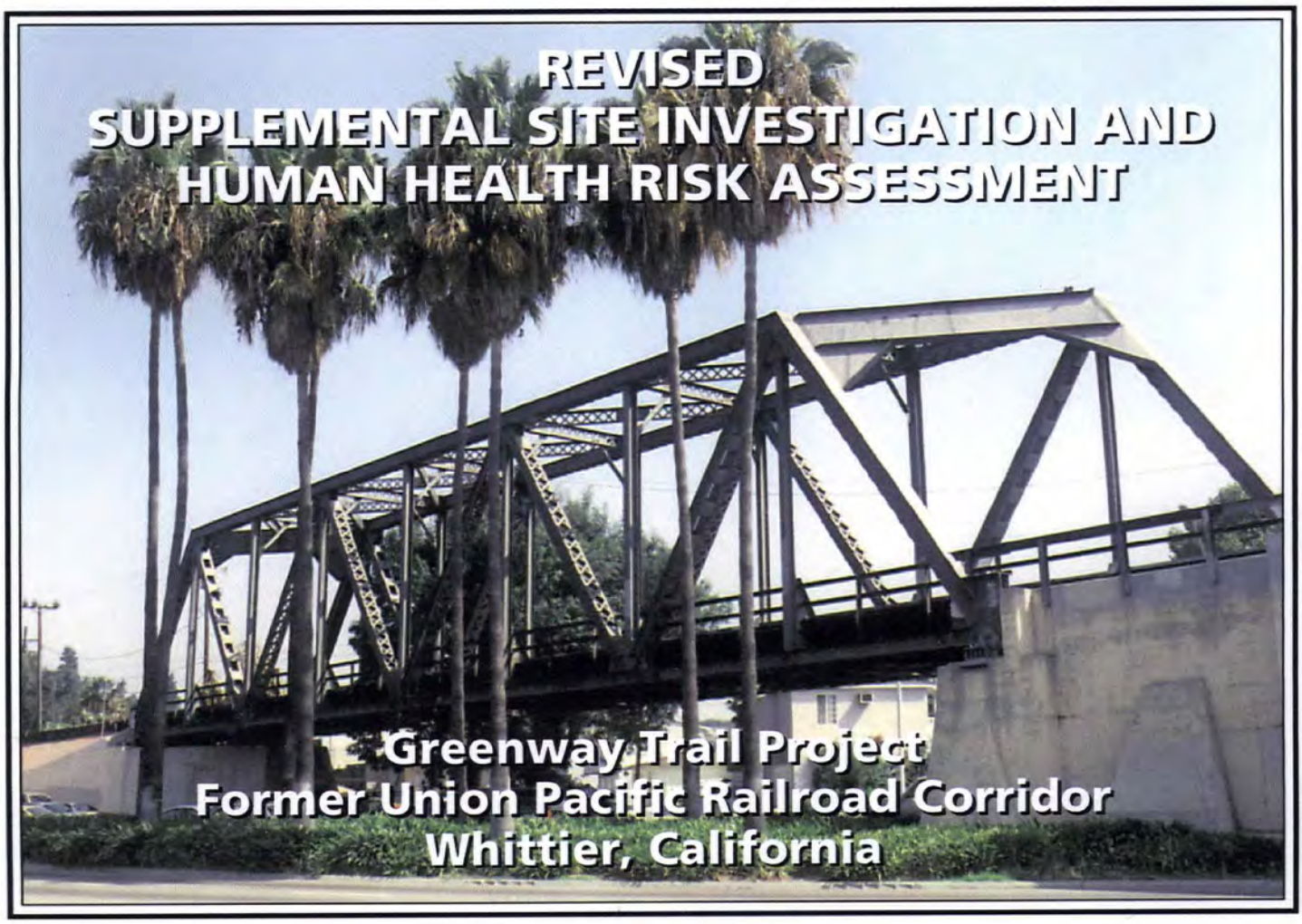


REVISED SUPPLEMENTAL SITE INVESTIGATION AND HUMAN HEALTH RISK ASSESSMENT

Greenway Trail Project
Former Union Pacific Railroad Corridor
Whittier, California

PREPARED FOR:

KIMLEY-HORN AND ASSOCIATES, INC.
517 FOURTH AVENUE, SUITE 301
SAN DIEGO, CALIFORNIA 92101

PREPARED BY:

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DRIVE, SUITE 800
RANCHO CORDOVA, CALIFORNIA 95742

GEOCON

GEOCON PROJECT NO. S8766-06-01

APRIL 2005

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S8766-06-01
April 22, 2005

Kim Clark, REHS, Hazardous Materials Specialist III
County of Los Angeles Fire Department
Health Hazardous Materials Division
Site Mitigation Unit
5825 Rickenbacker Road
Commerce, California 90040

RECEIVED
APR 27 2005
CITY MANAGER'S OFFICE

Subject: GREENWAY TRAIL PROJECT
FORMER UNION PACIFIC RAILROAD CORRIDOR
WHITTIER, CALIFORNIA
RESPONSE TO COMMENTS FOR REVISED SUPPLEMENTAL SITE INVESTIGATION AND HUMAN HEALTH RISK ASSESSMENT

Dear Ms. Clark:

We have revised the *Supplemental Site Investigation and Human Health Risk Assessment* prepared for the Greenway Trail Project dated April 12, 2005, to incorporate your final report comments received by Geocon via e-mail message on April 20, 2005. The following presents the comments and corresponding responses as reflected in the revised Report dated April 22, 2005.

Comment #1: *Calculations & raw data for the 95% UCL for all COIs listed in Table 7.*
Response: The 95% UCL calculations and raw data are presented in Appendix E.

Comment #2: *Renee Kalmes credentials/qualifications to perform Risk Assessments.*
Response: Renee Kalmes' resume is presented in Appendix A.

Comments #3 and #4: *Residential risk calculations for during construction & after - at a minimum it needs to address inhalation, due to the possiblity of residual arsenic contaminated being disturbed, wind, etc.* **and**
Construction worker exposure also needs to be addressed in the risk assessment.
Response: Sections 3.1, 3.2.2, 3.4.1, 3.5.3 and 5.2 of the Report have been revised to address potential health risks to construction workers and offsite residential exposure during and after site development. Supporting risk spreadsheet calculations and risk estimates are presented in Table 8 and Appendix E.

Comment #5: *Correct Table 4, which lists 4,4' DDE twice (1 should be 4,4' DDD).*
Response: Table 4 has been corrected per comment.

Comment #6: *Eliminate T1-T3 & T31 data from Tables since they are no longer part of this project.*

Response: Notations have been placed on the Site Plans (Figures 2a and 2i) and Appendix B data tables (excerpted from prior Corrective Action Plan and Remedial Action Workplan documents) indicating that exploratory trenches T1, T2, T3 and T31 are not located within the project boundaries. Section 3.2.1 of the Report further addresses this issue.

Comment #7: *Tables should probably include a notation that the samples in the debris/fill areas were not included in calculations (This would clarify why not all samples included in the raw data, which was requested in #1 above by someone at a later date).*

Response: Notations have been placed on the Appendix B data tables (excerpted from prior Corrective Action Plan and Remedial Action Workplan documents) indicating that debris fill materials are not incorporated in the risk assessment calculations since these materials will be properly removed from the Site. Section 3.2.1 of the Report further addresses this issue.

Comment #8: *Need to address/justify the fact that B1-S exceeds the TTLC for 4,4' DDE and 4,4' DDT.*

Response: Exceedance of California TTLC hazardous waste pesticide thresholds for sample B1-S is discussed in Section 2.4 of the Report.

Please contact me if you have any questions concerning the contents of this correspondence.

Sincerely,

GEOCON CONSULTANTS, INC.

John E. Juhrend, PE, CEG
Project Manager

JEJ:krc

(1) Addressee
(1) City of Whittier, Mr. Bob Chavez
(1) City of Whittier, Ms. Nancy Mendez
(1) Los Angeles Regional Water Quality Control Board, Mr. Rod Nelson
(1) Kimley-Horn and Associates, Inc., Mr. John Morris
(1) Exponent, Ms. Renee Kalmes

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S8766-06-01
April 12, 2005
Revised April 22, 2005

Mr. John Morris
Kimley-Horn and Associates, Inc.
517 Fourth Avenue, Suite 301
San Diego, California 92101

Subject: GREENWAY TRAIL PROJECT
FORMER UNION PACIFIC RAILROAD CORRIDOR
WHITTIER, CALIFORNIA
SUPPLEMENTAL SITE INVESTIGATION AND
HUMAN HEALTH RISK ASSESSMENT

Dear Mr. Morris:

In accordance with written directive received from the Los Angeles County Fire Department dated October 7, 2004, Geocon Consultants, Inc. and Exponent have prepared this Supplemental Site Investigation and Human Health Risk Assessment for the Greenway Trail Project (the *Site*) located in Whittier, California. The *Site* consists of a 4.5-mile-long former Union Pacific railroad corridor currently being designed for redevelopment as a pedestrian trail and community park system.

The accompanying report summarizes additional soil sampling and analytical testing for two areas within the *Site* previously identified with elevated pesticide and volatile organic compounds. The Report further includes a Human Health Risk Assessment (HRA) prepared by Exponent to evaluate potential health hazards from the identified chemicals of interest; notably arsenic in soil associated with slag ballast materials. The results of the HRA indicate that arsenic-affected soil, the only identified chemical of concern, does not pose an unacceptable risk for the intended use of the *Site* as a recreational trail. To further minimize pedestrian and adjacent residential exposure to arsenic in shallow soil above naturally occurring background levels, exposed soil areas adjacent to the paved and decomposed granite trail sections will be properly managed with landscaping improvements and ground cover.

Please contact us if you have any questions concerning the contents of this Report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

REGISTERED PROFESSIONAL ENGINEER
JOHN JUHREND
No. 46681
Exp. 06/30/07
CIVIL
STATE OF CALIFORNIA

John E. Juhrend, PE, CEG
Project Manager

EXPONENT

Renee Kalmes, CIH 3593 CP
Managing Scientist

JEJ:RK:ss

(2) Addressee
(1) City of Whittier, Mr. Bob Chavez
(1) City of Whittier, Ms. Nancy Mendez
(1) Los Angeles County Fire Department, Ms. Kim Clark
(1) Los Angeles Regional Water Quality Control Board, Mr. Ron Nelson

LIST OF ACRONYMS

AADD	annual average daily dose
ABS	skin absorption factor
AC	asphalt concrete
AT	averaging time
ATL	Advanced Technology Laboratories
bgs	below ground surface
BW	body weight
Cal-EPA	California Environmental Protection Agency
CSFs	cancer slope factors
CAP	Corrective Action Plan
CEG	Certified Engineering Geologist
CF	conversion factor
CIH	Certified Industrial Hygienist
COI	chemicals of interest
DG	decomposed granite
DTSC	Department of Toxic Substances Control
ED	exposure duration
EF	exposure frequency
EPA	Environmental Protection Agency
EPC	exposure point concentration
ESA	Environmental Site Assessment
FE	fraction exposed
HRA	Health Risk Assessment
IR	inhalation rate
IRIS	Integrated Risk Information Service
KHA	Kimley-Horn and Associates, Inc.
LACoFD	Los Angeles County Fire Department
LADD	lifetime average daily dose
μg/dL	micrograms per deciliter
μg/kg	micrograms per kilogram
$\mu g/m^3$	micrograms per cubic meter
mg/day	milligrams per day
mg/kg	milligrams per kilogram
MOU	Memorandum of Understanding
NCEA	National Center for Environmental Assessment
OEHHA	Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PE	Professional Engineer
PEF	particulate emission factor
PEL	Permissible Exposure Level
PRG	Preliminary Remediation Goal
QA/QC	quality assurance/quality control
RAW	Remedial Action Workplan
RfCs	reference concentrations
RfDs	reference doses
RME	reasonable maximum exposure
RWQCB	Regional Water Quality Control Board
SA	surface area
SCM	site conceptual model
SIR	soil ingestion rate
TCE	trichloroethene
TPH	total petroleum hydrocarbons
TTLC	Total Threshold Limit Concentration
TWA	time weighted average
UCL	upper confidence limit
UP	Union Pacific
USA	Underground Service Alert
VOCs	volatile organic compounds
WET	Waste Extraction Test

TABLE OF CONTENTS

REVISED SUPPLEMENTAL SITE INVESTIGATION AND HUMAN HEALTH RISK ASSESSMENT

1.0 INTRODUCTION 1
- 1.1 Site Location and Proposed Improvements 1
- 1.2 Background 1

2.0 PROJECT SCOPE 3
- 2.1 Pre-field Activities 3
- 2.2 Field Activities 3
- 2.3 Laboratory Analyses 4
- 2.4 Soil Analytical Results 4

3.0 HUMAN HEALTH RISK ASSESSMENT 6
- 3.1 Introduction 6
- 3.2 Data Evaluation and Selection of COIs 6
  - 3.2.1 Data Evaluation 7
  - 3.2.2 Selection of COIs in Soil 7
- 3.3 Toxicity Assessment Criteria for COIs 8
  - 3.3.1 Toxicity Criteria Used for COIs 8
  - 3.3.2 Arsenic Toxicity and Bioavailability 9
- 3.4 Human Exposure Assessment 9
  - 3.4.1 Characterization of Exposure Setting 10
  - 3.4.2 Identification of Exposure Pathways 10
  - 3.4.3 Quantification of Health Risk Estimates 11
- 3.5 Risk Characterization 12
  - 3.5.1 Evaluation of Potential Adverse Non-cancer Health Effects 13
  - 3.5.2 Evaluation of Potential Carcinogenic Effects 13
  - 3.5.3 Summary of Non-cancer and Cancer Health Effects 14
  - 3.5.4 Arsenic Concentrations 16

4.0 RISK MANAGEMENT APPROACH 17

5.0 SUMMARY AND CONCLUSIONS 18
- 5.1 Supplemental Site Investigation 18
- 5.2 Human Health Risk Assessment 18
- 5.3 Risk Management Approach 19
- 5.4 Grading Specifications and Environmental Monitoring 20
- 5.5 Regional Water Quality Control Board Waste Discharge Permit 21
- 5.6 Project Closure Report 21

6.0 REFERENCES 22

FIGURES

1. Project Location Map
2a-2i. Site Plans
3. Hadley Street Debris Fill Site Plan
4. Whittier Boulevard Overcrossing Debris Fill Site Plan
5. Site Conceptual Model
6. Distribution of Arsenic Concentrations

TABLE OF CONTENTS (cont)

TABLES

1. Summary of Soil Analytical Data - Pesticides
2. Summary of Soil Analytical Data - VOCs
3. Summary of Soil Analytical Data - Arsenic
4. Selection of Chemicals of Interest
5. Toxicity Values for Chemicals of Interest
6. Summary of Recreational Exposure Parameters
7. Recreational Risk Assessment
8. Construction and Off-Site Residential Risk Assessment

APPENDICES

A. Exponents's Renee Kalmes Resume
B. Previous Soil Analytical Data Tables
C. County of Los Angeles County Fire Department Correspondence
D. Boring Logs
E. Laboratory Reports and Chain-of-Custody Documentation
F. Risk Hazard Calculations

REVISED SUPPLEMENTAL SITE INVESTIGATION AND HUMAN HEALTH RISK ASSESSMENT

1.0 INTRODUCTION

1.1 Site Location and Proposed Improvements

Geocon Consultants, Inc. has prepared this Revised Supplemental Site Investigation Report and Human Health Risk Assessment (HRA) for the Greenway Trail Project (the *Site*) under contract with Kimley-Horn and Associates, Inc. (KHA), the prime design civil engineer representing the City of Whittier (City). This Report presents a cumulative summary of the environmental site assessment activities performed at the *Site,* provides the results of recently completed supplemental soil sampling and analytical testing, and presents a HRA prepared by Renee Kalmes with Exponent under subcontract to Geocon. A copy of Renee Kalmes' resume is presented in Appendix A.

The *Site* consists of an approximate 4.5-mile-long former Union Pacific (UP) railroad corridor located in the City of Whittier, California. The *Site* extends between Pioneer Boulevard and Mills Road and is currently being planned for redevelopment by the City as a pedestrian trail and community park system. The *Site* is generally 40 to 100 feet in width within the project limits. Proposed improvements include a 4- to 5-inch-thick asphalt concrete (AC) over 6 inches of aggregate base paved bike trail, a pedestrian path constructed with 6-inch-thick decomposed granite (DG), irrigation systems and greenbelt landscaping. Planned grading operations will generally consist of cut and fills on the order of from 1 to 2 feet deep. The approximate project limits are depicted on the Project Location Map, Figure 1 and Site Plans, Figures 2a through 2i.

1.2 Background

Geocon completed Phase I and II Environmental Site Assessments (ESAs) and a Corrective Action Plan (CAP) for the *Site* between September 2000 and November 2001. The results of the Phase I ESA indicated that before construction of the railroad corridor in the early 1900s, commercial operations near the *Site* included agricultural, lumber, feed, fruit packing, and oil storage facilities. Former or existing railroad maintenance, refueling facilities, and underground or aboveground storage tanks were not identified within the site boundaries.

The Phase II ESA included the excavation of 31 shallow exploratory trenches, near-surface soil and ballast sampling, and analytical testing. Recognized environmental conditions identified within the *Site* included asbestos and lead-based paint bridge and retaining wall components, slag ballast and track bed soil containing elevated arsenic concentrations, near-surface debris fill materials located near Hadley Street, and the presence of abandoned battery boxes and sporadic surface debris material. Significant or pervasive petroleum hydrocarbons, volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), pesticide, and herbicide impacts were not reported in the random and targeted (adjacent facility) sampling locations within the corridor.

Additional site investigation completed for the CAP identified the presence of near-surface debris fill materials along the southern abutment of the Whittier Boulevard Overcrossing. The CAP presented statistical and human health risk evaluations of the elevated arsenic levels detected in slag ballast and underlying track bed soils, and recommended remedial measures for the removal and offsite disposal of the encountered debris fill materials. A cumulative summary of the soil analytical data generated for the *Site* is presented in Appendix B. Approximate sample locations are depicted on the Site Plans, Figures 2a through 2i. The identified debris fill area sample locations are depicted on Figures 3 and 4.

The City completed purchase of the *Site* from UP in December 2001. The railroad track improvements (rail, spikes, plates and ties) and signal crossing improvements (battery boxes, crossing arms and signal boxes) were subsequently removed by UP. The City further installed security fencing around the Whittier Boulevard Overcrossing debris fill location due to the presence of surficial debris fill and homeless encampments.

In May 2004, the City requested local agency oversight from the Los Angeles County Fire Department (LACoFD) during planned remedial activities at the *Site*. Geocon subsequently completed a Remedial Action Workplan (RAW) to provide specifications for the remedial removal and offsite disposal of near-surface debris fill materials identified near Hadley Street and at the Whittier Boulevard Overcrossing. The LACoFD conditionally approved the RAW in writing dated October 7, 2004, and requested a Workplan to address the following areas of concern:

1. Further assessment of shallow pesticide soil impacts encountered between Broadway and Magnolia Avenues. The pesticide dieldrin was detected in surface soil sample S7-.5 at an elevated concentration of 250 micrograms per kilogram (µg/kg). The approximate location of soil sample S7 is depicted on Figure 2c.
2. Further assessment of VOC soil impacts encountered by Geocon in trench T20 adjacent to a former "dip tank" area at the American Cushion/Helferty and DeBeikes property located at 12353 Whittier Boulevard. The "dip tank" area was reportedly remediated by direct soil excavation in 1988. Trichloroethene (TCE) was detected in a 2-foot-deep soil sample (T20-2) obtained by Geocon in 2001 at a very low concentration of 34 µg/kg. The approximate location of trench T20 is depicted on Figure 2e.
3. Additional information regarding the presence and proposed handling of slag ballast and associated track bed soil materials containing elevated arsenic concentrations.

Geocon subsequently submitted a draft Supplemental Site Investigation Workplan dated November 30, 2004, that was approved by the LACoFD in writing dated December 13, 2004. Copies of the referenced LACoFD correspondence are presented in Appendix C.

2.0 PROJECT SCOPE

Outlined below is a summary of the scope of services performed by Geocon to address the areas of concern identified by the LACoFD:

2.1 Pre-field Activities

- A *Supplemental Site Investigation Workplan* was prepared dated December 15, 2004, to outline the field sampling and analytical testing protocols.
- A project-specific *Health and Safety Plan* was prepared dated December 16, 2004, to provide guidelines on the use of personal protective equipment and the health and safety procedures to be implemented during the field sampling activities.
- The investigation area in the vicinity of trench T20 was outlined with white paint for Underground Service Alert (USA) notification. A minimum of 48 hours prior to the start of field activities, the local public utilities were contacted via USA to attempt to delineate subsurface public utilities and conduits in proximity to the proposed exploration locations.
- Retained the services of Prosonic, a California C57-licensed drilling contractor, to perform direct-push borings in the vicinity of trench T20.
- Retained the services of Advanced Technology Laboratories (ATL), a California-certified analytical laboratory located in Signal Hill, California, for chemical analysis of soil samples.
- Representatives of Geocon, Exponent and the LACoFD completed a conference call on January 6, 2004, to review the County's requirement for additional risk evaluation and proper management of arsenic-affected soils. Additional meetings were held on March 8 and April 6, 2005, attended by representatives of the LACoFD, the City, KHA, Geocon and Exponent to review the results of the human health risk assessment. Copies of the project improvement plans and trail profiles prepared by KHA were further submitted to the LACoFD for review.

2.2 Field Activities

Five shallow hand-auger borings (B1 through B5) were performed on December 21, 2004, in the vicinity of previous surface soil sample S7 located between Broadway and Magnolia Avenues (see Figure 2c). The boring locations were determined in conjunction with Ms. Kim Clark with the LACoFD to evaluate the extent of elevated dieldrin. The borings were performed to a maximum depth of 2 feet below the ground surface (bgs). Soil samples were obtained from the surface (0-6 inches) and at a depth of 1.5 feet (1.0 to 1.5 feet) bgs using a drive tube sampler equipped with 6-inch-long stainless steel sample tubes. Each soil sample was capped, labeled and placed in a chilled cooler, and delivered to the analytical laboratory for chemical analyses utilizing standard chain-of-custody procedures.

Two direct-push soil borings (B6 and B7) were performed on December 30, 2004, in the vicinity of previous exploratory trench T20 (see Figure 2e). Soil samples were collected from the direct-push borings using a hydraulically driven soil sampler equipped with an acetate liner at depths of 5 and 10 feet bgs. The borings were logged under the supervision of a California Professional Geologist using the Unified Soil Classification System. Boring logs are presented in Appendix D. Upon completion of the sampling activities, the borings were backfilled with the soil cuttings (hand-auger) or lean cement grout (direct-push).

Quality assurance/quality control (QA/QC) procedures were performed during the field sampling activities. These procedures included decontamination of sampling equipment before each sample was collected, and providing chain-of-custody documentation for each soil sample submitted to the laboratory. The soil sampling equipment was cleansed between each boring by washing with an Alconox® solution followed by a double rinse with de-ionized water.

2.3 Laboratory Analyses

The soil samples were analyzed by ATL on standard ten-day turn-around schedule for the following:

- Six surface soil samples obtained in the vicinity of sample location S7 were analyzed for chlorinated pesticides following United States Environmental Protection Agency (EPA) Test Method 8081A. Following receipt of the initial data, the deeper 1.5-foot soil samples collected from borings B1 and B2 were assigned for analysis of chlorinated pesticides. Due to exceedance of the 14-day holding time for the deeper soil samples (collection date 12/21/04, analysis date 1/14/05), surface sample B1-6 was reanalyzed to verify validity of the deeper soil sample data.
- Four soil samples obtained from the direct-push borings B6 and B7 were analyzed for VOCs following EPA Test Method 8260B.
- Each soil sample was further analyzed for arsenic following EPA Test Method 6010B.

QA/QC procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. QA/QC measures included the following:

- One method blank for every ten samples, batch of samples or type of matrix whichever is more frequent.
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever is more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix; whichever is more frequent, with the spike made at ten times the detection limit or at the analyte level.

2.4 Soil Analytical Results

A summary of the soil analytical data is presented on Tables 1 through 3. Copies of the laboratory reports and chain-of-custody documentation are presented in Appendix E.

Pesticides including 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, chlordane, dieldrin, endrin, endrin ketone, gamma chlordane, heptachlor and heptachlor epoxide were detected in the surface soil samples. Only 4,4'-DDE and dieldrin were detected above the EPA Region IX residential Preliminary Remediation Goals (PRGs) of 1,700 and 30 µg/kg respectively, in surface soil samples B1-S and B2-S. The levels of 4,4'-DDE and 4,4'-DDT in soil sample B1-S further exceed the California Total Threshold Limit Concentration (TTLC) hazardous waste threshold of 1,000 µg/kg. The TTLC for these compounds of 1,000 µg/kg is less than the health risk based residential PRG of 1,700 µg/kg and is only applicable to disposal of waste soil. Since the existing soil material at this location is not proposed for

excavation and offsite disposal, and the presence of elevated pesticides has been incorporated in the HRA presented herein, the exceedance of TTLC hazardous waste criteria is not applicable.

Reanalysis of surface soil sample B1-S yielded good correlation with the other detected analytes indicating validity of the deeper soil sample data. Pesticides were not detected in the deeper soil samples obtained from borings B1 and B2.

With the exception of TCE, VOCs were not detected in each soil sample analyzed from borings B6 and B7. TCE was detected in soil samples B7-5 and B7-10 at very low concentrations of 5.3 and 10 µg/kg, respectively.

To further aid in evaluating elevated arsenic concentrations in shallow soil within the corridor, each soil sample obtained from borings B1 through B7 was analyzed for arsenic. Arsenic concentrations ranged from <1.0 to 55 to milligrams per kilogram (mg/kg) for the surface soil samples, <1.0 to 66 mg/kg for the 1.5-foot-deep samples, and 1.3 to 4.9 mg/kg for the 5- and 10-foot-deep soil samples.

3.0 HUMAN HEALTH RISK ASSESSMENT

3.1 Introduction

This HRA was prepared by Exponent for the Greenway Trail Project, a 4.5-mile-long former UP railroad corridor located in the City of Whittier, California. The purpose of this HRA was to determine whether site conditions pose a potential health hazard to future recreational site users for chemicals of interest (COIs) in soil. In additional, potential health risks to construction workers and offsite residential exposure to dusts during and after site development were evaluated. The resultant risk estimates are also used to support risk management decisions. The methods used in this report follow standard risk assessment guidance provided by the California Environmental Protection Agency (Cal-EPA) and the United States EPA (Cal-EPA 1994; U.S. EPA 1989). Any deviation from guidance is clearly noted, along with the scientific rationale.

This assessment is organized as follows:

- **Subsection 3.2, Data Evaluation and Selection of COIs:** This subsection presents the evaluation of soil data used in the assessment.
- **Subsection 3.3, Toxicity Assessment Criteria for COIs:** This subsection presents the toxicity criteria that were used to evaluate the COIs.
- **Subsection 3.4, Human Exposure Assessment:** This subsection describes the conceptual model for the potentially exposed future populations on the *Site*. The exposure scenarios and exposure parameters, along with the algorithms, are presented.
- **Subsection 3.5, Risk Characterization:** This subsection presents the estimated risks and hazard indices associated with potential exposure to the COIs for the scenarios evaluated. In addition, a qualitative uncertainty analysis discusses the relative impact of the primary assumptions used in the assessment.
- **Section 4.0, Risk Management Approach:** This section presents the risk management approaches to address the site impacts identified in the HRA.
- **Section 5.0, Summary and Conclusions:** This section summarizes the findings of the HRA.
- **Section 6.0, References:** This section provides complete references for the literature cited throughout the HRA.

3.2 Data Evaluation and Selection of COIs

Data evaluation is the process of analyzing site characteristics and analytical data to identify data of sufficient quality for inclusion in a risk assessment, and based on these data, identifying chemicals to be evaluated in the risk assessment. The identified COIs were evaluated further in the risk assessment, either quantitatively or qualitatively, and the results are presented in Section 3.5.

3.2.1 Data Evaluation

Site soils including slag ballast have been sampled to characterize inorganic impacts and potential organic impacts. The nature and extent of impacts of site soils have been characterized through soil sampling conducted between 2001 and 2004 (see Figures 2a through 2i). These data are presented in Table 1 through 3 and Appendix B of this Report. Two identified debris fill areas located near Hadley Street and the Whittier Bridge Overcrossing (see Figures 3 and 4) will be remediated prior to or during construction of the Greenway Trail Project as discussed in the RAW (Geocon 2004). The debris fill sample data were not included in the risk assessment because these impacted soils will be removed prior to pedestrian use of the project. Additionally, soil sample data generated from trenches T1 through T3, and T31 were not included in the risk assessment since these trench locations are located outside the project boundaries. The analytical data were reviewed and validated by Geocon as part of the overall quality assurance program for the site investigation. The results of this review indicate that the data collected meet project objectives, and a sufficient amount of data was collected to provide adequate characterization for purposes of conducting the HRA.

3.2.2 Selection of COIs in Soil

The purpose of the COI selection process is to focus attention on the substances that may potentially present a health risk. The chemicals detected in validated soil samples are evaluated in the screening risk assessment, except as noted below.

Petroleum hydrocarbon mixtures have been detected in soil samples collected at the *Site* (e.g., total petroleum hydrocarbons [TPH] as diesel). Such measurements represent mixtures of chemicals that, because of their highly variable composition, do not have descriptive health criteria. Therefore, the toxicity of these mixtures is best described by the aggregate toxicity of key individual chemicals in the mixture, such as benzene, toluene, ethylbenzene, and xylenes, and polycyclic aromatic hydrocarbons. For the purposes of this risk assessment, and as is the practice in California (Cal-EPA 1994), a quantitative evaluation of TPH measurements was not conducted in this study; rather, individually measured constituents of the TPH mixtures were evaluated.

Soil samples including slag ballast samples were analyzed for metals (41-73 samples; Method 3050B), VOCs (eleven samples; Methods 8260, 8020), semi-volatile organic compounds (eleven samples; Method 8270), pesticides (15 samples; Method 8081), herbicides (eight samples; Method 8151), and PCBs (eight samples; Method 8082). As an initial screen, maximum detected concentrations were compared to their corresponding EPA PRGs for residential soil (U.S. EPA 2004). PRGs are derived using current EPA toxicity values and standard exposure factors to estimate concentrations in environmental media (e.g., soil) that are protective of human health over a lifetime. This method evaluates potential health risks associated with exposure to residual chemicals in soil via incidental ingestion, dermal contact, and inhalation of vapors or re-suspended particulates (dust), assuming a residential scenario. Examples of these factors include a child soil ingestion rate of 200 milligrams per

day (mg/day), exposure frequency of 350 days per year, and exposure duration of 30 years (six as a child, 24 as an adult). PRGs are based on either non-cancer or cancer effects; the lowest value is chosen as the final PRG for chemicals that may cause both types of effects. These residential assumptions are very conservative, because they are based on the assumption that receptors will be living on the *Site* and exposed to the maximum detected concentration by ingestion, dermal contact and inhalation of dust. Because the *Site* is being developed as a recreational trail, the potential exposure to site soils will be far less than the exposure based on the residential scenario assumptions. However, as discussed further below, with the exception of a few chemicals that are further evaluated using more realistic site-specific conditions, exposure to detected chemicals do not pose a significant health risk even under residential assumptions.

The results of the screening assessment are presented in Table 4. The chemicals present at levels at or above the residential PRG were considered to be COIs and are evaluated further in the recreational, construction worker and offsite residential risk assessment. The maximum concentrations of arsenic, lead, vanadium, and thallium were above their corresponding residential PRGs. Aroclor 1260 was detected in one sample at a concentration equal to the PRG, and 4,4'-DDE and dieldrin were detected in several samples, with the maximum detected values above their respective residential PRGs.

3.3 Toxicity Assessment Criteria for COIs

The purpose of the toxicity assessment is to evaluate available information regarding the potential for a chemical to cause adverse health effects in exposed individuals (hazard identification) and to estimate the relation between the extent of exposure and the increased likelihood (e.g., probability or chance) and/or severity of adverse effects (dose-response assessment). The result of the dose-response assessment is a set of toxicity criteria that are used in the risk characterization to estimate the likelihood of adverse effects occurring in humans at different exposure levels. Standard procedures for toxicity assessment include identifying toxicity values for carcinogenic and noncarcinogenic effects and summarizing other relevant toxicity information.

3.3.1 Toxicity Criteria Used for COIs

The toxicity criteria used to evaluate noncarcinogenic and carcinogenic health risks are referred to as reference doses (RfDs) and cancer slope factors (CSFs), respectively. Existing regulatory criteria and guidelines have been used in this risk assessment for toxicity characterization. Table 5 presents the toxicity criteria used in this assessment. The hierarchy of sources used for the toxicity factors is consistent with those recommended by the Cal-EPA Department of Toxic Substances Control (DTSC) for risk assessment as follows:

- Cal-EPA Cancer Slope Factors (Cal-EPA 2004)
- Cal-EPA non-cancer chronic reference exposure levels (Cal-EPA, February 2003)

- CSFs, RfDs, and reference concentrations (RfCs) developed by EPA and listed in the Integrated Risk Information Service (IRIS) (U.S. EPA 2003)
- Nonpromulgated EPA RfDs and RfCs recommended by EPA's National Center for Environmental Assessment (NCEA).

Lead is evaluated in a different manner that relates lead exposure to blood lead levels. The DTSC model for evaluating lead has a default screening value of 146 mg/kg in soil - a concentration that will result in the 99th percentile value of a blood lead level of 10 micrograms per deciliter (μg/dL) under a residential scenario. The evaluation of lead is discussed further in Section 3.5.3.1.

3.3.2 Arsenic Toxicity and Bioavailability

The Risk Assessment Forum of the U.S. EPA developed a cancer slope factor for arsenic based on an epidemiology study relating skin cancer to high levels of arsenic in drinking water in Taiwan. The cancer slope factor assumes a linear dose-response relationship for cancer. However, there is a sufficient body of evidence to indicate there is a threshold or sublinear dose-response relationship for low doses of arsenic. The possibility that arsenic is an essential dietary component also supports the hypothesis that low dose exposures do not pose a carcinogenic hazard.

The carcinogenic slope factor for arsenic was derived, in part, from drinking-water studies in Taiwan. Using a carcinogenic slope factor derived from a drinking-water study for assessing potential exposures to arsenic in soil is very conservative (i.e., health protective), because a growing body of scientific evidence indicates that metals in soil are less well absorbed from the gastrointestinal tract than are metals dissolved in water (Kelley et al. 2002). The slag ballast material present at the *Site* consists of large chunks of gravel with few fines. The exposure to chemicals in such materials is less than that of soils due to a significantly lower potential for exposure via incidental ingestion, inhalation and dermal contact with ballast material. Further, the oral bioavailability of metals in soil or slag may be reduced due to a combination of factors, including the presence of less soluble species of the metal and interactions of dissolved metals with soil constituents, such as sorption and precipitation reactions. Ruby et al. (1999) presented a review of *in vivo* bioavailability studies of arsenic. The studies involving arsenic in soil containing slag material report relative absorption factors ranging from 15 to 51%. Other bioavailability values found in literature for arsenic in soils indicate that arsenic was 10-28% bioavailable (ATSDR 2000; Freeman et al 1993). Therefore, risk calculations used in this assessment may overestimate risks associated with arsenic in soil and slag material.

3.4 Human Exposure Assessment

Exposure assessment is the process of measuring or estimating the intensity, frequency, and duration of human exposure to chemicals of concern. As described in EPA's *Risk Assessment Guidance for Superfund* (U.S. EPA 1989), and more recently in *Guidelines for Exposure Assessment* (U.S. EPA 2002), the principal elements of exposure assessment are the following:

- Characterization of the exposure setting (physical environment and potential receptors)
- Identification of exposure pathways (potential sources, points of release, and exposure routes)
- Quantification of health risk estimates.

The purpose of the first step is to characterize the most important features of the site that might influence current or future human exposure to chemicals and to identify potential receptors. Potential pathways of human exposure are identified in the second step by characterizing the sources of chemicals released to the environment, points of release, and potential exposure routes. In the third step, the qualitative information from the first two steps is integrated with estimates of health risk.

Exposure assessment is conducted within the context of a site conceptual model (SCM). As described in EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (U.S. EPA 1988), the purpose of the SCM is to describe what is currently known about chemical sources, likely migration pathways, exposure routes, and possible exposure scenarios, so that the data necessary to evaluate potential health risks are identified. Figure 5 presents the SCM developed for the *Site.*

3.4.1 Characterization of Exposure Setting

Potential exposure to COIs depends on a number of factors related to the physical characteristics of a site and its surroundings. These factors include location, current and possible future use of the *Site* and surrounding areas, surface topography, and hydrogeology. These factors determine the types of activities that might occur at the S*ite*, the degree to which the *Site* is accessible to the general public, and the mechanisms that might result in the migration of COIs to potential receptors.

The *Site* is a 4.5-mile-long former UP railroad corridor which runs along both residential and commercial/industrial areas of Whittier, California. The future use of the *Site* will be a recreational trail to be used for both bicycle and pedestrian purposes. The HRA evaluates potential exposure to chemicals detected in site soils based on a recreational use scenario. Cancer risks are based on both the child and adult recreational use scenario (six years as a child and 24 years as an adult), and non-cancer risks are based on the more conservative child recreational use scenario. In additional, potential health risks to construction workers and off-site residential exposure to dusts during and after site development were evaluated.

3.4.2 Identification of Exposure Pathways

Exposure pathways are the means through which an individual may contact a chemical in the environment. Although several potential exposure pathways may exist, only a few may be "complete." For a pathway to be complete, each of the following elements must exist (U.S. EPA 1989):

- A source and mechanism for chemical release
- An environmental transport medium (e.g., air, water, or soil)
- A point of potential contact with the medium
- An exposure route at the contact point (e.g., inhalation, ingestion, or dermal contact).

For purposes of the risk assessment, potential exposures to site soils were based on data collected in the surface and near-surface soils down to 10.0 feet bgs, the deepest depth sampled. The inorganic chemicals detected in site soils may migrate to air via re-suspension of soil particulates (i.e., dust). A receptor may also be exposed to COIs in soil via incidental ingestion and dermal contact. These three pathways were evaluated for the recreational use scenario.

3.4.3 Quantification of Health Risk Estimates

The final step in conducting an exposure assessment involves identifying the equations and intake parameters for the appropriate exposure scenarios and routes, and quantifying exposure to the COIs. Exposure is estimated by calculating the annual average daily dose (AADD) and lifetime average daily dose (LADD) for each of the COIs and identified exposure pathways. The AADD and LADD both provide quantitative estimates of an individual's daily exposure to a chemical. The difference between the two estimates is the time over which the exposure is averaged. Potential noncarcinogenic health effects are assumed to occur only after a threshold dose is reached; therefore, the AADD represents the average daily dose during the period of exposure (i.e., if an individual is exposed for 25 years, then the dose is averaged over 25 years). Conversely, potential carcinogenic health effects are considered to be non-threshold phenomena. Therefore, the LADD represents the average daily dose over a lifetime (i.e., the daily dose averaged over 70 years). The components of the equation for each exposure pathway evaluated in this risk assessment are described below.

Definitions and values used for each input parameter are summarized in Table 6. The risk and hazard index calculations for the recreational use scenario are presented in Appendix F.

3.4.3.1 Inhalation of Particulates and Vapors

The following equation was used to estimate the chemical dose received by a receptor as a result of inhaling particulate COIs in soil:

$$Dose_{inhalation} = \frac{EPC \times IR \times EF \times FE \times ED}{BW \times AT \times PEF}$$

3.4.3.2 Incidental Soil Ingestion

The following equation was used to estimate the chemical dose received by a receptor as a result of incidental soil ingestion:

$$Dose_{soil\,ingestion} = \frac{EPC \times SIR \times EF \times ED \times FE \times CF}{BW \times AT}$$

3.4.3.3 Incidental Dermal Contact with Soil

The following equation was used to estimate the chemical dose received by a receptor as a result of dermal contact with soil:

$$Dose_{dermal\ contact} = \frac{EPC \times SA \times AF \times ABS \times EF \times ED \times FE \times CF}{BW\ x\ AT}$$

3.4.3.4 Exposure Parameter Assumptions

The exposure parameters used for the adult and child recreational use scenarios are the same as the default parameters used by EPA to calculate residential PRGs, with the exception of exposure frequency (EF) and fraction of soil to which the receptor is exposed at the trail (FE). An exposure frequency for a child recreator was estimated to be 196 days per year based on a community park scenario in which a child is estimated to spend four days a week at the trail for 49 weeks per year (Cal-EPA 1996). An adult was conservatively estimated to spend the same amount of time at the trail. The FE is estimated as the fraction of hours per day spent at the trail divided by the total hours awake per day. The recommended value is one hour out of twelve hours (Cal-EPA 1996); however, a more conservative value of two hours out of twelve hours was used (0.17 fraction). The exposure parameters are summarized in Table 6.

This exposure assessment is based on a reasonable maximum exposure (RME) scenario. EPA defines the RME scenario as "the highest exposure that is reasonably expected to occur at the site" (U.S. EPA 1989). In addition, EPA states, "The intent of the RME is to estimate a conservative exposure case (i.e., well above the average) that is still within the range of possible exposure" (U.S. EPA 1989). Due to the site features, a recreator is expected to use the entire trail, rather than just one portion of it. For the purposes of providing a conservative exposure estimate, the maximum detected values for each of the COIs were evaluated as the exposure point concentration (EPC) in the risk assessment. Additional calculations were performed using the 95% upper confidence limit (UCL) of the mean concentration as the EPC. The use of the 95% UCL presents a more realistic evaluation, in that it represents a soil concentration over the entire trail rather than in just one location.

3.5 Risk Characterization

Risk characterization represents the final step in the risk assessment process. In this step, the results of the exposure and toxicity assessments are integrated into quantitative or qualitative estimates of potential health risk. Potential noncarcinogenic health effects and carcinogenic health risks are characterized separately. This section also contains a qualitative discussion of the uncertainties associated with this assessment.

3.5.1 Evaluation of Potential Adverse Non-cancer Health Effects

Potential non-cancer adverse health effects were evaluated using the hazard index approach, as recommended by Cal-EPA (1992) and U.S. EPA (1989). The first step in this approach is to compare the AADD for each chemical to the appropriate RfD. This comparison is expressed in terms of a "hazard quotient," which is calculated as follows:

$$\text{Hazard Quotient}_i = \frac{\text{AADD}_i}{\text{RfD}_i}$$

A hazard quotient of less than or equal to 1 indicates that the predicted exposure to that chemical should not result in an adverse non-cancer health effect (U.S. EPA 1989). In cases where individual chemicals potentially act on the same organs or result in the same health endpoint (e.g., respiratory irritants), additive effects can be addressed by calculating a hazard index as follows:

$$\text{Hazard Index} = \sum_{i=1}^{n} \text{Hazard Quotient}_i$$

A hazard index of less than or equal to 1 indicates acceptable levels of exposure for chemicals that have an additive effect. In this assessment, a hazard index was calculated by summing the hazard quotients for all chemicals, regardless of toxic endpoint, as recommended by agency guidance (Cal-EPA 1994; U.S. EPA 1989). This approach is generally believed to overestimate the potential for noncarcinogenic health effects due to simultaneous exposure to multiple chemicals, because it does not account for different toxic endpoints (Risk Commission 1997). However, it can be used as a screening tool to identify those exposure scenarios for which exposure to multiple chemicals does not pose a non-cancer health risk. If the hazard index is greater than 1, a target-organ-specific hazard index can be calculated to more accurately assess the potential for noncarcinogenic effects to specific target organs.

3.5.2 Evaluation of Potential Carcinogenic Effects

Carcinogenic health risks are defined in terms of the increased probability of an individual developing cancer as the result of exposure to a given chemical at a given concentration. As required by Cal-EPA (1992) and U.S. EPA (1989), lifetime excess cancer risks are estimated as follows:

$$\text{Lifetime Excess Cancer Risk}_i = \text{LADD}_i \times \text{SF}_i$$

As with hazard indices, the estimated excess cancer risks for each chemical and exposure route are summed, regardless of the type of cancer associated with each chemical, to estimate the total excess cancer risk for the exposed individual.

Regulatory agencies such as Cal-EPA and U.S. EPA have defined what is considered an acceptable level of risk in similar though slightly different ways. U.S. EPA considers 1×10^{-6} to 1×10^{-4} to be the target range for acceptable risks at sites where remediation is considered (U.S. EPA 1990). Estimates of lifetime excess cancer risk associated with exposure to chemicals of less than one-in-one-million (1×10^{-6}) are considered to be so low as to warrant no further investigation or analysis (U.S. EPA 1990).

Cal-EPA also tends to work within the same target range for acceptable risk. For example, pursuant to the California Safe Drinking Water & Toxic Enforcement Act of 1986, the Office of Environmental Health Hazard Assessment (OEHHA) has established a no-significant-risk level at 1×10^{-5} (CCR Division 21.5, Title 22 §12703(b)). In addition, many air management districts consider 1×10^{-5} to be an acceptable risk level for managing air emissions under the Toxics Hot Spots program.

It should be noted that cancer risks in the 1×10^{-6} to 1×10^{-4} range or higher do not necessarily mean that adverse health effects will be observed. Current methodology for estimating the carcinogenic potential of chemicals is believed to not underestimate the true risk, but could overestimate the true risk by a considerable degree.

3.5.3 Summary of Non-cancer and Cancer Health Effects

Resultant carcinogenic risk estimates and noncarcinogenic hazard index values are presented in Table 7 for the recreational scenario, with supporting spreadsheet calculations presented in Table E-1 and E-2 (Appendix F). Construction worker and offsite residential risk estimates are presented in Table 8, with supporting spreadsheet calculations in Tables E-3 through E-5 (Appendix F). Calculations are presented using the maximum detected concentration and the 95% UCL of the mean concentration. The use of the 95% UCL presents a more realistic evaluation, in that it represents a soil concentration over the entire *Site*, rather than in just one location. Tables E-6 and E-7 (Appendix F) present the calculation of the 95% UCLs and the raw data, respectively.

The total excess cancer risk using maximum exposure concentrations for the recreational scenario is 3×10^{-5}, with arsenic contributing over 95% of the risk estimate. The total hazard index for the child recreator scenario using maximum exposure concentrations is 0.8, which is below the target hazard index value of 1.0. The total excess cancer risk for the recreational use scenario using 95% UCL exposure concentrations is 9×10^{-6}, with arsenic contributing almost 90% of the risk estimate. The total hazard index for the child recreational use scenario using 95% UCL concentrations is 0.3.

Under the construction worker scenario, it was assumed that construction would occur over a 6-month period. Workers were exposed to increased concentrations of dust due to soil movement activities, including dust generated by wind erosion, construction vehicle traffic and other construction activities. The total excess cancer risk for the construction worker is 1×10^{-6}, with arsenic contributing over 90% of the risk estimate. The total hazard index for the construction worker scenario is 0.7, which is below the target hazard index value of 1.0.

For the offsite residential scenario, it was assumed that residents would be exposed to increased concentrations of dust generated during construction activities. The receptor has no direct contact with offsite soils under this scenario. However, the screening assessment (Table 4) had previously evaluated residential receptors exposed to the maximum detected onsite concentration by ingestion, dermal

contact and inhalation of dust. The total excess cancer risks for the offsite residential scenario using the maximum and 95% UCL exposure concentrations are 2×10^{-8} and 6×10^{-9}, respectively. Arsenic contributed exclusively (99%) to the risk estimate. The total hazard index values for the offsite child residential scenario using the maximum and 95% UCL concentrations are 0.02 and 0.005, respectively.

The results of the assessment indicate that arsenic contributed almost exclusively to the carcinogenic risk estimates, and that no other COIs are a potential concern at the *Site*. The recreational scenario resulted in the highest risk estimates, and was therefore used to determine a health based target cleanup levels to be protective of future use conditions. Using the equations in Section 3.4.3, a recreational health-based target cleanup level for arsenic of 42 mg/kg was back-calculated based on the exposure parameters described in Table 6 and a target excess risk of 1×10^{-5}. Under the recreator scenario, the exposure pathway that contributes most significantly to potential health risks is ingestion of soil. This is because the recreator scenario assumes some extension of the play area behind the residential homes and incorporates a child soil ingestion rate. This is likely to be a health conservative assumption in that children are unlikely to behave in this manner on a routine basis. Additionally as previously discussed, arsenic toxicity is based on ingestion of arsenic in groundwater. Therefore, the default regulatory assumption that arsenic will be equally bioavailable in all media is likely health conservative in that metals in soil are less well absorbed from the gastrointestinal tract than are metals dissolved in water.

3.5.3.1 Evaluation of Lead

Lead is evaluated in a manner different from other chemicals, because lead toxicity is based on blood lead levels. DTSC has established an acceptable soil level of 146 mg/kg lead, based on a residential scenario calculated using LeadSpread, a spreadsheet tool that can be used to estimate blood lead concentrations that would result from exposure to lead via dietary intake, drinking water, soil and dust ingestion, inhalation, and dermal contact. This value represents the concentration in exterior soil and interior dust that will result in a 99th-percentile estimate of a blood lead level of 10 μg/dL in children. The soil concentration that would result in a 95th-percentile estimate is 226 mg/kg lead. For a recreational scenario, the exposure to lead in soil is substantially lower, due to the fact that the youth recreator is estimated to be exposed to the soil for a total of 196 days per year, rather than 365 days per year, and the fraction of site soil to which the recreator is exposed is 0.17. Using DTSC's standard default parameters and the recreational use exposure frequency and exposure fraction, clean-up levels of 333 and 560 mg/kg have been calculated, which represent the lead concentrations in soil that would result in 99th and 95th percentiles, respectively, of a blood lead level of 10 μg/dL in children. Only one of 41 soil samples analyzed for lead exceeds either of these values. This sample is at location T-12, which is located in a primarily commercial/industrial area of the *Site* and is therefore not likely to be an area in which a child recreator would spend all of his or her outdoor time. Furthermore, the 95% UCL of lead concentrations is 221 mg/kg, a value that is less than the default PRG that would result in a 95th-percentile blood lead level of 10 μg/dL in children under a residential scenario in which a child is exposed to this concentration of lead in outdoor soil and indoor dust continuously.

3.5.4 Arsenic Concentrations

Naturally occurring concentrations of arsenic are often higher than the thresholds calculated using risk assessment equations. In these cases, it is unlikely that there is any real reduction in risk to be realized in risk management options, because the observed concentrations likely represent ambient conditions. For example, the following table presents results from background metal concentration studies conducted in various California locations.

Source	Arsenic concentration (mg/kg)
Los Angeles Unified School District Sites	11.5
Lawrence Berkeley National Laboratories	19.1
Great Valley Group	31.0
Orinda Formation	17.8
Western U.S.	1-50

An assessment of arsenic soil concentrations was conducted by using the full arsenic data set and by plotting the arsenic cumulative probability versus the log of the concentration, per DTSC guidance (Cal-EPA 1997). Figure 6 shows the distribution of arsenic using the entire data set. If the data are drawn from one population, the cumulative probability plot will be a straight line. The breaks in the plot indicate the apparent presence of multiple distinct populations. Based on this assessment, the full data set is unlikely to be within the range of ambient background conditions, and some arsenic-affected soils are present. However, a significant portion of the data indicates arsenic levels within the commonly reported background ranges in California.

4.0 RISK MANAGEMENT APPROACH

This section presents the risk management approach to address the arsenic impacts identified in the HRA. As explained in Section 3.5.3, arsenic contributes almost exclusively to the excess cancer risk at the *Site*. Other chemicals are not expected to pose a health risk at the *Site*. Arsenic has been detected at concentrations ranging from less than 1 to 100 mg/kg in shallow soil at the *Site*, with a 95% UCL concentration of 30.7 mg/kg. The higher arsenic concentrations were detected sporadically across the *Site* and are likely associated with slag ballast materials within the former track bed. Other secondary sources of elevated arsenic concentrations may include arsenical pesticides and treated railroad ties (removed from *Site*). As noted previously, arsenic in soil containing slag material is known to have reduced bioavailability. In addition, there is a much lower potential for exposure to arsenic in slag ballast because this material is comprised primarily of large chunks of gravel.

Due to the large range of general ambient concentrations of arsenic detected in soil in California and within the United States, arsenic-affected sites have often been mitigated using a combination of soil management approaches. The desired risk management approach for the *Site* includes managing arsenic-affected soils by covering the existing track bed ballast and underlying soil section beneath asphalt pavement, and placement of landscaping and ground cover during trail development. The trail use areas will be constructed with 4- to 5-inch-thick AC paving over 6 inches of aggregate base (12-foot-wide bike trail) and a clean, imported 6-inch layer of DG (5-foot-wide pedestrian path). In addition, permanent landscaping and ground cover will be placed over the majority of the *Site*.

A tiered risk management approach has been developed to satisfy LACoFD requirements with respect to potential recreational and residential exposure to elevated arsenic concentrations in soil above naturally occurring background levels in addition to offsite disposal of soils containing arsenic above hazardous waste thresholds (if encountered). Soils containing arsenic concentrations up to 12 mg/kg are considered within the range of naturally occurring background levels for the greater Los Angeles area and will not require any mitigation measures other than typical dust and erosion control measures. Soils containing arsenic concentrations between 12 and 30 mg/kg will be covered with permanently maintained mulch with a minimum thickness of 6 inches and/or landscaping to minimize direct exposure. Based on the risk assessment, a level of 42 mg/kg is protective of recreator use of the Site. Therefore, covering soils containing arsenic concentrations between 12 and 30 mg/kg is a health conservative measure that will further reduce potential contact with soils. Soils containing arsenic concentrations over 30 mg/kg will be covered with minimum 12-inch-thick permanently maintained mulch and/or landscaping. Planned unlined drainage ditches will be treated with a binder product to minimize exposure and erosion potential.

5.0 SUMMARY AND CONCLUSIONS

This Supplemental Site Investigation and Human Health Risk Assessment has been prepared for the Greenway Trail Project, a 4.5-mile-long former UP railroad corridor located in the City of Whittier, California. Proposed improvements include development of the *Site* as a pedestrian trail and community park.

5.1 Supplemental Site Investigation

The results of the supplemental soil sampling performed in the vicinity of previous surface soil sample S7 (elevated dieldrin) and trench T20 (elevated TCE) did not identify significant contaminant concentrations requiring remedial efforts. Based on the results of the previous and current soil analytical data generated for the *Site*, additional sampling and analytical testing (other than remedial debris fill removal and arsenic confirmation testing) is not warranted prior to development of the *Site* as a recreational trail.

5.2 Human Health Risk Assessment

The HRA was conducted to determine whether present site conditions pose a potential health hazard to future recreational users. Arsenic has been detected in shallow soil at the *Site* at concentrations ranging from less than 1 to 100 mg/kg, with a 95% UCL concentration of 30.7 mg/kg. The higher arsenic concentrations were detected sporadically across the *Site* and are likely associated with slag ballast materials associated with the former rail operations. As noted previously, arsenic in soil containing slag material is known to have reduced bioavailability. In addition, there is a much lower potential for exposure to arsenic in slag ballast because this material is comprised primarily of large chunks of gravel. Therefore, arsenic in soil containing slag material poses a lower potential health risk.

The results of the HRA indicate that arsenic contributed almost exclusively to the carcinogenic risk estimates, and that no other COIs are cause for concern at the *Site*. The total excess cancer risk using the maximum detected soil concentration under a recreational use scenario is 3×10^{-5}, with arsenic contributing over 95% to the risk estimate. The total hazard index for a child recreator based on the maximum detected concentration is 0.8. The total excess cancer risk for the recreational scenario using 95% UCL exposure concentrations is 9×10^{-6}, with a total hazard index value of 0.3.

Under the construction worker scenario, it was assumed that construction would occur over a 6-month period. Workers were exposed to increased concentrations of dust due to soil movement activities, including dust generated by wind erosion, construction vehicle traffic and other construction activities. The total excess cancer risk for the construction worker is 1×10^{-6}, with arsenic contributing over 90% of the risk estimate. The total hazard index for the construction worker scenario is 0.7, which is below the target hazard index value of 1.0.

For the offsite residential scenario, it was assumed that residents would be exposed to increased concentrations of dust generated during construction activities. The receptor has no direct contact with offsite soils under this scenario. However, the screening assessment previously evaluated residential receptors exposed to the maximum detected onsite concentration by ingestion, dermal contact and inhalation of dust. The total excess cancer risk for the offsite residential scenario using the maximum and 95% UCL exposure concentrations is 2×10^{-8} and 6×10^{-9}, respectively. The total hazard index for the off-site child residential scenario using the maximum and 95% UCL concentration is 0.02 and 0.005, respectively.

The estimated excess cancer risk values are within EPA's range of acceptable risk of 1×10^{-4} to 1×10^{-6}. The hazard index values are below the target level of 1.0, and therefore, potential exposure to soils is not expected to pose a non-cancer risk. The recreational scenario resulted in the highest risk estimates, and was therefore used to determine a health based target cleanup levels to be protective of future use conditions. A target cleanup level for arsenic of 42 mg/kg was calculated based on recreational use and a 1×10^{-5} risk level. Under the recreator scenario, the exposure pathway that contributes most significantly to potential health risks is ingestion of soil. This is because the recreator scenario assumes some extension of the play area behind the residential homes and incorporates a child soil ingestion rate. This is likely to be a health conservative assumption in that children are unlikely to behave in this manner on a routine basis. Additionally, arsenic toxicity is based on ingestion of arsenic in groundwater. Therefore, the default regulatory assumption that arsenic will be equally bioavailable in all media is likely health conservative in that metals in soil are less well absorbed from the gastrointestinal tract than are metals dissolved in water. It is noted that the 95% UCL for arsenic of 30.7 mg/kg is significantly lower than the recreational target cleanup level of 42 mg/kg.

5.3 Risk Management Approach

The recommended risk management approach includes managing arsenic-affected soils by covering and placing the existing track bed ballast and underlying soil section beneath asphalt pavement, and permanently managing landscaping and ground cover during and after trail development. The existing track bed slag ballast materials and underling 2-inch soil section will be placed beneath the paved bike trail. The focused placement of soil containing elevated arsenic concentrations, along with establishment of landscaping and ground covering, will minimize potential future exposure to localized arsenic-containing soils at the *Site*, thereby reducing potential risks.

The following table presents a summary of the recommended risk management approach based on confirmation soil sample arsenic data:

Arsenic Level	Soil Type	Risk Management Approach
0-12 mg/kg	Background	Dust and erosion control
>12-30 mg/kg	Expected Range	Minimum 6-inch-thick permanent mulch and/or landscaping
>30 mg/kg	Elevated Arsenic	Minimum 12-inch-thick permanent mulch and/or landscaping
> 500 mg/kg or 5.0 mg/l	Hazardous Waste	Removal and offsite disposal at licensed Class I landfill by Class A/Haz Contractor

A Memorandum of Understanding (MOU) will be prepared between the City and the LACoFD to document the agreed upon risk management approaches including permanent maintenance of trail section and ground cover materials to minimize the potential for recreational and residential exposure to arsenic-affected soil after completion of the planned Greenway Trail improvements.

5.4 Grading Specifications and Environmental Monitoring

Soil samples will be obtained at approximate 200-foot intervals within the project boundaries to determine "representative" arsenic concentrations and applicable risk management approaches. Areas outside of planned grading operations may be sampled prior to the start of or during construction activities. The soil samples will be obtained from exposed (non-paved) soil areas alternating from each side of the trails and between the trails.

The soil samples will be obtained from the upper 6 inches of soil material using a pre-cleaned stainless steel trowel, placed in laboratory-provided glass sample jars, and submitted to the laboratory for analyses of total arsenic using EPA Test Method 6010B. The laboratory method detection limit will be 1.0 mg/kg. Soil samples containing arsenic above 50 mg/kg will be further analyzed for soluble arsenic using the Waste Extraction Test (WET) to determine potential exceedance of California hazardous waste thresholds. Soils determined to contain arsenic levels above California hazardous waste thresholds will require removal and disposal to a licensed Class I landfill facility by a properly licensed Class A/HAZ contractor.

The project Contractor will be required to implement "no visible" dust practices during the project grading operations to minimize potential construction worker and resident/pedestrian exposure to arsenic-impacted soil. Upwind and downwind air monitoring will further be performed periodically during the onsite grading operations to determine airborne dust and arsenic concentrations. Modifications to the Contractor dust control procedures will be required where air monitoring data exceed applicable regulatory standards including the California Occupational Safety and Health

Administration (OSHA) 8-hour Time Weighted Average (TWA) Permissible Exposure Level (PEL) of 10 micrograms per cubic meter ($\mu g/m^3$) for arsenic and the South Coast Air Quality Management District threshold of 50 $\mu g/m^3$ difference between upwind and downwind concentrations.

The Contractor should further prepare a site-specific health and safety plan prior to commencing site grading operations to address the presence of elevated arsenic in shallow soil and to outline worker training and safe practices.

5.5 Regional Water Quality Control Board Waste Discharge Permit

A copy of this report has been submitted to the Los Angeles Regional Water Quality Control Board (RWQCB) for review. The LACoFD has requested that the RWQCB provide a written waiver (if appropriate) of Waste Discharge Permit requirements to complete the planned recreational trail improvements at the *Site*.

5.6 Project Closure Report

Geocon's onsite representative will maintain field reports including a summary of project activities, grading equipment and locations, air monitoring data, soil sampling activities and where necessary soil disposal documentation. The field reports will further include scaled drawings depicting the locations of completed site improvements, soil samples and monitoring.

