | --              | --            |
| B-13-2.5                             | 5/4/02      | 5.6                      | --               | --                | --              | --            |
| B15-0.0                              | 8/13/02     | 110                      | --               | --                | --              | --            |
| B15-1.5                              | 8/13/02     | 5.9                      | --               | --                | --              | --            |
| B16-0                                | 8/13/02     | 150                      | --               | --                | --              | --            |
| B16-1.5                              | 8/13/02     | 15                       | --               | --                | --              | --            |
| B17-0                                | 8/13/02     | 150                      | --               | --                | --              | --            |
| B17-1.5                              | 8/13/02     | 2.4                      | --               | --                | --              | --            |
| B18-0                                | 8/13/02     | 120                      | --               | --                | --              | --            |
| B18-1.5                              | 8/13/02     | 2.4                      | --               | --                | --              | --            |
| B19-0                                | 8/13/02     | 130                      | --               | --                | --              | --            |
| B19-1.5                              | 8/13/02     | 61                       | --               | --                | --              | --            |
| B20-0.0                              | 8/13/02     | 160                      | --               | --                | --              | --            |
| B20-1.5                              | 8/13/02     | 110                      | --               | --                | --              | --            |
| WB-1-1.0                             | 2/18/03     | 9.9                      | 1.5              | 8.8               | 17              | 35            |
| WB-1-2.5                             | 2/18/03     | 49                       | --               | --                | --              | --            |
| WB-1-5.0                             | 2/18/03     | 6.8                      | --               | --                | --              | --            |
| WB-9-1.0                             | 2/18/03     | 180                      | 1.5              | 27                | 18              | 140           |
| WB-9-2.5                             | 2/18/03     | 12                       | --               | --                | --              | --            |
| WB-9-5.0                             | 2/18/03     | 1.9                      | --               | --                | --              | --            |
| Maximum                              |             | 180                      | 1.5              | 27                | 18              | 140           |
| Average                              |             | 71.1                     | NA               | NA                | NA              | NA            |
| Standard Deviation                   |             | 64.18308                 | NA               | NA                | NA              | NA            |
| Sample Count                         |             | 24                       | 1                | 2                 | 2               | 1             |
| Detected Count                       |             | 23                       | 2                | 2                 | 2               | 2             |
| t-value                              |             | 1.714                    | NA               | 6.314             | 6.314           | 6.314         |
| 95% UCL                              |             | 93.6                     | NA               | NA                | NA              | NA            |
| Exposure Point Concentration (mg/kg) |             | 180.0                    | 1.5              | 27.0              | 18.0            | 140.0         |
| Background (mg/kg)*                  |             | 27                       | 5.6              | 100               | 100             | 100           |
| Background Basis**                   |             | 95th                     | 99th             | 95th              | 95th            | 95th          |
| Soil EPC > Background Concentrations |             | Yes                      | No               | No                | No              | Yes           |
| Final Soil EPC                       |             | 180                      | BKG              | BKG               | BKG             | 140           |

Notes:

Exposure Point Concentration was assumed to equal the maximum

\* = Lawrence Berkeley National Laboratory. 2002. Analysis of Background Distributions of  
\*\* = 95th Percentile used if available. 99th Percentile used if 95th Percentile was not available.

BKG = EPC value is less than background value

EPC = Exposure Point Concentration

-- = Not analyzed

< = Not detected, less detection limit noted

UCL = Upper confidence limit of the arithmetic mean, assuming a normal data distribution

mg/kg = milligrams per kilogram

Table A-8. Soil Analytical Results, CAM 17 Metals  
Parcel A of the West Block

| Sample ID                            | Sample Date | Antimony<br>mg/kg | Arsenic<br>mg/kg | Barium<br>mg/kg | Beryllium<br>mg/kg | Cobalt<br>mg/kg | Copper<br>mg/kg | Molybdenum<br>mg/kg | Selenium<br>mg/kg | Silver<br>mg/kg | Thallium<br>mg/kg | Vanadium<br>mg/kg | Mercury<br>mg/kg |
|--------------------------------------|-------------|-------------------|------------------|-----------------|--------------------|-----------------|-----------------|---------------------|-------------------|-----------------|-------------------|-------------------|------------------|
| WB-1-1.0                             | 2/18/03     | < 2.0             | 3.6              | 250             | 0.72               | 5.5             | 14              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 17                | 0.97             |
| WB-9-1.0                             | 2/18/03     | < 2.0             | 3.2              | 87              | < 0.5              | 3.8             | 19              | < 1.0               | < 2.0             | < 1.0           | < 1.0             | 20                | 0.19             |
| Maximum                              |             | ND                | 3.6              | 250             | 0.72               | 5.5             | 19              | ND                  | ND                | ND              | ND                | 20                | 0.97             |
| Sample Count                         |             | 0                 | 2                | 2               | 1                  | 2               | 2               | 0                   | 0                 | 0               | 0                 | 2                 | 2                |
| Exposure Point Concentration (mg/kg) |             | ND                | 3.6              | 250.0           | 0.7                | 5.5             | 19.0            | ND                  | ND                | ND              | ND                | 20.0              | 1.0              |
| Background (mg/kg)*                  |             | 10                | 14               | 14              | 0.9                | 22              | 53              | 5                   | 5.1               | 3               | 10                | 77                | 0.5              |
| Background Basis**                   |             | 99th              | 95th             | 95th            | 95th               | 95th            | 95th            | 99th                | 99th              | 99th            | 99th              | 95th              | 95th             |
| Soil EPC > Background Concentrations |             | ND                | No               | Yes             | No                 | No              | No              | ND                  | ND                | ND              | ND                | No                | Yes              |
| Final Soil EPC                       |             | ND                | BKG              | 250             | BKG                | BKG             | BKG             | ND                  | ND                | ND              | ND                | BKG               | 0.97             |

Exposure point concentration were assumed to equal the maximum

\* = Lawrence Berkeley National Laboratory. 2002. Analysis of Background Distributions of Metals in the Soil at the Lawrence Berkeley National Laboratory. Environmental Restoration Program. June.

\*\* = 95th Percentile used if available. 99th Percentile used if 95th Percentile was not available.

BKG = EPC value is less than background value

EPC = Exposure Point Concentration



Table A-9. Soil Analytical Results, Organic Compounds  
Parcel A of the West Block

| Sample ID                            | Sample Date | Aldrin ug/kg | Dieldrin ug/kg | Endrin ug/kg | Endrin Ketone ug/kg | 4,4 -DDD ug/kg | 4,4 -DDT ug/kg | 4,4 -DDE ug/kg | alpha-BHC ug/kg |
|--------------------------------------|-------------|--------------|----------------|--------------|---------------------|----------------|----------------|----------------|-----------------|
| B-10-0.5                             | 5/4/02      | < 10         | 170            | < 10         | --                  | < 10           | 12             | < 10           | < 10            |
| B-10-2.5                             | 5/4/02      | < 2.0        | < 2.0          | < 2.0        | --                  | < 2.0          | < 2.0          | < 2.0          | < 2.0           |
| B-10-3.5                             | 5/4/02      | --           | --             | --           | --                  | --             | --             | --             | --              |
| B-13-0.5                             | 5/4/02      | < 10         | < 10           | < 10         | --                  | < 10           | 19             | 15             | < 10            |
| B15-0.0                              | 8/13/02     | <10          | 16             | <10          | --                  | < 10           | 16             | <10            | <10             |
| B16-0                                | 8/13/02     | <10          | 18             | <10          | --                  | < 10           | <10            | <10            | <10             |
| B16-1.5                              | 8/13/02     | <10          | 14             | <10          | --                  | < 10           | <10            | <10            | <10             |
| B17-0                                | 8/13/02     | <10          | <10            | <10          | --                  | < 10           | <10            | <10            | <10             |
| B18-0                                | 8/13/02     | <10          | <10            | <10          | --                  | < 10           | <10            | <10            | <10             |
| B19-0                                | 8/13/02     | <10          | 25             | <10          | --                  | < 10           | <10            | <10            | <10             |
| B19-1.5                              | 8/13/02     | <10          | <10            | <10          | --                  | < 10           | <10            | <10            | <10             |
| B20-0.0                              | 8/13/02     | <10          | <10            | <10          | --                  | < 10           | 22             | <10            | <10             |
| B20-1.5                              | 8/13/02     | <10          | <10            | <10          | --                  | < 10           | 21             | <10            | <10             |
| WB-1-1.0                             | 2/18/03     | 190          | 230            | <10          | 58                  | < 10           | < 10           | < 10           | < 10            |
| WB-1-2.5                             | 2/18/03     | 4,800        | 1,900          | < 500        | < 500               | < 500          | < 500          | < 500          | < 500           |
| WB-9-1.0                             | 2/18/03     | < 2.0        | 3.0            | < 2.0        | < 2.0               | < 2.0          | 20             | 2.5            | < 2.0           |
| WB-9-2.5                             | 2/18/03     | --           | --             | --           | --                  | --             | --             | --             | --              |
| WB-9-5.0                             | 2/18/03     | --           | --             | --           | --                  | --             | --             | --             | --              |
| Maximum                              |             | 4800         | 1900           | ND           | 58                  | ND             | 22             | 15             | ND              |
| Average                              |             | 336.47       | 160.47         | --           | NA                  | --             | 26.40          | 21.57          | --              |
| Standard Deviation                   |             | 1235.73      | 486.03         | 63.42        | NA                  | 63.42          | 62.28          | 63.26          | 63.42           |
| Sample Count                         |             | 15           | 15             | 15           | 3                   | 15             | 15             | 15             | 15              |
| Detected Count                       |             | 2            | 8              | 0            | 1                   | 0              | 6              | 2              | 0               |
| t-value                              |             | 1.761        | 1.761          | 1.761        | 2.92                | 1.761          | 1.761          | 1.761          | 1.761           |
| 95% UCL                              |             | 898.3        | 381.5          | --           | NA                  | --             | 54.7           | 50.3           | --              |
| Exposure Point Concentration (ug/kg) |             | 4800.0       | 1900.0         | ND           | 58.0                | ND             | 22.0           | 15.0           | ND              |

ug/kg = micrograms per kilogram  
EPC = maximum concentration  
EPC = Exposure Point Concentration

Table A-10. Groundwater Analytical Results, Metals

| Sample ID | Sample Date | Cadmium ug/l | Chromium ug/l | Lead ug/l | Nickel ug/l | Zinc ug/l | Barium ug/l | Cobalt ug/l | Molybdenum ug/l |
|-----------|-------------|--------------|---------------|-----------|-------------|-----------|-------------|-------------|-----------------|
| B-5-GW    | 5/4/02      | <2           | <5            | <5        | 11          | 23        | --          | --          | --              |
| B-7-GW    | 5/4/02      | <2           | <5            | <5        | 16          | 27        | --          | --          | --              |
| B-10-GW   | 5/4/02      | <2           | <5            | <5        | <5          | 26        | --          | --          | --              |
| B-12-GW   | 5/4/02      | <2           | <5            | <5        | <5          | 16        | --          | --          | --              |
| PB-14-W   | 1/8/02      | nd           | nd            | nd        | 17          | nd        | 42          | 19          | 16              |
| PB-15-W   | 5/4/02      | nd           | nd            | nd        | 42          | nd        | 105         | 9           | 3               |
| PB-16-W   | 5/4/02      | nd           | nd            | nd        | 37          | nd        | 52          | 31          | 43              |
| PB-17-W   | 5/4/02      | nd           | nd            | nd        | 58          | nd        | 89          | 57          | 50              |
| PB-18-W   | 5/4/02      | nd           | nd            | nd        | 21          | nd        | 46          | 17          | 59              |
| PB-19-5   | 1/8/02      | nd           | nd            | nd        | 65          | nd        | 102         | 76          | 54              |
| PB-20-8   | 1/8/02      | nd           | nd            | nd        | 35          | nd        | 112         | 44          | 15              |
| Maximum   |             | ND           | ND            | ND        | 65          | 27        | 112         | 76          | 59              |

Results in units at top: ug/l - micrograms per liter

> 1.0 - Not detected at detection limit given, -- Not analyzed

"B-5-GW" - Groundwater sample collected by Treadwell & Rollo

"PB-14-W" - Groundwater sample collected by PSI

The following metals were also analyzed by PSI and were not detected: Antimony, Arsenic, Beryllium, Copper, Mercury, Selenium, Silver, Thallium and Vanadium

Table A-11. Groundwater Analytical Results, Organic Compounds

| Sample ID | Sample Date | TPH-G<br>mg/l | TPH-D<br>mg/l | TPH-MO<br>mg/l | Toluene<br>ug/l | Ethyl<br>Benzene<br>ug/l | Xylenes<br>ug/l | 1,2-DCA<br>ug/l | Other VOCs |
|-----------|-------------|---------------|---------------|----------------|-----------------|--------------------------|-----------------|-----------------|------------|
| B-5-GW    | 5/4/02      | 50            | 180           | < 640          | < 0.5           | < 0.5                    | < 1             | 2.1             | nd         |
| B-7-GW    | 5/4/02      | < 50          | 94            | < 630          | < 0.5           | < 0.5                    | < 1             | < 0.5           | nd         |
| B-10-GW   | 5/4/02      | < 50          | < 60          | < 600          | 1.8             | < 0.5                    | 1.6             | < 0.5           | nd         |
| B-12-GW   | 5/4/02      | < 50          | < 59          | < 590          | < 0.5           | < 0.5                    | < 1             | < 0.5           | nd         |
| PB-14-W   | 1/8/02      | < 0.05        | < 0.05        | < 0.05         | nd              | nd                       | nd              | nd              | nd         |
| PB-15-W   | 5/4/02      | < 0.05        | < 0.05        | < 0.05         | nd              | nd                       | nd              | nd              | nd         |
| PB-16-W   | 5/4/02      | < 0.05        | < 0.05        | < 0.05         | nd              | nd                       | nd              | nd              | nd         |
| PB-17-W   | 5/4/02      | < 0.05        | < 0.05        | < 0.05         | 1.0             | 1.0                      | nd              | nd              | nd         |
| PB-18-W   | 5/4/02      | < 0.05        | < 0.05        | < 0.05         | nd              | nd                       | nd              | nd              | nd         |
| PB-19-5   | 1/8/02      | < 0.05        | < 0.05        | < 0.05         | nd              | nd                       | nd              | nd              | nd         |
| PB-20-8   | 1/8/02      | < 0.05        | < 0.05        | < 0.05         | nd              | nd                       | nd              | nd              | nd         |
| Maximum   |             | 50            | 180           | ND             | 1.8             | 1                        | 1.6             | 2.1             | ND         |

Results in units at top: mg/l - milligrams per liter, ug/l - micrograms per liter

> 1.0 - Not detected at detection limit given, nd - Not detected, detection limit varies, -- Not analyzed

"B-5-GW" - Groundwater sample collected by Treadwell & Rollo

"PB-14-W" - Groundwater sample collected by PSI

TPH-G - Total Petroleum Hydrocarbons quantified as gasoline

BTEX - benzene, toluene, ethyl benzene, xylenes

TPH-D and -MO - Total Petroleum Hydrocarbons quantified as diesel and motor oil, respectively

1,2-DCA - 1,2-dichloroethane

TABLE B-1. EXPOSURE PATHWAYS EVALUATED  
Mandela Gateway Redevelopment Site  
Oakland, California

| Potential Receptor                              | Media Evaluated | Route of Exposure Evaluated   |
|---|-----------------|---|
| Construction Worker - Pre-Development           | Soil            | Inhalation - Outdoor Air (Fugitive Dusts)<br>Incidental Ingestion<br>Dermal Contact   |
|   | Groundwater     | Dermal Contact<br>Inhalation - Outdoor Air (Volatile Emissions from Standing Water)   |
| Resident - Adult and Child - Pre-Development    | Soil            | Inhalation - Outdoor Air (Fugitive Dusts)<br>Incidental Ingestion<br>Dermal Contact<br>Ingestion of Homegrown Produce (Parcel A Only) |
|   | Groundwater     | Inhalation - Indoor Air (Volatiles)   |
| Resident - Adult and Child - Post Development   | Soil            | No Complete Exposure Pathway  |
|   | Groundwater     | Inhalation - Indoor Air (Volatiles)   |
| Commercial/Industrial Worker - Pre-Development  | Soil            | Inhalation - Outdoor Air (Fugitive Dusts)<br>Incidental Ingestion<br>Dermal Contact   |
|   | Groundwater     | Inhalation - Indoor Air (Volatiles)   |
| Commercial/Industrial Worker - Post Development | Soil            | No Complete Exposure Pathway  |
|   | Groundwater     | Inhalation - Indoor Air (Volatiles)   |

TABLE B-2. PARTICULATE EMISSION FACTORS DERIVATION  
Mandela Gateway Redevelopment Site  
Oakland, California

| Parameter/Definition   | Value           | Units  | Source  |
|--|-----------------|--|---|
| Q/C - inverse of mean concentration at center of square source         | 60.03           | g/m <sup>2</sup> - sec per kg/m <sup>3</sup> | U.S. EPA 1996 - San Francisco Area (Zone II) for 5-acre Site                                  |
| V - Fraction of vegetative cover                                       | 0.5             | unitless                                     | U.S. EPA 1991b  |
| Um - Mean annual wind speed  | 4.69            | meters/sec                                   | EQ, 1994  |
| Ut - Equivalent threshold value of windspeed at 7 meters               | 11.32           | meters/sec                                   | U.S. EPA 1991b  |
| F(x) - Function dependent on Um/Ut derived using Cowherd et al. (1985) | 0.194           | unitless                                     | U.S. EPA 1991b  |
| <b>Particulate Emission Factor</b>                                     | <b>8.70E+08</b> | <b>m<sup>3</sup>/kg</b>                      | <b>U.S. EPA 1996 - Calculated - Q/C * (3600)/(0.036 * (1-V) * (Um/Ut)<sup>3</sup> * F(x))</b> |
| Dust Emission Factor   | 1.2             | tons/acre/month                              | U.S. EPA 1985 - Emissions from apartment and shopping center construction                     |
| Dust Emission Factor   | 1089            | kgs/acre/month                               | U.S. EPA 1985 - Emissions from apartment and shopping center construction                     |
| Size of Area   | 1               | acre   | Default area  |
| Length Perpendicular to Wind   | 64              | m  | one side of 1-acre area   |
| Air mixing zone height   | 2               | m  | Default assumption  |
| Time in month  | 2.63E+06        | seconds                                      | 30.4 day /month, 24 hrs/day, 60 min/hour, 60 seconds/minute                                   |
| Volume of air passing over site per month per acre                     | 1.58E+09        | m <sup>3</sup>                               | Length perpendicular * Mixing Zone Height * Time per month * average wind speed               |
| Dust Concentration in air  | 6.91E-07        | kg/m <sup>3</sup>                            | Dust Emission Factor / Volume of Air  |
| Dust Concentration in air  | 6.91E-01        | mg/m <sup>3</sup>                            | Unit Conversion   |
| Concentration of dust in soil  | 1.00E+06        | mg/kg  | 1E+06 mg/kg of dust is derived from site soil   |
| <b>Particulate Emission Factor - Construction Worker</b>               | <b>1.45E+06</b> | <b>m<sup>3</sup>/kg</b>                      | <b>Concentration of dust in soil / concentration of dust in air</b>                           |

Notes:

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U.S. EPA. 1985. Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources. Office of Air and Radiation. No. AP-42. Fourth Edition. September.

Environmental Quality Management (EQ). 1995. Limited Validation of the Jury Infinite Source and Jury Reduced Solution Finite Source Models for Emissions of Soil-Incorporated Volatile Organic Compounds. Prepared for Office of Solid Waste and Emergency Response. U.S. EPA.

TABLE B-3. OUTDOOR AIR EMISSIONS OF VOLATILE ORGANIC COMPOUNDS FROM STANDING WATER  
Mandela Gateway Redevelopment Site  
Oakland, California

| Parameter   | 1,2-Dichloroethane | Toluene  | Ethylbenzene | Xylenes  | Notes  |
|---|--------------------|----------|--------------|----------|--|
| Groundwater EPC (ug/L)  | 2.10E+00           | 1.80E+00 | 1.00E+00     | 1.60E+00 |  |
| Gas Phase Mass Transfer Coefficient of Compound (cm/sec)                      | 8.30E-01           | 8.30E-01 | 8.30E-01     | 8.30E-01 | Default - U.S. EPA 1993  |
| Henry's Law Constant at 20C (atm-m <sup>3</sup> /mole)                        | 9.80E-04           | 6.60E-03 | 7.90E-03     | 7.30E-03 | Chemical-Specific Value  |
| Temperature (K)   | 2.93E+02           | 2.93E+02 | 2.93E+02     | 2.93E+02 | 20 Degrees Celsius   |
| Ideal Gas Constant (R) (atm-m <sup>3</sup> /mole-degrees K)                   | 8.20E-05           | 8.20E-05 | 8.20E-05     | 8.20E-05 | Default  |
| Molecular Weight  | 9.90E+01           | 9.20E+01 | 9.20E+01     | 1.10E+02 | Chemical-Specific Value  |
| Gas-Phase Mass Transfer Coefficient of Water (cm <sup>2</sup> /sec)           | 8.33E-01           | 8.33E-01 | 8.33E-01     | 8.33E-01 | U.S. EPA 1995  |
| Molecular Weight of Water   | 1.80E+01           | 1.80E+01 | 1.80E+01     | 1.80E+01 |  |
| Gas-Phase Mass Transfer Coefficient (cm/sec)                                  | 4.63E-01           | 4.74E-01 | 4.74E-01     | 4.47E-01 | Calculated   |
| Molecular Weight of Oxygen  | 3.20E+01           | 3.20E+01 | 3.20E+01     | 3.20E+01 |  |
| Liquid-Phase Mass Transfer of Oxygen  | 2.00E-03           | 2.00E-03 | 2.00E-03     | 2.00E-03 | U.S. EPA 1995  |
| Liquid Phase Mass Transfer Coefficient of Compound (cm/sec)                   | 1.12E-03           | 1.16E-03 | 1.16E-03     | 1.06E-03 | Calculated   |
| Overall Mass Transfer Coefficient (cm/sec)                                    | 1.06E-03           | 1.15E-03 | 1.15E-03     | 1.05E-03 | Calculated   |
| Surface Area of Water (m <sup>2</sup> )                                       | 2.00E+01           | 2.00E+01 | 2.00E+01     | 2.00E+01 | Assumed trench dimensions of 2 m x 10 m                                |
| Conversion Factor (liters/cm <sup>3</sup> x cm <sup>2</sup> /m <sup>2</sup> ) | 1.00E+01           | 1.00E+01 | 1.00E+01     | 1.00E+01 |  |
| Emission Rate (mg/sec)  | 4.43E-04           | 4.14E-04 | 2.30E-04     | 3.37E-04 | Calculated Value   |
| Average Wind Speed in Mixing Zone (m/sec)                                     | 4.69E+00           | 4.69E+00 | 4.69E+00     | 4.69E+00 | U.S. EPA 2000 Default Value Used in Outdoor Air Volatilization Factors |
| Width of Area Perpendicular to Wind Direction (m)                             | 1.00E+01           | 1.00E+01 | 1.00E+01     | 1.00E+01 | Trench Longest Side - 10 m   |
| Mixing Height (m)   | 1.50E+00           | 1.50E+00 | 1.50E+00     | 1.50E+00 | Assumed Trench Depth - 1.5 meters                                      |
| Exposed Groundwater Outdoor Air EPC for VOCs (mg/m <sup>3</sup> )             | 6.30E-06           | 5.88E-06 | 3.27E-06     | 4.79E-06 |  |

TABLE B-4. JOHNSON AND ETTINGER MODEL PARAMETERS  
Mandela Gateway Redevelopment Site  
Oakland, California

| Parameter   | Symbol      | Value  | Units                               | Notes                        |
|---|-------------|--------|-------------------------------------|------------------------------|
| Average Soil Temperature                            | $T_S$       | 20     | $^{\circ}\text{C}$                  | Assumed Value                |
| Depth below grade to bottom of enclosed space floor | $L_P$       | 15     | cm                                  | Equal to 5.9 inches          |
| Depth below grade to water table                    | $L_{WT}$    | 243.84 | cm                                  | Site-Specific Value - 8 feet |
| Depth below grade to top of contamination           | $L_t$       | --     | cm                                  |                              |
| Depth below grade to bottom of contamination        | $L_b$       | --     | cm                                  |                              |
| Soil gas sampling depth below grade                 | $L_s$       | --     | cm                                  |                              |
| Thickness of soil stratum A                         | $h_A$       | 243.84 | cm                                  | Site-Specific Value - 8 feet |
| Thickness of soil stratum B                         | $h_B$       |        | cm                                  | Single Stratum Only          |
| Thickness of soil stratum C                         | $h_C$       |        | cm                                  | Single Stratum Only          |
| Soil stratum directly above water table             | --          | A      |                                     | Single Stratum Only          |
| SCS soil type directly above water table            | --          | S      |                                     | Site-Specific Value          |
| Soil stratum A SCS soil type                        | --          | S      |                                     | Site-Specific Value          |
| User-Defined stratum A soil vapor permeability      | $k_v$       |        | $\text{cm}^2$                       |                              |
| Stratum A soil bulk density                         | $r_b^A$     | 2.002  | $\text{g}/\text{cm}^3$              | Site-Specific Value          |
| Stratum A soil total porosity                       | $n^A$       | 0.28   | unitless                            | Site-Specific Value          |
| Stratum A soil water-filled porosity                | $q_w^A$     | 0.1    | $\text{cm}^3/\text{cm}^3$           | Site-Specific Value          |
| Stratum A soil organic carbon fraction              | $f_{oc}^A$  | --     | unitless                            | Site-Specific Value          |
| Stratum B soil bulk density                         | $r_b^B$     | --     | $\text{g}/\text{cm}^3$              | Single Stratum Only          |
| Stratum B soil total porosity                       | $n^B$       | --     | unitless                            | Single Stratum Only          |
| Stratum B soil water-filled porosity                | $q_w^B$     | --     | $\text{cm}^3/\text{cm}^3$           | Single Stratum Only          |
| Stratum B soil organic carbon fraction              | $f_{oc}^B$  | --     | unitless                            | Single Stratum Only          |
| Stratum C soil bulk density                         | $r_b^C$     | --     | $\text{g}/\text{cm}^3$              | Single Stratum Only          |
| Stratum C soil total porosity                       | $n^C$       | --     | unitless                            | Single Stratum Only          |
| Stratum C soil water-filled porosity                | $q_w^C$     | --     | $\text{cm}^3/\text{cm}^3$           | Single Stratum Only          |
| Stratum C soil organic carbon fraction              | $f_{oc}^C$  | --     | unitless                            | Single Stratum Only          |
| Enclosed space floor thickness                      | $L_{crack}$ | 15     | cm                                  | Default                      |
| Soil-Building pressure differential                 | DP          | 40     | $\text{g}/\text{cm}\cdot\text{s}^2$ | Default                      |
| Enclosed space floor length                         | $L_B$       | 961    | cm                                  | Default                      |
| Enclosed space floor width                          | $W_B$       | 961    | cm                                  | Default                      |
| Enclosed space height                               | $H_B$       | 488    | cm                                  | Default                      |
| Floor-wall seam crack width                         | w           | 0.1    | cm                                  | Default                      |
| Indoor air exchange rate (residential)              | ER          | 2      | 1/h                                 | Oakland ULRP RBCA Value      |
| Indoor air exchange rate (commercial)               | ER          | 5      | 1/h                                 | Oakland ULRP RBCA Value      |

TABLE B-5. SOIL EXPOSURE POINT CONCENTRATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

| Soil Chemicals      | West Block Soil EPC (mg/kg) | Resident and Commercial/ Industrial Worker Receptor West Block Fugitive Dust EPC (mg/m3) | Construction Worker Receptor West Block Fugitive Dust EPC (mg/m3) | East Block Soil EPC (mg/kg) | Resident and Commercial/ Industrial Worker Receptor East Block Fugitive Dust EPC (mg/m3) | Construction Worker Receptor East Block Fugitive Dust EPC (mg/m3) | West Block Parcel A Soil EPC (mg/kg) | Resident and Commercial/ Industrial Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) | Construction Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) |
|---------------------|-----------------------------|--|---|-----------------------------|--|---|--------------------------------------|---|--|
| Arsenic             | BKG                         | --   | --  | BKG                         | --   | --  | BKG                                  | --  | --   |
| Barium              | 3.00E+02                    | 3.45E-07   | 2.07E-04  | 1.50E+02                    | 1.73E-07   | 1.04E-04  | 2.50E+02                             | 2.87E-07  | 1.73E-04   |
| Beryllium           | BKG                         | --   | --  | ND                          | --   | --  | BKG                                  | --  | --   |
| Cadmium             | BKG                         | --   | --  | BKG                         | --   | --  | BKG                                  | --  | --   |
| Chromium            | BKG                         | --   | --  | BKG                         | --   | --  | BKG                                  | --  | --   |
| Cobalt              | BKG                         | --   | --  | BKG                         | --   | --  | BKG                                  | --  | --   |
| Copper              | BKG                         | --   | --  | 3.69E+01                    | 4.24E-08   | 2.55E-05  | BKG                                  | --  | --   |
| Lead                | 1.17E+02                    | 1.34E-07   | 8.08E-05  | 2.11E+02                    | 2.42E-07   | 1.46E-04  | 1.80E+02                             | 2.07E-07  | 1.24E-04   |
| Mercury             | 2.20E+00                    | 2.53E-09   | 1.52E-06  | BKG                         | --   | --  | 9.70E-01                             | 1.11E-09  | 6.70E-07   |
| Molybdenum          | ND                          | --   | --  | ND                          | --   | --  | ND                                   | --  | --   |
| Nickel              | BKG                         | --   | --  | BKG                         | --   | --  | BKG                                  | --  | --   |
| Selenium            | ND                          | --   | --  | ND                          | --   | --  | ND                                   | --  | --   |
| Vanadium            | BKG                         | --   | --  | BKG                         | --   | --  | BKG                                  | --  | --   |
| Zinc                | 1.10E+02                    | 1.26E-07   | 7.60E-05  | 1.66E+02                    | 1.91E-07   | 1.15E-04  | 1.40E+02                             | 1.61E-07  | 9.67E-05   |
| Aldrin              | 3.09E-01                    | 3.55E-10   | 2.13E-07  | ND                          | --   | --  | 4.80E+00                             | 5.52E-09  | 3.32E-06   |
| Alpha-BHC (Lindane) | 2.20E-03                    | 2.53E-12   | 1.52E-09  | ND                          | --   | --  | ND                                   | --  | --   |
| DDD                 | 2.20E-03                    | 2.53E-12   | 1.52E-09  | ND                          | --   | --  | ND                                   | --  | --   |
| DDE                 | 4.32E-01                    | 4.96E-10   | 2.98E-07  | ND                          | --   | --  | 1.50E-02                             | 1.72E-11  | 1.04E-08   |
| DDT                 | 9.02E-01                    | 1.04E-09   | 6.23E-07  | ND                          | --   | --  | 2.20E-02                             | 2.53E-11  | 1.52E-08   |
| Dieldrin            | 1.94E-01                    | 2.23E-10   | 1.34E-07  | ND                          | --   | --  | 1.90E+00                             | 2.18E-09  | 1.31E-06   |
| Endrin              | 2.16E-01                    | 2.49E-10   | 1.49E-07  | ND                          | --   | --  | ND                                   | --  | --   |
| Endrin Ketone       | ND                          | --   | --  | ND                          | --   | --  | 5.80E-02                             | 6.67E-11  | 4.01E-08   |

BHC = Benzene Hexachloride  
 DDD = Dichlorodiphenyldichoroethane  
 DDE = Dichlorodiphenyldichoroethene  
 DDT = Dichlorodiphenyltrichoroethane  
 mg/kg = milligrams per kilogram  
 mg/m3 = milligrams per cubic meter



TABLE B-6. GROUNDWATER EXPOSURE POINT CONCENTRATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

| Groundwater Chemicals | Groundwater EPC (ug/L) | Resident and Receptor Indoor Air EPC (mg/m3) | Commercial/Industrial Worker Receptor Indoor Air EPC (mg/m3) | Construction Worker Receptor Standing Water Outdoor Air EPC (mg/m3) |
|-----------------------|------------------------|--|--|---|
| 1,2-Dichloroethane    | 2.10E+00               | 6.00E-07                                     | 2.40E-07   | 6.30E-06  |
| Toluene               | 1.80E+00               | 9.28E-07                                     | 3.71E-07   | 5.88E-06  |
| Ethylbenzene          | 1.00E+00               | 4.94E-07                                     | 1.98E-07   | 3.27E-06  |
| Xylenes               | 1.60E+00               | 7.67E-07                                     | 3.07E-07   | 4.79E-06  |
| Barium                | 1.12E+02               | NA   | NA   | NA  |
| Cobalt                | 7.60E+01               | NA   | NA   | NA  |
| Molybdenum            | 5.90E+01               | NA   | NA   | NA  |
| Nickel                | 6.50E+01               | NA   | NA   | NA  |
| Zinc                  | 2.70E+01               | NA   | NA   | NA  |

NA = Not Applicable

ug/L = Micrograms per liter

mg/m3 = Milligrams per cubic meter

TABLE B-7. SOIL DERMAL ABSORPTION FACTORS AND WATER PERMEABILITY COEFFICIENTS  
Mandela Gateway Redevelopment Site  
Oakland, California

| Chemicals           | Chemical-Specific<br>Soil Dermal Absorption<br>Factor* | Chemical-Specific<br>Water Permeability<br>Coefficient<br>(cm/hr)** |
|---------------------|--|---|
| Arsenic             | 0.03   | NA  |
| Barium              | 0.01   | 1.00E-03  |
| Beryllium           | 0.01   | NA  |
| Cadmium             | 0.001  | NA  |
| Chromium            | 0.01   | NA  |
| Cobalt              | 0.01   | 1.00E-03  |
| Copper              | 0.01   | NA  |
| Lead                | 0.01   | NA  |
| Mercury             | 0.01   | NA  |
| Molybdenum          | 0.01   | 1.00E-03  |
| Nickel              | 0.01   | 2.00E-04  |
| Selenium            | 0.01   | NA  |
| Vanadium            | 0.01   | NA  |
| Zinc                | 0.01   | 6.00E-04  |
| Aldrin              | 0.05   | NA  |
| Alpha-BHC (Lindane) | 0.05   | NA  |
| DDD                 | 0.05   | NA  |
| DDE                 | 0.05   | NA  |
| DDT                 | 0.05   | NA  |
| Dieldrin            | 0.05   | NA  |
| Endrin              | 0.05   | NA  |
| Endrin Ketone       | 0.05   | NA  |
| 1,2-Dichloroethane  | 0.1  | 1.00E-01  |
| Toluene             | 0.1  | 7.80E-01  |
| Ethylbenzene        | 0.1  | 1.20E+00  |
| Xylenes             | 0.1  | 1.40E+00  |

Notes:

NA = Not Applicable - chemical not detected in groundwater

Reference:

\* State of California Environmental Protection Agency.  
Department of Toxic Substances Control. 1994. Preliminary  
Endangerment Assessment Guidance Manual. January.

\*\*U.S. Environmental Protection Agency. 2001. Risk  
Assessment Guidance for Superfund, Volume I: Human Health  
Evaluation Manual (Part E, Supplemental Guidance for Dermal  
Risk Assessment). Interim Review Draft - For Public Comment.  
EPA/540/R/99-005. September. (95% UCLs) - Assumed values  
for cobalt and molybdenum of 1E-03.