A Closure Report will be submitted to the LACoFD upon completion of the site grading operations, trail paving, confirmation soil sampling and analytical testing, and placement of landscaping and ground cover improvements. The report will include an as-built plan depicting the completed trail improvements, arsenic in soil sample data and applicable risk management approach. The report will further include a summary of the soil sample data, health and safety monitoring, and copies of the MOU, laboratory reports, chain-of-custody documentation, site photographs and offsite disposal manifests (where required).

6.0 REFERENCES

Cal-EPA. 1992. Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities. California Environmental Protection Agency, Department of Toxic Substances Control, Office of Scientific Affairs. July.

Cal-EPA. 1994. Preliminary Endangerment Assessment Guidance Manual. California Environmental Protection Agency, Department of Toxic Substances Control. January.

Cal-EPA. 1997. Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities. California Environmental Protection Agency, Department of Toxic Substances Control, Human and Ecological Risk Division. February.

Cal-EPA. 2003. Chronic Reference Exposure Levels. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. August. http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html.

Cal-EPA. 2004. OEHHA Cancer Potency List. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. March. http://www.oehha.ca.gov/risk/pdf/092204_cas.pdf

Geocon. 2001. Greenway Trail Project, Abandoned Union Pacific Railroad Corridor, Whittier, California Corrective Action Plan. Geocon Consultants, Inc. November.

Geocon. 2004. Greenway Trail Project, Former Union Pacific Railroad Corridor, Whittier, California, Remedial Action Workplan, Hadley Street and Whittier Bridge Debris Fills. Geocon Consultants, Inc. November.

Risk Commission. 1997. Final report, Volume 2, Risk Management in Regulatory Decision-Making. Presidential/Congressional Commission of Risk Assessment and Risk Management, Washington, D.C., Ruby, M.V., R. Schoof, W. Brattin, M. Goldade, G. Post, M. Harnois, D.E. Mostby, S.W. Casteel, W. Berti, M. Carpenter, D. Edwards, D. Cragin, and W. Chappell. 1999. Advances in evaluating the oral bioavailability of inorganics in soil for use in human health risk assessment. Environ. Sci. Technol. 33(21).

U.S. EPA. 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA. U.S. Environmental Protection Agency, Washington, DC.

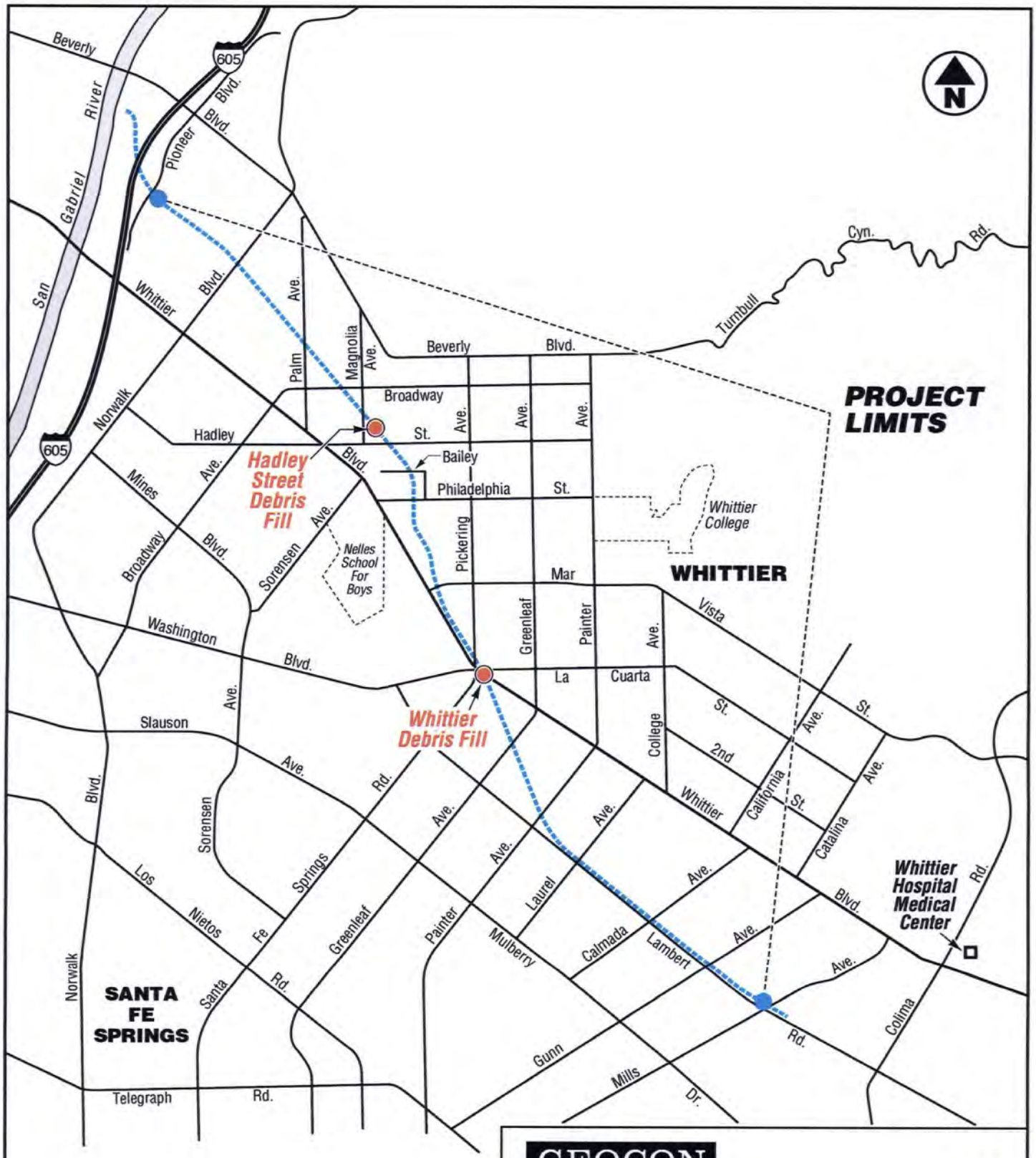
U.S. EPA. 1989. Risk Assessment Guidance for Superfund, Human Health Evaluation Manual. EPA\540\1-89\002. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC.

USEPA. 1990. National Oil and Hazardous Substances Pollution Contingency Plan. U.S. Environmental Protection Agency, Federal Register, v.55, p.8666.

U.S. EPA. 1997. Exposure Factors Handbook, Volume I, General Factors. EPA/600/P-95\002Fa. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC.

U.S. EPA. 2002. Guidelines for Exposure Assessment. U.S. Environmental Protection Agency, Washington, DC.

U.S. EPA. 2004. User's Guide and Background Technical Document for USEPA Region 9's Preliminary Remediation Goals (PRG) Table. U.S. Environmental Protection Agency, Washington, DC.



0 1/2
Scale in Miles

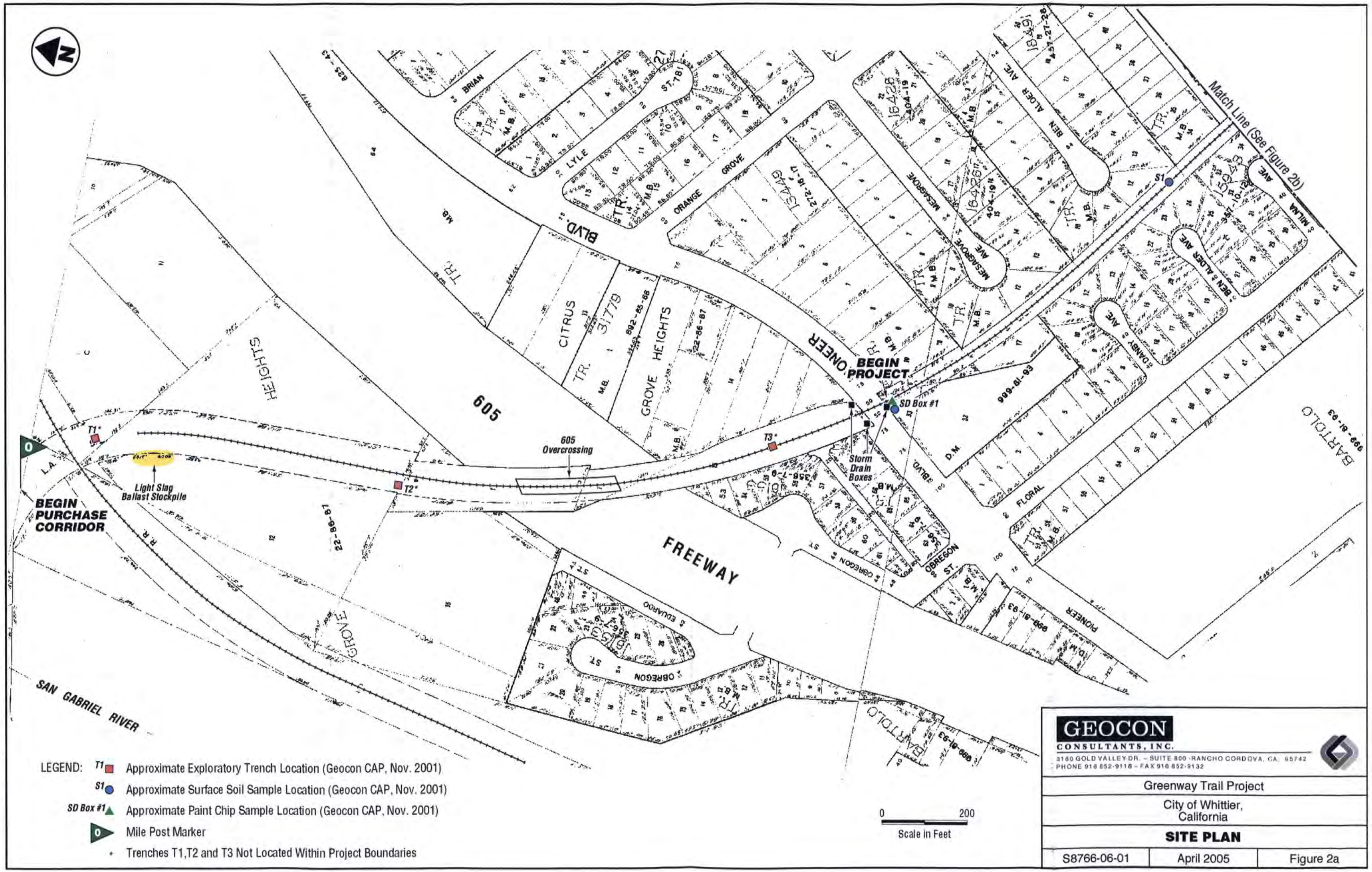
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

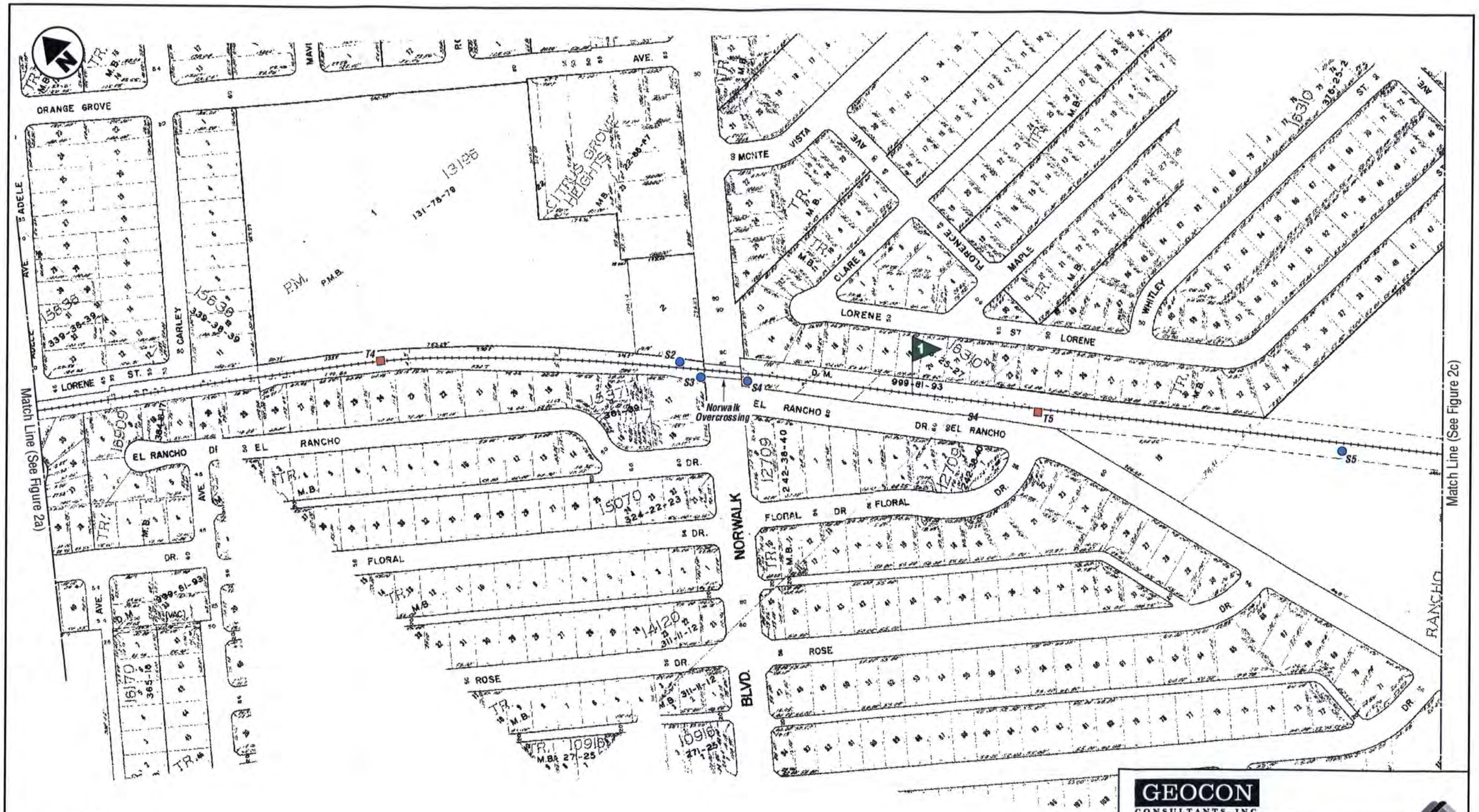
Greenway Trail Project

City of Whittier, California

PROJECT LOCATION MAP

S8766-06-01	April 2005	Figure 1


Match Line (See Figure 2b)
BEGIN PROJECT
SD Box #1
Storm Drain Boxes
605 Overcrossing
T1*
T2*
T3*
S1
Light Slag Ballast Stockpile
BEGIN PURCHASE CORRIDOR
605
FREEWAY
SAN GABRIEL RIVER
PIONEER BLVD.
ORANGE GROVE
LYLE
BRIAN
MESAGROVE AVE
BEN ALDER AVE
MILNA AVE
CITRUS HEIGHTS
GROVE HEIGHTS
FLORAL
OREGON ST.
EDUARDO
BARTOLO
L.A. R.R.
LEGEND:
T1 Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
S1 Approximate Surface Soil Sample Location (Geocon CAP, Nov. 2001)
SD Box #1 Approximate Paint Chip Sample Location (Geocon CAP, Nov. 2001)
Mile Post Marker
* Trenches T1,T2 and T3 Not Located Within Project Boundaries
0 200
Scale in Feet
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132
Greenway Trail Project
City of Whittier, California
SITE PLAN
S8766-06-01
April 2005
Figure 2a



LEGEND:

- T1 ■ Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
- S1 ● Approximate Surface Soil Sample Location (Geocon CAP, Nov. 2001)
- 0 ▶ Mile Post Marker

0 200
Scale in Feet

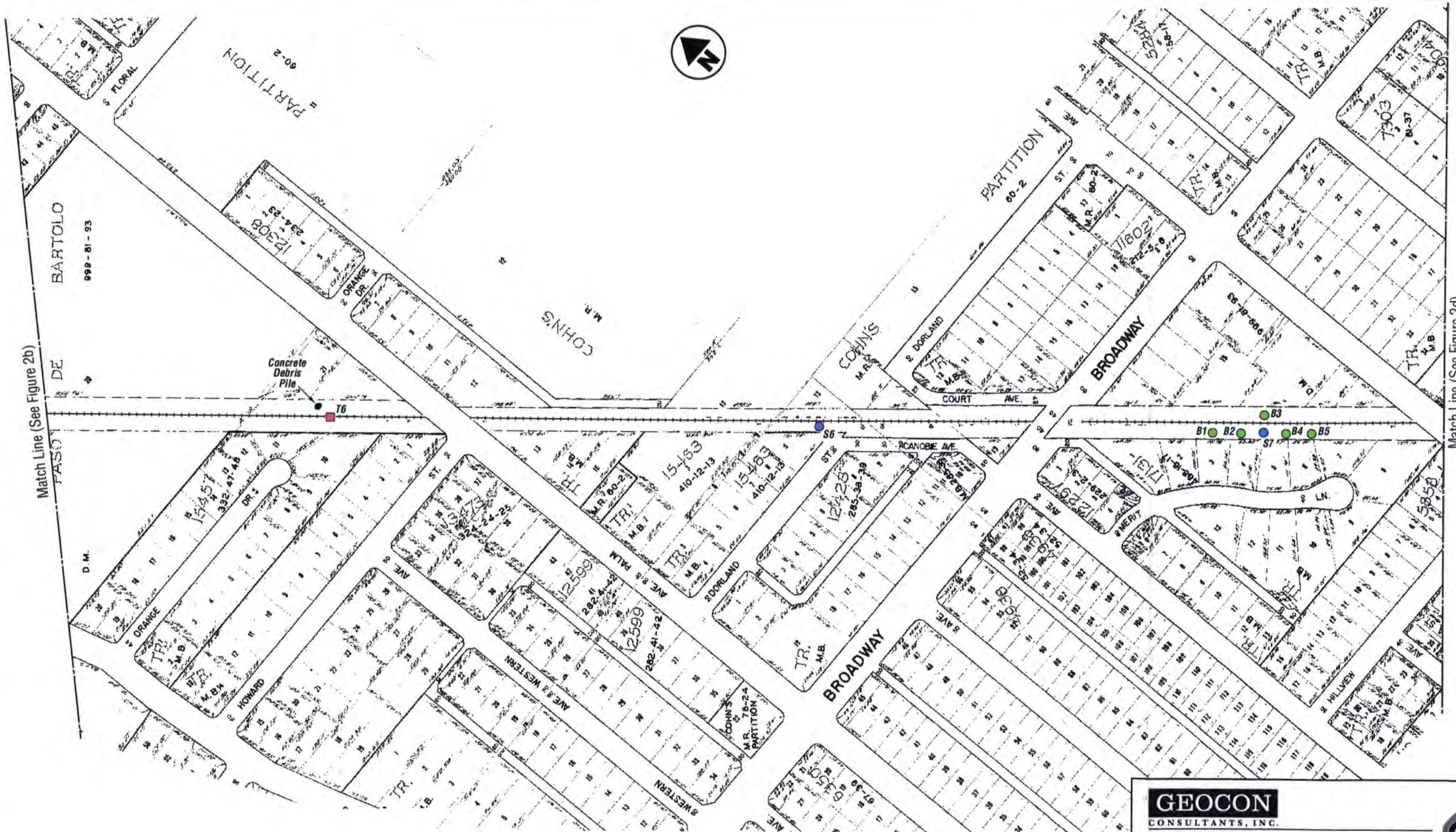
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2b



LEGEND:

- B1 Approximate Hand-Auger Boring Location (Dec. 2004)
- T1 Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
- S1 Approximate Surface Soil Sample Location (Geocon CAP, Nov. 2001)

0 200
Scale in Feet

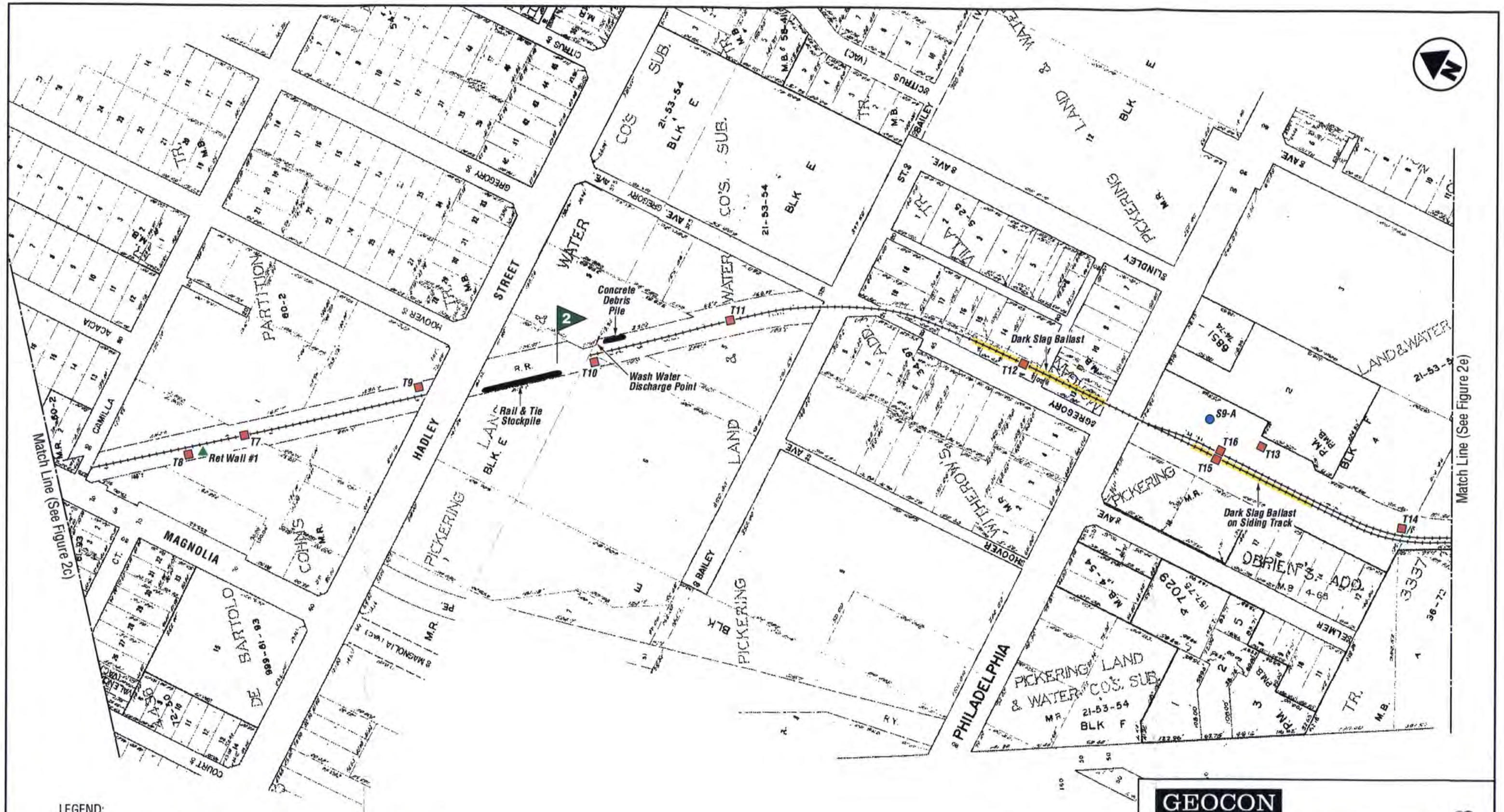
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2c



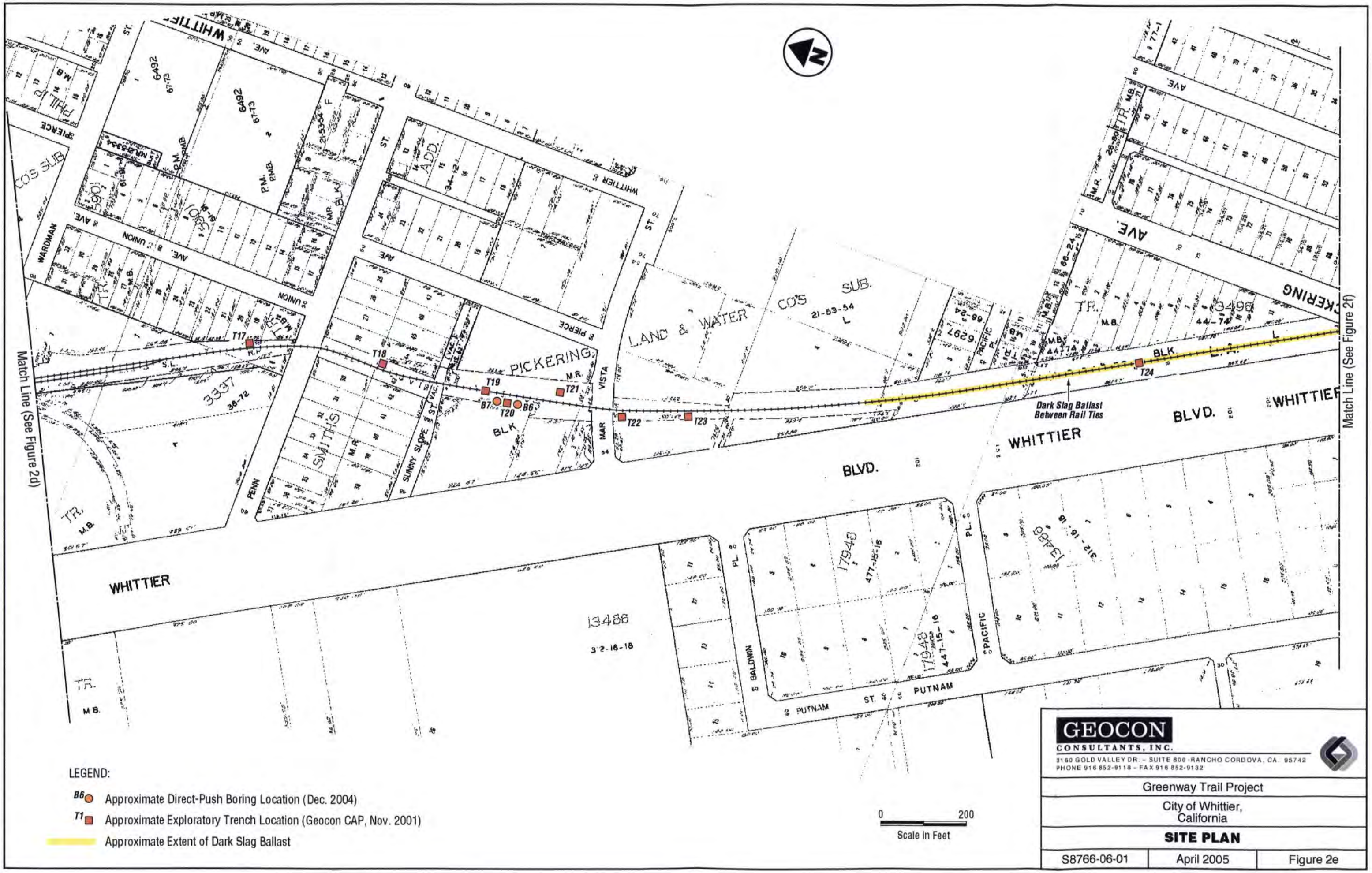
GEOCON
CONSULTANTS, INC.
8160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2d



GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2e

LEGEND:

- T1 Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
- S1 Approximate Surface Soil Sample Location (Geocon CAP, Nov. 2001)
- Approximate Extent of Dark Slag Ballast
- Mile Post Marker

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2f

LEGEND:

T1 Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)

Mile Post Marker

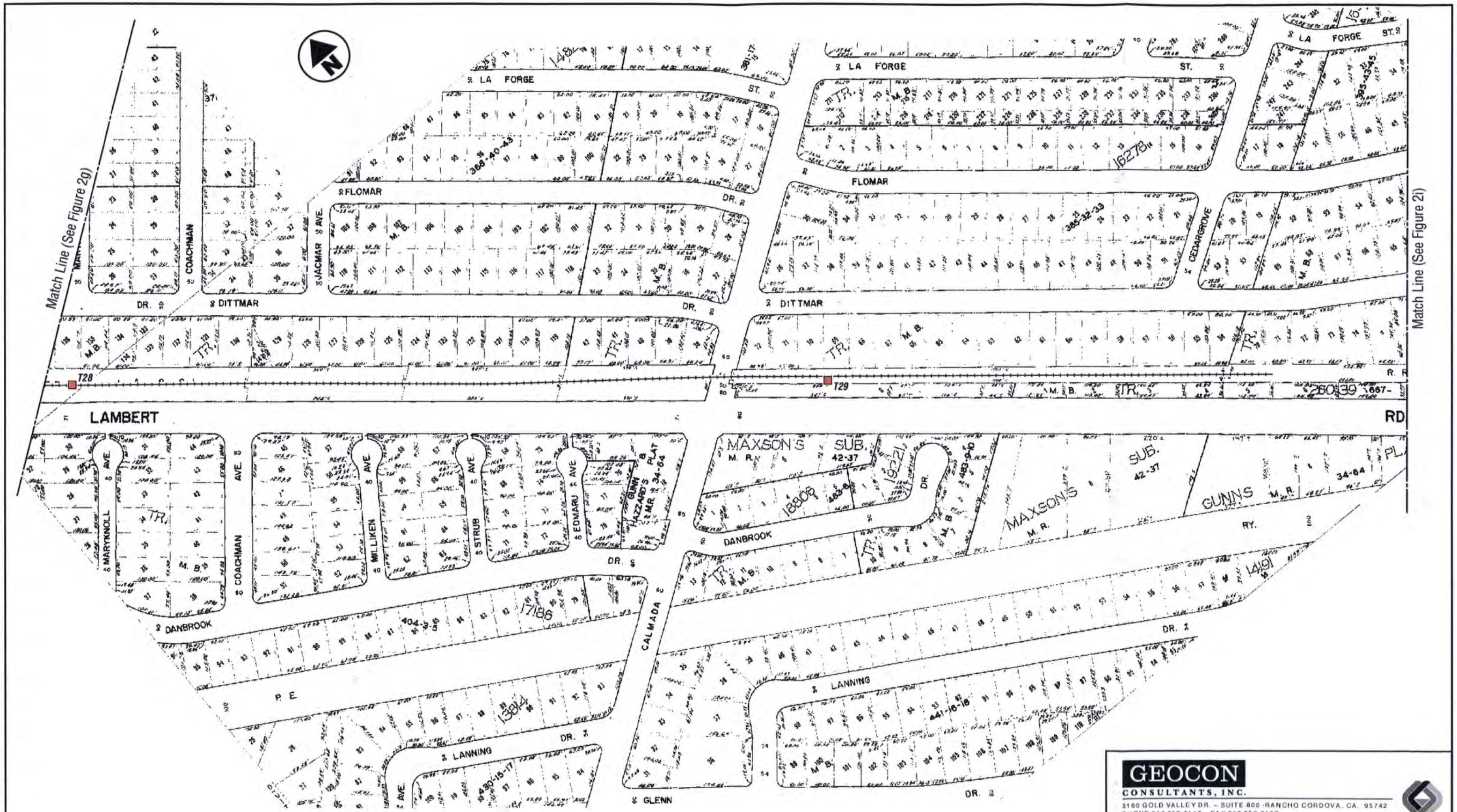
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 · RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2g



LEGEND:

T1 ■ Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2h

LEGEND:

- T1 ■ Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
- Approximate Extent of Dark Slag Ballast
- Mile Post Marker
- Trench T31 Not Located Within Project Boundaries

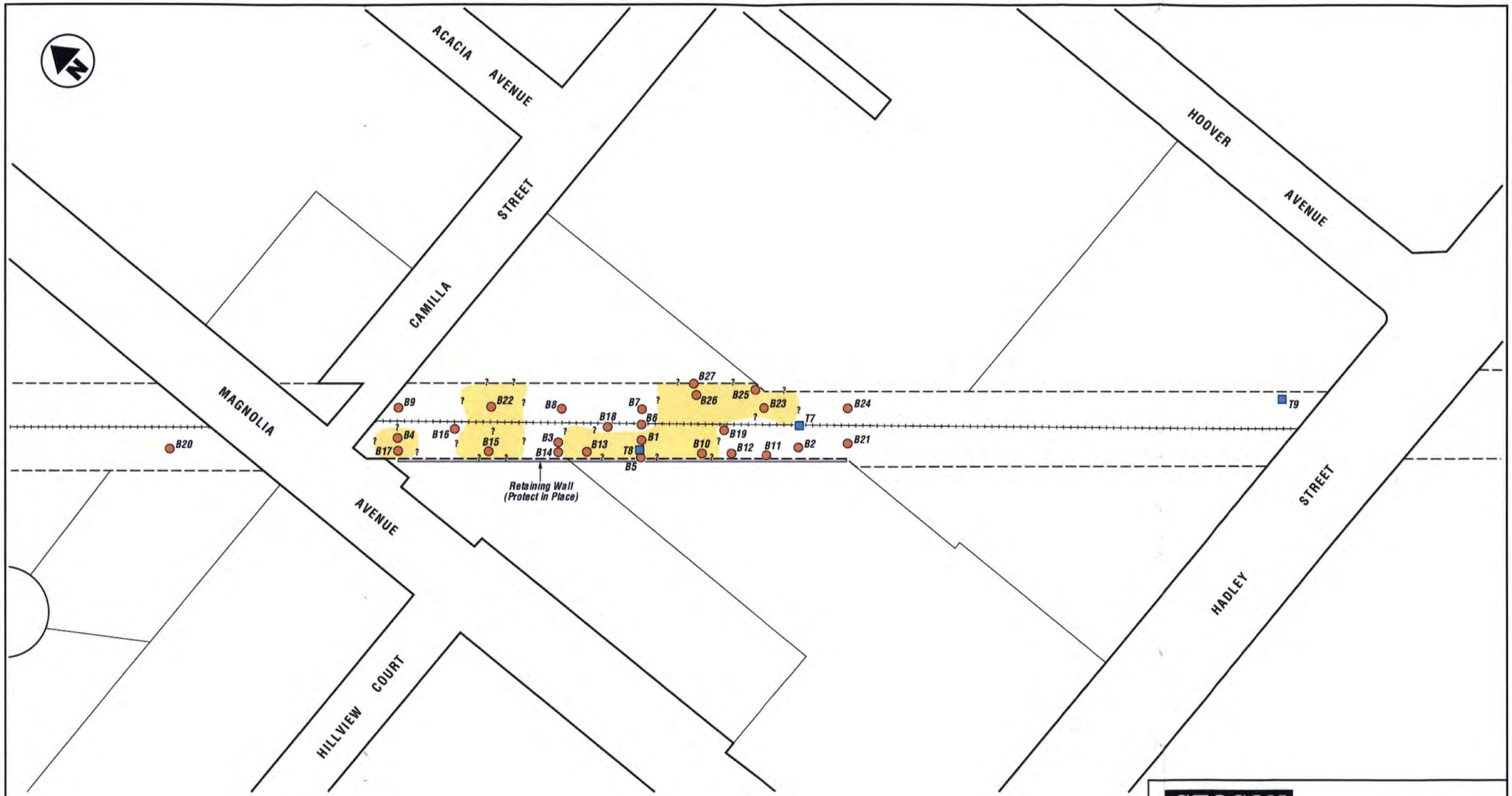
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2i



LEGEND:

- T7 ■ Approximate Exploratory Trench Location (Geocon RAW, Nov. 2004)
- B1 ● Approximate Exploration Location (Geocon RAW, Nov. 2004)
- Debris Fill Material (Queried Where Limits Undefined)

0 80
Scale in Feet

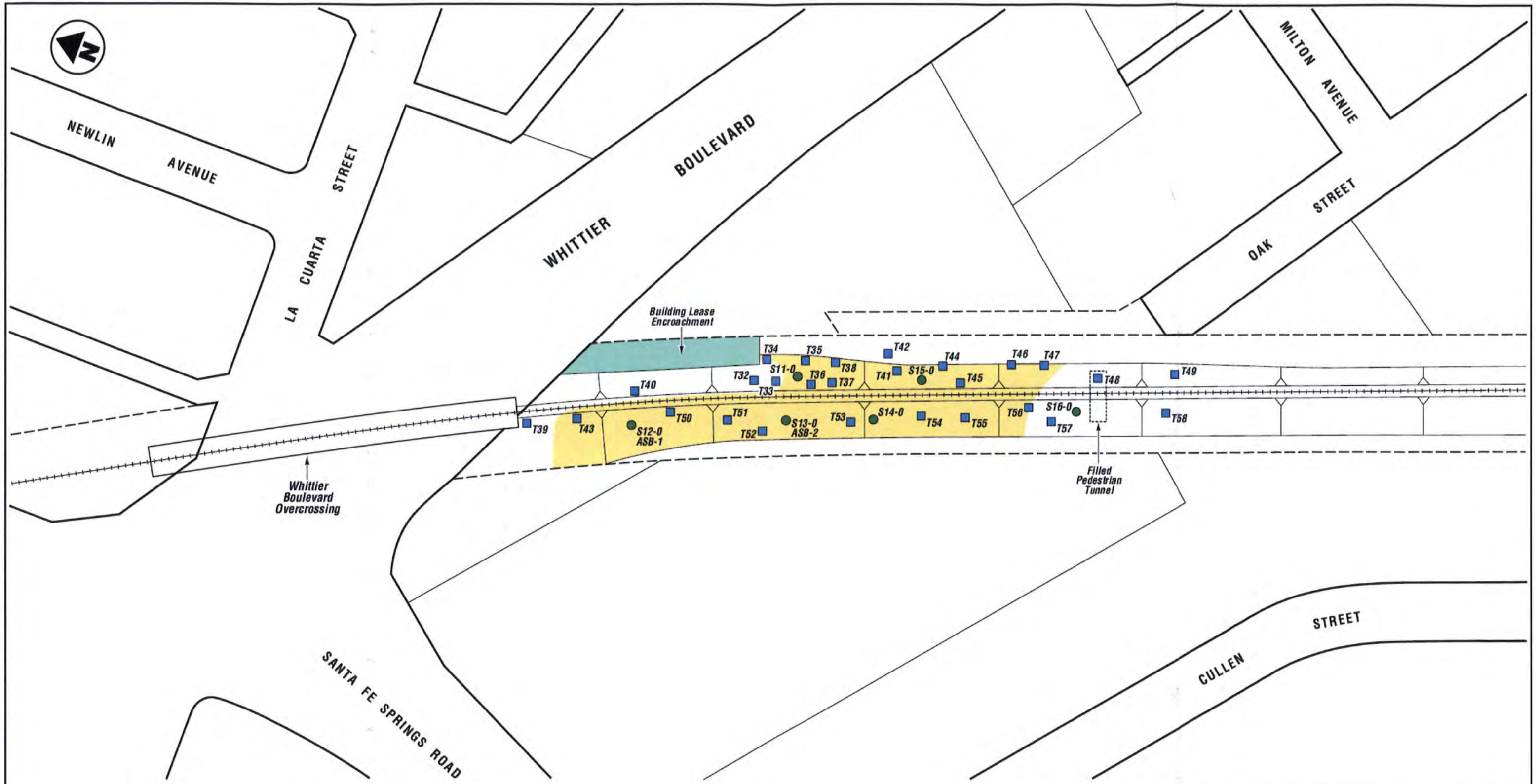
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Greenway Trail Project

City of Whittier,
California

Hadley Street Debris Fill Site Plan

S8766-06-01	April 2005	Figure 3



LEGEND:

S11-0 ● Approximate Surface Soil Sample Location (Geocon RAW, Nov. 2004)

T32 ■ Approximate Exploratory Trench Location (Geocon RAW, Nov. 2004)

Debris Fill Material

0 80
Scale in Feet

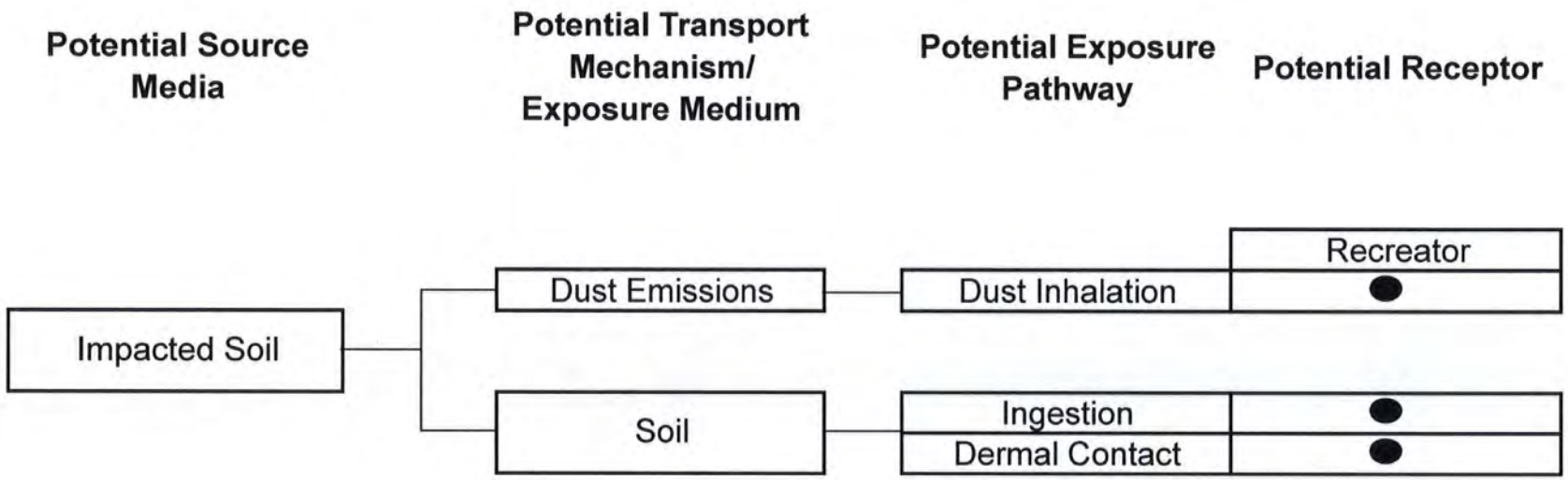
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

Whittier Boulevard Overcrossing
Debris Fill Site Plan

S8766-06-01	April 2005	Figure 4



Legend:

● Evaluated quantitatively in risk assessment

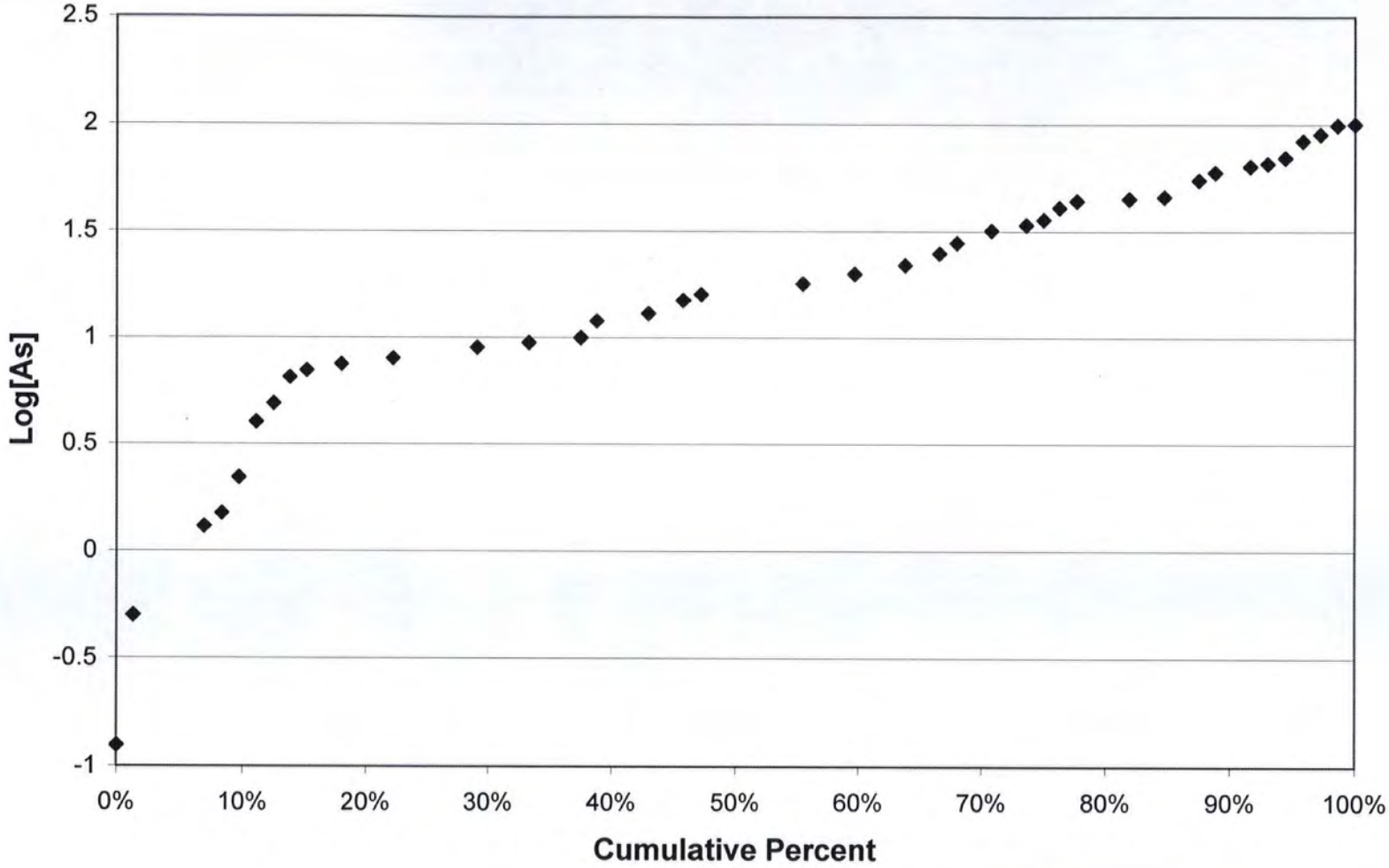
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE CONCEPTUAL MODEL

S8766-06-01	April 2005	Figure 5



GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier,
California

DISTRIBUTION OF ARSENIC CONCENTRATIONS

S8766-06-01	April 2005	Figure 6

TABLE 1
SUMMARY OF SOIL ANALYTICAL DATA - PESTICIDES
GREENWAY TRAIL
WHITTIER, CALIFORNIA

SAMPLE ID	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	alpha-Chlordane	beta-BHC	Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC	gamma-Chlordane	Heptachlor	Heptachlor Epoxide	Methoxychlor	Toxaphene
	Results reported in µg/kg																					
B1-S	15	**2,100**	530	<1.0	<1.0	15	<1.0	150	<1.0	**110**	<1.0	<2.0	<2.0	140	<2.0	16	<1.0	12	<1.0	<1.0	<8.5	<85
B1-S*	31	**2,400**	1,200	<1.0	<1.0	22	<1.0	180	<1.0	**130**	<1.0	<2.0	<2.0	100	<2.0	30	<1.0	18	<1.0	<1.0	<8.5	<85
B1-1.5	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<85
B2-S	5.1	150	42	<1.0	<1.0	79	<1.0	450	<1.0	**100**	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	61	1.7	13	<8.5	<85
B2-1.5	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<85
B3-S	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<1.0	5.7	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<85
B4-S	2.0	4.4	36	<1.0	<1.0	2.1	<1.0	22	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	2.6	<1.0	<1.0	<8.5	<85
B5-S	12	100	43	<1.0	<1.0	51	<1.0	330	<1.0	11	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	53	<1.0	8.7	<8.5	<85
EPA Residential PRG	2,400	1,700	1,700	29	90	NA	320	1,600	NA	30	370,000	NA	NA	18,000	NA	NA	440	440	110	53	310,000	440

Notes:

B1-1.5
- Depth in feet below ground surface (S)
- Boring Identification

µg/kg = Micrograms per kilogram
< = Less than laboratory detection limits
EPA = Environmental Protection Agency
PRG = Preliminary Remediation Goal = (data in bold where PRG exceeded)
* = re-analyzed

TABLE 2
SUMMARY OF SOIL ANALYTICAL DATA - VOCs
GREENWAY TRAIL
WHITTIER, CALIFORNIA

SAMPLE ID	VOCs (µg/kg)
B6-5	ND
B6-10	ND
B7-5	ND / TCE = 5.3
B7-10	ND / TCE = 10

Notes:

B6-5

Depth in feet below ground surface

Boring Identification

µg/kg = Micrograms per kilogram

ND = not detected above laboratory test method detection limits

VOCs = Volatile organic compounds by EPA Test Method 8260B

TCE = Trichloroethene (Preliminary Remediation Goal = 0.053 µg/kg)

TABLE 3
SUMMARY OF SOIL ANALYTICAL DATA - ARSENIC
GREENWAY TRAIL
WHITTIER, CALIFORNIA

SAMPLE ID	ARSENIC (mg/kg)
B1-S	55
B1-1.5	<1.0
B2-S	22
B2-1.5	<1.0
B3-S	44
B3-1.5	66
B4-S	16
B4-1.5	13
B5-S	<1.0
B5-1.5	<1.0
B6-5	4.9
B6-10	1.5
B7-5	2.2
B7-10	1.3
EPA Residential PRG	0.062

Notes:

B1-1.5
- 1.5 — Depth in feet below ground surface (S)
- B1 — Boring Identification

mg/kg = Milligrams per kilogram
< = Less than laboratory test method detection limits
EPA = Environmental Protection Agency
PRG = Preliminary Remediation Goal

TABLE 4
SELECTION OF CHEMICALS OF INTEREST (COI)
GREENWAY TRAIL
WHITTIER, CALIFORNIA

Chemical	Number of Samples	Number of detects	Frequency of detection (%)	Maximum Detected Concentration (mg/kg)	U.S. EPA Region IX Residential PRG (mg/kg)			Non-cancer Ratio	Cancer Ratio	Is the noncancer or cancer ratio greater than 1.0 and selected as a COI?
Antimony	40	34	85%	7	31	nc		2.3E-01	NA	No
Arsenic	54	50	93%	100	0.062	ca		NA	**1.6E+03**	**Yes**
Barium	40	40	100%	180	5400	nc		3.3E-02	NA	No
Beryllium	40	1	3%	1	150	nc		6.7E-03	NA	No
Cadmium	40	1	3%	0.16	37	nc		4.3E-03	NA	No
Chromium, total	40	40	100%	200	210	ca		NA	9.5E-01	No
Cobalt	40	40	100%	17	900	ca		NA	1.9E-02	No
Copper	40	40	100%	1000	3100	nc		3.2E-01	NA	No
Lead	40	40	100%	630	150	nc	(1)	**4.2E+00**	NA	**Yes**
Mercury	40	8	20%	0.27	23	nc		1.2E-02	NA	No
Molybdenum	40	34	85%	97	390	nc		2.5E-01	NA	No
Nickel	40	40	100%	33	1600	nc		2.1E-02	NA	No
Selenium	40	1	3%	2.5	390	nc		6.4E-03	NA	No
Silver	40	2	5%	0.5	390	nc		1.3E-03	NA	No
Thallium	40	39	98%	10	5.2	nc		**1.9E+00**	NA	**Yes**
Vanadium	40	40	100%	1000	780	nc		**1.3E+00**	NA	**Yes**
Zinc	40	40	100%	660	23000	nc		2.9E-02	NA	No
4,4'-DDD	15	6	40%	0.041	2.4	ca		NA	1.7E-02	No
4,4'-DDE	15	7	40%	2.4	1.7	ca		NA	**1.4E+00**	**Yes**
4,4'-DDT	15	7	47%	1.2	1.7	ca		NA	7.1E-01	No
Alpha-chlordane	15	7	47%	0.084	1.6	ca	(2)	NA	5.3E-02	No
Chlordane	15	7	47%	0.45	1.6	ca		NA	2.8E-01	No
Dieldrin	15	7	47%	0.25	0.03	ca		NA	**8.3E+00**	**Yes**
Gamma-chlordane	15	7	47%	0.064	1.6	ca		NA	4.0E-02	No
Heptaclor	15	1	7%	0.0017	0.11	ca		NA	1.5E-02	No
Heptaclor epoxide	15	4	27%	0.013	0.053	ca		NA	2.5E-01	No
Endrin	15	1	7%	0.14	18	nc		7.8E-03	NA	No
Endrin ketone	15	1	7%	0.03	18	nc	(3)	1.7E-03	NA	No
Arochlor 1260	8	1	13%	0.22	0.22	ca		NA	**1.0E+00**	**Yes**
Trichloroethene	7	3	43%	0.034	0.053	ca		NA	6.4E-01	No

Notes:

Values in bold indicate ratios greater than 1.0.

nc = PRG based on noncancer effects

ca = PRG based on cancer effects

NA = Not applicable

(1) California-modified PRG.

(2) There is no PRG for this chemical, therefore the PRG for chlordane was used as a surrogate.

(3) There is no PRG for this chemical, therefore the PRG for endrin was used as a surrogate.

PRG = Preliminary Remediation Goal

TABLE 5
TOXICITY VALUES FOR CHEMICALS OF INTEREST
GREENWAY TRAIL
WHITTIER, CALIFORNIA

Chemical	Oral RfD mg/kg-day	Reference	Inhalation RfD mg/kg-day	Reference	Inhalation SF (mg/kg-day)-1	Reference	Oral SF (mg/kg-day)-1	Reference
Arsenic	0.0003	IRIS	8.6E-06	Cal-EPA 2003	12	Cal-EPA 2004	1.5	Cal-EPA 2004
Lead	NA	(1)	NA	(1)	NA	NA	NA	NA
Thallium	0.000066	IRIS	0.000066	(2)	NA	NA	NA	NA
Vanadium	0.001	NCEA	0.001	(2)	NA	NA	NA	NA

Notes:

RfD = reference doses
IRIS = Integrated Risk Information Systems (United States Environmental Protection Agency)
NCEA = National Center for Environmental Assessment
SF = slope factor
mg/kg = milligrams per kilogram
NA = not applicable
(1) Lead is evaluated based on resultant blood lead levels. The evaluation of lead is presented in section 5.3.1.
(2) No inhalation RfD has been established for this chemical, therefore, the oral RfD was used as a surrogate for the inhalation RfD.

TABLE 6
SUMMARY OF RECREATIONAL EXPOSURE PARAMETERS
GREENWAY TRAIL
WHITTIER, CALIFORNIA

Parameter	Symbol	Units	Child Recreator	Adult Recreator
ALL PATHWAYS				
Exposure Point Concentration	EPC	mg/kg	CS	CS
Exposure Duration	ED	yr	6	24
Averaging Time-Non-cancer	ATnc	days	2,190	8,760
Averaging Time-Cancer	ATca	days	25,550	25,550
Body Weight	BW	kg	15	70
Exposure Frequency	EF	days/yr	196	196
Fraction Exposed	FE	unitless	0.17	0.17
Conversion Factor	CF	kg/mg	1E-06	1E-06
INCIDENTAL INGESTION OF SOIL				
Ingestion Rate	SIR	mg/day	200	100
DERMAL CONTACT WITH SOIL				
Exposed Skin Surface Area	SA	cm^2	2,800	5,700
Soil-to-Skin Adherence Factor	AF	mg/cm^2	0.2	0.07
Skin Absorption Factor	ABS	unitless	CS	CS
INHALATION OF VOLATILES/PARTICULATES IN AIR				
Inhalation Rate	IR	m^3/d	10	20
Particulate Emission Factor	PEF	m^3/kg	1.32E+09	1.32E+09

Notes:

CS -- chemical specific parameter

TABLE 7
RECREATIONAL RISK ASSESSMENT
GREENWAY TRAIL
WHITTIER, CALIFORNIA

Chemical	Number of Samples	Number of detects	Frequency of detection (%)	Calculations Using Maximum Value: Maximum Detected Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk	Calculations Using 95% UCL: 95% UCL Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk
Arsenic	73	68	93%	100	4.E-01	53%	2.4E-05	96%	30.7	1.E-01	49%	9E-06	89%
Lead	40	40	100%	630	NA	NA	NA	NA	221	NA	NA	NA	NA
Thallium	40	39	98%	10	2.E-01	23%	NA	NA	2.2	4.E-02	15%	NA	NA
Vanadium	40	40	100%	1000	2.E-01	21%	NA	NA	403	7.E-02	26%	NA	NA
4,4'-DDE	15	7	47%	2.4	NA	NA	1E-07	0.4%	1.8	NA	NA	8E-08	1%
Dieldrin	15	7	47%	0.25	8.E-03	1%	8E-07	3%	0.22	7.E-03	3%	7E-07	8%
Arochlor 1260	8	1	13%	0.22	2.E-02	2%	2E-07	0.9%	0.22*	2.E-02	7%	2E-07	3%
Total Hazard Index:					**8E-01**	**100%**	--	--		**3E-01**	**100%**	--	--
Total Excess Cancer Risk:					--	--	**3E-05**	**100%**		--	--	**9E-06**	**100%**

Notes:

NA = Not applicable
*The maximum value is used because there is only one detected value.
mg/kg = milligrams per kilogram
UCL = Upper Confidence Limit

TABLE 8
CONSTRUCTION AND OFFSITE RESIDENTIAL RISK ASSESSMENT
GREENWAY TRAIL
WHITTIER, CALIFORNIA

				Construction Worker Calculations					Offsite Residential Calculations Using Maximum Value					Offsite Residential Calculations Using 95% UCL				
Chemical	Number of Samples	Number of detects	Frequency of detection (%)	95% UCL Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk	Maximum Detected Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk	95% UCL Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk
Arsenic	73	68	93%	30.7	4.1E-01	52.90%	1.3E-06	89.70%	100	2.E-02	97.40%	1.7E-08	99.60%	30.7	5.E-03	97.5%	6.3E-09	99.0%
Lead	40	40	100%	221	NA	NA	NA	NA	630	NA	NA	NA	NA	221	NA	NA	NA	NA
Thallium	40	39	98%	2.2	1.1E-01	14.10%	NA	NA	10	2.E-04	1.30%	NA	NA	2.2	4.80E-05	0.8%	NA	NA
Vanadium	40	40	100%	403	1.9E-01	24.30%	NA	NA	1000	2.E-04	1.20%	NA	NA	403	8.E-05	1.4%	NA	NA
4,4'-DDE	15	7	47%	1.8	NA	NA	1.8E-08	0.80%	2.4	NA	NA	8.5E-12	0.10%	1.8	NA	NA	6.4E-12	0.1%
Dieldrin	15	7	47%	0.22	1.8E-02	2.30%	1.1E-07	7.10%	0.25	7.3E-06	0.10%	5.9E-11	0.30%	0.22	6.E-06	0.1%	5.2E-11	0.8%
Arochlor 1260	8	1	13%	0.22*	5.0E-02	6.40%	3.6E-08	2.40%	0.22	2.E-05	0.10%	6.5E-12	0.10%	0.22*	2.E-05	0.3%	6.5E-12	0.1%
Total Hazard Index:					**7E-01**					**2E-02**	**100%**	--	--		**5E-03**		--	--
Total Excess Cancer Risk:					--	--	**1E-06**			--	--	**2E-08**	**100%**		--	--	**6E-09**	**100%**

NA = Not applicable
*The maximum value is used because there is only one detected value.

APPENDIX A

Exponent

Renee M. Kalmes, M.S.P.H., C.I.H.
Managing Scientist

Professional Profile

Ms. Renee Kalmes is an environmental scientist and certified industrial hygienist with 20 years of environmental experience. Ms. Kalmes specializes in health risk assessments, exposure reconstruction, risk-based site investigations and regulatory negotiations. In this role, she is responsible for designing, conducting, and managing technical studies addressing environmental and occupational impacts of chemical agents. Ms. Kalmes has also developed and conducted sampling programs to evaluate potential chemical exposure associated with various consumer products. Ms. Kalmes has conducted over 100 risk assessments evaluating chemical exposure in both occupational and environmental settings.

Ms. Kalmes managed and testified as an expert witness for a residential development over a former landfill in northern California. For the $2 million project, prepared an extensive risk assessment, including a Monte Carlo analysis, that underwent community and regulatory agency review and was approved by the California Environmental Protection Agency Department of Toxic Substances and Control.

She has provided expert testimony to the California Public Utilities Commission, conducted third-party reviews for the California Environmental Protection Agency Department of Toxic Substances and Control, and conducted presentations to the California Central Coast Regional Water Quality Control board. Ms. Kalmes has taught more than 15 courses on risk assessment at the University of California Extension Program and has developed and conducted more than 100 employee Right-to-Know training programs for several private industries and municipalities.

Credentials and Professional Honors

M.S., Air and Industrial Hygiene—University of North Carolina (1983)
B.S., Environmental Science—Purdue University (1981)

Certified Industrial Hygienist, Comprehensive Practice

American Industrial Hygiene Association; Society of Risk Analysis; American Board of Industrial Hygiene; American Society for Testing Material, Risk Assessment Committee (Former Member); Northern California Industrial Hygiene Association (Former Newsletter Editor)

Relevant Experience

Human Health Risk Assessments

Managed health risk assessment of former ordinance explosive site in Northern California. Managed assessment of potential exposure from soil vapor to on and off-site residents from chemicals detected in groundwater beneath a residential development. For this project, Exponent compared collocated vapor flux measurements, groundwater concentrations, results of Jury and Johnson-Ettinger modeling results. Additionally, outdoor and indoor air monitoring data were evaluated. Extensive fate and transport modeling was conducted to determine effects of various soil parameters and modeling assumptions on the resultant air concentrations in an effort to calibrate the soil and groundwater vapor model. The client used our recommendations for assessing soil and groundwater vapor emissions for the site.