TABLE B-8. EXPOSURE PARAMETERS  
Mandela Gateway Redevelopment Site  
Oakland, California

| Construction Worker Variables                                 | Acronym               | Units                  | Values        | Source  |
|---|-----------------------|------------------------|---------------|---|
| Inhalation Rate - Construction Worker                         | CW IR                 | m <sup>3</sup> /day    | 20            | Cal EPA 1992 - Total commercial/industrial work day default value   |
| Ingestion Rate - Construction Worker                          | CW Ing                | mg/day                 | 480           | U.S. EPA 1997 - Assumed outdoor soil ingestion rate for adults engaged in yardwork or other physical activity |
| Unit conversion factor  | CF                    | kg/mg                  | 1.00E-06      | NA  |
| Soil Fraction Ingested  | FI                    | Unitless               | 1             | U.S. EPA 1991   |
| Skin Surface Area - Construction Worker                       | CW SA                 | cm <sup>2</sup> /day   | 3160          | DTSC 2000   |
| Groundwater Dermal Exposure Duration - Construction Worker    | WDED                  | hours                  | 0.5           | Professional Judgement  |
| Skin adherence factor - Construction Worker                   | SAF                   | mg/cm <sup>2</sup>     | 0.24          | Holmes et. al. 1999 - Maximum Geometric Mean value for soil loading (hands) for construction workers          |
| Unit conversion factor  | CF                    | liters/cm <sup>3</sup> | 1.00E-03      | NA  |
| Exposure Frequency - Construction Worker                      | CW EF                 | days/year              | 250           | U.S. EPA 1991, Cal EPA 1992   |
| Exposure Duration - Construction Worker                       | CW ED                 | years                  | 2             | Site-Specific Construction Duration   |
| Body Weight - Construction Worker                             | CW BW                 | kg                     | 70            | U.S. EPA 1991 / Cal EPA 1992  |
| Averaging Time-Non-carcinogenic - Construction Worker         | CW ATnon-carc         | days                   | 730           | Calculated  |
| Averaging Time-Carcinogenic                                   | AT <sub>carc</sub>    | days                   | 25550         | U.S. EPA 1991 / Cal EPA 1992  |
| <b>Adult Resident Variables</b>                               | <b>Acronym</b>        | <b>Units</b>           | <b>Values</b> | <b>Source</b>   |
| Inhalation Rate - Adult Resident                              | AdRes IR              | m <sup>3</sup> /day    | 20            | U.S. EPA 1997 / Cal EPA 1992 / U.S. EPA 1991  |
| Ingestion Rate - Adult Resident                               | AdRes Ing             | mg/day                 | 100           | Cal EPA 1992 / U.S. EPA 1991 - default adult residential value  |
| Unit conversion factor  | CF                    | kg/mg                  | 1.00E-06      | NA  |
| Fraction Ingested   | FI                    | Unitless               | 1             | U.S. EPA 1991   |
| Skin Surface Area - Adult Resident                            | AdRes SA              | cm <sup>2</sup> /day   | 5800          | Cal EPA 1992 - Default adult residential value  |
| Skin adherence factor - Adult Resident                        | SAF                   | mg/cm <sup>2</sup>     | 0.2           | Holmes et. al. 1999 - Maximum geometric mean value for soil loading (hands) for gardeners                     |
| Exposure Frequency - Adult Resident                           | AdRes EF              | days/year              | 350           | Cal EPA 1992 / U.S. EPA 1991 - default residential value  |
| Exposure Duration - Adult Resident                            | AdRes ED              | years                  | 24            | Cal EPA 1992 / U.S. EPA 1991 - default adult residential when child resident is 6 years (30 years total)      |
| Body Weight - Adult Resident                                  | AdRes BW              | kg                     | 70            | U.S. EPA 1991 / Cal EPA 1992 - default adult value  |
| Averaging Time-Noncarcinogenic - Adult Resident               | AdRes ATnon-carc      | days                   | 8760          | Calculated  |
| Averaging Time-Carcinogenic                                   | AT <sub>carc</sub>    | days                   | 25550         | U.S. EPA 1991 / Cal EPA 1992  |
| <b>Child Resident Variables</b>                               | <b>Acronym</b>        | <b>Units</b>           | <b>Values</b> | <b>Source</b>   |
| Inhalation Rate - Child Resident                              | ChRes IR              | m <sup>3</sup> /day    | 10            | U.S. EPA 1997 - default child 6-8 years of age mean recommended inhalation rate                               |
| Ingestion Rate - Child Resident                               | ChRes Ing             | mg/day                 | 200           | Cal EPA 1992 / U.S. EPA 1991 - default child residential value  |
| Unit conversion factor  | CF                    | kg/mg                  | 1.00E-06      | NA  |
| Fraction Ingested   | FI                    | Unitless               | 1             | U.S. EPA 1991   |
| Skin Surface Area - Child Resident                            | ChRes SA              | cm <sup>2</sup> /day   | 2000          | Cal EPA 1992 - default child residential value  |
| Skin adherence factor - Child Resident                        | SAF                   | mg/cm <sup>2</sup>     | 0.15          | Holmes et. al. 1999 - Maximum Geometric Mean value for soil loading (hands) for daycare kids                  |
| Exposure Frequency - Child Resident                           | ChRes EF              | days/year              | 350           | Cal EPA 1992 / U.S. EPA 1991 - default residential value  |
| Exposure Duration - Child Resident                            | ChRes ED              | years                  | 6             | Cal EPA 1992 / U.S. EPA 1991 - default child residential when adult resident is 6 years (30 years total)      |
| Body Weight - Child Resident                                  | ChRes BW              | kg                     | 15            | U.S. EPA 1991 / Cal EPA 1992 - default child value  |
| Averaging Time-Noncarcinogenic - Child Resident               | ChRes ATnon-carc      | days                   | 2190          | Calculated  |
| Averaging Time-Carcinogenic                                   | AT <sub>carc</sub>    | days                   | 25550         | U.S. EPA 1991 / Cal EPA 1992  |
| <b>Commercial/Industrial Worker Variables</b>                 | <b>Acronym</b>        | <b>Units</b>           | <b>Values</b> | <b>Source</b>   |
| Inhalation Rate - Commercial/Industrial Worker                | Comm/Ind W IR         | m <sup>3</sup> /day    | 20            | Cal EPA 1992 - Total commercial/industrial work day default value   |
| Ingestion Rate - Commercial/Industrial Worker                 | Comm/Ind W Ing        | mg/day                 | 100           | Cal EPA 1992 - Equivalent to an agricultural worker   |
| Unit conversion factor  | CF                    | kg/mg                  | 1.00E-06      | NA  |
| Soil Fraction Ingested  | FI                    | Unitless               | 1             | U.S. EPA 1991   |
| Skin Surface Area - Commercial/Industrial Worker              | Comm/Ind W SA         | cm <sup>2</sup> /day   | 3160          | DTSC 2000 - Equal to Construction Worker  |
| Skin adherence factor - Commercial/Industrial Worker          | SAF                   | mg/cm <sup>2</sup>     | 0.24          | Holmes et. al. 1999 - Maximum Geometric Mean value for soil loading (hands)                                   |
| Exposure Frequency - Commercial/Industrial Worker             | Comm/Ind W EF         | days/year              | 250           | Cal EPA 1992 - default commercial/industrial value  |
| Exposure Duration - Commercial/Industrial Worker              | Comm/Ind W ED         | years                  | 25            | Cal EPA 1992 - default commercial/industrial value  |
| Body Weight - Commercial/Industrial Worker                    | Comm/Ind W BW         | kg                     | 70            | U.S. EPA 1991 / Cal EPA 1992  |
| Averaging Time-Noncarcinogenic - Commercial/Industrial Worker | Comm/Ind W ATnon-carc | days                   | 9125          | Calculated  |
| Averaging Time-Carcinogenic                                   | AT <sub>carc</sub>    | days                   | 25550         | U.S. EPA 1991 / Cal EPA 1992  |

Notes:

m<sup>3</sup> = Cubic meter

ug = Microgram

mg = Milligram

kg = Kilogram

cm<sup>2</sup> = square centimeter.

U.S. EPA 1997 - Exposure Factors Handbook

U.S. EPA 2000 - Child-Specific Exposure Factors Handbook

U.S. EPA 2001 - Risk Assessment Guidance Part E (Dermal Guidance - Interim Draft Review Copy)

Cal EPA 1992 - DTSC Multimedia Risk Guidance

U.S. EPA 1991 - Default Exposure Parameters

TABLE B-9. EXPOSURE FACTORS  
Mandela Gateway Redevelopment Site  
Oakland, California

| <b>Construction Worker Exposure Factors</b>                | <b>Acronym</b>                | <b>Units</b>           | <b>Values</b> |
|--|-------------------------------|------------------------|---------------|
| Inhalation Non-Carcinogenic - Construction Worker          | Inh CW NC Factor              | m <sup>3</sup> /kg-day | 1.96E-01      |
| Ingestion Non-Carcinogenic - Construction Worker           | Ing CW NC Factor              | day <sup>-1</sup>      | 4.70E-06      |
| Soil Dermal Non-Carcinogenic - Construction Worker         | Soil Der CW NC Factor         | day <sup>-1</sup>      | 7.42E-06      |
| Groundwater Dermal Non-Carcinogenic - Construction Worker  | GW Der CW NC Factor           | hr-liter/cm-kg-day     | 1.55E-02      |
| Inhalation Carcinogenic - Construction Worker              | Inh CW C Factor               | m <sup>3</sup> /kg-day | 5.59E-03      |
| Ingestion Carcinogenic - Construction Worker               | Ing CW C Factor               | day <sup>-1</sup>      | 1.34E-07      |
| Soil Dermal Carcinogenic - Construction Worker             | Soil Der CW C Factor          | day <sup>-1</sup>      | 2.12E-07      |
| Groundwater Dermal Carcinogenic - Construction Worker      | GW Der CW C Factor            | hr-liter/cm-kg-day     | 4.42E-04      |
| <b>Adult Resident Exposure Factors</b>                     | <b>Acronym</b>                | <b>Units</b>           | <b>Values</b> |
| Inhalation Noncarcinogenic - Adult Resident                | Inh Ad Res NC Factor          | m <sup>3</sup> /kg-day | 2.74E-01      |
| Ingestion Noncarcinogenic - Adult Resident                 | Ing AdRes NC Factor           | day <sup>-1</sup>      | 1.37E-06      |
| Dermal Noncarcinogenic - Adult Resident                    | Der AdRes NC Factor           | day <sup>-1</sup>      | 1.59E-05      |
| Inhalation Carcinogenic - Adult Resident                   | Inh Ad Res C Factor           | m <sup>3</sup> /kg-day | 9.39E-02      |
| Ingestion Carcinogenic - Adult Resident                    | Ing AdRes C Factor            | day <sup>-1</sup>      | 4.70E-07      |
| Dermal Carcinogenic - Adult Resident                       | Der AdRes Der C Factor        | day <sup>-1</sup>      | 5.45E-06      |
| <b>Child Resident Exposure Factors</b>                     | <b>Acronym</b>                | <b>Units</b>           | <b>Values</b> |
| Inhalation Noncarcinogenic - Child Resident                | Inh Ch Res NC Factor          | m <sup>3</sup> /kg-day | 6.39E-01      |
| Ingestion Noncarcinogenic - Child Resident                 | Ing Ch Res NC Factor          | day <sup>-1</sup>      | 1.28E-05      |
| Dermal Noncarcinogenic - Child Resident                    | Der Ch Res Der Factor         | day <sup>-1</sup>      | 1.92E-05      |
| Inhalation Carcinogenic - Child Resident                   | Inh Ch Res C Factor           | m <sup>3</sup> /kg-day | 5.48E-02      |
| Ingestion Carcinogenic - Child Resident                    | Ing Ch Res C Factor           | day <sup>-1</sup>      | 1.10E-06      |
| Dermal Carcinogenic - Child Resident                       | Der Ch Res C Factor           | day <sup>-1</sup>      | 1.64E-06      |
| <b>Commercial/Industrial Worker Exposure Factors</b>       | <b>Acronym</b>                | <b>Units</b>           | <b>Values</b> |
| Inhalation Noncarcinogenic - Commercial/Industrial Worker  | Inh Comm/Ind W NC Factor      | m <sup>3</sup> /kg-day | 1.96E-01      |
| Ingestion Noncarcinogenic - Commercial/Industrial Worker   | Ing Comm/Ind W NC Factor      | day <sup>-1</sup>      | 9.78E-07      |
| Soil Dermal Noncarcinogenic - Commercial/Industrial Worker | Soil Der Comm/Ind W NC Factor | day <sup>-1</sup>      | 7.42E-06      |
| Inhalation Carcinogenic - Commercial/Industrial Worker     | Inh Comm/Ind W C Factor       | m <sup>3</sup> /kg-day | 6.99E-02      |
| Ingestion Carcinogenic - Commercial/Industrial Worker      | Ing Comm/Ind W C Factor       | day <sup>-1</sup>      | 6.99E-08      |
| Soil Dermal Carcinogenic - Commercial/Industrial Worker    | Soil Der Comm/Ind W C Factor  | day <sup>-1</sup>      | 2.65E-06      |

TABLE B-10. INTAKE, RISK AND HAZARD EQUATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

| Parameter   | Acronym               | Units                  | Formula  |
|---|-----------------------|------------------------|--|
| <b>Construction Worker</b>                                |                       |                        |  |
| Inhalation Exposure Factor - Noncarcinogenic - CW         | Inh CW NC Factor      | m <sup>3</sup> /kg-day | $\text{Inh CW NC Factor} = \frac{\text{CW IR} * \text{CW EF} * \text{CW ED}}{\text{CW BW} * \text{CW AT non-carc}}$  |
| Ingestion Exposure Factor - Noncarcinogenic - CW          | Ing CW NC Factor      | day <sup>-1</sup>      | $\text{Ing CW NC Factor} = \frac{\text{CW Ing} * \text{CF} * \text{FI} * \text{CW EF} * \text{CW ED}}{\text{CW BW} * \text{CW AT non-carc}}$   |
| Soil Dermal Exposure Factor - Noncarcinogenic - CW        | Soil Der CW NC Factor | day <sup>-1</sup>      | $\text{Soil Der CW NC Factor} = \frac{\text{CW SA} * \text{CF} * \text{SAF} * \text{CW EF} * \text{CW ED}}{\text{CW BW} * \text{CW AT non-carc}}$                                      |
| Groundwater Dermal Exposure Factor - Noncarcinogenic - CW | GW Der CW NC Factor   | hr-liter/cm-kg-day     | $\text{GW Der CW NC Factor} = \frac{\text{CW SA} * \text{WDED} * \text{CF} * \text{CW EF} * \text{CW ED}}{\text{CW BW} * \text{CW AT non-carc}}$                                       |
| Inhalation Exposure Factor - Carcinogenic - CW            | Inh CW C Factor       | m <sup>3</sup> /kg-day | $\text{Inh CW C Factor} = \frac{\text{CW IR} * \text{CW EF} * \text{CW ED}}{\text{CW BW} * \text{CW AT carc}}$   |
| Ingestion Exposure Factor - Carcinogenic - CW             | Ing CW C Factor       | day <sup>-1</sup>      | $\text{Ing CW C Factor} = \frac{\text{CW Ing} * \text{CF} * \text{FI} * \text{CW EF} * \text{CW ED}}{\text{CW BW} * \text{CW AT carc}}$  |
| Soil Dermal Exposure Factor - Carcinogenic - CW           | Soil Der CW C Factor  | day <sup>-1</sup>      | $\text{Soil Der CW C Factor} = \frac{\text{CW SA} * \text{CF} * \text{SAF} * \text{CW EF} * \text{CW ED}}{\text{CW BW} * \text{CW AT carc}}$   |
| Groundwater Dermal Exposure Factor - Carcinogenic - CW    | GW Der CW C Factor    | hr-liter/cm-kg-day     | $\text{GW Der CW C Factor} = \frac{\text{CW SA} * \text{WDED} * \text{CF} * \text{CW EF} * \text{CW ED}}{\text{CW BW} * \text{CW AT carc}}$  |
| Inhalation Noncarcinogenic Hazard Quotient - CW           | Soil Inh CW HQ        | unitless               | $\text{Inh CW HQ} = \text{Inh CW NC Factor} * \text{Air Concentration (Soil, Soil Gas or GW-Based)} / \text{RfDi}$   |
| Soil Ingestion Noncarcinogenic Hazard Quotient - CW       | Soil Ing CW HQ        | unitless               | $\text{Ing CW HQ} = \text{Ing CW NC Factor} * \text{Soil Concentration} / \text{RfDo}$   |
| Soil Dermal Noncarcinogenic Hazard Quotient - CW          | Soil Der CW HQ        | unitless               | $\text{Soil Der CW HQ} = \text{Soil Der CW NC Factor} * \text{DAF} * \text{Soil Concentration} / \text{RfDo}$  |
| Groundwater Dermal Noncarcinogenic Hazard Quotient - CW   | GW Der CW HQ          | unitless               | $\text{GW Der CW HQ} = \text{GW Der CW NC Factor} * \text{Chem-Specific Kp} * \text{Groundwater Concentration} / \text{RfDo}$  |
| Noncarcinogenic Hazard Index - CW                         | CW HI                 | unitless               | $\text{CW HI} = \text{GW Inh CW HQ} + \text{Soil Inh CW HQ} + \text{Soil Gas Inh CW HQ} + \text{Soil Ing HQ} + \text{Soil Der CW HQ} + \text{GW Der CW for all Chemicals}$             |
| Inhalation Carcinogenic Risk - CW                         | Inh CW RISK           | unitless               | $\text{Inh CW RISK} = \text{Inh CW C Factor} * \text{Air Concentration (Soil, Soil Gas or GW-Based)} * \text{CSFi}$  |
| Soil Ingestion Carcinogenic Risk - CW                     | Soil Ing CW RISK      | unitless               | $\text{Soil Ing CW RISK} = \text{Soil Ing CW C Factor} * \text{Soil Concentration} * \text{CSFo}$  |
| Soil Dermal Carcinogenic Risk - CW                        | Soil Der CW RISK      | unitless               | $\text{Soil Der CW RISK} = \text{Soil Der CW C factor} * \text{DAF} * \text{Soil Concentration} * \text{CSFo}$   |
| Groundwater Dermal Noncarcinogenic Risk - CW              | GW Der CW Risk        | unitless               | $\text{GW Der CW Risk} = \text{GW Der CW C Factor} * \text{Chem-Specific Kp} * \text{Groundwater Concentration} / \text{CSFo}$   |
| CW Carcinogenic Risk                                      | CW RISK               | unitless               | $\text{CW RISK} = \text{GW Inh CW Risk} + \text{Soil Inh CW Risk} + \text{Soil Gas Inh CW Risk} + \text{Soil Ing Risk} + \text{Soil Der CW} + \text{GW Der CW Risk for all Chemicals}$ |

TABLE B-10. INTAKE, RISK AND HAZARD EQUATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

| Parameter   | Acronym                   | Units                  | Formula   |
|---|---------------------------|------------------------|---|
| <b>Adult Resident</b>                                   |                           |                        |   |
| Inhalation Exposure Factor - Noncarcinogenic - Ad Res   | Inh Ad Res NC Factor      | m <sup>3</sup> /kg-day | $\text{Inh Ad Res NC Factor} = \frac{\text{Ad Res IR} * \text{Ad Res EF} * \text{Ad Res ED}}{\text{Ad Res BW} * \text{Ad Res AT non-carc}}$   |
| Ingestion Exposure Factor - Noncarcinogenic - Ad Res    | Ing Ad Res NC Factor      | day <sup>-1</sup>      | $\text{Ing Ad Res NC Factor} = \frac{\text{Ad Res Ing} * \text{CF} * \text{FI} * \text{Ad Res EF} * \text{Ad Res ED}}{\text{Ad Res BW} * \text{Ad Res AT non-carc}}$                    |
| Soil Dermal Exposure Factor - Noncarcinogenic - Ad Res  | Soil Der Ad Res NC Factor | day <sup>-1</sup>      | $\text{Soil Der Ad Res NC Factor} = \frac{\text{Ad Res SA} * \text{CF} * \text{SAF} * \text{Ad Res EF} * \text{Ad Res ED}}{\text{Ad Res BW} * \text{Ad Res AT non-carc}}$               |
| Inhalation Exposure Factor - Carcinogenic - Ad Res      | Inh Ad Res C Factor       | m <sup>3</sup> /kg-day | $\text{Inh Ad Res C Factor} = \frac{\text{Ad Res IR} * \text{Ad Res EF} * \text{Ad Res ED}}{\text{Ad Res BW} * \text{Ad Res AT carc}}$  |
| Ingestion Exposure Factor - Carcinogenic - Ad Res       | Ing Ad Res C Factor       | day <sup>-1</sup>      | $\text{Ing Ad Res C Factor} = \frac{\text{Ad Res Ing} * \text{CF} * \text{FI} * \text{Ad Res EF} * \text{Ad Res ED}}{\text{Ad Res BW} * \text{Ad Res AT carc}}$                         |
| Soil Dermal Exposure Factor - Carcinogenic - Ad Res     | Soil Der Ad Res C Factor  | day <sup>-1</sup>      | $\text{Soil Der Ad Res C Factor} = \frac{\text{Ad Res SA} * \text{CF} * \text{SAF} * \text{Ad Res EF} * \text{Ad Res ED}}{\text{Ad Res BW} * \text{Ad Res AT carc}}$                    |
| Inhalation Noncarcinogenic Hazard Quotient - Ad Res     | Soil Inh Ad Res HQ        | unitless               | $\text{Inh Ad Res HQ} = \text{Inh Ad Res NC Factor} * \text{Air Concentration (Soil, Soil Gas or GW-Based)} / \text{RfDi}$  |
| Soil Ingestion Noncarcinogenic Hazard Quotient - Ad Res | Soil Ing Ad Res HQ        | unitless               | $\text{Ing Ad Res HQ} = \text{Ing Ad Res NC Factor} * \text{Soil Concentration} / \text{RfDo}$  |
| Soil Dermal Noncarcinogenic Hazard Quotient - Ad Res    | Soil Der Ad Res HQ        | unitless               | $\text{Soil Der Ad Res HQ} = \text{Soil Der Ad Res NC Factor} * \text{DAF} * \text{Soil Concentration} / \text{RfDo}$   |
| Noncarcinogenic Hazard Index - Ad Res                   | Ad Res HI                 | unitless               | $\text{Ad Res HI} = \text{GW Inh Ad Res HQ} + \text{Soil Inh Ad Res HQ} + \text{Soil Gas Inh Ad Res HQ} + \text{Soil Ing HQ} + \text{Soil Der Ad Res HQ for all Chemicals}$             |
| Inhalation Carcinogenic Risk - Ad Res                   | Inh Ad Res RISK           | unitless               | $\text{Inh Ad Res RISK} = \text{Inh Ad Res C Factor} * \text{Air Concentration (Soil, Soil Gas or GW-Based)} * \text{CSFi}$   |
| Soil Ingestion Carcinogenic Risk - Ad Res               | Soil Ing Ad Res RISK      | unitless               | $\text{Ing Ad Res RISK} = \text{Soil Ing Ad Res C Factor} * \text{Soil Concentration} * \text{CSFo}$  |
| Soil Dermal Carcinogenic Risk - Ad Res                  | Soil Der Ad Res RISK      | unitless               | $\text{Soil Der Ad Res RISK} = \text{Soil Der Ad Res C factor} * \text{DAF} * \text{Soil Concentration} * \text{CSFo}$  |
| Ad Res Carcinogenic Risk                                | Ad Res RISK               | unitless               | $\text{Ad Res RISK} = \text{GW Inh Ad Res Risk} + \text{Soil Inh Ad Res Risk} + \text{Soil Gas Inh Ad Res Risk} + \text{Soil Ing Risk} + \text{Soil Der Ad Res Risk for all Chemicals}$ |
| <b>Child Resident</b>                                   |                           |                        |   |
| Inhalation Exposure Factor - Noncarcinogenic - Ch Res   | Inh Ch Res NC Factor      | m <sup>3</sup> /kg-day | $\text{Inh Ch Res NC Factor} = \frac{\text{Ch Res IR} * \text{Ch Res EF} * \text{Ch Res ED}}{\text{Ch Res BW} * \text{Ch Res AT non-carc}}$   |
| Ingestion Exposure Factor - Noncarcinogenic - Ch Res    | Ing Ch Res NC Factor      | day <sup>-1</sup>      | $\text{Ing Ch Res NC Factor} = \frac{\text{Ch Res Ing} * \text{CF} * \text{FI} * \text{Ch Res EF} * \text{Ch Res ED}}{\text{Ch Res BW} * \text{Ch Res AT non-carc}}$                    |
| Soil Dermal Exposure Factor - Noncarcinogenic - Ch Res  | Soil Der Ch Res NC Factor | day <sup>-1</sup>      | $\text{Soil Der Ch Res NC Factor} = \frac{\text{Ch Res SA} * \text{CF} * \text{SAF} * \text{Ch Res EF} * \text{Ch Res ED}}{\text{Ch Res BW} * \text{Ch Res AT non-carc}}$               |
| Inhalation Exposure Factor - Carcinogenic - Ch Res      | Inh Ch Res C Factor       | m <sup>3</sup> /kg-day | $\text{Inh Ch Res C Factor} = \frac{\text{Ch Res IR} * \text{Ch Res EF} * \text{Ch Res ED}}{\text{Ch Res BW} * \text{Ch Res AT carc}}$  |
| Ingestion Exposure Factor - Carcinogenic - Ch Res       | Ing Ch Res C Factor       | day <sup>-1</sup>      | $\text{Ing Ch Res C Factor} = \frac{\text{Ch Res Ing} * \text{CF} * \text{FI} * \text{Ch Res EF} * \text{Ch Res ED}}{\text{Ch Res BW} * \text{Ch Res AT carc}}$                         |
| Soil Dermal Exposure Factor - Carcinogenic - Ch Res     | Soil Der Ch Res C Factor  | day <sup>-1</sup>      | $\text{Soil Der Ch Res C Factor} = \frac{\text{Ch Res SA} * \text{CF} * \text{SAF} * \text{Ch Res EF} * \text{Ch Res ED}}{\text{Ch Res BW} * \text{Ch Res AT carc}}$                    |
| Inhalation Noncarcinogenic Hazard Quotient - Ch Res     | Soil Inh Ch Res HQ        | unitless               | $\text{Inh Ch Res HQ} = \text{Inh Ch Res NC Factor} * \text{Air Concentration (Soil, Soil Gas or GW-Based)} / \text{RfDi}$  |
| Soil Ingestion Noncarcinogenic Hazard Quotient - Ch Res | Soil Ing Ch Res HQ        | unitless               | $\text{Ing Ch Res HQ} = \text{Ing Ch Res NC Factor} * \text{Soil Concentration} / \text{RfDo}$  |
| Soil Dermal Noncarcinogenic Hazard Quotient - Ch Res    | Soil Der Ch Res HQ        | unitless               | $\text{Soil Der Ch Res HQ} = \text{Soil Der Ch Res NC Factor} * \text{DAF} * \text{Soil Concentration} / \text{RfDo}$   |
| Noncarcinogenic Hazard Index - Ch Res                   | Ch Res HI                 | unitless               | $\text{Ch Res HI} = \text{GW Inh Ch Res HQ} + \text{Soil Inh Ch Res HQ} + \text{Soil Gas Inh Ch Res HQ} + \text{Soil Ing HQ} + \text{Soil Der Ch Res HQ for all Chemicals}$             |
| Inhalation Carcinogenic Risk - Ch Res                   | Inh Ch Res RISK           | unitless               | $\text{Inh Ch Res RISK} = \text{Inh Ch Res C Factor} * \text{Air Concentration (Soil, Soil Gas or GW-Based)} * \text{CSFi}$   |
| Soil Ingestion Carcinogenic Risk - Ch Res               | Soil Ing Ch Res RISK      | unitless               | $\text{Ing Ch Res RISK} = \text{Soil Ing Ch Res C Factor} * \text{Soil Concentration} * \text{CSFo}$  |
| Soil Dermal Carcinogenic Risk - Ch Res                  | Soil Der Ch Res RISK      | unitless               | $\text{Soil Der Ch Res RISK} = \text{Soil Der Ch Res C factor} * \text{DAF} * \text{Soil Concentration} * \text{CSFo}$  |
| Ch Res Carcinogenic Risk                                | Ch Res RISK               | unitless               | $\text{Ch Res RISK} = \text{GW Inh Ch Res Risk} + \text{Soil Inh Ch Res Risk} + \text{Soil Gas Inh Ch Res Risk} + \text{Soil Ing Risk} + \text{Soil Der Ch Res Risk for all Chemicals}$ |
| <b>Residential Carcinogenic Risk</b>                    | <b>Res RISK</b>           | <b>unitless</b>        | $\text{Res RISK} = \text{Ad Res Risk} + \text{Ch Res Risk}$   |

TABLE B-10. INTAKE, RISK AND HAZARD EQUATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

| Parameter   | Acronym                       | Units                  | Formula   |
|---|-------------------------------|------------------------|---|
| <b>Commercial/Industrial Worker</b>                         |                               |                        |   |
| Inhalation Exposure Factor - Noncarcinogenic - Comm/Ind W   | Inh Comm/Ind W NC Factor      | m <sup>3</sup> /kg-day | $\text{Inh Comm/Ind W NC Factor} = \frac{\text{Comm/Ind W IR} * \text{Comm/Ind W EF} * \text{Comm/Ind W ED}}{\text{Comm/Ind W BW} * \text{Comm/Ind W AT non-care}}$   |
| Ingestion Exposure Factor - Noncarcinogenic - Comm/Ind W    | Ing Comm/Ind W NC Factor      | day <sup>-1</sup>      | $\text{Ing Comm/Ind W NC Factor} = \frac{\text{Comm/Ind W Ing} * \text{CF} * \text{FI} * \text{Comm/Ind W EF} * \text{Comm/Ind W ED}}{\text{Comm/Ind W BW} * \text{Comm/Ind W AT non-care}}$                |
| Soil Dermal Exposure Factor - Noncarcinogenic - Comm/Ind W  | Soil Der Comm/Ind W NC Factor | day <sup>-1</sup>      | $\text{Soil Der Comm/Ind W NC Factor} = \frac{\text{Comm/Ind W SA} * \text{CF} * \text{SAF} * \text{Comm/Ind W EF} * \text{Comm/Ind W ED}}{\text{Comm/Ind W BW} * \text{Comm/Ind W AT non-care}}$           |
| Inhalation Exposure Factor - Carcinogenic - Comm/Ind W      | Inh Comm/Ind W C Factor       | m <sup>3</sup> /kg-day | $\text{Inh Comm/Ind W C Factor} = \frac{\text{Comm/Ind W IR} * \text{Comm/Ind W EF} * \text{Comm/Ind W ED}}{\text{Comm/Ind W BW} * \text{Comm/Ind W AT carc}}$  |
| Ingestion Exposure Factor - Carcinogenic - Comm/Ind W       | Ing Comm/Ind W C Factor       | day <sup>-1</sup>      | $\text{Ing Comm/Ind W C Factor} = \frac{\text{Comm/Ind W Ing} * \text{CF} * \text{FI} * \text{Comm/Ind W EF} * \text{Comm/Ind W ED}}{\text{Comm/Ind W BW} * \text{Comm/Ind W AT carc}}$                     |
| Soil Dermal Exposure Factor - Carcinogenic - Comm/Ind W     | Soil Der Comm/Ind W C Factor  | day <sup>-1</sup>      | $\text{Soil Der Comm/Ind W C Factor} = \frac{\text{Comm/Ind W SA} * \text{CF} * \text{SAF} * \text{Comm/Ind W EF} * \text{Comm/Ind W ED}}{\text{Comm/Ind W BW} * \text{Comm/Ind W AT carc}}$                |
| Inhalation Noncarcinogenic Hazard Quotient - Comm/Ind W     | Soil Inh Comm/Ind W HQ        | unitless               | $\text{Inh Comm/Ind W HQ} = \text{Inh Comm/Ind W NC Factor} * \text{Air Concentration (Soil, Soil Gas or GW-Based)} / \text{RfDi}$  |
| Soil Ingestion Noncarcinogenic Hazard Quotient - Comm/Ind W | Soil Ing Comm/Ind W HQ        | unitless               | $\text{Ing Comm/Ind W HQ} = \text{Ing Comm/Ind W NC Factor} * \text{Soil Concentration} / \text{RfDo}$  |
| Soil Dermal Noncarcinogenic Hazard Quotient - Comm/Ind W    | Soil Der Comm/Ind W HQ        | unitless               | $\text{Soil Der Comm/Ind W HQ} = \text{Soil Der Comm/Ind W NC Factor} * \text{DAF} * \text{Soil Concentration} / \text{RfDo}$   |
| Noncarcinogenic Hazard Index - Comm/Ind W                   | Comm/Ind W HI                 | unitless               | $\text{Comm/Ind W HI} = \text{GW Inh Comm/Ind W HQ} + \text{Soil Inh Comm/Ind W HQ} + \text{Soil Gas Inh Comm/Ind W HQ} + \text{Soil Ing HQ} + \text{Soil Der Comm/Ind W HQ for all Chemicals}$             |
| Inhalation Carcinogenic Risk - Comm/Ind W                   | Inh Comm/Ind W RISK           | unitless               | $\text{Inh Comm/Ind W RISK} = \text{Inh Comm/Ind W C Factor} * \text{Air Concentration (Soil, Soil Gas or GW-Based)} * \text{CSFi}$   |
| Soil Ingestion Carcinogenic Risk - Comm/Ind W               | Soil Ing Comm/Ind W RISK      | unitless               | $\text{Soil Ing Comm/Ind W RISK} = \text{Soil Ing Comm/Ind W C Factor} * \text{Soil Concentration} * \text{CSFo}$   |
| Soil Dermal Carcinogenic Risk - Comm/Ind W                  | Soil Der Comm/Ind W RISK      | unitless               | $\text{Soil Der Comm/Ind W RISK} = \text{Soil Der Comm/Ind W C factor} * \text{DAF} * \text{Soil Concentration} * \text{CSFo}$  |
| Comm/Ind W Carcinogenic Risk                                | Comm/Ind W RISK               | unitless               | $\text{Comm/Ind W RISK} = \text{GW Inh Comm/Ind W Risk} + \text{Soil Inh Comm/Ind W Risk} + \text{Soil Gas Inh Comm/Ind W Risk} + \text{Soil Ing Risk} + \text{Soil Der Comm/Ind W Risk for all Chemicals}$ |

Notes:

Ad = Adult  
AT = Averaging time  
BW = Body weight  
CDI = Chronic Daily Intake  
CF = Conversion Factor  
Ch = Child  
CSF = Cancer slope factor  
Comm/Ind W = Commercial/Industrial Worker  
CW = Construction Worker  
DAF = Dermal absorption factor  
Der = Dermal  
ED = Exposure duration

EF = Exposure frequency  
FI = Fraction ingested  
HI = Hazard Index  
HQ = Hazard Quotient  
Ing = Ingestion  
Inh = Inhalation  
IR = Intake rate  
Kp = Chemical-Specific Permeability Coefficient  
mg/kg-day = milligrams per kilogram-day  
RfD = Noncarcinogenic reference dose  
SA = Skin surface area  
SAF = Skin adherence factor