Managed health risk assessment for a Brownfield redevelopment located in Modesto California. Designed a focused sampling investigation to gather data for use in the risk assessment. Ecologic and human health pathways were evaluated. Evaluated potential receptors including an indoor commercial worker, outdoor service work and construction worker. Chemicals of interest included barium, arsenic, and polycyclic aromatic hydrocarbons. Impact of sulfate and pH on soil and groundwater chemistry was also assessed.

Managed risk assessment for a residential development over a former landfill in northern California. For the $2 million project, prepared an extensive risk assessment, including a Monte Carlo analysis, that underwent community and regulatory agency review and was approved by the California Environmental Protection Agency Department of Toxic Substances and Control. Evaluated soil vapor emissions, methane impacts, and soil containing residual levels of chemicals.

Managed health risk assessment for Marin Country Day School in Corte Madera, California. For this project, developed a soil sampling program to evaluate residual concentrations of polychlorinated biphenyls (PCBs) in an upper soccer field of the school. Data were used to conduct a risk assessment that assessed potential health risks to children playing at the school field. The findings from the risk assessment that there were no increased health risks to children at the school were presented to the community and the parents or the community has raised no further issues.

Managed the first "Containment Zone" Order issued by the San Francisco Regional Water Quality Control Board involving a metal (mercury) in groundwater. Prepared an alternative strategy for managing the client's abandoned production facility and groundwater plume, allowing the client to pursue future development of the site. As part of the project, transport and fate modeling was conducted to determine mass loading of chemical into the nearest downgradient water, human and ecological risk assessments were conducted, and health-based groundwater trigger levels were developed. Performed a cost-benefit risk reduction analysis.

Managed a risk assessment and feasibility study for a pesticide-contaminated site in Monterey/Salinas, California. Negotiated with the Central Coast Regional Water Quality

EX™

Control Board (CCRWQCB) on the site order. Directed technical evaluations of engineering alternatives to determine the most cost-effective remediation of soils to concentrations of toxaphene and DDT that would not pose a risk to human health and the environment. Conducted presentations to the CCRWQCB.

Managed a human and ecological risk assessment to meet the requirements of the San Francisco Bay Regional Water Quality Control Board site Order to develop health based clean-up levels for a facility closure in Newark, California. As part of the assessment, vapor transport modeling was conducted and the impact of various remedial alternatives was evaluated. A future worker and service worker were evaluated. The primary chemicals of interest included chlorinated VOCs and arsenic in shallow groundwater.

Performed health assessment of total and hexavalent chromium levels detected in soils to respond to a California Regional Water Quality Control Board order. Potential contact with soils and inhalation of dusts from wind resuspension and vehicular traffic was evaluated.

Conducted a risk assessment at a former chemical site in northern California that evaluated potential health risks to future commercial employees after development of the site as a retail space. Several VOC, including trichloroethylene, perchloroethylene, cis-1,2,-dichloroethylene, dichlorobenzene, and BTEX were detected in soil and the first two groundwater zones at the site. Chemical vapor transport from groundwater was modeled to predict indoor and outdoor air concentrations. Potential health impacts during construction activities were also evaluated.

Conducted an assessment of potential health risks to a residential development located over a former oil production field. Exposure to residual levels of PAHs and metals in soils and groundwater was evaluated. The risk assessment was accepted by the California Environmental Protection Agency Department of Toxics Substances Control and assisted in the delisting of the site as a Superfund site.

Performed preliminary endangerment assessment (PEA) for several clients to respond to requests from the California Environmental Protection Agency Department of Toxic Substances and Control. These assessment screening health assessments were performed to determine no further action on the sites. The findings were used to approve future development of the sites.

Served as principal-in-charge for a major VOC groundwater risk assessment involving potential litigation in central California. For this project, a risk-based sampling approach was used to determine potential health impacts associated with migration of groundwater. Extensive vapor transport and groundwater modeling was conducted. Information gathered during the modeling was the basis for communicating potential health risks to the public.

Conducted a third-party review for California Environmental Protection Agency Department of Toxic Substances and Control on the risk assessment portion of the environmental impact report for a major hazardous landfill in northern California. The review focused on the technical assumptions used to support decisions regarding potential health risks associated with closure of the facility. Issues reviewed included leaching of chemicals into groundwater, airborne emissions associated with closure actions, and review of drum burial remedial alternatives.

Provided testimony to the California Public Utilities Commission regarding an acceptable level of vinyl chloride and benzene in landfill gas to be used as pipeline gas.

Proposition 65

Conducted Proposition 65 evaluation for evaluation of lead emissions from facility in Southern California. Various sources of emission data were reviewed to determine the most appropriate values for the emission sources, including fugitive emissions. Air dispersion modeling was used to assess potential neighborhood lead concentrations in soil and air and evaluate Proposition 65 warning requirements. Findings were presented to the District Attorney. Based on the risk assessment result, it was determined that warnings to off-site neighbors were not required.

Conducted Proposition 65 evaluation of hexavalent chromium emissions from catalyst plant. Potential airborne exposure at residential and commercial locations was evaluated based on air dispersion modeling and review of inventory emission reports. A Phased approach was used in this evaluation utilizing both a screening air dispersion model (SCREEN 3) and a more sophisticated model (ISCST 2). Hexavalent chromium emissions were not found to present a significant risk and warnings were not required.

Conducted Proposition 65 compliance evaluations for numerous clients, including aerospace, paper products, energy and power, painting and coating, and pharmaceutical and consumer product companies. Several evaluations included extensive literature searches and the use of toxicological models to derive no significant-risk-levels and no observed-effect-levels for reproductive and developmental endpoint. Chemicals evaluated included metals, benzene, PCBs, hexavalent chromium, lead, and various chlorinated solvents.

Conducted Proposition 65 evaluation on various consumer products assessing potential exposure to children and adults to metals including lead, cadmium and arsenic. Developed sampling protocol to evaluate metals in products. In addition, evaluated potential exposure associated with dermal contact and incidental ingestion associated with hand-to-mouth activities.

Provided expert witness assistance (exposure assessment) in a Proposition 65 lawsuit involving the migration of chlorinated solvents in groundwater under an industrial facility to surface water designated as a drinking water source. The evaluation included extensive fate and transport modeling of ground and surface waters.

Managed Proposition 65 compliance evaluation for manufacturer of sodium-o-phenylphenate, a post-harvest fungicide for specific fruits. Measured airborne levels and dermal deposition values were used to estimate lifetime daily dose under occupational and consumer scenarios.

Air

Evaluated potential worker health issues associated with hexavalent chromium air emissions from a nearby plating facility for a California School District. Developed monitoring plan to collect air samples and particulate fall-out. Provided interpretation of results and recommendations for worker health and safety and regulatory impacts.

FX™

Managed over 20 air risk assessments associated with the California Hot Spots Program (AB-2588) for aerospace, chemical, and manufacturing facilities. Managed air modeling and risk assessment teams, developed protocols, tracked job costs, and interfaced with clients. One facility required an extensive evaluation of air pollution control technologies. Successfully proposed risk reduction options to avoid notification requirements and interfaced with the local California Air Quality Control Boards.

Performed a risk assessment for airborne emissions of propylene oxide from an Almond Manufacturing site in northern California. The risk assessment was performed to meet requirements of the Toxic Air Hot Spots Program (AB 2588). Propylene oxide was found to be the major contributor to potential inhalation risks. Based on this finding, worked with facility and recommended measures that resulted in reduced emissions and potential health risks. The local Air Quality Management District accepted the final risk assessment.

Managed a $100,000 health risk assessment for modifications to a major hospital waste incinerator in southern California. Project included calculation and sampling of stack emission rates, removal efficiencies, and air pollution control evaluation. Prepared a multi-pathway risk assessment that evaluated inhalation, dermal, and ingestion exposure pathways to surrounding urban community. Conducted human health risk assessment evaluating dioxin and furan air emissions from a chemical manufacturing plant in Louisiana. Performed assessment using EPA's ComDEP air dispersion model and EPA's multi-pathway guidance to assess recreational and subsistence fishers and recreational, farming and residential populations.

Conducted comprehensive risk assessment and safety hazards evaluation for a treatment, storage, and disposal facility seeking modifications to a RCRA Part B permit. Performed a multi-pathway exposure assessment on fugitive emissions from treatment and loading operations during routine and upset conditions. Risk assessment results were incorporated into the environmental impact report and indicated no significant risk to the surrounding community.

Performed a public health evaluation as part of a RCRA Permit Subpart X for an open burn incinerator for a major aerospace company. Project included evaluation of waste burn material and resultant air emission calculations.

Occupational Epidemiology

Conducted exposure assessment analysis for a mortality study of petrochemical research workers. A rigorous review of potential exposure sources was conducted to address possible relationships between etiologically significant exposure and health outcomes of employees, including chemical, radiation and EMF sources. Findings from the exposure assessment were used to determine appropriate surrogates of exposure for use in a cohort and case control study. Results were published in a scientific peer-reviewed manuscript.

Analyzed industrial hygiene data for use in a case control study of chemical workers with a reported increase of prostate cancer. The study involved extensive review of over 20 years of air and biological sampling data, along with work history information to determine the most appropriate surrogates of potential exposure. The feasibility of extrapolating more recent data

to historical exposure by considering changes in production volume, plant operations, controls measures and job functions is being conducted.

Industrial Hygiene

Provided technical support on review of health literature, asbestos air sampling methods, and worker exposure data for clients of asbestos containing products. Evaluated literature on asbestos exposure to insulator workers and brake mechanics and the awareness of worker exposure information over time.

Managed industrial hygiene sampling program for client to determine occupational levels of cyanoacrylate adhesives in workplace. More than 150 samples were collected including 8-hour, time-weighted, peak (less than minutes) and short-term levels over a 1 week-period. Provided a statistical analysis of the airborne concentrations for different job categories. Based on current industrial hygiene sampling data along with review of engineering controls, process changes and respiratory use, Ms. Kalmes prepared historic estimates of exposure. The information was subsequently used in an epidemiology study to evaluate potential irritant effects. Results are being published in a scientific peer-reviewed manuscript.

Provided review of beryllium industrial hygiene air sampling data for Brush Wellman. Developed sampling methods for analysis of ultra-fine beryllium particulates, and provided statistical evaluation of historic industrial hygiene data. Analyzed over 40 years of industrial data and provided analysis of historic employee exposure.

Conducted air sampling to determine the concentrations of benzene associated with locomotive diesel exhaust in a roundhouse and airborne Stoddard solvent associated with cleaning a locomotive generator. A simulated worst-case exposure scenario was designed to measure benzene concentrations and assess the upper bound human health risks of benzene in a railroad worker. A comparative risk analysis of the benzene concentrations measured from diesel locomotive exhaust and airborne Stoddard solvent mist, to the current occupational exposure limits and to benzene concentrations associated with cigarette smoking and filling vehicle gas tanks at service stations was provided.

Evaluated potential health effects of theatrical fog for an opera association. Provided health and safety consultation regarding use of chemicals and conducting employee training.

Performed comprehensive hazardous materials work place and environmental audits for the public and private sector and recommended strategies for worker health and safety compliance programs. Developed and performed industrial hygiene surveys for solvents, heavy metals, and particulates. Audited and reviewed health and safety compliance programs for 15 petrochemical and agricultural manufacturing facilities, and analyzed loss prevention statistics.

Developed a 40-hour Hazardous Waste Site Training Course and conducted more than 15 training sessions. Developed and conducted more than 50 worker-Right-to-Know training programs for several private industries and municipalities, including the cities of Santa Monica and Burbank, California. Prepared compliance guidelines for worker hazard communication programs

Provided a health and safety assessment of potential methane migration into a building from anaerobic biodegradation of oily soils beneath the site. Proposed soil treatment, and evaluated ventilation systems.

Publications and Presentations

Hessel, PA., R. Kalmes, T. Smith, E.Lau, P. Mink and J. Mandel. A Nested Case-Control Study of Prostate Cancer and Atrazine Exposure. Journal of Occupational Environmental Medicine. Volume 46, Number 4, April 2004.

Buffler, PA, M. Kelsh, P. Chapman, S. Wood, E. Lau, A. Golembesky, R. Wood, R. Kalmes and G. Brorby. Primary Brain Tumor Mortality at a Petroleum Exploration and Extraction Research Facility. Journal of Occupational and Environmental Medicine. Volume 46, Number 3, March 2004.

Kolanz, M.E., A.K. Madl, M.A. Kelsh, M.S. Kent, R M. Kalmes and D. J. Paustenbach 2001. A comparison and critique of historical and current exposure assessment methods for beryllium: implications for evaluating risk of chronic beryllium disease. Applied Occup. and Environ. Health. Vol 16(5) 592-614.

Paustenbach, D.P., M.L. Burke, M Shum and R. M. Kalmes. Airborne concentrations of ethyl and methyl cyanoacrylate in the workplace. Am. Ind. Hyg. Assoc. J. Jan 2001 Vol 62, No.1.

Madl, A.K., R.M. Kalmes, and D.J. Paustenbach. 1999. Community one-hour inhalation exposure limits for chemical irritants among five agencies in the United States. Presented at the American Industrial Hygiene Conference and Exposition, June 7–9, 1999. Toronto, Canada.

Madl, A.K., R.M. Kalmes, and D.J. Paustenbach. 1999. Comparison of acute inhalation exposure levels for chemical irritants among five agencies in the United States. Presented at the Society of Toxicology Annual Meeting, March 14–18, 1999. New Orleans, LA.

Kalmes, R.M., and D.B. Mathur. 1996. Application of risk-based strategies and the containment zone provision of the Regional Water Quality Control Board, San Francisco Bay Region to implement the first containment zone for a heavy metal (mercury) in California. Presented at the Ann. Mtg. of the Soc. for Risk Analysis. Dec. 8–11, 1996. New Orleans, LA.

Paustenbach, D.J., J.D. Jernigan, R. Bass, R. Kalmes, and P. Scott. 1992. A proposed approach to regulatory contaminated soil: Identify safe concentrations for seven of the most frequently encountered exposure scenarios. Regul. Toxicol. Pharmacol. 16:21–56.

APPENDIX B

LABORATORY DATA

CORRECTIVE ACTION PLAN

GREENWAY TRAIL
WHITTIER, CALIFORNIA

Note: Laboratory data generated for debris fill materials has not been incorporated in the risk assessment calculations since these materials will be properly removed from the Site.

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
T1 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	4	NP	NP	30-40
T1 – 1	Soil	T1-T3 NOT WITHIN PROJECT					
T1 – 2	Soil						
T2 – 0.5	Soil	Heavy Metals - Slag	NP	5	NP	NP	10
T2 – 1	Soil						
T2 – 2	Soil						
T3 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	8	NP	8	12
T3 – 1	Soil						
T3 – 2	Soil						
T3 – Tie Gravel	Ballast	Creosote Stains Beneath Rail Ties					
T4 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	4	NP	NP	20
T4 – 1	Soil						
T4 – 2	Soil						
T5 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	4	NP	12	20
T5 – 1	Soil						
T5 – 2	Soil						
T6 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	8	NP	NP	16
T6 – 1	Soil						
T6 – 2	Soil						
T7 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	6	NP	NP	18
T7 – 1	Soil						
T7 – 2	Soil						
T8 – 1	Soil	Heavy Metals, TPH And VOCs Associated With Railroad Debris Fill Materials	4-7	NA	NA	NA	NA
T8 – 5.5	Debris Fill						
T8 – 7	Soil						
T8 – Stockpile	Debris Fill						
T9 – 1	Soil	TPH Stains Adjacent To Cool-A-Coo	NP	NA	NA	NA	NA
T10 – 1	Soil	TPH Adjacent To City Maintenance Facility	NP	7	NP	NP	17
T11 – 2	Soil	TPH Stain Within Track Bed	NP	10.5	NP	NP	17

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
T12 – 0.5	Dark Slag Ballast	Heavy Metals – Slag	NP	NP	8	NA	15
T12 – 1	Soil						
T12 – 2	Soil						
T13 – 2	Soil	TPH - Former Train Station Site	NP	NA	NA	NA	NA
T14 – 1	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
T15 - 0.5	Dark Slag Ballast	Heavy Metals – Slag	NP	NP	4 (siding track)	NP	15
T15 – 1	Soil						
T15 – 2	Soil						
T16 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	6	NP	12	15
T16 – 1	Soil						
T16 – 2	Soil						
T17 - 1.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
T18 – 1	Soil	TPH and VOCs Adjacent To Mar Vista Molding Co.	NP	NA	NA	NA	NA
T19 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	3	NP	18	15
T19 – 1	Soil						
T19 – 2	Soil						
T20 – 2	Soil	TPH and VOCs Adjacent to Former Dip Tank	NP	NA	NA	NA	NA
T21 – 1	Soil	VOCs From Glue Adjacent To Mar Vista Molding Co.	NP	NA	NA	NA	NA
T22 – 2	Soil	TPH Surface Stains/Oil Absorbent	NP	NA	NA	NA	NA
T23 – 1	Soil	TPH Surface Stains Adjacent To Pro Auto Sales	NP	NA	NA	NA	NA
T24 - 0.5	Light & Dark Slag Ballast	Heavy Metals – Slag	NP	4	12 (between ties)	NP	30-40 (slope)
T24 – 1	Soil						
T24 – 2	Soil						
T25 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	NP	4	12	22
T25 – 1	Soil						
T25 – 2	Soil						

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
T26 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	3	NP	9	17
T26 – 1	Soil						
T26 – 2	Soil						
T27 – 1	Soil	Pesticides, PCBs and Herbicides	NP	NA	NA	NA	NA
T28 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	3	NP	9	15
T28 – 1	Soil						
T28 – 2	Soil						
T29 – 1	Soil	TPH Adjacent to Lambert Tire Facility	NP	NA	NA	NA	NA
T30 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	3	NP	9	16
T30 – 1	Soil						
T30 – 2	Soil						
~~T31 - 0.5~~	~~Dark Slag Ballast~~	~~Heavy Metals - Slag~~	~~NP~~	~~NP~~	~~3~~	~~15~~	~~18~~
~~T31 – 1~~	~~Soil~~						
~~T31 – 2~~	~~Soil~~						
~~T31 – Slag~~	~~Dark Slag Ballast~~	T31 NOT WITHIN PROJECT					
T32-.5	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T32 Backing Strip	Material	Asbestos Associated With Debris Fill Materials					
T33-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T34-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2	NA	NA	NA	NA
T34-3	Soil						
T35-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T35-3	Soil						
T36-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T36-3	Soil						
T37-3	Soil	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T38-4.5	Soil	Heavy Metals Associated With Debris Fill Materials	0-3.5	NA	NA	NA	NA
T39-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
T40-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T41-3	Soil	Heavy Metals Associated With Debris Fill Materials	0-2	NA	NA	NA	NA
T42-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T43-1.5	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T44-3	Soil	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T45-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1.5	NA	NA	NA	NA
T46-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1.5	NA	NA	NA	NA
T47-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-1.5	NA	NA	NA	NA
T47-2	Soil						
T48-3	Soil	Heavy Metals Associated With Pedestrian Tunnel Backfill Materials	NP	NA	NA	NA	NA
T49-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T50-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T51-1	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T52-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T53-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T54-1.5	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T55-.5	Debris	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T55-1.5	Soil						
T56-3	Soil	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T57-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T58-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
S1 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S2 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S3 – 0	Soil	Lead at Painted Norwalk Bridge Abutment	NP	NA	NA	NA	NA
S4 – 0	Soil	Lead at Painted Norwalk Bridge Abutment	NP	NA	NA	NA	NA
S5 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S6 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S7 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	6.5	NP	NP	17
S8 – 0	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S9 – A	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S9 – B	Soil	Lead From Paint at Pedestrian Tunnel	NP	NA	NA	NA	NA
S10 – 0	Soil	Lead From Paint at Whittier Bridge Abutment	NP	NA	NA	NA	NA
S11-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S12-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S13-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S14-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S15-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S16-0	Soil	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
ASB-1	Asbestos Material	Debris Fill @ S. Whittier Bridge Embankment	NA	NA	NA	NA	
ASB-2	Asbestos Material	Debris Fill @ S. Whittier Bridge Embankment	NA	NA	NA	NA	
SD Box #1	Beige Paint Chip	Lead Containing Paint at Storm Drain Box	NA	NA	NA	NA	NA
SD Box #1	Soil	Lead From Paint at Storm Drain Box	NA	NA	NA	NA	NA
Ret Wall #1	Beige Paint Chip	Lead Containing Paint at Retaining Wall	NA	NA	NA	NA	NA
Ret Wall #1	Soil	Lead From Paint at Retaining Wall	NA	NA	NA	NA	NA
Ret Paint	Beige Paint Chip	Lead Containing Paint at Retaining Wall	NA	NA	NA	NA	NA
B1-8	Native Soil	Heavy Metals – Hadley Street Debris Fill	4-7	NA	NA	NA	NA
B1-12	Native Soil						
B2-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B2-4	Native Soil						
B2-8	Native Soil						
B3-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B3-4	Native Soil						
B3-8	Native Soil						

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
B4-3	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2-4	NA	NA	NA	NA
B4-4	Native Soil						
B4-8	Native Soil						
B5-2	Fill	Heavy Metals – Hadley Street Debris Fill	6-8	NA	NA	NA	NA
B5-4	Fill						
B5-7	Debris						
B5-8	Native Soil						
B5-12	Native Soil						
B6-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B6-4	Fill						
B6-6	Native Soil						
B6-8	Native Soil						
B6-12	Native Soil						
B7-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B7-4	Native Soil						
B7-8	Native Soil						
B7-12	Native Soil						
B8-4	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B8-8	Native Soil	Heavy Metals – Hadley Street Debris Fill					
B9-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B9-4	Fill						
B9-8	Native Soil						
B10-3	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2.5-3.5	NA	NA	NA	NA
B-11	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-12	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-13	Debris	Heavy Metals – Hadley Street Debris Fill	0-2	NA	NA	NA	NA
B-14	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-15	Debris	Heavy Metals – Hadley Street Debris Fill	1.5-3	NA	NA	NA	NA
B-16	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-17	Debris	Heavy Metals – Hadley Street Debris Fill	2-4	NA	NA	NA	NA
B-18	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-19	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-20	Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

Notes: NP = Not present
NA = Not available

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T1-.5	T1-1	T1-2	T2-.5	T2-1	T2-2	T3-.5	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.50	0.50	0.42	0.49	0.50	0.50	<0.25	500	150
Arsenic	34	**210 (12/1.4)**	**93 (5.2/1.4)**	12	11	17	8.0	500	50
Barium	140	38	71	110	130	150	130	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	30	7.5	11	22	20	20	10	2,500	5,600
Cobalt	5.5	3.5	6.4	9.5	11	9.0	3.0	8,000	800
Copper	46	22	30	22	20	28	14	2,500	250
Lead	48	44	28	5.0	3.5	14	18	1,000	50
Mercury	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	20	2
Molybdenum	1.5	0.25	0.39	0.48	0.50	0.50	0.33	3,500	3,500
Nickel	14	6.0	10	18	19	18	5.5	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.5	1.5	1.2	1.0	1.0	1.0	0.50	700	70
Vanadium	38	15	23	41	37	38	30	2,400	240
Zinc	64	110	230	52	48	100	45	5,000	2,500

T1-T3 NOT WITHIN PROJECT

Notes: B6-1-.5
- .5 — Sample depth in feet below surface grade
- 1 — Boring number
- B6 — Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T3-1	T3-2	T4-.5	T4-1	T4-2	T5-.5	T5-1	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.48	0.50	<0.25	0.48	0.45	1.0	0.50	500	150
Arsenic	**120 (4.8/1.2)**	18	4.0	**60 (7.1/<1.0)**	**90 (4.7/1.3)**	7.5	45	500	50
Barium	130	150	6.0	66	110	85	54	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	18	27	1.5	12	18	110	8.0	2,500	5,600
Cobalt	10	14	2.0	6.0	9.0	2.5	4.5	8,000	800
Copper	18	22	4.0	12	20	14	10	2,500	250
Lead	3.5	4.5	3.5	2.5	3.5	25	15	1,000	50
Mercury	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	20	2
Molybdenum	0.39	0.42	<0.25	<0.25	0.29	0.42	<0.25	3,500	3,500
Nickel	14	19	1.5	9.0	16	4.5	6.0	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.0	1.5	<0.25	1.0	1.0	3.0	1.5	700	70
Vanadium	36	53	5.5	24	35	**500 (11/<1.0)**	25	2,400	240
Zinc	48	57	20	34	46	34	110	5,000	2,500

T3 NOT WITHIN PROJECT

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T5-2	T6-.5	T6-1	T6-2	T7-.5	T7-1	T7-2	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.40	0.50	0.43	0.45	1.0	0.50	0.31	500	150
Arsenic	**100 (4.2/1.2)**	44	**84 (3.7/<1.0)**	9.5	46	46	45	500	50
Barium	150	62	150	160	140	100	150	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	18	26	15	16	52	22	15	2,500	5,600
Cobalt	9.0	3.5	7.5	8.0	6.0	7.0	8.0	8,000	800
Copper	20	12	17	18	**1,000 (25/<1.0)**	160	22	2,500	250
Lead	3.5	20	3.5	3.0	**190 (6.1/<1.0)**	20	3.5	1,000	50
Mercury	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	20	2
Molybdenum	0.50	0.50	1.0	1.5	1.5	0.50	1.0	3,500	3,500
Nickel	17	6.5	15	16	33	13	16	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.5	1.0	0.50	0.50	1.0	1.0	0.50	700	70
Vanadium	40	79	35	38	88	83	36	2,400	240
Zinc	59	64	120	46	260	160	46	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T8-1	T8-STK	T8-5.5	T8-7	T12-.5	T12-1	T12-2	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.27	<0.25	<0.25	<0.25	7.0	0.50	0.37	500	150
Arsenic	6.0	32	11	14	32	44	10	500	50
Barium	100	**3,600 (11/<1.0)**	170	210	7.5	50	130	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	9.5	76 (0.18 HEX)	12	14	0.50	47	17	2,500	5,600
Cobalt	4.0	4.5	7.0	8.0	17	4.5	7.5	8,000	800
Copper	14	64	30	29	**460 (<1.0/<1.0)**	16	20	2,500	250
Lead	25	**5,800**	**140 (74/<1.0)**	**160 (<1.0/<1.0)**	**630 (5.2/<1.0)**	38	3.0	1,000	50
Mercury	1.0	1.7	0.19	<0.10	<0.10	<0.10	0.20	20	2
Molybdenum	0.50	1.5	1.5	1.0	40	0.50	2.0	3,500	3,500
Nickel	10	10	16	16	3.0	9.0	20	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	2.5	<0.15	1.5	0.19	<0.15	<0.15	500	50
Thallium	0.50	3.0	0.50	1.0	0.31	0.50	1.0	700	70
Vanadium	19	18	29	31	0.50	73	40	2,400	240
Zinc	100	940	360	310	420	110	52	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
HEX = Hexavalent Chromium
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T15-.5	T15-1	T15-2	T16-.5	T16-1	T16-2	T19-.5	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	<0.25	0.27	0.29	1.0	<0.25	0.40	1.0	500	150
Arsenic	**60 (3.7/<1.0)**	16	8.0	18	18	15	13	500	50
Barium	94	170	120	160	140	150	84	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	1.0	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	9.5	16	13	200 (<0.1 HEX)	15	18	20	2,500	5,600
Cobalt	6.5	7.5	6.5	1.5	7.5	8.5	7.0	8,000	800
Copper	140	22	16	12	20	22	39	2,500	250
Lead	**94 (<1.0/<1.0)**	5.5	2.5	7.0	5.5	6.5	**84 (2.5/<1.0)**	1,000	50
Mercury	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.27	20	2
Molybdenum	18	3.5	1.5	<0.25	2.0	2.0	1.0	3,500	3,500
Nickel	22	23	16	7.5	18	22	13	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	0.50	0.50	0.50	2.5	0.50	1.0	0.50	700	70
Vanadium	22	40	32	**1,000 (7.5/<1.0)**	36	42	34	2,400	240
Zinc	440	66	42	18	86	74	140	5,000	2,500

Notes: B6-1-.5
- .5 = Sample depth in feet below surface grade
- 1 = Boring number
- B6 = Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
HEX = Hexavalent Chromium
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T19-1	T19-2	T24-.5	T24-1	T24-2	T25-.5	T25-1	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.50	0.32	2.5	0.50	0.29	1.0	0.25	500	150
Arsenic	9.5	18	**70 (<1.0/<1.0)**	32	9.0	20	20	500	50
Barium	68	40	96	43	170	60	37	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	11	7.0	5.0	5.5	14	100	8.0	2,500	5,600
Cobalt	8.0	4.5	6.5	3.0	6.5	6.5	3.5	8,000	800
Copper	23	9.5	**510 (<1.0/<1.0)**	8.5	20	240	12	2,500	250
Lead	28	29	**330 (<1.0/<1.0)**	10	8.0	43	6.5	1,000	50
Mercury	<0.10	0.10	0.17	<0.10	0.11	<0.10	<0.10	20	2
Molybdenum	0.38	0.42	97	0.50	1.0	42	0.50	3,500	3,500
Nickel	9.0	6.5	5.0	4.5	15	6.5	5.0	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	0.50	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.0	0.50	0.28	0.50	0.50	1.0	0.50	700	70
Vanadium	30	16	8.0	16	32	120	20	2,400	240
Zinc	63	64	660	260	46	150	73	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T25-2	T26-.5	T26-1	T26-2	T28-.5	T28-1	T28-2	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.50	2.0	<0.25	0.38	1.0	<0.25	0.37	500	150
Arsenic	16	12	16	41	34	16	20	500	50
Barium	150	60	36	180	130	32	160	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	0.16	<0.15	<0.15	<0.15	100	10
Chromium	26	170	5.5	21	60	6.0	22	2,500	5,600
Cobalt	11	2.5	3.5	8.5	4.5	3.5	8.0	8,000	800
Copper	25	10	5.5	24	14	5.5	24	2,500	250
Lead	4.0	18	2.0	4.5	42	4.5	6.0	1,000	50
Mercury	<0.10	0.14	<0.10	<0.10	0.12	<0.10	<0.10	20	2
Molybdenum	0.50	<0.25	0.30	3.0	0.50	<0.25	2.5	3,500	3,500
Nickel	20	2.5	4.0	29	8.0	4.5	26	2,000	200
Selenium	<0.25	2.5	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.5	10	0.48	1.0	1.5	0.50	1.5	700	70
Vanadium	46	**710 (1.8/<1.0)**	15	50	130	16	50	2,400	240
Zinc	110	38	200	71	340	92	68	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T30-.5	T30-1	T30-2	T31-.5	T31-1	T31-2	T31-SLAG	S11-0	S12-0	S16-0	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram											
Antimony	0.50	<0.25	0.32	0.50	0.50	0.28	0.30	16	3.0	0.47	500	150
Arsenic	**64 (2.8/<1.0)**	28	28	22	34	26	2.0	30	15	7.5	500	50
Barium	94	38	130	76	98	44	9.5	250	150	90	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	4.0	<0.15	100	10
Chromium	66	7.5	18	15	18	8.0	1.0	52	34	15	2,500	5,600
Cobalt	6.5	4.0	7.5	8.0	8.0	4.0	12	16	10	7.5	8,000	800
Copper	18	6.5	18	**330 (<1.0/<1.0)**	26	7.5	**300 (<1.0/<1.0)**	**3,400 [5.0]**	840 [0.53]	19	2,500	250
Lead	28	3.0	3.5	**84 (<1.0/<1.0)**	40	2.5	28	**6,200 [14]**	**1,200 [0.74]**	29	1,000	50
Mercury	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	1.4	0.72	<0.10	20	2
Molybdenum	1.0	0.37	1.5	4.5	1.0	0.44	5.0	7.5	7.0	0.50	3,500	3,500
Nickel	11	5.0	18	12	16	6.5	5.0	120	140	10	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	0.30	<0.15	<0.15	0.37	0.50	0.32	<0.15	500	50
Thallium	1.5	0.50	0.50	1.0	1.0	0.50	<0.25	2.5	1.0	1.0	700	70
Vanadium	110	20	38	28	36	18	1.5	54	120	28	2,400	240
Zinc	100	98	57	180	240	220	87	430	750	64	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant
[5.0] = Soluble concentration by Toxicity Characteristic Leaching Procedure (TCLP)

TABLE 3
SUMMARY OF SOIL ANALYTICAL RESULTS – PETROLEUM HYDROCARBONS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	DATE	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	VOCS EPA 8020 (µg/kg)	VOCS EPA 8260 (µg/kg)	SVOCs (µg/kg)
Detection Limit		<1.0	<1.0	<1.0	STD	STD	STD
~~T3-TIE G~~	~~8/23/01~~	~~---~~	~~<20~~	~~1,600~~			~~35,000[1]~~
T7-TIE G	8/23/01	---	<10	**340**	---	---	---
T8-STK	8/23/01	<1.0	<5.0	**250**	ND	**6.9[2]**	---
T8-5.5	8/23/01	<1.0	<10	**820**	ND	ND	---
T8-7	8/23/01	<1.0	<1.0	**5.2**	ND	ND	---
T9-1	8/23/01	---	<1.0	**96**	---	---	---
T10-1	8/23/01	<1.0	<1.0	**4.9**	ND	---	---
T11-2	8/23/01	<1.0	<1.0	**5.7**	ND	---	---
T13-2	8/23/01	<1.0	<1.0	**3.1**	ND	---	---
T18-1	8/23/01	---	<1.0	**17**	---	ND	---
T20-2	8/23/01	<1.0	<1.0	**6.5**	ND	**34[3]**	---
T21-1	8/23/01	---	---	---	---	ND	---
T22-2	8/23/01	---	<1.0	**7.1**	---	---	---
T23-1	8/23/01	---	<1.0	**5.1**	---	---	---
T29-1	8/23/01	<1.0	<5.0	**170**	ND	---	---

Notes:
TPHg = Total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
TPHmo = Total petroleum hydrocarbons as motor oil
µg/kg = Micrograms per kilogram
mg/kg = Milligrams per kilogram
GRO = Gasoline Range Organics by EPA Test Method 8015
VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds by EPA Test Method 8270
1 = SVOC = Fluoranthene
2 = VOC = Naphthalene
3 = VOC = Trichloroethene

< = Less than laboratory test method detection limits
--- = Not analyzed
ND = not detected above method detection limit
STD = Standard method detection limit for each constituent
BOLD = Detection

T3 NOT LOCATED WITHIN PROJECT

TABLE 4
SUMMARY OF SOIL ANALYTICAL RESULTS – PESTICIDES, PCBs AND HERBICIDES
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	DATE	PESTICIDES EPA TEST METHOD 8081 (µg/kg)	PCBs EPA TEST METHOD 8082 (µg/kg)	HERBICIDES EPA TEST METHOD 8151 (µg/kg)
Detection Limit		STD	STD	STD
T2-.5	8/23/01	ND	ND	ND
S1-.5	8/23/01	**6.2[1], 20[2], 46[3], 9.2[4], 60[5], 5.7[6], 9.5[7], 2.6[8]**	**220[9]**	ND
S2-.5	8/23/01	ND	ND	ND
S5-.5	8/23/01	ND	ND	ND
S6-.5	8/23/01	**14[2], 23[3], 16[4], 130[5], 10[6], 16[7]**	ND	ND
S7-.5	8/23/01	**41[1], 110[2], 46[3], 84[4], 370[5], 250[6], 64[7], 11[8]**	ND	ND
S8-0	8/23/01	ND	ND	ND
S9A-0	8/23/01	ND	ND	ND
T14-1	8/23/01	ND	ND	ND
T17-1.5	8/23/01	ND	ND	ND
T27-1	8/23/01	ND	ND	ND

Notes:
< = Less than laboratory test method detection limits
--- = Not analyzed
µg/kg = Micrograms per kilogram
STD = Standard method detection limit for each constituent
PCBs= Poly chlorinated Biphenyls
ND = not detected above method detection limit
PRG = Preliminary Remediation Goal
1 = 4,4'-DDD (Residential PRG = 2,400 µg/kg)
2 = 4,4'-DDE (Residential PRG = 1,700 µg/kg)
3 = 4,4'-DDT (Residential PRG = 1,700 µg/kg)
4 = alpha-Chlordane (Residential PRG = 1,600 µg/kg)
5 = Chlordane (Residential PRG = 1,600 µg/kg)
6 = Dieldrin (Residential PRG = 30 µg/kg)
7 = gamma-Chlordane (Residential PRG = 1,600 µg/kg)
8 = Heptachlor epoxide (Residential PRG = 53 µg/kg)
9 = PCBs = Aroclor 1260 (Residential PRG = 220 µg/kg)
BOLD = Detection

TABLE 5
SUMMARY OF SOIL AND PAINT CHIP ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD AND TOTAL ARSENIC
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	TOTAL LEAD EPA METHOD 6010 (mg/kg)	WET LEAD EPA METHOD 6010 (mg/l)	DI-WET LEAD EPA METHOD 6010 (mg/l)	TOTAL ARSENIC EPA METHOD 6010 (mg/kg)
~~T3-TIEG~~	~~22~~	~~---~~	~~---~~	~~10~~
T7-TIEG	**100**	---	---	46
T9-1	7.5	---	---	9.5
T10-1	4.0	---	---	7.0
T11-2	4.0	---	---	**99**
T13-2	4.0	---	---	7.0
T14-1	5.0	---	---	8.0
T17-1.5	12	---	---	36
T18-1	34	---	---	22
T20-2	15	---	---	8.0
T22-2	3.5	---	---	8.0
T23-1	14	---	---	16
T27-1	33	---	---	9.0
T29-1	<0.25	---	---	<0.25
T32.5	5.5	---	---	---
T33-1	<5	---	---	---
T34-1	82	---	---	---
T34-3	6.1	---	---	---
T35-1	**1,500**	---	---	---
T35-3	8.1	---	---	---
T36-1	**990**	---	---	---
T36-3	5.8	---	---	---
T37-3	<5	---	---	---
T38-4.5	12	---	---	---
T39-1	<5	---	---	---
T40-1	6.9	---	---	---
T41-3	<5	---	---	---
T42-1	5.4	---	---	---
T43-1.5	<5	---	---	---
T44-3	5.0	---	---	---
T45-2	<5	---	---	---
T46-2	<5	---	---	---
T47-1	**880**	---	---	---
T47-2	43	---	---	---
T48-3	**260**	---	---	---
T49-1	5.6	---	---	---
T50-2	<5	---	---	---
T51-1	**68**	---	---	---
T52-2	<5	---	---	---
T53-2	<5	---	---	---

T3 NOT LOCATED WITHIN PROJECT

TABLE 5
SUMMARY OF SOIL AND PAINT CHIP ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD AND TOTAL ARSENIC
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	TOTAL LEAD EPA METHOD 6010 (mg/kg)	WET LEAD EPA METHOD 6010 (mg/l)	DI-WET LEAD EPA METHOD 6010 (mg/l)	TOTAL ARSENIC EPA METHOD 6010 (mg/kg)
T54-1.5	<5	---	---	---
T55-.5	<5	---	---	---
T55-1.5	**290**	---	---	---
T56-3	5.7	---	---	---
T57-1	24	---	---	---
T58-1	5.1	---	---	---
S1-.5	16	---	---	25
S2-.5	13	---	---	8.0
S3-0	**120**	1.4	<1.0	---
S4-0	4.0	---	---	---
S5-.5	6.0	---	---	7.5
S6-.5	34	---	---	12
S7-.5	**66**	---	---	9.0
S8-0	**50**	---	---	6.5
S9A-0	**150**	---	---	12
S9B-0	**120**	2.7	<1.0	---
S10-0	**260**	**8.2**	<1.0	---
S13-0	**390**	---	---	---
S14-0	**550**	---	---	---
S15-0	33	---	---	---
SD BOX #1 PAINT	**1,100**	---	---	---
SD BOX #1 SOIL	**60**	2.2	<1.0	---
RET WALL #1 PAINT	6.0	---	---	---
RET WALL #1 SOIL	82	**9.5**	<1.0	---
RET PAINT	11			
B1-8	<5	---	---	---
B1-12	<5	---	---	---
B2-2	38	---	---	---
B2-4	<5	---	---	---
B2-8	<5	---	---	---
B3-2	<5	---	---	---
B3-4	<5	---	---	---
B3-8	<5	---	---	---
B4-3	7.2	---	---	---
B4-4	**2,200**	---	---	---
B4-8	<5	---	---	---

TABLE 5
SUMMARY OF SOIL AND PAINT CHIP ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD AND TOTAL ARSENIC
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	TOTAL LEAD EPA METHOD 6010 (mg/kg)	WET LEAD EPA METHOD 6010 (mg/l)	DI-WET LEAD EPA METHOD 6010 (mg/l)	TOTAL ARSENIC EPA METHOD 6010 (mg/kg)
B5-2	5.1	---	---	---
B5-4	<5	---	---	---
B5-7	8.7	---	---	---
B5-8	<5	---	---	---
B5-12	<5	---	---	---
B6-2	<5	---	---	---
B6-4	<5	---	---	---
B6-6	<5	---	---	---
B6-8	<5	---	---	---
B6-12	<5	---	---	---
B7-2	**560**	---	---	---
B7-4	<5	---	---	---
B7-8	<5	---	---	---
B7-12	<5	---	---	---
B8-4	10	---	---	---
B8-8	<5	---	---	---
B9-2	24	---	---	---
B9-4	17	---	---	---
B9-8	<5	---	---	---
B10-3	330	---	---	---

Notes: mg/kg = Milligrams per kilogram
mg/l = Milligrams per liter
WET = Waste Extract Test method using an acid extract
DI-WET = Waste Extract Test method using a deionized water extract
--- = Not analyzed
< = Less than laboratory reporting limits
BOLD = Greater than Total Threshold Limit Concentration of 1,000 mg/kg or 10 times Soluble Threshold Limit Concentration of 5 mg/l (50 mg/kg) for total lead concentrations.
BOLD = Greater than Soluble Threshold Limit Concentration of 5 mg/l for WET lead concentrations.
BOLD = Greater than 10 times Soluble Threshold Limit Concentration of 5 mg/l (50 mg/kg) for total arsenic concentrations.

LABORATORY DATA

REMEDIAL ACTION WORKPLAN

GREENWAY TRAIL
WHITTIER, CALIFORNIA

Note: Laboratory data generated for debris fill materials has not been incorporated in the risk assessment calculations since these materials will be properly removed from the Site.

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

EXPLORATION/ SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)
HADLEY STREET DEBRIS FILL			
T7 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP
T7 – 1	Soil		
T7 – 2	Soil		
T8 – 1	Soil	Heavy Metals, TPH And VOCs Associated With Railroad Debris Fill Materials	4-7 Debris
T8 – 5.5	Debris Fill		
T8 – 7	Soil		
T8 – Stockpile	Debris Fill		
T9 – 1	Native Soil	TPH Stains Adjacent To Cool-A-Coo	NP
B1-8	Native Soil	Heavy Metals – Hadley Street Debris Fill	4-7 Debris
B1-12	Native Soil		
B2-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B2-4	Native Soil		
B2-8	Native Soil		
B3-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B3-4	Native Soil		
B3-8	Native Soil		
B4-3	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2-4 Debris
B4-4	Debris Fill		
B4-8	Native Soil		
B5-2	Fill	Heavy Metals – Hadley Street Debris Fill	6-8 Debris
B5-4	Fill		
B5-7	Debris Fill		
B5-8	Native Soil		
B5-12	Native Soil		
B6-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B6-4	Fill		
B6-6	Native Soil		
B6-8	Native Soil		
B6-12	Native Soil		
B7-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B7-4	Native Soil		
B7-8	Native Soil		
B7-12	Native Soil		
B8-4	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B8-8	Native Soil		
B9-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B9-4	Fill		
B9-8	Native Soil		
B10-3	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2.5-3.5 Debris
B11	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B12	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B13	Debris Fill	Heavy Metals – Hadley Street Debris Fill	0-2 Debris
B14	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B15	Debris Fill	Heavy Metals – Hadley Street Debris Fill	1.5-3 Debris

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

EXPLORATION/ SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)
B16	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B17	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2-4 Debris
B18	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B19	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B20	Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B21	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B22	Debris Fill	Heavy Metals – Hadley Street Debris Fill	1.5-2 Debris
B23	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2-6 Debris
B24	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B25	Debris Fill	Heavy Metals – Hadley Street Debris Fill	0-6 Debris/Rubble
B26	Debris Fill	Heavy Metals – Hadley Street Debris Fill	4-7 Debris
B27	Debris Fill	Heavy Metals – Hadley Street Debris Fill	5-7.5 Debris
WHITTIER BOULEVARD OVERCROSSING DEBRIS FILL			
S11-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S12-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S13-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S14-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S15-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S16-0	Fill	Heavy Metals Associated With Debris Fill Materials	NA
ASB-1	Asbestos Material	Asbestos Associated With Debris Fill Materials	NA
ASB-2	Asbestos Material	Asbestos Associated With Debris Fill Materials	NA
T32-.5	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T32 Backing Strip	Asbestos Material	Asbestos Associated With Debris Fill Materials	
T33-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T34-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2 Debris
T34-3	Fill		
T35-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T35-3	Fill		
T36-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T36-3	Fill		
T37-3	Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T38-4.5	Fill	Heavy Metals Associated With Debris Fill Materials	0-3.5 Debris
T39-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T40-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T41-3	Fill	Heavy Metals Associated With Debris Fill Materials	0-2 Debris
T42-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T43-1.5	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T44-3	Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T45-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1.5 Debris

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

EXPLORATION/ SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)
T46-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1.5 Debris
T47-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-1.5 Debris
T47-2	Fill		
T48-3	Fill	Heavy Metals Associated With Pedestrian Tunnel Backfill Materials	NP
T49-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T50-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T51-1	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T52-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T53-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T54-1.5	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T55-.5	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T55-1.5	Fill		
T56-3	Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T57-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T58-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP

Notes: NP = Not present
NA = Not available

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T7-.5	T7-1	T7-2	T8-1	T8-STK	T8-5.5	T8-7	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	1.0	0.50	0.31	0.27	<0.25	<0.25	<0.25	500	150
Arsenic	46	46	45	6.0	32	11	14	500	50
Barium	140	100	150	100	**3,600 (11/<1.0)**	170	210	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	52	22	15	9.5	76 (0.18 HEX)	12	14	2,500	5,600
Cobalt	6.0	7.0	8.0	4.0	4.5	7.0	8.0	8,000	800
Copper	**1,000 (25/<1.0)**	160	22	14	64	30	29	2,500	250
Lead	**190 (6.1/<1.0)**	20	3.5	25	**5,800**	**140 (74/<1.0)**	**160 (<1.0/<1.0)**	1,000	50
Mercury	<0.10	<0.10	<0.10	1.0	1.7	0.19	<0.10	20	2
Molybdenum	1.5	0.50	1.0	0.50	1.5	1.5	1.0	3,500	3,500
Nickel	33	13	16	10	10	16	16	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	2.5	<0.15	1.5	500	50
Thallium	1.0	1.0	0.50	0.50	3.0	0.50	1.0	700	70
Vanadium	88	83	36	19	18	29	31	2,400	240
Zinc	260	160	46	100	940	360	310	5,000	2,500

Notes: T7-.5
- Sample depth in feet below surface grade
- Sample identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	S11-0	S12-0	S16-0	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram				
Antimony	16	3.0	0.47	500	150
Arsenic	30	15	7.5	500	50
Barium	250	150	90	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	4.0	<0.15	100	10
Chromium	52	34	15	2,500	5,600
Cobalt	16	10	7.5	8,000	800
Copper	**3,400** **[5.0]**	840 [0.53]	19	2,500	250
Lead	**6,200** **[14]**	**1,200** **[0.74]**	29	1,000	50
Mercury	1.4	0.72	<0.10	20	2
Molybdenum	7.5	7.0	0.50	3,500	3,500
Nickel	120	140	10	2,000	200
Selenium	<0.25	<0.25	<0.25	100	10
Silver	0.50	0.32	<0.15	500	50
Thallium	2.5	1.0	1.0	700	70
Vanadium	54	120	28	2,400	240
Zinc	430	750	64	5,000	2,500

Notes: T7-.5
└─Sample depth in feet below surface grade
└─Sample identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant
[5.0] = Soluble concentration by Toxicity Characteristic Leaching Procedure (TCLP)

TABLE 3
SUMMARY OF SOIL ANALYTICAL RESULTS – PETROLEUM HYDROCARBONS AND VOCS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	DATE	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	VOCs EPA 8020 (µg/kg)	VOCs EPA 8260 (µg/kg)
HADLEY STREET DEBRIS FILL						
T8-STK	8/23/01	<1.0	<5.0	**250**	ND	**6.9**[1]
T8-5.5	8/23/01	<1.0	<10	**820**	ND	ND
T8-7	8/23/01	<1.0	<1.0	**5.2**	ND	ND
T9-1	8/23/01	---	<1.0	**96**	---	---

Notes:
TPHg = Total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
TPHmo = Total petroleum hydrocarbons as motor oil
VOCs = Volatile Organic Compounds
mg/kg = Milligrams per kilogram
µg/kg = Micrograms per kilogram
BOLD = Detection
< = Less than laboratory test method detection limits
--- = Not analyzed
ND = not detected above method detection limit
[1] = Naphthalene

TABLE 4
SUMMARY OF SOIL ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD, pH AND ASBESTOS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	SAMPLE TYPE	TOTAL LEAD EPA METHOD 6010 (mg/kg)	TCLP SOLUBLE LEAD EPA METHOD 6010 (mg/l)	pH	% ASBESTOS
HADLEY STREET DEBRIS FILL					
T9-1	Native Soil	7.5	---	---	---
B1-8	Native Soil	<5	---	---	---
B1-12	Native Soil	<5	---	---	---
B2-2	Fill	38	---	---	---
B2-4	Native Soil	<5	---	---	---
B2-8	Native Soil	<5	---	---	---
B3-2	Fill	<5	---	---	---
B3-4	Native Soil	<5	---	---	---
B3-8	Native Soil	<5	---	---	---
B4-3	Debris Fill	7.2	---	---	---
B4-4	Debris Fill	**2,200**	---	---	---
B4-8	Native Soil	<5	---	---	---
B5-2	Fill	5.1	---	---	---
B5-4	Fill	<5	---	---	---
B5-7	Debris Fill	8.7	---	---	---
B5-8	Native Soil	<5	---	---	---
B5-12	Native Soil	<5	---	---	---
B6-2	Fill	<5	---	---	---
B6-4	Fill	<5	---	---	---
B6-6	Native Soil	<5	---	---	---
B6-8	Native Soil	<5	---	---	---
B6-12	Native Soil	<5	---	---	---
B7-2	Fill	**560**	---	---	---
B7-4	Native Soil	<5	---	---	---
B7-8	Native Soil	<5	---	---	---
B7-12	Native Soil	<5	---	---	---
B8-4	Fill	10	---	---	---
B9-2	Fill	24	---	---	---
B9-4	Fill	17	---	---	---
B9-8	Native Soil	<5	---	---	---
B10-3	Debris Fill	**330**	---	---	---

TABLE 4
SUMMARY OF SOIL ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD, pH AND ASBESTOS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	SAMPLE TYPE	TOTAL LEAD EPA METHOD 6010 (mg/kg)	TCLP SOLUBLE LEAD EPA METHOD 6010 (mg/l)	pH	% ASBESTOS
B25-2	Debris Fill	**1,600**	---	---	---
B27-2	Debris Fill	9.0	---	---	---
Comp #2 (B4-4, B5-7 and B10-3)	Debris Fill	**630**	1.9	---	---
WHITTIER BOULEVARD OVERCROSSING DEBRIS FILL					
S13-0	Debris Fill	**390**	---	8.18	---
S14-0	Debris Fill	**550**	---	---	---
S15-0	Debris Fill	33	---	11.08	---
ASB1	Asbestos Material	---	---	---	85%
ASB2	Asbestos Material	---	---	---	30-60%
T32.5	Fill	5.5	---	---	---
T32 Backing Strip	Asbestos Material	---	---	---	3%
T33-1	Fill	<5	---	---	---
T34-1	Debris Fill	82	---	---	---
T34-3	Fill	6.1	---	---	---
T35-1	Debris Fill	**1,500**	---	---	---
T35-3	Fill	8.1	---	---	---
T36-1	Debris Fill	**990**	---	---	---
T36-3	Fill	5.8	---	---	---
T37-3	Fill	<5	---	---	---
T38-4.5	Fill	12	---	---	---
T39-1	Fill	<5	---	---	---
T40-1	Fill	6.9	---	---	---
T41-3	Fill	<5	---	---	---
T42-1	Fill	5.4	---	---	---
T43-1.5	Fill	<5	---	---	---
T44-3	Fill	5.0	---	---	---
T45-2	Fill	<5	---	---	---
T46-2	Fill	<5	---	---	---
T47-1	Debris Fill	**880**	---	---	---
T47-2	Fill	43	---	---	---
T48-3	Fill	**260**	---	---	---
T49-1	Fill	5.6	---	---	---

TABLE 4
SUMMARY OF SOIL ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD, pH AND ASBESTOS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	SAMPLE TYPE	TOTAL LEAD EPA METHOD 6010 (mg/kg)	TCLP SOLUBLE LEAD EPA METHOD 6010 (mg/l)	pH	% ASBESTOS
T50-2	Fill	<5	---	---	---
T51-1	Fill	**68**	---	---	---
T52-2	Fill	<5	---	---	---
T53-2	Fill	<5	---	---	---
T54-1.5	Fill	<5	---	---	---
T55-.5	Debris Fill	<5	---	---	---
T55-1.5	Fill	**290**	---	---	---
T56-3	Fill	5.7	---	---	---
T57-1	Fill	24	---	---	---
T58-1	Fill	5.1	---	---	---
Comp #1 (T34-1, T35-1, T36-1 and T47-1)	Debris Fill	**1,100**	1.5	---	---

Notes: mg/kg = Milligrams per kilogram
mg/l = Milligrams per liter
TCLP = Toxicity Characteristic Leaching Procedure
--- = Not analyzed
< = Less than laboratory reporting limits
BOLD = Greater than Total Threshold Limit Concentration of 1,000 mg/kg or
10 times Soluble Threshold Limit Concentration of 5 mg/l (50 mg/kg) for total lead concentrations

APPENDIX C

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

RECEIVED
OCT 12 2004
BY: GEOCON

P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

Refer reply to
Health Hazardous Materials Division
5825 Rickenbacker Rd.
Commerce CA 90040-3027

October 7, 2004

Robert Chavez
City of Whittier
13230 Penn St.
Whittier, CA 90602

Dear Mr. Chavez:

GREENWAY TRAIL PROJECT, MILLS AVENUE & SAN GABRIEL RIVER, WHITTIER, CA 90605 (SMU FILE #04-611/RO0000110)

This Department has completed a review of the draft "Remedial Action Plan – Hadley Street and Whittier Bridge Debris Fills", dated August 2004, submitted by your consultant, Geocon. As discussed in telephone conversations between Jon Juhrend of Geocon and Kim Clark of this Department on October 4, 2004, the "Draft Remedial Action Plan" is approved. Therefore, please submit a "final" remediation action plan for this area that also includes the following:

1. Confirmation sampling shall also include analysis for arsenic, barium and copper.

2. A complete site-specific health and safety plan which meets the requirements of CCR Title 8, Section 5192, "Hazardous Waste Operations and Emergency Response." The health and safety plan should include but not limited to: Site map, key personnel, responsibilities and qualifications, job hazard analysis, risk assessment summary, exposure monitoring plan, protective equipment, work zones and security measures, decontamination procedures, general safe work practices, standard operating procedures, nearest hospital location and map, contingency plan, training requirements and documentation of the medical surveillance program.

In addition to the above, this Department has also completed a reviewed of the "Phase I Environmental Site Assessment", dated September 2000, The "Summary Report Right of Way Slag Investigation", dated November 2000, the "Phase II Environmental Site Assessment", dated October 2001, and the "Corrective Action Plan", dated November 2001 and "Environmental Site Assessment Summary". Based on this review, this Department has identified additional areas of concern that need to be addressed. You must determine the nature, concentration, and the vertical and lateral extent of the contamination and legally dispose or remediate all contaminated materials or soils to either non-detectable or natural background concentration levels. If remediation to non-detectable or natural background levels is not possible or

feasible, appropriate federal and/or state risk assessment guidelines must be used to determine a clean-up level sufficient to protect public health and the environment.

Please submit by November 30, 2004, a workplan, which meets the standards set forth in Cal/EPA Department of Toxic Substance Control's (DTSC) "Preliminary Endangerment Assessment Guidance Manual" (PEA); Los Angeles Regional Water Quality Control Board's (RWQCB) "Interim Site Assessment & Clean-up Guide Book"; CCR Title 8, Section 5192, "Hazardous Waste Operations and Emergency Response"; and includes the following:

1. A proposal for additional borings near T20, which will fully define the lateral and vertical extent of the trichloroethene contamination. Vertical extent evaluation requires establishing a "clean zone" or interval. For volatile organic compounds (VOCs), a minimum 20-40 foot clean earth interval is generally required. The clean zone for VOCs should be established by at least four appropriate "non-detects" at 5 to 10 foot intervals and at change in lithology. If porous soils are predominant, deep soil gas monitoring may be required to verify that groundwater resources are not threatened.

2. A proposal for additional borings near S7, which will fully define the lateral and vertical extent of the dieldrin contamination.

3. A detailed plan on how the City of Whittier plans to address the slag ballast. This Department is has reviewed the risk assessment that was included in the "Corrective Action Plan" and is concerned that there are extremely high concentrations of arsenic ("hot spots") present throughout the site that may represent a public health threat. By reducing the days of exposure from 350 to 50, the risk assessment did not take into consideration the residences that may have daily exposure to the elevated concentrations, nor did it take into consideration the users who may use the recreational area on a more frequent basis. In addition, the qualifications of the risk assessment preparer were not provided.

If you have any questions, please feel free to call Kim Clark at (323) 890-4114.

Very truly yours,

SHAHIN NOURISHAD, SUPERVISOR
SITE MITIGATION UNIT
HEALTH HAZARDOUS MATERIALS DIVISION

SN:kc

cc: John Juhrend, Geocon

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

Refer reply to
Health Hazardous Materials Division
5825 Rickenbacker Rd.
Commerce CA 90040-3027

December 13, 2004

RECEIVED
DEC 15 2004
BY: GEOCON

Robert Chavez
City of Whittier
13230 Penn St.
Whittier, CA 90602

Dear Mr. Chavez:

GREENWAY TRAIL PROJECT, MILLS AVENUE & SAN GABRIEL RIVER, WHITTIER, CA 90605 (SMU FILE #04-611/RO0000110)

This Department has completed a review of the "Remedial Action Workplan", dated November 2004, and the "Supplemental Site Investigation Workplan", dated November 30, 2004, submitted by your consultant, Geocon. Based on this review an approval is hereby granted for implementation of both the workplans. This approval is contingent upon you and your representatives complying with the standards in this Department's "Guidance for Site Mitigation Workplans"; Cal/EPA, Department of Toxic Substances Control's "Preliminary Endangerment Assessment Guidance Manual" (PEA); Los Angeles Regional Water Quality Control Boards' (RWQCB) "Interim Site Assessment & Clean-up Guidelines"; CCR Title 8, Section 5192, "Hazardous Waste Operations and Emergency Response" and the following:

1. The workplans shall be adhered to as approved. Any change must be submitted in writing and written approval obtained from this Department prior to implementation.

2. Submittal of the subcontractors complete site-specific health and safety plan which meets the requirements of CCR Title 8, Section 5192, "Hazardous Waste Operations and Emergency Response." The health and safety plan must be approved by this Department prior to implementation of these approved workplans.

3. All necessary permits and/or approvals for any work associated with this workplan must be obtained from the appropriate agencies. The requirements listed herein do not exempt the responsible party or his agent from compliance with any other applicable laws, regulations, or ordinances. They do not legalize waste treatment or disposal facilities and they leave unaffected any further restriction or restraint which may be contained in other statutes or required by other agencies.

4. This workplan must be implemented by January 28, 2005.

5. Notify this office at least three (3) working days prior to the implementation of this workplan.

If you have any questions, please feel free to call Kim Clark at (323) 890-4114.

Very truly yours,

Shahin Nourishad

SHAHIN NOURISHAD, SUPERVISOR
SITE MITIGATION UNIT
HEALTH HAZARDOUS MATERIALS DIVISION

SN:kc

cc: John Juhrend, Geocon

APPENDIX D

PROJECT NO. S8766-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	**BORING NO. B6** DATE DRILLED 12/30/04 WATER LEVEL (ATD) ____ EQUIPMENT GEOPROBE DRILLER PROSONIC	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				**ALLUVIUM**		
2						
3						
4						
5		B6-5 0945		Damp, dark brown, Clayey fine to medium SAND	SC	
6						
7						
8						
9						
10		B6-10 1000		Damp, light brown, fine to coarse SAND with trace gravel	SP	
11						
12				BORING TERMINATED AT 12 FEET NO STAINED OR ODOROUS SOIL ENCOUNTERED		

Figure 1, Log of Boring B6, page 1 of 1

ENV_NO_WELL GREENWAY.GPJ 02/11/05

BORING ELEVATION:	**NA**	ENGINEER/GEOLOGIST:	**TYLER RENFRO**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. S8766-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	**BORING NO. B7** DATE DRILLED 12/30/04 WATER LEVEL (ATD) ____ EQUIPMENT GEOPROBE DRILLER PROSONIC	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
				ALLUVIUM		
1						
2						
3						
4						
5		B7-5 1010		Damp, light brown, Clayey fine to medium SAND	SC	
6						
7						
8						
9						
10		B7-10 1015				
11						
12				BORING TERMINATED AT 12 FEET NO STAINED OR ODOROUS SOIL ENCOUNTERED		

Figure 2, Log of Boring B7, page 1 of 1

ENV_NO_WELL GREENWAY.GPJ 02/11/05

BORING ELEVATION:	**NA**	ENGINEER/GEOLOGIST:	**TYLER RENFRO**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

APPENDIX E

January 03, 2005

RECEIVED
FEB 07 2005
BY: GEOCON

ACCREDITED IN ACCORDANCE WITH nelac

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

Workorder No.: 073011

RE: GREENWAY TRAIL, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 21, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B1-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:22:00 PM
Lab ID:	073011-001A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4'-DDD	15	2.0		µg/Kg	1	12/29/2004
4,4'-DDE	2100	100		µg/Kg	50	12/30/2004
4,4'-DDT	530	100		µg/Kg	50	12/30/2004
Aldrin	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/29/2004
alpha-Chlordane	15	1.0		µg/Kg	1	12/29/2004
beta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Chlordane	150	8.5		µg/Kg	1	12/29/2004
delta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Dieldrin	110	100		µg/Kg	50	12/30/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/29/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/29/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/29/2004
Endrin	140	100		µg/Kg	50	12/30/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/29/2004
Endrin ketone	16	2.0		µg/Kg	1	12/29/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/29/2004
gamma-Chlordane	12	1.0		µg/Kg	1	12/29/2004
Heptachlor	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor epoxide	ND	1.0		µg/Kg	1	12/29/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/29/2004
Toxaphene	ND	85		µg/Kg	1	12/29/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B2-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:50:00 PM
Lab ID:	073011-003A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4'-DDD	5.1	2.0		µg/Kg	1	12/29/2004
4,4'-DDE	150	20		µg/Kg	10	12/30/2004
4,4'-DDT	42	20		µg/Kg	10	12/30/2004
Aldrin	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/29/2004
alpha-Chlordane	79	10		µg/Kg	10	12/30/2004
beta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Chlordane	450	85		µg/Kg	10	12/30/2004
delta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Dieldrin	100	20		µg/Kg	10	12/30/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/29/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/29/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/29/2004
Endrin	ND	2.0		µg/Kg	1	12/29/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/29/2004
Endrin ketone	ND	2.0		µg/Kg	1	12/29/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/29/2004
gamma-Chlordane	61	10		µg/Kg	10	12/30/2004
Heptachlor	1.7	1.0		µg/Kg	1	12/29/2004
Heptachlor epoxide	13	1.0		µg/Kg	1	12/29/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/29/2004
Toxaphene	ND	85		µg/Kg	1	12/29/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B3-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:58:00 PM
Lab ID:	073011-005A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4'-DDD	ND	2.0		µg/Kg	1	12/29/2004
4,4'-DDE	ND	2.0		µg/Kg	1	12/29/2004
4,4'-DDT	ND	2.0		µg/Kg	1	12/29/2004
Aldrin	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/29/2004
alpha-Chlordane	ND	1.0		µg/Kg	1	12/29/2004
beta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Chlordane	ND	8.5		µg/Kg	1	12/29/2004
delta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Dieldrin	5.7	2.0		µg/Kg	1	12/29/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/29/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/29/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/29/2004
Endrin	ND	2.0		µg/Kg	1	12/29/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/29/2004
Endrin ketone	ND	2.0		µg/Kg	1	12/29/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/29/2004
gamma-Chlordane	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor epoxide	ND	1.0		µg/Kg	1	12/29/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/29/2004
Toxaphene	ND	85		µg/Kg	1	12/29/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B4-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 1:08:00 PM
Lab ID:	073011-007A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	2.0	2.0		µg/Kg	1	12/30/2004
4,4´-DDE	4.4	2.0		µg/Kg	1	12/30/2004
4,4´-DDT	36	2.0		µg/Kg	1	12/30/2004
Aldrin	ND	1.0		µg/Kg	1	12/30/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/30/2004
alpha-Chlordane	2.1	1.0		µg/Kg	1	12/30/2004
beta-BHC	ND	1.0		µg/Kg	1	12/30/2004
Chlordane	22	8.5		µg/Kg	1	12/30/2004
delta-BHC	ND	1.0		µg/Kg	1	12/30/2004
Dieldrin	ND	2.0		µg/Kg	1	12/30/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/30/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/30/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/30/2004
Endrin	ND	2.0		µg/Kg	1	12/30/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/30/2004
Endrin ketone	ND	2.0		µg/Kg	1	12/30/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/30/2004
gamma-Chlordane	2.6	1.0		µg/Kg	1	12/30/2004
Heptachlor	ND	1.0		µg/Kg	1	12/30/2004
Heptachlor epoxide	ND	1.0		µg/Kg	1	12/30/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/30/2004
Toxaphene	ND	85		µg/Kg	1	12/30/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B5-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:32:00 PM
Lab ID:	073011-009A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4'-DDD	12	2.0		µg/Kg	1	12/30/2004
4,4'-DDE	100	20		µg/Kg	10	12/30/2004
4,4'-DDT	43	2.0		µg/Kg	1	12/30/2004
Aldrin	ND	1.0		µg/Kg	1	12/30/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/30/2004
alpha-Chlordane	51	10		µg/Kg	10	12/30/2004
beta-BHC	ND	1.0		µg/Kg	1	12/30/2004
Chlordane	330	8.5		µg/Kg	1	12/30/2004
delta-BHC	ND	1.0		µg/Kg	1	12/30/2004
Dieldrin	11	2.0		µg/Kg	1	12/30/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/30/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/30/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/30/2004
Endrin	ND	2.0		µg/Kg	1	12/30/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/30/2004
Endrin ketone	ND	2.0		µg/Kg	1	12/30/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/30/2004
gamma-Chlordane	53	10		µg/Kg	10	12/30/2004
Heptachlor	ND	1.0		µg/Kg	1	12/30/2004
Heptachlor epoxide	8.7	1.0		µg/Kg	1	12/30/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/30/2004
Toxaphene	ND	85		µg/Kg	1	12/30/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/29/2004	SeqNo:	658177

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/30/2004	SeqNo:	658696

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/30/2004	SeqNo:	658696

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC9_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/29/2004	SeqNo:	658878

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID MB-20722	SampType: MBLK	TestCode: 8081_S	Units: µg/Kg	Prep Date: 12/28/2004	Run ID: GC9_041229A
Client ID: ZZZZZ	Batch ID: 20722	TestNo: EPA 8081A	(EPA 3550B)	Analysis Date: 12/29/2004	SeqNo: 658878

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID MB-20722	SampType: MBLK	TestCode: 8081_S	Units: µg/Kg	Prep Date: 12/28/2004	Run ID: GC9_041229A
Client ID: ZZZZZ	Batch ID: 20722	TestNo: EPA 8081A	(EPA 3550B)	Analysis Date: 12/30/2004	SeqNo: 658938

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0									
4,4´-DDE	ND	2.0									
4,4´-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **MB-20722** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658938**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658178**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	15.87	2.0	16.65	0	95.3	58	134	0	0		
Aldrin	18.88	1.0	16.65	0	113	75	129	0	0		
Dieldrin	17.92	2.0	16.65	0	108	75	124	0	0		
Endrin	20.39	2.0	16.65	0	122	72	141	0	0		
gamma-BHC	18.88	1.0	16.65	0	113	78	130	0	0		
Heptachlor	20.8	1.0	16.65	0	125	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658698**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658698**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	16.17	2.0	16.65	0	97.1	58	134	0	0		
Aldrin	18.08	1.0	16.65	0	109	75	129	0	0		
Dieldrin	17.26	2.0	16.65	0	104	75	124	0	0		
Endrin	17.58	2.0	16.65	0	106	72	141	0	0		
gamma-BHC	18.18	1.0	16.65	0	109	78	130	0	0		
Heptachlor	17.74	1.0	16.65	0	107	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658880**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	16.48	2.0	16.65	0	99	58	134	0	0		
Aldrin	18.06	1.0	16.65	0	108	75	129	0	0		
Dieldrin	16.9	2.0	16.65	0	102	75	124	0	0		
Endrin	18.25	2.0	16.65	0	110	72	141	0	0		
gamma-BHC	17.9	1.0	16.65	0	107	78	130	0	0		
Heptachlor	16.38	1.0	16.65	0	98.4	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658939**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	15.48	2.0	16.65	0	93	58	134	0	0		
Aldrin	18.66	1.0	16.65	0	112	75	129	0	0		
Dieldrin	17.53	2.0	16.65	0	105	75	124	0	0		
Endrin	20.26	2.0	16.65	0	122	72	141	0	0		
gamma-BHC	18.54	1.0	16.65	0	111	78	130	0	0		
Heptachlor	17.28	1.0	16.65	0	104	65	139	0	0		

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **073015-109AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658179**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	14.62	2.0	16.65	0	87.8	23	162	0	0		
Aldrin	17.54	1.0	16.65	0	105	68	127	0	0		
Dieldrin	16.46	2.0	16.65	0	98.9	66	129	0	0		
Endrin	19.17	2.0	16.65	0	115	72	137	0	0		
gamma-BHC	17.39	1.0	16.65	0	104	67	130	0	0		
Heptachlor	19.34	1.0	16.65	0	116	61	134	0	0		

Sample ID **073015-109AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658180**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	14.56	2.0	16.65	0	87.5	23	162	14.62	0.434	30	
Aldrin	17.29	1.0	16.65	0	104	68	127	17.54	1.45	30	
Dieldrin	16.25	2.0	16.65	0	97.6	66	129	16.46	1.28	30	
Endrin	19	2.0	16.65	0	114	72	137	19.17	0.882	30	
gamma-BHC	17.09	1.0	16.65	0	103	67	130	17.39	1.73	30	
Heptachlor	19.25	1.0	16.65	0	116	61	134	19.34	0.458	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#:
Logged By: Date: 12/21/04

Method of Transport: Client ☑ ATL ☐ CA OverN ☐ FEDEX ☐ Other:

Sample Condition Upon Receipt
1. CHILLED N/A Y☑ N☐ 4. SEALED Y☐ N☑
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☐ N☑

Client: GEOCON ENVIRONMENTAL
Attn: JOHN JUHREND
Address: ~~6970 Flanders Drive~~ 3160 GOLD VALLEY DR #800
City: ~~San Diego~~ RANCHO CARDOVA State: CA Zip Code: ~~92121~~ 95742
TEL: (858) 558-6100
FAX: (858) 558-8437

Project Name: GREENWAY TRAIL
Project #: 587666-06-01
Sampler: (Printed Name) T RENFRO (Signature)

Relinquished by: (Signature and Printed Name) Date: 12/21/04 Time: 245 Received by: (Signature and Printed Name) Date: 12/21/04 Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: T RENFRO 12/21/04
Print Name Date
Signature

Send Report To:
Attn:
Co: CLIENT
Address
City State Zip

Bill To:
Attn:
Co: CLIENT
Address
City State Zip

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides) CHLORINATED; 8082 (PCB); 8260B (Volatiles); 8270C (BNA); 6010B (Total Metal); 8015B (GRO) / BTEX; 8015B (DRO)

SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER

QA/QC: RTNE ☐ CT ☑ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides) CHLORINATED	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / BTEX	8015B (DRO)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	0730 11-001	B1-5	12/21	1222	X							X				E	1	J	C	C
	002	B1-1.5	↓	1225								↓				↓	↓	↓	↓	↓
	003	B2-5	↓	1250	X							↓				E	↓	↓	↓	↓
	004	B2-1.5	↓	1253								↓				↓	↓	↓	↓	↓
	005	B3-5	↓	1258	X							↓				E	↓	↓	↓	↓
	006	B3-1.5	↓	1301								↓				↓	↓	↓	↓	↓
	007	B4-5	↓	1308	X							↓				E	↓	↓	↓	↓
	008	B4-1.5	↓	1315								↓				↓	↓	↓	↓	↓
	009	B5-5	↓	1232	X							↓				E	↓	↓	↓	↓
	010	B5-1.5	↓	1238								↓				↓	↓	↓	↓	↓

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

RECEIVED
FEB 07 2005
BY: GEOCON

January 24, 2005

ACCREDITED IN ACCORDANCE WITH nelac

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

Workorder No.: 073011

RE: GREENWAY TRAIL, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 21, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B1-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:22:00 PM
Lab ID:	073011-001A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	15	2.0		µg/Kg	1	12/29/2004
4,4´-DDD	31	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDE	2400	100	H	µg/Kg	50	1/17/2005
4,4´-DDE	2100	100		µg/Kg	50	12/30/2004
4,4´-DDT	1200	100	H	µg/Kg	50	1/17/2005
4,4´-DDT	530	100		µg/Kg	50	12/30/2004
Aldrin	ND	1.0	H	µg/Kg	1	1/14/2005
Aldrin	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-Chlordane	15	1.0		µg/Kg	1	12/29/2004
alpha-Chlordane	22	1.0	H	µg/Kg	1	1/14/2005
beta-BHC	ND	1.0		µg/Kg	1	12/29/2004
beta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Chlordane	150	8.5		µg/Kg	1	12/29/2004
Chlordane	180	8.5	H	µg/Kg	1	1/14/2005
delta-BHC	ND	1.0		µg/Kg	1	12/29/2004
delta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Dieldrin	110	100		µg/Kg	50	12/30/2004
Dieldrin	130	20	H	µg/Kg	10	1/17/2005
Endosulfan I	ND	1.0	H	µg/Kg	1	1/14/2005
Endosulfan I	ND	1.0		µg/Kg	1	12/29/2004
Endosulfan II	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan II	ND	2.0		µg/Kg	1	12/29/2004
Endosulfan sulfate	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/29/2004
Endrin	100	20	H	µg/Kg	10	1/17/2005
Endrin	140	100		µg/Kg	50	12/30/2004
Endrin aldehyde	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin aldehyde	ND	2.0		µg/Kg	1	12/29/2004
Endrin ketone	16	2.0		µg/Kg	1	12/29/2004
Endrin ketone	30	2.0	H	µg/Kg	1	1/14/2005
gamma-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
gamma-BHC	ND	1.0		µg/Kg	1	12/29/2004
gamma-Chlordane	18	1.0	H	µg/Kg	1	1/14/2005
gamma-Chlordane	12	1.0		µg/Kg	1	12/29/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B1-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:22:00 PM
Lab ID:	073011-001A	**Matrix:**	SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD (EPA 3550B)				**EPA 8081A**		
RunID: GC9_041229A	QC Batch: 20722				PrepDate 12/28/2004	Analyst: **EES**
Heptachlor	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor epoxide	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor epoxide	ND	1.0	H	µg/Kg	1	1/14/2005
Methoxychlor	ND	8.5		µg/Kg	1	12/29/2004
Methoxychlor	ND	8.5	H	µg/Kg	1	1/14/2005
Toxaphene	ND	85		µg/Kg	1	12/29/2004
Toxaphene	ND	85	H	µg/Kg	1	1/14/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B1-1.5
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:25:00 PM
Lab ID:	073011-002A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC5_050114A QC Batch: 20892 PrepDate 1/14/2005 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDE	ND	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDT	ND	2.0	H	µg/Kg	1	1/14/2005
Aldrin	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-Chlordane	ND	1.0	H	µg/Kg	1	1/14/2005
beta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Chlordane	ND	8.5	H	µg/Kg	1	1/14/2005
delta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Dieldrin	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan I	ND	1.0	H	µg/Kg	1	1/14/2005
Endosulfan II	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan sulfate	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin aldehyde	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin ketone	ND	2.0	H	µg/Kg	1	1/14/2005
gamma-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
gamma-Chlordane	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor epoxide	ND	1.0	H	µg/Kg	1	1/14/2005
Methoxychlor	ND	8.5	H	µg/Kg	1	1/14/2005
Toxaphene	ND	85	H	µg/Kg	1	1/14/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B2-1.5
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:53:00 PM
Lab ID:	073011-004A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC5_050114A QC Batch: 20892 PrepDate 1/14/2005 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDE	ND	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDT	ND	2.0	H	µg/Kg	1	1/14/2005
Aldrin	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-Chlordane	ND	1.0	H	µg/Kg	1	1/14/2005
beta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Chlordane	ND	8.5	H	µg/Kg	1	1/14/2005
delta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Dieldrin	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan I	ND	1.0	H	µg/Kg	1	1/14/2005
Endosulfan II	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan sulfate	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin aldehyde	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin ketone	ND	2.0	H	µg/Kg	1	1/14/2005
gamma-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
gamma-Chlordane	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor epoxide	ND	1.0	H	µg/Kg	1	1/14/2005
Methoxychlor	ND	8.5	H	µg/Kg	1	1/14/2005
Toxaphene	ND	85	H	µg/Kg	1	1/14/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/29/2004	SeqNo:	658177

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/30/2004	SeqNo:	658696

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A		(EPA 3550B)	Analysis Date:	12/30/2004	SeqNo:	658696

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC9_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A		(EPA 3550B)	Analysis Date:	12/29/2004	SeqNo:	658878

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC9_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/29/2004	SeqNo:	658878

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC9_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/30/2004	SeqNo:	658938

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **MB-20722** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658938**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID **MB-20892** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **ZZZZZ** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666021**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20892	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	1/14/2005	Run ID:	GC5_050114A
Client ID:	ZZZZZ	Batch ID:	20892	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	1/14/2005	SeqNo:	666021

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20892	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	1/14/2005	Run ID:	GC5_050114A
Client ID:	ZZZZZ	Batch ID:	20892	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	1/17/2005	SeqNo:	666362

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **MB-20892** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **ZZZZZ** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/17/2005** SeqNo: **666362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658178**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	15.87	2.0	16.65	0	95.3	58	134	0	0		
Aldrin	18.88	1.0	16.65	0	113	75	129	0	0		
Dieldrin	17.92	2.0	16.65	0	108	75	124	0	0		
Endrin	20.39	2.0	16.65	0	122	72	141	0	0		
gamma-BHC	18.88	1.0	16.65	0	113	78	130	0	0		
Heptachlor	20.8	1.0	16.65	0	125	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658698**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	16.17	2.0	16.65	0	97.1	58	134	0	0		
Aldrin	18.08	1.0	16.65	0	109	75	129	0	0		
Dieldrin	17.26	2.0	16.65	0	104	75	124	0	0		
Endrin	17.58	2.0	16.65	0	106	72	141	0	0		
gamma-BHC	18.18	1.0	16.65	0	109	78	130	0	0		
Heptachlor	17.74	1.0	16.65	0	107	65	139	0	0		

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658880**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	16.48	2.0	16.65	0	99	58	134	0	0		
Aldrin	18.06	1.0	16.65	0	108	75	129	0	0		
Dieldrin	16.9	2.0	16.65	0	102	75	124	0	0		
Endrin	18.25	2.0	16.65	0	110	72	141	0	0		
gamma-BHC	17.9	1.0	16.65	0	107	78	130	0	0		
Heptachlor	16.38	1.0	16.65	0	98.4	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658939**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	15.48	2.0	16.65	0	93	58	134	0	0		
Aldrin	18.66	1.0	16.65	0	112	75	129	0	0		
Dieldrin	17.53	2.0	16.65	0	105	75	124	0	0		
Endrin	20.26	2.0	16.65	0	122	72	141	0	0		
gamma-BHC	18.54	1.0	16.65	0	111	78	130	0	0		
Heptachlor	17.28	1.0	16.65	0	104	65	139	0	0		

Sample ID **LCS-20892** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **ZZZZZ** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666022**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	15.85	2.0	16.65	0	95.2	58	134	0	0		
Aldrin	18.09	1.0	16.65	0	109	75	129	0	0		
Dieldrin	17.02	2.0	16.65	0	102	75	124	0	0		
Endrin	15.94	2.0	16.65	0	95.8	72	141	0	0		
gamma-BHC	18.55	1.0	16.65	0	111	78	130	0	0		
Heptachlor	19.63	1.0	16.65	0	118	65	139	0	0		

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **LCS-20892** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **ZZZZZ** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/17/2005** SeqNo: **666363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	18.06	2.0	16.65	0	108	58	134	0	0		
Aldrin	18.76	1.0	16.65	0	113	75	129	0	0		
Dieldrin	17.5	2.0	16.65	0	105	75	124	0	0		
Endrin	16.44	2.0	16.65	0	98.7	72	141	0	0		
gamma-BHC	19.29	1.0	16.65	0	116	78	130	0	0		
Heptachlor	20.68	1.0	16.65	0	124	65	139	0	0		

Sample ID **073015-109AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658179**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	14.62	2.0	16.65	0	87.8	23	162	0	0		
Aldrin	17.54	1.0	16.65	0	105	68	127	0	0		
Dieldrin	16.46	2.0	16.65	0	98.9	66	129	0	0		
Endrin	19.17	2.0	16.65	0	115	72	137	0	0		
gamma-BHC	17.39	1.0	16.65	0	104	67	130	0	0		
Heptachlor	19.34	1.0	16.65	0	116	61	134	0	0		

Sample ID **073011-002AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **B1-1.5** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666023**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	21.99	2.0	16.65	0	132	23	162	0	0		
Aldrin	17.87	1.0	16.65	0	107	68	127	0	0		
Dieldrin	17.66	2.0	16.65	0	106	66	129	0	0		
Endrin	18.75	2.0	16.65	0	113	72	137	0	0		
gamma-BHC	18.15	1.0	16.65	0	109	67	130	0	0		
Heptachlor	20.17	1.0	16.65	0	121	61	134	0	0		

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **073015-109AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658180**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	14.56	2.0	16.65	0	87.5	23	162	14.62	0.434	30	
Aldrin	17.29	1.0	16.65	0	104	68	127	17.54	1.45	30	
Dieldrin	16.25	2.0	16.65	0	97.6	66	129	16.46	1.28	30	
Endrin	19	2.0	16.65	0	114	72	137	19.17	0.882	30	
gamma-BHC	17.09	1.0	16.65	0	103	67	130	17.39	1.73	30	
Heptachlor	19.25	1.0	16.65	0	116	61	134	19.34	0.458	30	

Sample ID **073011-002AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **B1-1.5** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666024**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	22.54	2.0	16.65	0	135	23	162	21.99	2.47	30	
Aldrin	16.32	1.0	16.65	0	98	68	127	17.87	9.05	30	
Dieldrin	16.37	2.0	16.65	0	98.3	66	129	17.66	7.60	30	
Endrin	17.32	2.0	16.65	0	104	72	137	18.75	7.92	30	
gamma-BHC	16.68	1.0	16.65	0	100	67	130	18.15	8.46	30	
Heptachlor	18.59	1.0	16.65	0	112	61	134	20.17	8.15	30	

Sample ID **073011-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **B2-S** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658888**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	5.42	2.0	0	0	0	0	0	5.083	6.41	30	
Aldrin	ND	1.0	0	0	0	0	0	0	0	30	
alpha-BHC	ND	1.0	0	0	0	0	0	0	0	30	
beta-BHC	1.203	1.0	0	0	0	0	0	0.8733	31.8	30	R
delta-BHC	ND	1.0	0	0	0	0	0	0	0	30	
Endosulfan I	ND	1.0	0	0	0	0	0	0	0	30	
Endosulfan II	ND	2.0	0	0	0	0	0	0	0	30	
Endosulfan sulfate	ND	2.0	0	0	0	0	0	0	0	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **073011-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **B2-S** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658888**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Endrin	ND	2.0	0	0	0	0	0	0	0	30	
Endrin aldehyde	ND	2.0	0	0	0	0	0	0	0	30	
Endrin ketone	ND	2.0	0	0	0	0	0	0.8367	0	30	
gamma-BHC	ND	1.0	0	0	0	0	0	0	0	30	
Heptachlor	2.173	1.0	0	0	0	0	0	1.703	24.2	30	
Heptachlor epoxide	12.36	1.0	0	0	0	0	0	12.75	3.12	30	
Methoxychlor	ND	8.5	0	0	0	0	0	0	0	30	
Toxaphene	ND	85	0	0	0	0	0	0	0	30	

Sample ID **073011-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **B2-S** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658943**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDE	166.2	20	0	0	0	0	0	153.6	7.91	30	
4,4´-DDT	46.07	20	0	0	0	0	0	41.83	9.63	30	
alpha-Chlordane	84.57	10	0	0	0	0	0	78.93	6.89	30	
Chlordane	450.2	85	0	0	0	0	0	453.8	0.797	30	
Dieldrin	108.3	20	0	0	0	0	0	101.6	6.43	30	
gamma-Chlordane	66.82	10	0	0	0	0	0	61.48	8.31	30	

Sample ID **073011-004ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **B2-1.5** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666028**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0	0	0	0	0	0	0	0	30	
4,4´-DDE	ND	2.0	0	0	0	0	0	0	0	30	
4,4´-DDT	ND	2.0	0	0	0	0	0	0	0	30	
Aldrin	ND	1.0	0	0	0	0	0	0	0	30	
alpha-BHC	ND	1.0	0	0	0	0	0	0	0	30	
alpha-Chlordane	ND	1.0	0	0	0	0	0	0	0	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	073011-004ADUP	SampType:	DUP	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	1/14/2005	Run ID:	GC5_050114A
Client ID:	B2-1.5	Batch ID:	20892	TestNo:	EPA 8081A		(EPA 3550B)	Analysis Date:	1/14/2005	SeqNo:	666028

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
beta-BHC	ND	1.0	0	0	0	0	0	0	0	30	
Chlordane	ND	8.5	0	0	0	0	0	0	0	30	
delta-BHC	ND	1.0	0	0	0	0	0	0	0	30	
Dieldrin	ND	2.0	0	0	0	0	0	0	0	30	
Endosulfan I	ND	1.0	0	0	0	0	0	0	0	30	
Endosulfan II	ND	2.0	0	0	0	0	0	0	0	30	
Endosulfan sulfate	ND	2.0	0	0	0	0	0	0	0	30	
Endrin	ND	2.0	0	0	0	0	0	0	0	30	
Endrin aldehyde	ND	2.0	0	0	0	0	0	0	0	30	
Endrin ketone	ND	2.0	0	0	0	0	0	0	0	30	
gamma-BHC	ND	1.0	0	0	0	0	0	0	0	30	
gamma-Chlordane	ND	1.0	0	0	0	0	0	0	0	30	
Heptachlor	ND	1.0	0	0	0	0	0	0	0	30	
Heptachlor epoxide	ND	1.0	0	0	0	0	0	0	0	30	
Methoxychlor	ND	8.5	0	0	0	0	0	0	0	30	
Toxaphene	ND	85	0	0	0	0	0	0	0	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Galvan, Diane

From: John Juhrend [juhrend@geoconinc.com]

Sent: Wednesday, January 12, 2005 1:32 PM

To: Galvan, Diane

Subject: RE: Partial Results - Greenway Trail (073011)

What if re-run B1-6 (073011-001A) that had the highest levels to show no apparent reduction and run the other two deeper samples (B1-1.5 073011-002) and B2 (B2-1.5 073011-004) with notation regarding holding time exceedance.

Sincerely,

John E. Juhrend, PE, CEG
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742
916.852.9118 Tel
916.852.9132 Fax
juhrend@geoconinc.com
www.geoconinc.com

GEOCON
CONSULTANTS, INC

GEOCON
CONSULTANTS, INC

January 12, 2005

RECEIVED
FEB 07 2005
BY: GEOCON

ACCREDITED IN ACCORDANCE WITH nelac

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

Workorder No.: 073244

RE: Greenway Trail Project, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 30, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B6-5
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 9:45:00 AM
Lab ID:	073244-001A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/3/2005
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/3/2005
Benzene	ND	5.0		µg/Kg	1	1/3/2005
Bromobenzene	ND	5.0		µg/Kg	1	1/3/2005
Bromodichloromethane	ND	5.0		µg/Kg	1	1/3/2005
Bromoform	ND	5.0		µg/Kg	1	1/3/2005
Bromomethane	ND	5.0		µg/Kg	1	1/3/2005
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/3/2005
Chlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
Chloroethane	ND	5.0		µg/Kg	1	1/3/2005
Chloroform	ND	5.0		µg/Kg	1	1/3/2005
Chloromethane	ND	5.0		µg/Kg	1	1/3/2005
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B6-5
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 9:45:00 AM
Lab ID:	073244-001A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/3/2005
Dibromomethane	ND	5.0		µg/Kg	1	1/3/2005
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Ethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/3/2005
Isopropylbenzene	ND	5.0		µg/Kg	1	1/3/2005
m,p-Xylene	ND	5.0		µg/Kg	1	1/3/2005
Methylene chloride	ND	5.0		µg/Kg	1	1/3/2005
n-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
n-Propylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Naphthalene	ND	5.0		µg/Kg	1	1/3/2005
o-Xylene	ND	5.0		µg/Kg	1	1/3/2005
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Styrene	ND	5.0		µg/Kg	1	1/3/2005
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Tetrachloroethene	ND	5.0		µg/Kg	1	1/3/2005
Toluene	ND	5.0		µg/Kg	1	1/3/2005
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Vinyl chloride	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B6-10
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:00:00 AM
Lab ID:	073244-002A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/3/2005
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/3/2005
Benzene	ND	5.0		µg/Kg	1	1/3/2005
Bromobenzene	ND	5.0		µg/Kg	1	1/3/2005
Bromodichloromethane	ND	5.0		µg/Kg	1	1/3/2005
Bromoform	ND	5.0		µg/Kg	1	1/3/2005
Bromomethane	ND	5.0		µg/Kg	1	1/3/2005
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/3/2005
Chlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
Chloroethane	ND	5.0		µg/Kg	1	1/3/2005
Chloroform	ND	5.0		µg/Kg	1	1/3/2005
Chloromethane	ND	5.0		µg/Kg	1	1/3/2005
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B6-10
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:00:00 AM
Lab ID:	073244-002A	**Matrix:**	SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS3_050103A	QC Batch: R05VS001			PrepDate		Analyst: **JPC**
Dibromochloromethane	ND	5.0		µg/Kg	1	1/3/2005
Dibromomethane	ND	5.0		µg/Kg	1	1/3/2005
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Ethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/3/2005
Isopropylbenzene	ND	5.0		µg/Kg	1	1/3/2005
m,p-Xylene	ND	5.0		µg/Kg	1	1/3/2005
Methylene chloride	ND	5.0		µg/Kg	1	1/3/2005
n-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
n-Propylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Naphthalene	ND	5.0		µg/Kg	1	1/3/2005
o-Xylene	ND	5.0		µg/Kg	1	1/3/2005
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Styrene	ND	5.0		µg/Kg	1	1/3/2005
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Tetrachloroethene	ND	5.0		µg/Kg	1	1/3/2005
Toluene	ND	5.0		µg/Kg	1	1/3/2005
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Vinyl chloride	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B7-5
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:10:00 AM
Lab ID:	073244-003A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/3/2005
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/3/2005
Benzene	ND	5.0		µg/Kg	1	1/3/2005
Bromobenzene	ND	5.0		µg/Kg	1	1/3/2005
Bromodichloromethane	ND	5.0		µg/Kg	1	1/3/2005
Bromoform	ND	5.0		µg/Kg	1	1/3/2005
Bromomethane	ND	5.0		µg/Kg	1	1/3/2005
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/3/2005
Chlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
Chloroethane	ND	5.0		µg/Kg	1	1/3/2005
Chloroform	ND	5.0		µg/Kg	1	1/3/2005
Chloromethane	ND	5.0		µg/Kg	1	1/3/2005
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B7-5
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:10:00 AM
Lab ID:	073244-003A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/3/2005
Dibromomethane	ND	5.0		µg/Kg	1	1/3/2005
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Ethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/3/2005
Isopropylbenzene	ND	5.0		µg/Kg	1	1/3/2005
m,p-Xylene	ND	5.0		µg/Kg	1	1/3/2005
Methylene chloride	ND	5.0		µg/Kg	1	1/3/2005
n-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
n-Propylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Naphthalene	ND	5.0		µg/Kg	1	1/3/2005
o-Xylene	ND	5.0		µg/Kg	1	1/3/2005
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Styrene	ND	5.0		µg/Kg	1	1/3/2005
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Tetrachloroethene	ND	5.0		µg/Kg	1	1/3/2005
Toluene	ND	5.0		µg/Kg	1	1/3/2005
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichloroethene	5.3	5.0		µg/Kg	1	1/3/2005
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Vinyl chloride	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B7-10
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:15:00 AM
Lab ID:	073244-004A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/3/2005
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/3/2005
Benzene	ND	5.0		µg/Kg	1	1/3/2005
Bromobenzene	ND	5.0		µg/Kg	1	1/3/2005
Bromodichloromethane	ND	5.0		µg/Kg	1	1/3/2005
Bromoform	ND	5.0		µg/Kg	1	1/3/2005
Bromomethane	ND	5.0		µg/Kg	1	1/3/2005
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/3/2005
Chlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
Chloroethane	ND	5.0		µg/Kg	1	1/3/2005
Chloroform	ND	5.0		µg/Kg	1	1/3/2005
Chloromethane	ND	5.0		µg/Kg	1	1/3/2005
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B7-10
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:15:00 AM
Lab ID:	073244-004A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/3/2005
Dibromomethane	ND	5.0		µg/Kg	1	1/3/2005
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Ethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/3/2005
Isopropylbenzene	ND	5.0		µg/Kg	1	1/3/2005
m,p-Xylene	ND	5.0		µg/Kg	1	1/3/2005
Methylene chloride	ND	5.0		µg/Kg	1	1/3/2005
n-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
n-Propylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Naphthalene	ND	5.0		µg/Kg	1	1/3/2005
o-Xylene	ND	5.0		µg/Kg	1	1/3/2005
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Styrene	ND	5.0		µg/Kg	1	1/3/2005
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Tetrachloroethene	ND	5.0		µg/Kg	1	1/3/2005
Toluene	ND	5.0		µg/Kg	1	1/3/2005
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichloroethene	10	5.0		µg/Kg	1	1/3/2005
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Vinyl chloride	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073244
Project: Greenway Trail Project, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID **R050103MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: Run ID: **MS3_050103A**
Client ID: **ZZZZZ** Batch ID: **R05VS001** TestNo: **EPA 8260B** Analysis Date: **1/3/2005** SeqNo: **659671**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
1,1-Dichloroethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
1,1-Dichloropropene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									
1,2-Dichloropropane	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									
1,3-Dichloropropane	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Chlorotoluene	ND	5.0									
4-Chlorotoluene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
Benzene	ND	5.0									
Bromobenzene	ND	5.0									
Bromodichloromethane	ND	5.0									
Bromoform	ND	5.0									
Bromomethane	ND	5.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073244
Project: Greenway Trail Project, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID	R050103MB2	SampType:	MBLK	TestCode:	8260_S	Units:	µg/Kg	Prep Date:			Run ID:	MS3_050103A
Client ID:	ZZZZZ	Batch ID:	R05VS001	TestNo:	EPA 8260B			Analysis Date:	1/3/2005		SeqNo:	659671

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon tetrachloride	ND	5.0									
Chlorobenzene	ND	5.0									
Chloroethane	ND	5.0									
Chloroform	ND	5.0									
Chloromethane	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
cis-1,3-Dichloropropene	ND	5.0									
Dibromochloromethane	ND	5.0									
Dibromomethane	ND	5.0									
Dichlorodifluoromethane	ND	5.0									
Ethylbenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Isopropylbenzene	ND	5.0									
m,p-Xylene	ND	5.0									
Methylene chloride	ND	5.0									
n-Butylbenzene	ND	5.0									
n-Propylbenzene	ND	5.0									
Naphthalene	ND	5.0									
o-Xylene	ND	5.0									
sec-Butylbenzene	ND	5.0									
Styrene	ND	5.0									
tert-Butylbenzene	ND	5.0									
Tetrachloroethene	ND	5.0									
Toluene	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
Trichloroethene	ND	5.0									
Trichlorofluoromethane	ND	5.0									
Vinyl chloride	ND	5.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073244
Project: Greenway Trail Project, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID **R050103LC1** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: Run ID: **MS3_050103A**
Client ID: **ZZZZZ** Batch ID: **R05VS001** TestNo: **EPA 8260B** Analysis Date: **1/3/2005** SeqNo: **659668**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	89.16	5.0	100	0	89.2	63	127	0	0		
Benzene	98.05	5.0	100	0	98	88	126	0	0		
Chlorobenzene	101.9	5.0	100	0	102	91	133	0	0		
Toluene	99.36	5.0	100	0	99.4	87	126	0	0		
Trichloroethene	103.8	5.0	100	0	104	86	134	0	0		

Sample ID **073244-002AMS** SampType: **MS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: Run ID: **MS3_050103A**
Client ID: **B6-10** Batch ID: **R05VS001** TestNo: **EPA 8260B** Analysis Date: **1/3/2005** SeqNo: **659669**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	90.06	5.0	100	0	90.1	51	128	0	0		
Benzene	99.76	5.0	100	0	99.8	65	136	0	0		
Chlorobenzene	102.8	5.0	100	0	103	52	152	0	0		
Toluene	99.47	5.0	100	0	99.5	56	142	0	0		
Trichloroethene	107.6	5.0	100	0	108	54	155	0	0		

Sample ID **073244-002AMSD** SampType: **MSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: Run ID: **MS3_050103A**
Client ID: **B6-10** Batch ID: **R05VS001** TestNo: **EPA 8260B** Analysis Date: **1/3/2005** SeqNo: **659670**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	72.61	5.0	100	0	72.6	51	128	90.06	21.5	30	
Benzene	83.88	5.0	100	0	83.9	65	136	99.76	17.3	30	
Chlorobenzene	88.12	5.0	100	0	88.1	52	152	102.8	15.4	30	
Toluene	85.08	5.0	100	0	85.1	56	142	99.47	15.6	30	
Trichloroethene	87.65	5.0	100	0	87.6	54	155	107.6	20.5	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#:
Logged By: AL Date: 12/30/04

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other:

Sample Condition Upon Receipt
1. CHILLED 5-0 Y☑ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☐ N☑

Client: GEOCON ENVIRONMENTAL
Attn: John Johrend
Address: 6970 Flanders Drive
City: San Diego State: CA Zip Code: 92121
TEL: (858) 558-6100
FAX: (858) 558-8437

Project Name: Greenway Trail Project
Project #: S8875-06-02
Sampler: (Printed Name) TMR (Signature)

Relinquished by: (Signature and Printed Name) Tyler Renfro Date: 12/30/04 Time: 14:45
Received by: (Signature and Printed Name) [signature] ATL Date: 12/30/04 Time: 1445
Relinquished by: (Signature and Printed Name) Date: Time:
Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time:
Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: Tyler Renfro 12/30/04
Print Name Date
Signature

Send Report To:
Attn: John Johrend
Co:
Address: 3160 Gold Valley Dr #800
City: Rancho Cordova State: CA Zip: 95742

Bill To:
Attn:
Co:
Address:
City State Zip

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.
Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / BTEX	8015B (DRO)	SPECIFY APPROPRIATE MATRIX: SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	QA/QC: RTNE ☑ CT ☐ SWRCB ☐ Logcode ___ OTHER ___ REMARKS
	843244-001	B6-5	12/30	0945			X					X				E	1	T P	C	
	002	B6-10		1000			X													
	003	B7-5		1010			X													
	004	B7-10		1015			X													

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

RECEIVED
FEB 07 2005
BY: GEOCON

January 24, 2005

ACCREDITED IN ACCORDANCE WITH nelac

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

Workorder No.: 073011

RE: GREENWAY TRAIL, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 21, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Project: GREENWAY TRAIL, S8766-06-01

Lab Order: 073011

Lab ID: 073011-001 **Collection Date:** 12/21/2004 12:22:00 PM
Client Sample ID: B1-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	55	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-002 **Collection Date:** 12/21/2004 12:25:00 PM
Client Sample ID: B1-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	ND	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-003 **Collection Date:** 12/21/2004 12:50:00 PM
Client Sample ID: B2-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	22	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-004 **Collection Date:** 12/21/2004 12:53:00 PM
Client Sample ID: B2-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	ND	1.0		mg/Kg	1	1/13/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H-Sample exceding holding time

Results are wet unless othewise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Project: GREENWAY TRAIL, S8766-06-01
Lab Order: 073011

Lab ID: 073011-005 **Collection Date:** 12/21/2004 12:58:00 PM
Client Sample ID: B3-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	44	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-006 **Collection Date:** 12/21/2004 1:01:00 PM
Client Sample ID: B3-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	66	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-007 **Collection Date:** 12/21/2004 1:08:00 PM
Client Sample ID: B4-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	16	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-008 **Collection Date:** 12/21/2004 1:15:00 PM
Client Sample ID: B4-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	13	1.0		mg/Kg	1	1/13/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H-Sample exceding holding time

Results are wet unless othewise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Project: GREENWAY TRAIL, S8766-06-01

Lab Order: 073011

Lab ID: 073011-009 **Collection Date:** 12/21/2004 12:32:00 PM
Client Sample ID: B5-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871				PrepDate 1/12/2005	Analyst: **RQ**
Arsenic	ND	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-010 **Collection Date:** 12/21/2004 12:38:00 PM
Client Sample ID: B5-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871				PrepDate 1/12/2005	Analyst: **RQ**
Arsenic	ND	1.0		mg/Kg	1	1/13/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H-Sample exceding holding time

Results are wet unless othewise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
MB-20871	MBLK	6010_S	mg/Kg	1/12/2005	ICP5_050113A
Client ID: ZZZZZ	Batch ID: 20871	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/13/2005	SeqNo: 664576

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0									

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073011-010AMS	MS	6010_S	mg/Kg	1/12/2005	ICP5_050113A
Client ID: B5-1.5	Batch ID: 20871	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/13/2005	SeqNo: 664588

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	108.2	1.0	125	0	86.6	64	111	0	0		

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073011-010AMSD	MSD	6010_S	mg/Kg	1/12/2005	ICP5_050113A
Client ID: B5-1.5	Batch ID: 20871	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/13/2005	SeqNo: 664589

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	104.6	1.0	125	0	83.7	64	111	108.2	3.43	20	

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073011-010ADUP	DUP	6010_S	mg/Kg	1/12/2005	ICP5_050113A
Client ID: B5-1.5	Batch ID: 20871	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/13/2005	SeqNo: 664587

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0	0	0	0	0	0	0	0	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Galvan, Diane

From: Rebecca Silva [silva@geoconinc.com]
Sent: Thursday, January 06, 2005 10:48 AM
To: Galvan, Diane
Subject: Greenway Trail

Diane,

Please analyze the samples collected for the Greenway Trail project (S8766-06-01) for total arsenic under standard TAT.

There are two sets of samples - 10 samples collected on 12/21 and four samples collected on 12/30.

We need these reported separately as they will go into a different document.

Please contact me with any questions.

Thanks, Rebecca

****
Rebecca L. Silva, REA
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742

916.852.9118 tel
916.852.9132 fax

silva@geoconinc.com
****

January 13, 2005

RECEIVED
FEB 07 2005
BY: GEOCON

ACCREDITED IN ACCORDANCE WITH nelac

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

Workorder No.: 073244

RE: Greenway Trail Project, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 30, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *13-Jan-05*

CLIENT: Geocon Consultants, Inc.
Project: Greenway Trail Project, S8766-06-01
Lab Order: 073244

Lab ID: 073244-001 **Collection Date:** 12/30/2004 9:45:00 AM
Client Sample ID: B6-5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP6_050112B	QC Batch: 20875			PrepDate	1/12/2005	Analyst: **NS**
Arsenic	4.9	1.0		mg/Kg	1	1/12/2005

Lab ID: 073244-002 **Collection Date:** 12/30/2004 10:00:00 AM
Client Sample ID: B6-10 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP6_050112B	QC Batch: 20875			PrepDate	1/12/2005	Analyst: **NS**
Arsenic	1.5	1.0		mg/Kg	1	1/12/2005

Lab ID: 073244-003 **Collection Date:** 12/30/2004 10:10:00 AM
Client Sample ID: B7-5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP6_050112B	QC Batch: 20875			PrepDate	1/12/2005	Analyst: **NS**
Arsenic	2.2	1.0		mg/Kg	1	1/12/2005

Lab ID: 073244-004 **Collection Date:** 12/30/2004 10:15:00 AM
Client Sample ID: B7-10 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP6_050112B	QC Batch: 20875			PrepDate	1/12/2005	Analyst: **NS**
Arsenic	1.3	1.0		mg/Kg	1	1/12/2005

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H-Sample exceding holding time

Results are wet unless othewise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *13-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073244
Project: Greenway Trail Project, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
MB-20875	MBLK	6010_S	mg/Kg	1/12/2005	ICP6_050112B
Client ID: ZZZZZ	Batch ID: 20875	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/12/2005	SeqNo: 663996

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0									

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
LCS-20875	LCS	6010_S	mg/Kg	1/12/2005	ICP6_050112B
Client ID: ZZZZZ	Batch ID: 20875	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/12/2005	SeqNo: 663995

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	52.64	1.0	50	0	105	80	120	0	0		

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073535-003AMS	MS	6010_S	mg/Kg	1/12/2005	ICP6_050112B
Client ID: ZZZZZ	Batch ID: 20875	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/12/2005	SeqNo: 664200

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	511.1	40	500	0	102	64	111	0	0		

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073535-003AMSD	MSD	6010_S	mg/Kg	1/12/2005	ICP6_050112B
Client ID: ZZZZZ	Batch ID: 20875	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/12/2005	SeqNo: 664201

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	524.6	40	500	0	105	64	111	511.1	2.61	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Galvan, Diane

From: Rebecca Silva [silva@geoconinc.com]
Sent: Thursday, January 06, 2005 10:48 AM
To: Galvan, Diane
Subject: Greenway Trail

Diane,

Please analyze the samples collected for the Greenway Trail project (S8766-06-01) for total arsenic under standard TAT.

There are two sets of samples - 10 samples collected on 12/21 and four samples collected on 12/30.

We need these reported separately as they will go into a different document.

Please contact me with any questions.

Thanks, Rebecca

****
Rebecca L. Silva, REA
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742

916.852.9118 tel
916.852.9132 fax

silva@geoconinc.com
****

APPENDIX F

E-1. Recreational Risk/Hazard Calculations for Chemicals of Interest in Soil (Using Maximum Values)

Exposure Parameters

	Adult Incidental Ingestion	Child Incidental Ingestion	Adult Incidental Dermal Contact	Child Incidental Dermal Contact	Adult Vapor Inhalation	Child Vapor Inhalation	
Body Weight (BW):	70	15	70	15	70	15	kg
Averaging Time-noncarcinogenic (Atnc):	8,760	2,190	8,760	2,190	8,760	2,190	days
Averaging Time-carcinogenic (Atcan):	25,550	25,550	25,550	25,550	25,550	25,550	days
Exposure Duration (ED):	24	6	24	6	24	6	years
Exposure Frequency (EF):	196	196	196	196	196	196	days/year
Fraction Exposed (FE):	0.17	0.17	0.17	0.17	0.17	0.17	unitless
Inhalation Rate (IR):					20	10	m3/day
Conversion Factor (CF):	1.00E-06	1.00E-06	1.00E-06	1.00E-06			kg/mg
Soil Ingestion rate (SIR):	100	200					mg/day
Skin surface area (SA):			5700	2800			cm2
Soil-to-Skin adherence factor (AF):			0.07	0.2			mg/cm2
Particulate Emission Factor (PEF):					1.32E+09	1.32E+09	m3/kg

Chemical-specific parameters

Chemical	Soil EPC Maximum (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	100	8.57E-06	1.20E+01	3.00E-04	1.50E+00	1.32E+09	3.00E-02
Thallium	10	6.60E-05	NA	6.60E-05	NA	1.32E+09	1.00E-02
Vanadium	1000	7.00E-03	NA	7.00E-03	NA	1.32E+09	1.00E-02
4,4'-DDE	2.4	NA	2.40E-01	NA	2.40E-01	1.32E+09	1.00E-01
Dieldrin	0.25	5.00E-05	1.60E+01	5.00E-05	1.60E+01	1.32E+09	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	1.32E+09	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic	1.46E-05	1.38E-06	1.05E-09	2.40E-05	95.6%
Thallium	1.46E-06	4.61E-08	1.05E-10	NA	NA
Vanadium	1.46E-04	4.61E-06	1.05E-08	NA	NA
4,4'-DDE	3.51E-07	1.11E-07	2.52E-11	1.11E-07	0.4%
Dieldrin	3.65E-08	1.15E-08	2.63E-12	7.69E-07	3.1%
Aroclor 1260	3.21E-08	1.42E-08	2.31E-12	2.32E-07	0.9%
			Total:	**3E-05**	

Noncarcinogenic Effects

	Adult					Child				
Chemical	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution
Arsenic	1.28E-05	1.53E-06	1.94E-09	4.79E-02	53.2%	1.19E-04	1.00E-05	1.94E-09	4.31E-01	52.7%
Thallium	1.28E-06	5.10E-08	1.94E-10	2.01E-02	22.3%	1.19E-05	3.34E-07	1.94E-10	1.86E-01	22.7%
Vanadium	1.28E-04	5.10E-06	1.94E-08	1.90E-02	21.1%	1.19E-03	3.34E-05	1.94E-08	1.75E-01	21.4%
4,4'-DDE	3.07E-07	1.22E-07	4.65E-11	NA	NA	2.86E-06	8.02E-07	4.65E-11	NA	NA
Dieldrin	3.20E-08	1.28E-08	4.84E-12	8.94E-04	1.0%	2.98E-07	8.35E-08	4.84E-12	7.64E-03	0.9%
Aroclor 1260	2.81E-08	1.57E-08	4.26E-12	2.19E-03	2.4%	2.63E-07	1.03E-07	4.26E-12	1.83E-02	2.2%
			Total:	**9E-02**				**Total:**	**8E-01**	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDinhalation = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atcanadult) + (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atcanchild)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (Inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

ADDingestion, child = (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, child = (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDinhalation, adult = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

LADDinhalation, child = (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atncchild)

Hazard $Index_{adult}$ = ($ADD_{inhalation,\ adult}$/inhalation RfD) + ($ADD_{ingestion,\ adult}$/oral RfD) + ($ADD_{dermal,\ adult}$/oral RfD)

Hazard $Index_{child}$ = ($ADD_{inhalation,\ child}$/inhalation RfD) + ($ADD_{ingestion,\ child}$/oral RfD) + ($ADD_{dermal,\ child}$/oral RfD)

E-2. Recreational Risk/Hazard Calculations for Chemicals of Interest in Soil (Using 95% UCL)

Exposure Parameters

	Adult Incidental Ingestion	Child Incidental Ingestion	Adult Incidental Dermal Contact	Child Incidental Dermal Contact	Adult Vapor Inhalation	Child Vapor Inhalation	
Body Weight (BW):	70	15	70	15	70	15	kg
Averaging Time-noncarcinogenic (Atnc):	8,760	2,190	8,760	2,190	8,760	2,190	days
Averaging Time-carcinogenic (Atcan):	25,550	25,550	25,550	25,550	25,550	25,550	days
Exposure Duration (ED):	24	6	24	6	24	6	years
Exposure Frequency (EF):	196	196	196	196	196	196	days/year
Fraction Exposed (FE):	0.17	0.17	0.17	0.17	0.17	0.17	unitless
Inhalation Rate (IR):					20	10	m3/day
Conversion Factor (CF):	1.00E-06	1.00E-06	1.00E-06	1.00E-06			kg/mg
Soil ingestion rate (SIR):	100	200					mg/day
Skin surface area (SA):			5700	2800			cm2
Soil-to-Skin adherence factor (AF):			0.07	0.2			mg/cm2
Particulate Emission Factor (PEF):					1.32E+09	1.32E+09	m3/kg

Chemical-specific parameters

Chemical	Soil EPC (95% UCL) (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	30.7	8.57E-06	1.20E+01	3.00E-04	1.50E+00	1.32E+09	3.00E-02
Thallium	2.2	6.60E-05	NA	6.60E-05	NA	1.32E+09	1.00E-02
Vanadium	403	7.00E-03	NA	7.00E-03	NA	1.32E+09	1.00E-02
4,4'-DDE	1.76	NA	2.40E-01	NA	2.40E-01	1.32E+09	1.00E-01
Dieldrin	0.22	5.00E-05	1.60E+01	5.00E-05	1.60E+01	1.32E+09	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	1.32E+09	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic	5.19E-06	4.91E-07	3.73E-10	8.52E-06	89.6%
Thallium	3.20E-07	1.01E-08	2.30E-11	NA	NA
Vanadium	5.88E-05	1.86E-06	4.23E-09	NA	NA
4,4'-DDE	2.58E-07	8.14E-08	1.86E-11	8.14E-08	0.9%
Dieldrin	3.19E-08	1.01E-08	2.30E-12	6.72E-07	7.1%
Aroclor 1260	3.21E-08	1.42E-08	2.31E-12	2.32E-07	2.4%
			Total:	1E-05	

Noncarcinogenic Effects

	Adult					Child				
Chemical	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution
Arsenic	4.54E-06	5.43E-07	6.88E-10	1.70E-02	53.1%	4.24E-05	3.56E-06	6.88E-10	1.53E-01	52.9%
Thallium	2.80E-07	1.12E-08	4.24E-11	4.41E-03	13.8%	2.61E-06	7.31E-08	4.24E-11	4.07E-02	14.1%
Vanadium	5.15E-05	2.05E-06	7.80E-09	7.65E-03	23.9%	4.80E-04	1.35E-05	7.80E-09	7.06E-02	24.4%
4,4'-DDE	2.26E-07	9.00E-08	3.42E-11	NA	NA	2.11E-06	5.90E-07	3.42E-11	NA	NA
Dieldrin	2.79E-08	1.11E-08	4.23E-12	7.81E-04	2.4%	2.61E-07	7.30E-08	4.23E-12	6.67E-03	2.3%
Aroclor 1260	2.81E-08	1.57E-08	4.26E-12	2.19E-03	6.8%	2.63E-07	1.03E-07	4.26E-12	1.63E-02	6.3%
			Total:	3E-02				Total:	3E-01	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDinhalation = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atcanadult) + (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atcanchild)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (Inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

ADDingestion, child = (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, child = (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDinhalation, adult = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

LADDinhalation, child = (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atncchild)

Hazard $Index_{adult}$ = ($ADD_{inhalation, adult}$/inhalation RfD) + ($ADD_{ingestion, adult}$/oral RfD) + ($ADD_{dermal, adult}$/oral RfD)

Hazard $Index_{child}$ = ($ADD_{inhalation, child}$/inhalation RfD) + ($ADD_{ingestion, child}$/oral RfD) + ($ADD_{dermal, child}$/oral RfD)

E-3. Construction Worker Risk/Hazard Calculations for Chemicals of Interest in Soil (Using 95%UCL)

Exposure Parameters

	Incidental Ingestion	Incidental Dermal Contact	Inhalation	
Body Weight (BW):	70	70	70	kg
Averaging Time-noncarcinogenic (Atnc):	183	183	183	days
Averaging Time-carcinogenic (Atcan):	25,550	25,550	25,550	days
Exposure Duration (ED):	0.5	0.5	0.5	years
Exposure Frequency (EF):	250	250	250	days/year
Fraction Exposed (FE):	1.00	1.00	1.00	unitless
Inhalation Rate (IR):			20	m3/day
Conversion Factor (CF):	1.00E-06	1.00E-06		kg/mg
Soil ingestion rate (SIR):	330			mg/day
Reduced Absorption Factor (RAF):	100%			
Skin surface area (SA):		3300		cm2
Soil-to-Skin adherence factor (AF):		0.3		mg/cm2
Particulate air concentration (PA):			1.36E+09	m3/kg

Chemical-specific parameters

Chemical	Soil EPC 95%UCL (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	30.7	8.57E-06	1.20E+01	3.00E-04	1.50E+00	1.36E+09	3.00E-02
Thallium	2.2	6.60E-05	NA	6.60E-05	NA	1.36E+09	1.00E-02
Vanadium	403	7.00E-03	NA	7.00E-03	NA	1.36E+09	1.00E-02
4,4'-DDE	1.76	NA	2.40E-01	NA	2.40E-01	1.36E+09	1.00E-01
Dieldrin	0.22	5.00E-05	1.60E+01	5.00E-05	1.60E+01	1.36E+09	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	1.36E+09	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic	7.08E-07	6.37E-08	3.16E-11	1.16E-06	88.2%
Thallium	5.07E-08	1.52E-09	2.26E-12	NA	NA
Vanadium	9.29E-06	2.79E-07	4.14E-10	NA	NA
4,4'-DDE	4.06E-08	1.22E-08	1.81E-12	1.27E-08	1.0%
Dieldrin	5.07E-09	1.52E-09	2.26E-13	1.06E-07	8.0%
Aroclor 1260	5.07E-09	2.13E-09	2.26E-13	3.60E-08	2.7%
			Total:	**1E-06**	
			Total w/o arsenic:	**2E-07**	

Noncarcinogenic Effects

Chemical	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution
Arsenic	9.91E-05	8.92E-06	4.42E-09	3.61E-01	49.3%
Thallium	7.10E-06	2.13E-07	3.17E-10	1.11E-01	15.1%
Vanadium	1.30E-03	3.90E-05	5.80E-08	1.91E-01	26.2%
4,4'-DDE	5.68E-06	1.70E-06	2.53E-10	NA	NA
Dieldrin	7.10E-07	2.13E-07	3.17E-11	1.85E-02	2.5%
Aroclor 1260	7.10E-07	2.98E-07	3.17E-11	5.04E-02	6.9%
			Total:	**7E-01**	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult)

LADDinhalation = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atcanadult)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (Inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDinhalation, adult = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

Hazard $Index_{total}$ = ($ADD_{inhalation,\ adult}$/inhalation RfD) + ($ADD_{ingestion,\ adult}$/oral RfD) + ($ADD_{dermal,\ adult}$/oral RfD)

E-4. Off-Site Residential Inhalation Scenario Risk/Hazard Calculations for Chemicals of Interest in Soil (Using Maximum Values)

Exposure Parameters

	Adult Incidental Ingestion	Child Incidental Ingestion	Adult Incidental Dermal Contact	Child Incidental Dermal Contact	Adult Inhalation	Child Inhalation	
Body Weight (BW):					70	15	kg
Averaging Time-noncarcinogenic (Atnc):					183	183	days
Averaging Time-carcinogenic (Atcan):					25,550	25,550	days
Exposure Duration (ED):					0.5	0.5	years
Exposure Frequency (EF):					350	350	days/year
Fraction Exposed (FE):					1.00	1.00	unitless
Inhalation Rate (IR):					20	10	m3/day
Conversion Factor (CF):							kg/mg
Soil ingestion rate (SIR):							mg/day
Reduced Absorption Factor (RAF):							
Skin surface area (SA):							cm2
Soil-to-Skin adherence factor (AF):							mg/cm2
Particulate air concentration (PA):					4.40E+08	4.40E+08	m3/kg

Chemical-specific parameters

Chemical	Soil EPC Maximum (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	100	8.57E-06	1.20E+01	3.00E-04	1.50E+00	4.40E+08	3.00E-02
Thallium	10	6.60E-05	NA	6.60E-05	NA	4.40E+08	1.00E-02
Vanadium	1000	7.00E-03	NA	7.00E-03	NA	4.40E+08	1.00E-02
4,4'-DDE	2.4	NA	2.40E-01	NA	2.40E-01	4.40E+08	1.00E-01
Dieldrin	0.25	5.00E-05	1.60E+01	5.00E-05	1.60E+01	4.40E+08	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	4.40E+08	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic			1.48E-09	1.78E-08	99.6%
Thallium			1.48E-10	NA	NA
Vanadium			1.48E-08	NA	NA
4,4'-DDE			3.56E-11	8.54E-12	0.0%
Dieldrin			3.71E-12	5.93E-11	0.3%
Aroclor 1260			3.26E-12	6.52E-12	0.0%
			Total:	**2E-08**	
			Total w/o arsenic:	**7E-11**	

Noncarcinogenic Effects

Chemical	Adult Ingestion ADD mg/kg-day	Adult Dermal ADD mg/kg-day	Adult Inhalation ADD mg/kg-day	Adult Hazard Index	Adult % Contribution	Child Ingestion ADD mg/kg-day	Child Dermal ADD mg/kg-day	Child Inhalation ADD mg/kg-day	Child Hazard Index	Child % Contribution
Arsenic			6.23E-08	7.27E-03	97.4%			1.45E-07	1.70E-02	97.4%
Thallium			6.23E-09	9.43E-05	1.3%			1.45E-08	2.20E-04	1.3%
Vanadium			6.23E-07	8.90E-05	1.2%			1.45E-06	2.08E-04	1.2%
4,4'-DDE			1.49E-09	NA	NA			3.49E-09	NA	NA
Dieldrin			1.56E-10	3.11E-06	0.0%			3.63E-10	7.26E-06	0.0%
Aroclor 1260			1.37E-10	6.85E-06	0.1%			3.20E-10	1.60E-05	0.1%
			Total:	**7E-03**				**Total:**	**2E-02**	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDinhalation = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atcanadult) + (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atcanchild)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

ADDingestion, child = (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, child = (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDinhalation, adult = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

LADDinhalation, child = (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atncchild)

Hazard $Index_{adult}$ = ($ADD_{inhalation,\ adult}$/inhalation RfD) + ($ADD_{ingestion,\ adult}$/oral RfD) + ($ADD_{dermal,\ adult}$/oral RfD)

Hazard $Index_{child}$ = ($ADD_{inhalation,\ child}$/inhalation RfD) + ($ADD_{ingestion,\ child}$/oral RfD) + ($ADD_{dermal,\ child}$/oral RfD)

E-5. Off-Site Residential Inhalation Scenario Risk/Hazard Calculations for Chemicals of Interest in Soil (Using 95% UCL)