TABLE B-11. HOMEGROWN PRODUCE INGESTION EXPOSURE PARAMETERS AND EXPOSURE FACTORS

Mandela Gateway Redevelopment Site  
Oakland, California

| Parameter  | Value             | Units         | Acronym        | Notes and Formulae  |
|--|-------------------|---------------|----------------|---|
| Soil Concentration                                   | chemical-specific | mg/kg         | Cs             | Parcel A-Specific   |
| Plant Uptake Factor                                  | chemical-specific | unitless      | — PUF          | ORNL, 2003. For vegetables and fruits.  |
| Resuspension Multiplier                              | 2.60E-01          | unitless      | ResusM         | ORNL, 2003. For vegetables only   |
| Vegetable Intake - Adult and Child                   | 1.40E+00          | g/kg-day      | Int-Veg        | U.S. EPA 1997. Mean value for consumer intake of homegrown vegetables for urban areas               |
| Fruit Intake - Adult and Child                       | 1.99E+00          | g/kg-day      | Int-Frt        | U.S. EPA 1997. Mean value for consumer intake of homegrown fruit for urban areas                    |
| Conversion Factor                                    | 1.00E-03          | kg/g          | CF             | Conversion of fruit and vegetable intake units  |
| Exposure Frequency                                   | 3.50E+02          | days/year     | EF             | U.S. EPA 1991 and CalEPA 1992   |
| Exposure Duration - Adult                            | 2.40E+01          | years         | ED-Ad          | U.S. EPA 1991 and CalEPA 1992. 30 year resident consisting of 6 year child and 24 year adult        |
| Averaging Time - Cancer                              | 2.56E+04          | days          | AT-Carc        | U.S. EPA 1991 and CalEPA 1992. 70 years at 365 days/year  |
| Averaging Time - Noncancer - Adult                   | 8.76E+03          | days          | AT-NC-Ad       | U.S. EPA 1991 and CalEPA 1992. Exposure Duration (years) at 365 days/year                           |
| Intake Factor - Cancer - Vegetable Intake - Adult    | 4.60E-04          | kg/kg-day     | IF-Carc-Veg-Ad | $(\text{Int-Veg} \times \text{CF} \times \text{EF} \times \text{ED-Ad}) / (\text{AT-Carc})$         |
| Intake Factor - Cancer - Fruit Intake - Adult        | 6.54E-04          | kg/kg-day     | IF-Carc-Frt-Ad | $(\text{Int-Frt} \times \text{CF} \times \text{EF} \times \text{ED-Ad}) / (\text{AT-Carc})$         |
| Vegetable Lifetime Average Daily Dose - Adult        | chemical-specific | mg/kg-day     | Veg-LADD-Ad    | $((\text{Cs} \times \text{PUF}) + (\text{Cs} \times \text{ResusM})) \times (\text{IF-Carc-Veg-Ad})$ |
| Fruit Lifetime Average Daily Dose - Adult            | chemical-specific | mg/kg-day     | Frt-LADD-Ad    | $(\text{Cs} \times \text{PUF} \times \text{IF-Carc-Frt-Ad})$  |
| Lifetime Average Daily Dose (Cancer) - Adult         | chemical-specific | mg/kg-day     | LADD-Ad        | $(\text{Veg-LADD-Ad} + \text{Frt-LADD-Ad})$   |
| Exposure Duration - Child                            | 6.00E+00          | years         | ED-Ch          | U.S. EPA 1991 and CalEPA 1992. 30 year resident consisting of 6 year child and 24 year adult        |
| Averaging Time - Noncancer - Child                   | 2.19E+03          | days          | AT-NC-Ch       | U.S. EPA 1991 and CalEPA 1992. Exposure Duration (years) at 365 days/year                           |
| Intake Factor - Cancer - Vegetable Intake - Child    | 1.15E-04          | kg/kg-day     | IF-Carc-Veg-Ch | $(\text{Int-Veg} \times \text{CF} \times \text{EF} \times \text{ED-Ch}) / (\text{AT-Carc})$         |
| Intake Factor - Cancer - Fruit Intake - Child        | 1.64E-04          | kg/kg-day     | IF-Carc-Frt-Ch | $(\text{Int-Frt} \times \text{CF} \times \text{EF} \times \text{ED-Ch}) / (\text{AT-Carc})$         |
| Vegetable Lifetime Average Daily Dose - Child        | chemical-specific | mg/kg-day     | Veg-LADD-Ch    | $((\text{Cs} \times \text{PUF}) + (\text{Cs} \times \text{ResusM})) \times (\text{IF-Carc-Veg-Ch})$ |
| Fruit Lifetime Average Daily Dose - Child            | chemical-specific | mg/kg-day     | Frt-LADD-Ch    | $(\text{Cs} \times \text{PUF} \times \text{IF-Carc-Frt-Ch})$  |
| Lifetime Average Daily Dose (Cancer) - Child         | chemical-specific | mg/kg-day     | LADD-Ch        | $(\text{Veg-LADD-Ch} + \text{Frt-LADD-Ch})$   |
| Excess Cancer Risk - Adult                           | chemical-specific | unitless      | Risk-Ad        | $\text{LADD-Ad} \times \text{CSF}$  |
| Excess Cancer Risk - Child                           | chemical-specific | unitless      | Risk-Ch        | $\text{LADD-Ch} \times \text{CSF}$  |
| Cancer Slope Factor                                  | chemical-specific | (1/mg-kg-day) | CSF            | Table B-13  |
| Resident Excess Cancer Risk                          | Calculated        | unitless      | Res-Risk       | $(\text{Risk-Ad} + \text{Risk-Ch})$   |
| Intake Factor - Noncancer - Vegetable Intake - Adult | 1.34E-03          | kg/kg-day     | IF-NC-Veg-Ad   | $(\text{Int-Veg} \times \text{CF} \times \text{EF} \times \text{ED-Ad}) / (\text{AT-NC-Ad})$        |
| Intake Factor - Noncancer - Fruit Intake - Adult     | 1.91E-03          | kg/kg-day     | IF-NC-Frt-Ad   | $(\text{Int-Frt} \times \text{CF} \times \text{EF} \times \text{ED-Ad}) / (\text{AT-NC-Ad})$        |
| Vegetable Average Daily Dose - Adult                 | chemical-specific | mg/kg-day     | Veg-ADD-Ad     | $((\text{Cs} \times \text{PUF}) + (\text{Cs} \times \text{ResusM})) \times (\text{IF-NC-Veg-Ad})$   |
| Fruit Average Daily Dose - Adult                     | chemical-specific | mg/kg-day     | Frt-ADD-Ad     | $(\text{Cs} \times \text{PUF} \times \text{IF-NC-Frt-Ad})$  |
| Average Daily Dose (Noncancer) - Adult               | chemical-specific | mg/kg-day     | ADD-Ad         | $(\text{Veg-ADD-Ad} + \text{Frt-ADD-Ad})$   |
| Intake Factor - Noncancer - Vegetable Intake - Child | 1.34E-03          | kg/kg-day     | IF-NC-Veg-Ch   | $(\text{Int-Veg} \times \text{CF} \times \text{EF} \times \text{ED-Ch}) / (\text{AT-NC-Ch})$        |
| Intake Factor - Noncancer - Fruit Intake - Child     | 1.91E-03          | kg/kg-day     | IF-NC-Frt-Ch   | $(\text{Int-Frt} \times \text{CF} \times \text{EF} \times \text{ED-Ch}) / (\text{AT-NC-Ch})$        |
| Vegetable Average Daily Dose - Child                 | chemical-specific | mg/kg-day     | Veg-ADD-Ch     | $((\text{Cs} \times \text{PUF}) + (\text{Cs} \times \text{ResusM})) \times (\text{IF-NC-Veg-Ch})$   |
| Fruit Average Daily Dose - Child                     | chemical-specific | mg/kg-day     | Frt-ADD-Ch     | $(\text{Cs} \times \text{PUF} \times \text{IF-NC-Frt-Ch})$  |
| Average Daily Dose (Noncancer) - Child               | chemical-specific | mg/kg-day     | ADD-Ch         | $(\text{Veg-ADD-Ch} + \text{Frt-ADD-Ch})$   |
| Verified Reference Dose                              | chemical-specific | mg-kg-day     | RfD            | Table B-13  |
| Adult Noncancer Hazard Index                         | Calculated        | unitless      | NC HI-Ad       | $(\text{ADD-Ad}/\text{RfD})$ - Summed for all chemicals   |
| Child Noncancer Hazard Index                         | Calculated        | unitless      | NC HI-Ch       | $(\text{ADD-Ch}/\text{RfD})$ - Summed for all chemicals   |

Notes:

g = gram  
mg = milligram  
kg = kilogram

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TABLE B-12. PLANT UPTAKE FACTORS  
Mandela Gateway Redevelopment Site  
Oakland, California

| Chemical            | Soil-to-Wet Plant Uptake Factor<br>(unitless - kg/kg) | Source of Factor |
|---------------------|---|------------------|
| Arsenic             | 1.00E-02  | ORNL, 2003       |
| Barium              | 3.00E-03  | ORNL, 2003       |
| Beryllium           | 2.50E-03  | ORNL, 2003       |
| Cadmium             | 1.40E-01  | ORNL, 2003       |
| Chromium            | 1.00E-04  | ORNL, 2003       |
| Cobalt              | 2.30E-02  | ORNL, 2003       |
| Copper              | 8.00E-02  | ORNL, 2003       |
| Lead                | 7.60E-04  | ORNL, 2003       |
| Mercury             | 3.00E-01  | ORNL, 2003       |
| Molybdenum          | 8.00E-02  | ORNL, 2003       |
| Nickel              | 5.00E-02  | ORNL, 2003       |
| Selenium            | 1.00E-01  | ORNL, 2003       |
| Vanadium            | 1.40E-03  | ORNL, 2003       |
| Zinc                | 2.60E-01  | ORNL, 2003       |
| Aldrin              | 1.40E-01  | ORNL, 2003       |
| Alpha-BHC (Lindane) | 4.20E-02  | ORNL, 2003       |
| DDD                 | 3.30E-03  | ORNL, 2003       |
| DDE                 | 3.80E-03  | ORNL, 2003       |
| DDT                 | 1.60E-03  | ORNL, 2003       |
| Dieldrin            | 1.70E-02  | ORNL, 2003       |
| Endrin              | 1.70E-02  | ORNL, 2003       |
| Endrin Ketone*      | 1.70E-02  | ORNL, 2003       |
| 1,2-Dichloroethane  | 1.00E+00  | ORNL, 2003       |
| Toluene             | 2.10E-01  | ORNL, 2003       |
| Ethylbenzene        | 1.20E-01  | ORNL, 2003       |
| Xylenes             | 9.40E-02  | ORNL, 2003       |

Notes:

\* = Endrin used as surrogate for endrin ketone

NA = Not available

kg = Kilogram

References:

Oak Ridge National Laboratory (ORNL). 2003. Toxicity and Chemical-S.  
<http://risk.lsd.ornl.gov/cgi-bin/tox>. March 7.

Table B-13. Toxicity Values  
Mandela Gateway Redevelopment Site  
Oakland, California

| Chemicals                       | Carcinogenicity Assessment Weight of Evidence* | Oral Cancer Slope Factor [1/(mg/kg-day)] | Source Oral Cancer Slope Factor | % of Gastrointestinal Absorption* | Dermal Cancer Slope Factor ** [1/(mg/kg-day)] | Inhalation Unit Risk Factor [1/(ug/m <sup>3</sup> )] | Inhalation Cancer Slope Factor [1/(mg/kg-day)] | Source Inhalation Unit Risk and Cancer Slope Factors | Chronic Inhalation REL (ug/m <sup>3</sup> ) | Source Chronic Inhalation REL | Inhalation RfC (mg/m <sup>3</sup> ) | Inhalation RfD (mg/kg-day) | Source Inhalation RfD and RfC | Oral RfD (mg/kg-day) | Source Oral RfD | % of Gastrointestinal Absorption * | Dermal RfD *** (mg/kg-day) | Oral RfD Target Organ | Inhalation RfD/RfC Target Organ |
|---------------------------------|--|--|---------------------------------|-----------------------------------|---|--|--|--|---|-------------------------------|-------------------------------------|----------------------------|-------------------------------|----------------------|-----------------|------------------------------------|----------------------------|-----------------------|---------------------------------|
| 1,2-Dichloroethane              | B2   | 4.70E-02                                 | OEHHA                           | 100.0%                            | 4.70E-02                                      | 2.10E-05   | 7.20E-02                                       | OEHHA  | --  | --                            | --                                  | 1.40E-03                   | NCEA                          | 3.00E-02             | NCEA            | 100.0%                             | 3.00E-02                   | Other                 | Other                           |
| Aldrin                          | B2   | 1.70E+01                                 | OEHHA                           | 100.0%                            | 1.70E+01                                      | 4.90E-03   | 1.70E+01                                       | OEHHA  | --  | --                            | --                                  | 3.00E-05                   | R                             | 3.00E-05             | IRIS            | 100.0%                             | 3.00E-05                   | Liver                 | Liver                           |
| Alpha-BHC                       | B2   | 2.70E+00                                 | OEHHA                           | 100.0%                            | 2.70E+00                                      | 7.70E-04   | 2.70E+00                                       | OEHHA  | --  | --                            | --                                  | 5.00E-04                   | R                             | 5.00E-04             | NCEA            | 100.0%                             | 5.00E-04                   | Other                 | Other                           |
| Antimony                        | --   | NC                                       | NC                              | 15%                               | NC  | NC   | NC   | IRIS   | --  | --                            | --                                  | --                         | --                            | 4.00E-04             | IRIS            | 15%                                | 6.00E-05                   | Blood                 | --                              |
| Arsenic                         | A  | 1.50E+00                                 | OEHHA                           | 100%                              | 1.50E+00                                      | 3.30E-03   | 1.20E+01                                       | OEHHA  | 3.00E-02                                    | Cal EPA                       | --                                  | 8.57E-06                   | Cal EPA                       | 3.00E-04             | IRIS            | 100%                               | 3.00E-04                   | Skin                  | CNS, Blood                      |
| Barium                          | D  | NC                                       | NC                              | 7%                                | NC  | NC   | NC   | IRIS   | --  | --                            | 5.00E-04                            | 1.43E-04                   | HEAST/PRG                     | 7.00E-02             | IRIS            | 7%                                 | 4.90E-03                   | Other, Kidney         | --                              |
| Beryllium                       | B1   | --                                       | --                              | 0.7%                              | --  | 2.40E-03   | 8.40E+00                                       | OEHHA  | 7.00E-03                                    | Cal EPA                       | 2.00E-05                            | 5.71E-06                   | IRIS                          | 2.00E-03             | IRIS            | 0.7%                               | 1.40E-05                   | GI                    | Other                           |
| Cadmium                         | B1   | 3.80E-01                                 | OEHHA                           | 2.5%                              | 1.52E+01                                      | 4.00E-03   | 1.50E+01                                       | OEHHA  | 2.00E-02                                    | Cal EPA                       | --                                  | 5.71E-06                   | Cal EPA                       | 5.00E-04             | IRIS            | 2.5%                               | 1.25E-05                   | Blood                 | Kidney, Lung                    |
| Chromium (III)                  | D  | NC                                       | NC                              | 1.3%                              | NC  | NC   | NC   | IRIS   | --  | --                            | --                                  | --                         | --                            | 1.50E+00             | IRIS            | 1.3%                               | 1.95E-02                   | --                    | None                            |
| Cobalt                          | --   | NC                                       | NC                              | 100%                              | NC  | NC   | NC   | --   | --  | --                            | --                                  | --                         | --                            | 6.00E-02             | NCEA            | 100%                               | 6.00E-02                   | --                    | --                              |
| Copper                          | D  | NC                                       | NC                              | 100%                              | NC  | NC   | NC   | IRIS   | --  | --                            | --                                  | --                         | --                            | 4.00E-02             | HEAST/PRG       | 100%                               | 4.00E-02                   | --                    | --                              |
| Dichlorodiphenyldichloroethane  | B2   | 2.40E-01                                 | OEHHA                           | 100.0%                            | 2.40E-01                                      | 6.90E-05   | 2.40E-01                                       | OEHHA  | --  | --                            | --                                  | --                         | --                            | --                   | --              | 100.0%                             | --                         | --                    | --                              |
| Dichlorodiphenyldichloroethene  | B2   | 3.40E-01                                 | OEHHA                           | 100.0%                            | 3.40E-01                                      | 9.70E-05   | 3.40E-01                                       | OEHHA  | --  | --                            | --                                  | --                         | --                            | --                   | --              | 100.0%                             | --                         | --                    | --                              |
| Dichlorodiphenyltrichloroethane | B2   | 3.40E-01                                 | OEHHA                           | 100.0%                            | 3.40E-01                                      | 9.70E-05   | 3.40E-01                                       | OEHHA  | --  | --                            | --                                  | 5.00E-04                   | R                             | 5.00E-04             | IRIS            | 100.0%                             | 5.00E-04                   | Liver                 | Liver                           |
| Dieldrin                        | B2   | 1.60E+01                                 | OEHHA                           | 100.0%                            | 1.60E+01                                      | 4.60E-03   | 1.60E+01                                       | OEHHA  | --  | --                            | --                                  | 5.00E-05                   | R                             | 5.00E-05             | IRIS            | 100.0%                             | 5.00E-05                   | Liver                 | Liver                           |
| Endrin                          | D  | NC                                       | NC                              | 100.0%                            | NC  | NC   | NC   | IRIS   | --  | --                            | --                                  | 3.00E-04                   | R                             | 3.00E-04             | IRIS            | 100.0%                             | 3.00E-04                   | Liver                 | Liver                           |
| Endrin Ketone*****              | D  | NC                                       | NC                              | 100.0%                            | NC  | NC   | NC   | IRIS   | --  | --                            | --                                  | 3.00E-04                   | R                             | 3.00E-04             | IRIS            | 100.0%                             | 3.00E-04                   | Liver                 | Liver                           |
| Ethylbenzene                    | D  | NC                                       | NC                              | 100.0%                            | NC  | NC   | NC   | IRIS   | --  | --                            | 1.00E+00                            | 2.86E-01                   | IRIS                          | 1.00E-01             | IRIS            | 100.0%                             | 1.00E-01                   | Liver, Kidney         | Liver, Kidney                   |
| Lead****                        | B2   | NC                                       | --                              | 100%                              | NC  | --   | NC   | --   | --  | --                            | --                                  | --                         | --                            | --                   | --              | 100%                               | --                         | --                    | --                              |
| Mercury                         | D  | NC                                       | NC                              | 7%                                | NC  | NC   | NC   | IRIS   | 9.00E-02                                    | Cal EPA                       | 3.00E-04                            | 8.57E-05                   | IRIS                          | --                   | --              | 7%                                 | --                         | CNS                   | --                              |
| Molybdenum                      | --   | NC                                       | NC                              | 100%                              | NC  | NC   | NC   | IRIS   | --  | --                            | --                                  | --                         | --                            | 5.00E-03             | IRIS            | 100%                               | 5.00E-03                   | Kidney                | --                              |
| Nickel                          | A  | --                                       | --                              | 4%                                | --  | 2.60E-04   | 9.10E-01                                       | OEHHA  | 5.00E-02                                    | Cal EPA                       | --                                  | 1.43E-05                   | Cal EPA                       | 2.00E-02             | IRIS            | 4%                                 | 8.00E-04                   | --                    | Body Weight                     |
| Selenium                        | D  | NC                                       | NC                              | 100%                              | NC  | NC   | NC   | IRIS   | 2.00E+01                                    | Cal EPA                       | --                                  | 5.71E-03                   | Cal EPA                       | 5.00E-03             | IRIS            | 100%                               | 5.00E-03                   | Other                 | --                              |
| Silver                          | D  | NC                                       | NC                              | 4%                                | NC  | NC   | NC   | IRIS   | --  | --                            | --                                  | --                         | --                            | 5.00E-03             | IRIS            | 4%                                 | 2.00E-04                   | Argyria               | --                              |
| Toluene                         | D  | NC                                       | NC                              | 100.0%                            | NC  | NC   | NC   | IRIS   | --  | --                            | 4.00E-01                            | 1.14E-01                   | IRIS                          | 2.00E-01             | IRIS            | 100.0%                             | 2.00E-01                   | Kidney, Liver         | CNS, Lung                       |
| Vanadium                        | --   | NC                                       | NC                              | 2.6%                              | NC  | NC   | NC   | --   | --  | --                            | --                                  | --                         | --                            | 7.00E-03             | HEAST           | 2.6%                               | 1.82E-04                   | --                    | --                              |
| Xylenes                         | D  | NC                                       | NC                              | 100.0%                            | NC  | NC   | NC   | IRIS   | 7.00E+02                                    | Cal EPA                       | --                                  | 2.00E+00                   | R                             | 2.00E+00             | IRIS            | 100.0%                             | 2.00E+00                   | Body Weight, Other    | Body Weight, Other              |
| Zinc                            | D  | NC                                       | NC                              | 100%                              | NC  | NC   | NC   | IRIS   | --  | --                            | --                                  | --                         | --                            | 3.00E-01             | IRIS            | 100%                               | 3.00E-01                   | --                    | Blood                           |

Notes:

- \* From U.S. EPA 2001. Assumed 100% where no absorption information was available.
- \*\* Dermal cancer slope factor = oral cancer slope factor / % of gastrointestinal absorption
- \*\*\* Dermal RfD = Oral RfD \* % of gastrointestinal absorption
- \*\*\*\* Lead evaluated separately through estimation of blood lead concentrations. It is noted as "NC" only from an excess cancer risk calculation perspective.
- \*\*\*\*\* Endrin used as surrogate for endrin ketone
- = Not available
- NC = Chemical is not classified as a carcinogen
- RfD = Reference Dose
- RfC = Reference Concentration
- REL = Reference Exposure Level
- R = Route-to-route extrapolation
- m<sup>3</sup> = Cubic meter
- ug = Microgram
- mg = Milligram
- kg = Kilogram

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**APPENDIX C**  
**West Block Risk Calculations**

TABLE C-1. WEST BLOCK CONSTRUCTION WORKER EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Soil EPC (mg/kg) | Construction Worker Receptor West Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Construction Worker Receptor Standing Water Air EPC (mg/m3) | Construction Worker Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Construction Worker Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Construction Worker Ingestion Carcinogenic Exposure Factor (day)-1 | Construction Worker Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Construction Worker Soil Dermal Carcinogenic Exposure Factor (day)-1 | Construction Worker Soil Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Construction Worker Water Dermal Carcinogenic Exposure Factor (hr-liter/cm2-day) | Chemical-Specific Water Permeability Coefficient (cm/hr) | Construction Worker Water Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Construction Worker Standing Water Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day)-1 | Oral Cancer Slope Factor (mg/kg-day)-1 | Dermal Cancer Slope Factor (mg/kg-day)-1 | Construction Worker Soil Inhalation Risk | Construction Worker Soil Ingestion Risk | Construction Worker Soil Dermal Risk | Construction Worker Water Dermal Risk | Construction Worker Standing Water Inhalation Risk | Construction Worker Total Risk |
|---------------------|-----------------------------|---|------------------------|---|---|---|--|---|--|--|---|--|--|--|---|--|--|--|--|---|--------------------------------------|---------------------------------------|--|--------------------------------|
| Arsenic             | BKG                         | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 3.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | 1.20E+01  | 1.50E+00                                     | 1.50E+00                               | --                                       | --                                       | --                                      | --                                   | --                                    | --   |                                |
| Barium              | 3.00E+02                    | 2.07E-04  | 1.12E-01               | NA  | 5.59E-03  | 1.16E-06  | 1.34E-07   | 4.03E-05  | 1.00E-02                                 | 2.12E-07   | 6.36E-07  | 4.42E-04   | 1.00E-03   | 4.95E-08   | --  | NC   | NC                                     | NC                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Beryllium           | BKG                         | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | 8.40E+00  | --   | --                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Cadmium             | BKG                         | --  | ND                     | ND  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-03                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | 1.50E+01  | 3.80E-01                                     | 1.52E+01                               | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Chromium            | BKG                         | --  | ND                     | ND  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | NC  | NC   | NC                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | 1.00E-03   | 3.36E-08   | --  | NC   | NC                                     | NC                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Copper              | BKG                         | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | NC  | NC   | NC                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Lead                | 1.17E+02                    | 8.08E-05  | ND                     | ND  | 5.59E-03  | 4.52E-07  | 1.34E-07   | 1.57E-05  | 1.00E-02                                 | 2.12E-07   | 2.48E-07  | 4.42E-04   | NA   | --   | NC  | NC   | NC                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Mercury             | 2.20E+00                    | 1.52E-06  | NA                     | NA  | 5.59E-03  | 8.50E-09  | 1.34E-07   | 2.95E-07  | 1.00E-02                                 | 2.12E-07   | 4.66E-09  | 4.42E-04   | NA   | --   | NC  | NC   | NC                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Molybdenum          | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | 1.00E-03   | --   | NC  | NC   | NC                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Nickel              | BKG                         | --  | 6.50E-02               | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | 2.00E-04   | 5.74E-09   | --  | 9.10E-01                                     | --                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Selenium            | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | NC  | NC   | NC                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Vanadium            | BKG                         | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | NC  | NC   | NC                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Zinc                | 1.10E+02                    | 7.60E-05  | 2.70E-02               | NA  | 5.59E-03  | 4.25E-07  | 1.34E-07   | 1.48E-05  | 1.00E-02                                 | 2.12E-07   | 2.33E-07  | 4.42E-04   | 6.00E-04   | 7.16E-09   | --  | NC   | NC                                     | NC                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Aldrin              | 3.09E-01                    | 2.13E-07  | NA                     | NA  | 5.59E-03  | 1.19E-09  | 1.34E-07   | 4.14E-08  | 5.00E-02                                 | 2.12E-07   | 3.27E-09  | 4.42E-04   | NA   | --   | 1.70E+01  | 1.70E+01                                     | 1.70E+01                               | 2.03E-08                                 | 7.04E-07                                 | 5.56E-08                                | --                                   | --                                    | 7.80E-07   |                                |
| Alpha-BHC (Lindane) | 2.20E-03                    | 1.52E-09  | NA                     | NA  | 5.59E-03  | 8.50E-12  | 1.34E-07   | 2.95E-10  | 5.00E-02                                 | 2.12E-07   | 2.33E-11  | 4.42E-04   | NA   | --   | 2.70E+00  | 2.70E+00                                     | 2.70E+00                               | 2.29E-11                                 | 7.97E-10                                 | 6.30E-11                                | --                                   | --                                    | 8.83E-10   |                                |
| DDD                 | 2.20E-03                    | 1.52E-09  | NA                     | NA  | 5.59E-03  | 8.50E-12  | 1.34E-07   | 2.95E-10  | 5.00E-02                                 | 2.12E-07   | 2.33E-11  | 4.42E-04   | NA   | --   | 2.40E-01  | 2.40E-01                                     | 2.40E-01                               | 2.04E-12                                 | 7.09E-11                                 | 5.60E-12                                | --                                   | --                                    | 7.85E-11   |                                |
| DDE                 | 4.32E-01                    | 2.98E-07  | NA                     | NA  | 5.59E-03  | 1.67E-09  | 1.34E-07   | 5.79E-08  | 5.00E-02                                 | 2.12E-07   | 4.58E-09  | 4.42E-04   | NA   | --   | 3.40E-01  | 3.40E-01                                     | 3.40E-01                               | 5.67E-10                                 | 1.97E-08                                 | 1.56E-09                                | --                                   | --                                    | 2.18E-08   |                                |
| DDT                 | 9.02E-01                    | 6.23E-07  | NA                     | NA  | 5.59E-03  | 3.48E-09  | 1.34E-07   | 1.21E-07  | 5.00E-02                                 | 2.12E-07   | 9.56E-09  | 4.42E-04   | NA   | --   | 3.40E-01  | 3.40E-01                                     | 3.40E-01                               | 1.18E-09                                 | 4.11E-08                                 | 3.25E-09                                | --                                   | --                                    | 4.56E-08   |                                |
| Dieldrin            | 1.94E-01                    | 1.34E-07  | NA                     | NA  | 5.59E-03  | 7.51E-10  | 1.34E-07   | 2.61E-08  | 5.00E-02                                 | 2.12E-07   | 2.06E-09  | 4.42E-04   | NA   | --   | 1.60E+01  | 1.60E+01                                     | 1.60E+01                               | 1.20E-08                                 | 4.17E-07                                 | 3.30E-08                                | --                                   | --                                    | 4.62E-07   |                                |
| Endrin              | 2.16E-01                    | 1.49E-07  | NA                     | NA  | 5.59E-03  | 8.35E-10  | 1.34E-07   | 2.90E-08  | 5.00E-02                                 | 2.12E-07   | 2.29E-09  | 4.42E-04   | NA   | --   | NC  | NC   | NC                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Endrin Ketone       | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | NC  | NC   | NC                                     | --                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| 1,2-Dichloroethane  | ND                          | --  | 2.10E-03               | 6.30E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 1.00E-01   | 9.28E-08   | 3.52E-08  | 7.20E-02                                     | 4.70E-02                               | 4.70E-02                                 | --                                       | --                                      | --                                   | 4.36E-09                              | 2.54E-09   | 4.36E-09                       |
| Toluene             | ND                          | --  | 1.80E-03               | 5.88E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 7.80E-01   | 6.20E-07   | 3.29E-08  | NC   | NC                                     | NC                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Ethylbenzene        | ND                          | --  | 1.00E-03               | 3.27E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 1.20E+00   | 5.30E-07   | 1.83E-08  | NC   | NC                                     | NC                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Xylenes             | ND                          | --  | 1.60E-03               | 4.79E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 1.40E+00   | 9.89E-07   | 2.68E-08  | NC   | NC                                     | NC                                       | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| <b>TOTAL</b>        |                             |   |                        |   |   |   |  |   |  |  |   |  |  |  |   |  |  |  | <b>3.40E-08</b>                          | <b>1.18E-06</b>                         | <b>9.34E-08</b>                      | <b>4.36E-09</b>                       | <b>2.54E-09</b>                                    | <b>1.31E-06</b>                |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 cm/hr = centimeters per hour  
 EPC = Exposure point concentration  
 hr-liter/cm2-day = Hour-liter per centimeter-kilogram-day  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 mg/L = milligrams per liter  
 NC = Chemical is not considered a carcinogen

TABLE C-2. WEST BLOCK CONSTRUCTION WORKER NONCANCER HAZARD CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Soil EPC (mg/kg) | Construction Worker Receptor West Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Construction Worker Receptor Standing Water Air EPC (mg/m3) | Construction Worker Inhalation Noncancer Exposure Factor (m3/kg-day) | Construction Worker Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Construction Worker Ingestion Noncancer Exposure Factor (day-1) | Construction Worker Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Construction Worker Soil Dermal Noncancer Exposure Factor (day-1) | Construction Worker Soil Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Construction Worker Water Dermal Noncancer Exposure Factor (hr-liter/cm-kg-day) | Chemical-Specific Water Permeability Coefficient (cm/hr) | Construction Worker Water Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Construction Worker Standing Water Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Construction Worker Soil Inhalation Noncancer Hazard | Construction Worker Soil Ingestion Noncancer Hazard | Construction Worker Soil Dermal Noncancer Hazard | Construction Worker Water Dermal Noncancer Hazard | Construction Worker Standing Water Inhalation Noncancer Hazard | Total Construction Worker Noncancer Hazard |
|---------------------|-----------------------------|---|------------------------|---|--|---|---|--|--|---|--|---|--|---|--|--|--|--|--|---|--|---|--|--|
| Arsenic             | BKG                         | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 3.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | 8.57E-06   | 3.00E-04                                       | 3.00E-04                                 | --   | --   | --  | --   | --  | --   | 3.09E-01                                   |
| Barium              | 3.00E+02                    | 2.07E-04  | 1.12E-01               | NA  | 1.96E-01   | 4.05E-05  | 4.70E-06  | 1.41E-03   | 1.00E-02                                 | 7.42E-06  | 2.23E-05   | 1.55E-02  | 1.00E-03   | 1.73E-06  | --   | 1.43E-04                                       | 7.00E-02                                 | 4.90E-03                                   | 2.84E-01   | 2.01E-02  | 4.54E-03   | 3.53E-04  | --   | --   |
| Beryllium           | BKG                         | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | 5.71E-06   | 2.00E-03                                       | 1.40E-05                                 | --   | --   | --  | --   | --  | --   | --   |
| Cadmium             | BKG                         | --  | ND                     | ND  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-03                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | 5.71E-06   | 5.00E-04                                       | 1.25E-05                                 | --   | --   | --  | --   | --  | --   | --   |
| Chromium            | BKG                         | --  | ND                     | ND  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 1.50E+00                                       | 1.95E-02                                 | --   | --   | --  | --   | --  | --   | --   |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | 1.00E-03   | 1.17E-06  | --   | 6.00E-02                                       | 6.00E-02                                 | --   | --   | --  | 1.96E-05   | --  | --   | 1.96E-05                                   |
| Copper              | BKG                         | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 4.00E-02                                       | 4.00E-02                                 | --   | --   | --  | --   | --  | --   | --   |
| Lead                | 1.17E+02                    | 8.08E-05  | ND                     | ND  | 1.96E-01   | 1.58E-05  | 4.70E-06  | 5.50E-04   | 1.00E-02                                 | 7.42E-06  | 8.68E-06   | 1.55E-02  | NA   | --  | --   | --   | --                                       | --   | --   | --  | --   | --  | --   | --   |
| Mercury             | 2.20E+00                    | 1.52E-06  | NA                     | NA  | 1.96E-01   | 2.97E-07  | 4.70E-06  | 1.03E-05   | 1.00E-02                                 | 7.42E-06  | 1.63E-07   | 1.55E-02  | NA   | --  | 8.57E-05   | --   | --                                       | 3.47E-03                                   | --   | --  | --   | --  | --   | 3.47E-03                                   |
| Molybdenum          | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | 1.00E-03   | --  | --   | 5.00E-03                                       | 5.00E-03                                 | --   | --   | --  | --   | --  | --   | --   |
| Nickel              | BKG                         | --  | 6.50E-02               | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | 2.00E-04   | 2.01E-07  | --   | 1.43E-05                                       | 2.00E-02                                 | 8.00E-04                                   | --   | --  | --   | 2.51E-04  | --   | 2.51E-04                                   |
| Selenium            | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | 5.71E-03   | 5.00E-03                                       | 5.00E-03                                 | --   | --   | --  | --   | --  | --   | --   |
| Vanadium            | BKG                         | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 7.00E-03                                       | 1.82E-04                                 | --   | --   | --  | --   | --  | --   | --   |
| Zinc                | 1.10E+02                    | 7.60E-05  | 2.70E-02               | NA  | 1.96E-01   | 1.49E-05  | 4.70E-06  | 5.17E-04   | 1.00E-02                                 | 7.42E-06  | 8.16E-06   | 1.55E-02  | 6.00E-04   | 2.50E-07  | --   | 3.00E-01                                       | 3.00E-01                                 | --   | 1.72E-03   | 2.72E-05  | 8.35E-07   | --  | --   | 1.75E-03                                   |
| Aldrin              | 3.09E-01                    | 2.13E-07  | NA                     | NA  | 1.96E-01   | 4.17E-08  | 4.70E-06  | 1.45E-06   | 5.00E-02                                 | 7.42E-06  | 1.14E-07   | 1.55E-02  | NA   | --  | --   | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | 1.39E-03   | 4.83E-02  | 3.82E-03   | --  | --   | 5.35E-02                                   |
| Alpha-BHC (Lindane) | 2.20E-03                    | 1.52E-09  | NA                     | NA  | 1.96E-01   | 2.97E-10  | 4.70E-06  | 1.03E-08   | 5.00E-02                                 | 7.42E-06  | 8.16E-10   | 1.55E-02  | NA   | --  | --   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 5.95E-07   | 2.07E-05  | 1.63E-06   | --  | --   | 2.29E-05                                   |
| DDD                 | 2.20E-03                    | 1.52E-09  | NA                     | NA  | 1.96E-01   | 2.97E-10  | 4.70E-06  | 1.03E-08   | 5.00E-02                                 | 7.42E-06  | 8.16E-10   | 1.55E-02  | NA   | --  | --   | --   | --                                       | --   | --   | --  | --   | --  | --   | --   |
| DDE                 | 4.32E-01                    | 2.98E-07  | NA                     | NA  | 1.96E-01   | 5.83E-08  | 4.70E-06  | 2.03E-06   | 5.00E-02                                 | 7.42E-06  | 1.60E-07   | 1.55E-02  | NA   | --  | --   | --   | --                                       | --   | --   | --  | --   | --  | --   | --   |
| DDT                 | 9.02E-01                    | 6.23E-07  | NA                     | NA  | 1.96E-01   | 1.22E-07  | 4.70E-06  | 4.23E-06   | 5.00E-02                                 | 7.42E-06  | 3.35E-07   | 1.55E-02  | NA   | --  | --   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 2.44E-04   | 8.47E-03  | 6.69E-04   | --  | --   | 9.38E-03                                   |
| Dieldrin            | 1.94E-01                    | 1.34E-07  | NA                     | NA  | 1.96E-01   | 2.63E-08  | 4.70E-06  | 9.13E-07   | 5.00E-02                                 | 7.42E-06  | 7.21E-08   | 1.55E-02  | NA   | --  | --   | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | 5.25E-04   | 1.83E-02  | 1.44E-03   | --  | --   | 2.02E-02                                   |
| Endrin              | 2.16E-01                    | 1.49E-07  | NA                     | NA  | 1.96E-01   | 2.92E-08  | 4.70E-06  | 1.02E-06   | 5.00E-02                                 | 7.42E-06  | 8.03E-08   | 1.55E-02  | NA   | --  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | 9.74E-05   | 3.39E-03  | 2.68E-04   | --  | --   | 3.75E-03                                   |
| Endrin Ketone       | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --   | --   |
| 1,2-Dichloroethane  | ND                          | --  | 2.10E-03               | 6.30E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 1.00E-01   | 3.25E-06  | 1.23E-06   | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --   | --  | 1.08E-04   | 8.81E-04  | 1.08E-04   |  |
| Toluene             | ND                          | --  | 1.80E-03               | 5.88E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 7.80E-01   | 2.17E-05  | 1.15E-06   | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --   | --  | 1.09E-04   | 1.01E-05  | 1.09E-04   |  |
| Ethylbenzene        | ND                          | --  | 1.00E-03               | 3.27E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 1.20E+00   | 1.86E-05  | 6.40E-07   | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --   | --  | 1.86E-04   | 2.24E-06  | 1.86E-04   |  |
| Xylenes             | ND                          | --  | 1.60E-03               | 4.79E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 1.40E+00   | 3.46E-05  | 9.37E-07   | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --   | --  | 1.73E-05   | 4.68E-07  | 1.73E-05   |  |
| <b>Total</b>        |                             |   |                        |   |  |   |   |  |  |   |  |   |  |   |  |  |  |  | <b>2.90E-01</b>                                      | <b>1.00E-01</b>                                     | <b>1.08E-02</b>                                  | <b>1.04E-03</b>                                   | <b>8.94E-04</b>  | <b>4.02E-01</b>                            |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