Exposure Parameters

	Adult Incidental Ingestion	Child Incidental Ingestion	Adult Incidental Dermal Contact	Child Incidental Dermal Contact	Adult Inhalation	Child Inhalation	
Body Weight (BW):				15	70	15	kg
Averaging Time-noncarcinogenic (Atnc):				183	183	183	days
Averaging Time-carcinogenic (Atcan):				25,550	25,550	25,550	days
Exposure Duration (ED):				0.5	0.5	0.5	years
Exposure Frequency (EF):				350	350	350	days/year
Fraction Exposed (FE):				1.00	1.00	1.00	unitless
Inhalation Rate (IR):					20	10	m3/day
Conversion Factor (CF):				1.00E-06			kg/mg
Soil ingestion rate (SIR):							mg/day
Reduced Absorption Factor (RAF):							
Skin surface area (SA):				2800			cm2
Soil-to-Skin adherence factor (AF):				0.2			mg/cm2
Particulate air concentration (PA):					4.40E+08	4.40E+08	m3/kg

Chemical-specific parameters

Chemical	Soil EPC (95% UCL) (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	30.7	8.57E-06	1.20E+01	3.00E-04	1.50E+00	4.40E+08	3.00E-02
Thallium	2.2	6.60E-05	NA	6.60E-05	NA	4.40E+08	1.00E-02
Vanadium	403	7.00E-03	NA	7.00E-03	NA	4.40E+08	1.00E-02
4,4'-DDE	1.8	NA	2.40E-01	NA	2.40E-01	4.40E+08	1.00E-01
Dieldrin	0.22	5.00E-05	1.60E+01	5.00E-05	1.60E+01	4.40E+08	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	4.40E+08	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic			4.55E-10	5.46E-09	98.8%
Thallium			3.26E-11	NA	NA
Vanadium			5.97E-09	NA	NA
4,4'-DDE			2.67E-11	6.40E-12	0.1%
Dieldrin			3.26E-12	5.22E-11	0.9%
Aroclor 1260			3.26E-12	6.52E-12	0.1%
			Total:	**6E-09**	
			Total w/o arsenic:	**7E-11**	

Noncarcinogenic Effects

Chemical	Adult Ingestion ADD mg/kg-day	Adult Dermal ADD mg/kg-day	Adult Inhalation ADD mg/kg-day	Adult Hazard Index	Adult % Contribution	Child Ingestion ADD mg/kg-day	Child Dermal ADD mg/kg-day	Child Inhalation ADD mg/kg-day	Child Hazard Index	Child % Contribution
Arsenic			1.91E-08	2.23E-03	97.1%			4.46E-08	5.20E-03	97.1%
Thallium			1.37E-09	2.08E-05	0.9%			3.20E-09	4.84E-05	0.9%
Vanadium			2.51E-07	3.58E-05	1.6%			5.86E-07	8.36E-05	1.6%
4,4'-DDE			1.12E-09	NA	NA			2.62E-09	NA	NA
Dieldrin			1.37E-10	2.74E-06	0.1%			3.20E-10	6.39E-06	0.1%
Aroclor 1260			1.37E-10	6.85E-06	0.3%			3.20E-10	1.60E-05	0.3%
			Total:	**2E-03**				**Total:**	**5E-03**	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x FIadult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SIRchild x RAF x EFchild x FIchild x EDchild x CF)/(BWchild x Atcanchild)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x FIadult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SAchild x AFchild x ABS x EFchild x FIchild x EDchild x CF)/(BWchild x Atcanchild)

LADDinhalation = (EPC x IRadult x EFadult x FIadult x EDadult x CF)/(BWadult x VForPEF x Atcanadult) + (EPC x IRchild x EFchild x FIchild x EDchild x CF)/(BWchild x VForPEF x Atcanchild)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (Inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x FIadult x EDadult x CF)/(BWadult x Atncadult)

ADDingestion, child = (EPC x SIRchild x RAF x EFchild x FIchild x EDchild x CF)/(BWchild x Atncchild)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x FIadult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, child = (EPC x SAchild x AFchild x ABS x EFchild x FIchild x EDchild x CF)/(BWchild x Atncchild)

LADDinhalation, adult = (EPC x IRadult x EFadult x FIadult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

LADDinhalation, child = (EPC x IRchild x EFchild x FIchild x EDchild x CF)/(BWchild x VForPEF x Atncchild)

Hazard $Index_{adult}$ = ($ADD_{inhalation,\ adult}$/inhalation RfD) + ($ADD_{ingestion,\ adult}$/oral RfD) + ($ADD_{dermal,\ adult}$/oral RfD)

Hazard $Index_{child}$ = ($ADD_{inhalation,\ child}$/inhalation RfD) + ($ADD_{ingestion,\ child}$/oral RfD) + ($ADD_{dermal,\ child}$/oral RfD)

Table E-6a. Arsenic 95% UCL

Data File

Variable: Arsenic

Raw Statistics	
Number of Valid Samples	73
Number of Unique Samples	39
Minimum	0.25
Maximum	100
Mean	24.84452
Median	16
Standard Deviation	24.41036
Variance	595.8658
Coefficient of Variation	0.982525
Skewness	1.46221

Gamma Statistics	
k hat	0.973088
k star (bias corrected)	0.942231
Theta hat	25.53161
Theta star	26.36776
nu hat	142.0709
nu star	137.5657
Approx.Chi Square Value (.05)	111.4606
Adjusted Level of Significance	0.046712
Adjusted Chi Square Value	110.9894

Log-transformed Statistics	
Minimum of log data	-1.386294
Maximum of log data	4.60517
Mean of log data	2.617542
Standard Deviation of log data	1.3265
Variance of log data	1.759601

RECOMMENDATION

Data follow gamma distribution (0.05)

Use Approximate Gamma UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.208795
Lilliefors 5% Critical Value	0.103698
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	29.60515

Gamma Distribution Test	
A-D Test Statistic	0.649281
A-D 5% Critical Value	0.782194
K-S Test Statistic	0.100868
K-S 5% Critical Value	0.107591
Data follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	30.66333
Adjusted Gamma UCL	30.79351

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.155631
Lilliefors 5% Critical Value	0.103698
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	49.47701
95% Chebyshev (MVUE) UCL	60.78445
97.5% Chebyshev (MVUE) UCL	73.10487
99% Chebyshev (MVUE) UCL	97.30595

95% Non-parametric UCLs	
CLT UCL	29.5439
Adj-CLT UCL (Adjusted for skewness)	30.06634
Mod-t UCL (Adjusted for skewness)	29.68664
Jackknife UCL	29.60515
Standard Bootstrap UCL	29.54804
Bootstrap-t UCL	30.3936
Hall's Bootstrap UCL	30.04302
Percentile Bootstrap UCL	29.66712
BCA Bootstrap UCL	29.80342
95% Chebyshev (Mean, Sd) UCL	37.29797
97.5% Chebyshev (Mean, Sd) UCL	42.68659
99% Chebyshev (Mean, Sd) UCL	53.27148

Table: E-6b. Lead 95% UCL

Data File

Variable: Lead

Raw Statistics

Number of Valid Samples	40
Number of Unique Samples	26
Minimum	2
Maximum	630
Mean	44.2
Median	6.75
Standard Deviation	112.1463
Variance	12576.79
Coefficient of Variation	2.537247
Skewness	4.327055

Gamma Statistics

k hat	0.484217
k star (bias corrected)	0.464567
Theta hat	91.28139
Theta star	95.14228
nu hat	38.73736
nu star	37.16539
Approx.Chi Square Value (.05)	24.20634
Adjusted Level of Significance	0.044
Adjusted Chi Square Value	23.81353

Log-transformed Statistics

Minimum of log data	0.693147
Maximum of log data	6.44572
Mean of log data	2.470389
Standard Deviation of log data	1.433892
Variance of log data	2.056047

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test

Shapiro-Wilk Test Statisitic	0.412197
Shapiro-Wilk 5% Critical Value	0.94

Data not normal at 5% significance level

95% UCL (Assuming Normal Distribution)

Student's-t UCL	74.07601

Gamma Distribution Test

A-D Test Statistic	3.579094
A-D 5% Critical Value	0.816636
K-S Test Statistic	0.213314
K-S 5% Critical Value	0.147866

Data do not follow gamma distribution at 5% significance level

95% UCLs (Assuming Gamma Distribution)

Approximate Gamma UCL	67.86282
Adjusted Gamma UCL	68.98223

Lognormal Distribution Test

Shapiro-Wilk Test Statisitic	0.890609
Shapiro-Wilk 5% Critical Value	0.94

Data not lognormal at 5% significance level

95% UCLs (Assuming Lognormal Distribution)

95% H-UCL	64.35999
95% Chebyshev (MVUE) UCL	71.44296
97.5% Chebyshev (MVUE) UCL	88.73139
99% Chebyshev (MVUE) UCL	122.6912

95% Non-parametric UCLs

CLT UCL	73.36636
Adj-CLT UCL (Adjusted for skewness)	86.32913
Mod-t UCL (Adjusted for skewness)	76.09794
Jackknife UCL	74.07601
Standard Bootstrap UCL	72.83904
Bootstrap-t UCL	131.9612
Hall's Bootstrap UCL	192.7492
Percentile Bootstrap UCL	74.5375
BCA Bootstrap UCL	91.475
95% Chebyshev (Mean, Sd) UCL	121.4915
97.5% Chebyshev (Mean, Sd) UCL	154.9356
99% Chebyshev (Mean, Sd) UCL	220.63

ProUCL Output

Table E-6c. Thallium 95% UCL

Data File

Variable: Thallium

Raw Statistics	
Number of Valid Samples	40
Number of Unique Samples	10
Minimum	0.125
Maximum	10
Mean	1.117375
Median	0.75
Standard Deviation	1.554394
Variance	2.41614
Coefficient of Variation	1.391112
Skewness	5.062069

Gamma Statistics	
k hat	1.57074
k star (bias corrected)	1.469601
Theta hat	0.711369
Theta star	0.760325
nu hat	125.6592
nu star	117.5681
Approx.Chi Square Value (.05)	93.52804
Adjusted Level of Significance	0.044
Adjusted Chi Square Value	92.72536

Log-transformed Statistics	
Minimum of log data	-2.079442
Maximum of log data	2.302585
Mean of log data	-0.239941
Standard Deviation of log data	0.743763
Variance of log data	0.553183

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.44419
Shapiro-Wilk 5% Critical Value	0.94
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	1.531469

Gamma Distribution Test	
A-D Test Statistic	2.829202
A-D 5% Critical Value	0.764851
K-S Test Statistic	0.228051
K-S 5% Critical Value	0.141914
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	1.40458
Adjusted Gamma UCL	1.416739

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.894242
Shapiro-Wilk 5% Critical Value	0.94
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	1.333299
95% Chebyshev (MVUE) UCL	1.608091
97.5% Chebyshev (MVUE) UCL	1.858929
99% Chebyshev (MVUE) UCL	2.351653

95% Non-parametric UCLs	
CLT UCL	1.521633
Adj-CLT UCL (Adjusted for skewness)	1.731821
Mod-t UCL (Adjusted for skewness)	1.564254
Jackknife UCL	1.531469
Standard Bootstrap UCL	1.516826
Bootstrap-t UCL	2.201538
Hall's Bootstrap UCL	3.094474
Percentile Bootstrap UCL	1.558375
BCA Bootstrap UCL	1.955625
95% Chebyshev (Mean, Sd) UCL	2.188667
97.5% Chebyshev (Mean, Sd) UCL	2.652216
99% Chebyshev (Mean, Sd) UCL	3.562768

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Table E-6d. Vanadium 95% UCL

Data File

Variable: Vanadium

Raw Statistics	
Number of Valid Samples	40
Number of Unique Samples	30
Minimum	0.5
Maximum	1000
Mean	94.075
Median	36
Standard Deviation	196.1011
Variance	38455.62
Coefficient of Variation	2.084518
Skewness	3.703836

Gamma Statistics	
k hat	0.685517
k star (bias corrected)	0.650769
Theta hat	137.2323
Theta star	144.5596
nu hat	54.84132
nu star	52.06156
Approx.Chi Square Value (.05)	36.48585
Adjusted Level of Significance	0.044
Adjusted Chi Square Value	35.99657

Log-transformed Statistics	
Minimum of log data	-0.693147
Maximum of log data	6.907755
Mean of log data	3.659916
Standard Deviation of log data	1.261972
Variance of log data	1.592574

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.432823
Shapiro-Wilk 5% Critical Value	0.94
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	146.3167

Gamma Distribution Test	
A-D Test Statistic	3.733193
A-D 5% Critical Value	0.795296
K-S Test Statistic	0.270824
K-S 5% Critical Value	0.145616
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	134.2353
Adjusted Gamma UCL	136.0599

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.896471
Shapiro-Wilk 5% Critical Value	0.94
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	148.1182
95% Chebyshev (MVUE) UCL	172.9275
97.5% Chebyshev (MVUE) UCL	211.7162
99% Chebyshev (MVUE) UCL	287.9091

95% Non-parametric UCLs	
CLT UCL	145.0758
Adj-CLT UCL (Adjusted for skewness)	164.4781
Mod-t UCL (Adjusted for skewness)	149.3431
Jackknife UCL	146.3167
Standard Bootstrap UCL	145.4762
Bootstrap-t UCL	212.5185
Hall's Bootstrap UCL	160.0311
Percentile Bootstrap UCL	149.6
BCA Bootstrap UCL	187.0375
95% Chebyshev (Mean, Sd) UCL	229.2283
97.5% Chebyshev (Mean, Sd) UCL	287.7093
99% Chebyshev (Mean, Sd) UCL	402.5838

ProUCL Output

Table E-6e. 4,4- DDE 95% UCL

Data File

Variable: 4,4'DDE

Raw Statistics	
Number of Valid Samples	15
Number of Unique Samples	8
Minimum	0.001
Maximum	2.4
Mean	0.187093
Median	0.001
Standard Deviation	0.614129
Variance	0.377155
Coefficient of Variation	3.282475
Skewness	3.831501

Gamma Statistics	
k hat	0.220661
k star (bias corrected)	0.220973
Theta hat	0.847878
Theta star	0.846679
nu hat	6.619822
nu star	6.629191
Approx.Chi Square Value (.05)	1.96885
Adjusted Level of Significance	0.03235
Adjusted Chi Square Value	1.672271

Log-transformed Statistics	
Minimum of log data	-6.907755
Maximum of log data	0.875469
Mean of log data	-4.960028
Standard Deviation of log data	2.538514
Variance of log data	6.444052

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.337226
Shapiro-Wilk 5% Critical Value	0.881
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.46638

Gamma Distribution Test	
A-D Test Statistic	2.109431
A-D 5% Critical Value	0.86823
K-S Test Statistic	0.285994
K-S 5% Critical Value	0.244035
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.62995
Adjusted Gamma UCL	0.741672

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.782901
Shapiro-Wilk 5% Critical Value	0.881
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	8.041217
95% Chebyshev (MVUE) UCL	0.397049
97.5% Chebyshev (MVUE) UCL	0.527809
99% Chebyshev (MVUE) UCL	0.784661

95% Non-parametric UCLs	
CLT UCL	0.447914
Adj-CLT UCL (Adjusted for skewness)	0.615531
Mod-t UCL (Adjusted for skewness)	0.492525
Jackknife UCL	0.46638
Standard Bootstrap UCL	0.435929
Bootstrap-t UCL	3.074686
Hall's Bootstrap UCL	2.907113
Percentile Bootstrap UCL	0.498827
BCA Bootstrap UCL	0.669587
95% Chebyshev (Mean, Sd) UCL	0.878273
97.5% Chebyshev (Mean, Sd) UCL	1.177347
99% Chebyshev (Mean, Sd) UCL	1.76482

ProUCL Output

Table E-6f. Dieldrin 95% UCL

Data File

Variable: Dieldrin

Raw Statistics	
Number of Valid Samples	15
Number of Unique Samples	7
Minimum	0.001
Maximum	0.25
Mean	0.034693
Median	0.001
Standard Deviation	0.071534
Variance	0.005117
Coefficient of Variation	2.061894
Skewness	2.418641

Gamma Statistics	
k hat	0.337898
k star (bias corrected)	0.314763
Theta hat	0.102674
Theta star	0.110221
nu hat	10.13693
nu star	9.442876
Approx.Chi Square Value (.05)	3.595842
Adjusted Level of Significance	0.03235
Adjusted Chi Square Value	3.164375

Log-transformed Statistics	
Minimum of log data	-6.907755
Maximum of log data	-1.386294
Mean of log data	-5.362717
Standard Deviation of log data	2.012285
Variance of log data	4.049293

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.554425
Shapiro-Wilk 5% Critical Value	0.881
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.067225

Gamma Distribution Test	
A-D Test Statistic	1.95586
A-D 5% Critical Value	0.827453
K-S Test Statistic	0.299621
K-S 5% Critical Value	0.238843
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.091107
Adjusted Gamma UCL	0.103529

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.766558
Shapiro-Wilk 5% Critical Value	0.881
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	0.418686
95% Chebyshev (MVUE) UCL	0.093669
97.5% Chebyshev (MVUE) UCL	0.122953
99% Chebyshev (MVUE) UCL	0.180476

95% Non-parametric UCLs	
CLT UCL	0.065074
Adj-CLT UCL (Adjusted for skewness)	0.077398
Mod-t UCL (Adjusted for skewness)	0.069147
Jackknife UCL	0.067225
Standard Bootstrap UCL	0.063062
Bootstrap-t UCL	0.106673
Hall's Bootstrap UCL	0.075024
Percentile Bootstrap UCL	0.066247
BCA Bootstrap UCL	0.08558
95% Chebyshev (Mean, Sd) UCL	0.115202
97.5% Chebyshev (Mean, Sd) UCL	0.150038
99% Chebyshev (Mean, Sd) UCL	0.218467

Table 7a: Raw Data for Calculation of 95 % UCL

SAMPLE I.D.	Arsenic	Lead	Thallium	Vanadium
T7-2	45	3.5	0.5	36
T7-1	46	20	1	83
T7-.5	46	190	1	88
T6-2	9.5	3	0.5	38
T6-1	84	3.5	0.5	35
T6-.5	44	20	1	79
T5-2	100	3.5	1.5	40
T5-1	45	15	1.5	25
T5-.5	7.5	25	3	500
T4-2	90	3.5	1	35
T4-1	60	2.5	1	24
T4-.5	4	3.5	<0.25	5.5
T30-2	28	3.5	0.5	38
T30-1	28	3	0.5	20
T30-.5	64	28	1.5	110
T28-2	20	6	1.5	50
T28-1	16	4.5	0.5	16
T28-.5	34	42	1.5	130
T26-2	41	4.5	1	50
T26-1	16	2	0.48	15
T26-.5	12	18	10	710
T25-2	16	4	1.5	46
T25-1	20	6.5	0.5	20
T25-.5	20	43	1	120
T24-2	9	8	0.5	32
T24-1	32	10	0.5	16
T24-.5	70	330	0.28	8
T19-2	18	29	0.5	16
T19-1	9.5	28	1	30
T19-.5	13	84	0.5	34
T16-2	15	6.5	1	42
T16-1	18	5.5	0.5	36
T16-.5	18	7	2.5	1000
T15-2	8	2.5	0.5	32
T15-1	16	5.5	0.5	40
T15-.5	60	94	0.5	22
T12-2	10	3	1	40
T12-1	44	38	0.5	73
T12-.5	32	630	0.31	0.5
S16-0	7.5	29	1	28
B7-5	2.2			
B7-10	1.3			
B6-5	4.9			
B6-10	1.5			
B5-S	<1			
B5-1.5	<1			
B4-S	16			
B4-1.5	13			
B3-S	44			
B3-1.5	66			
B2-S	22			
B2-1.5	<1			
B1-S	55			
B1-1.5	<1			
T9-1	9.5			
T10-1	7			
T11-2	99			
T13-2	7			
T14-1	8			
T17-1.5	36			
T18-1	22			

Raw Data

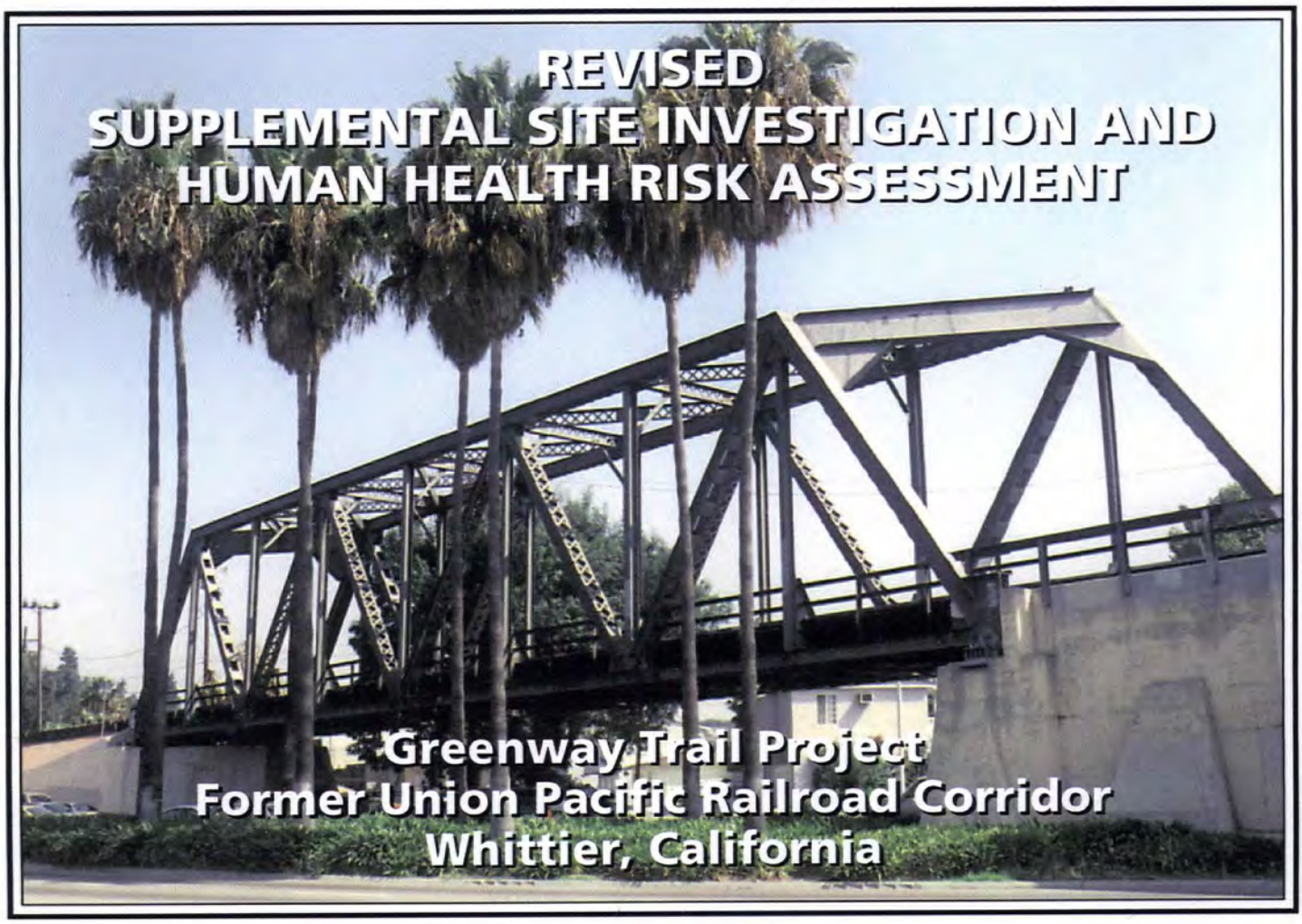
T20-2	8				
T22-2	8				
T23-1	16				
T27-1	9				
T29-1	<0.25				
S1-.5	25				
S2-.5	8				
S5-.5	7.5				
S6-.5	12				
S7-.5	9				
S8-0	6.5				
S9A-0	12				
Min	**1.3**	**2**	**0.28**	**0.5**	**mg/kg**
Max	**100**	**630**	**10**	**1000**	**mg/kg**
Mean	**26.63823529**	**44.2**	**1.142820513**	**94.075**	**mg/kg**
No. Detected	**68**	**40**	**39**	**40**	**mg/kg**
No. Samples	**73**	**40**	**40**	**40**	**mg/kg**

Raw Data

SAMPLE I.D.	4,4'DDE	Dieldrin	Aroclor 1260
S1-.5	20	5.7	220
S2-.5	ND	ND	ND
S5-.5	ND	ND	ND
S6-.5	14	10	ND
S7-.5	110	250	ND
T14-1	ND	ND	ND
T17-1.5	ND	ND	ND
T27-1	ND	ND	ND
B1-S	2400	130	
B1-1.5	ND	ND	
B2-S	150	100	
B2-1.5	ND	ND	
B3-S	ND	5.7	
B4-S	4.4	ND	
B5-S	100	11	
Min	**4.4**	**5.7**	**220 ug/kg**
Max	**2400**	**250**	**220 ug/kg**
Mean	**399.7714286**	**73.2**	**220 ug/kg**
No. Detected	**7**	**7**	**1 ug/kg**
No. Samples	**15**	**15**	**8 ug/kg**
	DL = 2.0	*DL = 2.0*	

Table 7b: Pro UCL input

Arsenic	Lead	Thallium	Vanadium	4,4'DDE	Dieldrin
100	630	10	1000	0.001	0.001
99	330	3	710	0.001	0.001
90	190	2.5	500	0.001	0.001
84	94	1.5	130	0.001	0.001
70	84	1.5	120	0.001	0.001
66	43	1.5	110	0.001	0.001
64	42	1.5	88	0.001	0.001
60	38	1.5	83	0.001	0.001
60	29	1.5	79	2.4	0.25
55	29	1	73	0.15	0.13
46	28	1	50	0.11	0.1
46	28	1	50	0.1	0.011
45	25	1	46	0.02	0.01
45	20	1	42	0.014	0.0057
44	20	1	40	0.0044	0.0057
44	18	1	40		
44	15	1	40		
41	10	1	38		
36	8	1	38		
34	7	1	36		
32	6.5	0.5	36		
32	6.5	0.5	35		
28	6	0.5	35		
28	5.5	0.5	34		
25	5.5	0.5	32		
22	4.5	0.5	32		
22	4.5	0.5	30		
20	4	0.5	28		
20	3.5	0.5	25		
20	3.5	0.5	24		
18	3.5	0.5	22		
18	3.5	0.5	20		
18	3.5	0.5	20		
16	3.5	0.5	16		
16	3	0.5	16		
16	3	0.5	16		
16	3	0.48	15		
16	2.5	0.31	8		
16	2.5	0.28	5.5		
15	2	0.125	0.5		
13					
13					
12					
12					
12					
10					
9.5					
9.5					
9.5					
9					
9					
9					
8					
8					
8					
8					
8					
7.5					
7.5					
7.5					
7					
7					
6.5					
4.9					
4					
2.2					
1.5					
1.3					
0.5					
0.5					
0.5					
0.5					
0.25					



REVISED SUPPLEMENTAL SITE INVESTIGATION AND HUMAN HEALTH RISK ASSESSMENT

Greenway Trail Project
Former Union Pacific Railroad Corridor
Whittier, California

PREPARED FOR:

KIMLEY-HORN AND ASSOCIATES, INC.
517 FOURTH AVENUE, SUITE 301
SAN DIEGO, CALIFORNIA 92101

PREPARED BY:

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DRIVE, SUITE 800
RANCHO CORDOVA, CALIFORNIA 95742

GEOCON

GEOCON PROJECT NO. S8766-06-01

APRIL 2005

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S8766-06-01
April 22, 2005

Kim Clark, REHS, Hazardous Materials Specialist III
County of Los Angeles Fire Department
Health Hazardous Materials Division
Site Mitigation Unit
5825 Rickenbacker Road
Commerce, California 90040

RECEIVED
APR 27 2005
CITY MANAGER'S OFFICE

Subject: GREENWAY TRAIL PROJECT
FORMER UNION PACIFIC RAILROAD CORRIDOR
WHITTIER, CALIFORNIA
RESPONSE TO COMMENTS FOR REVISED SUPPLEMENTAL SITE INVESTIGATION AND HUMAN HEALTH RISK ASSESSMENT

Dear Ms. Clark:

We have revised the *Supplemental Site Investigation and Human Health Risk Assessment* prepared for the Greenway Trail Project dated April 12, 2005, to incorporate your final report comments received by Geocon via e-mail message on April 20, 2005. The following presents the comments and corresponding responses as reflected in the revised Report dated April 22, 2005.

Comment #1: *Calculations & raw data for the 95% UCL for all COIs listed in Table 7.*
Response: The 95% UCL calculations and raw data are presented in Appendix E.

Comment #2: *Renee Kalmes credentials/qualifications to perform Risk Assessments.*
Response: Renee Kalmes' resume is presented in Appendix A.

Comments #3 and #4: *Residential risk calculations for during construction & after - at a minimum it needs to address inhalation, due to the possiblity of residual arsenic contaminated being disturbed, wind, etc.* **and**
Construction worker exposure also needs to be addressed in the risk assessment.
Response: Sections 3.1, 3.2.2, 3.4.1, 3.5.3 and 5.2 of the Report have been revised to address potential health risks to construction workers and offsite residential exposure during and after site development. Supporting risk spreadsheet calculations and risk estimates are presented in Table 8 and Appendix E.

Comment #5: *Correct Table 4, which lists 4,4' DDE twice (1 should be 4,4' DDD).*
Response: Table 4 has been corrected per comment.

Comment #6: *Eliminate T1-T3 & T31 data from Tables since they are no longer part of this project.*

Response: Notations have been placed on the Site Plans (Figures 2a and 2i) and Appendix B data tables (excerpted from prior Corrective Action Plan and Remedial Action Workplan documents) indicating that exploratory trenches T1, T2, T3 and T31 are not located within the project boundaries. Section 3.2.1 of the Report further addresses this issue.

Comment #7: *Tables should probably include a notation that the samples in the debris/fill areas were not included in calculations (This would clarify why not all samples included in the raw data, which was requested in #1 above by someone at a later date).*

Response: Notations have been placed on the Appendix B data tables (excerpted from prior Corrective Action Plan and Remedial Action Workplan documents) indicating that debris fill materials are not incorporated in the risk assessment calculations since these materials will be properly removed from the Site. Section 3.2.1 of the Report further addresses this issue.

Comment #8: *Need to address/justify the fact that B1-S exceeds the TTLC for 4,4' DDE and 4,4' DDT.*

Response: Exceedance of California TTLC hazardous waste pesticide thresholds for sample B1-S is discussed in Section 2.4 of the Report.

Please contact me if you have any questions concerning the contents of this correspondence.

Sincerely,

GEOCON CONSULTANTS, INC.

John E. Juhrend, PE, CEG
Project Manager

JEJ:krc

(1) Addressee
(1) City of Whittier, Mr. Bob Chavez
(1) City of Whittier, Ms. Nancy Mendez
(1) Los Angeles Regional Water Quality Control Board, Mr. Rod Nelson
(1) Kimley-Horn and Associates, Inc., Mr. John Morris
(1) Exponent, Ms. Renee Kalmes

GEOCON
CONSULTANTS, INC.
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. S8766-06-01
April 12, 2005
Revised April 22, 2005

Mr. John Morris
Kimley-Horn and Associates, Inc.
517 Fourth Avenue, Suite 301
San Diego, California 92101

Subject: GREENWAY TRAIL PROJECT
FORMER UNION PACIFIC RAILROAD CORRIDOR
WHITTIER, CALIFORNIA
SUPPLEMENTAL SITE INVESTIGATION AND
HUMAN HEALTH RISK ASSESSMENT

Dear Mr. Morris:

In accordance with written directive received from the Los Angeles County Fire Department dated October 7, 2004, Geocon Consultants, Inc. and Exponent have prepared this Supplemental Site Investigation and Human Health Risk Assessment for the Greenway Trail Project (the *Site*) located in Whittier, California. The *Site* consists of a 4.5-mile-long former Union Pacific railroad corridor currently being designed for redevelopment as a pedestrian trail and community park system.

The accompanying report summarizes additional soil sampling and analytical testing for two areas within the *Site* previously identified with elevated pesticide and volatile organic compounds. The Report further includes a Human Health Risk Assessment (HRA) prepared by Exponent to evaluate potential health hazards from the identified chemicals of interest; notably arsenic in soil associated with slag ballast materials. The results of the HRA indicate that arsenic-affected soil, the only identified chemical of concern, does not pose an unacceptable risk for the intended use of the *Site* as a recreational trail. To further minimize pedestrian and adjacent residential exposure to arsenic in shallow soil above naturally occurring background levels, exposed soil areas adjacent to the paved and decomposed granite trail sections will be properly managed with landscaping improvements and ground cover.

Please contact us if you have any questions concerning the contents of this Report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

REGISTERED PROFESSIONAL ENGINEER
JOHN JUHREND
No. 46681
Exp. 06/30/07
CIVIL
STATE OF CALIFORNIA

John E. Juhrend, PE, CEG
Project Manager

EXPONENT

Renee Kalmes, CIH 3593 CP
Managing Scientist

JEJ:RK:ss

(2) Addressee
(1) City of Whittier, Mr. Bob Chavez
(1) City of Whittier, Ms. Nancy Mendez
(1) Los Angeles County Fire Department, Ms. Kim Clark
(1) Los Angeles Regional Water Quality Control Board, Mr. Ron Nelson

LIST OF ACRONYMS

AADD	annual average daily dose
ABS	skin absorption factor
AC	asphalt concrete
AT	averaging time
ATL	Advanced Technology Laboratories
bgs	below ground surface
BW	body weight
Cal-EPA	California Environmental Protection Agency
CSFs	cancer slope factors
CAP	Corrective Action Plan
CEG	Certified Engineering Geologist
CF	conversion factor
CIH	Certified Industrial Hygienist
COI	chemicals of interest
DG	decomposed granite
DTSC	Department of Toxic Substances Control
ED	exposure duration
EF	exposure frequency
EPA	Environmental Protection Agency
EPC	exposure point concentration
ESA	Environmental Site Assessment
FE	fraction exposed
HRA	Health Risk Assessment
IR	inhalation rate
IRIS	Integrated Risk Information Service
KHA	Kimley-Horn and Associates, Inc.
LACoFD	Los Angeles County Fire Department
LADD	lifetime average daily dose
μg/dL	micrograms per deciliter
μg/kg	micrograms per kilogram
$\mu g/m^3$	micrograms per cubic meter
mg/day	milligrams per day
mg/kg	milligrams per kilogram
MOU	Memorandum of Understanding
NCEA	National Center for Environmental Assessment
OEHHA	Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PE	Professional Engineer
PEF	particulate emission factor
PEL	Permissible Exposure Level
PRG	Preliminary Remediation Goal
QA/QC	quality assurance/quality control
RAW	Remedial Action Workplan
RfCs	reference concentrations
RfDs	reference doses
RME	reasonable maximum exposure
RWQCB	Regional Water Quality Control Board
SA	surface area
SCM	site conceptual model
SIR	soil ingestion rate
TCE	trichloroethene
TPH	total petroleum hydrocarbons
TTLC	Total Threshold Limit Concentration
TWA	time weighted average
UCL	upper confidence limit
UP	Union Pacific
USA	Underground Service Alert
VOCs	volatile organic compounds
WET	Waste Extraction Test

TABLE OF CONTENTS

REVISED SUPPLEMENTAL SITE INVESTIGATION AND HUMAN HEALTH RISK ASSESSMENT

1.0 INTRODUCTION 1
- 1.1 Site Location and Proposed Improvements 1
- 1.2 Background 1

2.0 PROJECT SCOPE 3
- 2.1 Pre-field Activities 3
- 2.2 Field Activities 3
- 2.3 Laboratory Analyses 4
- 2.4 Soil Analytical Results 4

3.0 HUMAN HEALTH RISK ASSESSMENT 6
- 3.1 Introduction 6
- 3.2 Data Evaluation and Selection of COIs 6
  - 3.2.1 Data Evaluation 7
  - 3.2.2 Selection of COIs in Soil 7
- 3.3 Toxicity Assessment Criteria for COIs 8
  - 3.3.1 Toxicity Criteria Used for COIs 8
  - 3.3.2 Arsenic Toxicity and Bioavailability 9
- 3.4 Human Exposure Assessment 9
  - 3.4.1 Characterization of Exposure Setting 10
  - 3.4.2 Identification of Exposure Pathways 10
  - 3.4.3 Quantification of Health Risk Estimates 11
- 3.5 Risk Characterization 12
  - 3.5.1 Evaluation of Potential Adverse Non-cancer Health Effects 13
  - 3.5.2 Evaluation of Potential Carcinogenic Effects 13
  - 3.5.3 Summary of Non-cancer and Cancer Health Effects 14
  - 3.5.4 Arsenic Concentrations 16

4.0 RISK MANAGEMENT APPROACH 17

5.0 SUMMARY AND CONCLUSIONS 18
- 5.1 Supplemental Site Investigation 18
- 5.2 Human Health Risk Assessment 18
- 5.3 Risk Management Approach 19
- 5.4 Grading Specifications and Environmental Monitoring 20
- 5.5 Regional Water Quality Control Board Waste Discharge Permit 21
- 5.6 Project Closure Report 21

6.0 REFERENCES 22

FIGURES

1. Project Location Map
2a-2i. Site Plans
3. Hadley Street Debris Fill Site Plan
4. Whittier Boulevard Overcrossing Debris Fill Site Plan
5. Site Conceptual Model
6. Distribution of Arsenic Concentrations

TABLE OF CONTENTS (cont)

TABLES

1. Summary of Soil Analytical Data - Pesticides
2. Summary of Soil Analytical Data - VOCs
3. Summary of Soil Analytical Data - Arsenic
4. Selection of Chemicals of Interest
5. Toxicity Values for Chemicals of Interest
6. Summary of Recreational Exposure Parameters
7. Recreational Risk Assessment
8. Construction and Off-Site Residential Risk Assessment

APPENDICES

A. Exponents's Renee Kalmes Resume
B. Previous Soil Analytical Data Tables
C. County of Los Angeles County Fire Department Correspondence
D. Boring Logs
E. Laboratory Reports and Chain-of-Custody Documentation
F. Risk Hazard Calculations

REVISED SUPPLEMENTAL SITE INVESTIGATION AND HUMAN HEALTH RISK ASSESSMENT

1.0 INTRODUCTION

1.1 Site Location and Proposed Improvements

Geocon Consultants, Inc. has prepared this Revised Supplemental Site Investigation Report and Human Health Risk Assessment (HRA) for the Greenway Trail Project (the *Site*) under contract with Kimley-Horn and Associates, Inc. (KHA), the prime design civil engineer representing the City of Whittier (City). This Report presents a cumulative summary of the environmental site assessment activities performed at the *Site,* provides the results of recently completed supplemental soil sampling and analytical testing, and presents a HRA prepared by Renee Kalmes with Exponent under subcontract to Geocon. A copy of Renee Kalmes' resume is presented in Appendix A.

The *Site* consists of an approximate 4.5-mile-long former Union Pacific (UP) railroad corridor located in the City of Whittier, California. The *Site* extends between Pioneer Boulevard and Mills Road and is currently being planned for redevelopment by the City as a pedestrian trail and community park system. The *Site* is generally 40 to 100 feet in width within the project limits. Proposed improvements include a 4- to 5-inch-thick asphalt concrete (AC) over 6 inches of aggregate base paved bike trail, a pedestrian path constructed with 6-inch-thick decomposed granite (DG), irrigation systems and greenbelt landscaping. Planned grading operations will generally consist of cut and fills on the order of from 1 to 2 feet deep. The approximate project limits are depicted on the Project Location Map, Figure 1 and Site Plans, Figures 2a through 2i.

1.2 Background

Geocon completed Phase I and II Environmental Site Assessments (ESAs) and a Corrective Action Plan (CAP) for the *Site* between September 2000 and November 2001. The results of the Phase I ESA indicated that before construction of the railroad corridor in the early 1900s, commercial operations near the *Site* included agricultural, lumber, feed, fruit packing, and oil storage facilities. Former or existing railroad maintenance, refueling facilities, and underground or aboveground storage tanks were not identified within the site boundaries.

The Phase II ESA included the excavation of 31 shallow exploratory trenches, near-surface soil and ballast sampling, and analytical testing. Recognized environmental conditions identified within the *Site* included asbestos and lead-based paint bridge and retaining wall components, slag ballast and track bed soil containing elevated arsenic concentrations, near-surface debris fill materials located near Hadley Street, and the presence of abandoned battery boxes and sporadic surface debris material. Significant or pervasive petroleum hydrocarbons, volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), pesticide, and herbicide impacts were not reported in the random and targeted (adjacent facility) sampling locations within the corridor.

Additional site investigation completed for the CAP identified the presence of near-surface debris fill materials along the southern abutment of the Whittier Boulevard Overcrossing. The CAP presented statistical and human health risk evaluations of the elevated arsenic levels detected in slag ballast and underlying track bed soils, and recommended remedial measures for the removal and offsite disposal of the encountered debris fill materials. A cumulative summary of the soil analytical data generated for the *Site* is presented in Appendix B. Approximate sample locations are depicted on the Site Plans, Figures 2a through 2i. The identified debris fill area sample locations are depicted on Figures 3 and 4.

The City completed purchase of the *Site* from UP in December 2001. The railroad track improvements (rail, spikes, plates and ties) and signal crossing improvements (battery boxes, crossing arms and signal boxes) were subsequently removed by UP. The City further installed security fencing around the Whittier Boulevard Overcrossing debris fill location due to the presence of surficial debris fill and homeless encampments.

In May 2004, the City requested local agency oversight from the Los Angeles County Fire Department (LACoFD) during planned remedial activities at the *Site*. Geocon subsequently completed a Remedial Action Workplan (RAW) to provide specifications for the remedial removal and offsite disposal of near-surface debris fill materials identified near Hadley Street and at the Whittier Boulevard Overcrossing. The LACoFD conditionally approved the RAW in writing dated October 7, 2004, and requested a Workplan to address the following areas of concern:

1. Further assessment of shallow pesticide soil impacts encountered between Broadway and Magnolia Avenues. The pesticide dieldrin was detected in surface soil sample S7-.5 at an elevated concentration of 250 micrograms per kilogram (µg/kg). The approximate location of soil sample S7 is depicted on Figure 2c.
2. Further assessment of VOC soil impacts encountered by Geocon in trench T20 adjacent to a former "dip tank" area at the American Cushion/Helferty and DeBeikes property located at 12353 Whittier Boulevard. The "dip tank" area was reportedly remediated by direct soil excavation in 1988. Trichloroethene (TCE) was detected in a 2-foot-deep soil sample (T20-2) obtained by Geocon in 2001 at a very low concentration of 34 µg/kg. The approximate location of trench T20 is depicted on Figure 2e.
3. Additional information regarding the presence and proposed handling of slag ballast and associated track bed soil materials containing elevated arsenic concentrations.

Geocon subsequently submitted a draft Supplemental Site Investigation Workplan dated November 30, 2004, that was approved by the LACoFD in writing dated December 13, 2004. Copies of the referenced LACoFD correspondence are presented in Appendix C.

2.0 PROJECT SCOPE

Outlined below is a summary of the scope of services performed by Geocon to address the areas of concern identified by the LACoFD:

2.1 Pre-field Activities

- A *Supplemental Site Investigation Workplan* was prepared dated December 15, 2004, to outline the field sampling and analytical testing protocols.
- A project-specific *Health and Safety Plan* was prepared dated December 16, 2004, to provide guidelines on the use of personal protective equipment and the health and safety procedures to be implemented during the field sampling activities.
- The investigation area in the vicinity of trench T20 was outlined with white paint for Underground Service Alert (USA) notification. A minimum of 48 hours prior to the start of field activities, the local public utilities were contacted via USA to attempt to delineate subsurface public utilities and conduits in proximity to the proposed exploration locations.
- Retained the services of Prosonic, a California C57-licensed drilling contractor, to perform direct-push borings in the vicinity of trench T20.
- Retained the services of Advanced Technology Laboratories (ATL), a California-certified analytical laboratory located in Signal Hill, California, for chemical analysis of soil samples.
- Representatives of Geocon, Exponent and the LACoFD completed a conference call on January 6, 2004, to review the County's requirement for additional risk evaluation and proper management of arsenic-affected soils. Additional meetings were held on March 8 and April 6, 2005, attended by representatives of the LACoFD, the City, KHA, Geocon and Exponent to review the results of the human health risk assessment. Copies of the project improvement plans and trail profiles prepared by KHA were further submitted to the LACoFD for review.

2.2 Field Activities

Five shallow hand-auger borings (B1 through B5) were performed on December 21, 2004, in the vicinity of previous surface soil sample S7 located between Broadway and Magnolia Avenues (see Figure 2c). The boring locations were determined in conjunction with Ms. Kim Clark with the LACoFD to evaluate the extent of elevated dieldrin. The borings were performed to a maximum depth of 2 feet below the ground surface (bgs). Soil samples were obtained from the surface (0-6 inches) and at a depth of 1.5 feet (1.0 to 1.5 feet) bgs using a drive tube sampler equipped with 6-inch-long stainless steel sample tubes. Each soil sample was capped, labeled and placed in a chilled cooler, and delivered to the analytical laboratory for chemical analyses utilizing standard chain-of-custody procedures.

Two direct-push soil borings (B6 and B7) were performed on December 30, 2004, in the vicinity of previous exploratory trench T20 (see Figure 2e). Soil samples were collected from the direct-push borings using a hydraulically driven soil sampler equipped with an acetate liner at depths of 5 and 10 feet bgs. The borings were logged under the supervision of a California Professional Geologist using the Unified Soil Classification System. Boring logs are presented in Appendix D. Upon completion of the sampling activities, the borings were backfilled with the soil cuttings (hand-auger) or lean cement grout (direct-push).

Quality assurance/quality control (QA/QC) procedures were performed during the field sampling activities. These procedures included decontamination of sampling equipment before each sample was collected, and providing chain-of-custody documentation for each soil sample submitted to the laboratory. The soil sampling equipment was cleansed between each boring by washing with an Alconox® solution followed by a double rinse with de-ionized water.

2.3 Laboratory Analyses

The soil samples were analyzed by ATL on standard ten-day turn-around schedule for the following:

- Six surface soil samples obtained in the vicinity of sample location S7 were analyzed for chlorinated pesticides following United States Environmental Protection Agency (EPA) Test Method 8081A. Following receipt of the initial data, the deeper 1.5-foot soil samples collected from borings B1 and B2 were assigned for analysis of chlorinated pesticides. Due to exceedance of the 14-day holding time for the deeper soil samples (collection date 12/21/04, analysis date 1/14/05), surface sample B1-6 was reanalyzed to verify validity of the deeper soil sample data.
- Four soil samples obtained from the direct-push borings B6 and B7 were analyzed for VOCs following EPA Test Method 8260B.
- Each soil sample was further analyzed for arsenic following EPA Test Method 6010B.

QA/QC procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. QA/QC measures included the following:

- One method blank for every ten samples, batch of samples or type of matrix whichever is more frequent.
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever is more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix; whichever is more frequent, with the spike made at ten times the detection limit or at the analyte level.

2.4 Soil Analytical Results

A summary of the soil analytical data is presented on Tables 1 through 3. Copies of the laboratory reports and chain-of-custody documentation are presented in Appendix E.

Pesticides including 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, chlordane, dieldrin, endrin, endrin ketone, gamma chlordane, heptachlor and heptachlor epoxide were detected in the surface soil samples. Only 4,4'-DDE and dieldrin were detected above the EPA Region IX residential Preliminary Remediation Goals (PRGs) of 1,700 and 30 µg/kg respectively, in surface soil samples B1-S and B2-S. The levels of 4,4'-DDE and 4,4'-DDT in soil sample B1-S further exceed the California Total Threshold Limit Concentration (TTLC) hazardous waste threshold of 1,000 µg/kg. The TTLC for these compounds of 1,000 µg/kg is less than the health risk based residential PRG of 1,700 µg/kg and is only applicable to disposal of waste soil. Since the existing soil material at this location is not proposed for

excavation and offsite disposal, and the presence of elevated pesticides has been incorporated in the HRA presented herein, the exceedance of TTLC hazardous waste criteria is not applicable.

Reanalysis of surface soil sample B1-S yielded good correlation with the other detected analytes indicating validity of the deeper soil sample data. Pesticides were not detected in the deeper soil samples obtained from borings B1 and B2.

With the exception of TCE, VOCs were not detected in each soil sample analyzed from borings B6 and B7. TCE was detected in soil samples B7-5 and B7-10 at very low concentrations of 5.3 and 10 µg/kg, respectively.

To further aid in evaluating elevated arsenic concentrations in shallow soil within the corridor, each soil sample obtained from borings B1 through B7 was analyzed for arsenic. Arsenic concentrations ranged from <1.0 to 55 to milligrams per kilogram (mg/kg) for the surface soil samples, <1.0 to 66 mg/kg for the 1.5-foot-deep samples, and 1.3 to 4.9 mg/kg for the 5- and 10-foot-deep soil samples.

3.0 HUMAN HEALTH RISK ASSESSMENT

3.1 Introduction

This HRA was prepared by Exponent for the Greenway Trail Project, a 4.5-mile-long former UP railroad corridor located in the City of Whittier, California. The purpose of this HRA was to determine whether site conditions pose a potential health hazard to future recreational site users for chemicals of interest (COIs) in soil. In additional, potential health risks to construction workers and offsite residential exposure to dusts during and after site development were evaluated. The resultant risk estimates are also used to support risk management decisions. The methods used in this report follow standard risk assessment guidance provided by the California Environmental Protection Agency (Cal-EPA) and the United States EPA (Cal-EPA 1994; U.S. EPA 1989). Any deviation from guidance is clearly noted, along with the scientific rationale.

This assessment is organized as follows:

- **Subsection 3.2, Data Evaluation and Selection of COIs:** This subsection presents the evaluation of soil data used in the assessment.
- **Subsection 3.3, Toxicity Assessment Criteria for COIs:** This subsection presents the toxicity criteria that were used to evaluate the COIs.
- **Subsection 3.4, Human Exposure Assessment:** This subsection describes the conceptual model for the potentially exposed future populations on the *Site*. The exposure scenarios and exposure parameters, along with the algorithms, are presented.
- **Subsection 3.5, Risk Characterization:** This subsection presents the estimated risks and hazard indices associated with potential exposure to the COIs for the scenarios evaluated. In addition, a qualitative uncertainty analysis discusses the relative impact of the primary assumptions used in the assessment.
- **Section 4.0, Risk Management Approach:** This section presents the risk management approaches to address the site impacts identified in the HRA.
- **Section 5.0, Summary and Conclusions:** This section summarizes the findings of the HRA.
- **Section 6.0, References:** This section provides complete references for the literature cited throughout the HRA.

3.2 Data Evaluation and Selection of COIs

Data evaluation is the process of analyzing site characteristics and analytical data to identify data of sufficient quality for inclusion in a risk assessment, and based on these data, identifying chemicals to be evaluated in the risk assessment. The identified COIs were evaluated further in the risk assessment, either quantitatively or qualitatively, and the results are presented in Section 3.5.

3.2.1 Data Evaluation

Site soils including slag ballast have been sampled to characterize inorganic impacts and potential organic impacts. The nature and extent of impacts of site soils have been characterized through soil sampling conducted between 2001 and 2004 (see Figures 2a through 2i). These data are presented in Table 1 through 3 and Appendix B of this Report. Two identified debris fill areas located near Hadley Street and the Whittier Bridge Overcrossing (see Figures 3 and 4) will be remediated prior to or during construction of the Greenway Trail Project as discussed in the RAW (Geocon 2004). The debris fill sample data were not included in the risk assessment because these impacted soils will be removed prior to pedestrian use of the project. Additionally, soil sample data generated from trenches T1 through T3, and T31 were not included in the risk assessment since these trench locations are located outside the project boundaries. The analytical data were reviewed and validated by Geocon as part of the overall quality assurance program for the site investigation. The results of this review indicate that the data collected meet project objectives, and a sufficient amount of data was collected to provide adequate characterization for purposes of conducting the HRA.

3.2.2 Selection of COIs in Soil

The purpose of the COI selection process is to focus attention on the substances that may potentially present a health risk. The chemicals detected in validated soil samples are evaluated in the screening risk assessment, except as noted below.

Petroleum hydrocarbon mixtures have been detected in soil samples collected at the *Site* (e.g., total petroleum hydrocarbons [TPH] as diesel). Such measurements represent mixtures of chemicals that, because of their highly variable composition, do not have descriptive health criteria. Therefore, the toxicity of these mixtures is best described by the aggregate toxicity of key individual chemicals in the mixture, such as benzene, toluene, ethylbenzene, and xylenes, and polycyclic aromatic hydrocarbons. For the purposes of this risk assessment, and as is the practice in California (Cal-EPA 1994), a quantitative evaluation of TPH measurements was not conducted in this study; rather, individually measured constituents of the TPH mixtures were evaluated.

Soil samples including slag ballast samples were analyzed for metals (41-73 samples; Method 3050B), VOCs (eleven samples; Methods 8260, 8020), semi-volatile organic compounds (eleven samples; Method 8270), pesticides (15 samples; Method 8081), herbicides (eight samples; Method 8151), and PCBs (eight samples; Method 8082). As an initial screen, maximum detected concentrations were compared to their corresponding EPA PRGs for residential soil (U.S. EPA 2004). PRGs are derived using current EPA toxicity values and standard exposure factors to estimate concentrations in environmental media (e.g., soil) that are protective of human health over a lifetime. This method evaluates potential health risks associated with exposure to residual chemicals in soil via incidental ingestion, dermal contact, and inhalation of vapors or re-suspended particulates (dust), assuming a residential scenario. Examples of these factors include a child soil ingestion rate of 200 milligrams per

day (mg/day), exposure frequency of 350 days per year, and exposure duration of 30 years (six as a child, 24 as an adult). PRGs are based on either non-cancer or cancer effects; the lowest value is chosen as the final PRG for chemicals that may cause both types of effects. These residential assumptions are very conservative, because they are based on the assumption that receptors will be living on the *Site* and exposed to the maximum detected concentration by ingestion, dermal contact and inhalation of dust. Because the *Site* is being developed as a recreational trail, the potential exposure to site soils will be far less than the exposure based on the residential scenario assumptions. However, as discussed further below, with the exception of a few chemicals that are further evaluated using more realistic site-specific conditions, exposure to detected chemicals do not pose a significant health risk even under residential assumptions.

The results of the screening assessment are presented in Table 4. The chemicals present at levels at or above the residential PRG were considered to be COIs and are evaluated further in the recreational, construction worker and offsite residential risk assessment. The maximum concentrations of arsenic, lead, vanadium, and thallium were above their corresponding residential PRGs. Aroclor 1260 was detected in one sample at a concentration equal to the PRG, and 4,4'-DDE and dieldrin were detected in several samples, with the maximum detected values above their respective residential PRGs.

3.3 Toxicity Assessment Criteria for COIs

The purpose of the toxicity assessment is to evaluate available information regarding the potential for a chemical to cause adverse health effects in exposed individuals (hazard identification) and to estimate the relation between the extent of exposure and the increased likelihood (e.g., probability or chance) and/or severity of adverse effects (dose-response assessment). The result of the dose-response assessment is a set of toxicity criteria that are used in the risk characterization to estimate the likelihood of adverse effects occurring in humans at different exposure levels. Standard procedures for toxicity assessment include identifying toxicity values for carcinogenic and noncarcinogenic effects and summarizing other relevant toxicity information.

3.3.1 Toxicity Criteria Used for COIs

The toxicity criteria used to evaluate noncarcinogenic and carcinogenic health risks are referred to as reference doses (RfDs) and cancer slope factors (CSFs), respectively. Existing regulatory criteria and guidelines have been used in this risk assessment for toxicity characterization. Table 5 presents the toxicity criteria used in this assessment. The hierarchy of sources used for the toxicity factors is consistent with those recommended by the Cal-EPA Department of Toxic Substances Control (DTSC) for risk assessment as follows:

- Cal-EPA Cancer Slope Factors (Cal-EPA 2004)
- Cal-EPA non-cancer chronic reference exposure levels (Cal-EPA, February 2003)

- CSFs, RfDs, and reference concentrations (RfCs) developed by EPA and listed in the Integrated Risk Information Service (IRIS) (U.S. EPA 2003)
- Nonpromulgated EPA RfDs and RfCs recommended by EPA's National Center for Environmental Assessment (NCEA).

Lead is evaluated in a different manner that relates lead exposure to blood lead levels. The DTSC model for evaluating lead has a default screening value of 146 mg/kg in soil - a concentration that will result in the 99th percentile value of a blood lead level of 10 micrograms per deciliter (μg/dL) under a residential scenario. The evaluation of lead is discussed further in Section 3.5.3.1.

3.3.2 Arsenic Toxicity and Bioavailability

The Risk Assessment Forum of the U.S. EPA developed a cancer slope factor for arsenic based on an epidemiology study relating skin cancer to high levels of arsenic in drinking water in Taiwan. The cancer slope factor assumes a linear dose-response relationship for cancer. However, there is a sufficient body of evidence to indicate there is a threshold or sublinear dose-response relationship for low doses of arsenic. The possibility that arsenic is an essential dietary component also supports the hypothesis that low dose exposures do not pose a carcinogenic hazard.

The carcinogenic slope factor for arsenic was derived, in part, from drinking-water studies in Taiwan. Using a carcinogenic slope factor derived from a drinking-water study for assessing potential exposures to arsenic in soil is very conservative (i.e., health protective), because a growing body of scientific evidence indicates that metals in soil are less well absorbed from the gastrointestinal tract than are metals dissolved in water (Kelley et al. 2002). The slag ballast material present at the *Site* consists of large chunks of gravel with few fines. The exposure to chemicals in such materials is less than that of soils due to a significantly lower potential for exposure via incidental ingestion, inhalation and dermal contact with ballast material. Further, the oral bioavailability of metals in soil or slag may be reduced due to a combination of factors, including the presence of less soluble species of the metal and interactions of dissolved metals with soil constituents, such as sorption and precipitation reactions. Ruby et al. (1999) presented a review of *in vivo* bioavailability studies of arsenic. The studies involving arsenic in soil containing slag material report relative absorption factors ranging from 15 to 51%. Other bioavailability values found in literature for arsenic in soils indicate that arsenic was 10-28% bioavailable (ATSDR 2000; Freeman et al 1993). Therefore, risk calculations used in this assessment may overestimate risks associated with arsenic in soil and slag material.

3.4 Human Exposure Assessment

Exposure assessment is the process of measuring or estimating the intensity, frequency, and duration of human exposure to chemicals of concern. As described in EPA's *Risk Assessment Guidance for Superfund* (U.S. EPA 1989), and more recently in *Guidelines for Exposure Assessment* (U.S. EPA 2002), the principal elements of exposure assessment are the following:

- Characterization of the exposure setting (physical environment and potential receptors)
- Identification of exposure pathways (potential sources, points of release, and exposure routes)
- Quantification of health risk estimates.

The purpose of the first step is to characterize the most important features of the site that might influence current or future human exposure to chemicals and to identify potential receptors. Potential pathways of human exposure are identified in the second step by characterizing the sources of chemicals released to the environment, points of release, and potential exposure routes. In the third step, the qualitative information from the first two steps is integrated with estimates of health risk.

Exposure assessment is conducted within the context of a site conceptual model (SCM). As described in EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (U.S. EPA 1988), the purpose of the SCM is to describe what is currently known about chemical sources, likely migration pathways, exposure routes, and possible exposure scenarios, so that the data necessary to evaluate potential health risks are identified. Figure 5 presents the SCM developed for the *Site.*

3.4.1 Characterization of Exposure Setting

Potential exposure to COIs depends on a number of factors related to the physical characteristics of a site and its surroundings. These factors include location, current and possible future use of the *Site* and surrounding areas, surface topography, and hydrogeology. These factors determine the types of activities that might occur at the S*ite*, the degree to which the *Site* is accessible to the general public, and the mechanisms that might result in the migration of COIs to potential receptors.

The *Site* is a 4.5-mile-long former UP railroad corridor which runs along both residential and commercial/industrial areas of Whittier, California. The future use of the *Site* will be a recreational trail to be used for both bicycle and pedestrian purposes. The HRA evaluates potential exposure to chemicals detected in site soils based on a recreational use scenario. Cancer risks are based on both the child and adult recreational use scenario (six years as a child and 24 years as an adult), and non-cancer risks are based on the more conservative child recreational use scenario. In additional, potential health risks to construction workers and off-site residential exposure to dusts during and after site development were evaluated.

3.4.2 Identification of Exposure Pathways

Exposure pathways are the means through which an individual may contact a chemical in the environment. Although several potential exposure pathways may exist, only a few may be "complete." For a pathway to be complete, each of the following elements must exist (U.S. EPA 1989):

- A source and mechanism for chemical release
- An environmental transport medium (e.g., air, water, or soil)
- A point of potential contact with the medium
- An exposure route at the contact point (e.g., inhalation, ingestion, or dermal contact).

For purposes of the risk assessment, potential exposures to site soils were based on data collected in the surface and near-surface soils down to 10.0 feet bgs, the deepest depth sampled. The inorganic chemicals detected in site soils may migrate to air via re-suspension of soil particulates (i.e., dust). A receptor may also be exposed to COIs in soil via incidental ingestion and dermal contact. These three pathways were evaluated for the recreational use scenario.

3.4.3 Quantification of Health Risk Estimates

The final step in conducting an exposure assessment involves identifying the equations and intake parameters for the appropriate exposure scenarios and routes, and quantifying exposure to the COIs. Exposure is estimated by calculating the annual average daily dose (AADD) and lifetime average daily dose (LADD) for each of the COIs and identified exposure pathways. The AADD and LADD both provide quantitative estimates of an individual's daily exposure to a chemical. The difference between the two estimates is the time over which the exposure is averaged. Potential noncarcinogenic health effects are assumed to occur only after a threshold dose is reached; therefore, the AADD represents the average daily dose during the period of exposure (i.e., if an individual is exposed for 25 years, then the dose is averaged over 25 years). Conversely, potential carcinogenic health effects are considered to be non-threshold phenomena. Therefore, the LADD represents the average daily dose over a lifetime (i.e., the daily dose averaged over 70 years). The components of the equation for each exposure pathway evaluated in this risk assessment are described below.