TABLE C-3. WEST BLOCK ADULT RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor West Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Adult Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Residential Adult Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Adult Groundwater Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Adult Ingestion Carcinogenic Exposure Factor (day)-1 | Residential Adult Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Adult Dermal Carcinogenic Exposure Factor (day)-1 | Residential Adult Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Residential Adult Soil Inhalation Risk | Residential Adult Soil Ingestion Risk | Residential Adult Soil Dermal Risk | Residential Adult Groundwater Inhalation Risk |
|---------------------|-----------------------------|---|------------------------|--|---|---|--|--|---|--|---|--|--|--|--|--|---------------------------------------|------------------------------------|---|
| Arsenic             | BKG                         | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 3.00E-02                                 | 5.45E-06  | --   | 1.20E+01   | 1.50E+00   | 1.50E+00   | --                                     | --                                    | --                                 | --  |
| Barium              | 3.00E+02                    | 3.45E-07  | 1.12E-01               | NA   | 9.39E-02  | 3.24E-08  | --   | 4.70E-07   | 1.41E-04  | 1.00E-02                                 | 5.45E-06  | 1.63E-05   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Beryllium           | BKG                         | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | 8.40E+00   | --   | --   | --                                     | --                                    | --                                 | --  |
| Cadmium             | BKG                         | --  | ND                     | ND   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-03                                 | 5.45E-06  | --   | 1.50E+01   | 3.80E-01   | 1.52E+01   | --                                     | --                                    | --                                 | --  |
| Chromium            | BKG                         | --  | ND                     | ND   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Copper              | BKG                         | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Lead                | 1.17E+02                    | 1.34E-07  | ND                     | ND   | 9.39E-02  | 1.26E-08  | --   | 4.70E-07   | 5.50E-05  | 1.00E-02                                 | 5.45E-06  | 6.38E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Mercury             | 2.20E+00                    | 2.53E-09  | NA                     | NA   | 9.39E-02  | 2.37E-10  | --   | 4.70E-07   | 1.03E-06  | 1.00E-02                                 | 5.45E-06  | 1.20E-07   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Molybdenum          | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Nickel              | BKG                         | --  | 6.50E-02               | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | 9.10E-01   | --   | --   | --                                     | --                                    | --                                 | --  |
| Selenium            | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Vanadium            | BKG                         | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Zinc                | 1.10E+02                    | 1.26E-07  | 2.70E-02               | NA   | 9.39E-02  | 1.19E-08  | --   | 4.70E-07   | 5.17E-05  | 1.00E-02                                 | 5.45E-06  | 5.99E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Aldrin              | 3.09E-01                    | 3.55E-10  | NA                     | NA   | 9.39E-02  | 3.33E-11  | --   | 4.70E-07   | 1.45E-07  | 5.00E-02                                 | 5.45E-06  | 8.40E-08   | 1.70E+01   | 1.70E+01   | 1.70E+01   | 5.66E-10                               | 2.46E-06                              | 1.43E-06                           | --  |
| Alpha-BHC (Lindane) | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 9.39E-02  | 2.37E-13  | --   | 4.70E-07   | 1.03E-09  | 5.00E-02                                 | 5.45E-06  | 5.99E-10   | 2.70E+00   | 2.70E+00   | 2.70E+00   | 6.41E-13                               | 2.79E-09                              | 1.62E-09                           | --  |
| DDD                 | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 9.39E-02  | 2.37E-13  | --   | 4.70E-07   | 1.03E-09  | 5.00E-02                                 | 5.45E-06  | 5.99E-10   | 2.40E-01   | 2.40E-01   | 2.40E-01   | 5.70E-14                               | 2.48E-10                              | 1.44E-10                           | --  |
| DDE                 | 4.32E-01                    | 4.96E-10  | NA                     | NA   | 9.39E-02  | 4.66E-11  | --   | 4.70E-07   | 2.03E-07  | 5.00E-02                                 | 5.45E-06  | 1.18E-07   | 3.40E-01   | 3.40E-01   | 3.40E-01   | 1.58E-11                               | 6.89E-08                              | 4.00E-08                           | --  |
| DDT                 | 9.02E-01                    | 1.04E-09  | NA                     | NA   | 9.39E-02  | 9.73E-11  | --   | 4.70E-07   | 4.23E-07  | 5.00E-02                                 | 5.45E-06  | 2.46E-07   | 3.40E-01   | 3.40E-01   | 3.40E-01   | 3.31E-11                               | 1.44E-07                              | 8.35E-08                           | --  |
| Dieldrin            | 1.94E-01                    | 2.23E-10  | NA                     | NA   | 9.39E-02  | 2.10E-11  | --   | 4.70E-07   | 9.13E-08  | 5.00E-02                                 | 5.45E-06  | 5.29E-08   | 1.60E+01   | 1.60E+01   | 1.60E+01   | 3.36E-10                               | 1.46E-06                              | 8.47E-07                           | --  |
| Endrin              | 2.16E-01                    | 2.49E-10  | NA                     | NA   | 9.39E-02  | 2.33E-11  | --   | 4.70E-07   | 1.02E-07  | 5.00E-02                                 | 5.45E-06  | 5.89E-08   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Endrin Ketone       | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| 1,2-Dichloroethane  | ND                          | --  | 6.00E-10               | 6.00E-07                                       | 9.39E-02  | --  | 5.64E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | 7.20E-02   | 4.70E-02   | 4.70E-02   | --                                     | --                                    | --                                 | 4.06E-09                                      |
| Toluene             | ND                          | --  | 9.28E-10               | 9.28E-07                                       | 9.39E-02  | --  | 8.71E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Ethylbenzene        | ND                          | --  | 4.94E-10               | 4.94E-07                                       | 9.39E-02  | --  | 4.64E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Xylenes             | ND                          | --  | 7.67E-10               | 7.67E-07                                       | 9.39E-02  | --  | 7.21E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen  
 mg/L = milligrams per liter

TABLE C-4. WEST BLOCK CHILD RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor West Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Child Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Residential Child Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Adult Groundwater Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Child Ingestion Carcinogenic Exposure Factor (day)-1 | Residential Child Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Child Dermal Carcinogenic Exposure Factor (day)-1 | Residential Child Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Residential Child Soil Inhalation Risk | Residential Child Soil Ingestion Risk | Residential Child Soil Dermal Risk | Residential Child Groundwater Inhalation Risk |
|---------------------|-----------------------------|---|------------------------|--|---|---|--|--|---|--|---|--|--|--|--|--|---------------------------------------|------------------------------------|---|
| Arsenic             | BKG                         | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 3.00E-02                                 | 1.64E-06  | --   | 1.20E+01   | 1.50E+00   | 1.50E+00   | --                                     | --                                    | --                                 | --  |
| Barium              | 3.00E+02                    | 3.45E-07  | 1.12E-01               | NA   | 5.48E-02  | 1.89E-08  | --   | 1.10E-06   | 3.29E-04  | 1.00E-02                                 | 1.64E-06  | 4.93E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Beryllium           | BKG                         | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | 8.40E+00   | --   | --   | --                                     | --                                    | --                                 | --  |
| Cadmium             | BKG                         | --  | ND                     | ND   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-03                                 | 1.64E-06  | --   | 1.50E+01   | 3.80E-01   | 1.52E+01   | --                                     | --                                    | --                                 | --  |
| Chromium            | BKG                         | --  | ND                     | ND   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Copper              | BKG                         | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Lead                | 1.17E+02                    | 1.34E-07  | ND                     | ND   | 5.48E-02  | 7.37E-09  | --   | 1.10E-06   | 1.28E-04  | 1.00E-02                                 | 1.64E-06  | 1.92E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Mercury             | 2.20E+00                    | 2.53E-09  | NA                     | NA   | 5.48E-02  | 1.39E-10  | --   | 1.10E-06   | 2.41E-06  | 1.00E-02                                 | 1.64E-06  | 3.62E-08   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Molybdenum          | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Nickel              | BKG                         | --  | 6.50E-02               | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | 9.10E-01   | --   | --   | --                                     | --                                    | --                                 | --  |
| Selenium            | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Vanadium            | BKG                         | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Zinc                | 1.10E+02                    | 1.26E-07  | 2.70E-02               | NA   | 5.48E-02  | 6.93E-09  | --   | 1.10E-06   | 1.21E-04  | 1.00E-02                                 | 1.64E-06  | 1.81E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Aldrin              | 3.09E-01                    | 3.55E-10  | NA                     | NA   | 5.48E-02  | 1.94E-11  | --   | 1.10E-06   | 3.38E-07  | 5.00E-02                                 | 1.64E-06  | 2.54E-08   | 1.70E+01   | 1.70E+01   | 1.70E+01   | 3.30E-10                               | 5.75E-06                              | 4.31E-07                           | --  |
| Alpha-BHC (Lindane) | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 5.48E-02  | 1.39E-13  | --   | 1.10E-06   | 2.41E-09  | 5.00E-02                                 | 1.64E-06  | 1.81E-10   | 2.70E+00   | 2.70E+00   | 2.70E+00   | 3.74E-13                               | 6.51E-09                              | 4.88E-10                           | --  |
| DDD                 | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 5.48E-02  | 1.39E-13  | --   | 1.10E-06   | 2.41E-09  | 5.00E-02                                 | 1.64E-06  | 1.81E-10   | 2.40E-01   | 2.40E-01   | 2.40E-01   | 3.32E-14                               | 5.79E-10                              | 4.34E-11                           | --  |
| DDE                 | 4.32E-01                    | 4.96E-10  | NA                     | NA   | 5.48E-02  | 2.72E-11  | --   | 1.10E-06   | 4.73E-07  | 5.00E-02                                 | 1.64E-06  | 3.55E-08   | 3.40E-01   | 3.40E-01   | 3.40E-01   | 9.24E-12                               | 1.61E-07                              | 1.21E-08                           | --  |
| DDT                 | 9.02E-01                    | 1.04E-09  | NA                     | NA   | 5.48E-02  | 5.68E-11  | --   | 1.10E-06   | 9.88E-07  | 5.00E-02                                 | 1.64E-06  | 7.41E-08   | 3.40E-01   | 3.40E-01   | 3.40E-01   | 1.93E-11                               | 3.36E-07                              | 2.52E-08                           | --  |
| Dieldrin            | 1.94E-01                    | 2.23E-10  | NA                     | NA   | 5.48E-02  | 1.22E-11  | --   | 1.10E-06   | 2.13E-07  | 5.00E-02                                 | 1.64E-06  | 1.60E-08   | 1.60E+01   | 1.60E+01   | 1.60E+01   | 1.96E-10                               | 3.41E-06                              | 2.56E-07                           | --  |
| Endrin              | 2.16E-01                    | 2.49E-10  | NA                     | NA   | 5.48E-02  | 1.36E-11  | --   | 1.10E-06   | 2.37E-07  | 5.00E-02                                 | 1.64E-06  | 1.78E-08   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Endrin Ketone       | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| 1,2-Dichloroethane  | ND                          | --  | 6.00E-10               | 6.00E-07                                       | 5.48E-02  | --  | 3.29E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | 7.20E-02   | 4.70E-02   | 4.70E-02   | --                                     | --                                    | --                                 | 2.37E-09                                      |
| Toluene             | ND                          | --  | 9.28E-10               | 9.28E-07                                       | 5.48E-02  | --  | 5.08E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Ethylbenzene        | ND                          | --  | 4.94E-10               | 4.94E-07                                       | 5.48E-02  | --  | 2.71E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Xylenes             | ND                          | --  | 7.67E-10               | 7.67E-07                                       | 5.48E-02  | --  | 4.20E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen  
 mg/L = milligrams per liter

TABLE C-5. WEST BLOCK TOTAL RESIDENTIAL EXCESS CANCER RISK CALCULATIONS

Mandela Gateway Redevelopment Site  
Oakland, California

|                     | Residential Adult Soil Inhalation Risk | Residential Child Soil Inhalation Risk | Total Residential Soil Inhalation Risk | Residential Adult Soil Ingestion Risk | Residential Child Soil Ingestion Risk | Total Residential Soil Inhalation Risk | Residential Adult Soil Dermal Risk | Residential Child Soil Dermal Risk | Total Residential Soil Inhalation Risk | Total Residential Soil Risk | Residential Adult Groundwater Inhalation Risk | Residential Child Groundwater Inhalation Risk | Total Residential Groundwater Inhalation Risk | Total Residential Risk |
|---------------------|--|--|--|---------------------------------------|---------------------------------------|--|------------------------------------|------------------------------------|--|-----------------------------|---|---|---|------------------------|
| Arsenic             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Barium              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Beryllium           | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Cadmium             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Chromium            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Cobalt              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Copper              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Lead                | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Mercury             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Molybdenum          | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Nickel              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Selenium            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Vanadium            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Zinc                | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Aldrin              | 5.66E-10                               | 3.30E-10                               | 8.96E-10                               | 2.46E-06                              | 5.75E-06                              | 8.21E-06                               | 1.43E-06                           | 4.31E-07                           | 1.86E-06                               | 1.01E-05                    | --  | --  | --  | 1.01E-05               |
| Alpha-BHC (Lindane) | 6.41E-13                               | 3.74E-13                               | 1.02E-12                               | 2.79E-09                              | 6.51E-09                              | 9.30E-09                               | 1.62E-09                           | 4.88E-10                           | 2.11E-09                               | 1.14E-08                    | --  | --  | --  | 1.14E-08               |
| DDD                 | 5.70E-14                               | 3.32E-14                               | 9.02E-14                               | 2.48E-10                              | 5.79E-10                              | 8.27E-10                               | 1.44E-10                           | 4.34E-11                           | 1.87E-10                               | 1.01E-09                    | --  | --  | --  | 1.01E-09               |
| DDE                 | 1.58E-11                               | 9.24E-12                               | 2.51E-11                               | 6.89E-08                              | 1.61E-07                              | 2.30E-07                               | 4.00E-08                           | 1.21E-08                           | 5.20E-08                               | 2.82E-07                    | --  | --  | --  | 2.82E-07               |
| DDT                 | 3.31E-11                               | 1.93E-11                               | 5.24E-11                               | 1.44E-07                              | 3.36E-07                              | 4.80E-07                               | 8.35E-08                           | 2.52E-08                           | 1.09E-07                               | 5.89E-07                    | --  | --  | --  | 5.89E-07               |
| Dieldrin            | 3.36E-10                               | 1.96E-10                               | 5.32E-10                               | 1.46E-06                              | 3.41E-06                              | 4.87E-06                               | 8.47E-07                           | 2.56E-07                           | 1.10E-06                               | 5.97E-06                    | --  | --  | --  | 5.97E-06               |
| Endrin              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Endrin Ketone       | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| 1,2-Dichloroethane  | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | 4.06E-09                                      | 2.37E-09                                      | 6.43E-09                                      | 6.43E-09               |
| Toluene             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Ethylbenzene        | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Xylenes             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| <b>Total</b>        | <b>9.5E-10</b>                         | <b>5.6E-10</b>                         | <b>1.5E-09</b>                         | <b>4.1E-06</b>                        | <b>9.7E-06</b>                        | <b>1.4E-05</b>                         | <b>2.4E-06</b>                     | <b>7.2E-07</b>                     | <b>3.1E-06</b>                         | <b>1.7E-05</b>              | <b>4.1E-09</b>                                | <b>2.4E-09</b>                                | <b>6.4E-09</b>                                | <b>1.7E-05</b>         |

Notes:  
-- = Not Applicable





TABLE C-7. WEST BLOCK CHILD RESIDENTIAL NONCANCER HAZARD CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor West Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Child Inhalation Noncancer Exposure Factor (m3/kg-day) | Residential Child Soil Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Residential Child Groundwater Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Residential Child Ingestion Noncancer Exposure Factor (day)-1 | Residential Child Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Child Dermal Noncancer Exposure Factor (day)-1 | Residential Child Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Residential Child Soil Inhalation Noncancer Hazard | Residential Child Soil Ingestion Noncancer Hazard | Residential Child Soil Dermal Noncancer Hazard | Total Residential Child Soil Noncancer Hazard | Residential Child Groundwater Inhalation Noncancer Hazard | Total Child Residential Noncancer Hazard |
|---------------------|-----------------------------|---|------------------------|--|--|--|---|---|--|--|--|---|--|--|--|--|---|--|---|---|--|
| Arsenic             | BKG                         | --  | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 3.00E-02                                 | 1.92E-05   | --  | 8.57E-06                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --  | --                                       |
| Barium              | 3.00E+02                    | 3.45E-07  | 1.12E-01               | NA   | 6.39E-01   | 2.20E-07   | --  | 1.28E-05  | 3.84E-03   | 1.00E-02                                 | 1.92E-05   | 5.75E-05  | 1.43E-04                                       | 7.00E-02                                 | 4.90E-03                                   | 1.54E-03   | 5.48E-02  | 1.17E-02                                       | 6.81E-02                                      | --  | 6.81E-02                                 |
| Beryllium           | BKG                         | --  | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | 5.71E-06                                       | 2.00E-03                                 | 1.40E-05                                   | --   | --  | --   | --  | --  | --                                       |
| Cadmium             | BKG                         | --  | ND                     | ND   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-03                                 | 1.92E-05   | --  | 5.71E-06                                       | 5.00E-04                                 | 1.25E-05                                   | --   | --  | --   | --  | --  | --                                       |
| Chromium            | BKG                         | --  | ND                     | ND   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | --   | 1.50E+00                                 | 1.95E-02                                   | --   | --  | --   | --  | --  | --                                       |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | --   | 6.00E-02                                 | 6.00E-02                                   | --   | --  | --   | --  | --  | --                                       |
| Copper              | BKG                         | --  | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | --   | 4.00E-02                                 | 4.00E-02                                   | --   | --  | --   | --  | --  | --                                       |
| Lead                | 1.17E+02                    | 1.34E-07  | ND                     | ND   | 6.39E-01   | 8.60E-08   | --  | 1.28E-05  | 1.50E-03   | 1.00E-02                                 | 1.92E-05   | 2.24E-05  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |
| Mercury             | 2.20E+00                    | 2.53E-09  | NA                     | NA   | 6.39E-01   | 1.62E-09   | --  | 1.28E-05  | 2.81E-05   | 1.00E-02                                 | 1.92E-05   | 4.22E-07  | 8.57E-05                                       | --                                       | --   | 1.89E-05   | --  | --   | 1.89E-05                                      | --  | 1.89E-05                                 |
| Molybdenum          | ND                          | --  | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | --   | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --  | --                                       |
| Nickel              | BKG                         | --  | 6.50E-02               | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | 1.43E-05                                       | 2.00E-02                                 | 8.00E-04                                   | --   | --  | --   | --  | --  | --                                       |
| Selenium            | ND                          | --  | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | 5.71E-03                                       | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --  | --                                       |
| Vanadium            | BKG                         | --  | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | --   | 7.00E-03                                 | 1.82E-04                                   | --   | --  | --   | --  | --  | --                                       |
| Zinc                | 1.10E+02                    | 1.26E-07  | 2.70E-02               | NA   | 6.39E-01   | 8.08E-08   | --  | 1.28E-05  | 1.41E-03   | 1.00E-02                                 | 1.92E-05   | 2.11E-05  | --   | 3.00E-01                                 | 3.00E-01                                   | --   | 4.69E-03  | 7.03E-05                                       | 4.76E-03                                      | --  | 4.76E-03                                 |
| Aldrin              | 3.09E-01                    | 3.55E-10  | NA                     | NA   | 6.39E-01   | 2.27E-10   | --  | 1.28E-05  | 3.94E-06   | 5.00E-02                                 | 1.92E-05   | 2.96E-07  | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | 7.55E-06   | 1.31E-01  | 9.86E-03                                       | 1.41E-01                                      | --  | 1.41E-01                                 |
| Alpha-BHC (Lindane) | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 6.39E-01   | 1.62E-12   | --  | 1.28E-05  | 2.81E-08   | 5.00E-02                                 | 1.92E-05   | 2.11E-09  | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 3.23E-09   | 5.63E-05  | 4.22E-06                                       | 6.05E-05                                      | --  | 6.05E-05                                 |
| DDD                 | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 6.39E-01   | 1.62E-12   | --  | 1.28E-05  | 2.81E-08   | 5.00E-02                                 | 1.92E-05   | 2.11E-09  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |
| DDE                 | 4.32E-01                    | 4.96E-10  | NA                     | NA   | 6.39E-01   | 3.17E-10   | --  | 1.28E-05  | 5.52E-06   | 5.00E-02                                 | 1.92E-05   | 4.14E-07  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |
| DDT                 | 9.02E-01                    | 1.04E-09  | NA                     | NA   | 6.39E-01   | 6.62E-10   | --  | 1.28E-05  | 1.15E-05   | 5.00E-02                                 | 1.92E-05   | 8.65E-07  | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 1.32E-06   | 2.31E-02  | 1.73E-03                                       | 2.48E-02                                      | --  | 2.48E-02                                 |
| Dieldrin            | 1.94E-01                    | 2.23E-10  | NA                     | NA   | 6.39E-01   | 1.43E-10   | --  | 1.28E-05  | 2.48E-06   | 5.00E-02                                 | 1.92E-05   | 1.86E-07  | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | 2.86E-06   | 4.97E-02  | 3.73E-03                                       | 5.34E-02                                      | --  | 5.34E-02                                 |
| Endrin              | 2.16E-01                    | 2.49E-10  | NA                     | NA   | 6.39E-01   | 1.59E-10   | --  | 1.28E-05  | 2.77E-06   | 5.00E-02                                 | 1.92E-05   | 2.07E-07  | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | 5.30E-07   | 9.22E-03  | 6.91E-04                                       | 9.91E-03                                      | --  | 9.91E-03                                 |
| Endrin Ketone       | ND                          | --  | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 5.00E-02                                 | 1.92E-05   | --  | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --  | --                                       |
| 1,2-Dichloroethane  | ND                          | --  | 6.00E-10               | 6.00E-07                                       | 6.39E-01   | --   | 3.84E-07  | 1.28E-05  | --   | 1.00E-01                                 | 1.92E-05   | --  | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --   | --  | --   | --  | 2.74E-04  | 2.74E-04                                 |
| Toluene             | ND                          | --  | 9.28E-10               | 9.28E-07                                       | 6.39E-01   | --   | 5.93E-07  | 1.28E-05  | --   | 1.00E-01                                 | 1.92E-05   | --  | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --   | --  | --   | --  | 5.19E-06  | 5.19E-06                                 |
| Ethylbenzene        | ND                          | --  | 4.94E-10               | 4.94E-07                                       | 6.39E-01   | --   | 3.16E-07  | 1.28E-05  | --   | 1.00E-01                                 | 1.92E-05   | --  | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --   | --  | --   | --  | 1.11E-06  | 1.11E-06                                 |
| Xylenes             | ND                          | --  | 7.67E-10               | 7.67E-07                                       | 6.39E-01   | --   | 4.90E-07  | 1.28E-05  | --   | 1.00E-01                                 | 1.92E-05   | --  | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --   | --  | --   | --  | 2.45E-07  | 2.45E-07                                 |
| <b>Total</b>        |                             |   |                        |  |  |  |   |   |  |  |  |   |  |  |  |  |   |  | <b>3.02E-01</b>                               | <b>2.81E-04</b>   | <b>3.03E-01</b>                          |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen  
 mg/L = milligrams per liter

TABLE C-8. WEST BLOCK COMMERCIAL/INDUSTRIAL WORKER EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor West Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Commercial/Industrial Groundwater Indoor Air EPC (mg/m3) | Commercial/Industrial Worker Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Commercial/Industrial Worker Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Groundwater Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Ingestion Carcinogenic Exposure Factor (day-1) | Commercial/Industrial Worker Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Commercial/Industrial Worker Dermal Carcinogenic Exposure Factor (day-1) | Commercial/Industrial Worker Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Commercial/Industrial Worker Soil Inhalation Risk | Commercial/Industrial Worker Soil Ingestion Risk | Commercial/Industrial Worker Soil Dermal Risk | Total Commercial/Industrial Worker Soil Risk | Commercial/Industrial Worker Groundwater Inhalation Risk | Total Commercial/Industrial Worker Risk |
|---------------------|-----------------------------|---|------------------------|--|--|--|---|---|--|--|--|---|--|--|--|---|--|---|--|--|---|
| Arsenic             | BKG                         | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 3.00E-02                                 | 2.65E-06   | --  | 1.20E+01   | 1.50E+00   | 1.50E+00   | --  | --   | --  | --   | --   | --                                      |
| Barium              | 3.00E+02                    | 3.45E-07  | 1.12E-01               | NA   | 6.99E-02   | 2.41E-08   | --  | 6.99E-08  | 2.10E-05   | 1.00E-02                                 | 2.65E-06   | 7.95E-06  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Beryllium           | BKG                         | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | 8.40E+00   | --   | --   | --  | --   | --  | --   | --   | --                                      |
| Cadmium             | BKG                         | --  | ND                     | ND   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-03                                 | 2.65E-06   | --  | 1.50E+01   | 3.80E-01   | 1.52E+01   | --  | --   | --  | --   | --   | --                                      |
| Chromium            | BKG                         | --  | ND                     | ND   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Copper              | BKG                         | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Lead                | 1.17E+02                    | 1.34E-07  | ND                     | ND   | 6.99E-02   | 9.40E-09   | --  | 6.99E-08  | 8.18E-06   | 1.00E-02                                 | 2.65E-06   | 3.10E-06  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Mercury             | 2.20E+00                    | 2.53E-09  | NA                     | NA   | 6.99E-02   | 1.77E-10   | --  | 6.99E-08  | 1.54E-07   | 1.00E-02                                 | 2.65E-06   | 5.83E-08  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Molybdenum          | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Nickel              | BKG                         | --  | 6.50E-02               | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | 9.10E-01   | --   | --   | --  | --   | --  | --   | --   | --                                      |
| Selenium            | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Vanadium            | BKG                         | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Zinc                | 1.10E+02                    | 1.26E-07  | 2.70E-02               | NA   | 6.99E-02   | 8.83E-09   | --  | 6.99E-08  | 7.69E-06   | 1.00E-02                                 | 2.65E-06   | 2.92E-06  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Aldrin              | 3.09E-01                    | 3.55E-10  | NA                     | NA   | 6.99E-02   | 2.48E-11   | --  | 6.99E-08  | 2.16E-08   | 5.00E-02                                 | 2.65E-06   | 4.09E-08  | 1.70E+01   | 1.70E+01   | 1.70E+01   | 4.21E-10  | 3.67E-07   | 6.95E-07                                      | 1.06E-06                                     | --   | 1.06E-06                                |
| Alpha-BHC (Lindane) | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 6.99E-02   | 1.77E-13   | --  | 6.99E-08  | 1.54E-10   | 5.00E-02                                 | 2.65E-06   | 2.92E-10  | 2.70E+00   | 2.70E+00   | 2.70E+00   | 4.77E-13  | 4.15E-10   | 7.87E-10                                      | 1.20E-09                                     | --   | 1.20E-09                                |
| DDD                 | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 6.99E-02   | 1.77E-13   | --  | 6.99E-08  | 1.54E-10   | 5.00E-02                                 | 2.65E-06   | 2.92E-10  | 2.40E-01   | 2.40E-01   | 2.40E-01   | 4.24E-14  | 3.69E-11   | 7.00E-11                                      | 1.07E-10                                     | --   | 1.07E-10                                |
| DDE                 | 4.32E-01                    | 4.96E-10  | NA                     | NA   | 6.99E-02   | 3.47E-11   | --  | 6.99E-08  | 3.02E-08   | 5.00E-02                                 | 2.65E-06   | 5.72E-08  | 3.40E-01   | 3.40E-01   | 3.40E-01   | 1.18E-11  | 1.03E-08   | 1.94E-08                                      | 2.97E-08                                     | --   | 2.97E-08                                |
| DDT                 | 9.02E-01                    | 1.04E-09  | NA                     | NA   | 6.99E-02   | 7.24E-11   | --  | 6.99E-08  | 6.30E-08   | 5.00E-02                                 | 2.65E-06   | 1.19E-07  | 3.40E-01   | 3.40E-01   | 3.40E-01   | 2.46E-11  | 2.14E-08   | 4.06E-08                                      | 6.21E-08                                     | --   | 6.21E-08                                |
| Dieldrin            | 1.94E-01                    | 2.23E-10  | NA                     | NA   | 6.99E-02   | 1.56E-11   | --  | 6.99E-08  | 1.36E-08   | 5.00E-02                                 | 2.65E-06   | 2.58E-08  | 1.60E+01   | 1.60E+01   | 1.60E+01   | 2.50E-10  | 2.17E-07   | 4.12E-07                                      | 6.30E-07                                     | --   | 6.30E-07                                |
| Endrin              | 2.16E-01                    | 2.49E-10  | NA                     | NA   | 6.99E-02   | 1.74E-11   | --  | 6.99E-08  | 1.51E-08   | 5.00E-02                                 | 2.65E-06   | 2.87E-08  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Endrin Ketone       | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| 1,2-Dichloroethane  | ND                          | --  | 6.00E-10               | 2.40E-10   | 6.99E-02   | --   | 1.68E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | 7.20E-02   | 4.70E-02   | 4.70E-02   | --  | --   | --  | --   | --   | --                                      |
| Toluene             | ND                          | --  | 9.28E-10               | 3.71E-10   | 6.99E-02   | --   | 2.59E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | 1.21E-12   | 1.21E-12                                |
| Ethylbenzene        | ND                          | --  | 4.94E-10               | 1.98E-10   | 6.99E-02   | --   | 1.38E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Xylenes             | ND                          | --  | 7.67E-10               | 3.07E-10   | 6.99E-02   | --   | 2.15E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

TABLE C-9. WEST BLOCK COMMERCIAL/INDUSTRIAL WORKER NONCANCER HAZARD CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor West Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Commercial/Industrial Groundwater Indoor Air EPC (mg/m3) | Commercial/Industrial Worker Inhalation Noncancer Exposure Factor (m3/kg-day) | Commercial/Industrial Worker Soil Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Groundwater Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Ingestion Noncancer Exposure Factor (day)-1 | Commercial/Industrial Worker Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Commercial/Industrial Worker Dermal Noncancer Exposure Factor (day)-1 | Commercial/Industrial Worker Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Commercial/Industrial Worker Soil Inhalation Noncancer Hazard | Commercial/Industrial Worker Soil Ingestion Noncancer Hazard | Commercial/Industrial Worker Soil Dermal Noncancer Hazard | Total Commercial/Industrial Worker Soil Noncancer Hazard | Commercial/Industrial Worker Groundwater Inhalation Noncancer Hazard | Total Commercial/Industrial Worker Noncancer Hazard |                 |
|---------------------|-----------------------------|---|------------------------|--|---|---|--|--|---|--|---|--|--|--|--|---|--|---|--|--|---|-----------------|
| Arsenic             | BKG                         | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 3.00E-02                                 | 7.42E-06  | --   | 8.57E-06                                       | 3.00E-04                                 | 3.00E-04                                   | --  | --   | --  | --   | --   | --  |                 |
| Barium              | 3.00E+02                    | 3.45E-07  | 1.12E-01               | NA   | 1.96E-01  | 6.75E-08  | --   | 9.78E-07   | 2.94E-04  | 1.00E-02                                 | 7.42E-06  | 2.23E-05   | 1.43E-04                                       | 7.00E-02                                 | 4.90E-03                                   | 4.72E-04  | 4.19E-03   | 4.54E-03  | 9.21E-03   | --   | 9.21E-03  |                 |
| Beryllium           | BKG                         | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 5.71E-06                                       | 2.00E-03                                 | 1.40E-05                                   | --  | --   | --  | --   | --   | --  |                 |
| Cadmium             | BKG                         | --  | ND                     | ND   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-03                                 | 7.42E-06  | --   | 5.71E-06                                       | 5.00E-04                                 | 1.25E-05                                   | --  | --   | --  | --   | --   | --  |                 |
| Chromium            | BKG                         | --  | ND                     | ND   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 1.50E+00                                 | 1.95E-02                                   | --  | --   | --  | --   | --   | --  |                 |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 6.00E-02                                 | 6.00E-02                                   | --  | --   | --  | --   | --   | --  |                 |
| Copper              | BKG                         | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 4.00E-02                                 | 4.00E-02                                   | --  | --   | --  | --   | --   | --  |                 |
| Lead                | 1.17E+02                    | 1.34E-07  | ND                     | ND   | 1.96E-01  | 2.63E-08  | --   | 9.78E-07   | 1.15E-04  | 1.00E-02                                 | 7.42E-06  | 8.68E-06   | --   | --                                       | --   | --  | --   | --  | --   | --   | --  |                 |
| Mercury             | 2.20E+00                    | 2.53E-09  | NA                     | NA   | 1.96E-01  | 4.95E-10  | --   | 9.78E-07   | 2.15E-06  | 1.00E-02                                 | 7.42E-06  | 1.63E-07   | 8.57E-05                                       | --                                       | --   | 5.77E-06  | --   | --  | 5.77E-06   | --   | 5.77E-06  |                 |
| Molybdenum          | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 5.00E-03                                 | 5.00E-03                                   | --  | --   | --  | --   | --   | --  |                 |
| Nickel              | BKG                         | --  | 6.50E-02               | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 1.43E-05                                       | 2.00E-02                                 | 8.00E-04                                   | --  | --   | --  | --   | --   | --  |                 |
| Selenium            | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 5.71E-03                                       | 5.00E-03                                 | 5.00E-03                                   | --  | --   | --  | --   | --   | --  |                 |
| Vanadium            | BKG                         | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 7.00E-03                                 | 1.82E-04                                   | --  | --   | --  | --   | --   | --  |                 |
| Zinc                | 1.10E+02                    | 1.26E-07  | 2.70E-02               | NA   | 1.96E-01  | 2.47E-08  | --   | 9.78E-07   | 1.08E-04  | 1.00E-02                                 | 7.42E-06  | 8.16E-06   | --   | 3.00E-01                                 | 3.00E-01                                   | --  | 3.59E-04   | 2.72E-05  | 3.86E-04   | --   | 3.86E-04  |                 |
| Aldrin              | 3.09E-01                    | 3.55E-10  | NA                     | NA   | 1.96E-01  | 6.94E-11  | --   | 9.78E-07   | 3.02E-07  | 5.00E-02                                 | 7.42E-06  | 1.14E-07   | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | 2.31E-06  | 1.01E-02   | 3.82E-03  | 1.39E-02   | --   | 1.39E-02  |                 |
| Alpha-BHC (Lindane) | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 1.96E-01  | 4.95E-13  | --   | 9.78E-07   | 2.15E-09  | 5.00E-02                                 | 7.42E-06  | 8.16E-10   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 9.89E-10  | 4.31E-06   | 1.63E-06  | 5.94E-06   | --   | 5.94E-06  |                 |
| DDD                 | 2.20E-03                    | 2.53E-12  | NA                     | NA   | 1.96E-01  | 4.95E-13  | --   | 9.78E-07   | 2.15E-09  | 5.00E-02                                 | 7.42E-06  | 8.16E-10   | --   | --                                       | --   | --  | --   | --  | --   | --   | --  |                 |
| DDE                 | 4.32E-01                    | 4.96E-10  | NA                     | NA   | 1.96E-01  | 9.71E-11  | --   | 9.78E-07   | 4.22E-07  | 5.00E-02                                 | 7.42E-06  | 1.60E-07   | --   | --                                       | --   | --  | --   | --  | --   | --   | --  |                 |
| DDT                 | 9.02E-01                    | 1.04E-09  | NA                     | NA   | 1.96E-01  | 2.03E-10  | --   | 9.78E-07   | 8.82E-07  | 5.00E-02                                 | 7.42E-06  | 3.35E-07   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 4.06E-07  | 1.76E-03   | 6.69E-04  | 2.43E-03   | --   | 2.43E-03  |                 |
| Dieldrin            | 1.94E-01                    | 2.23E-10  | NA                     | NA   | 1.96E-01  | 4.37E-11  | --   | 9.78E-07   | 1.90E-07  | 5.00E-02                                 | 7.42E-06  | 7.21E-08   | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | 8.74E-07  | 3.80E-03   | 1.44E-03  | 5.25E-03   | --   | 5.25E-03  |                 |
| Endrin              | 2.16E-01                    | 2.49E-10  | NA                     | NA   | 1.96E-01  | 4.86E-11  | --   | 9.78E-07   | 2.12E-07  | 5.00E-02                                 | 7.42E-06  | 8.03E-08   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | 1.62E-07  | 7.05E-04   | 2.68E-04  | 9.73E-04   | --   | 9.73E-04  |                 |
| Endrin Ketone       | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --  | --   | --  | --   | --   | --  |                 |
| 1,2-Dichloroethane  | ND                          | --  | 6.00E-10               | 2.40E-10   | 1.96E-01  | --  | 4.70E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --  | --   | --  | --   | 3.36E-08   | 3.36E-08  |                 |
| Toluene             | ND                          | --  | 9.28E-10               | 3.71E-10   | 1.96E-01  | --  | 7.26E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --  | --   | --  | --   | 6.35E-10   | 6.35E-10  |                 |
| Ethylbenzene        | ND                          | --  | 4.94E-10               | 1.98E-10   | 1.96E-01  | --  | 3.87E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --  | --   | --  | --   | 1.35E-10   | 1.35E-10  |                 |
| Xylenes             | ND                          | --  | 7.67E-10               | 3.07E-10   | 1.96E-01  | --  | 6.01E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --  | --   | --  | --   | 3.00E-11   | 3.00E-11  |                 |
|                     |                             |   |                        |  |   |   |  |  |   |  |   |  |  |  |  |   |  |   | <b>Total</b>   | <b>3.21E-02</b>  | <b>3.44E-08</b>                                     | <b>3.21E-02</b> |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

**APPENDIX D**

**East Block Risk Calculations**

TABLE D-1. EAST BLOCK CONSTRUCTION WORKER EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | East Block Soil EPC (mg/kg) | Construction Worker Receptor East Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Construction Worker Receptor Standing Water Air EPC (mg/m3) | Construction Worker Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Construction Worker Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Construction Worker Ingestion Carcinogenic Exposure Factor (day)-1 | Construction Worker Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Construction Worker Soil Dermal Carcinogenic Exposure Factor (day)-1 | Construction Worker Soil Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Construction Worker Water Dermal Carcinogenic Exposure Factor (hr-liter/cm-kg-day) | Chemical-Specific Water Permeability Coefficient (cm/hr) | Construction Worker Water Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Construction Worker Standing Water Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Construction Worker Soil Inhalation Risk | Construction Worker Soil Ingestion Risk | Construction Worker Soil Dermal Risk | Construction Worker Water Dermal Risk | Construction Worker Standing Water Inhalation Risk | Construction Worker Total Risk |
|---------------------|-----------------------------|---|------------------------|---|---|---|--|---|--|--|---|--|--|--|---|--|--|--|--|---|--------------------------------------|---------------------------------------|--|--------------------------------|
| Arsenic             | BKG                         | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 3.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 1.20E+01   | 1.50E+00   | 1.50E+00   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Barium              | 1.50E+02                    | 1.04E-04  | NA                     | NA  | 5.59E-03  | 5.81E-07  | 1.34E-07   | 2.02E-05  | 1.00E-02                                 | 2.12E-07   | 3.19E-07  | 4.42E-04   | 1.00E-03   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Beryllium           | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 8.40E+00   | --   | --   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Cadmium             | BKG                         | --  | ND                     | ND  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-03                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 1.50E+01   | 3.80E-01   | 1.52E+01   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Chromium            | BKG                         | --  | ND                     | ND  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Cobalt              | BKG                         | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | 1.00E-03   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Copper              | 3.69E+01                    | 2.55E-05  | NA                     | NA  | 5.59E-03  | 1.43E-07  | 1.34E-07   | 4.95E-06  | 1.00E-02                                 | 2.12E-07   | 7.83E-08  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Lead                | 2.11E+02                    | 1.46E-04  | ND                     | ND  | 5.59E-03  | 8.15E-07  | 1.34E-07   | 2.83E-05  | 1.00E-02                                 | 2.12E-07   | 4.47E-07  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Mercury             | BKG                         | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Molybdenum          | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | 1.00E-03   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Nickel              | BKG                         | --  | 6.50E+01               | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | 2.00E-04   | 5.74E-06   | --  | 9.10E-01   | --   | --   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Selenium            | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Vanadium            | BKG                         | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Zinc                | 1.66E+02                    | 1.15E-04  | 2.70E+01               | NA  | 5.59E-03  | 6.41E-07  | 1.34E-07   | 2.23E-05  | 1.00E-02                                 | 2.12E-07   | 3.52E-07  | 4.42E-04   | 6.00E-04   | 7.16E-06   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Aldrin              | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 1.70E+01   | 1.70E+01   | 1.70E+01   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Alpha-BHC (Lindane) | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 2.70E+00   | 2.70E+00   | 2.70E+00   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| DDD                 | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 2.40E-01   | 2.40E-01   | 2.40E-01   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| DDE                 | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 3.40E-01   | 3.40E-01   | 3.40E-01   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| DDT                 | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 3.40E-01   | 3.40E-01   | 3.40E-01   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Dieldrin            | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 1.60E+01   | 1.60E+01   | 1.60E+01   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Endrin              | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Endrin Ketone       | ND                          | --  | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| 1,2-Dichloroethane  | ND                          | --  | 2.10E-03               | 6.30E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 1.00E-01   | 9.28E-08   | 3.52E-08  | 7.20E-02   | 4.70E-02   | 4.70E-02   | --                                       | --                                      | --                                   | 4.36E-09                              | 2.54E-09   | 4.36E-09                       |
| Toluene             | ND                          | --  | 1.80E-03               | 5.88E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 7.80E-01   | 6.20E-07   | 3.29E-08  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Ethylbenzene        | ND                          | --  | 1.00E-03               | 3.27E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 1.20E+00   | 5.30E-07   | 1.83E-08  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Xylenes             | ND                          | --  | 1.60E-03               | 4.79E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 1.40E+00   | 9.89E-07   | 2.68E-08  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| <b>TOTAL</b>        |                             |   |                        |   |   |   |  |   |  |  |   |  |  |  |   |  |  |  | <b>0.00E+00</b>                          | <b>0.00E+00</b>                         | <b>0.00E+00</b>                      | <b>4.36E-09</b>                       | <b>2.54E-09</b>                                    | <b>4.36E-09</b>                |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 cm/hr = centimeters per hour  
 EPC = Exposure point concentration  
 hr-liter/cm-kg-day = Hour-liter per centimeter-kilogram-day  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 mg/L = milligrams per liter  
 NC = Chemical is not considered a carcinogen

TABLE D-2. EAST BLOCK CONSTRUCTION WORKER NONCANCER HAZARD CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | East Block Soil EPC (mg/kg) | Construction Worker Receptor East Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Construction Worker Receptor Standing Water Air EPC (mg/m3) | Construction Worker Inhalation Noncancer Exposure Factor (m3/kg-day) | Construction Worker Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Construction Worker Ingestion Noncancer Exposure Factor (day)-1 | Construction Worker Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Construction Worker Soil Dermal Noncancer Exposure Factor (day)-1 | Construction Worker Soil Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Construction Worker Water Dermal Noncancer Exposure Factor (hr-liter/cm-kg-day) | Chemical-Specific Water Permeability Coefficient (cm/hr) | Construction Worker Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Construction Worker Standing Water Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Construction Worker Soil Inhalation Noncancer Hazard | Construction Worker Soil Ingestion Noncancer Hazard | Construction Worker Soil Dermal Noncancer Hazard | Construction Worker Water Dermal Noncancer Hazard | Construction Worker Standing Water Inhalation Noncancer Hazard | Total Construction Worker Noncancer Hazard |
|---------------------|-----------------------------|---|------------------------|---|--|---|---|--|--|---|--|---|--|---|--|--|--|--|--|---|--|---|--|--|
| Arsenic             | BKG                         | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 3.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 8.57E-06                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --   | --   |
| Barium              | 1.50E+02                    | 1.04E-04  | NA                     | NA  | 1.96E-01   | 2.03E-05  | 4.70E-06  | 7.06E-04   | 1.00E-02                                 | 7.42E-06  | 1.12E-05   | 1.55E-02  | 1.00E-03   | --  | --   | 1.43E-04                                       | 7.00E-02                                 | 4.90E-03                                   | 1.42E-01   | 1.01E-02  | 2.28E-03   | --  | --   | 1.55E-01                                   |
| Beryllium           | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 5.71E-06                                       | 2.00E-03                                 | 1.40E-05                                   | --   | --  | --   | --  | --   | --   |
| Cadmium             | BKG                         | --  | ND                     | ND  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 5.71E-06                                       | 5.00E-04                                 | 1.25E-05                                   | --   | --  | --   | --  | --   | --   |
| Chromium            | BKG                         | --  | ND                     | ND  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | --   | 1.50E+00                                 | 1.95E-02                                   | --   | --  | --   | --  | --   | --   |
| Cobalt              | BKG                         | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | 1.00E-03   | --  | --   | --   | 6.00E-02                                 | 6.00E-02                                   | --   | --  | --   | --  | --   | --   |
| Copper              | 3.69E+01                    | 2.55E-05  | NA                     | NA  | 1.96E-01   | 4.99E-06  | 4.70E-06  | 1.73E-04   | 1.00E-02                                 | 7.42E-06  | 2.74E-06   | 1.55E-02  | NA   | --  | --   | --   | 4.00E-02                                 | 4.00E-02                                   | --   | 4.33E-03  | 6.85E-05   | --  | --   | 4.40E-03                                   |
| Lead                | 2.11E+02                    | 1.46E-04  | ND                     | ND  | 1.96E-01   | 2.85E-05  | 4.70E-06  | 9.91E-04   | 1.00E-02                                 | 7.42E-06  | 1.57E-05   | 1.55E-02  | NA   | --  | --   | --   | --                                       | --   | --   | --  | --   | --  | --   | --   |
| Mercury             | BKG                         | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 8.57E-05                                       | --                                       | --   | --   | --  | --   | --  | --   | --   |
| Molybdenum          | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | 1.00E-03   | --  | --   | --   | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --   | --   |
| Nickel              | BKG                         | --  | 6.50E-02               | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | 2.00E-04   | 2.01E-07  | --   | 1.43E-05                                       | 2.00E-02                                 | 8.00E-04                                   | --   | --  | --   | 2.51E-04  | --   | 2.51E-04                                   |
| Selenium            | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 5.71E-03                                       | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --   | --   |
| Vanadium            | BKG                         | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | --   | 7.00E-03                                 | 1.82E-04                                   | --   | --  | --   | --  | --   | --   |
| Zinc                | 1.66E+02                    | 1.15E-04  | 2.70E-02               | NA  | 1.96E-01   | 2.24E-05  | 4.70E-06  | 7.80E-04   | 1.00E-02                                 | 7.42E-06  | 1.23E-05   | 1.55E-02  | 6.00E-04   | 2.50E-07  | --   | --   | 3.00E-01                                 | 3.00E-01                                   | --   | 2.60E-03  | 4.11E-05   | 8.35E-07  | --   | 2.64E-03                                   |
| Aldrin              | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | --   | --  | --   | --  | --   | --   |
| Alpha-BHC (Lindane) | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --   | --  | --   | --  | --   | --   |
| DDD                 | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | --   | --                                       | --   | --   | --  | --   | --  | --   | --   |
| DDE                 | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | --   | --                                       | --   | --   | --  | --   | --  | --   | --   |
| DDT                 | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --   | --  | --   | --  | --   | --   |
| Dieldrin            | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | --   | --  | --   | --  | --   | --   |
| Endrin              | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --   | --   |
| Endrin Ketone       | ND                          | --  | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --   | --   |
| 1,2-Dichloroethane  | ND                          | --  | 2.10E-03               | 6.30E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 1.00E-01   | 3.25E-06  | 1.23E-06   | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --   | --  | --   | 1.08E-04  | 8.81E-04   | 1.08E-04                                   |
| Toluene             | ND                          | --  | 1.30E-03               | 5.88E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 7.80E-01   | 2.17E-05  | 1.15E-06   | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --   | --  | --   | 1.09E-04  | 1.01E-05   | 1.09E-04                                   |
| Ethylbenzene        | ND                          | --  | 1.00E-03               | 3.27E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 1.20E+00   | 1.86E-05  | 6.40E-07   | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --   | --  | --   | 1.86E-04  | 2.24E-06   | 1.86E-04                                   |
| Xylenes             | ND                          | --  | 1.60E-03               | 4.79E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 1.40E+00   | 3.46E-05  | 9.37E-07   | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --   | --  | --   | 1.73E-05  | 4.68E-07   | 1.73E-05                                   |
| <b>Total</b>        |                             |   |                        |   |  |   |   |  |  |   |  |   |  |   |  |  |  |  | <b>1.42E-01</b>                                      | <b>1.70E-02</b>                                     | <b>2.39E-03</b>                                  | <b>6.72E-04</b>                                   | <b>8.94E-04</b>  | <b>1.62E-01</b>                            |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

TABLE D-3. EAST BLOCK ADULT RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | East Block Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor East Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Adult Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Residential Adult Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Adult Groundwater Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Adult Ingestion Carcinogenic Exposure Factor (day)-1 | Residential Adult Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Adult Dermal Carcinogenic Exposure Factor (day)-1 | Residential Adult Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Residential Adult Soil Inhalation Risk | Residential Adult Soil Ingestion Risk | Residential Adult Soil Dermal Risk | Residential Adult Groundwater Inhalation Risk |
|---------------------|-----------------------------|---|------------------------|--|---|---|--|--|---|--|---|--|--|--|--|--|---------------------------------------|------------------------------------|---|
| Arsenic             | BKG                         | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 3.00E-02                                 | 5.45E-06  | --   | 1.20E+01   | 1.50E+00   | 1.50E+00   | --                                     | --                                    | --                                 | --  |
| Barium              | 1.50E+02                    | 1.73E-07  | 1.12E-01               | NA   | 9.39E-02  | 1.62E-08  | --   | 4.70E-07   | 7.06E-05  | 1.00E-02                                 | 5.45E-06  | 8.19E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Beryllium           | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | 8.40E+00   | --   | --   | --                                     | --                                    | --                                 | --  |
| Cadmium             | BKG                         | --  | ND                     | ND   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-03                                 | 5.45E-06  | --   | 1.50E+01   | 3.80E-01   | 1.52E+01   | --                                     | --                                    | --                                 | --  |
| Chromium            | BKG                         | --  | ND                     | ND   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Copper              | 3.69E+01                    | 4.24E-08  | NA                     | NA   | 9.39E-02  | 3.98E-09  | --   | 4.70E-07   | 1.73E-05  | 1.00E-02                                 | 5.45E-06  | 2.01E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Lead                | 2.11E+02                    | 2.42E-07  | ND                     | ND   | 9.39E-02  | 2.28E-08  | --   | 4.70E-07   | 9.91E-05  | 1.00E-02                                 | 5.45E-06  | 1.15E-05   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Mercury             | BKG                         | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Molybdenum          | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Nickel              | BKG                         | --  | 6.50E-02               | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | 9.10E-01   | --   | --   | --                                     | --                                    | --                                 | --  |
| Selenium            | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Vanadium            | BKG                         | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Zinc                | 1.66E+02                    | 1.91E-07  | 2.70E-02               | NA   | 9.39E-02  | 1.79E-08  | --   | 4.70E-07   | 7.80E-05  | 1.00E-02                                 | 5.45E-06  | 9.05E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Aldrin              | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | 1.70E+01   | 1.70E+01   | 1.70E+01   | --                                     | --                                    | --                                 | --  |
| Alpha-BHC (Lindane) | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | 2.70E+00   | 2.70E+00   | 2.70E+00   | --                                     | --                                    | --                                 | --  |
| DDD                 | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | 2.40E-01   | 2.40E-01   | 2.40E-01   | --                                     | --                                    | --                                 | --  |
| DDE                 | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | 3.40E-01   | 3.40E-01   | 3.40E-01   | --                                     | --                                    | --                                 | --  |
| DDT                 | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | 3.40E-01   | 3.40E-01   | 3.40E-01   | --                                     | --                                    | --                                 | --  |
| Dieldrin            | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | 1.60E+01   | 1.60E+01   | 1.60E+01   | --                                     | --                                    | --                                 | --  |
| Endrin              | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Endrin Ketone       | ND                          | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| 1,2-Dichloroethane  | ND                          | --  | 6.00E-10               | 6.00E-07                                       | 9.39E-02  | --  | 5.64E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | 7.20E-02   | 4.70E-02   | 4.70E-02   | --                                     | --                                    | --                                 | 4.06E-09                                      |
| Toluene             | ND                          | --  | 9.28E-10               | 9.28E-07                                       | 9.39E-02  | --  | 8.71E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Ethylbenzene        | ND                          | --  | 4.94E-10               | 4.94E-07                                       | 9.39E-02  | --  | 4.64E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Xylenes             | ND                          | --  | 7.67E-10               | 7.67E-07                                       | 9.39E-02  | --  | 7.21E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |

Notes:  
-- = Not Applicable  
BKG = EPC is below background concentration and chemical is not evaluated  
EPC = Exposure point concentration  
m3 = cubic meters  
mg/kg = milligrams per kilogram  
NC = Chemical is not considered a carcinogen  
mg/L = milligrams per liter



TABLE D-4. EAST BLOCK CHILD RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | East Block Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor East Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Child Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Residential Child Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Adult Groundwater Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Child Ingestion Carcinogenic Exposure Factor (day)-1 | Residential Child Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Child Dermal Carcinogenic Exposure Factor (day)-1 | Residential Child Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Residential Child Soil Inhalation Risk | Residential Child Soil Ingestion Risk | Residential Child Soil Dermal Risk | Residential Child Groundwater Inhalation Risk |
|---------------------|-----------------------------|---|------------------------|--|---|---|--|--|---|--|---|--|--|--|--|--|---------------------------------------|------------------------------------|---|
| Arsenic             | BKG                         | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 3.00E-02                                 | 1.64E-06  | --   | 1.20E+01   | 1.50E+00   | 1.50E+00   | --                                     | --                                    | --                                 | --  |
| Barium              | 1.50E+02                    | 1.73E-07  | 1.12E-01               | NA   | 5.48E-02  | 9.47E-09  | --   | 1.10E-06   | 1.65E-04  | 1.00E-02                                 | 1.64E-06  | 2.47E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Beryllium           | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | 8.40E+00   | --   | --   | --                                     | --                                    | --                                 | --  |
| Cadmium             | BKG                         | --  | ND                     | ND   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-03                                 | 1.64E-06  | --   | 1.50E+01   | 3.80E-01   | 1.52E+01   | --                                     | --                                    | --                                 | --  |
| Chromium            | BKG                         | --  | ND                     | ND   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Copper              | 3.69E+01                    | 4.24E-08  | NA                     | NA   | 5.48E-02  | 2.32E-09  | --   | 1.10E-06   | 4.05E-05  | 1.00E-02                                 | 1.64E-06  | 6.07E-07   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Lead                | 2.11E+02                    | 2.42E-07  | ND                     | ND   | 5.48E-02  | 1.33E-08  | --   | 1.10E-06   | 2.31E-04  | 1.00E-02                                 | 1.64E-06  | 3.47E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Mercury             | BKG                         | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Molybdenum          | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Nickel              | BKG                         | --  | 6.50E-02               | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | 9.10E-01   | --   | --   | --                                     | --                                    | --                                 | --  |
| Selenium            | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Vanadium            | BKG                         | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Zinc                | 1.66E+02                    | 1.91E-07  | 2.70E-02               | NA   | 5.48E-02  | 1.05E-08  | --   | 1.10E-06   | 1.82E-04  | 5.00E-02                                 | 1.64E-06  | 1.37E-05   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Aldrin              | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | 1.70E+01   | 1.70E+01   | 1.70E+01   | --                                     | --                                    | --                                 | --  |
| Alpha-BHC (Lindane) | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | 2.70E+00   | 2.70E+00   | 2.70E+00   | --                                     | --                                    | --                                 | --  |
| DDD                 | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | 2.40E-01   | 2.40E-01   | 2.40E-01   | --                                     | --                                    | --                                 | --  |
| DDE                 | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | 3.40E-01   | 3.40E-01   | 3.40E-01   | --                                     | --                                    | --                                 | --  |
| DDT                 | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | 3.40E-01   | 3.40E-01   | 3.40E-01   | --                                     | --                                    | --                                 | --  |
| Dieldrin            | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | 1.60E+01   | 1.60E+01   | 1.60E+01   | --                                     | --                                    | --                                 | --  |
| Endrin              | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Endrin Ketone       | ND                          | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| 1,2-Dichloroethane  | ND                          | --  | 6.00E-10               | 6.00E-07                                       | 5.48E-02  | --  | 3.29E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | 7.20E-02   | 4.70E-02   | 4.70E-02   | --                                     | --                                    | --                                 | 2.37E-09                                      |
| Toluene             | ND                          | --  | 9.28E-10               | 9.28E-07                                       | 5.48E-02  | --  | 5.08E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Ethylbenzene        | ND                          | --  | 4.94E-10               | 4.94E-07                                       | 5.48E-02  | --  | 2.71E-08   | 1.10E-06   | --  | 0.00E+00                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Xylenes             | ND                          | --  | 7.67E-10               | 7.67E-07                                       | 5.48E-02  | --  | 4.20E-08   | 1.10E-06   | --  | 0.00E+00                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen  
 mg/L = milligrams per liter

TABLE D-5. EAST BLOCK TOTAL RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | Residential Adult Soil Inhalation Risk | Residential Child Soil Inhalation Risk | Total Residential Soil Inhalation Risk | Residential Adult Soil Ingestion Risk | Residential Child Soil Ingestion Risk | Total Residential Soil Inhalation Risk | Residential Adult Soil Dermal Risk | Residential Child Soil Dermal Risk | Total Residential Soil Inhalation Risk | Total Residential Soil Risk | Residential Adult Groundwater Inhalation Risk | Residential Child Groundwater Inhalation Risk | Total Residential Groundwater Inhalation Risk | Total Residential Risk |
|---------------------|--|--|--|---------------------------------------|---------------------------------------|--|------------------------------------|------------------------------------|--|-----------------------------|---|---|---|------------------------|
| Arsenic             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Barium              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Beryllium           | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Cadmium             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Chromium            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Cobalt              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Copper              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Lead                | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Mercury             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Molybdenum          | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Nickel              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Selenium            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Vanadium            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Zinc                | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Aldrin              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Alpha-BHC (Lindane) | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| DDD                 | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| DDE                 | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| DDT                 | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Dieldrin            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Endrin              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Endrin Ketone       | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| 1,2-Dichloroethane  | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | 4.06E-09                                      | 2.37E-09                                      | 6.43E-09                                      | 6.43E-09               |
| Toluene             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Ethylbenzene        | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| Xylenes             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --                     |
| <b>Total</b>        | <b>0.0E+00</b>                         | <b>0.0E+00</b>                         | <b>0.0E+00</b>                         | <b>0.0E+00</b>                        | <b>0.0E+00</b>                        | <b>0.0E+00</b>                         | <b>0.0E+00</b>                     | <b>0.0E+00</b>                     | <b>0.0E+00</b>                         | <b>0.0E+00</b>              | <b>4.1E-09</b>                                | <b>2.4E-09</b>                                | <b>6.4E-09</b>                                | <b>6.4E-09</b>         |

Notes:  
-- = Not Applicable

TABLE D-6. EAST BLOCK HOMEGROWN PRODUCE RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | East Block Soil EPC (mg/kg) | Plant Uptake Factor (kg/kg) | Resuspension Multiplier (unitless) | Intake Factor - Cancer - Vegetable Intake - Adult (kg/kg-day) | Intake Factor - Cancer - Fruit Intake - Adult (kg/kg-day) | Vegetable Lifetime Average Daily Dose - Adult (mg/kg-day) | Fruit Lifetime Average Daily Dose - Adult (mg/kg-day) | Lifetime Average Daily Dose (Cancer) - Adult (mg/kg-day) | Intake Factor - Cancer - Vegetable Intake - Child (kg/kg-day) | Intake Factor - Cancer - Fruit Intake - Child (kg/kg-day) | Vegetable Lifetime Average Daily Dose - Child (mg/kg-day) | Fruit Lifetime Average Daily Dose - Child (mg/kg-day) | Lifetime Average Daily Dose (Cancer) - Child (mg/kg-day) | Oral Cancer Slope Factor (1/mg/kg-day) | Homegrown Produce Ingestion Excess Cancer Risk - Adult | Homegrown Produce Excess Cancer Risk - Child | Homegrown Produce Resident Excess Cancer Risk | Soil and Groundwater Residential Risk* | Total Unrestricted Residential Risks |
|---------------------|-----------------------------|-----------------------------|------------------------------------|---|---|---|---|--|---|---|---|---|--|--|--|--|---|--|--------------------------------------|
| Arsenic             | BKG                         | 1.00E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 1.50E+00                               | 0E+00  | 0E+00  | --  | --                                     | --                                   |
| Barium              | 1.50E+02                    | 3.00E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 1.82E-02  | 2.95E-04  | 1.85E-02   | 1.15E-04  | 1.64E-04  | 4.55E-03  | 7.38E-05  | 4.62E-03   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Beryllium           | ND                          | 2.50E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | --                                     | --   | --   | --  | --                                     | --                                   |
| Cadmium             | BKG                         | 1.40E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 3.80E-01                               | 0E+00  | 0E+00  | --  | --                                     | --                                   |
| Chromium            | BKG                         | 1.00E-04                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Cobalt              | BKG                         | 2.30E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Copper              | 3.69E+01                    | 8.00E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 5.78E-03  | 1.93E-03  | 7.71E-03   | 1.15E-04  | 1.64E-04  | 1.44E-03  | 4.83E-04  | 1.93E-03   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Lead                | 2.11E+02                    | 7.60E-04                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 2.53E-02  | 1.05E-04  | 2.54E-02   | 1.15E-04  | 1.64E-04  | 6.33E-03  | 2.62E-05  | 6.36E-03   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Mercury             | BKG                         | 3.00E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Molybdenum          | ND                          | 8.00E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Nickel              | BKG                         | 5.00E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | --                                     | --   | --   | --  | --                                     | --                                   |
| Selenium            | ND                          | 1.00E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Vanadium            | BKG                         | 1.40E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Zinc                | 1.66E+02                    | 2.60E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 3.98E-02  | 2.83E-02  | 6.80E-02   | 1.15E-04  | 1.64E-04  | 9.94E-03  | 7.06E-03  | 1.70E-02   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Aldrin              | ND                          | 1.40E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 1.70E+01                               | 0E+00  | 0E+00  | --  | --                                     | --                                   |
| Alpha-BHC (Lindane) | ND                          | 4.20E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 2.70E+00                               | 0E+00  | 0E+00  | --  | --                                     | --                                   |
| DDD                 | ND                          | 3.30E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 2.40E-01                               | 0E+00  | 0E+00  | --  | --                                     | --                                   |
| DDE                 | ND                          | 3.80E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 3.40E-01                               | 0E+00  | 0E+00  | --  | --                                     | --                                   |
| DDT                 | ND                          | 1.60E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 3.40E-01                               | 0E+00  | 0E+00  | --  | --                                     | --                                   |
| Dieldrin            | ND                          | 1.70E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 1.60E+01                               | 0E+00  | 0E+00  | --  | --                                     | --                                   |
| Endrin              | ND                          | 1.70E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Endrin Ketone       | ND                          | 1.70E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| 1,2-Dichloroethane  | ND                          | 1.00E+00                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 4.70E-02                               | 0E+00  | 0E+00  | --  | 6E-09                                  | 6E-09                                |
| Toluene             | ND                          | 2.10E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Ethylbenzene        | ND                          | 1.20E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |
| Xylenes             | ND                          | 9.40E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --  | --                                     | --                                   |

Notes:  
-- = Not Applicable  
BKG = EPC is below background concentration and chemical is not evaluated  
EPC = Exposure point concentration  
kg = kilogram  
mg/kg = milligrams per kilogram  
NC = Chemical is not considered a carcinogen

TABLE D-7. EAST BLOCK ADULT RESIDENTIAL NONCANCER HAZARDS CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | East Block Soil EPC (mg/kg) | Resident and Commercial/ Industrial Worker Receptor East Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Adult Inhalation Noncancer Exposure Factor (m3/kg-day) | Residential Adult Soil Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Residential Adult Groundwater Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Residential Adult Ingestion Noncancer Exposure Factor (day-1) | Residential Adult Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Adult Dermal Noncancer Exposure Factor (day-1) | Residential Adult Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Residential Adult Soil Inhalation Noncancer Hazard | Residential Adult Soil Ingestion Noncancer Hazard | Residential Adult Soil Dermal Noncancer Hazard | Total Residential Adult Soil Noncancer Hazard | Residential Adult Groundwater Inhalation Noncancer Hazard | Total Adult Residential Noncancer Hazard |                 |
|---------------------|-----------------------------|--|------------------------|--|--|--|---|---|--|--|--|---|--|--|--|--|---|--|---|---|--|-----------------|
| Arsenic             | BKG                         | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 3.00E-02                                 | 1.59E-05   | --  | 8.57E-06                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Barium              | 1.50E+02                    | 1.73E-07   | 1.12E-01               | NA   | 2.74E-01   | 4.73E-08   | --  | 1.37E-06  | 2.06E-04   | 1.00E-02                                 | 1.59E-05   | 2.39E-05  | 1.43E-04                                       | 7.00E-02                                 | 4.90E-03                                   | 3.31E-04   | 2.94E-03  | 4.88E-03                                       | 8.15E-03                                      | --  | 8.15E-03                                 |                 |
| Beryllium           | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | 5.71E-06                                       | 2.00E-03                                 | 1.40E-05                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Cadmium             | BKG                         | --   | ND                     | ND   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | 5.71E-06                                       | 5.00E-04                                 | 1.25E-05                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Chromium            | BKG                         | --   | ND                     | ND   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | --   | 1.50E+00                                 | 1.95E-02                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Cobalt              | BKG                         | --   | 7.60E-02               | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | --   | 6.00E-02                                 | 6.00E-02                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Copper              | 3.69E+01                    | 4.24E-08   | NA                     | NA   | 2.74E-01   | 1.16E-08   | --  | 1.37E-06  | 5.06E-05   | 1.00E-02                                 | 1.59E-05   | 5.87E-06  | --   | 4.00E-02                                 | 4.00E-02                                   | --   | 1.26E-03  | 1.47E-04                                       | 1.41E-03                                      | --  | 1.41E-03                                 |                 |
| Lead                | 2.11E+02                    | 2.42E-07   | ND                     | ND   | 2.74E-01   | 6.64E-08   | --  | 1.37E-06  | 2.89E-04   | 1.00E-02                                 | 1.59E-05   | 3.35E-05  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| Mercury             | BKG                         | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | 8.57E-05                                       | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| Molybdenum          | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | --   | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Nickel              | BKG                         | --   | 6.50E-02               | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | 1.43E-05                                       | 2.00E-02                                 | 8.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Selenium            | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | 5.71E-03                                       | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Vanadium            | BKG                         | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | --   | 7.00E-03                                 | 1.82E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Zinc                | 1.66E+02                    | 1.91E-07   | 2.70E-02               | NA   | 2.74E-01   | 5.23E-08   | --  | 1.37E-06  | 2.28E-04   | 1.00E-02                                 | 1.59E-05   | 2.64E-05  | --   | 3.00E-01                                 | 3.00E-01                                   | --   | 7.58E-04  | 8.80E-05                                       | 8.46E-04                                      | --  | 8.46E-04                                 |                 |
| Aldrin              | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Alpha-BHC (Lindane) | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| DDD                 | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| DDE                 | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| DDT                 | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Dieldrin            | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Endrin              | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Endrin Ketone       | ND                          | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| 1,2-Dichloroethane  | ND                          | --   | 6.00E-10               | 6.00E-07                                       | 2.74E-01   | --   | 1.64E-07  | 1.37E-06  | --   | 1.00E-01                                 | 1.59E-05   | --  | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --   | --  | --   | --  | 1.17E-04  | 1.17E-04                                 |                 |
| Tohene              | ND                          | --   | 9.28E-10               | 9.28E-07                                       | 2.74E-01   | --   | 2.54E-07  | 1.37E-06  | --   | 1.00E-01                                 | 1.59E-05   | --  | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --   | --  | --   | --  | 2.22E-06  | 2.22E-06                                 |                 |
| Ethylbenzene        | ND                          | --   | 4.94E-10               | 4.94E-07                                       | 2.74E-01   | --   | 1.35E-07  | 1.37E-06  | --   | 1.00E-01                                 | 1.59E-05   | --  | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --   | --  | --   | --  | 4.74E-07  | 4.74E-07                                 |                 |
| Xylenes             | ND                          | --   | 7.67E-10               | 7.67E-07                                       | 2.74E-01   | --   | 2.10E-07  | 1.37E-06  | --   | 1.00E-01                                 | 1.59E-05   | --  | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --   | --  | --   | --  | 1.05E-07  | 1.05E-07                                 |                 |
|                     |                             |  |                        |  |  |  |   |   |  |  |  |   |  |  |  |  |   |  | <b>Total</b>                                  | <b>1.04E-02</b>   | <b>1.20E-04</b>                          | <b>1.05E-02</b> |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen  
 mg/L = milligrams per liter