Definitions and values used for each input parameter are summarized in Table 6. The risk and hazard index calculations for the recreational use scenario are presented in Appendix F.

3.4.3.1 Inhalation of Particulates and Vapors

The following equation was used to estimate the chemical dose received by a receptor as a result of inhaling particulate COIs in soil:

$$Dose_{inhalation} = \frac{EPC \times IR \times EF \times FE \times ED}{BW \times AT \times PEF}$$

3.4.3.2 Incidental Soil Ingestion

The following equation was used to estimate the chemical dose received by a receptor as a result of incidental soil ingestion:

$$Dose_{soil\,ingestion} = \frac{EPC \times SIR \times EF \times ED \times FE \times CF}{BW \times AT}$$

3.4.3.3 Incidental Dermal Contact with Soil

The following equation was used to estimate the chemical dose received by a receptor as a result of dermal contact with soil:

$$Dose_{dermal\ contact} = \frac{EPC \times SA \times AF \times ABS \times EF \times ED \times FE \times CF}{BW\ x\ AT}$$

3.4.3.4 Exposure Parameter Assumptions

The exposure parameters used for the adult and child recreational use scenarios are the same as the default parameters used by EPA to calculate residential PRGs, with the exception of exposure frequency (EF) and fraction of soil to which the receptor is exposed at the trail (FE). An exposure frequency for a child recreator was estimated to be 196 days per year based on a community park scenario in which a child is estimated to spend four days a week at the trail for 49 weeks per year (Cal-EPA 1996). An adult was conservatively estimated to spend the same amount of time at the trail. The FE is estimated as the fraction of hours per day spent at the trail divided by the total hours awake per day. The recommended value is one hour out of twelve hours (Cal-EPA 1996); however, a more conservative value of two hours out of twelve hours was used (0.17 fraction). The exposure parameters are summarized in Table 6.

This exposure assessment is based on a reasonable maximum exposure (RME) scenario. EPA defines the RME scenario as "the highest exposure that is reasonably expected to occur at the site" (U.S. EPA 1989). In addition, EPA states, "The intent of the RME is to estimate a conservative exposure case (i.e., well above the average) that is still within the range of possible exposure" (U.S. EPA 1989). Due to the site features, a recreator is expected to use the entire trail, rather than just one portion of it. For the purposes of providing a conservative exposure estimate, the maximum detected values for each of the COIs were evaluated as the exposure point concentration (EPC) in the risk assessment. Additional calculations were performed using the 95% upper confidence limit (UCL) of the mean concentration as the EPC. The use of the 95% UCL presents a more realistic evaluation, in that it represents a soil concentration over the entire trail rather than in just one location.

3.5 Risk Characterization

Risk characterization represents the final step in the risk assessment process. In this step, the results of the exposure and toxicity assessments are integrated into quantitative or qualitative estimates of potential health risk. Potential noncarcinogenic health effects and carcinogenic health risks are characterized separately. This section also contains a qualitative discussion of the uncertainties associated with this assessment.

3.5.1 Evaluation of Potential Adverse Non-cancer Health Effects

Potential non-cancer adverse health effects were evaluated using the hazard index approach, as recommended by Cal-EPA (1992) and U.S. EPA (1989). The first step in this approach is to compare the AADD for each chemical to the appropriate RfD. This comparison is expressed in terms of a "hazard quotient," which is calculated as follows:

$$\text{Hazard Quotient}_i = \frac{\text{AADD}_i}{\text{RfD}_i}$$

A hazard quotient of less than or equal to 1 indicates that the predicted exposure to that chemical should not result in an adverse non-cancer health effect (U.S. EPA 1989). In cases where individual chemicals potentially act on the same organs or result in the same health endpoint (e.g., respiratory irritants), additive effects can be addressed by calculating a hazard index as follows:

$$\text{Hazard Index} = \sum_{i=1}^{n} \text{Hazard Quotient}_i$$

A hazard index of less than or equal to 1 indicates acceptable levels of exposure for chemicals that have an additive effect. In this assessment, a hazard index was calculated by summing the hazard quotients for all chemicals, regardless of toxic endpoint, as recommended by agency guidance (Cal-EPA 1994; U.S. EPA 1989). This approach is generally believed to overestimate the potential for noncarcinogenic health effects due to simultaneous exposure to multiple chemicals, because it does not account for different toxic endpoints (Risk Commission 1997). However, it can be used as a screening tool to identify those exposure scenarios for which exposure to multiple chemicals does not pose a non-cancer health risk. If the hazard index is greater than 1, a target-organ-specific hazard index can be calculated to more accurately assess the potential for noncarcinogenic effects to specific target organs.

3.5.2 Evaluation of Potential Carcinogenic Effects

Carcinogenic health risks are defined in terms of the increased probability of an individual developing cancer as the result of exposure to a given chemical at a given concentration. As required by Cal-EPA (1992) and U.S. EPA (1989), lifetime excess cancer risks are estimated as follows:

$$\text{Lifetime Excess Cancer Risk}_i = \text{LADD}_i \times \text{SF}_i$$

As with hazard indices, the estimated excess cancer risks for each chemical and exposure route are summed, regardless of the type of cancer associated with each chemical, to estimate the total excess cancer risk for the exposed individual.

Regulatory agencies such as Cal-EPA and U.S. EPA have defined what is considered an acceptable level of risk in similar though slightly different ways. U.S. EPA considers 1×10^{-6} to 1×10^{-4} to be the target range for acceptable risks at sites where remediation is considered (U.S. EPA 1990). Estimates of lifetime excess cancer risk associated with exposure to chemicals of less than one-in-one-million (1×10^{-6}) are considered to be so low as to warrant no further investigation or analysis (U.S. EPA 1990).

Cal-EPA also tends to work within the same target range for acceptable risk. For example, pursuant to the California Safe Drinking Water & Toxic Enforcement Act of 1986, the Office of Environmental Health Hazard Assessment (OEHHA) has established a no-significant-risk level at 1×10^{-5} (CCR Division 21.5, Title 22 §12703(b)). In addition, many air management districts consider 1×10^{-5} to be an acceptable risk level for managing air emissions under the Toxics Hot Spots program.

It should be noted that cancer risks in the 1×10^{-6} to 1×10^{-4} range or higher do not necessarily mean that adverse health effects will be observed. Current methodology for estimating the carcinogenic potential of chemicals is believed to not underestimate the true risk, but could overestimate the true risk by a considerable degree.

3.5.3 Summary of Non-cancer and Cancer Health Effects

Resultant carcinogenic risk estimates and noncarcinogenic hazard index values are presented in Table 7 for the recreational scenario, with supporting spreadsheet calculations presented in Table E-1 and E-2 (Appendix F). Construction worker and offsite residential risk estimates are presented in Table 8, with supporting spreadsheet calculations in Tables E-3 through E-5 (Appendix F). Calculations are presented using the maximum detected concentration and the 95% UCL of the mean concentration. The use of the 95% UCL presents a more realistic evaluation, in that it represents a soil concentration over the entire *Site*, rather than in just one location. Tables E-6 and E-7 (Appendix F) present the calculation of the 95% UCLs and the raw data, respectively.

The total excess cancer risk using maximum exposure concentrations for the recreational scenario is 3×10^{-5}, with arsenic contributing over 95% of the risk estimate. The total hazard index for the child recreator scenario using maximum exposure concentrations is 0.8, which is below the target hazard index value of 1.0. The total excess cancer risk for the recreational use scenario using 95% UCL exposure concentrations is 9×10^{-6}, with arsenic contributing almost 90% of the risk estimate. The total hazard index for the child recreational use scenario using 95% UCL concentrations is 0.3.

Under the construction worker scenario, it was assumed that construction would occur over a 6-month period. Workers were exposed to increased concentrations of dust due to soil movement activities, including dust generated by wind erosion, construction vehicle traffic and other construction activities. The total excess cancer risk for the construction worker is 1×10^{-6}, with arsenic contributing over 90% of the risk estimate. The total hazard index for the construction worker scenario is 0.7, which is below the target hazard index value of 1.0.

For the offsite residential scenario, it was assumed that residents would be exposed to increased concentrations of dust generated during construction activities. The receptor has no direct contact with offsite soils under this scenario. However, the screening assessment (Table 4) had previously evaluated residential receptors exposed to the maximum detected onsite concentration by ingestion, dermal

contact and inhalation of dust. The total excess cancer risks for the offsite residential scenario using the maximum and 95% UCL exposure concentrations are 2×10^{-8} and 6×10^{-9}, respectively. Arsenic contributed exclusively (99%) to the risk estimate. The total hazard index values for the offsite child residential scenario using the maximum and 95% UCL concentrations are 0.02 and 0.005, respectively.

The results of the assessment indicate that arsenic contributed almost exclusively to the carcinogenic risk estimates, and that no other COIs are a potential concern at the *Site*. The recreational scenario resulted in the highest risk estimates, and was therefore used to determine a health based target cleanup levels to be protective of future use conditions. Using the equations in Section 3.4.3, a recreational health-based target cleanup level for arsenic of 42 mg/kg was back-calculated based on the exposure parameters described in Table 6 and a target excess risk of 1×10^{-5}. Under the recreator scenario, the exposure pathway that contributes most significantly to potential health risks is ingestion of soil. This is because the recreator scenario assumes some extension of the play area behind the residential homes and incorporates a child soil ingestion rate. This is likely to be a health conservative assumption in that children are unlikely to behave in this manner on a routine basis. Additionally as previously discussed, arsenic toxicity is based on ingestion of arsenic in groundwater. Therefore, the default regulatory assumption that arsenic will be equally bioavailable in all media is likely health conservative in that metals in soil are less well absorbed from the gastrointestinal tract than are metals dissolved in water.

3.5.3.1 Evaluation of Lead

Lead is evaluated in a manner different from other chemicals, because lead toxicity is based on blood lead levels. DTSC has established an acceptable soil level of 146 mg/kg lead, based on a residential scenario calculated using LeadSpread, a spreadsheet tool that can be used to estimate blood lead concentrations that would result from exposure to lead via dietary intake, drinking water, soil and dust ingestion, inhalation, and dermal contact. This value represents the concentration in exterior soil and interior dust that will result in a 99th-percentile estimate of a blood lead level of 10 μg/dL in children. The soil concentration that would result in a 95th-percentile estimate is 226 mg/kg lead. For a recreational scenario, the exposure to lead in soil is substantially lower, due to the fact that the youth recreator is estimated to be exposed to the soil for a total of 196 days per year, rather than 365 days per year, and the fraction of site soil to which the recreator is exposed is 0.17. Using DTSC's standard default parameters and the recreational use exposure frequency and exposure fraction, clean-up levels of 333 and 560 mg/kg have been calculated, which represent the lead concentrations in soil that would result in 99th and 95th percentiles, respectively, of a blood lead level of 10 μg/dL in children. Only one of 41 soil samples analyzed for lead exceeds either of these values. This sample is at location T-12, which is located in a primarily commercial/industrial area of the *Site* and is therefore not likely to be an area in which a child recreator would spend all of his or her outdoor time. Furthermore, the 95% UCL of lead concentrations is 221 mg/kg, a value that is less than the default PRG that would result in a 95th-percentile blood lead level of 10 μg/dL in children under a residential scenario in which a child is exposed to this concentration of lead in outdoor soil and indoor dust continuously.

3.5.4 Arsenic Concentrations

Naturally occurring concentrations of arsenic are often higher than the thresholds calculated using risk assessment equations. In these cases, it is unlikely that there is any real reduction in risk to be realized in risk management options, because the observed concentrations likely represent ambient conditions. For example, the following table presents results from background metal concentration studies conducted in various California locations.

Source	Arsenic concentration (mg/kg)
Los Angeles Unified School District Sites	11.5
Lawrence Berkeley National Laboratories	19.1
Great Valley Group	31.0
Orinda Formation	17.8
Western U.S.	1-50

An assessment of arsenic soil concentrations was conducted by using the full arsenic data set and by plotting the arsenic cumulative probability versus the log of the concentration, per DTSC guidance (Cal-EPA 1997). Figure 6 shows the distribution of arsenic using the entire data set. If the data are drawn from one population, the cumulative probability plot will be a straight line. The breaks in the plot indicate the apparent presence of multiple distinct populations. Based on this assessment, the full data set is unlikely to be within the range of ambient background conditions, and some arsenic-affected soils are present. However, a significant portion of the data indicates arsenic levels within the commonly reported background ranges in California.

4.0 RISK MANAGEMENT APPROACH

This section presents the risk management approach to address the arsenic impacts identified in the HRA. As explained in Section 3.5.3, arsenic contributes almost exclusively to the excess cancer risk at the *Site*. Other chemicals are not expected to pose a health risk at the *Site*. Arsenic has been detected at concentrations ranging from less than 1 to 100 mg/kg in shallow soil at the *Site*, with a 95% UCL concentration of 30.7 mg/kg. The higher arsenic concentrations were detected sporadically across the *Site* and are likely associated with slag ballast materials within the former track bed. Other secondary sources of elevated arsenic concentrations may include arsenical pesticides and treated railroad ties (removed from *Site*). As noted previously, arsenic in soil containing slag material is known to have reduced bioavailability. In addition, there is a much lower potential for exposure to arsenic in slag ballast because this material is comprised primarily of large chunks of gravel.

Due to the large range of general ambient concentrations of arsenic detected in soil in California and within the United States, arsenic-affected sites have often been mitigated using a combination of soil management approaches. The desired risk management approach for the *Site* includes managing arsenic-affected soils by covering the existing track bed ballast and underlying soil section beneath asphalt pavement, and placement of landscaping and ground cover during trail development. The trail use areas will be constructed with 4- to 5-inch-thick AC paving over 6 inches of aggregate base (12-foot-wide bike trail) and a clean, imported 6-inch layer of DG (5-foot-wide pedestrian path). In addition, permanent landscaping and ground cover will be placed over the majority of the *Site*.

A tiered risk management approach has been developed to satisfy LACoFD requirements with respect to potential recreational and residential exposure to elevated arsenic concentrations in soil above naturally occurring background levels in addition to offsite disposal of soils containing arsenic above hazardous waste thresholds (if encountered). Soils containing arsenic concentrations up to 12 mg/kg are considered within the range of naturally occurring background levels for the greater Los Angeles area and will not require any mitigation measures other than typical dust and erosion control measures. Soils containing arsenic concentrations between 12 and 30 mg/kg will be covered with permanently maintained mulch with a minimum thickness of 6 inches and/or landscaping to minimize direct exposure. Based on the risk assessment, a level of 42 mg/kg is protective of recreator use of the Site. Therefore, covering soils containing arsenic concentrations between 12 and 30 mg/kg is a health conservative measure that will further reduce potential contact with soils. Soils containing arsenic concentrations over 30 mg/kg will be covered with minimum 12-inch-thick permanently maintained mulch and/or landscaping. Planned unlined drainage ditches will be treated with a binder product to minimize exposure and erosion potential.

5.0 SUMMARY AND CONCLUSIONS

This Supplemental Site Investigation and Human Health Risk Assessment has been prepared for the Greenway Trail Project, a 4.5-mile-long former UP railroad corridor located in the City of Whittier, California. Proposed improvements include development of the *Site* as a pedestrian trail and community park.

5.1 Supplemental Site Investigation

The results of the supplemental soil sampling performed in the vicinity of previous surface soil sample S7 (elevated dieldrin) and trench T20 (elevated TCE) did not identify significant contaminant concentrations requiring remedial efforts. Based on the results of the previous and current soil analytical data generated for the *Site*, additional sampling and analytical testing (other than remedial debris fill removal and arsenic confirmation testing) is not warranted prior to development of the *Site* as a recreational trail.

5.2 Human Health Risk Assessment

The HRA was conducted to determine whether present site conditions pose a potential health hazard to future recreational users. Arsenic has been detected in shallow soil at the *Site* at concentrations ranging from less than 1 to 100 mg/kg, with a 95% UCL concentration of 30.7 mg/kg. The higher arsenic concentrations were detected sporadically across the *Site* and are likely associated with slag ballast materials associated with the former rail operations. As noted previously, arsenic in soil containing slag material is known to have reduced bioavailability. In addition, there is a much lower potential for exposure to arsenic in slag ballast because this material is comprised primarily of large chunks of gravel. Therefore, arsenic in soil containing slag material poses a lower potential health risk.

The results of the HRA indicate that arsenic contributed almost exclusively to the carcinogenic risk estimates, and that no other COIs are cause for concern at the *Site*. The total excess cancer risk using the maximum detected soil concentration under a recreational use scenario is 3×10^{-5}, with arsenic contributing over 95% to the risk estimate. The total hazard index for a child recreator based on the maximum detected concentration is 0.8. The total excess cancer risk for the recreational scenario using 95% UCL exposure concentrations is 9×10^{-6}, with a total hazard index value of 0.3.

Under the construction worker scenario, it was assumed that construction would occur over a 6-month period. Workers were exposed to increased concentrations of dust due to soil movement activities, including dust generated by wind erosion, construction vehicle traffic and other construction activities. The total excess cancer risk for the construction worker is 1×10^{-6}, with arsenic contributing over 90% of the risk estimate. The total hazard index for the construction worker scenario is 0.7, which is below the target hazard index value of 1.0.

For the offsite residential scenario, it was assumed that residents would be exposed to increased concentrations of dust generated during construction activities. The receptor has no direct contact with offsite soils under this scenario. However, the screening assessment previously evaluated residential receptors exposed to the maximum detected onsite concentration by ingestion, dermal contact and inhalation of dust. The total excess cancer risk for the offsite residential scenario using the maximum and 95% UCL exposure concentrations is 2×10^{-8} and 6×10^{-9}, respectively. The total hazard index for the off-site child residential scenario using the maximum and 95% UCL concentration is 0.02 and 0.005, respectively.

The estimated excess cancer risk values are within EPA's range of acceptable risk of 1×10^{-4} to 1×10^{-6}. The hazard index values are below the target level of 1.0, and therefore, potential exposure to soils is not expected to pose a non-cancer risk. The recreational scenario resulted in the highest risk estimates, and was therefore used to determine a health based target cleanup levels to be protective of future use conditions. A target cleanup level for arsenic of 42 mg/kg was calculated based on recreational use and a 1×10^{-5} risk level. Under the recreator scenario, the exposure pathway that contributes most significantly to potential health risks is ingestion of soil. This is because the recreator scenario assumes some extension of the play area behind the residential homes and incorporates a child soil ingestion rate. This is likely to be a health conservative assumption in that children are unlikely to behave in this manner on a routine basis. Additionally, arsenic toxicity is based on ingestion of arsenic in groundwater. Therefore, the default regulatory assumption that arsenic will be equally bioavailable in all media is likely health conservative in that metals in soil are less well absorbed from the gastrointestinal tract than are metals dissolved in water. It is noted that the 95% UCL for arsenic of 30.7 mg/kg is significantly lower than the recreational target cleanup level of 42 mg/kg.

5.3 Risk Management Approach

The recommended risk management approach includes managing arsenic-affected soils by covering and placing the existing track bed ballast and underlying soil section beneath asphalt pavement, and permanently managing landscaping and ground cover during and after trail development. The existing track bed slag ballast materials and underling 2-inch soil section will be placed beneath the paved bike trail. The focused placement of soil containing elevated arsenic concentrations, along with establishment of landscaping and ground covering, will minimize potential future exposure to localized arsenic-containing soils at the *Site*, thereby reducing potential risks.

The following table presents a summary of the recommended risk management approach based on confirmation soil sample arsenic data:

Arsenic Level	Soil Type	Risk Management Approach
0-12 mg/kg	Background	Dust and erosion control
>12-30 mg/kg	Expected Range	Minimum 6-inch-thick permanent mulch and/or landscaping
>30 mg/kg	Elevated Arsenic	Minimum 12-inch-thick permanent mulch and/or landscaping
> 500 mg/kg or 5.0 mg/l	Hazardous Waste	Removal and offsite disposal at licensed Class I landfill by Class A/Haz Contractor

A Memorandum of Understanding (MOU) will be prepared between the City and the LACoFD to document the agreed upon risk management approaches including permanent maintenance of trail section and ground cover materials to minimize the potential for recreational and residential exposure to arsenic-affected soil after completion of the planned Greenway Trail improvements.

5.4 Grading Specifications and Environmental Monitoring

Soil samples will be obtained at approximate 200-foot intervals within the project boundaries to determine "representative" arsenic concentrations and applicable risk management approaches. Areas outside of planned grading operations may be sampled prior to the start of or during construction activities. The soil samples will be obtained from exposed (non-paved) soil areas alternating from each side of the trails and between the trails.

The soil samples will be obtained from the upper 6 inches of soil material using a pre-cleaned stainless steel trowel, placed in laboratory-provided glass sample jars, and submitted to the laboratory for analyses of total arsenic using EPA Test Method 6010B. The laboratory method detection limit will be 1.0 mg/kg. Soil samples containing arsenic above 50 mg/kg will be further analyzed for soluble arsenic using the Waste Extraction Test (WET) to determine potential exceedance of California hazardous waste thresholds. Soils determined to contain arsenic levels above California hazardous waste thresholds will require removal and disposal to a licensed Class I landfill facility by a properly licensed Class A/HAZ contractor.

The project Contractor will be required to implement "no visible" dust practices during the project grading operations to minimize potential construction worker and resident/pedestrian exposure to arsenic-impacted soil. Upwind and downwind air monitoring will further be performed periodically during the onsite grading operations to determine airborne dust and arsenic concentrations. Modifications to the Contractor dust control procedures will be required where air monitoring data exceed applicable regulatory standards including the California Occupational Safety and Health

Administration (OSHA) 8-hour Time Weighted Average (TWA) Permissible Exposure Level (PEL) of 10 micrograms per cubic meter ($\mu g/m^3$) for arsenic and the South Coast Air Quality Management District threshold of 50 $\mu g/m^3$ difference between upwind and downwind concentrations.

The Contractor should further prepare a site-specific health and safety plan prior to commencing site grading operations to address the presence of elevated arsenic in shallow soil and to outline worker training and safe practices.

5.5 Regional Water Quality Control Board Waste Discharge Permit

A copy of this report has been submitted to the Los Angeles Regional Water Quality Control Board (RWQCB) for review. The LACoFD has requested that the RWQCB provide a written waiver (if appropriate) of Waste Discharge Permit requirements to complete the planned recreational trail improvements at the *Site*.

5.6 Project Closure Report

Geocon's onsite representative will maintain field reports including a summary of project activities, grading equipment and locations, air monitoring data, soil sampling activities and where necessary soil disposal documentation. The field reports will further include scaled drawings depicting the locations of completed site improvements, soil samples and monitoring.

A Closure Report will be submitted to the LACoFD upon completion of the site grading operations, trail paving, confirmation soil sampling and analytical testing, and placement of landscaping and ground cover improvements. The report will include an as-built plan depicting the completed trail improvements, arsenic in soil sample data and applicable risk management approach. The report will further include a summary of the soil sample data, health and safety monitoring, and copies of the MOU, laboratory reports, chain-of-custody documentation, site photographs and offsite disposal manifests (where required).

6.0 REFERENCES

Cal-EPA. 1992. Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities. California Environmental Protection Agency, Department of Toxic Substances Control, Office of Scientific Affairs. July.

Cal-EPA. 1994. Preliminary Endangerment Assessment Guidance Manual. California Environmental Protection Agency, Department of Toxic Substances Control. January.

Cal-EPA. 1997. Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities. California Environmental Protection Agency, Department of Toxic Substances Control, Human and Ecological Risk Division. February.

Cal-EPA. 2003. Chronic Reference Exposure Levels. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. August. http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html.

Cal-EPA. 2004. OEHHA Cancer Potency List. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. March. http://www.oehha.ca.gov/risk/pdf/092204_cas.pdf

Geocon. 2001. Greenway Trail Project, Abandoned Union Pacific Railroad Corridor, Whittier, California Corrective Action Plan. Geocon Consultants, Inc. November.

Geocon. 2004. Greenway Trail Project, Former Union Pacific Railroad Corridor, Whittier, California, Remedial Action Workplan, Hadley Street and Whittier Bridge Debris Fills. Geocon Consultants, Inc. November.

Risk Commission. 1997. Final report, Volume 2, Risk Management in Regulatory Decision-Making. Presidential/Congressional Commission of Risk Assessment and Risk Management, Washington, D.C., Ruby, M.V., R. Schoof, W. Brattin, M. Goldade, G. Post, M. Harnois, D.E. Mostby, S.W. Casteel, W. Berti, M. Carpenter, D. Edwards, D. Cragin, and W. Chappell. 1999. Advances in evaluating the oral bioavailability of inorganics in soil for use in human health risk assessment. Environ. Sci. Technol. 33(21).

U.S. EPA. 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA. U.S. Environmental Protection Agency, Washington, DC.

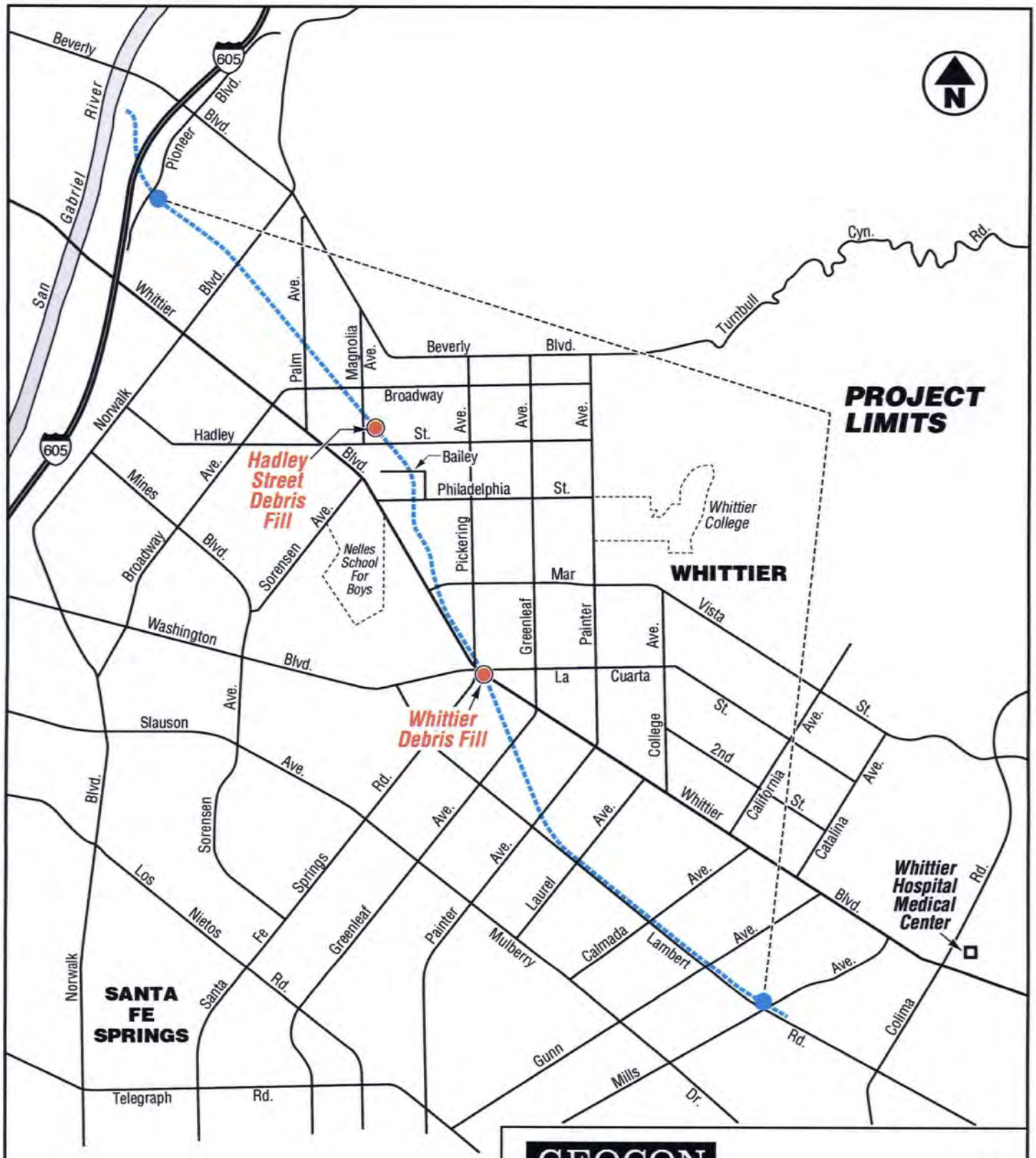
U.S. EPA. 1989. Risk Assessment Guidance for Superfund, Human Health Evaluation Manual. EPA\540\1-89\002. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC.

USEPA. 1990. National Oil and Hazardous Substances Pollution Contingency Plan. U.S. Environmental Protection Agency, Federal Register, v.55, p.8666.

U.S. EPA. 1997. Exposure Factors Handbook, Volume I, General Factors. EPA/600/P-95\002Fa. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC.

U.S. EPA. 2002. Guidelines for Exposure Assessment. U.S. Environmental Protection Agency, Washington, DC.

U.S. EPA. 2004. User's Guide and Background Technical Document for USEPA Region 9's Preliminary Remediation Goals (PRG) Table. U.S. Environmental Protection Agency, Washington, DC.



0 1/2
Scale in Miles

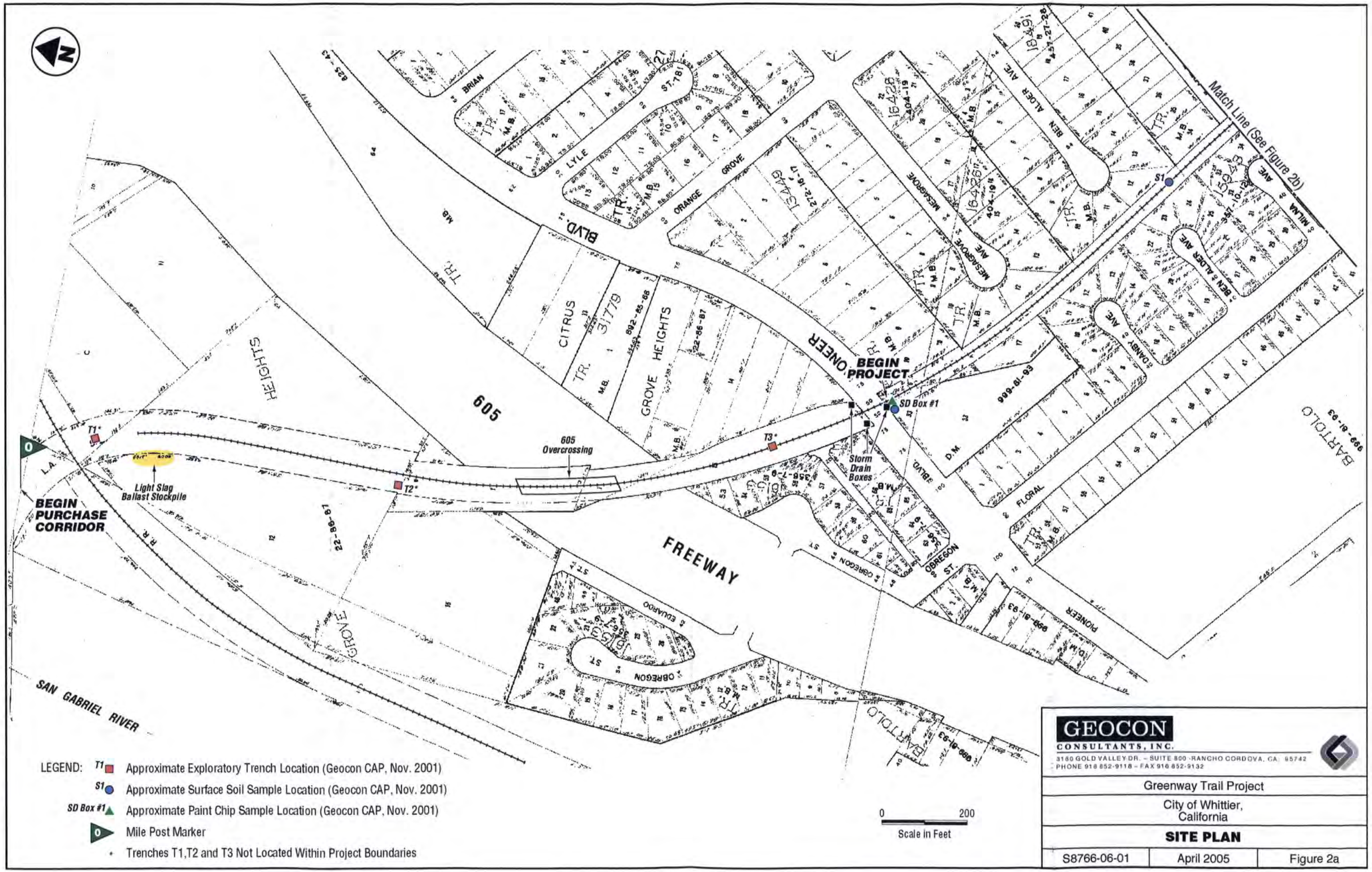
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

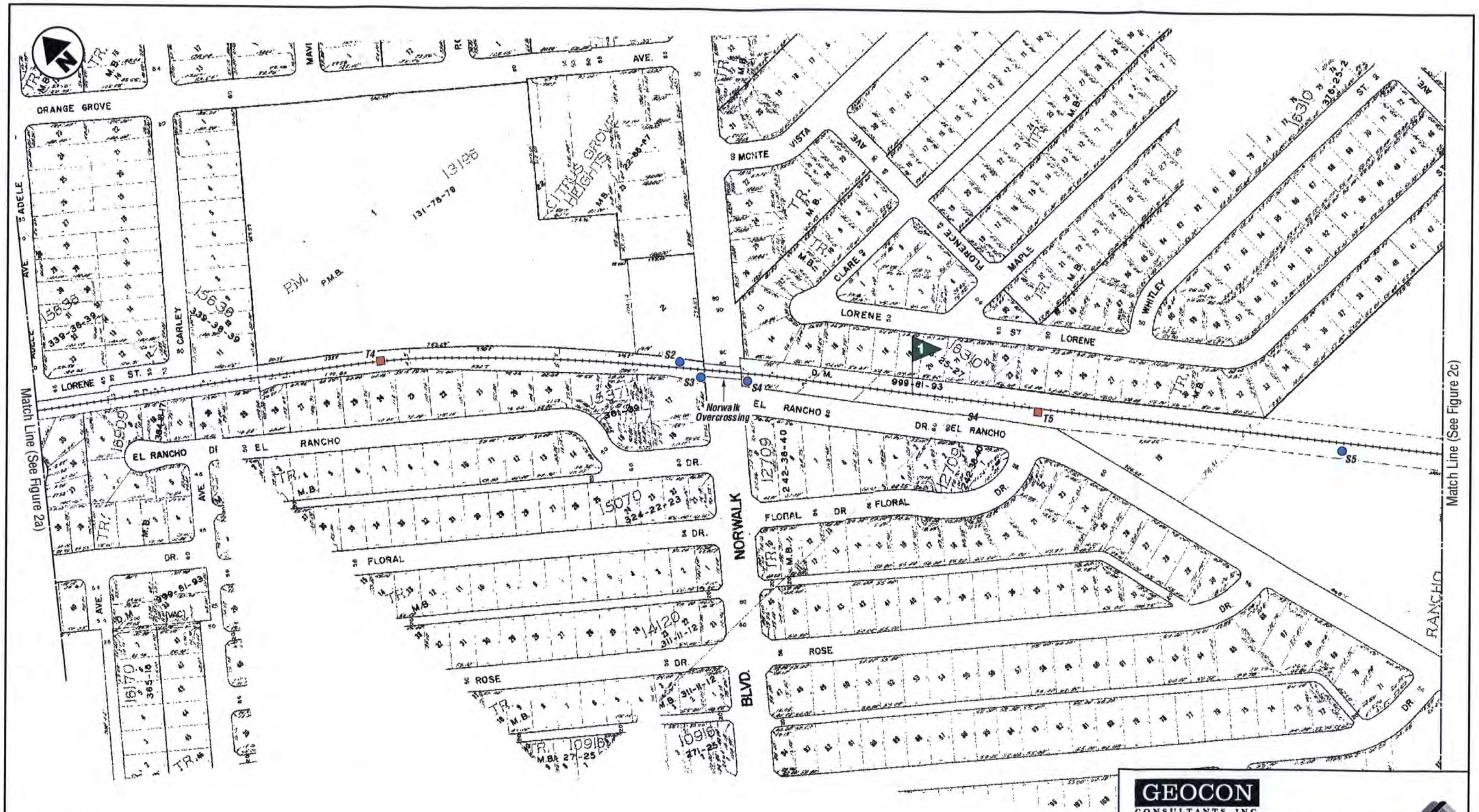
Greenway Trail Project

City of Whittier, California

PROJECT LOCATION MAP

S8766-06-01	April 2005	Figure 1


Match Line (See Figure 2b)
BEGIN PROJECT
SD Box #1
Storm Drain Boxes
605 Overcrossing
T1*
T2*
T3*
S1
Light Slag Ballast Stockpile
BEGIN PURCHASE CORRIDOR
605
FREEWAY
SAN GABRIEL RIVER
PIONEER BLVD.
ORANGE GROVE
LYLE
BRIAN
MESAGROVE AVE
BEN ALDER AVE
MILNA AVE
CITRUS HEIGHTS
GROVE HEIGHTS
FLORAL
OREGON ST.
EDUARDO
BARTOLO
L.A. R.R.
LEGEND:
T1 Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
S1 Approximate Surface Soil Sample Location (Geocon CAP, Nov. 2001)
SD Box #1 Approximate Paint Chip Sample Location (Geocon CAP, Nov. 2001)
Mile Post Marker
* Trenches T1,T2 and T3 Not Located Within Project Boundaries
0 200
Scale in Feet
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132
Greenway Trail Project
City of Whittier, California
SITE PLAN
S8766-06-01
April 2005
Figure 2a



LEGEND:

- T1 ■ Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
- S1 ● Approximate Surface Soil Sample Location (Geocon CAP, Nov. 2001)
- 0 ▶ Mile Post Marker

0 200
Scale in Feet

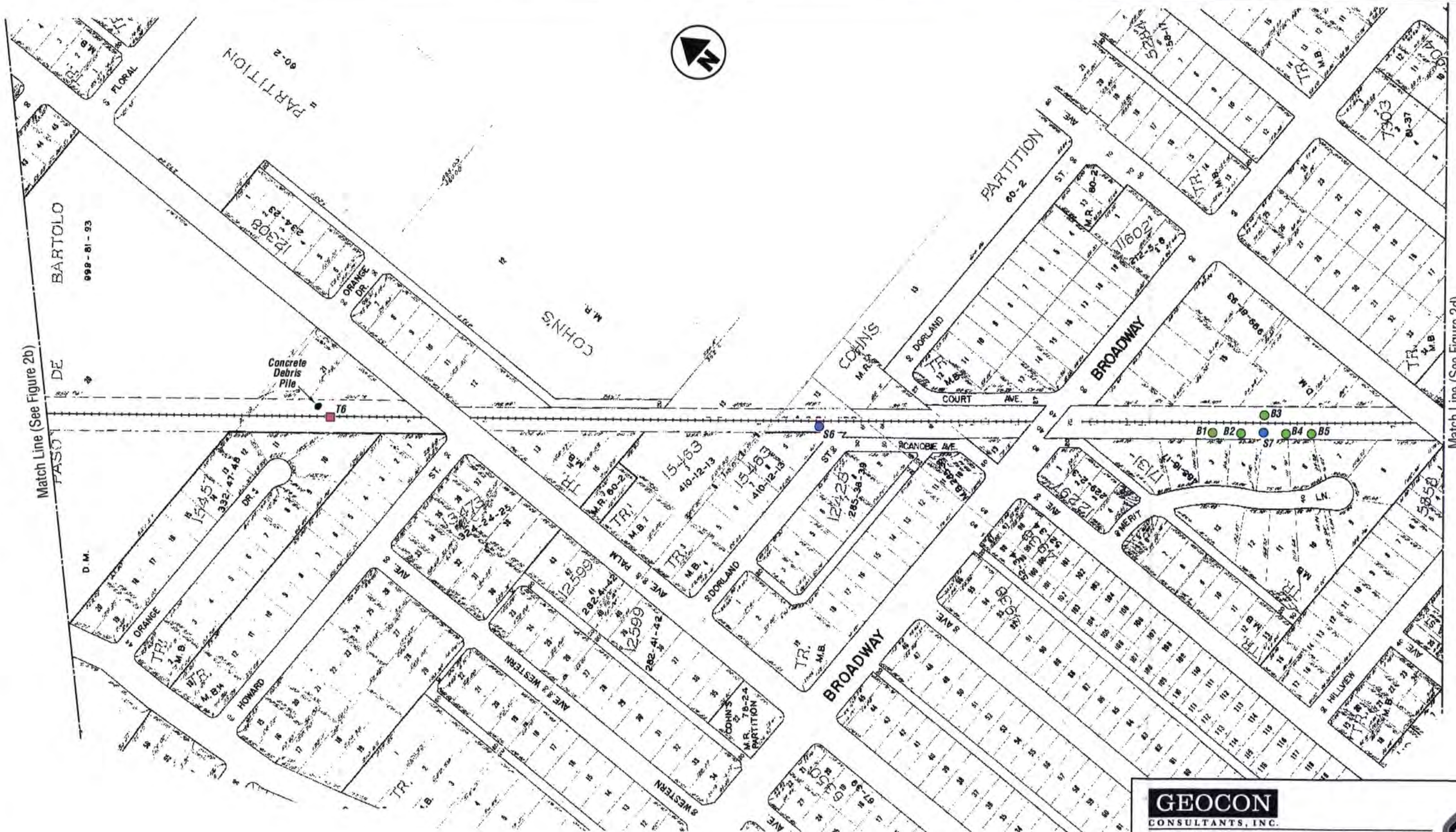
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2b



LEGEND:

- B1 Approximate Hand-Auger Boring Location (Dec. 2004)
- T1 Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
- S1 Approximate Surface Soil Sample Location (Geocon CAP, Nov. 2001)

0 200
Scale in Feet

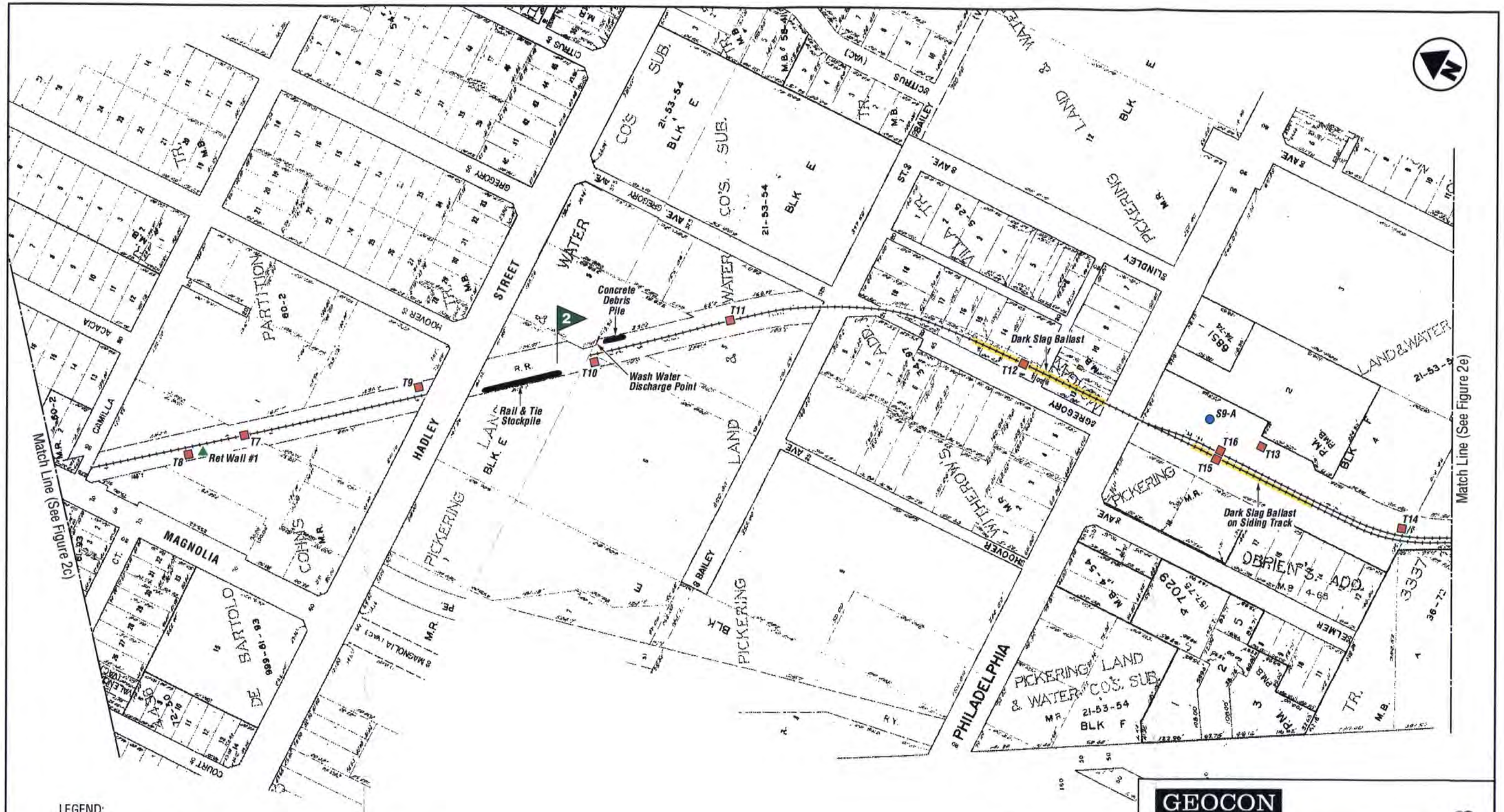
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2c



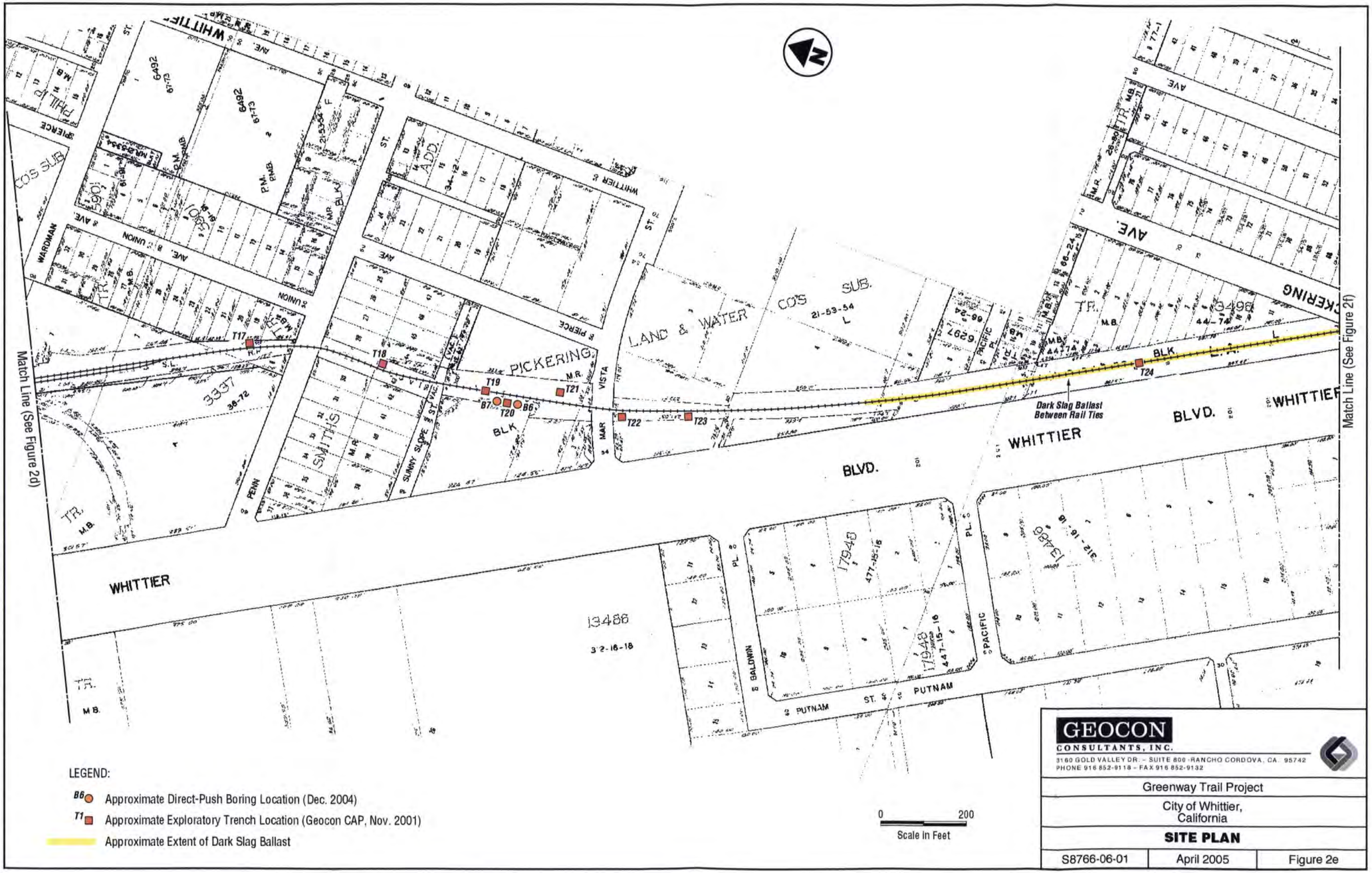
GEOCON
CONSULTANTS, INC.
8160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2d



GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2e

LEGEND:

- T1 Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
- S1 Approximate Surface Soil Sample Location (Geocon CAP, Nov. 2001)
- Approximate Extent of Dark Slag Ballast
- Mile Post Marker

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2f

LEGEND:

T1 Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)

Mile Post Marker

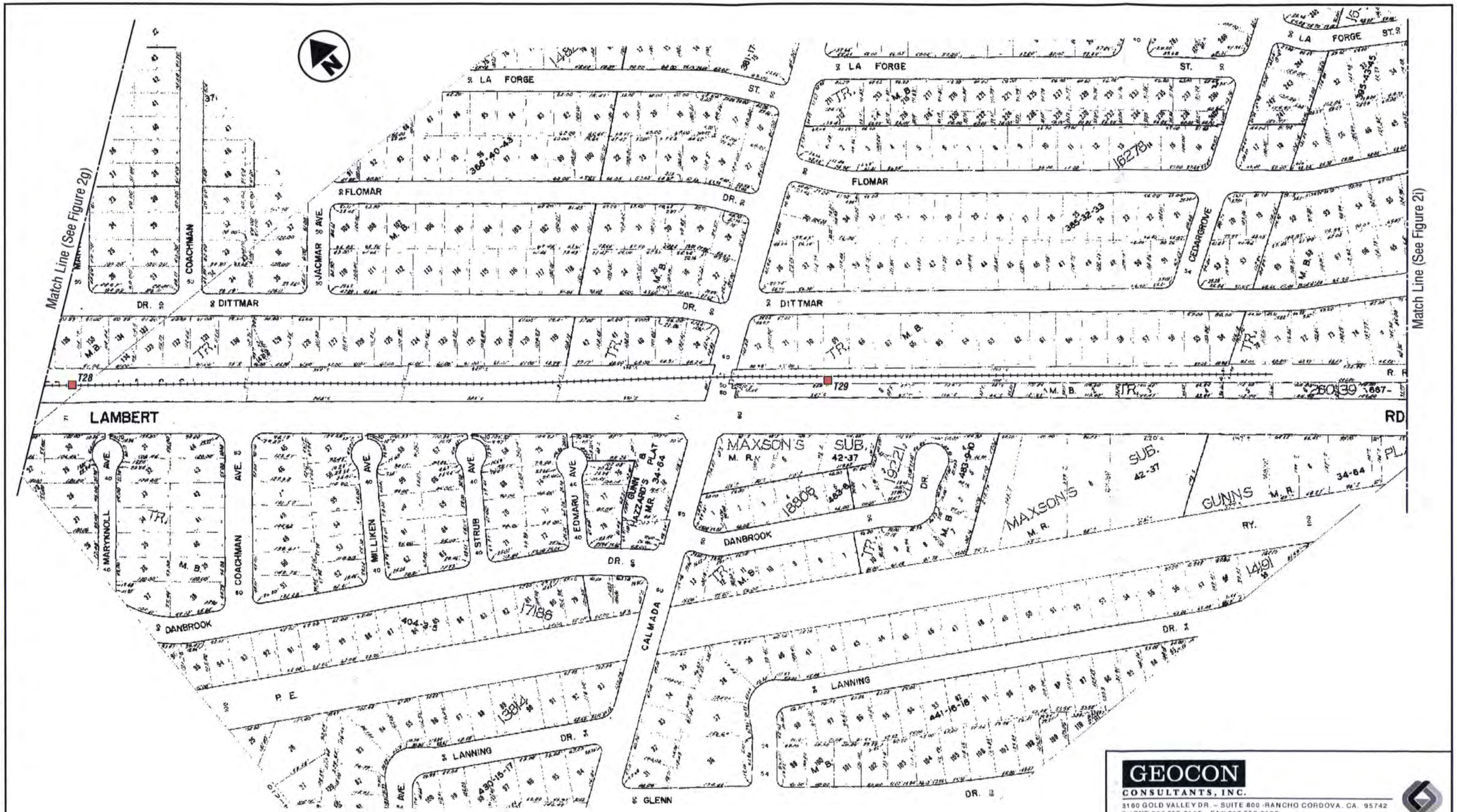
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 · RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2g



LEGEND:

T1 ■ Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2h

LEGEND:

- T1 ■ Approximate Exploratory Trench Location (Geocon CAP, Nov. 2001)
- Approximate Extent of Dark Slag Ballast
- Mile Post Marker
- Trench T31 Not Located Within Project Boundaries

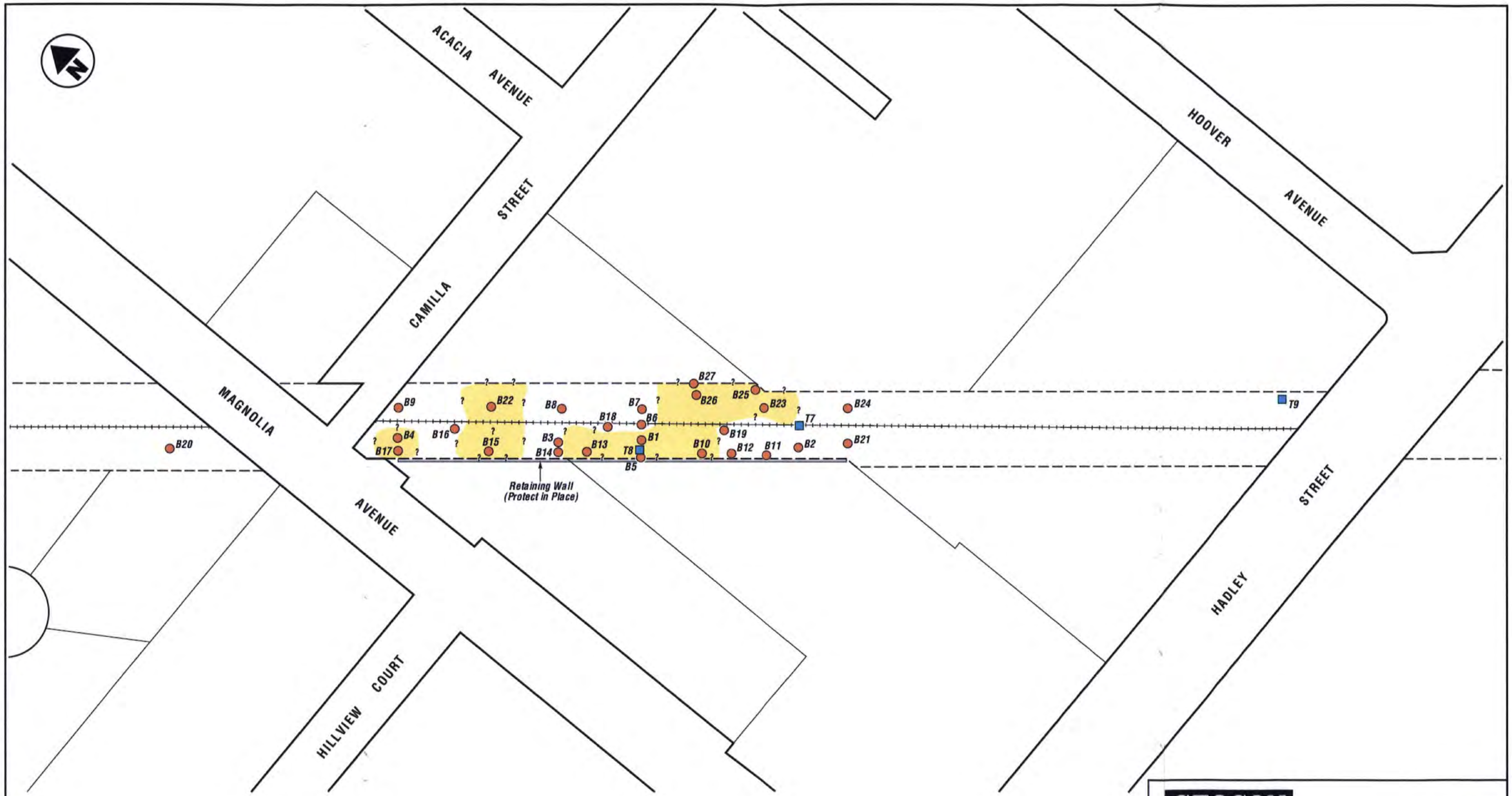
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE PLAN

S8766-06-01	April 2005	Figure 2i



LEGEND:

- T7 ■ Approximate Exploratory Trench Location (Geocon RAW, Nov. 2004)
- B1 ● Approximate Exploration Location (Geocon RAW, Nov. 2004)
- Debris Fill Material (Queried Where Limits Undefined)

0 80
Scale in Feet

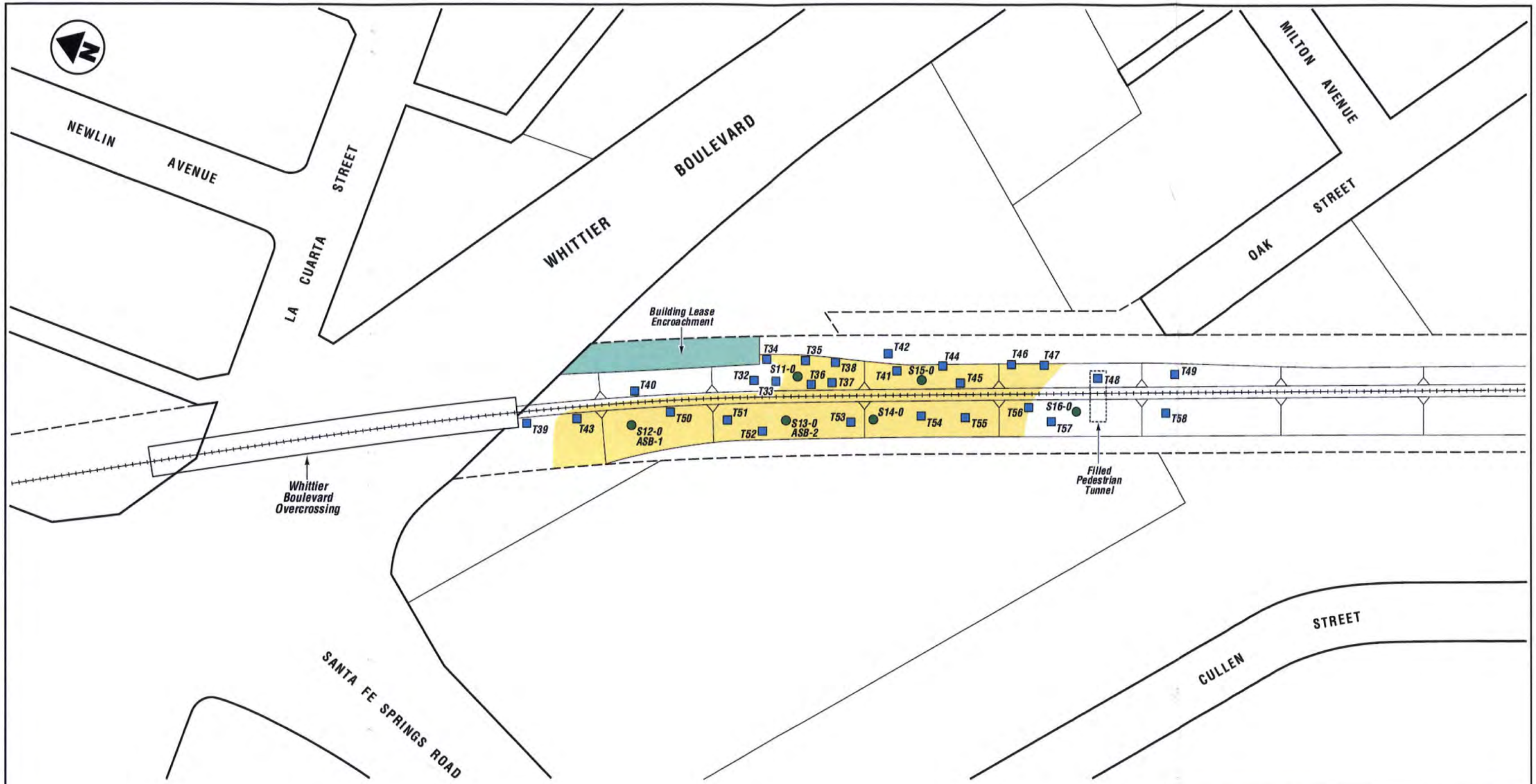
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Greenway Trail Project