TABLE D-9. EAST BLOCK HOMEROWN PRODUCE RESIDENTIAL NONCANCER HAZARDS CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | East Block Soil EPC (mg/kg) | Plant Uptake Factor (kg/kg) | Resuspension Multiplier (unitless) | Intake Factor - Noncancer - Vegetable Intake - Adult (kg/kg-day) | Intake Factor - Noncancer - Fruit Intake - Adult (kg/kg-day) | Vegetable Lifetime Average Daily Dose - Adult (mg/kg-day) | Fruit Lifetime Average Daily Dose - Adult (mg/kg-day) | Lifetime Average Daily Dose (Noncancer) - Adult (mg/kg-day) | Intake Factor - Noncancer - Vegetable Intake - Child (kg/kg-day) | Intake Factor - Noncancer - Fruit Intake - Child (kg/kg-day) | Vegetable Lifetime Average Daily Dose - Child (mg/kg-day) | Fruit Lifetime Average Daily Dose - Child (mg/kg-day) | Lifetime Average Daily Dose (Noncancer) - Child (mg/kg-day) | Oral Reference Dose (mg/kg-day) | Homegrown Produce Ingestion Noncancer Hazard - Adult | Homegrown Produce Noncancer Hazard - Child | Soil and Groundwater Adult Residential Noncancer Hazard* | Soil and Groundwater Child Residential Noncancer Hazard* | Total Adult Residential Noncancer Hazard | Total Child Residential Noncancer Hazard |
|---------------------|-----------------------------|-----------------------------|------------------------------------|--|--|---|---|---|--|--|---|---|---|---------------------------------|--|--|--|--|--|--|
| Arsenic             | BKG                         | 1.00E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 3.00E-04                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Barium              | 1.50E+02                    | 3.00E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 1.82E-02  | 2.95E-04  | 1.85E-02  | 1.15E-04   | 1.64E-04   | 4.55E-03  | 7.38E-05  | 4.62E-03  | 7.00E-02                        | 1E-03  | 3E-04                                      | 1E-02  | 3E-02  | 1E-02                                    | 3E-02                                    |
| Beryllium           | ND                          | 2.50E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 2.00E-03                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Cadmium             | BKG                         | 1.40E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 5.00E-04                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Chromium            | BKG                         | 1.00E-04                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 1.50E+00                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Cobalt              | BKG                         | 2.30E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 6.00E-02                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Copper              | 3.69E+01                    | 8.00E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 5.78E-03  | 1.93E-03  | 7.71E-03  | 1.15E-04   | 1.64E-04   | 1.44E-03  | 4.83E-04  | 1.93E-03  | 4.00E-02                        | 3E-04  | 8E-05                                      | --   | 1E-02  | 3E-04                                    | 1E-02                                    |
| Lead                | 2.11E+02                    | 7.60E-04                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 2.53E-02  | 1.05E-04  | 2.54E-02  | 1.15E-04   | 1.64E-04   | 6.33E-03  | 2.62E-05  | 6.36E-03  | --                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Mercury             | BKG                         | 3.00E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | --                              | --   | --   | 4E-06  | --   | 4E-06                                    | 0E+00                                    |
| Molybdenum          | ND                          | 8.00E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 5.00E-03                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Nickel              | BKG                         | 5.00E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 2.00E-02                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Selenium            | ND                          | 1.00E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 5.00E-03                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Vanadium            | BKG                         | 1.40E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 7.00E-03                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Zinc                | 1.66E+02                    | 2.60E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 3.98E-02  | 2.83E-02  | 6.80E-02  | 1.15E-04   | 1.64E-04   | 9.94E-03  | 7.06E-03  | 1.70E-02  | 3.00E-01                        | 2E-02  | 5E-03                                      | 7E-04  | 7E-03  | 2E-02                                    | 1E-02                                    |
| Aldrin              | ND                          | 1.40E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 3.00E-05                        | 0E+00  | 0E+00                                      | 3E-01  | --   | 3E-01                                    | 0E+00                                    |
| Alpha-BHC (Lindane) | ND                          | 4.20E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 5.00E-04                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| DDD                 | ND                          | 3.30E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | --                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| DDE                 | ND                          | 3.80E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | --                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| DDT                 | ND                          | 1.60E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 5.00E-04                        | 0E+00  | 0E+00                                      | 1E-04  | --   | 1E-04                                    | 0E+00                                    |
| Dieldrin            | ND                          | 1.70E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 5.00E-05                        | 0E+00  | 0E+00                                      | 8E-02  | --   | 8E-02                                    | 0E+00                                    |
| Endrin              | ND                          | 1.70E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 3.00E-04                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Endrin Ketone       | ND                          | 1.70E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 3.00E-04                        | 0E+00  | 0E+00                                      | 4E-04  | --   | 4E-04                                    | 0E+00                                    |
| 1,2-Dichloroethane  | ND                          | 1.00E+00                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 3.00E-02                        | 0E+00  | 0E+00                                      | 1.17E-04   | 3E-04  | 1E-04                                    | 3E-04                                    |
| Toluene             | ND                          | 2.10E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 2.00E-01                        | 0E+00  | 0E+00                                      | 2.22E-06   | 5E-06  | 2E-06                                    | 5E-06                                    |
| Ethylbenzene        | ND                          | 1.20E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 1.00E-01                        | 0E+00  | 0E+00                                      | 4.74E-07   | 1E-06  | 5E-07                                    | 1E-06                                    |
| Xylenes             | ND                          | 9.40E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 2.00E+00                        | 0E+00  | 0E+00                                      | 1.05E-07   | 2E-07  | 1E-07                                    | 2E-07                                    |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 kg = kilogram  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

TABLE D-10. EAST BLOCK COMMERCIAL/INDUSTRIAL WORKER EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | East Block Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor East Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Commercial/Industrial Groundwater Indoor Air EPC (mg/m3) | Commercial/Industrial Worker Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Commercial/Industrial Worker Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Groundwater Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Ingestion Carcinogenic Exposure Factor (day)-1 | Commercial/Industrial Worker Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Commercial/Industrial Worker Dermal Carcinogenic Exposure Factor (day)-1 | Commercial/Industrial Worker Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Commercial/Industrial Worker Soil Inhalation Risk | Commercial/Industrial Worker Soil Ingestion Risk | Commercial/Industrial Worker Soil Dermal Risk | Total Commercial/Industrial Worker Soil Risk | Commercial/Industrial Worker Groundwater Inhalation Risk | Total Commercial/Industrial Worker Risk |
|---------------------|-----------------------------|---|------------------------|--|--|--|---|---|--|--|--|---|--|--|--|---|--|---|--|--|---|
| Arsenic             | BKG                         | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 3.00E-02                                 | 2.65E-06   | --  | 1.20E+01   | 1.50E+00   | 1.50E+00   | --  | --   | --  | --   | --   | --                                      |
| Barium              | 1.50E+02                    | 1.73E-07  | 1.12E-01               | NA   | 6.99E-02   | 1.21E-08   | --  | 6.99E-08  | 1.05E-05   | 1.00E-02                                 | 2.65E-06   | 3.99E-06  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Beryllium           | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | 8.40E+00   | --   | --   | --  | --   | --  | --   | --   | --                                      |
| Cadmium             | BKG                         | --  | ND                     | ND   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-03                                 | 2.65E-06   | --  | 1.50E+01   | 3.80E-01   | 1.52E+01   | --  | --   | --  | --   | --   | --                                      |
| Chromium            | BKG                         | --  | ND                     | ND   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Copper              | 3.69E+01                    | 4.24E-08  | NA                     | NA   | 6.99E-02   | 2.96E-09   | --  | 6.99E-08  | 2.58E-06   | 1.00E-02                                 | 2.65E-06   | 9.78E-07  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Lead                | 2.11E+02                    | 2.42E-07  | ND                     | ND   | 6.99E-02   | 1.69E-08   | --  | 6.99E-08  | 1.47E-05   | 1.00E-02                                 | 2.65E-06   | 5.59E-06  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Mercury             | BKG                         | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Molybdenum          | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Nickel              | BKG                         | --  | 6.50E-02               | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | 9.10E-01   | --   | --   | --  | --   | --  | --   | --   | --                                      |
| Selenium            | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Vanadium            | BKG                         | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Zinc                | 1.66E+02                    | 1.91E-07  | 2.70E-02               | NA   | 6.99E-02   | 1.33E-08   | --  | 6.99E-08  | 1.16E-05   | 1.00E-02                                 | 2.65E-06   | 4.40E-06  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Aldrin              | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | 1.70E+01   | 1.70E+01   | 1.70E+01   | --  | --   | --  | --   | --   | --                                      |
| Alpha-BHC (Lindane) | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | 2.70E+00   | 2.70E+00   | 2.70E+00   | --  | --   | --  | --   | --   | --                                      |
| DDD                 | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | 2.40E-01   | 2.40E-01   | 2.40E-01   | --  | --   | --  | --   | --   | --                                      |
| DDE                 | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | 3.40E-01   | 3.40E-01   | 3.40E-01   | --  | --   | --  | --   | --   | --                                      |
| DDT                 | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | 3.40E-01   | 3.40E-01   | 3.40E-01   | --  | --   | --  | --   | --   | --                                      |
| Dieldrin            | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | 1.60E+01   | 1.60E+01   | 1.60E+01   | --  | --   | --  | --   | --   | --                                      |
| Endrin              | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Endrin Ketone       | ND                          | --  | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| 1,2-Dichloroethane  | ND                          | --  | 6.00E-10               | 2.40E-10   | 6.99E-02   | --   | 1.68E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | 7.20E-02   | 4.70E-02   | 4.70E-02   | --  | --   | --  | --   | 1.21E-12   | 1.21E-12                                |
| Toluene             | ND                          | --  | 9.28E-10               | 3.71E-10   | 6.99E-02   | --   | 2.59E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Ethylbenzene        | ND                          | --  | 4.94E-10               | 1.98E-10   | 6.99E-02   | --   | 1.38E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Xylenes             | ND                          | --  | 7.67E-10               | 3.07E-10   | 6.99E-02   | --   | 2.15E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

TABLE D-11. EAST BLOCK COMMERCIAL/INDUSTRIAL WORKER NONCANCER HAZARDS CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | East Block Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor East Block Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Commercial/Industrial Groundwater Indoor Air EPC (mg/m3) | Commercial/Industrial Worker Inhalation Noncancer Exposure Factor (m3/kg-day) | Commercial/Industrial Worker Soil Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Groundwater Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Ingestion Noncancer Exposure Factor (day)-1 | Commercial/Industrial Worker Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Commercial/Industrial Worker Dermal Noncancer Exposure Factor (day)-1 | Commercial/Industrial Worker Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Commercial/Industrial Worker Soil Inhalation Noncancer Hazard | Commercial/Industrial Worker Soil Ingestion Noncancer Hazard | Commercial/Industrial Worker Soil Dermal Noncancer Hazard | Total Commercial/Industrial Worker Soil Noncancer Hazard | Commercial/Industrial Worker Groundwater Inhalation Noncancer Hazard | Total Commercial/Industrial Worker Noncancer Hazard |
|---------------------|-----------------------------|---|------------------------|--|---|---|--|--|---|--|---|--|--|--|--|---|--|---|--|--|---|
| Arsenic             | BKG                         | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 3.00E-02                                 | 7.42E-06  | --   | 8.57E-06                                       | 3.00E-04                                 | 3.00E-04                                   | --  | --   | --  | 4.62E-03   | --   | 4.62E-03  |
| Barium              | 1.50E+02                    | 1.73E-07  | 1.12E-01               | NA   | 1.96E-01  | 3.38E-08  | --   | 9.78E-07   | 1.47E-04  | 1.00E-02                                 | 7.42E-06  | 1.12E-05   | 1.43E-04                                       | 7.00E-02                                 | 4.90E-03                                   | 2.37E-04  | 2.10E-03   | 2.28E-03  | 4.62E-03   | --   | 4.62E-03  |
| Beryllium           | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 5.71E-06                                       | 2.00E-03                                 | 1.40E-05                                   | --  | --   | --  | --   | --   | --  |
| Cadmium             | BKG                         | --  | ND                     | ND   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-03                                 | 7.42E-06  | --   | 5.71E-06                                       | 5.00E-04                                 | 1.25E-05                                   | --  | --   | --  | --   | --   | --  |
| Chromium            | BKG                         | --  | ND                     | ND   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 1.50E+00                                 | 1.95E-02                                   | --  | --   | --  | --   | --   | --  |
| Cobalt              | BKG                         | --  | 7.60E-02               | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 6.00E-02                                 | 6.00E-02                                   | --  | --   | --  | --   | --   | --  |
| Copper              | 3.69E+01                    | 4.24E-08  | NA                     | NA   | 1.96E-01  | 8.30E-09  | --   | 9.78E-07   | 3.61E-05  | 1.00E-02                                 | 7.42E-06  | 2.74E-06   | --   | 4.00E-02                                 | 4.00E-02                                   | --  | 9.03E-04   | 6.85E-05  | 9.72E-04   | --   | 9.72E-04  |
| Lead                | 2.11E+02                    | 2.42E-07  | ND                     | ND   | 1.96E-01  | 4.74E-08  | --   | 9.78E-07   | 2.06E-04  | 1.00E-02                                 | 7.42E-06  | 1.57E-05   | --   | --                                       | --   | --  | --   | --  | --   | --   | --  |
| Mercury             | BKG                         | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 8.57E-05                                       | --                                       | --   | --  | --   | --  | --   | --   | --  |
| Molybdenum          | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 5.00E-03                                 | 5.00E-03                                   | --  | --   | --  | --   | --   | --  |
| Nickel              | BKG                         | --  | 6.50E-02               | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 1.43E-05                                       | 2.00E-02                                 | 8.00E-04                                   | --  | --   | --  | --   | --   | --  |
| Selenium            | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 5.71E-03                                       | 5.00E-03                                 | 5.00E-03                                   | --  | --   | --  | --   | --   | --  |
| Vanadium            | BKG                         | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 7.00E-03                                 | 1.82E-04                                   | --  | --   | --  | --   | --   | --  |
| Zinc                | 1.66E+02                    | 1.91E-07  | 2.70E-02               | NA   | 1.96E-01  | 3.73E-08  | --   | 9.78E-07   | 1.63E-04  | 1.00E-02                                 | 7.42E-06  | 1.23E-05   | --   | 3.00E-01                                 | 3.00E-01                                   | --  | 5.42E-04   | 4.11E-05  | 5.83E-04   | --   | 5.83E-04  |
| Aldrin              | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | --  | --   | --  | --   | --   | --  |
| Alpha-BHC (Lindane) | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --  | --   | --  | --   | --   | --  |
| DDD                 | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | --   | --                                       | --   | --  | --   | --  | --   | --   | --  |
| DDE                 | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | --   | --                                       | --   | --  | --   | --  | --   | --   | --  |
| DDT                 | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --  | --   | --  | --   | --   | --  |
| Dieldrin            | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | --  | --   | --  | --   | --   | --  |
| Endrin              | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --  | --   | --  | --   | --   | --  |
| Endrin Ketone       | ND                          | --  | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --  | --   | --  | --   | --   | --  |
| 1,2-Dichloroethane  | ND                          | --  | 6.00E-10               | 2.40E-10   | 1.96E-01  | --  | 4.70E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --  | --   | --  | 3.36E-08   | 3.36E-08   | 3.36E-08  |
| Toluene             | ND                          | --  | 9.28E-10               | 3.71E-10   | 1.96E-01  | --  | 7.26E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --  | --   | --  | 6.35E-10   | 6.35E-10   | 6.35E-10  |
| Ethylbenzene        | ND                          | --  | 4.94E-10               | 1.98E-10   | 1.96E-01  | --  | 3.87E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --  | --   | --  | 1.35E-10   | 1.35E-10   | 1.35E-10  |
| Xylenes             | ND                          | --  | 7.67E-10               | 3.07E-10   | 1.96E-01  | --  | 6.01E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --  | --   | --  | 3.00E-11   | 3.00E-11   | 3.00E-11  |
| <b>Total</b>        |                             |   |                        |  |   |   |  |  |   |  |   |  |  |  |  |   |  |   | <b>6.17E-03</b>  | <b>3.44E-08</b>  | <b>6.17E-03</b>                                     |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen



**APPENDIX E**

**Parcel A of West Block Risk Calculations**

TABLE E-1. WEST BLOCK PARCEL A CONSTRUCTION WORKER EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Parcel A Soil EPC (mg/kg) | Construction Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Construction Worker Receptor Standing Water Air EPC (mg/m3) | Construction Worker Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Construction Worker Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Construction Worker Ingestion Carcinogenic Exposure Factor (day-1) | Construction Worker Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Construction Worker Soil Dermal Carcinogenic Exposure Factor (day-1) | Construction Worker Soil Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Construction Worker Dermal Carcinogenic Exposure Factor (hr-liter/cm-kg-day) | Chemical-Specific Water Permeability Coefficient (cm/hr) | Construction Worker Water Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Construction Worker Standing Water Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Construction Worker Soil Inhalation Risk | Construction Worker Soil Ingestion Risk | Construction Worker Soil Dermal Risk | Construction Worker Water Dermal Risk | Construction Worker Standing Water Inhalation Risk | Construction Worker Total Risk |
|---------------------|--------------------------------------|--|------------------------|---|---|---|--|---|--|--|---|--|--|--|---|--|--|--|--|---|--------------------------------------|---------------------------------------|--|--------------------------------|
| Arsenic             | BKG                                  | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 3.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 1.20E+01   | 1.50E+00   | 1.50E+00   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Barium              | 2.50E+02                             | 1.73E-04   | NA                     | NA  | 5.59E-03  | 9.65E-07  | 1.34E-07   | 3.35E-05  | 1.00E-02                                 | 2.12E-07   | 5.30E-07  | 4.42E-04   | 1.00E-03   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Beryllium           | BKG                                  | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 8.40E+00   | --   | --   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Cadmium             | BKG                                  | --   | ND                     | ND  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-03                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 1.50E+01   | 3.80E-01   | 1.52E+01   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Chromium            | BKG                                  | --   | ND                     | ND  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Cobalt              | BKG                                  | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | 1.00E-03   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Copper              | BKG                                  | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Lead                | 1.80E+02                             | 1.24E-04   | ND                     | ND  | 5.59E-03  | 6.95E-07  | 1.34E-07   | 2.42E-05  | 1.00E-02                                 | 2.12E-07   | 3.82E-07  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Mercury             | 9.70E-01                             | 6.70E-07   | NA                     | NA  | 5.59E-03  | 3.75E-09  | 1.34E-07   | 1.30E-07  | 1.00E-02                                 | 2.12E-07   | 2.06E-09  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Molybdenum          | ND                                   | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | 1.00E-03   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Nickel              | BKG                                  | --   | 6.50E+01               | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | 2.00E-04   | 5.74E-06   | --  | 9.10E-01   | --   | --   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Selenium            | ND                                   | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Vanadium            | BKG                                  | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Zinc                | 1.40E+02                             | 9.67E-05   | 2.70E+01               | NA  | 5.59E-03  | 5.41E-07  | 1.34E-07   | 1.88E-05  | 1.00E-02                                 | 2.12E-07   | 2.97E-07  | 4.42E-04   | 6.00E-04   | 7.16E-06   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Aldrin              | 4.80E+00                             | 3.32E-06   | NA                     | NA  | 5.59E-03  | 1.85E-08  | 1.34E-07   | 6.44E-07  | 5.00E-02                                 | 2.12E-07   | 5.09E-08  | 4.42E-04   | NA   | --   | --  | 1.70E+01   | 1.70E+01   | 1.70E+01   | 3.15E-07                                 | 1.09E-05                                | 8.65E-07                             | --                                    | --   | 1.21E-05                       |
| Alpha-BHC (Lindane) | ND                                   | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 2.70E+00   | 2.70E+00   | 2.70E+00   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| DDD                 | ND                                   | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | 2.40E-01   | 2.40E-01   | 2.40E-01   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| DDE                 | 1.50E-02                             | 1.04E-08   | NA                     | NA  | 5.59E-03  | 5.79E-11  | 1.34E-07   | 2.01E-09  | 5.00E-02                                 | 2.12E-07   | 1.59E-10  | 4.42E-04   | NA   | --   | --  | 3.40E-01   | 3.40E-01   | 3.40E-01   | 1.97E-11                                 | 6.84E-10                                | 5.41E-11                             | --                                    | --   | 7.58E-10                       |
| DDT                 | 2.20E-02                             | 1.52E-08   | NA                     | NA  | 5.59E-03  | 8.50E-11  | 1.34E-07   | 2.95E-09  | 5.00E-02                                 | 2.12E-07   | 2.33E-10  | 4.42E-04   | NA   | --   | --  | 3.40E-01   | 3.40E-01   | 3.40E-01   | 2.89E-11                                 | 1.00E-09                                | 7.93E-11                             | --                                    | --   | 1.11E-09                       |
| Dieldrin            | 1.90E+00                             | 1.31E-06   | NA                     | NA  | 5.59E-03  | 7.34E-09  | 1.34E-07   | 2.55E-07  | 5.00E-02                                 | 2.12E-07   | 2.01E-08  | 4.42E-04   | NA   | --   | --  | 1.60E+01   | 1.60E+01   | 1.60E+01   | 1.17E-07                                 | 4.08E-06                                | 3.22E-07                             | --                                    | --   | 4.52E-06                       |
| Endrin              | ND                                   | --   | NA                     | NA  | 5.59E-03  | --  | 1.34E-07   | --  | 5.00E-02                                 | 2.12E-07   | --  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Endrin Ketone       | 5.80E-02                             | 4.01E-08   | NA                     | NA  | 5.59E-03  | 2.24E-10  | 1.34E-07   | 7.78E-09  | 5.00E-02                                 | 2.12E-07   | 6.15E-10  | 4.42E-04   | NA   | --   | --  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| 1,2-Dichloroethane  | ND                                   | --   | 2.10E-03               | 6.30E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 1.00E-01   | 9.28E-08   | 3.52E-08  | 7.20E-02   | 4.70E-02   | 4.70E-02   | --                                       | --                                      | --                                   | 4.36E-09                              | 2.54E-09   | 4.36E-09                       |
| Toluene             | ND                                   | --   | 1.80E-03               | 5.88E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 7.80E-01   | 6.20E-07   | 3.29E-08  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Ethylbenzene        | ND                                   | --   | 1.00E-03               | 3.27E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 1.20E+00   | 5.30E-07   | 1.83E-08  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| Xylenes             | ND                                   | --   | 1.60E-03               | 4.79E-06  | 5.59E-03  | --  | 1.34E-07   | --  | 1.00E-01                                 | 2.12E-07   | --  | 4.42E-04   | 1.40E+00   | 9.89E-07   | 2.68E-08  | NC   | NC   | NC   | --                                       | --                                      | --                                   | --                                    | --   | --                             |
| <b>TOTAL</b>        |                                      |  |                        |   |   |   |  |   |  |  |   |  |  |  |   |  |  |  | <b>4.33E-07</b>                          | <b>1.50E-05</b>                         | <b>1.19E-06</b>                      | <b>4.36E-09</b>                       | <b>2.54E-09</b>                                    | <b>1.67E-05</b>                |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 cm/hr = centimeters per hour  
 EPC = Exposure point concentration  
 hr-liter/cm-kg-day = Hour-liter per centimeter-kilogram-day  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 mg/L = milligrams per liter  
 NC = Chemical is not considered a carcinogen

TABLE E-2. WEST BLOCK PARCEL A CONSTRUCTION WORKER NONCANCER HAZARD CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Parcel A Soil EPC (mg/kg) | Construction Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Construction Worker Receptor Standing Water Air EPC (mg/m3) | Construction Worker Inhalation Noncancer Exposure Factor (m3/kg-day) | Construction Worker Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Construction Worker Ingestion Noncancer Exposure Factor (day)-1 | Construction Worker Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Construction Worker Soil Dermal Noncancer Exposure Factor (day)-1 | Construction Worker Soil Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Construction Worker Water Dermal Noncancer Exposure Factor (hr-liter/cm-kg-day) | Chemical-Specific Water Permeability Coefficient (cm/hr) | Construction Worker Water Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Construction Worker Standing Water Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Construction Worker Soil Inhalation Noncancer Hazard | Construction Worker Soil Ingestion Noncancer Hazard | Construction Worker Soil Dermal Noncancer Hazard | Construction Worker Water Dermal Noncancer Hazard | Construction Worker Standing Water Inhalation Noncancer Hazard | Total Construction Worker Noncancer Hazard |
|---------------------|--------------------------------------|--|------------------------|---|--|---|---|--|--|---|--|---|--|---|--|--|--|--|--|---|--|---|--|--|
| Arsenic             | BKG                                  | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | 3.00E-02   | 7.42E-06                                 | --  | 1.55E-02   | NA  | --   | --  | 8.57E-06   | 3.00E-04                                       | 3.00E-04                                 | --   | --   | --  | --   | --  | --   |  |
| Barium              | 2.50E+02                             | 1.73E-04   | NA                     | NA  | 1.96E-01   | 3.38E-05  | 4.70E-06  | 1.17E-03   | 1.00E-02                                 | 7.42E-06  | 1.86E-05   | 1.55E-02  | 1.00E-03   | --  | 1.43E-04   | 7.00E-02                                       | 4.90E-03                                 | 2.37E-01                                   | 1.68E-02   | 3.79E-03  | --   | --  | 2.57E-01   |  |
| Beryllium           | BKG                                  | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | 1.00E-02   | 7.42E-06                                 | --  | 1.55E-02   | NA  | --   | --  | 5.71E-06   | 2.00E-03                                       | 1.40E-05                                 | --   | --   | --  | --   | --  | --   |  |
| Cadmium             | BKG                                  | --   | ND                     | ND  | 1.96E-01   | --  | 4.70E-06  | 1.00E-03   | 7.42E-06                                 | --  | 1.55E-02   | NA  | --   | --  | 5.71E-06   | 5.00E-04                                       | 1.25E-05                                 | --   | --   | --  | --   | --  | --   |  |
| Chromium            | BKG                                  | --   | ND                     | ND  | 1.96E-01   | --  | 4.70E-06  | 1.00E-02   | 7.42E-06                                 | --  | 1.55E-02   | NA  | --   | --  | 1.50E+00   | 1.95E-02                                       | --                                       | --   | --   | --  | --   | --  | --   |  |
| Cobalt              | BKG                                  | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | 1.00E-02   | 7.42E-06                                 | --  | 1.55E-02   | 1.00E-03  | --   | --  | --   | 6.00E-02                                       | 6.00E-02                                 | --   | --   | --  | --   | --  | --   |  |
| Copper              | BKG                                  | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | 1.00E-02   | 7.42E-06                                 | --  | 1.55E-02   | NA  | --   | --  | --   | 4.00E-02                                       | 4.00E-02                                 | --   | --   | --  | --   | --  | --   |  |
| Lead                | 1.80E+02                             | 1.24E-04   | ND                     | ND  | 1.96E-01   | 2.43E-05  | 4.70E-06  | 8.45E-04   | 1.00E-02                                 | 7.42E-06  | 1.34E-05   | 1.55E-02  | NA   | --  | --   | --   | --                                       | --   | --   | --  | --   | --  | --   |  |
| Mercury             | 9.70E-01                             | 6.70E-07   | NA                     | NA  | 1.96E-01   | 1.31E-07  | 4.70E-06  | 4.56E-06   | 1.00E-02                                 | 7.42E-06  | 7.20E-08   | 1.55E-02  | NA   | --  | --   | 8.57E-05                                       | --                                       | --   | 1.53E-03   | --  | --   | --  | 1.53E-03   |  |
| Molybdenum          | ND                                   | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | 1.00E-02   | 7.42E-06                                 | --  | 1.55E-02   | 1.00E-03  | --   | --  | --   | 5.00E-03                                       | 5.00E-03                                 | --   | --   | --  | --   | --  | --   |  |
| Nickel              | BKG                                  | --   | 6.50E+01               | NA  | 1.96E-01   | --  | 4.70E-06  | 1.00E-02   | 7.42E-06                                 | --  | 1.55E-02   | 2.00E-04  | 2.01E-04   | --  | 1.43E-05   | 2.00E-02                                       | 8.00E-04                                 | --   | --   | --  | 2.51E-01   | --  | 2.51E-01   |  |
| Selenium            | ND                                   | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | 1.00E-02   | 7.42E-06                                 | --  | 1.55E-02   | NA  | --   | --  | 5.71E-03   | 5.00E-03                                       | 5.00E-03                                 | --   | --   | --  | --   | --  | --   |  |
| Vanadium            | BKG                                  | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | 1.00E-02   | 7.42E-06                                 | --  | 1.55E-02   | NA  | --   | --  | --   | 7.00E-03                                       | 1.82E-04                                 | --   | --   | --  | --   | --  | --   |  |
| Zinc                | 1.40E+02                             | 9.67E-05   | 2.70E+01               | NA  | 1.96E-01   | 1.89E-05  | 4.70E-06  | 6.58E-04   | 1.00E-02                                 | 7.42E-06  | 1.04E-05   | 1.55E-02  | 6.00E-04   | 2.50E-04  | --   | 3.00E-01                                       | 3.00E-01                                 | --   | 2.19E-03   | 3.46E-05  | 8.35E-04   | --  | 3.06E-03   |  |
| Aldrin              | 4.80E+00                             | 3.32E-06   | NA                     | NA  | 1.96E-01   | 6.49E-07  | 4.70E-06  | 2.25E-05   | 5.00E-02                                 | 7.42E-06  | 1.78E-06   | 1.55E-02  | NA   | --  | --   | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | 2.16E-02   | 7.51E-01  | 5.94E-02   | --  | 8.32E-01   |  |
| Alpha-BHC (Lindane) | ND                                   | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --   | --  | --   | --  | --   |  |
| DDD                 | ND                                   | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | --   | --                                       | --   | --   | --  | --   | --  | --   |  |
| DDE                 | 1.50E-02                             | 1.04E-08   | NA                     | NA  | 1.96E-01   | 2.03E-09  | 4.70E-06  | 7.05E-08   | 5.00E-02                                 | 7.42E-06  | 5.57E-09   | 1.55E-02  | NA   | --  | --   | --   | --                                       | --   | --   | --  | --   | --  | --   |  |
| DDT                 | 2.20E-02                             | 1.52E-08   | NA                     | NA  | 1.96E-01   | 2.97E-09  | 4.70E-06  | 1.03E-07   | 5.00E-02                                 | 7.42E-06  | 8.16E-09   | 1.55E-02  | NA   | --  | --   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 5.95E-06   | 2.07E-04  | 1.63E-05   | --  | 2.29E-04   |  |
| Dieldrin            | 1.90E+00                             | 1.31E-06   | NA                     | NA  | 1.96E-01   | 2.57E-07  | 4.70E-06  | 8.92E-06   | 5.00E-02                                 | 7.42E-06  | 7.05E-07   | 1.55E-02  | NA   | --  | --   | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | 5.14E-03   | 1.78E-01  | 1.41E-02   | --  | 1.98E-01   |  |
| Endrin              | ND                                   | --   | NA                     | NA  | 1.96E-01   | --  | 4.70E-06  | --   | 5.00E-02                                 | 7.42E-06  | --   | 1.55E-02  | NA   | --  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --   |  |
| Endrin Ketone       | 5.80E-02                             | 4.01E-08   | NA                     | NA  | 1.96E-01   | 7.84E-09  | 4.70E-06  | 2.72E-07   | 5.00E-02                                 | 7.42E-06  | 2.15E-08   | 1.55E-02  | NA   | --  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | 2.61E-05   | 9.08E-04  | 7.17E-05   | --  | 1.01E-03   |  |
| 1,2-Dichloroethane  | ND                                   | --   | 2.10E-03               | 6.30E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 1.00E-01   | 3.25E-06  | 1.23E-06   | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --   | --  | 1.08E-04   | 8.81E-04  | 1.08E-04   |  |
| Toluene             | ND                                   | --   | 1.80E-03               | 5.88E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 7.80E-01   | 2.17E-05  | 1.15E-06   | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --   | --  | 1.09E-04   | 1.01E-05  | 1.09E-04   |  |
| Ethylbenzene        | ND                                   | --   | 1.00E-03               | 3.27E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 1.20E+00   | 1.86E-05  | 6.40E-07   | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --   | --  | 1.86E-04   | 2.24E-06  | 1.86E-04   |  |
| Xylenes             | ND                                   | --   | 1.60E-03               | 4.79E-06  | 1.96E-01   | --  | 4.70E-06  | --   | 1.00E-01                                 | 7.42E-06  | --   | 1.55E-02  | 1.40E+00   | 3.46E-05  | 9.37E-07   | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --   | --  | 1.73E-05   | 4.68E-07  | 1.73E-05   |  |
| <b>Total</b>        |                                      |  |                        |   |  |   |   |  |  |   |  |   |  |   |  |  |  |  | <b>2.65E-01</b>                                      | <b>9.50E-01</b>                                     | <b>7.74E-02</b>                                  | <b>2.52E-01</b>                                   | <b>8.94E-04</b>  | <b>1.54E+00</b>                            |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

TABLE E-3. WEST BLOCK PARCEL A ADULT RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Parcel A Soil EPC (mg/kg) | Resident and Commercial/ Industrial Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Adult Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Residential Adult Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Adult Groundwater Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Adult Ingestion Carcinogenic Exposure Factor (day)-1 | Residential Adult Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Adult Dermal Carcinogenic Exposure Factor (day)-1 | Residential Adult Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Residential Adult Soil Inhalation Risk | Residential Adult Soil Ingestion Risk | Residential Adult Soil Dermal Risk | Residential Adult Groundwater Inhalation Risk |
|---------------------|--------------------------------------|---|------------------------|--|---|---|--|--|---|--|---|--|--|--|--|--|---------------------------------------|------------------------------------|---|
| Arsenic             | BKG                                  | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 3.00E-02                                 | 5.45E-06  | --   | 1.20E+01   | 1.50E+00   | 1.50E+00   | --                                     | --                                    | --                                 | --  |
| Barium              | 2.50E+02                             | 2.87E-07  | 1.12E-01               | NA   | 9.39E-02  | 2.70E-08  | --   | 4.70E-07   | 1.17E-04  | 1.00E-02                                 | 5.45E-06  | 1.36E-05   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Beryllium           | BKG                                  | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | 8.40E+00   | --   | --   | --                                     | --                                    | --                                 | --  |
| Cadmium             | BKG                                  | --  | ND                     | ND   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-03                                 | 5.45E-06  | --   | 1.50E+01   | 3.80E-01   | 1.52E+01   | --                                     | --                                    | --                                 | --  |
| Chromium            | BKG                                  | --  | ND                     | ND   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Cobalt              | BKG                                  | --  | 7.60E-02               | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Copper              | BKG                                  | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Lead                | 1.80E+02                             | 2.07E-07  | ND                     | ND   | 9.39E-02  | 1.94E-08  | --   | 4.70E-07   | 8.45E-05  | 1.00E-02                                 | 5.45E-06  | 9.81E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Mercury             | 9.70E-01                             | 1.11E-09  | NA                     | NA   | 9.39E-02  | 1.05E-10  | --   | 4.70E-07   | 4.56E-07  | 1.00E-02                                 | 5.45E-06  | 5.28E-08   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Molybdenum          | ND                                   | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Nickel              | BKG                                  | --  | 6.50E-02               | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | 9.10E-01   | --   | --   | --                                     | --                                    | --                                 | --  |
| Selenium            | ND                                   | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Vanadium            | BKG                                  | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 1.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Zinc                | 1.40E+02                             | 1.61E-07  | 2.70E-02               | NA   | 9.39E-02  | 1.51E-08  | --   | 4.70E-07   | 6.58E-05  | 1.00E-02                                 | 5.45E-06  | 7.63E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Aldrin              | 4.80E+00                             | 5.52E-09  | NA                     | NA   | 9.39E-02  | 5.18E-10  | --   | 4.70E-07   | 2.25E-06  | 5.00E-02                                 | 5.45E-06  | 1.31E-06   | 1.70E+01   | 1.70E+01   | 1.70E+01   | 8.81E-09                               | 3.83E-05                              | 2.22E-05                           | --  |
| Alpha-BHC (Lindane) | ND                                   | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | 2.70E+00   | 2.70E+00   | 2.70E+00   | --                                     | --                                    | --                                 | --  |
| DDD                 | ND                                   | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | 2.40E-01   | 2.40E-01   | 2.40E-01   | --                                     | --                                    | --                                 | --  |
| DDE                 | 1.50E-02                             | 1.72E-11  | NA                     | NA   | 9.39E-02  | 1.62E-12  | --   | 4.70E-07   | 7.05E-09  | 5.00E-02                                 | 5.45E-06  | 4.09E-09   | 3.40E-01   | 3.40E-01   | 3.40E-01   | 5.51E-13                               | 2.40E-09                              | 1.39E-09                           | --  |
| DDT                 | 2.20E-02                             | 2.53E-11  | NA                     | NA   | 9.39E-02  | 2.37E-12  | --   | 4.70E-07   | 1.03E-08  | 5.00E-02                                 | 5.45E-06  | 5.99E-09   | 3.40E-01   | 3.40E-01   | 3.40E-01   | 8.07E-13                               | 3.51E-09                              | 2.04E-09                           | --  |
| Dieldrin            | 1.90E+00                             | 2.18E-09  | NA                     | NA   | 9.39E-02  | 2.05E-10  | --   | 4.70E-07   | 8.92E-07  | 5.00E-02                                 | 5.45E-06  | 5.18E-07   | 1.60E+01   | 1.60E+01   | 1.60E+01   | 3.28E-09                               | 1.43E-05                              | 8.28E-06                           | --  |
| Endrin              | ND                                   | --  | NA                     | NA   | 9.39E-02  | --  | --   | 4.70E-07   | --  | 5.00E-02                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Endrin Ketone       | 5.80E-02                             | 6.67E-11  | NA                     | NA   | 9.39E-02  | 6.26E-12  | --   | 4.70E-07   | 2.72E-08  | 5.00E-02                                 | 5.45E-06  | 1.58E-08   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| 1,2-Dichloroethane  | ND                                   | --  | 6.00E-10               | 6.00E-07                                       | 9.39E-02  | --  | 5.64E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | 7.20E-02   | 4.70E-02   | 4.70E-02   | --                                     | --                                    | --                                 | 4.06E-09                                      |
| Toluene             | ND                                   | --  | 9.28E-10               | 9.28E-07                                       | 9.39E-02  | --  | 8.71E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Ethylbenzene        | ND                                   | --  | 4.94E-10               | 4.94E-07                                       | 9.39E-02  | --  | 4.64E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Xylenes             | ND                                   | --  | 7.67E-10               | 7.67E-07                                       | 9.39E-02  | --  | 7.21E-08   | 4.70E-07   | --  | 1.00E-01                                 | 5.45E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen  
 mg/L = milligrams per liter

TABLE E-4. WEST BLOCK PARCEL A CHILD RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Parcel A Soil EPC (mg/kg) | Resident and Commercial/ Industrial Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Child Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Residential Child Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Adult Groundwater Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Residential Child Ingestion Carcinogenic Exposure Factor (day)-1 | Residential Child Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Child Dermal Carcinogenic Exposure Factor (day)-1 | Residential Child Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Residential Child Soil Inhalation Risk | Residential Child Soil Ingestion Risk | Residential Child Soil Dermal Risk | Residential Child Groundwater Inhalation Risk |
|---------------------|--------------------------------------|---|------------------------|--|---|---|--|--|---|--|---|--|--|--|--|--|---------------------------------------|------------------------------------|---|
| Arsenic             | BKG                                  | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 3.00E-02                                 | 1.64E-06  | --   | 1.20E+01   | 1.50E+00   | 1.50E+00   | --                                     | --                                    | --                                 | --  |
| Barium              | 2.50E+02                             | 2.87E-07  | 1.12E-01               | NA   | 5.48E-02  | 1.57E-08  | --   | 1.10E-06   | 2.74E-04  | 1.00E-02                                 | 1.64E-06  | 4.11E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Beryllium           | BKG                                  | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | 8.40E+00   | --   | --   | --                                     | --                                    | --                                 | --  |
| Cadmium             | BKG                                  | --  | ND                     | ND   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-03                                 | 1.64E-06  | --   | 1.50E+01   | 3.80E-01   | 1.52E+01   | --                                     | --                                    | --                                 | --  |
| Chromium            | BKG                                  | --  | ND                     | ND   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Cobalt              | BKG                                  | --  | 7.60E-02               | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Copper              | BKG                                  | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Lead                | 1.80E+02                             | 2.07E-07  | ND                     | ND   | 5.48E-02  | 1.13E-08  | --   | 1.10E-06   | 1.97E-04  | 1.00E-02                                 | 1.64E-06  | 2.96E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Mercury             | 9.70E-01                             | 1.11E-09  | NA                     | NA   | 5.48E-02  | 6.11E-11  | --   | 1.10E-06   | 1.06E-06  | 1.00E-02                                 | 1.64E-06  | 1.59E-08   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Molybdenum          | ND                                   | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Nickel              | BKG                                  | --  | 6.50E-02               | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | 9.10E-01   | --   | --   | --                                     | --                                    | --                                 | --  |
| Selenium            | ND                                   | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Vanadium            | BKG                                  | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 1.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Zinc                | 1.40E+02                             | 1.61E-07  | 2.70E-02               | NA   | 5.48E-02  | 8.82E-09  | --   | 1.10E-06   | 1.53E-04  | 1.00E-02                                 | 1.64E-06  | 2.30E-06   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Aldrin              | 4.80E+00                             | 5.52E-09  | NA                     | NA   | 5.48E-02  | 3.02E-10  | --   | 1.10E-06   | 5.26E-06  | 5.00E-02                                 | 1.64E-06  | 3.95E-07   | 1.70E+01   | 1.70E+01   | 1.70E+01   | 5.14E-09                               | 8.94E-05                              | 6.71E-06                           | --  |
| Alpha-BHC (Lindane) | ND                                   | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | 2.70E+00   | 2.70E+00   | 2.70E+00   | --                                     | --                                    | --                                 | --  |
| DDD                 | ND                                   | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | 2.40E-01   | 2.40E-01   | 2.40E-01   | --                                     | --                                    | --                                 | --  |
| DDE                 | 1.50E-02                             | 1.72E-11  | NA                     | NA   | 5.48E-02  | 9.45E-13  | --   | 1.10E-06   | 1.64E-08  | 5.00E-02                                 | 1.64E-06  | 1.23E-09   | 3.40E-01   | 3.40E-01   | 3.40E-01   | 3.21E-13                               | 5.59E-09                              | 4.19E-10                           | --  |
| DDT                 | 2.20E-02                             | 2.53E-11  | NA                     | NA   | 5.48E-02  | 1.39E-12  | --   | 1.10E-06   | 2.41E-08  | 5.00E-02                                 | 1.64E-06  | 1.81E-09   | 3.40E-01   | 3.40E-01   | 3.40E-01   | 4.71E-13                               | 8.20E-09                              | 6.15E-10                           | --  |
| Dieldrin            | 1.90E+00                             | 2.18E-09  | NA                     | NA   | 5.48E-02  | 1.20E-10  | --   | 1.10E-06   | 2.08E-06  | 5.00E-02                                 | 1.64E-06  | 1.56E-07   | 1.60E+01   | 1.60E+01   | 1.60E+01   | 1.91E-09                               | 3.33E-05                              | 2.50E-06                           | --  |
| Endrin              | ND                                   | --  | NA                     | NA   | 5.48E-02  | --  | --   | 1.10E-06   | --  | 5.00E-02                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Endrin Ketone       | 5.80E-02                             | 6.67E-11  | NA                     | NA   | 5.48E-02  | 3.65E-12  | --   | 1.10E-06   | 6.36E-08  | 5.00E-02                                 | 1.64E-06  | 4.77E-09   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| 1,2-Dichloroethane  | ND                                   | --  | 6.00E-10               | 6.00E-07                                       | 5.48E-02  | --  | 3.29E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | 7.20E-02   | 4.70E-02   | 4.70E-02   | --                                     | --                                    | --                                 | 2.37E-09                                      |
| Toluene             | ND                                   | --  | 9.28E-10               | 9.28E-07                                       | 5.48E-02  | --  | 5.08E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Ethylbenzene        | ND                                   | --  | 4.94E-10               | 4.94E-07                                       | 5.48E-02  | --  | 2.71E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |
| Xylenes             | ND                                   | --  | 7.67E-10               | 7.67E-07                                       | 5.48E-02  | --  | 4.20E-08   | 1.10E-06   | --  | 1.00E-01                                 | 1.64E-06  | --   | NC   | NC   | NC   | --                                     | --                                    | --                                 | --  |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen  
 mg/L = milligrams per liter

TABLE E-5. WEST BLOCK PARCEL A TOTAL RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | Residential Adult Soil Inhalation Risk | Residential Child Soil Inhalation Risk | Total Residential Soil Inhalation Risk | Residential Adult Soil Ingestion Risk | Residential Child Soil Ingestion Risk | Total Residential Soil Inhalation Risk | Residential Adult Soil Dermal Risk | Residential Child Soil Dermal Risk | Total Residential Soil Inhalation Risk | Total Residential Soil Risk | Residential Adult Groundwater Inhalation Risk | Residential Child Groundwater Inhalation Risk | Total Residential Groundwater Inhalation Risk | West Block Parcel A Total Residential Risk |
|---------------------|--|--|--|---------------------------------------|---------------------------------------|--|------------------------------------|------------------------------------|--|-----------------------------|---|---|---|--|
| Arsenic             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Barium              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Beryllium           | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Cadmium             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Chromium            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Cobalt              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Copper              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Lead                | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Mercury             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Molybdenum          | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Nickel              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Selenium            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Vanadium            | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Zinc                | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Aldrin              | 8.81E-09                               | 5.14E-09                               | 1.39E-08                               | 3.83E-05                              | 8.94E-05                              | 1.28E-04                               | 2.22E-05                           | 6.71E-06                           | 2.89E-05                               | 1.57E-04                    | --  | --  | --  | 1.57E-04                                   |
| Alpha-BHC (Lindane) | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| DDD                 | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| DDE                 | 5.51E-13                               | 3.21E-13                               | 8.72E-13                               | 2.40E-09                              | 5.59E-09                              | 7.98E-09                               | 1.39E-09                           | 4.19E-10                           | 1.81E-09                               | 9.79E-09                    | --  | --  | --  | 9.79E-09                                   |
| DDT                 | 8.07E-13                               | 4.71E-13                               | 1.28E-12                               | 3.51E-09                              | 8.20E-09                              | 1.17E-08                               | 2.04E-09                           | 6.15E-10                           | 2.65E-09                               | 1.44E-08                    | --  | --  | --  | 1.44E-08                                   |
| Dieldrin            | 3.28E-09                               | 1.91E-09                               | 5.20E-09                               | 1.43E-05                              | 3.33E-05                              | 4.76E-05                               | 8.28E-06                           | 2.50E-06                           | 1.08E-05                               | 5.84E-05                    | --  | --  | --  | 5.84E-05                                   |
| Endrin              | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Endrin Ketone       | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| 1,2-Dichloroethane  | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | 4.06E-09                                      | 2.37E-09                                      | 6.43E-09                                      | 6.43E-09                                   |
| Toluene             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Ethylbenzene        | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Xylenes             | --                                     | --                                     | --                                     | --                                    | --                                    | --                                     | --                                 | --                                 | --                                     | --                          | --  | --  | --  | --   |
| Total               | 1.2E-08                                | 7.1E-09                                | 1.9E-08                                | 5.3E-05                               | 1.2E-04                               | 1.8E-04                                | 3.1E-05                            | 9.2E-06                            | 4.0E-05                                | 2.2E-04                     | 4.1E-09                                       | 2.4E-09                                       | 6.4E-09                                       | 2.2E-04                                    |

Notes:  
-- = Not Applicable

TABLE E-6. WEST BLOCK PARCEL A HOMEGROWN PRODUCE RESIDENTIAL EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Parcel A Soil EPC (mg/kg) | Plant Uptake Factor (kg/kg) | Resuspension Multiplier (unitless) | Intake Factor - Cancer - Vegetable Intake - Adult (kg/kg-day) | Intake Factor - Cancer - Fruit Intake - Adult (kg/kg-day) | Vegetable Lifetime Average Daily Dose - Adult (mg/kg-day) | Fruit Lifetime Average Daily Dose - Adult (mg/kg-day) | Lifetime Average Daily Dose (Cancer) - Adult (mg/kg-day) | Intake Factor - Cancer - Vegetable Intake - Child (kg/kg-day) | Intake Factor - Cancer - Fruit Intake - Child (kg/kg-day) | Vegetable Lifetime Average Daily Dose - Child (mg/kg-day) | Fruit Lifetime Average Daily Dose - Child (mg/kg-day) | Lifetime Average Daily Dose (Cancer) - Child (mg/kg-day) | Oral Cancer Slope Factor (1/mg/kg-day) | Homegrown Produce Ingestion Excess Cancer Risk - Adult | Homegrown Produce Excess Cancer Risk - Child | Homegrown Produce Excess Cancer Risk | Soil and Groundwater Residential Risk* | Total Unrestricted Risks |
|---------------------|--------------------------------------|-----------------------------|------------------------------------|---|---|---|---|--|---|---|---|---|--|--|--|--|--------------------------------------|--|--------------------------|
| Arsenic             | BKG                                  | 1.00E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 1.50E+00                               | 0E+00  | 0E+00  | --                                   | --                                     | --                       |
| Barium              | 2.50E+02                             | 3.00E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 3.03E-02  | 4.91E-04  | 3.08E-02   | 1.15E-04  | 1.64E-04  | 7.57E-03  | 1.23E-04  | 7.69E-03   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Beryllium           | BKG                                  | 2.50E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | --                                     | --   | --   | --                                   | --                                     | --                       |
| Cadmium             | BKG                                  | 1.40E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 3.80E-01                               | 0E+00  | 0E+00  | --                                   | --                                     | --                       |
| Chromium            | BKG                                  | 1.00E-04                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Cobalt              | BKG                                  | 2.30E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Copper              | BKG                                  | 8.00E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Lead                | 1.80E+02                             | 7.60E-04                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 2.16E-02  | 8.95E-05  | 2.17E-02   | 1.15E-04  | 1.64E-04  | 5.40E-03  | 2.24E-05  | 5.42E-03   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Mercury             | 9.70E-01                             | 3.00E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 2.50E-04  | 1.90E-04  | 4.40E-04   | 1.15E-04  | 1.64E-04  | 6.25E-05  | 4.76E-05  | 1.10E-04   | NC                                     | --   | --   | 1.0E-04                              | --                                     | --                       |
| Molybdenum          | ND                                   | 8.00E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Nickel              | BKG                                  | 5.00E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | --                                     | --   | --   | --                                   | --                                     | --                       |
| Selenium            | ND                                   | 1.00E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Vanadium            | BKG                                  | 1.40E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Zinc                | 1.40E+02                             | 2.60E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 3.35E-02  | 2.38E-02  | 5.73E-02   | 1.15E-04  | 1.64E-04  | 8.38E-03  | 5.95E-03  | 1.43E-02   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Aldrin              | 4.80E+00                             | 1.40E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 8.84E-04  | 4.40E-04  | 1.32E-03   | 1.15E-04  | 1.64E-04  | 2.21E-04  | 1.10E-04  | 3.31E-04   | 1.70E+01                               | 2E-02  | 6E-03  | 3E-02                                | 2E-04                                  | 3E-02                    |
| Alpha-BHC (Lindane) | ND                                   | 4.20E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 2.70E+00                               | 0E+00  | 0E+00  | --                                   | --                                     | --                       |
| DDD                 | ND                                   | 3.30E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 2.40E-01                               | 0E+00  | 0E+00  | --                                   | --                                     | --                       |
| DDE                 | 1.50E-02                             | 3.80E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 1.82E-06  | 3.73E-08  | 1.86E-06   | 1.15E-04  | 1.64E-04  | 4.55E-07  | 9.32E-09  | 4.65E-07   | 3.40E-01                               | 6E-07  | 2E-07  | 8E-07                                | 1E-08                                  | 8E-07                    |
| DDT                 | 2.20E-02                             | 1.60E-03                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 2.65E-06  | 2.30E-08  | 2.67E-06   | 1.15E-04  | 1.64E-04  | 6.62E-07  | 5.76E-09  | 6.68E-07   | 3.40E-01                               | 9E-07  | 2E-07  | 1E-06                                | 1E-08                                  | 1E-06                    |
| Dieldrin            | 1.90E+00                             | 1.70E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 2.42E-04  | 2.11E-05  | 2.63E-04   | 1.15E-04  | 1.64E-04  | 6.06E-05  | 5.28E-06  | 6.58E-05   | 1.60E+01                               | 4E-03  | 1E-03  | 5E-03                                | 6E-05                                  | 5E-03                    |
| Endrin              | ND                                   | 1.70E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Endrin Ketone       | 5.80E-02                             | 1.70E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | 7.39E-06  | 6.45E-07  | 8.04E-06   | 1.15E-04  | 1.64E-04  | 1.85E-06  | 1.61E-07  | 2.01E-06   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| 1,2-Dichloroethane  | ND                                   | 1.00E+00                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | 4.70E-02                               | 0E+00  | 0E+00  | --                                   | 6.43E-09                               | 6E-09                    |
| Toluene             | ND                                   | 2.10E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Ethylbenzene        | ND                                   | 1.20E-01                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |
| Xylenes             | ND                                   | 9.40E-02                    | 2.60E-01                           | 4.60E-04  | 6.54E-04  | --  | --  | 0.00E+00   | 1.15E-04  | 1.64E-04  | --  | --  | 0.00E+00   | NC                                     | --   | --   | --                                   | --                                     | --                       |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 kg = kilogram  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

TABLE E-7. WEST BLOCK PARCEL A ADULT RESIDENTIAL NONCANCER HAZARD CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Parcel A Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Adult Inhalation Noncancer Exposure Factor (m3/kg-day) | Residential Adult Soil Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Residential Adult Groundwater Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Residential Adult Ingestion Noncancer Exposure Factor (day)-1 | Residential Adult Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Adult Dermal Noncancer Exposure Factor (day)-1 | Residential Adult Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Residential Adult Soil Inhalation Noncancer Hazard | Residential Adult Soil Ingestion Noncancer Hazard | Residential Adult Soil Dermal Noncancer Hazard | Total Residential Adult Soil Noncancer Hazard | Residential Adult Groundwater Inhalation Noncancer Hazard | Total Adult Residential Noncancer Hazard |                 |
|---------------------|--------------------------------------|--|------------------------|--|--|--|---|---|--|--|--|---|--|--|--|--|---|--|---|---|--|-----------------|
| Arsenic             | BKG                                  | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 3.00E-02                                 | 1.59E-05   | --  | 8.57E-06                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Barium              | 2.50E+02                             | 2.87E-07   | 1.12E-01               | NA   | 2.74E-01   | 7.87E-08   | --  | 1.37E-06  | 3.42E-04   | 1.00E-02                                 | 1.59E-05   | 3.97E-05  | 1.43E-04                                       | 7.00E-02                                 | 4.90E-03                                   | 5.51E-04   | 4.89E-03  | 8.11E-03                                       | 1.36E-02                                      | --  | 1.36E-02                                 |                 |
| Beryllium           | BKG                                  | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | 5.71E-06                                       | 2.00E-03                                 | 1.40E-05                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Cadmium             | BKG                                  | --   | ND                     | ND   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-03                                 | 1.59E-05   | --  | 5.71E-06                                       | 5.00E-04                                 | 1.25E-05                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Chromium            | BKG                                  | --   | ND                     | ND   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | --   | 1.50E+00                                 | 1.95E-02                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Cobalt              | BKG                                  | --   | 7.60E-02               | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | --   | 6.00E-02                                 | 6.00E-02                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Copper              | BKG                                  | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | --   | 4.00E-02                                 | 4.00E-02                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Lead                | 1.80E+02                             | 2.07E-07   | ND                     | ND   | 2.74E-01   | 5.67E-08   | --  | 1.37E-06  | 2.47E-04   | 1.00E-02                                 | 1.59E-05   | 2.86E-05  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| Mercury             | 9.70E-01                             | 1.11E-09   | NA                     | NA   | 2.74E-01   | 3.05E-10   | --  | 1.37E-06  | 1.33E-06   | 1.00E-02                                 | 1.59E-05   | 1.54E-07  | 8.57E-05                                       | --                                       | --   | 3.56E-06   | --  | --   | 3.56E-06                                      | --  | 3.56E-06                                 |                 |
| Molybdenum          | ND                                   | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | --   | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Nickel              | BKG                                  | --   | 6.50E-02               | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | 1.43E-05                                       | 2.00E-02                                 | 8.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Selenium            | ND                                   | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | 5.71E-03                                       | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Vanadium            | BKG                                  | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 1.00E-02                                 | 1.59E-05   | --  | --   | 7.00E-03                                 | 1.82E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Zinc                | 1.40E+02                             | 1.61E-07   | 2.70E-02               | NA   | 2.74E-01   | 4.41E-08   | --  | 1.37E-06  | 1.92E-04   | 1.00E-02                                 | 1.59E-05   | 2.22E-05  | --   | 3.00E-01                                 | 3.00E-01                                   | --   | 6.39E-04  | 7.42E-05                                       | 7.13E-04                                      | --  | 7.13E-04                                 |                 |
| Aldrin              | 4.80E+00                             | 5.52E-09   | NA                     | NA   | 2.74E-01   | 1.51E-09   | --  | 1.37E-06  | 6.58E-06   | 5.00E-02                                 | 1.59E-05   | 3.81E-06  | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | 5.04E-05   | 2.19E-01  | 1.27E-01                                       | 3.46E-01                                      | --  | 3.46E-01                                 |                 |
| Alpha-BHC (Lindane) | ND                                   | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| DDD                 | ND                                   | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| DDE                 | 1.50E-02                             | 1.72E-11   | NA                     | NA   | 2.74E-01   | 4.72E-12   | --  | 1.37E-06  | 2.05E-08   | 5.00E-02                                 | 1.59E-05   | 1.19E-08  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| DDT                 | 2.20E-02                             | 2.53E-11   | NA                     | NA   | 2.74E-01   | 6.93E-12   | --  | 1.37E-06  | 3.01E-08   | 5.00E-02                                 | 1.59E-05   | 1.75E-08  | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 1.39E-08   | 6.03E-05  | 3.50E-05                                       | 9.52E-05                                      | --  | 9.52E-05                                 |                 |
| Dieldrin            | 1.90E+00                             | 2.18E-09   | NA                     | NA   | 2.74E-01   | 5.98E-10   | --  | 1.37E-06  | 2.60E-06   | 5.00E-02                                 | 1.59E-05   | 1.51E-06  | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | 1.20E-05   | 5.21E-02  | 3.02E-02                                       | 8.23E-02                                      | --  | 8.23E-02                                 |                 |
| Endrin              | ND                                   | --   | NA                     | NA   | 2.74E-01   | --   | --  | 1.37E-06  | --   | 5.00E-02                                 | 1.59E-05   | --  | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Endrin Ketone       | 5.80E-02                             | 6.67E-11   | NA                     | NA   | 2.74E-01   | 1.83E-11   | --  | 1.37E-06  | 7.95E-08   | 5.00E-02                                 | 1.59E-05   | 4.61E-08  | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | 6.09E-08   | 2.65E-04  | 1.54E-04                                       | 4.19E-04                                      | --  | 4.19E-04                                 |                 |
| 1,2-Dichloroethane  | ND                                   | --   | 6.00E-10               | 6.00E-07                                       | 2.74E-01   | --   | 1.64E-07  | 1.37E-06  | --   | 1.00E-01                                 | 1.59E-05   | --  | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --   | --  | --   | --  | 1.17E-04  | 1.17E-04                                 |                 |
| Toluene             | ND                                   | --   | 9.28E-10               | 9.28E-07                                       | 2.74E-01   | --   | 2.54E-07  | 1.37E-06  | --   | 1.00E-01                                 | 1.59E-05   | --  | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --   | --  | --   | --  | 2.22E-06  | 2.22E-06                                 |                 |
| Ethylbenzene        | ND                                   | --   | 4.94E-10               | 4.94E-07                                       | 2.74E-01   | --   | 1.35E-07  | 1.37E-06  | --   | 1.00E-01                                 | 1.59E-05   | --  | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --   | --  | --   | --  | 4.74E-07  | 4.74E-07                                 |                 |
| Xylenes             | ND                                   | --   | 7.67E-10               | 7.67E-07                                       | 2.74E-01   | --   | 2.10E-07  | 1.37E-06  | --   | 1.00E-01                                 | 1.59E-05   | --  | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --   | --  | --   | --  | 1.05E-07  | 1.05E-07                                 |                 |
|                     |                                      |  |                        |  |  |  |   |   |  |  |  |   |  |  |  |  |   |  | <b>Total</b>                                  | <b>4.43E-01</b>   | <b>1.20E-04</b>                          | <b>4.44E-01</b> |

Notes:  
-- = Not Applicable  
BKG = EPC is below background concentration and chemical is not evaluated  
EPC = Exposure point concentration  
m3 = cubic meters  
mg/kg = milligrams per kilogram  
NC = Chemical is not considered a carcinogen  
mg/L = milligrams per liter



TABLE E-8. WEST BLOCK PARCEL A CHILD RESIDENTIAL NONCANCER HAZARD CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Parcel A Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Residential Groundwater Indoor Air EPC (mg/m3) | Residential Child Inhalation Noncancer Exposure Factor (m3/kg-day) | Residential Child Soil Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Residential Child Groundwater Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Residential Child Ingestion Noncancer Exposure Factor (day)-1 | Residential Child Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Residential Child Dermal Noncancer Exposure Factor (day)-1 | Residential Child Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Residential Child Soil Inhalation Noncancer Hazard | Residential Child Soil Ingestion Noncancer Hazard | Residential Child Soil Dermal Noncancer Hazard | Total Residential Child Soil Noncancer Hazard | Residential Child Groundwater Inhalation Noncancer Hazard | Total Child Residential Noncancer Hazard |                 |
|---------------------|--------------------------------------|--|------------------------|--|--|--|---|---|--|--|--|---|--|--|--|--|---|--|---|---|--|-----------------|
| Arsenic             | BKG                                  | --   | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 3.00E-02                                 | 1.92E-05   | 4.79E-05  | 8.57E-06                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | 5.67E-02                                      | --  | 5.67E-02                                 |                 |
| Barium              | 2.50E+02                             | 2.87E-07   | 1.12E-01               | NA   | 6.39E-01   | 1.84E-07   | --  | 1.28E-05  | 3.20E-03   | 1.00E-02                                 | 1.92E-05   | --  | 1.43E-04                                       | 7.00E-02                                 | 4.90E-03                                   | 1.29E-03   | 4.57E-02  | 9.78E-03                                       | 5.67E-02                                      | --  | 5.67E-02                                 |                 |
| Beryllium           | BKG                                  | --   | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | 5.71E-06                                       | 2.00E-03                                 | 1.40E-05                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Cadmium             | BKG                                  | --   | ND                     | ND   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-03                                 | 1.92E-05   | --  | 5.71E-06                                       | 5.00E-04                                 | 1.25E-05                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Chromium            | BKG                                  | --   | ND                     | ND   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | --   | 1.50E+00                                 | 1.95E-02                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Cobalt              | BKG                                  | --   | 7.60E-02               | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | --   | 6.00E-02                                 | 6.00E-02                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Copper              | BKG                                  | --   | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | --   | 4.00E-02                                 | 4.00E-02                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Lead                | 1.80E+02                             | 2.07E-07   | ND                     | ND   | 6.39E-01   | 1.32E-07   | --  | 1.28E-05  | 2.30E-03   | 1.00E-02                                 | 1.92E-05   | 3.45E-05  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| Mercury             | 9.70E-01                             | 1.11E-09   | NA                     | NA   | 6.39E-01   | 7.13E-10   | --  | 1.28E-05  | 1.24E-05   | 1.00E-02                                 | 1.92E-05   | 1.86E-07  | 8.57E-05                                       | --                                       | --   | 8.31E-06   | --  | --   | 8.31E-06                                      | --  | 8.31E-06                                 |                 |
| Molybdenum          | ND                                   | --   | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | 5.00E-03                                       | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Nickel              | BKG                                  | --   | 6.50E-02               | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | 1.43E-05                                       | 2.00E-02                                 | 8.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Selenium            | ND                                   | --   | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | 5.71E-03                                       | 5.00E-03                                 | 5.00E-03                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Vanadium            | BKG                                  | --   | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 1.00E-02                                 | 1.92E-05   | --  | 7.00E-03                                       | 1.82E-04                                 | --   | --   | --  | --   | --  | --  | --                                       |                 |
| Zinc                | 1.40E+02                             | 1.61E-07   | 2.70E-02               | NA   | 6.39E-01   | 1.03E-07   | --  | 1.28E-05  | 1.79E-03   | 1.00E-02                                 | 1.92E-05   | 2.68E-05  | 3.00E-01                                       | 3.00E-01                                 | 3.00E-01                                   | --   | 5.97E-03  | 8.95E-05                                       | 6.06E-03                                      | --  | 6.06E-03                                 |                 |
| Aldrin              | 4.80E+00                             | 5.52E-09   | NA                     | NA   | 6.39E-01   | 3.53E-09   | --  | 1.28E-05  | 6.14E-05   | 5.00E-02                                 | 1.92E-05   | 4.60E-06  | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | 1.18E-04   | 2.05E+00  | 1.53E-01                                       | 2.20E+00                                      | --  | 2.20E+00                                 |                 |
| Alpha-BHC (Lindane) | ND                                   | --   | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 5.00E-02                                 | 1.92E-05   | --  | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| DDD                 | ND                                   | --   | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 5.00E-02                                 | 1.92E-05   | --  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| DDE                 | 1.50E-02                             | 1.72E-11   | NA                     | NA   | 6.39E-01   | 1.10E-11   | --  | 1.28E-05  | 1.92E-07   | 5.00E-02                                 | 1.92E-05   | 1.44E-08  | --   | --                                       | --   | --   | --  | --   | --  | --  | --                                       |                 |
| DDT                 | 2.20E-02                             | 2.53E-11   | NA                     | NA   | 6.39E-01   | 1.62E-11   | --  | 1.28E-05  | 2.81E-07   | 5.00E-02                                 | 1.92E-05   | 2.11E-08  | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 3.23E-08   | 5.63E-04  | 4.22E-05                                       | 6.05E-04                                      | --  | 6.05E-04                                 |                 |
| Diieldrin           | 1.90E+00                             | 2.18E-09   | NA                     | NA   | 6.39E-01   | 1.40E-09   | --  | 1.28E-05  | 2.43E-05   | 5.00E-02                                 | 1.92E-05   | 1.82E-06  | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | 2.79E-05   | 4.86E-01  | 3.64E-02                                       | 5.22E-01                                      | --  | 5.22E-01                                 |                 |
| Dieldrin            | 1.90E+00                             | 2.18E-09   | NA                     | NA   | 6.39E-01   | 1.40E-09   | --  | 1.28E-05  | 2.43E-05   | 5.00E-02                                 | 1.92E-05   | 1.82E-06  | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | 2.79E-05   | 4.86E-01  | 3.64E-02                                       | 5.22E-01                                      | --  | 5.22E-01                                 |                 |
| Endrin              | ND                                   | --   | NA                     | NA   | 6.39E-01   | --   | --  | 1.28E-05  | --   | 5.00E-02                                 | 1.92E-05   | --  | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --   | --  | --   | --  | --  | --                                       |                 |
| Endrin Ketone       | 5.80E-02                             | 6.67E-11   | NA                     | NA   | 6.39E-01   | 4.26E-11   | --  | 1.28E-05  | 7.42E-07   | 5.00E-02                                 | 1.92E-05   | 5.56E-08  | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | 1.42E-07   | 2.47E-03  | 1.85E-04                                       | 2.66E-03                                      | --  | 2.66E-03                                 |                 |
| 1,2-Dichloroethane  | ND                                   | --   | 6.00E-10               | 6.00E-07                                       | 6.39E-01   | --   | 3.84E-07  | 1.28E-05  | --   | 1.00E-01                                 | 1.92E-05   | --  | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --   | --  | --   | 2.74E-04                                      | --  | 2.74E-04                                 |                 |
| Toluene             | ND                                   | --   | 9.28E-10               | 9.28E-07                                       | 6.39E-01   | --   | 5.93E-07  | 1.28E-05  | --   | 1.00E-01                                 | 1.92E-05   | --  | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --   | --  | --   | 5.19E-06                                      | --  | 5.19E-06                                 |                 |
| Ethylbenzene        | ND                                   | --   | 4.94E-10               | 4.94E-07                                       | 6.39E-01   | --   | 3.16E-07  | 1.28E-05  | --   | 1.00E-01                                 | 1.92E-05   | --  | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --   | --  | --   | 1.11E-06                                      | --  | 1.11E-06                                 |                 |
| Xylenes             | ND                                   | --   | 7.67E-10               | 7.67E-07                                       | 6.39E-01   | --   | 4.90E-07  | 1.28E-05  | --   | 1.00E-01                                 | 1.92E-05   | --  | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --   | --  | --   | 2.45E-07                                      | --  | 2.45E-07                                 |                 |
|                     |                                      |  |                        |  |  |  |   |   |  |  |  |   |  |  |  |  |   |  | <b>Total</b>                                  | <b>2.79E+00</b>   | <b>2.81E-04</b>                          | <b>2.79E+00</b> |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen  
 mg/L = milligrams per liter