City of Whittier,
California

Hadley Street Debris Fill Site Plan

S8766-06-01	April 2005	Figure 3



LEGEND:

S11-0 ● Approximate Surface Soil Sample Location (Geocon RAW, Nov. 2004)

T32 ■ Approximate Exploratory Trench Location (Geocon RAW, Nov. 2004)

Debris Fill Material

0 80
Scale in Feet

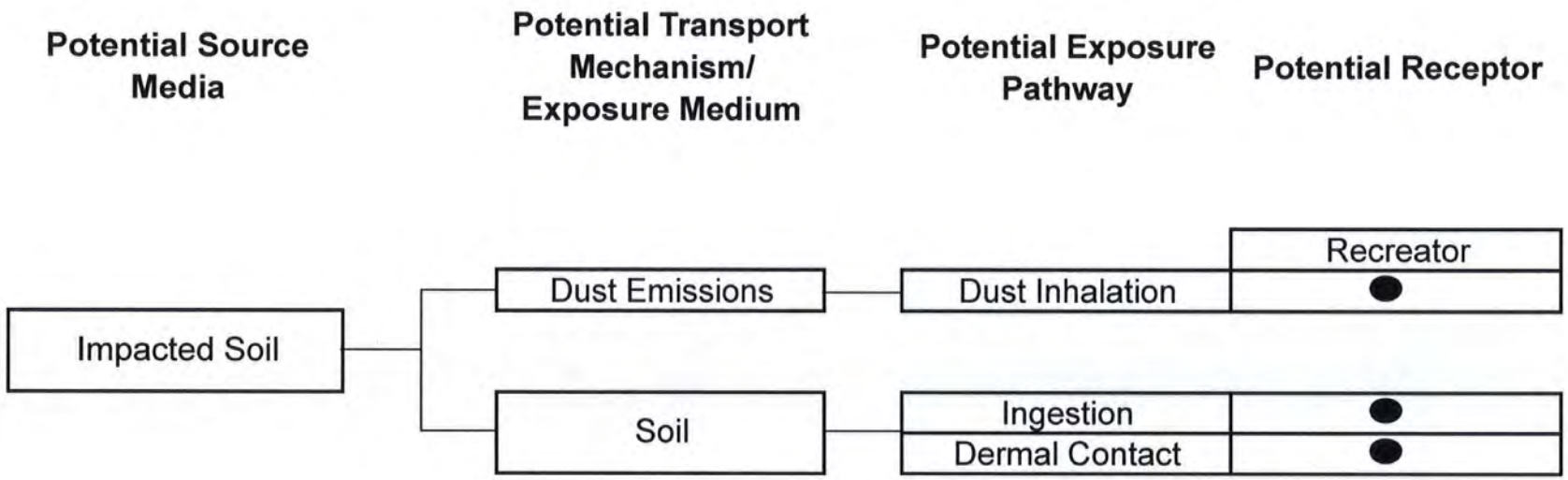
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 -RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

Whittier Boulevard Overcrossing
Debris Fill Site Plan

S8766-06-01	April 2005	Figure 4



Legend:

● Evaluated quantitatively in risk assessment

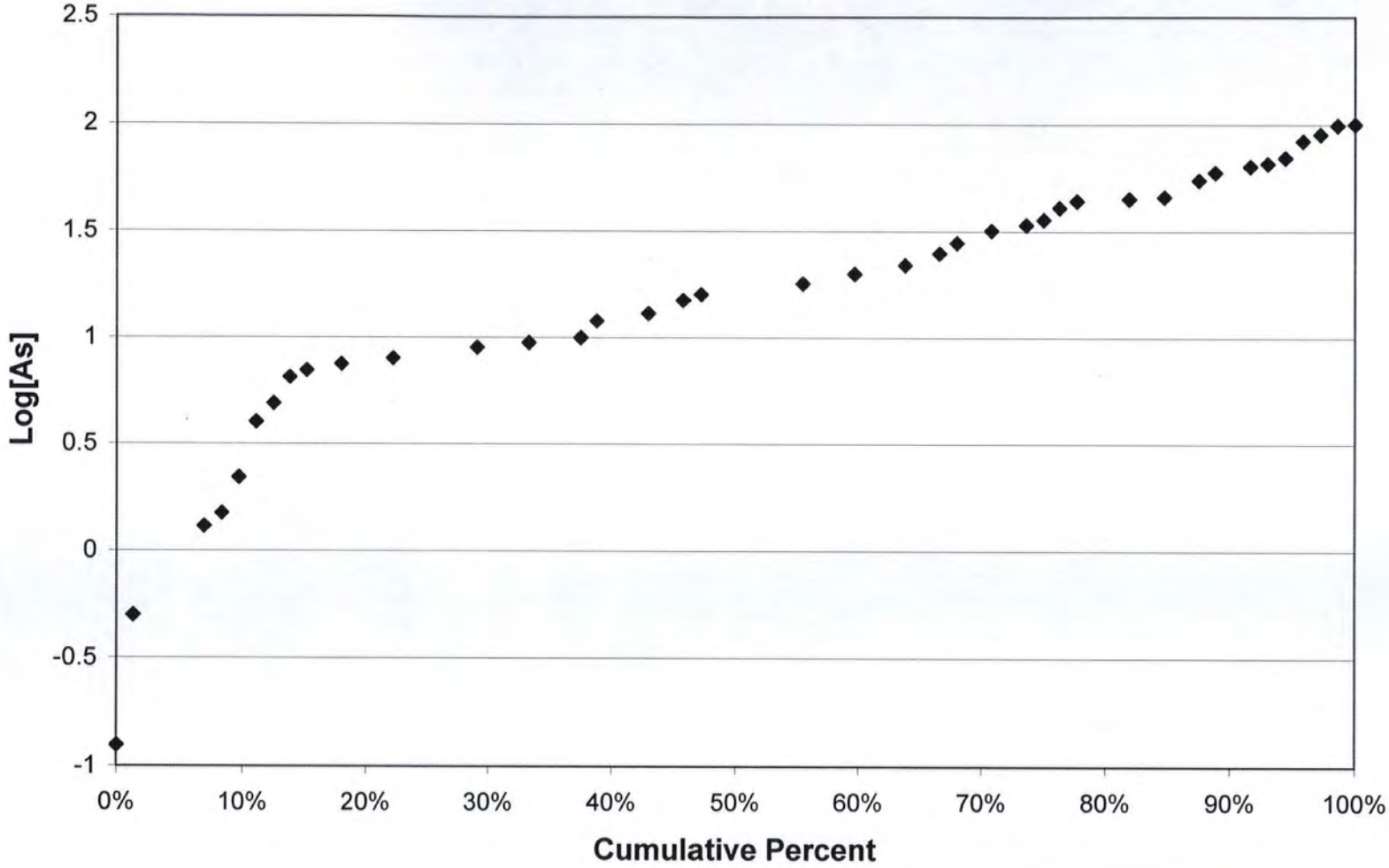
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier, California

SITE CONCEPTUAL MODEL

S8766-06-01	April 2005	Figure 5



GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Greenway Trail Project

City of Whittier,
California

DISTRIBUTION OF ARSENIC CONCENTRATIONS

S8766-06-01	April 2005	Figure 6

TABLE 1
SUMMARY OF SOIL ANALYTICAL DATA - PESTICIDES
GREENWAY TRAIL
WHITTIER, CALIFORNIA

SAMPLE ID	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	alpha-Chlordane	beta-BHC	Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC	gamma-Chlordane	Heptachlor	Heptachlor Epoxide	Methoxychlor	Toxaphene
	Results reported in µg/kg																					
B1-S	15	**2,100**	530	<1.0	<1.0	15	<1.0	150	<1.0	**110**	<1.0	<2.0	<2.0	140	<2.0	16	<1.0	12	<1.0	<1.0	<8.5	<85
B1-S*	31	**2,400**	1,200	<1.0	<1.0	22	<1.0	180	<1.0	**130**	<1.0	<2.0	<2.0	100	<2.0	30	<1.0	18	<1.0	<1.0	<8.5	<85
B1-1.5	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<85
B2-S	5.1	150	42	<1.0	<1.0	79	<1.0	450	<1.0	**100**	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	61	1.7	13	<8.5	<85
B2-1.5	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<85
B3-S	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<1.0	5.7	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<8.5	<85
B4-S	2.0	4.4	36	<1.0	<1.0	2.1	<1.0	22	<1.0	<2.0	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	2.6	<1.0	<1.0	<8.5	<85
B5-S	12	100	43	<1.0	<1.0	51	<1.0	330	<1.0	11	<1.0	<2.0	<2.0	<2.0	<2.0	<2.0	<1.0	53	<1.0	8.7	<8.5	<85
EPA Residential PRG	2,400	1,700	1,700	29	90	NA	320	1,600	NA	30	370,000	NA	NA	18,000	NA	NA	440	440	110	53	310,000	440

Notes:

B1-1.5
- Depth in feet below ground surface (S)
- Boring Identification

µg/kg = Micrograms per kilogram
< = Less than laboratory detection limits
EPA = Environmental Protection Agency
PRG = Preliminary Remediation Goal = (data in bold where PRG exceeded)
* = re-analyzed

TABLE 2
SUMMARY OF SOIL ANALYTICAL DATA - VOCs
GREENWAY TRAIL
WHITTIER, CALIFORNIA

SAMPLE ID	VOCs (µg/kg)
B6-5	ND
B6-10	ND
B7-5	ND / TCE = 5.3
B7-10	ND / TCE = 10

Notes:

B6-5

Depth in feet below ground surface

Boring Identification

µg/kg = Micrograms per kilogram

ND = not detected above laboratory test method detection limits

VOCs = Volatile organic compounds by EPA Test Method 8260B

TCE = Trichloroethene (Preliminary Remediation Goal = 0.053 µg/kg)

TABLE 3
SUMMARY OF SOIL ANALYTICAL DATA - ARSENIC
GREENWAY TRAIL
WHITTIER, CALIFORNIA

SAMPLE ID	ARSENIC (mg/kg)
B1-S	55
B1-1.5	<1.0
B2-S	22
B2-1.5	<1.0
B3-S	44
B3-1.5	66
B4-S	16
B4-1.5	13
B5-S	<1.0
B5-1.5	<1.0
B6-5	4.9
B6-10	1.5
B7-5	2.2
B7-10	1.3
EPA Residential PRG	0.062

Notes:

B1-1.5
- 1.5 — Depth in feet below ground surface (S)
- B1 — Boring Identification

mg/kg = Milligrams per kilogram
< = Less than laboratory test method detection limits
EPA = Environmental Protection Agency
PRG = Preliminary Remediation Goal

TABLE 4
SELECTION OF CHEMICALS OF INTEREST (COI)
GREENWAY TRAIL
WHITTIER, CALIFORNIA

Chemical	Number of Samples	Number of detects	Frequency of detection (%)	Maximum Detected Concentration (mg/kg)	U.S. EPA Region IX Residential PRG (mg/kg)			Non-cancer Ratio	Cancer Ratio	Is the noncancer or cancer ratio greater than 1.0 and selected as a COI?
Antimony	40	34	85%	7	31	nc		2.3E-01	NA	No
Arsenic	54	50	93%	100	0.062	ca		NA	**1.6E+03**	**Yes**
Barium	40	40	100%	180	5400	nc		3.3E-02	NA	No
Beryllium	40	1	3%	1	150	nc		6.7E-03	NA	No
Cadmium	40	1	3%	0.16	37	nc		4.3E-03	NA	No
Chromium, total	40	40	100%	200	210	ca		NA	9.5E-01	No
Cobalt	40	40	100%	17	900	ca		NA	1.9E-02	No
Copper	40	40	100%	1000	3100	nc		3.2E-01	NA	No
Lead	40	40	100%	630	150	nc	(1)	**4.2E+00**	NA	**Yes**
Mercury	40	8	20%	0.27	23	nc		1.2E-02	NA	No
Molybdenum	40	34	85%	97	390	nc		2.5E-01	NA	No
Nickel	40	40	100%	33	1600	nc		2.1E-02	NA	No
Selenium	40	1	3%	2.5	390	nc		6.4E-03	NA	No
Silver	40	2	5%	0.5	390	nc		1.3E-03	NA	No
Thallium	40	39	98%	10	5.2	nc		**1.9E+00**	NA	**Yes**
Vanadium	40	40	100%	1000	780	nc		**1.3E+00**	NA	**Yes**
Zinc	40	40	100%	660	23000	nc		2.9E-02	NA	No
4,4'-DDD	15	6	40%	0.041	2.4	ca		NA	1.7E-02	No
4,4'-DDE	15	7	40%	2.4	1.7	ca		NA	**1.4E+00**	**Yes**
4,4'-DDT	15	7	47%	1.2	1.7	ca		NA	7.1E-01	No
Alpha-chlordane	15	7	47%	0.084	1.6	ca	(2)	NA	5.3E-02	No
Chlordane	15	7	47%	0.45	1.6	ca		NA	2.8E-01	No
Dieldrin	15	7	47%	0.25	0.03	ca		NA	**8.3E+00**	**Yes**
Gamma-chlordane	15	7	47%	0.064	1.6	ca		NA	4.0E-02	No
Heptaclor	15	1	7%	0.0017	0.11	ca		NA	1.5E-02	No
Heptaclor epoxide	15	4	27%	0.013	0.053	ca		NA	2.5E-01	No
Endrin	15	1	7%	0.14	18	nc		7.8E-03	NA	No
Endrin ketone	15	1	7%	0.03	18	nc	(3)	1.7E-03	NA	No
Arochlor 1260	8	1	13%	0.22	0.22	ca		NA	**1.0E+00**	**Yes**
Trichloroethene	7	3	43%	0.034	0.053	ca		NA	6.4E-01	No

Notes:

Values in bold indicate ratios greater than 1.0.

nc = PRG based on noncancer effects

ca = PRG based on cancer effects

NA = Not applicable

(1) California-modified PRG.

(2) There is no PRG for this chemical, therefore the PRG for chlordane was used as a surrogate.

(3) There is no PRG for this chemical, therefore the PRG for endrin was used as a surrogate.

PRG = Preliminary Remediation Goal

TABLE 5
TOXICITY VALUES FOR CHEMICALS OF INTEREST
GREENWAY TRAIL
WHITTIER, CALIFORNIA

Chemical	Oral RfD mg/kg-day	Reference	Inhalation RfD mg/kg-day	Reference	Inhalation SF (mg/kg-day)-1	Reference	Oral SF (mg/kg-day)-1	Reference
Arsenic	0.0003	IRIS	8.6E-06	Cal-EPA 2003	12	Cal-EPA 2004	1.5	Cal-EPA 2004
Lead	NA	(1)	NA	(1)	NA	NA	NA	NA
Thallium	0.000066	IRIS	0.000066	(2)	NA	NA	NA	NA
Vanadium	0.001	NCEA	0.001	(2)	NA	NA	NA	NA

Notes:

RfD = reference doses
IRIS = Integrated Risk Information Systems (United States Environmental Protection Agency)
NCEA = National Center for Environmental Assessment
SF = slope factor
mg/kg = milligrams per kilogram
NA = not applicable
(1) Lead is evaluated based on resultant blood lead levels. The evaluation of lead is presented in section 5.3.1.
(2) No inhalation RfD has been established for this chemical, therefore, the oral RfD was used as a surrogate for the inhalation RfD.

TABLE 6
SUMMARY OF RECREATIONAL EXPOSURE PARAMETERS
GREENWAY TRAIL
WHITTIER, CALIFORNIA

Parameter	Symbol	Units	Child Recreator	Adult Recreator
ALL PATHWAYS				
Exposure Point Concentration	EPC	mg/kg	CS	CS
Exposure Duration	ED	yr	6	24
Averaging Time-Non-cancer	ATnc	days	2,190	8,760
Averaging Time-Cancer	ATca	days	25,550	25,550
Body Weight	BW	kg	15	70
Exposure Frequency	EF	days/yr	196	196
Fraction Exposed	FE	unitless	0.17	0.17
Conversion Factor	CF	kg/mg	1E-06	1E-06
INCIDENTAL INGESTION OF SOIL				
Ingestion Rate	SIR	mg/day	200	100
DERMAL CONTACT WITH SOIL				
Exposed Skin Surface Area	SA	cm^2	2,800	5,700
Soil-to-Skin Adherence Factor	AF	mg/cm^2	0.2	0.07
Skin Absorption Factor	ABS	unitless	CS	CS
INHALATION OF VOLATILES/PARTICULATES IN AIR				
Inhalation Rate	IR	m^3/d	10	20
Particulate Emission Factor	PEF	m^3/kg	1.32E+09	1.32E+09

Notes:

CS -- chemical specific parameter

TABLE 7
RECREATIONAL RISK ASSESSMENT
GREENWAY TRAIL
WHITTIER, CALIFORNIA

Chemical	Number of Samples	Number of detects	Frequency of detection (%)	Calculations Using Maximum Value: Maximum Detected Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk	Calculations Using 95% UCL: 95% UCL Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk
Arsenic	73	68	93%	100	4.E-01	53%	2.4E-05	96%	30.7	1.E-01	49%	9E-06	89%
Lead	40	40	100%	630	NA	NA	NA	NA	221	NA	NA	NA	NA
Thallium	40	39	98%	10	2.E-01	23%	NA	NA	2.2	4.E-02	15%	NA	NA
Vanadium	40	40	100%	1000	2.E-01	21%	NA	NA	403	7.E-02	26%	NA	NA
4,4'-DDE	15	7	47%	2.4	NA	NA	1E-07	0.4%	1.8	NA	NA	8E-08	1%
Dieldrin	15	7	47%	0.25	8.E-03	1%	8E-07	3%	0.22	7.E-03	3%	7E-07	8%
Arochlor 1260	8	1	13%	0.22	2.E-02	2%	2E-07	0.9%	0.22*	2.E-02	7%	2E-07	3%
Total Hazard Index:					**8E-01**	**100%**	--	--		**3E-01**	**100%**	--	--
Total Excess Cancer Risk:					--	--	**3E-05**	**100%**		--	--	**9E-06**	**100%**

Notes:

NA = Not applicable
*The maximum value is used because there is only one detected value.
mg/kg = milligrams per kilogram
UCL = Upper Confidence Limit

TABLE 8
CONSTRUCTION AND OFFSITE RESIDENTIAL RISK ASSESSMENT
GREENWAY TRAIL
WHITTIER, CALIFORNIA

				Construction Worker Calculations					Offsite Residential Calculations Using Maximum Value					Offsite Residential Calculations Using 95% UCL				
Chemical	Number of Samples	Number of detects	Frequency of detection (%)	95% UCL Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk	Maximum Detected Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk	95% UCL Concentration (mg/kg)	Noncancer Hazard Quotient (child)	Percent Contribution to Hazard Index	Excess Cancer Risk	Percent Contribution to Cancer Risk
Arsenic	73	68	93%	30.7	4.1E-01	52.90%	1.3E-06	89.70%	100	2.E-02	97.40%	1.7E-08	99.60%	30.7	5.E-03	97.5%	6.3E-09	99.0%
Lead	40	40	100%	221	NA	NA	NA	NA	630	NA	NA	NA	NA	221	NA	NA	NA	NA
Thallium	40	39	98%	2.2	1.1E-01	14.10%	NA	NA	10	2.E-04	1.30%	NA	NA	2.2	4.80E-05	0.8%	NA	NA
Vanadium	40	40	100%	403	1.9E-01	24.30%	NA	NA	1000	2.E-04	1.20%	NA	NA	403	8.E-05	1.4%	NA	NA
4,4'-DDE	15	7	47%	1.8	NA	NA	1.8E-08	0.80%	2.4	NA	NA	8.5E-12	0.10%	1.8	NA	NA	6.4E-12	0.1%
Dieldrin	15	7	47%	0.22	1.8E-02	2.30%	1.1E-07	7.10%	0.25	7.3E-06	0.10%	5.9E-11	0.30%	0.22	6.E-06	0.1%	5.2E-11	0.8%
Arochlor 1260	8	1	13%	0.22*	5.0E-02	6.40%	3.6E-08	2.40%	0.22	2.E-05	0.10%	6.5E-12	0.10%	0.22*	2.E-05	0.3%	6.5E-12	0.1%
Total Hazard Index:					**7E-01**					**2E-02**	**100%**	--	--		**5E-03**		--	--
Total Excess Cancer Risk:					--	--	**1E-06**			--	--	**2E-08**	**100%**		--	--	**6E-09**	**100%**

NA = Not applicable
*The maximum value is used because there is only one detected value.

APPENDIX A

Exponent

Renee M. Kalmes, M.S.P.H., C.I.H.
Managing Scientist

Professional Profile

Ms. Renee Kalmes is an environmental scientist and certified industrial hygienist with 20 years of environmental experience. Ms. Kalmes specializes in health risk assessments, exposure reconstruction, risk-based site investigations and regulatory negotiations. In this role, she is responsible for designing, conducting, and managing technical studies addressing environmental and occupational impacts of chemical agents. Ms. Kalmes has also developed and conducted sampling programs to evaluate potential chemical exposure associated with various consumer products. Ms. Kalmes has conducted over 100 risk assessments evaluating chemical exposure in both occupational and environmental settings.

Ms. Kalmes managed and testified as an expert witness for a residential development over a former landfill in northern California. For the $2 million project, prepared an extensive risk assessment, including a Monte Carlo analysis, that underwent community and regulatory agency review and was approved by the California Environmental Protection Agency Department of Toxic Substances and Control.

She has provided expert testimony to the California Public Utilities Commission, conducted third-party reviews for the California Environmental Protection Agency Department of Toxic Substances and Control, and conducted presentations to the California Central Coast Regional Water Quality Control board. Ms. Kalmes has taught more than 15 courses on risk assessment at the University of California Extension Program and has developed and conducted more than 100 employee Right-to-Know training programs for several private industries and municipalities.

Credentials and Professional Honors

M.S., Air and Industrial Hygiene—University of North Carolina (1983)
B.S., Environmental Science—Purdue University (1981)

Certified Industrial Hygienist, Comprehensive Practice

American Industrial Hygiene Association; Society of Risk Analysis; American Board of Industrial Hygiene; American Society for Testing Material, Risk Assessment Committee (Former Member); Northern California Industrial Hygiene Association (Former Newsletter Editor)

Relevant Experience

Human Health Risk Assessments

Managed health risk assessment of former ordinance explosive site in Northern California. Managed assessment of potential exposure from soil vapor to on and off-site residents from chemicals detected in groundwater beneath a residential development. For this project, Exponent compared collocated vapor flux measurements, groundwater concentrations, results of Jury and Johnson-Ettinger modeling results. Additionally, outdoor and indoor air monitoring data were evaluated. Extensive fate and transport modeling was conducted to determine effects of various soil parameters and modeling assumptions on the resultant air concentrations in an effort to calibrate the soil and groundwater vapor model. The client used our recommendations for assessing soil and groundwater vapor emissions for the site.

Managed health risk assessment for a Brownfield redevelopment located in Modesto California. Designed a focused sampling investigation to gather data for use in the risk assessment. Ecologic and human health pathways were evaluated. Evaluated potential receptors including an indoor commercial worker, outdoor service work and construction worker. Chemicals of interest included barium, arsenic, and polycyclic aromatic hydrocarbons. Impact of sulfate and pH on soil and groundwater chemistry was also assessed.

Managed risk assessment for a residential development over a former landfill in northern California. For the $2 million project, prepared an extensive risk assessment, including a Monte Carlo analysis, that underwent community and regulatory agency review and was approved by the California Environmental Protection Agency Department of Toxic Substances and Control. Evaluated soil vapor emissions, methane impacts, and soil containing residual levels of chemicals.

Managed health risk assessment for Marin Country Day School in Corte Madera, California. For this project, developed a soil sampling program to evaluate residual concentrations of polychlorinated biphenyls (PCBs) in an upper soccer field of the school. Data were used to conduct a risk assessment that assessed potential health risks to children playing at the school field. The findings from the risk assessment that there were no increased health risks to children at the school were presented to the community and the parents or the community has raised no further issues.

Managed the first "Containment Zone" Order issued by the San Francisco Regional Water Quality Control Board involving a metal (mercury) in groundwater. Prepared an alternative strategy for managing the client's abandoned production facility and groundwater plume, allowing the client to pursue future development of the site. As part of the project, transport and fate modeling was conducted to determine mass loading of chemical into the nearest downgradient water, human and ecological risk assessments were conducted, and health-based groundwater trigger levels were developed. Performed a cost-benefit risk reduction analysis.

Managed a risk assessment and feasibility study for a pesticide-contaminated site in Monterey/Salinas, California. Negotiated with the Central Coast Regional Water Quality

EX™

Control Board (CCRWQCB) on the site order. Directed technical evaluations of engineering alternatives to determine the most cost-effective remediation of soils to concentrations of toxaphene and DDT that would not pose a risk to human health and the environment. Conducted presentations to the CCRWQCB.

Managed a human and ecological risk assessment to meet the requirements of the San Francisco Bay Regional Water Quality Control Board site Order to develop health based clean-up levels for a facility closure in Newark, California. As part of the assessment, vapor transport modeling was conducted and the impact of various remedial alternatives was evaluated. A future worker and service worker were evaluated. The primary chemicals of interest included chlorinated VOCs and arsenic in shallow groundwater.

Performed health assessment of total and hexavalent chromium levels detected in soils to respond to a California Regional Water Quality Control Board order. Potential contact with soils and inhalation of dusts from wind resuspension and vehicular traffic was evaluated.

Conducted a risk assessment at a former chemical site in northern California that evaluated potential health risks to future commercial employees after development of the site as a retail space. Several VOC, including trichloroethylene, perchloroethylene, cis-1,2,-dichloroethylene, dichlorobenzene, and BTEX were detected in soil and the first two groundwater zones at the site. Chemical vapor transport from groundwater was modeled to predict indoor and outdoor air concentrations. Potential health impacts during construction activities were also evaluated.

Conducted an assessment of potential health risks to a residential development located over a former oil production field. Exposure to residual levels of PAHs and metals in soils and groundwater was evaluated. The risk assessment was accepted by the California Environmental Protection Agency Department of Toxics Substances Control and assisted in the delisting of the site as a Superfund site.

Performed preliminary endangerment assessment (PEA) for several clients to respond to requests from the California Environmental Protection Agency Department of Toxic Substances and Control. These assessment screening health assessments were performed to determine no further action on the sites. The findings were used to approve future development of the sites.

Served as principal-in-charge for a major VOC groundwater risk assessment involving potential litigation in central California. For this project, a risk-based sampling approach was used to determine potential health impacts associated with migration of groundwater. Extensive vapor transport and groundwater modeling was conducted. Information gathered during the modeling was the basis for communicating potential health risks to the public.

Conducted a third-party review for California Environmental Protection Agency Department of Toxic Substances and Control on the risk assessment portion of the environmental impact report for a major hazardous landfill in northern California. The review focused on the technical assumptions used to support decisions regarding potential health risks associated with closure of the facility. Issues reviewed included leaching of chemicals into groundwater, airborne emissions associated with closure actions, and review of drum burial remedial alternatives.

Provided testimony to the California Public Utilities Commission regarding an acceptable level of vinyl chloride and benzene in landfill gas to be used as pipeline gas.

Proposition 65

Conducted Proposition 65 evaluation for evaluation of lead emissions from facility in Southern California. Various sources of emission data were reviewed to determine the most appropriate values for the emission sources, including fugitive emissions. Air dispersion modeling was used to assess potential neighborhood lead concentrations in soil and air and evaluate Proposition 65 warning requirements. Findings were presented to the District Attorney. Based on the risk assessment result, it was determined that warnings to off-site neighbors were not required.

Conducted Proposition 65 evaluation of hexavalent chromium emissions from catalyst plant. Potential airborne exposure at residential and commercial locations was evaluated based on air dispersion modeling and review of inventory emission reports. A Phased approach was used in this evaluation utilizing both a screening air dispersion model (SCREEN 3) and a more sophisticated model (ISCST 2). Hexavalent chromium emissions were not found to present a significant risk and warnings were not required.

Conducted Proposition 65 compliance evaluations for numerous clients, including aerospace, paper products, energy and power, painting and coating, and pharmaceutical and consumer product companies. Several evaluations included extensive literature searches and the use of toxicological models to derive no significant-risk-levels and no observed-effect-levels for reproductive and developmental endpoint. Chemicals evaluated included metals, benzene, PCBs, hexavalent chromium, lead, and various chlorinated solvents.

Conducted Proposition 65 evaluation on various consumer products assessing potential exposure to children and adults to metals including lead, cadmium and arsenic. Developed sampling protocol to evaluate metals in products. In addition, evaluated potential exposure associated with dermal contact and incidental ingestion associated with hand-to-mouth activities.

Provided expert witness assistance (exposure assessment) in a Proposition 65 lawsuit involving the migration of chlorinated solvents in groundwater under an industrial facility to surface water designated as a drinking water source. The evaluation included extensive fate and transport modeling of ground and surface waters.

Managed Proposition 65 compliance evaluation for manufacturer of sodium-o-phenylphenate, a post-harvest fungicide for specific fruits. Measured airborne levels and dermal deposition values were used to estimate lifetime daily dose under occupational and consumer scenarios.

Air

Evaluated potential worker health issues associated with hexavalent chromium air emissions from a nearby plating facility for a California School District. Developed monitoring plan to collect air samples and particulate fall-out. Provided interpretation of results and recommendations for worker health and safety and regulatory impacts.

FX™

Managed over 20 air risk assessments associated with the California Hot Spots Program (AB-2588) for aerospace, chemical, and manufacturing facilities. Managed air modeling and risk assessment teams, developed protocols, tracked job costs, and interfaced with clients. One facility required an extensive evaluation of air pollution control technologies. Successfully proposed risk reduction options to avoid notification requirements and interfaced with the local California Air Quality Control Boards.

Performed a risk assessment for airborne emissions of propylene oxide from an Almond Manufacturing site in northern California. The risk assessment was performed to meet requirements of the Toxic Air Hot Spots Program (AB 2588). Propylene oxide was found to be the major contributor to potential inhalation risks. Based on this finding, worked with facility and recommended measures that resulted in reduced emissions and potential health risks. The local Air Quality Management District accepted the final risk assessment.

Managed a $100,000 health risk assessment for modifications to a major hospital waste incinerator in southern California. Project included calculation and sampling of stack emission rates, removal efficiencies, and air pollution control evaluation. Prepared a multi-pathway risk assessment that evaluated inhalation, dermal, and ingestion exposure pathways to surrounding urban community. Conducted human health risk assessment evaluating dioxin and furan air emissions from a chemical manufacturing plant in Louisiana. Performed assessment using EPA's ComDEP air dispersion model and EPA's multi-pathway guidance to assess recreational and subsistence fishers and recreational, farming and residential populations.

Conducted comprehensive risk assessment and safety hazards evaluation for a treatment, storage, and disposal facility seeking modifications to a RCRA Part B permit. Performed a multi-pathway exposure assessment on fugitive emissions from treatment and loading operations during routine and upset conditions. Risk assessment results were incorporated into the environmental impact report and indicated no significant risk to the surrounding community.

Performed a public health evaluation as part of a RCRA Permit Subpart X for an open burn incinerator for a major aerospace company. Project included evaluation of waste burn material and resultant air emission calculations.

Occupational Epidemiology

Conducted exposure assessment analysis for a mortality study of petrochemical research workers. A rigorous review of potential exposure sources was conducted to address possible relationships between etiologically significant exposure and health outcomes of employees, including chemical, radiation and EMF sources. Findings from the exposure assessment were used to determine appropriate surrogates of exposure for use in a cohort and case control study. Results were published in a scientific peer-reviewed manuscript.

Analyzed industrial hygiene data for use in a case control study of chemical workers with a reported increase of prostate cancer. The study involved extensive review of over 20 years of air and biological sampling data, along with work history information to determine the most appropriate surrogates of potential exposure. The feasibility of extrapolating more recent data

to historical exposure by considering changes in production volume, plant operations, controls measures and job functions is being conducted.

Industrial Hygiene

Provided technical support on review of health literature, asbestos air sampling methods, and worker exposure data for clients of asbestos containing products. Evaluated literature on asbestos exposure to insulator workers and brake mechanics and the awareness of worker exposure information over time.

Managed industrial hygiene sampling program for client to determine occupational levels of cyanoacrylate adhesives in workplace. More than 150 samples were collected including 8-hour, time-weighted, peak (less than minutes) and short-term levels over a 1 week-period. Provided a statistical analysis of the airborne concentrations for different job categories. Based on current industrial hygiene sampling data along with review of engineering controls, process changes and respiratory use, Ms. Kalmes prepared historic estimates of exposure. The information was subsequently used in an epidemiology study to evaluate potential irritant effects. Results are being published in a scientific peer-reviewed manuscript.

Provided review of beryllium industrial hygiene air sampling data for Brush Wellman. Developed sampling methods for analysis of ultra-fine beryllium particulates, and provided statistical evaluation of historic industrial hygiene data. Analyzed over 40 years of industrial data and provided analysis of historic employee exposure.

Conducted air sampling to determine the concentrations of benzene associated with locomotive diesel exhaust in a roundhouse and airborne Stoddard solvent associated with cleaning a locomotive generator. A simulated worst-case exposure scenario was designed to measure benzene concentrations and assess the upper bound human health risks of benzene in a railroad worker. A comparative risk analysis of the benzene concentrations measured from diesel locomotive exhaust and airborne Stoddard solvent mist, to the current occupational exposure limits and to benzene concentrations associated with cigarette smoking and filling vehicle gas tanks at service stations was provided.

Evaluated potential health effects of theatrical fog for an opera association. Provided health and safety consultation regarding use of chemicals and conducting employee training.

Performed comprehensive hazardous materials work place and environmental audits for the public and private sector and recommended strategies for worker health and safety compliance programs. Developed and performed industrial hygiene surveys for solvents, heavy metals, and particulates. Audited and reviewed health and safety compliance programs for 15 petrochemical and agricultural manufacturing facilities, and analyzed loss prevention statistics.

Developed a 40-hour Hazardous Waste Site Training Course and conducted more than 15 training sessions. Developed and conducted more than 50 worker-Right-to-Know training programs for several private industries and municipalities, including the cities of Santa Monica and Burbank, California. Prepared compliance guidelines for worker hazard communication programs

Provided a health and safety assessment of potential methane migration into a building from anaerobic biodegradation of oily soils beneath the site. Proposed soil treatment, and evaluated ventilation systems.

Publications and Presentations

Hessel, PA., R. Kalmes, T. Smith, E.Lau, P. Mink and J. Mandel. A Nested Case-Control Study of Prostate Cancer and Atrazine Exposure. Journal of Occupational Environmental Medicine. Volume 46, Number 4, April 2004.

Buffler, PA, M. Kelsh, P. Chapman, S. Wood, E. Lau, A. Golembesky, R. Wood, R. Kalmes and G. Brorby. Primary Brain Tumor Mortality at a Petroleum Exploration and Extraction Research Facility. Journal of Occupational and Environmental Medicine. Volume 46, Number 3, March 2004.

Kolanz, M.E., A.K. Madl, M.A. Kelsh, M.S. Kent, R M. Kalmes and D. J. Paustenbach 2001. A comparison and critique of historical and current exposure assessment methods for beryllium: implications for evaluating risk of chronic beryllium disease. Applied Occup. and Environ. Health. Vol 16(5) 592-614.

Paustenbach, D.P., M.L. Burke, M Shum and R. M. Kalmes. Airborne concentrations of ethyl and methyl cyanoacrylate in the workplace. Am. Ind. Hyg. Assoc. J. Jan 2001 Vol 62, No.1.

Madl, A.K., R.M. Kalmes, and D.J. Paustenbach. 1999. Community one-hour inhalation exposure limits for chemical irritants among five agencies in the United States. Presented at the American Industrial Hygiene Conference and Exposition, June 7–9, 1999. Toronto, Canada.

Madl, A.K., R.M. Kalmes, and D.J. Paustenbach. 1999. Comparison of acute inhalation exposure levels for chemical irritants among five agencies in the United States. Presented at the Society of Toxicology Annual Meeting, March 14–18, 1999. New Orleans, LA.

Kalmes, R.M., and D.B. Mathur. 1996. Application of risk-based strategies and the containment zone provision of the Regional Water Quality Control Board, San Francisco Bay Region to implement the first containment zone for a heavy metal (mercury) in California. Presented at the Ann. Mtg. of the Soc. for Risk Analysis. Dec. 8–11, 1996. New Orleans, LA.

Paustenbach, D.J., J.D. Jernigan, R. Bass, R. Kalmes, and P. Scott. 1992. A proposed approach to regulatory contaminated soil: Identify safe concentrations for seven of the most frequently encountered exposure scenarios. Regul. Toxicol. Pharmacol. 16:21–56.

APPENDIX B

LABORATORY DATA

CORRECTIVE ACTION PLAN

GREENWAY TRAIL
WHITTIER, CALIFORNIA

Note: Laboratory data generated for debris fill materials has not been incorporated in the risk assessment calculations since these materials will be properly removed from the Site.

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
T1 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	4	NP	NP	30-40
T1 – 1	Soil	T1-T3 NOT WITHIN PROJECT					
T1 – 2	Soil						
T2 – 0.5	Soil	Heavy Metals - Slag	NP	5	NP	NP	10
T2 – 1	Soil						
T2 – 2	Soil						
T3 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	8	NP	8	12
T3 – 1	Soil						
T3 – 2	Soil						
T3 – Tie Gravel	Ballast	Creosote Stains Beneath Rail Ties					
T4 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	4	NP	NP	20
T4 – 1	Soil						
T4 – 2	Soil						
T5 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	4	NP	12	20
T5 – 1	Soil						
T5 – 2	Soil						
T6 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	8	NP	NP	16
T6 – 1	Soil						
T6 – 2	Soil						
T7 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP	6	NP	NP	18
T7 – 1	Soil						
T7 – 2	Soil						
T8 – 1	Soil	Heavy Metals, TPH And VOCs Associated With Railroad Debris Fill Materials	4-7	NA	NA	NA	NA
T8 – 5.5	Debris Fill						
T8 – 7	Soil						
T8 – Stockpile	Debris Fill						
T9 – 1	Soil	TPH Stains Adjacent To Cool-A-Coo	NP	NA	NA	NA	NA
T10 – 1	Soil	TPH Adjacent To City Maintenance Facility	NP	7	NP	NP	17
T11 – 2	Soil	TPH Stain Within Track Bed	NP	10.5	NP	NP	17

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
T12 – 0.5	Dark Slag Ballast	Heavy Metals – Slag	NP	NP	8	NA	15
T12 – 1	Soil						
T12 – 2	Soil						
T13 – 2	Soil	TPH - Former Train Station Site	NP	NA	NA	NA	NA
T14 – 1	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
T15 - 0.5	Dark Slag Ballast	Heavy Metals – Slag	NP	NP	4 (siding track)	NP	15
T15 – 1	Soil						
T15 – 2	Soil						
T16 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	6	NP	12	15
T16 – 1	Soil						
T16 – 2	Soil						
T17 - 1.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
T18 – 1	Soil	TPH and VOCs Adjacent To Mar Vista Molding Co.	NP	NA	NA	NA	NA
T19 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	3	NP	18	15
T19 – 1	Soil						
T19 – 2	Soil						
T20 – 2	Soil	TPH and VOCs Adjacent to Former Dip Tank	NP	NA	NA	NA	NA
T21 – 1	Soil	VOCs From Glue Adjacent To Mar Vista Molding Co.	NP	NA	NA	NA	NA
T22 – 2	Soil	TPH Surface Stains/Oil Absorbent	NP	NA	NA	NA	NA
T23 – 1	Soil	TPH Surface Stains Adjacent To Pro Auto Sales	NP	NA	NA	NA	NA
T24 - 0.5	Light & Dark Slag Ballast	Heavy Metals – Slag	NP	4	12 (between ties)	NP	30-40 (slope)
T24 – 1	Soil						
T24 – 2	Soil						
T25 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	NP	4	12	22
T25 – 1	Soil						
T25 – 2	Soil						

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
T26 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	3	NP	9	17
T26 – 1	Soil						
T26 – 2	Soil						
T27 – 1	Soil	Pesticides, PCBs and Herbicides	NP	NA	NA	NA	NA
T28 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	3	NP	9	15
T28 – 1	Soil						
T28 – 2	Soil						
T29 – 1	Soil	TPH Adjacent to Lambert Tire Facility	NP	NA	NA	NA	NA
T30 - 0.5	Light Slag Ballast	Heavy Metals – Slag	NP	3	NP	9	16
T30 – 1	Soil						
T30 – 2	Soil						
~~T31 - 0.5~~	~~Dark Slag Ballast~~	~~Heavy Metals - Slag~~	~~NP~~	~~NP~~	~~3~~	~~15~~	~~18~~
~~T31 – 1~~	~~Soil~~						
~~T31 – 2~~	~~Soil~~						
~~T31 – Slag~~	~~Dark Slag Ballast~~	T31 NOT WITHIN PROJECT					
T32-.5	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T32 Backing Strip	Material	Asbestos Associated With Debris Fill Materials					
T33-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T34-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2	NA	NA	NA	NA
T34-3	Soil						
T35-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T35-3	Soil						
T36-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T36-3	Soil						
T37-3	Soil	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T38-4.5	Soil	Heavy Metals Associated With Debris Fill Materials	0-3.5	NA	NA	NA	NA
T39-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
T40-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T41-3	Soil	Heavy Metals Associated With Debris Fill Materials	0-2	NA	NA	NA	NA
T42-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T43-1.5	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T44-3	Soil	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T45-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1.5	NA	NA	NA	NA
T46-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1.5	NA	NA	NA	NA
T47-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-1.5	NA	NA	NA	NA
T47-2	Soil						
T48-3	Soil	Heavy Metals Associated With Pedestrian Tunnel Backfill Materials	NP	NA	NA	NA	NA
T49-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T50-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T51-1	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T52-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T53-2	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T54-1.5	Soil	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T55-.5	Debris	Heavy Metals Associated With Debris Fill Materials	0-1	NA	NA	NA	NA
T55-1.5	Soil						
T56-3	Soil	Heavy Metals Associated With Debris Fill Materials	0-2.5	NA	NA	NA	NA
T57-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA
T58-1	Soil	Heavy Metals Associated With Debris Fill Materials	NP	NA	NA	NA	NA

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
S1 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S2 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S3 – 0	Soil	Lead at Painted Norwalk Bridge Abutment	NP	NA	NA	NA	NA
S4 – 0	Soil	Lead at Painted Norwalk Bridge Abutment	NP	NA	NA	NA	NA
S5 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S6 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S7 – 0.5	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	6.5	NP	NP	17
S8 – 0	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S9 – A	Soil	Pesticides, PCBs, Herbicides, lead and arsenic	NP	NA	NA	NA	NA
S9 – B	Soil	Lead From Paint at Pedestrian Tunnel	NP	NA	NA	NA	NA
S10 – 0	Soil	Lead From Paint at Whittier Bridge Abutment	NP	NA	NA	NA	NA
S11-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S12-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S13-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S14-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S15-0	Debris Fill	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
S16-0	Soil	Heavy Metals – Whittier Bridge Debris Fill	NA	NA	NA	NA	NA
ASB-1	Asbestos Material	Debris Fill @ S. Whittier Bridge Embankment	NA	NA	NA	NA	
ASB-2	Asbestos Material	Debris Fill @ S. Whittier Bridge Embankment	NA	NA	NA	NA	
SD Box #1	Beige Paint Chip	Lead Containing Paint at Storm Drain Box	NA	NA	NA	NA	NA
SD Box #1	Soil	Lead From Paint at Storm Drain Box	NA	NA	NA	NA	NA
Ret Wall #1	Beige Paint Chip	Lead Containing Paint at Retaining Wall	NA	NA	NA	NA	NA
Ret Wall #1	Soil	Lead From Paint at Retaining Wall	NA	NA	NA	NA	NA
Ret Paint	Beige Paint Chip	Lead Containing Paint at Retaining Wall	NA	NA	NA	NA	NA
B1-8	Native Soil	Heavy Metals – Hadley Street Debris Fill	4-7	NA	NA	NA	NA
B1-12	Native Soil						
B2-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B2-4	Native Soil						
B2-8	Native Soil						
B3-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B3-4	Native Soil						
B3-8	Native Soil						

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)	LIGHT SLAG DEPTH (inches)	DARK SLAG DEPTH (inches)	GRAVEL DEPTH (inches)	BALLAST WIDTH (feet)
B4-3	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2-4	NA	NA	NA	NA
B4-4	Native Soil						
B4-8	Native Soil						
B5-2	Fill	Heavy Metals – Hadley Street Debris Fill	6-8	NA	NA	NA	NA
B5-4	Fill						
B5-7	Debris						
B5-8	Native Soil						
B5-12	Native Soil						
B6-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B6-4	Fill						
B6-6	Native Soil						
B6-8	Native Soil						
B6-12	Native Soil						
B7-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B7-4	Native Soil						
B7-8	Native Soil						
B7-12	Native Soil						
B8-4	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B8-8	Native Soil	Heavy Metals – Hadley Street Debris Fill					
B9-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B9-4	Fill						
B9-8	Native Soil						
B10-3	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2.5-3.5	NA	NA	NA	NA
B-11	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-12	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-13	Debris	Heavy Metals – Hadley Street Debris Fill	0-2	NA	NA	NA	NA
B-14	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-15	Debris	Heavy Metals – Hadley Street Debris Fill	1.5-3	NA	NA	NA	NA
B-16	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-17	Debris	Heavy Metals – Hadley Street Debris Fill	2-4	NA	NA	NA	NA
B-18	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-19	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA
B-20	Native Soil	Heavy Metals – Hadley Street Debris Fill	NP	NA	NA	NA	NA

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

Notes: NP = Not present
NA = Not available

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T1-.5	T1-1	T1-2	T2-.5	T2-1	T2-2	T3-.5	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.50	0.50	0.42	0.49	0.50	0.50	<0.25	500	150
Arsenic	34	**210 (12/1.4)**	**93 (5.2/1.4)**	12	11	17	8.0	500	50
Barium	140	38	71	110	130	150	130	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	30	7.5	11	22	20	20	10	2,500	5,600
Cobalt	5.5	3.5	6.4	9.5	11	9.0	3.0	8,000	800
Copper	46	22	30	22	20	28	14	2,500	250
Lead	48	44	28	5.0	3.5	14	18	1,000	50
Mercury	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	20	2
Molybdenum	1.5	0.25	0.39	0.48	0.50	0.50	0.33	3,500	3,500
Nickel	14	6.0	10	18	19	18	5.5	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.5	1.5	1.2	1.0	1.0	1.0	0.50	700	70
Vanadium	38	15	23	41	37	38	30	2,400	240
Zinc	64	110	230	52	48	100	45	5,000	2,500

T1-T3 NOT WITHIN PROJECT

Notes: B6-1-.5
- .5 — Sample depth in feet below surface grade
- 1 — Boring number
- B6 — Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T3-1	T3-2	T4-.5	T4-1	T4-2	T5-.5	T5-1	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.48	0.50	<0.25	0.48	0.45	1.0	0.50	500	150
Arsenic	**120 (4.8/1.2)**	18	4.0	**60 (7.1/<1.0)**	**90 (4.7/1.3)**	7.5	45	500	50
Barium	130	150	6.0	66	110	85	54	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	18	27	1.5	12	18	110	8.0	2,500	5,600
Cobalt	10	14	2.0	6.0	9.0	2.5	4.5	8,000	800
Copper	18	22	4.0	12	20	14	10	2,500	250
Lead	3.5	4.5	3.5	2.5	3.5	25	15	1,000	50
Mercury	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	20	2
Molybdenum	0.39	0.42	<0.25	<0.25	0.29	0.42	<0.25	3,500	3,500
Nickel	14	19	1.5	9.0	16	4.5	6.0	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.0	1.5	<0.25	1.0	1.0	3.0	1.5	700	70
Vanadium	36	53	5.5	24	35	**500 (11/<1.0)**	25	2,400	240
Zinc	48	57	20	34	46	34	110	5,000	2,500

T3 NOT WITHIN PROJECT

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T5-2	T6-.5	T6-1	T6-2	T7-.5	T7-1	T7-2	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.40	0.50	0.43	0.45	1.0	0.50	0.31	500	150
Arsenic	**100 (4.2/1.2)**	44	**84 (3.7/<1.0)**	9.5	46	46	45	500	50
Barium	150	62	150	160	140	100	150	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	18	26	15	16	52	22	15	2,500	5,600
Cobalt	9.0	3.5	7.5	8.0	6.0	7.0	8.0	8,000	800
Copper	20	12	17	18	**1,000 (25/<1.0)**	160	22	2,500	250
Lead	3.5	20	3.5	3.0	**190 (6.1/<1.0)**	20	3.5	1,000	50
Mercury	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	20	2
Molybdenum	0.50	0.50	1.0	1.5	1.5	0.50	1.0	3,500	3,500
Nickel	17	6.5	15	16	33	13	16	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.5	1.0	0.50	0.50	1.0	1.0	0.50	700	70
Vanadium	40	79	35	38	88	83	36	2,400	240
Zinc	59	64	120	46	260	160	46	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T8-1	T8-STK	T8-5.5	T8-7	T12-.5	T12-1	T12-2	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.27	<0.25	<0.25	<0.25	7.0	0.50	0.37	500	150
Arsenic	6.0	32	11	14	32	44	10	500	50
Barium	100	**3,600 (11/<1.0)**	170	210	7.5	50	130	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	9.5	76 (0.18 HEX)	12	14	0.50	47	17	2,500	5,600
Cobalt	4.0	4.5	7.0	8.0	17	4.5	7.5	8,000	800
Copper	14	64	30	29	**460 (<1.0/<1.0)**	16	20	2,500	250
Lead	25	**5,800**	**140 (74/<1.0)**	**160 (<1.0/<1.0)**	**630 (5.2/<1.0)**	38	3.0	1,000	50
Mercury	1.0	1.7	0.19	<0.10	<0.10	<0.10	0.20	20	2
Molybdenum	0.50	1.5	1.5	1.0	40	0.50	2.0	3,500	3,500
Nickel	10	10	16	16	3.0	9.0	20	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	2.5	<0.15	1.5	0.19	<0.15	<0.15	500	50
Thallium	0.50	3.0	0.50	1.0	0.31	0.50	1.0	700	70
Vanadium	19	18	29	31	0.50	73	40	2,400	240
Zinc	100	940	360	310	420	110	52	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
HEX = Hexavalent Chromium
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T15-.5	T15-1	T15-2	T16-.5	T16-1	T16-2	T19-.5	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	<0.25	0.27	0.29	1.0	<0.25	0.40	1.0	500	150
Arsenic	**60 (3.7/<1.0)**	16	8.0	18	18	15	13	500	50
Barium	94	170	120	160	140	150	84	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	1.0	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	9.5	16	13	200 (<0.1 HEX)	15	18	20	2,500	5,600
Cobalt	6.5	7.5	6.5	1.5	7.5	8.5	7.0	8,000	800
Copper	140	22	16	12	20	22	39	2,500	250
Lead	**94 (<1.0/<1.0)**	5.5	2.5	7.0	5.5	6.5	**84 (2.5/<1.0)**	1,000	50
Mercury	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.27	20	2
Molybdenum	18	3.5	1.5	<0.25	2.0	2.0	1.0	3,500	3,500
Nickel	22	23	16	7.5	18	22	13	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	0.50	0.50	0.50	2.5	0.50	1.0	0.50	700	70
Vanadium	22	40	32	**1,000 (7.5/<1.0)**	36	42	34	2,400	240
Zinc	440	66	42	18	86	74	140	5,000	2,500

Notes: B6-1-.5
- .5 = Sample depth in feet below surface grade
- 1 = Boring number
- B6 = Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
HEX = Hexavalent Chromium
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T19-1	T19-2	T24-.5	T24-1	T24-2	T25-.5	T25-1	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.50	0.32	2.5	0.50	0.29	1.0	0.25	500	150
Arsenic	9.5	18	**70 (<1.0/<1.0)**	32	9.0	20	20	500	50
Barium	68	40	96	43	170	60	37	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	11	7.0	5.0	5.5	14	100	8.0	2,500	5,600
Cobalt	8.0	4.5	6.5	3.0	6.5	6.5	3.5	8,000	800
Copper	23	9.5	**510 (<1.0/<1.0)**	8.5	20	240	12	2,500	250
Lead	28	29	**330 (<1.0/<1.0)**	10	8.0	43	6.5	1,000	50
Mercury	<0.10	0.10	0.17	<0.10	0.11	<0.10	<0.10	20	2
Molybdenum	0.38	0.42	97	0.50	1.0	42	0.50	3,500	3,500
Nickel	9.0	6.5	5.0	4.5	15	6.5	5.0	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	0.50	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.0	0.50	0.28	0.50	0.50	1.0	0.50	700	70
Vanadium	30	16	8.0	16	32	120	20	2,400	240
Zinc	63	64	660	260	46	150	73	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T25-2	T26-.5	T26-1	T26-2	T28-.5	T28-1	T28-2	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	0.50	2.0	<0.25	0.38	1.0	<0.25	0.37	500	150
Arsenic	16	12	16	41	34	16	20	500	50
Barium	150	60	36	180	130	32	160	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	0.16	<0.15	<0.15	<0.15	100	10
Chromium	26	170	5.5	21	60	6.0	22	2,500	5,600
Cobalt	11	2.5	3.5	8.5	4.5	3.5	8.0	8,000	800
Copper	25	10	5.5	24	14	5.5	24	2,500	250
Lead	4.0	18	2.0	4.5	42	4.5	6.0	1,000	50
Mercury	<0.10	0.14	<0.10	<0.10	0.12	<0.10	<0.10	20	2
Molybdenum	0.50	<0.25	0.30	3.0	0.50	<0.25	2.5	3,500	3,500
Nickel	20	2.5	4.0	29	8.0	4.5	26	2,000	200
Selenium	<0.25	2.5	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	500	50
Thallium	1.5	10	0.48	1.0	1.5	0.50	1.5	700	70
Vanadium	46	**710 (1.8/<1.0)**	15	50	130	16	50	2,400	240
Zinc	110	38	200	71	340	92	68	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T30-.5	T30-1	T30-2	T31-.5	T31-1	T31-2	T31-SLAG	S11-0	S12-0	S16-0	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram											
Antimony	0.50	<0.25	0.32	0.50	0.50	0.28	0.30	16	3.0	0.47	500	150
Arsenic	**64 (2.8/<1.0)**	28	28	22	34	26	2.0	30	15	7.5	500	50
Barium	94	38	130	76	98	44	9.5	250	150	90	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	4.0	<0.15	100	10
Chromium	66	7.5	18	15	18	8.0	1.0	52	34	15	2,500	5,600
Cobalt	6.5	4.0	7.5	8.0	8.0	4.0	12	16	10	7.5	8,000	800
Copper	18	6.5	18	**330 (<1.0/<1.0)**	26	7.5	**300 (<1.0/<1.0)**	**3,400 [5.0]**	840 [0.53]	19	2,500	250
Lead	28	3.0	3.5	**84 (<1.0/<1.0)**	40	2.5	28	**6,200 [14]**	**1,200 [0.74]**	29	1,000	50
Mercury	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	1.4	0.72	<0.10	20	2
Molybdenum	1.0	0.37	1.5	4.5	1.0	0.44	5.0	7.5	7.0	0.50	3,500	3,500
Nickel	11	5.0	18	12	16	6.5	5.0	120	140	10	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	0.30	<0.15	<0.15	0.37	0.50	0.32	<0.15	500	50
Thallium	1.5	0.50	0.50	1.0	1.0	0.50	<0.25	2.5	1.0	1.0	700	70
Vanadium	110	20	38	28	36	18	1.5	54	120	28	2,400	240
Zinc	100	98	57	180	240	220	87	430	750	64	5,000	2,500

Notes: B6-1-.5
- Sample depth in feet below surface grade
- Boring number
- Sample/bent identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant
[5.0] = Soluble concentration by Toxicity Characteristic Leaching Procedure (TCLP)

TABLE 3
SUMMARY OF SOIL ANALYTICAL RESULTS – PETROLEUM HYDROCARBONS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	DATE	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	VOCS EPA 8020 (µg/kg)	VOCS EPA 8260 (µg/kg)	SVOCs (µg/kg)
Detection Limit		<1.0	<1.0	<1.0	STD	STD	STD
~~T3-TIE G~~	~~8/23/01~~	~~---~~	~~<20~~	~~1,600~~			~~35,000[1]~~
T7-TIE G	8/23/01	---	<10	**340**	---	---	---
T8-STK	8/23/01	<1.0	<5.0	**250**	ND	**6.9[2]**	---
T8-5.5	8/23/01	<1.0	<10	**820**	ND	ND	---
T8-7	8/23/01	<1.0	<1.0	**5.2**	ND	ND	---
T9-1	8/23/01	---	<1.0	**96**	---	---	---
T10-1	8/23/01	<1.0	<1.0	**4.9**	ND	---	---
T11-2	8/23/01	<1.0	<1.0	**5.7**	ND	---	---
T13-2	8/23/01	<1.0	<1.0	**3.1**	ND	---	---
T18-1	8/23/01	---	<1.0	**17**	---	ND	---
T20-2	8/23/01	<1.0	<1.0	**6.5**	ND	**34[3]**	---
T21-1	8/23/01	---	---	---	---	ND	---
T22-2	8/23/01	---	<1.0	**7.1**	---	---	---
T23-1	8/23/01	---	<1.0	**5.1**	---	---	---
T29-1	8/23/01	<1.0	<5.0	**170**	ND	---	---

Notes:
TPHg = Total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
TPHmo = Total petroleum hydrocarbons as motor oil
µg/kg = Micrograms per kilogram
mg/kg = Milligrams per kilogram
GRO = Gasoline Range Organics by EPA Test Method 8015
VOCs = Volatile Organic Compounds
SVOCs = Semi-Volatile Organic Compounds by EPA Test Method 8270
1 = SVOC = Fluoranthene
2 = VOC = Naphthalene
3 = VOC = Trichloroethene

< = Less than laboratory test method detection limits
--- = Not analyzed
ND = not detected above method detection limit
STD = Standard method detection limit for each constituent
BOLD = Detection

T3 NOT LOCATED WITHIN PROJECT

TABLE 4
SUMMARY OF SOIL ANALYTICAL RESULTS – PESTICIDES, PCBs AND HERBICIDES
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	DATE	PESTICIDES EPA TEST METHOD 8081 (µg/kg)	PCBs EPA TEST METHOD 8082 (µg/kg)	HERBICIDES EPA TEST METHOD 8151 (µg/kg)
Detection Limit		STD	STD	STD
T2-.5	8/23/01	ND	ND	ND
S1-.5	8/23/01	**6.2[1], 20[2], 46[3], 9.2[4], 60[5], 5.7[6], 9.5[7], 2.6[8]**	**220[9]**	ND
S2-.5	8/23/01	ND	ND	ND
S5-.5	8/23/01	ND	ND	ND
S6-.5	8/23/01	**14[2], 23[3], 16[4], 130[5], 10[6], 16[7]**	ND	ND
S7-.5	8/23/01	**41[1], 110[2], 46[3], 84[4], 370[5], 250[6], 64[7], 11[8]**	ND	ND
S8-0	8/23/01	ND	ND	ND
S9A-0	8/23/01	ND	ND	ND
T14-1	8/23/01	ND	ND	ND
T17-1.5	8/23/01	ND	ND	ND
T27-1	8/23/01	ND	ND	ND

Notes:
< = Less than laboratory test method detection limits
--- = Not analyzed
µg/kg = Micrograms per kilogram
STD = Standard method detection limit for each constituent
PCBs= Poly chlorinated Biphenyls
ND = not detected above method detection limit
PRG = Preliminary Remediation Goal
1 = 4,4'-DDD (Residential PRG = 2,400 µg/kg)
2 = 4,4'-DDE (Residential PRG = 1,700 µg/kg)
3 = 4,4'-DDT (Residential PRG = 1,700 µg/kg)
4 = alpha-Chlordane (Residential PRG = 1,600 µg/kg)
5 = Chlordane (Residential PRG = 1,600 µg/kg)
6 = Dieldrin (Residential PRG = 30 µg/kg)
7 = gamma-Chlordane (Residential PRG = 1,600 µg/kg)
8 = Heptachlor epoxide (Residential PRG = 53 µg/kg)
9 = PCBs = Aroclor 1260 (Residential PRG = 220 µg/kg)
BOLD = Detection

TABLE 5
SUMMARY OF SOIL AND PAINT CHIP ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD AND TOTAL ARSENIC
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	TOTAL LEAD EPA METHOD 6010 (mg/kg)	WET LEAD EPA METHOD 6010 (mg/l)	DI-WET LEAD EPA METHOD 6010 (mg/l)	TOTAL ARSENIC EPA METHOD 6010 (mg/kg)
~~T3-TIEG~~	~~22~~	~~---~~	~~---~~	~~10~~
T7-TIEG	**100**	---	---	46
T9-1	7.5	---	---	9.5
T10-1	4.0	---	---	7.0
T11-2	4.0	---	---	**99**
T13-2	4.0	---	---	7.0
T14-1	5.0	---	---	8.0
T17-1.5	12	---	---	36
T18-1	34	---	---	22
T20-2	15	---	---	8.0
T22-2	3.5	---	---	8.0
T23-1	14	---	---	16
T27-1	33	---	---	9.0
T29-1	<0.25	---	---	<0.25
T32.5	5.5	---	---	---
T33-1	<5	---	---	---
T34-1	82	---	---	---
T34-3	6.1	---	---	---
T35-1	**1,500**	---	---	---
T35-3	8.1	---	---	---
T36-1	**990**	---	---	---
T36-3	5.8	---	---	---
T37-3	<5	---	---	---
T38-4.5	12	---	---	---
T39-1	<5	---	---	---
T40-1	6.9	---	---	---
T41-3	<5	---	---	---
T42-1	5.4	---	---	---
T43-1.5	<5	---	---	---
T44-3	5.0	---	---	---
T45-2	<5	---	---	---
T46-2	<5	---	---	---
T47-1	**880**	---	---	---
T47-2	43	---	---	---
T48-3	**260**	---	---	---
T49-1	5.6	---	---	---
T50-2	<5	---	---	---
T51-1	**68**	---	---	---
T52-2	<5	---	---	---
T53-2	<5	---	---	---

T3 NOT LOCATED WITHIN PROJECT

TABLE 5
SUMMARY OF SOIL AND PAINT CHIP ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD AND TOTAL ARSENIC
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	TOTAL LEAD EPA METHOD 6010 (mg/kg)	WET LEAD EPA METHOD 6010 (mg/l)	DI-WET LEAD EPA METHOD 6010 (mg/l)	TOTAL ARSENIC EPA METHOD 6010 (mg/kg)
T54-1.5	<5	---	---	---
T55-.5	<5	---	---	---
T55-1.5	**290**	---	---	---
T56-3	5.7	---	---	---
T57-1	24	---	---	---
T58-1	5.1	---	---	---
S1-.5	16	---	---	25
S2-.5	13	---	---	8.0
S3-0	**120**	1.4	<1.0	---
S4-0	4.0	---	---	---
S5-.5	6.0	---	---	7.5
S6-.5	34	---	---	12
S7-.5	**66**	---	---	9.0
S8-0	**50**	---	---	6.5
S9A-0	**150**	---	---	12
S9B-0	**120**	2.7	<1.0	---
S10-0	**260**	**8.2**	<1.0	---
S13-0	**390**	---	---	---
S14-0	**550**	---	---	---
S15-0	33	---	---	---
SD BOX #1 PAINT	**1,100**	---	---	---
SD BOX #1 SOIL	**60**	2.2	<1.0	---
RET WALL #1 PAINT	6.0	---	---	---
RET WALL #1 SOIL	82	**9.5**	<1.0	---
RET PAINT	11			
B1-8	<5	---	---	---
B1-12	<5	---	---	---
B2-2	38	---	---	---
B2-4	<5	---	---	---
B2-8	<5	---	---	---
B3-2	<5	---	---	---
B3-4	<5	---	---	---
B3-8	<5	---	---	---
B4-3	7.2	---	---	---
B4-4	**2,200**	---	---	---
B4-8	<5	---	---	---

TABLE 5
SUMMARY OF SOIL AND PAINT CHIP ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD AND TOTAL ARSENIC
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	TOTAL LEAD EPA METHOD 6010 (mg/kg)	WET LEAD EPA METHOD 6010 (mg/l)	DI-WET LEAD EPA METHOD 6010 (mg/l)	TOTAL ARSENIC EPA METHOD 6010 (mg/kg)
B5-2	5.1	---	---	---
B5-4	<5	---	---	---
B5-7	8.7	---	---	---
B5-8	<5	---	---	---
B5-12	<5	---	---	---
B6-2	<5	---	---	---
B6-4	<5	---	---	---
B6-6	<5	---	---	---
B6-8	<5	---	---	---
B6-12	<5	---	---	---
B7-2	**560**	---	---	---
B7-4	<5	---	---	---
B7-8	<5	---	---	---
B7-12	<5	---	---	---
B8-4	10	---	---	---
B8-8	<5	---	---	---
B9-2	24	---	---	---
B9-4	17	---	---	---
B9-8	<5	---	---	---
B10-3	330	---	---	---

Notes: mg/kg = Milligrams per kilogram
mg/l = Milligrams per liter
WET = Waste Extract Test method using an acid extract
DI-WET = Waste Extract Test method using a deionized water extract
--- = Not analyzed
< = Less than laboratory reporting limits
BOLD = Greater than Total Threshold Limit Concentration of 1,000 mg/kg or 10 times Soluble Threshold Limit Concentration of 5 mg/l (50 mg/kg) for total lead concentrations.
BOLD = Greater than Soluble Threshold Limit Concentration of 5 mg/l for WET lead concentrations.
BOLD = Greater than 10 times Soluble Threshold Limit Concentration of 5 mg/l (50 mg/kg) for total arsenic concentrations.