TABLE E-9. WEST BLOCK PARCEL A HOMEGROWN PRODUCE RESIDENTIAL NONCANCER HAZARDS CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | Soil Concentration (mg/kg) | Plant Uptake Factor (kg/kg) | Resuspension Multiplier (unitless) | Intake Factor - Noncancer - Vegetable Intake - Adult (kg/kg-day) | Intake Factor - Noncancer - Fruit Intake - Adult (kg/kg-day) | Vegetable Lifetime Average Daily Dose - Adult (mg/kg-day) | Fruit Lifetime Average Daily Dose - Adult (mg/kg-day) | Lifetime Average Daily Dose (Noncancer) - Adult (mg/kg-day) | Intake Factor - Noncancer - Vegetable Intake - Child (kg/kg-day) | Intake Factor - Noncancer - Fruit Intake - Child (kg/kg-day) | Vegetable Lifetime Average Daily Dose - Child (mg/kg-day) | Fruit Lifetime Average Daily Dose - Child (mg/kg-day) | Lifetime Average Daily Dose (Noncancer) - Child (mg/kg-day) | Oral Reference Dose (mg/kg-day) | Homegrown Produce Ingestion Noncancer Hazard - Adult | Homegrown Produce Noncancer Hazard - Child | Soil and Groundwater Adult Residential Noncancer Hazard* | Soil and Groundwater Child Residential Noncancer Hazard* | Total Adult Residential Noncancer Hazard | Total Child Residential Noncancer Hazard |
|---------------------|----------------------------|-----------------------------|------------------------------------|--|--|---|---|---|--|--|---|---|---|---------------------------------|--|--|--|--|--|--|
| Arsenic             | BKG                        | 1.00E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 1.50E+00                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Barium              | 2.50E+02                   | 3.00E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 3.03E-02  | 4.91E-04  | 3.08E-02  | 1.15E-04   | 1.64E-04   | 7.57E-03  | 1.23E-04  | 7.69E-03  | NC                              | --   | --   | 1E-02  | 6E-02  | 1E-02                                    | 6E-02                                    |
| Beryllium           | BKG                        | 2.50E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | --                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Cadmium             | BKG                        | 1.40E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 3.80E-01                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| Chromium            | BKG                        | 1.00E-04                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Cobalt              | BKG                        | 2.30E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Copper              | BKG                        | 8.00E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Lead                | 1.80E+02                   | 7.60E-04                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 2.16E-02  | 8.95E-05  | 2.17E-02  | 1.15E-04   | 1.64E-04   | 5.40E-03  | 2.24E-05  | 5.42E-03  | NC                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Mercury             | 9.70E-01                   | 3.00E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 2.50E-04  | 1.90E-04  | 4.40E-04  | 1.15E-04   | 1.64E-04   | 6.25E-05  | 4.76E-05  | 1.10E-04  | NC                              | --   | --   | 4E-06  | 8E-06  | 4E-06                                    | 8E-06                                    |
| Molybdenum          | ND                         | 8.00E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Nickel              | BKG                        | 5.00E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | --                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Selenium            | ND                         | 1.00E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Vanadium            | BKG                        | 1.40E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Zinc                | 1.40E+02                   | 2.60E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 3.35E-02  | 2.38E-02  | 5.73E-02  | 1.15E-04   | 1.64E-04   | 8.38E-03  | 5.95E-03  | 1.43E-02  | NC                              | --   | --   | 7E-04  | 6E-03  | 7E-04                                    | 6E-03                                    |
| Aldrin              | 4.80E+00                   | 1.40E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 8.84E-04  | 4.40E-04  | 1.32E-03  | 1.15E-04   | 1.64E-04   | 2.21E-04  | 1.10E-04  | 3.31E-04  | 1.70E+01                        | 2E-02  | 6E-03                                      | 1E-01  | 2E+00  | 4E-01                                    | 2E+00                                    |
| Alpha-BHC (Lindane) | ND                         | 4.20E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 2.70E+00                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| DDD                 | ND                         | 3.30E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 2.40E-01                        | 0E+00  | 0E+00                                      | --   | --   | 0E+00                                    | 0E+00                                    |
| DDE                 | 1.50E-02                   | 3.80E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 1.82E-06  | 3.73E-08  | 1.86E-06  | 1.15E-04   | 1.64E-04   | 4.55E-07  | 9.32E-09  | 4.65E-07  | 3.40E-01                        | 6E-07  | 2E-07                                      | --   | --   | 6E-07                                    | 2E-07                                    |
| DDT                 | 2.20E-02                   | 1.60E-03                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 2.65E-06  | 2.30E-08  | 2.67E-06  | 1.15E-04   | 1.64E-04   | 6.62E-07  | 5.76E-09  | 6.68E-07  | 3.40E-01                        | 9E-07  | 2E-07                                      | 1E-04  | 6E-04  | 1E-04                                    | 6E-04                                    |
| Dieldrin            | 1.90E+00                   | 1.70E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 2.42E-04  | 2.11E-05  | 2.63E-04  | 1.15E-04   | 1.64E-04   | 6.06E-05  | 5.28E-06  | 6.58E-05  | 1.60E+01                        | 4E-03  | 1E-03                                      | 8E-02  | 5E-01  | 9E-02                                    | 5E-01                                    |
| Endrin              | ND                         | 1.70E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | --   | --   | 0E+00                                    | 0E+00                                    |
| Endrin Ketone       | 5.80E-02                   | 1.70E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | 7.39E-06  | 6.45E-07  | 8.04E-06  | 1.15E-04   | 1.64E-04   | 1.85E-06  | 1.61E-07  | 2.01E-06  | NC                              | --   | --   | 4E-04  | 3E-03  | 4E-04                                    | 3E-03                                    |
| 1,2-Dichloroethane  | ND                         | 1.00E+00                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | 4.70E-02                        | 0E+00  | 0E+00                                      | 1.17E-04   | 2.74E-04   | 1E-04                                    | 3E-04                                    |
| Toluene             | ND                         | 2.10E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | 2.22E-06   | 5.19E-06   | 2E-06                                    | 5E-06                                    |
| Ethylbenzene        | ND                         | 1.20E-01                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | 4.74E-07   | 1.11E-06   | 5E-07                                    | 1E-06                                    |
| Xylenes             | ND                         | 9.40E-02                    | 2.60E-01                           | 4.60E-04   | 6.54E-04   | --  | --  | 0.00E+00  | 1.15E-04   | 1.64E-04   | --  | --  | 0.00E+00  | NC                              | --   | --   | 1.05E-07   | 2.45E-07   | 1E-07                                    | 2E-07                                    |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 kg = kilogram  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

TABLE E-10. WEST BLOCK PARCEL A COMMERCIAL/INDUSTRIAL WORKER EXCESS CANCER RISK CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Parcel A Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Commercial/Industrial Groundwater Indoor Air EPC (mg/m3) | Commercial/Industrial Worker Inhalation Carcinogenic Exposure Factor (m3/kg-day) | Commercial/Industrial Worker Soil Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Groundwater Inhalation Carcinogenic Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Ingestion Carcinogenic Exposure Factor (day-1) | Commercial/Industrial Worker Ingestion Carcinogenic Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Commercial/Industrial Worker Dermal Carcinogenic Exposure Factor (day-1) | Commercial/Industrial Worker Dermal Carcinogenic Chronic Daily Intake (mg/kg-day) | Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Dermal Cancer Slope Factor (mg/kg-day) <sup>-1</sup> | Commercial/Industrial Worker Soil Inhalation Risk | Commercial/Industrial Worker Soil Ingestion Risk | Commercial/Industrial Worker Soil Dermal Risk | Total Commercial/Industrial Worker Soil Risk | Commercial/Industrial Worker Groundwater Inhalation Risk | Total Commercial/Industrial Worker Risk |
|---------------------|--------------------------------------|--|------------------------|--|--|--|---|---|--|--|--|---|--|--|--|---|--|---|--|--|---|
| Arsenic             | BKG                                  | --   | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 3.00E-02                                 | 2.65E-06   | --  | 1.20E+01   | 1.50E+00   | 1.50E+00   | --  | --   | --  | --   | --   | --                                      |
| Barium              | 2.50E+02                             | 2.87E-07   | 1.12E-01               | NA   | 6.99E-02   | 2.01E-08   | --  | 6.99E-08  | 1.75E-05   | 1.00E-02                                 | 2.65E-06   | 6.63E-06  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Beryllium           | BKG                                  | --   | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | 8.40E+00   | --   | --   | --  | --   | --  | --   | --   | --                                      |
| Cadmium             | BKG                                  | --   | ND                     | ND   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-03                                 | 2.65E-06   | --  | 1.50E+01   | 3.80E-01   | 1.52E+01   | --  | --   | --  | --   | --   | --                                      |
| Chromium            | BKG                                  | --   | ND                     | ND   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Cobalt              | BKG                                  | --   | 7.60E-02               | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Copper              | BKG                                  | --   | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Lead                | 1.80E+02                             | 2.07E-07   | ND                     | ND   | 6.99E-02   | 1.45E-08   | --  | 6.99E-08  | 1.26E-05   | 1.00E-02                                 | 2.65E-06   | 4.77E-06  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Mercury             | 9.70E-01                             | 1.11E-09   | NA                     | NA   | 6.99E-02   | 7.79E-11   | --  | 6.99E-08  | 6.78E-08   | 1.00E-02                                 | 2.65E-06   | 2.57E-08  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Molybdenum          | ND                                   | --   | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Nickel              | BKG                                  | --   | 6.50E-02               | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | 9.10E-01   | --   | --   | --  | --   | --  | --   | --   | --                                      |
| Selenium            | ND                                   | --   | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Vanadium            | BKG                                  | --   | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 1.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Zinc                | 1.40E+02                             | 1.61E-07   | 2.70E-02               | NA   | 6.99E-02   | 1.12E-08   | --  | 6.99E-08  | 9.78E-06   | 1.00E-02                                 | 2.65E-06   | 3.71E-06  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Aldrin              | 4.80E+00                             | 5.52E-09   | NA                     | NA   | 6.99E-02   | 3.86E-10   | --  | 6.99E-08  | 3.35E-07   | 5.00E-02                                 | 2.65E-06   | 6.36E-07  | 1.70E+01   | 1.70E+01   | 1.70E+01   | 6.55E-09  | 5.70E-06   | 1.08E-05                                      | 1.65E-05                                     | --   | 1.65E-05                                |
| Alpha-BHC (Lindane) | ND                                   | --   | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | 2.70E+00   | 2.70E+00   | 2.70E+00   | --  | --   | --  | --   | --   | --                                      |
| DDD                 | ND                                   | --   | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | 2.40E-01   | 2.40E-01   | 2.40E-01   | --  | --   | --  | --   | --   | --                                      |
| DDE                 | 1.50E-02                             | 1.72E-11   | NA                     | NA   | 6.99E-02   | 1.20E-12   | --  | 6.99E-08  | 1.05E-09   | 5.00E-02                                 | 2.65E-06   | 1.99E-09  | 3.40E-01   | 3.40E-01   | 3.40E-01   | 4.10E-13  | 3.56E-10   | 6.76E-10                                      | 1.03E-09                                     | --   | 1.03E-09                                |
| DDT                 | 2.20E-02                             | 2.53E-11   | NA                     | NA   | 6.99E-02   | 1.77E-12   | --  | 6.99E-08  | 1.54E-09   | 5.00E-02                                 | 2.65E-06   | 2.92E-09  | 3.40E-01   | 3.40E-01   | 3.40E-01   | 6.01E-13  | 5.23E-10   | 9.91E-10                                      | 1.51E-09                                     | --   | 1.51E-09                                |
| Dieldrin            | 1.90E+00                             | 2.18E-09   | NA                     | NA   | 6.99E-02   | 1.53E-10   | --  | 6.99E-08  | 1.33E-07   | 5.00E-02                                 | 2.65E-06   | 2.52E-07  | 1.60E+01   | 1.60E+01   | 1.60E+01   | 2.44E-09  | 2.12E-06   | 4.03E-06                                      | 6.16E-06                                     | --   | 6.16E-06                                |
| Endrin              | ND                                   | --   | NA                     | NA   | 6.99E-02   | --   | --  | 6.99E-08  | --   | 5.00E-02                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Endrin Ketone       | 5.80E-02                             | 6.67E-11   | NA                     | NA   | 6.99E-02   | 4.66E-12   | --  | 6.99E-08  | 4.05E-09   | 5.00E-02                                 | 2.65E-06   | 7.69E-09  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| 1,2-Dichloroethane  | ND                                   | --   | 6.00E-10               | 2.40E-10   | 6.99E-02   | --   | 1.68E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | 7.20E-02   | 4.70E-02   | 4.70E-02   | --  | --   | --  | --   | 1.21E-12   | 1.21E-12                                |
| Toluene             | ND                                   | --   | 9.28E-10               | 3.71E-10   | 6.99E-02   | --   | 2.59E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Ethylbenzene        | ND                                   | --   | 4.94E-10               | 1.98E-10   | 6.99E-02   | --   | 1.38E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |
| Xylenes             | ND                                   | --   | 7.67E-10               | 3.07E-10   | 6.99E-02   | --   | 2.15E-11  | 6.99E-08  | --   | 1.00E-01                                 | 2.65E-06   | --  | NC   | NC   | NC   | --  | --   | --  | --   | --   | --                                      |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

TABLE E-11. WEST BLOCK PARCEL A COMMERCIAL/INDUSTRIAL WORKER NONCANCER HAZARDS CALCULATIONS  
Mandela Gateway Redevelopment Site  
Oakland, California

|                     | West Block Parcel A Soil EPC (mg/kg) | Resident and Commercial/Industrial Worker Receptor West Block Parcel A Fugitive Dust EPC (mg/m3) | Groundwater EPC (mg/L) | Commercial/Industrial Groundwater Indoor Air EPC (mg/m3) | Commercial/Industrial Worker Inhalation Noncancer Exposure Factor (m3/kg-day) | Commercial/Industrial Worker Soil Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Groundwater Inhalation Noncancer Chronic Daily Intake (mg/kg-day) | Commercial/Industrial Worker Ingestion Noncancer Exposure Factor (day)-1 | Commercial/Industrial Worker Ingestion Noncancer Chronic Daily Intake (mg/kg-day) | Soil Dermal Absorption Factor (unitless) | Commercial/Industrial Worker Dermal Noncancer Exposure Factor (day)-1 | Commercial/Industrial Worker Dermal Noncancer Chronic Daily Intake (mg/kg-day) | Inhalation Verified Reference Dose (mg/kg-day) | Oral Verified Reference Dose (mg/kg-day) | Dermal Verified Reference Dose (mg/kg-day) | Commercial/Industrial Worker Soil Inhalation Noncancer Hazard | Commercial/Industrial Worker Soil Ingestion Noncancer Hazard | Commercial/Industrial Worker Soil Dermal Noncancer Hazard | Total Commercial/Industrial Worker Soil Noncancer Hazard | Commercial/Industrial Worker Groundwater Inhalation Noncancer Hazard | Total Commercial/Industrial Worker Noncancer Hazard |
|---------------------|--------------------------------------|--|------------------------|--|---|---|--|--|---|--|---|--|--|--|--|---|--|---|--|--|---|
| Arsenic             | BKG                                  | --   | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 3.00E-02                                 | 7.42E-06  | --   | 8.57E-06                                       | 3.00E-04                                 | 3.00E-04                                   | --  | --   | --  | --   | --   | --  |
| Barium              | 2.50E+02                             | 2.87E-07   | 1.12E-01               | NA   | 1.96E-01  | 5.62E-08  | --   | 9.78E-07   | 2.45E-04  | 1.00E-02                                 | 7.42E-06  | 1.86E-05   | 1.43E-04                                       | 7.00E-02                                 | 4.90E-03                                   | 3.94E-04  | 3.49E-03   | 3.79E-03  | 7.67E-03   | --   | 7.67E-03  |
| Beryllium           | BKG                                  | --   | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 5.71E-06                                       | 2.00E-03                                 | 1.40E-05                                   | --  | --   | --  | --   | --   | --  |
| Cadmium             | BKG                                  | --   | ND                     | ND   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-03                                 | 7.42E-06  | --   | 5.71E-06                                       | 5.00E-04                                 | 1.25E-05                                   | --  | --   | --  | --   | --   | --  |
| Chromium            | BKG                                  | --   | ND                     | ND   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 1.50E+00                                 | 1.95E-02                                   | --  | --   | --  | --   | --   | --  |
| Cobalt              | BKG                                  | --   | 7.60E-02               | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 6.00E-02                                 | 6.00E-02                                   | --  | --   | --  | --   | --   | --  |
| Copper              | BKG                                  | --   | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 4.00E-02                                 | 4.00E-02                                   | --  | --   | --  | --   | --   | --  |
| Lead                | 1.80E+02                             | 2.07E-07   | ND                     | ND   | 1.96E-01  | 4.05E-08  | --   | 9.78E-07   | 1.76E-04  | 1.00E-02                                 | 7.42E-06  | 1.34E-05   | --   | --                                       | --   | --  | --   | --  | --   | --   | --  |
| Mercury             | 9.70E-01                             | 1.11E-09   | NA                     | NA   | 1.96E-01  | 2.18E-10  | --   | 9.78E-07   | 9.49E-07  | 1.00E-02                                 | 7.42E-06  | 7.20E-08   | 8.57E-05                                       | --                                       | --   | 2.54E-06  | --   | --  | 2.54E-06   | --   | 2.54E-06  |
| Molybdenum          | ND                                   | --   | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 5.00E-03                                 | 5.00E-03                                   | --  | --   | --  | --   | --   | --  |
| Nickel              | BKG                                  | --   | 6.50E-02               | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 1.43E-05                                       | 2.00E-02                                 | 8.00E-04                                   | --  | --   | --  | --   | --   | --  |
| Selenium            | ND                                   | --   | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | 5.71E-03                                       | 5.00E-03                                 | 5.00E-03                                   | --  | --   | --  | --   | --   | --  |
| Vanadium            | BKG                                  | --   | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 1.00E-02                                 | 7.42E-06  | --   | --   | 7.00E-03                                 | 1.82E-04                                   | --  | --   | --  | --   | --   | --  |
| Zinc                | 1.40E+02                             | 1.61E-07   | 2.70E-02               | NA   | 1.96E-01  | 3.15E-08  | --   | 9.78E-07   | 1.37E-04  | 1.00E-02                                 | 7.42E-06  | 1.04E-05   | --   | 3.00E-01                                 | 3.00E-01                                   | --  | 4.57E-04   | 3.46E-05  | 4.91E-04   | --   | 4.91E-04  |
| Aldrin              | 4.80E+00                             | 5.52E-09   | NA                     | NA   | 1.96E-01  | 1.08E-09  | --   | 9.78E-07   | 4.70E-06  | 5.00E-02                                 | 7.42E-06  | 1.78E-06   | 3.00E-05                                       | 3.00E-05                                 | 3.00E-05                                   | 3.60E-05  | 1.57E-01   | 5.94E-02  | 2.16E-01   | --   | 2.16E-01  |
| Alpha-BHC (Lindane) | ND                                   | --   | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | --  | --   | --  | --   | --   | --  |
| DDD                 | ND                                   | --   | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | --   | --                                       | --   | --  | --   | --  | --   | --   | --  |
| DDE                 | 1.50E-02                             | 1.72E-11   | NA                     | NA   | 1.96E-01  | 3.37E-12  | --   | 9.78E-07   | 1.47E-08  | 5.00E-02                                 | 7.42E-06  | 5.57E-09   | --   | --                                       | --   | --  | --   | --  | --   | --   | --  |
| DDT                 | 2.20E-02                             | 2.53E-11   | NA                     | NA   | 1.96E-01  | 4.95E-12  | --   | 9.78E-07   | 2.15E-08  | 5.00E-02                                 | 7.42E-06  | 8.16E-09   | 5.00E-04                                       | 5.00E-04                                 | 5.00E-04                                   | 9.89E-09  | 4.31E-05   | 1.63E-05  | 5.94E-05   | --   | 5.94E-05  |
| Dieldrin            | 1.90E+00                             | 2.18E-09   | NA                     | NA   | 1.96E-01  | 4.27E-10  | --   | 9.78E-07   | 1.86E-06  | 5.00E-02                                 | 7.42E-06  | 7.05E-07   | 5.00E-05                                       | 5.00E-05                                 | 5.00E-05                                   | 8.55E-06  | 3.72E-02   | 1.41E-02  | 5.13E-02   | --   | 5.13E-02  |
| Endrin              | ND                                   | --   | NA                     | NA   | 1.96E-01  | --  | --   | 9.78E-07   | --  | 5.00E-02                                 | 7.42E-06  | --   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | --  | --   | --  | --   | --   | --  |
| Endrin Ketone       | 5.80E-02                             | 6.67E-11   | NA                     | NA   | 1.96E-01  | 1.30E-11  | --   | 9.78E-07   | 5.68E-08  | 5.00E-02                                 | 7.42E-06  | 2.15E-08   | 3.00E-04                                       | 3.00E-04                                 | 3.00E-04                                   | 4.35E-08  | 1.89E-04   | 7.17E-05  | 2.61E-04   | --   | 2.61E-04  |
| 1,2-Dichloroethane  | ND                                   | --   | 6.00E-10               | 2.40E-10   | 1.96E-01  | --  | 4.70E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 1.40E-03                                       | 3.00E-02                                 | 3.00E-02                                   | --  | --   | --  | --   | 3.36E-08   | 3.36E-08  |
| Toluene             | ND                                   | --   | 9.28E-10               | 3.71E-10   | 1.96E-01  | --  | 7.26E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 1.14E-01                                       | 2.00E-01                                 | 2.00E-01                                   | --  | --   | --  | --   | 6.35E-10   | 6.35E-10  |
| Ethylbenzene        | ND                                   | --   | 4.94E-10               | 1.98E-10   | 1.96E-01  | --  | 3.87E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 2.86E-01                                       | 1.00E-01                                 | 1.00E-01                                   | --  | --   | --  | --   | 1.35E-10   | 1.35E-10  |
| Xylenes             | ND                                   | --   | 7.67E-10               | 3.07E-10   | 1.96E-01  | --  | 6.01E-11   | 9.78E-07   | --  | 1.00E-01                                 | 7.42E-06  | --   | 2.00E+00                                       | 2.00E+00                                 | 2.00E+00                                   | --  | --   | --  | --   | 3.00E-11   | 3.00E-11  |
| <b>Total</b>        |                                      |  |                        |  |   |   |  |  |   |  |   |  |  |  |  |   |  |   | <b>2.76E-01</b>  | <b>3.44E-08</b>  | <b>2.76E-01</b>                                     |

Notes:  
 -- = Not Applicable  
 BKG = EPC is below background concentration and chemical is not evaluated  
 EPC = Exposure point concentration  
 m3 = cubic meters  
 mg/kg = milligrams per kilogram  
 NC = Chemical is not considered a carcinogen

**APPENDIX F**

**Lead in Soil**

**TABLE F-1 LEAD SPREAD 7 MODEL - NO HOMEGROWN PRODUCE**  
**Mandela Gateway Redevelopment Site**  
**Oakland, California**

| LEAD RISK ASSESSMENT SPREADSHEET                  |                     |                        |          |  |                       |                      |   |         |                      |       |               |               |      |
|---|---------------------|------------------------|----------|--|-----------------------|----------------------|---|---------|----------------------|-------|---------------|---------------|------|
| CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL |                     |                        |          |  |                       |                      |   |         |                      |       |               |               |      |
| USER'S GUIDE to version 7                         |                     |                        |          |  |                       |                      |   |         |                      |       |               |               |      |
| INPUT   |                     |                        |          |  | OUTPUT                |                      |   |         |                      |       |               |               |      |
| MEDIUM  | LEVEL               |                        |          |  |                       |                      | Percentile Estimate of Blood Pb (ug/dl) |         |                      |       |               |               |      |
| Lead in Air (ug/m <sup>3</sup> )                  | 0.019               |                        |          |  |                       | 50th                 | 90th                                    | 95th    | 98th                 | 99th  | PRG-99 (ug/g) | PRG-95 (ug/g) |      |
| Lead in Soil/Dust (ug/g)                          | 0.00                | BLOOD Pb, ADULT        |          |  |                       |                      | 0.5                                     | 1.0     | 1.2                  | 1.4   | 1.6           | 3042          | 4433 |
| Lead in Water (ug/l)                              | 5                   | BLOOD Pb, CHILD        |          |  |                       |                      | 0.9                                     | 1.6     | 1.9                  | 2.3   | 2.6           | 347           | 527  |
| % Home-grown Produce                              | 0.00%               | BLOOD Pb, PICA CHILD   |          |  |                       |                      | 0.9                                     | 1.6     | 1.9                  | 2.3   | 2.6           | 174           | 265  |
| Respirable Dust (ug/m <sup>3</sup> )              | 1.5                 | BLOOD Pb, OCCUPATIONAL |          |  |                       |                      | 0.5                                     | 1.0     | 1.2                  | 1.4   | 1.6           | 4361          | 6350 |
| EXPOSURE PARAMETERS                               |                     |                        |          |  | PATHWAYS              |                      |   |         |                      |       |               |               |      |
|   | units               | adults                 | children |  | ADULTS                | Residential          |   |         | Occupational         |       |               |               |      |
| Days per week                                     | days/wk             | 7                      |          |  |                       | Pathway contribution |   |         | Pathway contribution |       |               |               |      |
| Days per week, occupational                       |                     | 5                      |          |  | Pathway               | PEF                  | ug/dl                                   | percent | PEF                  | ug/dl | percent       |               |      |
| Geometric Standard Deviation                      |                     | 1.6                    |          |  | Soil Contact          | 3.8E-5               | 0.00                                    | 0%      | 1.4E-5               | 0.00  | 0%            |               |      |
| Blood lead level of concern (ug/dl)               |                     | 10                     |          |  | Soil Ingestion        | 8.8E-4               | 0.00                                    | 0%      | 6.3E-4               | 0.00  | 0%            |               |      |
| Skin area, residential                            | cm <sup>2</sup>     | 5700                   | 2900     |  | Inhalation, bkgmd     |                      | 0.03                                    | 6%      |                      | 0.02  | 4%            |               |      |
| Skin area occupational                            | cm <sup>2</sup>     | 2900                   |          |  | Inhalation            | 2.5E-6               | 0.00                                    | 0%      | 1.8E-6               | 0.00  | 0%            |               |      |
| Soil adherence                                    | ug/cm <sup>2</sup>  | 70                     | 200      |  | Water Ingestion       |                      | 0.28                                    | 51%     |                      | 0.28  | 52%           |               |      |
| Dermal uptake constant                            | (ug/dl)/(ug/day)    | 0.0001                 |          |  | Food Ingestion, bkgmd |                      | 0.23                                    | 43%     |                      | 0.23  | 44%           |               |      |
| Soil ingestion                                    | mg/day              | 50                     | 100      |  | Food Ingestion        | 0.0E+0               | 0.00                                    | 0%      |                      |       | 0%            |               |      |
| Soil ingestion, pica                              | mg/day              | 200                    |          |  |                       |                      |   |         |                      |       |               |               |      |
| Ingestion constant                                | (ug/dl)/(ug/day)    | 0.04                   | 0.16     |  | CHILDREN              | typical              |   |         | with pica            |       |               |               |      |
| Bioavailability                                   | unitless            | 0.44                   |          |  |                       | Pathway contribution |   |         | Pathway contribution |       |               |               |      |
| Breathing rate                                    | m <sup>3</sup> /day | 20                     | 6.8      |  | Pathway               | PEF                  | ug/dl                                   | percent | PEF                  | ug/dl | percent       |               |      |
| Inhalation constant                               | (ug/dl)/(ug/day)    | 0.08                   | 0.192    |  | Soil Contact          | 5.6E-5               | 0.00                                    | 0%      |                      | 0.00  | 0%            |               |      |
| Water ingestion                                   | l/day               | 1.4                    | 0.4      |  | Soil Ingestion        | 7.0E-3               | 0.00                                    | 0%      | 1.4E-2               | 0.00  | 0%            |               |      |
| Food ingestion                                    | kg/day              | 1.9                    | 1.1      |  | Inhalation            | 2.0E-6               | 0.00                                    | 0%      |                      | 0.00  | 0%            |               |      |
| Lead in market basket                             | ug/kg               | 3.1                    |          |  | Inhalation, bkgmd     |                      | 0.02                                    | 3%      |                      | 0.02  | 3%            |               |      |
| Lead in home-grown produce                        | ug/kg               | 0.0                    |          |  | Water Ingestion       |                      | 0.32                                    | 36%     |                      | 0.32  | 36%           |               |      |
|   |                     |                        |          |  | Food Ingestion, bkgmd |                      | 0.54                                    | 61%     |                      | 0.54  | 61%           |               |      |
| <a href="#">Click here for REFERENCES</a>         |                     |                        |          |  | Food Ingestion        | 0.0E+0               | 0.00                                    | 0%      |                      | 0.00  | 0%            |               |      |

**TABLE F-2 LEAD SPREAD 7 MODEL - HOMEGROWN PRODUCE**  
**Mandela Gateway Redevelopment Site**  
**Oakland, California**

| LEAD RISK ASSESSMENT SPREADSHEET                  |                     |                        |          |                       |          |                      |   |         |                      |        |         |        |        |
|---|---------------------|------------------------|----------|-----------------------|----------|----------------------|---|---------|----------------------|--------|---------|--------|--------|
| CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL |                     |                        |          |                       |          |                      |   |         |                      |        |         |        |        |
| USER'S GUIDE to version 7                         |                     |                        |          |                       |          |                      |   |         |                      |        |         |        |        |
| INPUT   |                     |                        |          |                       | OUTPUT   |                      |   |         |                      |        |         |        |        |
| MEDIUM  | LEVEL               |                        |          |                       |          |                      | Percentile Estimate of Blood Pb (ug/dl) |         |                      | PRG-99 | PRG-95  |        |        |
| Lead in Air (ug/m <sup>3</sup> )                  | 0.019               |                        |          |                       |          |                      | 50th                                    | 90th    | 95th                 | 98th   | 99th    | (ug/g) | (ug/g) |
| Lead in Soil/Dust (ug/g)                          | 0.00                | BLOOD Pb, ADULT        |          |                       |          |                      | 0.5                                     | 1.0     | 1.2                  | 1.4    | 1.6     | 1442   | 2100   |
| Lead in Water (ug/l)                              | 5                   | BLOOD Pb, CHILD        |          |                       |          |                      | 0.9                                     | 1.6     | 1.9                  | 2.3    | 2.6     | 261    | 397    |
| % Home-grown Produce                              | 3.00%               | BLOOD Pb, PICA CHILD   |          |                       |          |                      | 0.9                                     | 1.6     | 1.9                  | 2.3    | 2.6     | 150    | 228    |
| Respirable Dust (ug/m <sup>3</sup> )              | 1.5                 | BLOOD Pb, OCCUPATIONAL |          |                       |          |                      | 0.5                                     | 1.0     | 1.2                  | 1.4    | 1.6     | 4361   | 6350   |
| EXPOSURE PARAMETERS                               |                     |                        |          |                       | PATHWAYS |                      |   |         |                      |        |         |        |        |
|   | units               | adults                 | children | ADULTS                |          | Residential          |   |         | Occupational         |        |         |        |        |
| Days per week                                     | days/wk             | 7                      |          | Pathway               |          | Pathway contribution |   |         | Pathway contribution |        |         |        |        |
| Days per week, occupational                       |                     | 5                      |          | Pathway               |          | PEF                  | ug/dl                                   | percent | PEF                  | ug/dl  | percent |        |        |
| Geometric Standard Deviation                      |                     | 1.6                    |          | Soil Contact          |          | 3.8E-5               | 0.00                                    | 0%      | 1.4E-5               | 0.00   | 0%      |        |        |
| Blood lead level of concern (ug/dl)               |                     | 10                     |          | Soil Ingestion        |          | 8.8E-4               | 0.00                                    | 0%      | 6.3E-4               | 0.00   | 0%      |        |        |
| Skin area, residential                            | cm <sup>2</sup>     | 5700                   | 2900     | Inhalation, bkgmd     |          |                      | 0.03                                    | 6%      |                      | 0.02   | 4%      |        |        |
| Skin area occupational                            | cm <sup>2</sup>     | 2900                   |          | Inhalation            |          | 2.5E-6               | 0.00                                    | 0%      | 1.8E-6               | 0.00   | 0%      |        |        |
| Soil adherence                                    | ug/cm <sup>2</sup>  | 70                     | 200      | Water Ingestion       |          |                      | 0.28                                    | 52%     |                      | 0.28   | 52%     |        |        |
| Dermal uptake constant                            | (ug/dl)/(ug/day)    | 0.0001                 |          | Food Ingestion, bkgmd |          |                      | 0.23                                    | 42%     |                      | 0.23   | 44%     |        |        |
| Soil ingestion                                    | mg/day              | 50                     | 100      | Food Ingestion        |          | 1.0E-3               | 0.00                                    | 0%      |                      |        | 0%      |        |        |
| Soil ingestion, pica                              | mg/day              | 200                    |          |                       |          |                      |   |         |                      |        |         |        |        |
| Ingestion constant                                | (ug/dl)/(ug/day)    | 0.04                   | 0.16     | CHILDREN              |          | typical              |   |         | with pica            |        |         |        |        |
| Bioavailability                                   | unitless            | 0.44                   |          | Pathway contribution  |          | Pathway contribution |   |         | Pathway contribution |        |         |        |        |
| Breathing rate                                    | m <sup>3</sup> /day | 20                     | 6.8      | Pathway               |          | PEF                  | ug/dl                                   | percent | PEF                  | ug/dl  | percent |        |        |
| Inhalation constant                               | (ug/dl)/(ug/day)    | 0.08                   | 0.192    | Soil Contact          |          | 5.6E-5               | 0.00                                    | 0%      |                      | 0.00   | 0%      |        |        |
| Water ingestion                                   | l/day               | 1.4                    | 0.4      | Soil Ingestion        |          | 7.0E-3               | 0.00                                    | 0%      | 1.4E-2               | 0.00   | 0%      |        |        |
| Food ingestion                                    | kg/day              | 1.9                    | 1.1      | Inhalation            |          | 2.0E-6               | 0.00                                    | 0%      |                      | 0.00   | 0%      |        |        |
| Lead in market basket                             | ug/kg               | 3.1                    |          | Inhalation, bkgmd     |          |                      | 0.02                                    | 3%      |                      | 0.02   | 3%      |        |        |
| Lead in home-grown produce                        | ug/kg               | 0.0                    |          | Water Ingestion       |          |                      | 0.32                                    | 37%     |                      | 0.32   | 37%     |        |        |
|   |                     |                        |          | Food Ingestion, bkgmd |          |                      | 0.52                                    | 60%     |                      | 0.52   | 60%     |        |        |
| <a href="#">Click here for REFERENCES</a>         |                     |                        |          | Food Ingestion        |          | 2.4E-3               | 0.00                                    | 0%      |                      | 0.00   | 0%      |        |        |

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