LABORATORY DATA

REMEDIAL ACTION WORKPLAN

GREENWAY TRAIL
WHITTIER, CALIFORNIA

Note: Laboratory data generated for debris fill materials has not been incorporated in the risk assessment calculations since these materials will be properly removed from the Site.

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

EXPLORATION/ SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)
HADLEY STREET DEBRIS FILL			
T7 – 0.5	Light Slag Ballast	Heavy Metals - Slag	NP
T7 – 1	Soil		
T7 – 2	Soil		
T8 – 1	Soil	Heavy Metals, TPH And VOCs Associated With Railroad Debris Fill Materials	4-7 Debris
T8 – 5.5	Debris Fill		
T8 – 7	Soil		
T8 – Stockpile	Debris Fill		
T9 – 1	Native Soil	TPH Stains Adjacent To Cool-A-Coo	NP
B1-8	Native Soil	Heavy Metals – Hadley Street Debris Fill	4-7 Debris
B1-12	Native Soil		
B2-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B2-4	Native Soil		
B2-8	Native Soil		
B3-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B3-4	Native Soil		
B3-8	Native Soil		
B4-3	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2-4 Debris
B4-4	Debris Fill		
B4-8	Native Soil		
B5-2	Fill	Heavy Metals – Hadley Street Debris Fill	6-8 Debris
B5-4	Fill		
B5-7	Debris Fill		
B5-8	Native Soil		
B5-12	Native Soil		
B6-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B6-4	Fill		
B6-6	Native Soil		
B6-8	Native Soil		
B6-12	Native Soil		
B7-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B7-4	Native Soil		
B7-8	Native Soil		
B7-12	Native Soil		
B8-4	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B8-8	Native Soil		
B9-2	Fill	Heavy Metals – Hadley Street Debris Fill	NP
B9-4	Fill		
B9-8	Native Soil		
B10-3	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2.5-3.5 Debris
B11	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B12	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B13	Debris Fill	Heavy Metals – Hadley Street Debris Fill	0-2 Debris
B14	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B15	Debris Fill	Heavy Metals – Hadley Street Debris Fill	1.5-3 Debris

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

EXPLORATION/ SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)
B16	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B17	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2-4 Debris
B18	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B19	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B20	Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B21	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B22	Debris Fill	Heavy Metals – Hadley Street Debris Fill	1.5-2 Debris
B23	Debris Fill	Heavy Metals – Hadley Street Debris Fill	2-6 Debris
B24	Fill/Native Soil	Heavy Metals – Hadley Street Debris Fill	NP
B25	Debris Fill	Heavy Metals – Hadley Street Debris Fill	0-6 Debris/Rubble
B26	Debris Fill	Heavy Metals – Hadley Street Debris Fill	4-7 Debris
B27	Debris Fill	Heavy Metals – Hadley Street Debris Fill	5-7.5 Debris
WHITTIER BOULEVARD OVERCROSSING DEBRIS FILL			
S11-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S12-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S13-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S14-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S15-0	Debris Fill	Heavy Metals Associated With Debris Fill Materials	NA
S16-0	Fill	Heavy Metals Associated With Debris Fill Materials	NA
ASB-1	Asbestos Material	Asbestos Associated With Debris Fill Materials	NA
ASB-2	Asbestos Material	Asbestos Associated With Debris Fill Materials	NA
T32-.5	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T32 Backing Strip	Asbestos Material	Asbestos Associated With Debris Fill Materials	
T33-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T34-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2 Debris
T34-3	Fill		
T35-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T35-3	Fill		
T36-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T36-3	Fill		
T37-3	Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T38-4.5	Fill	Heavy Metals Associated With Debris Fill Materials	0-3.5 Debris
T39-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T40-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T41-3	Fill	Heavy Metals Associated With Debris Fill Materials	0-2 Debris
T42-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T43-1.5	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T44-3	Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T45-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1.5 Debris

TABLE 1
SAMPLE LOG
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

EXPLORATION/ SAMPLE IDENTIFICATION – DEPTH (feet)	SAMPLE TYPE	POTENTIAL IMPACT	DEBRIS FILL DEPTH INTERVAL (feet)
T46-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1.5 Debris
T47-1	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-1.5 Debris
T47-2	Fill		
T48-3	Fill	Heavy Metals Associated With Pedestrian Tunnel Backfill Materials	NP
T49-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T50-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T51-1	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T52-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T53-2	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T54-1.5	Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T55-.5	Debris Fill	Heavy Metals Associated With Debris Fill Materials	0-1 Debris
T55-1.5	Fill		
T56-3	Fill	Heavy Metals Associated With Debris Fill Materials	0-2.5 Debris
T57-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP
T58-1	Fill	Heavy Metals Associated With Debris Fill Materials	NP

Notes: NP = Not present
NA = Not available

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	T7-.5	T7-1	T7-2	T8-1	T8-STK	T8-5.5	T8-7	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram								
Antimony	1.0	0.50	0.31	0.27	<0.25	<0.25	<0.25	500	150
Arsenic	46	46	45	6.0	32	11	14	500	50
Barium	140	100	150	100	**3,600 (11/<1.0)**	170	210	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	100	10
Chromium	52	22	15	9.5	76 (0.18 HEX)	12	14	2,500	5,600
Cobalt	6.0	7.0	8.0	4.0	4.5	7.0	8.0	8,000	800
Copper	**1,000 (25/<1.0)**	160	22	14	64	30	29	2,500	250
Lead	**190 (6.1/<1.0)**	20	3.5	25	**5,800**	**140 (74/<1.0)**	**160 (<1.0/<1.0)**	1,000	50
Mercury	<0.10	<0.10	<0.10	1.0	1.7	0.19	<0.10	20	2
Molybdenum	1.5	0.50	1.0	0.50	1.5	1.5	1.0	3,500	3,500
Nickel	33	13	16	10	10	16	16	2,000	200
Selenium	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	100	10
Silver	<0.15	<0.15	<0.15	<0.15	2.5	<0.15	1.5	500	50
Thallium	1.0	1.0	0.50	0.50	3.0	0.50	1.0	700	70
Vanadium	88	83	36	19	18	29	31	2,400	240
Zinc	260	160	46	100	940	360	310	5,000	2,500

Notes: T7-.5
- Sample depth in feet below surface grade
- Sample identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant

TABLE 2
SUMMARY OF SOIL ANALYTICAL RESULTS- TITLE 22 METALS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	S11-0	S12-0	S16-0	TTLC	10 X STLC
ANALYTE	Results in milligrams per kilogram				
Antimony	16	3.0	0.47	500	150
Arsenic	30	15	7.5	500	50
Barium	250	150	90	10,000	1,000
Beryllium	<0.15	<0.15	<0.15	75	7.5
Cadmium	<0.15	4.0	<0.15	100	10
Chromium	52	34	15	2,500	5,600
Cobalt	16	10	7.5	8,000	800
Copper	**3,400** **[5.0]**	840 [0.53]	19	2,500	250
Lead	**6,200** **[14]**	**1,200** **[0.74]**	29	1,000	50
Mercury	1.4	0.72	<0.10	20	2
Molybdenum	7.5	7.0	0.50	3,500	3,500
Nickel	120	140	10	2,000	200
Selenium	<0.25	<0.25	<0.25	100	10
Silver	0.50	0.32	<0.15	500	50
Thallium	2.5	1.0	1.0	700	70
Vanadium	54	120	28	2,400	240
Zinc	430	750	64	5,000	2,500

Notes: T7-.5
└─Sample depth in feet below surface grade
└─Sample identification

< = Less than laboratory detection limits.
TTLC = Total Threshold Limit Concentration.
STLC = Soluble Threshold Limit Concentration.
(5.2/<1.0) = Soluble concentration by Waste Extraction Test (WET) using citric acid and WET using de-ionized water extractant
[5.0] = Soluble concentration by Toxicity Characteristic Leaching Procedure (TCLP)

TABLE 3
SUMMARY OF SOIL ANALYTICAL RESULTS – PETROLEUM HYDROCARBONS AND VOCS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	DATE	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	VOCs EPA 8020 (µg/kg)	VOCs EPA 8260 (µg/kg)
HADLEY STREET DEBRIS FILL						
T8-STK	8/23/01	<1.0	<5.0	**250**	ND	**6.9**[1]
T8-5.5	8/23/01	<1.0	<10	**820**	ND	ND
T8-7	8/23/01	<1.0	<1.0	**5.2**	ND	ND
T9-1	8/23/01	---	<1.0	**96**	---	---

Notes:
TPHg = Total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
TPHmo = Total petroleum hydrocarbons as motor oil
VOCs = Volatile Organic Compounds
mg/kg = Milligrams per kilogram
µg/kg = Micrograms per kilogram
BOLD = Detection
< = Less than laboratory test method detection limits
--- = Not analyzed
ND = not detected above method detection limit
[1] = Naphthalene

TABLE 4
SUMMARY OF SOIL ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD, pH AND ASBESTOS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	SAMPLE TYPE	TOTAL LEAD EPA METHOD 6010 (mg/kg)	TCLP SOLUBLE LEAD EPA METHOD 6010 (mg/l)	pH	% ASBESTOS
HADLEY STREET DEBRIS FILL					
T9-1	Native Soil	7.5	---	---	---
B1-8	Native Soil	<5	---	---	---
B1-12	Native Soil	<5	---	---	---
B2-2	Fill	38	---	---	---
B2-4	Native Soil	<5	---	---	---
B2-8	Native Soil	<5	---	---	---
B3-2	Fill	<5	---	---	---
B3-4	Native Soil	<5	---	---	---
B3-8	Native Soil	<5	---	---	---
B4-3	Debris Fill	7.2	---	---	---
B4-4	Debris Fill	**2,200**	---	---	---
B4-8	Native Soil	<5	---	---	---
B5-2	Fill	5.1	---	---	---
B5-4	Fill	<5	---	---	---
B5-7	Debris Fill	8.7	---	---	---
B5-8	Native Soil	<5	---	---	---
B5-12	Native Soil	<5	---	---	---
B6-2	Fill	<5	---	---	---
B6-4	Fill	<5	---	---	---
B6-6	Native Soil	<5	---	---	---
B6-8	Native Soil	<5	---	---	---
B6-12	Native Soil	<5	---	---	---
B7-2	Fill	**560**	---	---	---
B7-4	Native Soil	<5	---	---	---
B7-8	Native Soil	<5	---	---	---
B7-12	Native Soil	<5	---	---	---
B8-4	Fill	10	---	---	---
B9-2	Fill	24	---	---	---
B9-4	Fill	17	---	---	---
B9-8	Native Soil	<5	---	---	---
B10-3	Debris Fill	**330**	---	---	---

TABLE 4
SUMMARY OF SOIL ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD, pH AND ASBESTOS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	SAMPLE TYPE	TOTAL LEAD EPA METHOD 6010 (mg/kg)	TCLP SOLUBLE LEAD EPA METHOD 6010 (mg/l)	pH	% ASBESTOS
B25-2	Debris Fill	**1,600**	---	---	---
B27-2	Debris Fill	9.0	---	---	---
Comp #2 (B4-4, B5-7 and B10-3)	Debris Fill	**630**	1.9	---	---
WHITTIER BOULEVARD OVERCROSSING DEBRIS FILL					
S13-0	Debris Fill	**390**	---	8.18	---
S14-0	Debris Fill	**550**	---	---	---
S15-0	Debris Fill	33	---	11.08	---
ASB1	Asbestos Material	---	---	---	85%
ASB2	Asbestos Material	---	---	---	30-60%
T32.5	Fill	5.5	---	---	---
T32 Backing Strip	Asbestos Material	---	---	---	3%
T33-1	Fill	<5	---	---	---
T34-1	Debris Fill	82	---	---	---
T34-3	Fill	6.1	---	---	---
T35-1	Debris Fill	**1,500**	---	---	---
T35-3	Fill	8.1	---	---	---
T36-1	Debris Fill	**990**	---	---	---
T36-3	Fill	5.8	---	---	---
T37-3	Fill	<5	---	---	---
T38-4.5	Fill	12	---	---	---
T39-1	Fill	<5	---	---	---
T40-1	Fill	6.9	---	---	---
T41-3	Fill	<5	---	---	---
T42-1	Fill	5.4	---	---	---
T43-1.5	Fill	<5	---	---	---
T44-3	Fill	5.0	---	---	---
T45-2	Fill	<5	---	---	---
T46-2	Fill	<5	---	---	---
T47-1	Debris Fill	**880**	---	---	---
T47-2	Fill	43	---	---	---
T48-3	Fill	**260**	---	---	---
T49-1	Fill	5.6	---	---	---

TABLE 4
SUMMARY OF SOIL ANALYTICAL RESULTS - TOTAL AND SOLUBLE LEAD, pH AND ASBESTOS
GREENWAY TRAIL PROJECT
WHITTIER, CALIFORNIA

SAMPLE I.D.	SAMPLE TYPE	TOTAL LEAD EPA METHOD 6010 (mg/kg)	TCLP SOLUBLE LEAD EPA METHOD 6010 (mg/l)	pH	% ASBESTOS
T50-2	Fill	<5	---	---	---
T51-1	Fill	**68**	---	---	---
T52-2	Fill	<5	---	---	---
T53-2	Fill	<5	---	---	---
T54-1.5	Fill	<5	---	---	---
T55-.5	Debris Fill	<5	---	---	---
T55-1.5	Fill	**290**	---	---	---
T56-3	Fill	5.7	---	---	---
T57-1	Fill	24	---	---	---
T58-1	Fill	5.1	---	---	---
Comp #1 (T34-1, T35-1, T36-1 and T47-1)	Debris Fill	**1,100**	1.5	---	---

Notes: mg/kg = Milligrams per kilogram
mg/l = Milligrams per liter
TCLP = Toxicity Characteristic Leaching Procedure
--- = Not analyzed
< = Less than laboratory reporting limits
BOLD = Greater than Total Threshold Limit Concentration of 1,000 mg/kg or
10 times Soluble Threshold Limit Concentration of 5 mg/l (50 mg/kg) for total lead concentrations

APPENDIX C

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

RECEIVED
OCT 12 2004
BY: GEOCON

P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

Refer reply to
Health Hazardous Materials Division
5825 Rickenbacker Rd.
Commerce CA 90040-3027

October 7, 2004

Robert Chavez
City of Whittier
13230 Penn St.
Whittier, CA 90602

Dear Mr. Chavez:

GREENWAY TRAIL PROJECT, MILLS AVENUE & SAN GABRIEL RIVER, WHITTIER, CA 90605 (SMU FILE #04-611/RO0000110)

This Department has completed a review of the draft "Remedial Action Plan – Hadley Street and Whittier Bridge Debris Fills", dated August 2004, submitted by your consultant, Geocon. As discussed in telephone conversations between Jon Juhrend of Geocon and Kim Clark of this Department on October 4, 2004, the "Draft Remedial Action Plan" is approved. Therefore, please submit a "final" remediation action plan for this area that also includes the following:

1. Confirmation sampling shall also include analysis for arsenic, barium and copper.

2. A complete site-specific health and safety plan which meets the requirements of CCR Title 8, Section 5192, "Hazardous Waste Operations and Emergency Response." The health and safety plan should include but not limited to: Site map, key personnel, responsibilities and qualifications, job hazard analysis, risk assessment summary, exposure monitoring plan, protective equipment, work zones and security measures, decontamination procedures, general safe work practices, standard operating procedures, nearest hospital location and map, contingency plan, training requirements and documentation of the medical surveillance program.

In addition to the above, this Department has also completed a reviewed of the "Phase I Environmental Site Assessment", dated September 2000, The "Summary Report Right of Way Slag Investigation", dated November 2000, the "Phase II Environmental Site Assessment", dated October 2001, and the "Corrective Action Plan", dated November 2001 and "Environmental Site Assessment Summary". Based on this review, this Department has identified additional areas of concern that need to be addressed. You must determine the nature, concentration, and the vertical and lateral extent of the contamination and legally dispose or remediate all contaminated materials or soils to either non-detectable or natural background concentration levels. If remediation to non-detectable or natural background levels is not possible or

feasible, appropriate federal and/or state risk assessment guidelines must be used to determine a clean-up level sufficient to protect public health and the environment.

Please submit by November 30, 2004, a workplan, which meets the standards set forth in Cal/EPA Department of Toxic Substance Control's (DTSC) "Preliminary Endangerment Assessment Guidance Manual" (PEA); Los Angeles Regional Water Quality Control Board's (RWQCB) "Interim Site Assessment & Clean-up Guide Book"; CCR Title 8, Section 5192, "Hazardous Waste Operations and Emergency Response"; and includes the following:

1. A proposal for additional borings near T20, which will fully define the lateral and vertical extent of the trichloroethene contamination. Vertical extent evaluation requires establishing a "clean zone" or interval. For volatile organic compounds (VOCs), a minimum 20-40 foot clean earth interval is generally required. The clean zone for VOCs should be established by at least four appropriate "non-detects" at 5 to 10 foot intervals and at change in lithology. If porous soils are predominant, deep soil gas monitoring may be required to verify that groundwater resources are not threatened.

2. A proposal for additional borings near S7, which will fully define the lateral and vertical extent of the dieldrin contamination.

3. A detailed plan on how the City of Whittier plans to address the slag ballast. This Department is has reviewed the risk assessment that was included in the "Corrective Action Plan" and is concerned that there are extremely high concentrations of arsenic ("hot spots") present throughout the site that may represent a public health threat. By reducing the days of exposure from 350 to 50, the risk assessment did not take into consideration the residences that may have daily exposure to the elevated concentrations, nor did it take into consideration the users who may use the recreational area on a more frequent basis. In addition, the qualifications of the risk assessment preparer were not provided.

If you have any questions, please feel free to call Kim Clark at (323) 890-4114.

Very truly yours,

SHAHIN NOURISHAD, SUPERVISOR
SITE MITIGATION UNIT
HEALTH HAZARDOUS MATERIALS DIVISION

SN:kc

cc: John Juhrend, Geocon

COUNTY OF LOS ANGELES

FIRE DEPARTMENT

P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

Refer reply to
Health Hazardous Materials Division
5825 Rickenbacker Rd.
Commerce CA 90040-3027

December 13, 2004

RECEIVED
DEC 15 2004
BY: GEOCON

Robert Chavez
City of Whittier
13230 Penn St.
Whittier, CA 90602

Dear Mr. Chavez:

GREENWAY TRAIL PROJECT, MILLS AVENUE & SAN GABRIEL RIVER, WHITTIER, CA 90605 (SMU FILE #04-611/RO0000110)

This Department has completed a review of the "Remedial Action Workplan", dated November 2004, and the "Supplemental Site Investigation Workplan", dated November 30, 2004, submitted by your consultant, Geocon. Based on this review an approval is hereby granted for implementation of both the workplans. This approval is contingent upon you and your representatives complying with the standards in this Department's "Guidance for Site Mitigation Workplans"; Cal/EPA, Department of Toxic Substances Control's "Preliminary Endangerment Assessment Guidance Manual" (PEA); Los Angeles Regional Water Quality Control Boards' (RWQCB) "Interim Site Assessment & Clean-up Guidelines"; CCR Title 8, Section 5192, "Hazardous Waste Operations and Emergency Response" and the following:

1. The workplans shall be adhered to as approved. Any change must be submitted in writing and written approval obtained from this Department prior to implementation.

2. Submittal of the subcontractors complete site-specific health and safety plan which meets the requirements of CCR Title 8, Section 5192, "Hazardous Waste Operations and Emergency Response." The health and safety plan must be approved by this Department prior to implementation of these approved workplans.

3. All necessary permits and/or approvals for any work associated with this workplan must be obtained from the appropriate agencies. The requirements listed herein do not exempt the responsible party or his agent from compliance with any other applicable laws, regulations, or ordinances. They do not legalize waste treatment or disposal facilities and they leave unaffected any further restriction or restraint which may be contained in other statutes or required by other agencies.

4. This workplan must be implemented by January 28, 2005.

5. Notify this office at least three (3) working days prior to the implementation of this workplan.

If you have any questions, please feel free to call Kim Clark at (323) 890-4114.

Very truly yours,

Shahin Nourishad

SHAHIN NOURISHAD, SUPERVISOR
SITE MITIGATION UNIT
HEALTH HAZARDOUS MATERIALS DIVISION

SN:kc

cc: John Juhrend, Geocon

APPENDIX D

PROJECT NO. S8766-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	**BORING NO. B6** DATE DRILLED 12/30/04 WATER LEVEL (ATD) ____ EQUIPMENT GEOPROBE DRILLER PROSONIC	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				**ALLUVIUM**		
2						
3						
4						
5		B6-5 0945		Damp, dark brown, Clayey fine to medium SAND	SC	
6						
7						
8						
9						
10		B6-10 1000		Damp, light brown, fine to coarse SAND with trace gravel	SP	
11						
12				BORING TERMINATED AT 12 FEET NO STAINED OR ODOROUS SOIL ENCOUNTERED		

Figure 1, Log of Boring B6, page 1 of 1

ENV_NO_WELL GREENWAY.GPJ 02/11/05

BORING ELEVATION:	**NA**	ENGINEER/GEOLOGIST:	**TYLER RENFRO**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. S8766-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	**BORING NO. B7** DATE DRILLED 12/30/04 WATER LEVEL (ATD) ____ EQUIPMENT GEOPROBE DRILLER PROSONIC	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
				ALLUVIUM		
1						
2						
3						
4						
5		B7-5 1010		Damp, light brown, Clayey fine to medium SAND	SC	
6						
7						
8						
9						
10		B7-10 1015				
11						
12				BORING TERMINATED AT 12 FEET NO STAINED OR ODOROUS SOIL ENCOUNTERED		

Figure 2, Log of Boring B7, page 1 of 1

ENV_NO_WELL GREENWAY.GPJ 02/11/05

BORING ELEVATION:	**NA**	ENGINEER/GEOLOGIST:	**TYLER RENFRO**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

APPENDIX E

January 03, 2005

RECEIVED
FEB 07 2005
BY: GEOCON

ACCREDITED IN ACCORDANCE WITH nelac

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

Workorder No.: 073011

RE: GREENWAY TRAIL, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 21, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B1-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:22:00 PM
Lab ID:	073011-001A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4'-DDD	15	2.0		µg/Kg	1	12/29/2004
4,4'-DDE	2100	100		µg/Kg	50	12/30/2004
4,4'-DDT	530	100		µg/Kg	50	12/30/2004
Aldrin	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/29/2004
alpha-Chlordane	15	1.0		µg/Kg	1	12/29/2004
beta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Chlordane	150	8.5		µg/Kg	1	12/29/2004
delta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Dieldrin	110	100		µg/Kg	50	12/30/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/29/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/29/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/29/2004
Endrin	140	100		µg/Kg	50	12/30/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/29/2004
Endrin ketone	16	2.0		µg/Kg	1	12/29/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/29/2004
gamma-Chlordane	12	1.0		µg/Kg	1	12/29/2004
Heptachlor	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor epoxide	ND	1.0		µg/Kg	1	12/29/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/29/2004
Toxaphene	ND	85		µg/Kg	1	12/29/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B2-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:50:00 PM
Lab ID:	073011-003A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4'-DDD	5.1	2.0		µg/Kg	1	12/29/2004
4,4'-DDE	150	20		µg/Kg	10	12/30/2004
4,4'-DDT	42	20		µg/Kg	10	12/30/2004
Aldrin	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/29/2004
alpha-Chlordane	79	10		µg/Kg	10	12/30/2004
beta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Chlordane	450	85		µg/Kg	10	12/30/2004
delta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Dieldrin	100	20		µg/Kg	10	12/30/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/29/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/29/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/29/2004
Endrin	ND	2.0		µg/Kg	1	12/29/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/29/2004
Endrin ketone	ND	2.0		µg/Kg	1	12/29/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/29/2004
gamma-Chlordane	61	10		µg/Kg	10	12/30/2004
Heptachlor	1.7	1.0		µg/Kg	1	12/29/2004
Heptachlor epoxide	13	1.0		µg/Kg	1	12/29/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/29/2004
Toxaphene	ND	85		µg/Kg	1	12/29/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B3-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:58:00 PM
Lab ID:	073011-005A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4'-DDD	ND	2.0		µg/Kg	1	12/29/2004
4,4'-DDE	ND	2.0		µg/Kg	1	12/29/2004
4,4'-DDT	ND	2.0		µg/Kg	1	12/29/2004
Aldrin	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/29/2004
alpha-Chlordane	ND	1.0		µg/Kg	1	12/29/2004
beta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Chlordane	ND	8.5		µg/Kg	1	12/29/2004
delta-BHC	ND	1.0		µg/Kg	1	12/29/2004
Dieldrin	5.7	2.0		µg/Kg	1	12/29/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/29/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/29/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/29/2004
Endrin	ND	2.0		µg/Kg	1	12/29/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/29/2004
Endrin ketone	ND	2.0		µg/Kg	1	12/29/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/29/2004
gamma-Chlordane	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor epoxide	ND	1.0		µg/Kg	1	12/29/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/29/2004
Toxaphene	ND	85		µg/Kg	1	12/29/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B4-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 1:08:00 PM
Lab ID:	073011-007A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	2.0	2.0		µg/Kg	1	12/30/2004
4,4´-DDE	4.4	2.0		µg/Kg	1	12/30/2004
4,4´-DDT	36	2.0		µg/Kg	1	12/30/2004
Aldrin	ND	1.0		µg/Kg	1	12/30/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/30/2004
alpha-Chlordane	2.1	1.0		µg/Kg	1	12/30/2004
beta-BHC	ND	1.0		µg/Kg	1	12/30/2004
Chlordane	22	8.5		µg/Kg	1	12/30/2004
delta-BHC	ND	1.0		µg/Kg	1	12/30/2004
Dieldrin	ND	2.0		µg/Kg	1	12/30/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/30/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/30/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/30/2004
Endrin	ND	2.0		µg/Kg	1	12/30/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/30/2004
Endrin ketone	ND	2.0		µg/Kg	1	12/30/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/30/2004
gamma-Chlordane	2.6	1.0		µg/Kg	1	12/30/2004
Heptachlor	ND	1.0		µg/Kg	1	12/30/2004
Heptachlor epoxide	ND	1.0		µg/Kg	1	12/30/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/30/2004
Toxaphene	ND	85		µg/Kg	1	12/30/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B5-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:32:00 PM
Lab ID:	073011-009A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4'-DDD	12	2.0		µg/Kg	1	12/30/2004
4,4'-DDE	100	20		µg/Kg	10	12/30/2004
4,4'-DDT	43	2.0		µg/Kg	1	12/30/2004
Aldrin	ND	1.0		µg/Kg	1	12/30/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/30/2004
alpha-Chlordane	51	10		µg/Kg	10	12/30/2004
beta-BHC	ND	1.0		µg/Kg	1	12/30/2004
Chlordane	330	8.5		µg/Kg	1	12/30/2004
delta-BHC	ND	1.0		µg/Kg	1	12/30/2004
Dieldrin	11	2.0		µg/Kg	1	12/30/2004
Endosulfan I	ND	1.0		µg/Kg	1	12/30/2004
Endosulfan II	ND	2.0		µg/Kg	1	12/30/2004
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/30/2004
Endrin	ND	2.0		µg/Kg	1	12/30/2004
Endrin aldehyde	ND	2.0		µg/Kg	1	12/30/2004
Endrin ketone	ND	2.0		µg/Kg	1	12/30/2004
gamma-BHC	ND	1.0		µg/Kg	1	12/30/2004
gamma-Chlordane	53	10		µg/Kg	10	12/30/2004
Heptachlor	ND	1.0		µg/Kg	1	12/30/2004
Heptachlor epoxide	8.7	1.0		µg/Kg	1	12/30/2004
Methoxychlor	ND	8.5		µg/Kg	1	12/30/2004
Toxaphene	ND	85		µg/Kg	1	12/30/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *03-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/29/2004	SeqNo:	658177

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/30/2004	SeqNo:	658696

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/30/2004	SeqNo:	658696

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC9_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/29/2004	SeqNo:	658878

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID MB-20722	SampType: MBLK	TestCode: 8081_S	Units: µg/Kg	Prep Date: 12/28/2004	Run ID: GC9_041229A
Client ID: ZZZZZ	Batch ID: 20722	TestNo: EPA 8081A	(EPA 3550B)	Analysis Date: 12/29/2004	SeqNo: 658878

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID MB-20722	SampType: MBLK	TestCode: 8081_S	Units: µg/Kg	Prep Date: 12/28/2004	Run ID: GC9_041229A
Client ID: ZZZZZ	Batch ID: 20722	TestNo: EPA 8081A	(EPA 3550B)	Analysis Date: 12/30/2004	SeqNo: 658938

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0									
4,4´-DDE	ND	2.0									
4,4´-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **MB-20722** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658938**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658178**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	15.87	2.0	16.65	0	95.3	58	134	0	0		
Aldrin	18.88	1.0	16.65	0	113	75	129	0	0		
Dieldrin	17.92	2.0	16.65	0	108	75	124	0	0		
Endrin	20.39	2.0	16.65	0	122	72	141	0	0		
gamma-BHC	18.88	1.0	16.65	0	113	78	130	0	0		
Heptachlor	20.8	1.0	16.65	0	125	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658698**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658698**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	16.17	2.0	16.65	0	97.1	58	134	0	0		
Aldrin	18.08	1.0	16.65	0	109	75	129	0	0		
Dieldrin	17.26	2.0	16.65	0	104	75	124	0	0		
Endrin	17.58	2.0	16.65	0	106	72	141	0	0		
gamma-BHC	18.18	1.0	16.65	0	109	78	130	0	0		
Heptachlor	17.74	1.0	16.65	0	107	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658880**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	16.48	2.0	16.65	0	99	58	134	0	0		
Aldrin	18.06	1.0	16.65	0	108	75	129	0	0		
Dieldrin	16.9	2.0	16.65	0	102	75	124	0	0		
Endrin	18.25	2.0	16.65	0	110	72	141	0	0		
gamma-BHC	17.9	1.0	16.65	0	107	78	130	0	0		
Heptachlor	16.38	1.0	16.65	0	98.4	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658939**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	15.48	2.0	16.65	0	93	58	134	0	0		
Aldrin	18.66	1.0	16.65	0	112	75	129	0	0		
Dieldrin	17.53	2.0	16.65	0	105	75	124	0	0		
Endrin	20.26	2.0	16.65	0	122	72	141	0	0		
gamma-BHC	18.54	1.0	16.65	0	111	78	130	0	0		
Heptachlor	17.28	1.0	16.65	0	104	65	139	0	0		

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **073015-109AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658179**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	14.62	2.0	16.65	0	87.8	23	162	0	0		
Aldrin	17.54	1.0	16.65	0	105	68	127	0	0		
Dieldrin	16.46	2.0	16.65	0	98.9	66	129	0	0		
Endrin	19.17	2.0	16.65	0	115	72	137	0	0		
gamma-BHC	17.39	1.0	16.65	0	104	67	130	0	0		
Heptachlor	19.34	1.0	16.65	0	116	61	134	0	0		

Sample ID **073015-109AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658180**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	14.56	2.0	16.65	0	87.5	23	162	14.62	0.434	30	
Aldrin	17.29	1.0	16.65	0	104	68	127	17.54	1.45	30	
Dieldrin	16.25	2.0	16.65	0	97.6	66	129	16.46	1.28	30	
Endrin	19	2.0	16.65	0	114	72	137	19.17	0.882	30	
gamma-BHC	17.09	1.0	16.65	0	103	67	130	17.39	1.73	30	
Heptachlor	19.25	1.0	16.65	0	116	61	134	19.34	0.458	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#:
Logged By: Date: 12/21/04

Method of Transport: Client ☑ ATL ☐ CA OverN ☐ FEDEX ☐ Other:

Sample Condition Upon Receipt
1. CHILLED N/A Y☑ N☐ 4. SEALED Y☐ N☑
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☐ N☑

Client: GEOCON ENVIRONMENTAL
Attn: JOHN JUHREND
Address: ~~6970 Flanders Drive~~ 3160 GOLD VALLEY DR #800
City: ~~San Diego~~ RANCHO CARDOVA State: CA Zip Code: ~~92121~~ 95742
TEL: (858) 558-6100
FAX: (858) 558-8437

Project Name: GREENWAY TRAIL
Project #: 587666-06-01
Sampler: (Printed Name) T RENFRO (Signature)

Relinquished by: (Signature and Printed Name) Date: 12/21/04 Time: 245 Received by: (Signature and Printed Name) Date: 12/21/04 Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time: Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: T RENFRO 12/21/04
Print Name Date
Signature

Send Report To:
Attn:
Co: CLIENT
Address
City State Zip

Bill To:
Attn:
Co: CLIENT
Address
City State Zip

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.

Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested: 8081A (Pesticides) CHLORINATED; 8082 (PCB); 8260B (Volatiles); 8270C (BNA); 6010B (Total Metal); 8015B (GRO) / BTEX; 8015B (DRO)

SPECIFY APPROPRIATE MATRIX: SOIL; WATER; GROUND WATER; WASTEWATER

QA/QC: RTNE ☐ CT ☑ SWRCB ☐ Logcode ____ OTHER ____

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides) CHLORINATED	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / BTEX	8015B (DRO)	SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	REMARKS
	0730 11-001	B1-5	12/21	1222	X							X				E	1	J	C	C
	002	B1-1.5	↓	1225								↓				↓	↓	↓	↓	↓
	003	B2-5	↓	1250	X							↓				E	↓	↓	↓	↓
	004	B2-1.5	↓	1253								↓				↓	↓	↓	↓	↓
	005	B3-5	↓	1258	X							↓				E	↓	↓	↓	↓
	006	B3-1.5	↓	1301								↓				↓	↓	↓	↓	↓
	007	B4-5	↓	1308	X							↓				E	↓	↓	↓	↓
	008	B4-1.5	↓	1315								↓				↓	↓	↓	↓	↓
	009	B5-5	↓	1232	X							↓				E	↓	↓	↓	↓
	010	B5-1.5	↓	1238								↓				↓	↓	↓	↓	↓

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

RECEIVED
FEB 07 2005
BY: GEOCON

January 24, 2005

ACCREDITED IN ACCORDANCE WITH nelac

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

Workorder No.: 073011

RE: GREENWAY TRAIL, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 21, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B1-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:22:00 PM
Lab ID:	073011-001A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

(EPA 3550B) **EPA 8081A**

RunID: GC9_041229A QC Batch: 20722 PrepDate 12/28/2004 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	15	2.0		µg/Kg	1	12/29/2004
4,4´-DDD	31	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDE	2400	100	H	µg/Kg	50	1/17/2005
4,4´-DDE	2100	100		µg/Kg	50	12/30/2004
4,4´-DDT	1200	100	H	µg/Kg	50	1/17/2005
4,4´-DDT	530	100		µg/Kg	50	12/30/2004
Aldrin	ND	1.0	H	µg/Kg	1	1/14/2005
Aldrin	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0		µg/Kg	1	12/29/2004
alpha-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-Chlordane	15	1.0		µg/Kg	1	12/29/2004
alpha-Chlordane	22	1.0	H	µg/Kg	1	1/14/2005
beta-BHC	ND	1.0		µg/Kg	1	12/29/2004
beta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Chlordane	150	8.5		µg/Kg	1	12/29/2004
Chlordane	180	8.5	H	µg/Kg	1	1/14/2005
delta-BHC	ND	1.0		µg/Kg	1	12/29/2004
delta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Dieldrin	110	100		µg/Kg	50	12/30/2004
Dieldrin	130	20	H	µg/Kg	10	1/17/2005
Endosulfan I	ND	1.0	H	µg/Kg	1	1/14/2005
Endosulfan I	ND	1.0		µg/Kg	1	12/29/2004
Endosulfan II	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan II	ND	2.0		µg/Kg	1	12/29/2004
Endosulfan sulfate	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan sulfate	ND	2.0		µg/Kg	1	12/29/2004
Endrin	100	20	H	µg/Kg	10	1/17/2005
Endrin	140	100		µg/Kg	50	12/30/2004
Endrin aldehyde	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin aldehyde	ND	2.0		µg/Kg	1	12/29/2004
Endrin ketone	16	2.0		µg/Kg	1	12/29/2004
Endrin ketone	30	2.0	H	µg/Kg	1	1/14/2005
gamma-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
gamma-BHC	ND	1.0		µg/Kg	1	12/29/2004
gamma-Chlordane	18	1.0	H	µg/Kg	1	1/14/2005
gamma-Chlordane	12	1.0		µg/Kg	1	12/29/2004

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B1-S
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:22:00 PM
Lab ID:	073011-001A	**Matrix:**	SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD (EPA 3550B)				**EPA 8081A**		
RunID: GC9_041229A	QC Batch: 20722				PrepDate 12/28/2004	Analyst: **EES**
Heptachlor	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor epoxide	ND	1.0		µg/Kg	1	12/29/2004
Heptachlor epoxide	ND	1.0	H	µg/Kg	1	1/14/2005
Methoxychlor	ND	8.5		µg/Kg	1	12/29/2004
Methoxychlor	ND	8.5	H	µg/Kg	1	1/14/2005
Toxaphene	ND	85		µg/Kg	1	12/29/2004
Toxaphene	ND	85	H	µg/Kg	1	1/14/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B1-1.5
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:25:00 PM
Lab ID:	073011-002A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC5_050114A QC Batch: 20892 PrepDate 1/14/2005 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDE	ND	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDT	ND	2.0	H	µg/Kg	1	1/14/2005
Aldrin	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-Chlordane	ND	1.0	H	µg/Kg	1	1/14/2005
beta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Chlordane	ND	8.5	H	µg/Kg	1	1/14/2005
delta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Dieldrin	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan I	ND	1.0	H	µg/Kg	1	1/14/2005
Endosulfan II	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan sulfate	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin aldehyde	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin ketone	ND	2.0	H	µg/Kg	1	1/14/2005
gamma-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
gamma-Chlordane	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor epoxide	ND	1.0	H	µg/Kg	1	1/14/2005
Methoxychlor	ND	8.5	H	µg/Kg	1	1/14/2005
Toxaphene	ND	85	H	µg/Kg	1	1/14/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B2-1.5
Lab Order:	073011		
Project:	GREENWAY TRAIL, S8766-06-01	**Collection Date:**	12/21/2004 12:53:00 PM
Lab ID:	073011-004A	**Matrix:**	SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD
(EPA 3550B) **EPA 8081A**

RunID: GC5_050114A QC Batch: 20892 PrepDate 1/14/2005 Analyst: **EES**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDE	ND	2.0	H	µg/Kg	1	1/14/2005
4,4´-DDT	ND	2.0	H	µg/Kg	1	1/14/2005
Aldrin	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
alpha-Chlordane	ND	1.0	H	µg/Kg	1	1/14/2005
beta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Chlordane	ND	8.5	H	µg/Kg	1	1/14/2005
delta-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
Dieldrin	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan I	ND	1.0	H	µg/Kg	1	1/14/2005
Endosulfan II	ND	2.0	H	µg/Kg	1	1/14/2005
Endosulfan sulfate	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin aldehyde	ND	2.0	H	µg/Kg	1	1/14/2005
Endrin ketone	ND	2.0	H	µg/Kg	1	1/14/2005
gamma-BHC	ND	1.0	H	µg/Kg	1	1/14/2005
gamma-Chlordane	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor	ND	1.0	H	µg/Kg	1	1/14/2005
Heptachlor epoxide	ND	1.0	H	µg/Kg	1	1/14/2005
Methoxychlor	ND	8.5	H	µg/Kg	1	1/14/2005
Toxaphene	ND	85	H	µg/Kg	1	1/14/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/29/2004	SeqNo:	658177

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/30/2004	SeqNo:	658696

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC10_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A		(EPA 3550B)	Analysis Date:	12/30/2004	SeqNo:	658696

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC9_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A		(EPA 3550B)	Analysis Date:	12/29/2004	SeqNo:	658878

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC9_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/29/2004	SeqNo:	658878

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20722	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	12/28/2004	Run ID:	GC9_041229A
Client ID:	ZZZZZ	Batch ID:	20722	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	12/30/2004	SeqNo:	658938

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **MB-20722** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658938**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID **MB-20892** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **ZZZZZ** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666021**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	MB-20892	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	1/14/2005	Run ID:	GC5_050114A
Client ID:	ZZZZZ	Batch ID:	20892	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	1/14/2005	SeqNo:	666021

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID	MB-20892	SampType:	MBLK	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	1/14/2005	Run ID:	GC5_050114A
Client ID:	ZZZZZ	Batch ID:	20892	TestNo:	EPA 8081A	(EPA 3550B)		Analysis Date:	1/17/2005	SeqNo:	666362

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDD	ND	2.0									
4,4'-DDE	ND	2.0									
4,4'-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **MB-20892** SampType: **MBLK** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **ZZZZZ** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/17/2005** SeqNo: **666362**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658178**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	15.87	2.0	16.65	0	95.3	58	134	0	0		
Aldrin	18.88	1.0	16.65	0	113	75	129	0	0		
Dieldrin	17.92	2.0	16.65	0	108	75	124	0	0		
Endrin	20.39	2.0	16.65	0	122	72	141	0	0		
gamma-BHC	18.88	1.0	16.65	0	113	78	130	0	0		
Heptachlor	20.8	1.0	16.65	0	125	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658698**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	16.17	2.0	16.65	0	97.1	58	134	0	0		
Aldrin	18.08	1.0	16.65	0	109	75	129	0	0		
Dieldrin	17.26	2.0	16.65	0	104	75	124	0	0		
Endrin	17.58	2.0	16.65	0	106	72	141	0	0		
gamma-BHC	18.18	1.0	16.65	0	109	78	130	0	0		
Heptachlor	17.74	1.0	16.65	0	107	65	139	0	0		

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658880**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	16.48	2.0	16.65	0	99	58	134	0	0		
Aldrin	18.06	1.0	16.65	0	108	75	129	0	0		
Dieldrin	16.9	2.0	16.65	0	102	75	124	0	0		
Endrin	18.25	2.0	16.65	0	110	72	141	0	0		
gamma-BHC	17.9	1.0	16.65	0	107	78	130	0	0		
Heptachlor	16.38	1.0	16.65	0	98.4	65	139	0	0		

Sample ID **LCS-20722** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658939**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	15.48	2.0	16.65	0	93	58	134	0	0		
Aldrin	18.66	1.0	16.65	0	112	75	129	0	0		
Dieldrin	17.53	2.0	16.65	0	105	75	124	0	0		
Endrin	20.26	2.0	16.65	0	122	72	141	0	0		
gamma-BHC	18.54	1.0	16.65	0	111	78	130	0	0		
Heptachlor	17.28	1.0	16.65	0	104	65	139	0	0		

Sample ID **LCS-20892** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **ZZZZZ** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666022**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	15.85	2.0	16.65	0	95.2	58	134	0	0		
Aldrin	18.09	1.0	16.65	0	109	75	129	0	0		
Dieldrin	17.02	2.0	16.65	0	102	75	124	0	0		
Endrin	15.94	2.0	16.65	0	95.8	72	141	0	0		
gamma-BHC	18.55	1.0	16.65	0	111	78	130	0	0		
Heptachlor	19.63	1.0	16.65	0	118	65	139	0	0		

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **LCS-20892** SampType: **LCS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **ZZZZZ** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/17/2005** SeqNo: **666363**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	18.06	2.0	16.65	0	108	58	134	0	0		
Aldrin	18.76	1.0	16.65	0	113	75	129	0	0		
Dieldrin	17.5	2.0	16.65	0	105	75	124	0	0		
Endrin	16.44	2.0	16.65	0	98.7	72	141	0	0		
gamma-BHC	19.29	1.0	16.65	0	116	78	130	0	0		
Heptachlor	20.68	1.0	16.65	0	124	65	139	0	0		

Sample ID **073015-109AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658179**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	14.62	2.0	16.65	0	87.8	23	162	0	0		
Aldrin	17.54	1.0	16.65	0	105	68	127	0	0		
Dieldrin	16.46	2.0	16.65	0	98.9	66	129	0	0		
Endrin	19.17	2.0	16.65	0	115	72	137	0	0		
gamma-BHC	17.39	1.0	16.65	0	104	67	130	0	0		
Heptachlor	19.34	1.0	16.65	0	116	61	134	0	0		

Sample ID **073011-002AMS** SampType: **MS** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **B1-1.5** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666023**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4'-DDT	21.99	2.0	16.65	0	132	23	162	0	0		
Aldrin	17.87	1.0	16.65	0	107	68	127	0	0		
Dieldrin	17.66	2.0	16.65	0	106	66	129	0	0		
Endrin	18.75	2.0	16.65	0	113	72	137	0	0		
gamma-BHC	18.15	1.0	16.65	0	109	67	130	0	0		
Heptachlor	20.17	1.0	16.65	0	121	61	134	0	0		

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **073015-109AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC10_041229A**
Client ID: **ZZZZZ** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658180**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	14.56	2.0	16.65	0	87.5	23	162	14.62	0.434	30	
Aldrin	17.29	1.0	16.65	0	104	68	127	17.54	1.45	30	
Dieldrin	16.25	2.0	16.65	0	97.6	66	129	16.46	1.28	30	
Endrin	19	2.0	16.65	0	114	72	137	19.17	0.882	30	
gamma-BHC	17.09	1.0	16.65	0	103	67	130	17.39	1.73	30	
Heptachlor	19.25	1.0	16.65	0	116	61	134	19.34	0.458	30	

Sample ID **073011-002AMSD** SampType: **MSD** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **B1-1.5** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666024**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDT	22.54	2.0	16.65	0	135	23	162	21.99	2.47	30	
Aldrin	16.32	1.0	16.65	0	98	68	127	17.87	9.05	30	
Dieldrin	16.37	2.0	16.65	0	98.3	66	129	17.66	7.60	30	
Endrin	17.32	2.0	16.65	0	104	72	137	18.75	7.92	30	
gamma-BHC	16.68	1.0	16.65	0	100	67	130	18.15	8.46	30	
Heptachlor	18.59	1.0	16.65	0	112	61	134	20.17	8.15	30	

Sample ID **073011-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **B2-S** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658888**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	5.42	2.0	0	0	0	0	0	5.083	6.41	30	
Aldrin	ND	1.0	0	0	0	0	0	0	0	30	
alpha-BHC	ND	1.0	0	0	0	0	0	0	0	30	
beta-BHC	1.203	1.0	0	0	0	0	0	0.8733	31.8	30	R
delta-BHC	ND	1.0	0	0	0	0	0	0	0	30	
Endosulfan I	ND	1.0	0	0	0	0	0	0	0	30	
Endosulfan II	ND	2.0	0	0	0	0	0	0	0	30	
Endosulfan sulfate	ND	2.0	0	0	0	0	0	0	0	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID **073011-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **B2-S** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/29/2004** SeqNo: **658888**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Endrin	ND	2.0	0	0	0	0	0	0	0	30	
Endrin aldehyde	ND	2.0	0	0	0	0	0	0	0	30	
Endrin ketone	ND	2.0	0	0	0	0	0	0.8367	0	30	
gamma-BHC	ND	1.0	0	0	0	0	0	0	0	30	
Heptachlor	2.173	1.0	0	0	0	0	0	1.703	24.2	30	
Heptachlor epoxide	12.36	1.0	0	0	0	0	0	12.75	3.12	30	
Methoxychlor	ND	8.5	0	0	0	0	0	0	0	30	
Toxaphene	ND	85	0	0	0	0	0	0	0	30	

Sample ID **073011-003ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **12/28/2004** Run ID: **GC9_041229A**
Client ID: **B2-S** Batch ID: **20722** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **12/30/2004** SeqNo: **658943**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDE	166.2	20	0	0	0	0	0	153.6	7.91	30	
4,4´-DDT	46.07	20	0	0	0	0	0	41.83	9.63	30	
alpha-Chlordane	84.57	10	0	0	0	0	0	78.93	6.89	30	
Chlordane	450.2	85	0	0	0	0	0	453.8	0.797	30	
Dieldrin	108.3	20	0	0	0	0	0	101.6	6.43	30	
gamma-Chlordane	66.82	10	0	0	0	0	0	61.48	8.31	30	

Sample ID **073011-004ADUP** SampType: **DUP** TestCode: **8081_S** Units: **µg/Kg** Prep Date: **1/14/2005** Run ID: **GC5_050114A**
Client ID: **B2-1.5** Batch ID: **20892** TestNo: **EPA 8081A** **(EPA 3550B)** Analysis Date: **1/14/2005** SeqNo: **666028**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0	0	0	0	0	0	0	0	30	
4,4´-DDE	ND	2.0	0	0	0	0	0	0	0	30	
4,4´-DDT	ND	2.0	0	0	0	0	0	0	0	30	
Aldrin	ND	1.0	0	0	0	0	0	0	0	30	
alpha-BHC	ND	1.0	0	0	0	0	0	0	0	30	
alpha-Chlordane	ND	1.0	0	0	0	0	0	0	0	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081_S

Sample ID	073011-004ADUP	SampType:	DUP	TestCode:	8081_S	Units:	µg/Kg	Prep Date:	1/14/2005	Run ID:	GC5_050114A
Client ID:	B2-1.5	Batch ID:	20892	TestNo:	EPA 8081A		(EPA 3550B)	Analysis Date:	1/14/2005	SeqNo:	666028

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
beta-BHC	ND	1.0	0	0	0	0	0	0	0	30	
Chlordane	ND	8.5	0	0	0	0	0	0	0	30	
delta-BHC	ND	1.0	0	0	0	0	0	0	0	30	
Dieldrin	ND	2.0	0	0	0	0	0	0	0	30	
Endosulfan I	ND	1.0	0	0	0	0	0	0	0	30	
Endosulfan II	ND	2.0	0	0	0	0	0	0	0	30	
Endosulfan sulfate	ND	2.0	0	0	0	0	0	0	0	30	
Endrin	ND	2.0	0	0	0	0	0	0	0	30	
Endrin aldehyde	ND	2.0	0	0	0	0	0	0	0	30	
Endrin ketone	ND	2.0	0	0	0	0	0	0	0	30	
gamma-BHC	ND	1.0	0	0	0	0	0	0	0	30	
gamma-Chlordane	ND	1.0	0	0	0	0	0	0	0	30	
Heptachlor	ND	1.0	0	0	0	0	0	0	0	30	
Heptachlor epoxide	ND	1.0	0	0	0	0	0	0	0	30	
Methoxychlor	ND	8.5	0	0	0	0	0	0	0	30	
Toxaphene	ND	85	0	0	0	0	0	0	0	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Galvan, Diane

From: John Juhrend [juhrend@geoconinc.com]

Sent: Wednesday, January 12, 2005 1:32 PM

To: Galvan, Diane

Subject: RE: Partial Results - Greenway Trail (073011)

What if re-run B1-6 (073011-001A) that had the highest levels to show no apparent reduction and run the other two deeper samples (B1-1.5 073011-002) and B2 (B2-1.5 073011-004) with notation regarding holding time exceedance.

Sincerely,

John E. Juhrend, PE, CEG
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742
916.852.9118 Tel
916.852.9132 Fax
juhrend@geoconinc.com
www.geoconinc.com

GEOCON
CONSULTANTS, INC

GEOCON
CONSULTANTS, INC

January 12, 2005

RECEIVED
FEB 07 2005
BY: GEOCON

ACCREDITED IN ACCORDANCE WITH nelac

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

Workorder No.: 073244

RE: Greenway Trail Project, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 30, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B6-5
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 9:45:00 AM
Lab ID:	073244-001A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/3/2005
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/3/2005
Benzene	ND	5.0		µg/Kg	1	1/3/2005
Bromobenzene	ND	5.0		µg/Kg	1	1/3/2005
Bromodichloromethane	ND	5.0		µg/Kg	1	1/3/2005
Bromoform	ND	5.0		µg/Kg	1	1/3/2005
Bromomethane	ND	5.0		µg/Kg	1	1/3/2005
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/3/2005
Chlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
Chloroethane	ND	5.0		µg/Kg	1	1/3/2005
Chloroform	ND	5.0		µg/Kg	1	1/3/2005
Chloromethane	ND	5.0		µg/Kg	1	1/3/2005
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B6-5
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 9:45:00 AM
Lab ID:	073244-001A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/3/2005
Dibromomethane	ND	5.0		µg/Kg	1	1/3/2005
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Ethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/3/2005
Isopropylbenzene	ND	5.0		µg/Kg	1	1/3/2005
m,p-Xylene	ND	5.0		µg/Kg	1	1/3/2005
Methylene chloride	ND	5.0		µg/Kg	1	1/3/2005
n-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
n-Propylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Naphthalene	ND	5.0		µg/Kg	1	1/3/2005
o-Xylene	ND	5.0		µg/Kg	1	1/3/2005
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Styrene	ND	5.0		µg/Kg	1	1/3/2005
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Tetrachloroethene	ND	5.0		µg/Kg	1	1/3/2005
Toluene	ND	5.0		µg/Kg	1	1/3/2005
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Vinyl chloride	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B6-10
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:00:00 AM
Lab ID:	073244-002A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/3/2005
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/3/2005
Benzene	ND	5.0		µg/Kg	1	1/3/2005
Bromobenzene	ND	5.0		µg/Kg	1	1/3/2005
Bromodichloromethane	ND	5.0		µg/Kg	1	1/3/2005
Bromoform	ND	5.0		µg/Kg	1	1/3/2005
Bromomethane	ND	5.0		µg/Kg	1	1/3/2005
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/3/2005
Chlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
Chloroethane	ND	5.0		µg/Kg	1	1/3/2005
Chloroform	ND	5.0		µg/Kg	1	1/3/2005
Chloromethane	ND	5.0		µg/Kg	1	1/3/2005
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B6-10
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:00:00 AM
Lab ID:	073244-002A	**Matrix:**	SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY GC/MS						
			EPA 8260B			
RunID: MS3_050103A	QC Batch: R05VS001			PrepDate		Analyst: **JPC**
Dibromochloromethane	ND	5.0		µg/Kg	1	1/3/2005
Dibromomethane	ND	5.0		µg/Kg	1	1/3/2005
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Ethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/3/2005
Isopropylbenzene	ND	5.0		µg/Kg	1	1/3/2005
m,p-Xylene	ND	5.0		µg/Kg	1	1/3/2005
Methylene chloride	ND	5.0		µg/Kg	1	1/3/2005
n-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
n-Propylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Naphthalene	ND	5.0		µg/Kg	1	1/3/2005
o-Xylene	ND	5.0		µg/Kg	1	1/3/2005
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Styrene	ND	5.0		µg/Kg	1	1/3/2005
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Tetrachloroethene	ND	5.0		µg/Kg	1	1/3/2005
Toluene	ND	5.0		µg/Kg	1	1/3/2005
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Vinyl chloride	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B7-5
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:10:00 AM
Lab ID:	073244-003A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/3/2005
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/3/2005
Benzene	ND	5.0		µg/Kg	1	1/3/2005
Bromobenzene	ND	5.0		µg/Kg	1	1/3/2005
Bromodichloromethane	ND	5.0		µg/Kg	1	1/3/2005
Bromoform	ND	5.0		µg/Kg	1	1/3/2005
Bromomethane	ND	5.0		µg/Kg	1	1/3/2005
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/3/2005
Chlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
Chloroethane	ND	5.0		µg/Kg	1	1/3/2005
Chloroform	ND	5.0		µg/Kg	1	1/3/2005
Chloromethane	ND	5.0		µg/Kg	1	1/3/2005
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B7-5
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:10:00 AM
Lab ID:	073244-003A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/3/2005
Dibromomethane	ND	5.0		µg/Kg	1	1/3/2005
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Ethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/3/2005
Isopropylbenzene	ND	5.0		µg/Kg	1	1/3/2005
m,p-Xylene	ND	5.0		µg/Kg	1	1/3/2005
Methylene chloride	ND	5.0		µg/Kg	1	1/3/2005
n-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
n-Propylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Naphthalene	ND	5.0		µg/Kg	1	1/3/2005
o-Xylene	ND	5.0		µg/Kg	1	1/3/2005
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Styrene	ND	5.0		µg/Kg	1	1/3/2005
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Tetrachloroethene	ND	5.0		µg/Kg	1	1/3/2005
Toluene	ND	5.0		µg/Kg	1	1/3/2005
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichloroethene	5.3	5.0		µg/Kg	1	1/3/2005
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Vinyl chloride	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B7-10
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:15:00 AM
Lab ID:	073244-004A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
1,1,1,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,1-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2,2-Tetrachloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1,2-Trichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
1,1-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,3-Trichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2,4-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dibromo-3-chloropropane	ND	10		µg/Kg	1	1/3/2005
1,2-Dibromoethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloroethane	ND	5.0		µg/Kg	1	1/3/2005
1,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,3,5-Trimethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
1,3-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
1,4-Dichlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
2,2-Dichloropropane	ND	5.0		µg/Kg	1	1/3/2005
2-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Chlorotoluene	ND	5.0		µg/Kg	1	1/3/2005
4-Isopropyltoluene	ND	5.0		µg/Kg	1	1/3/2005
Benzene	ND	5.0		µg/Kg	1	1/3/2005
Bromobenzene	ND	5.0		µg/Kg	1	1/3/2005
Bromodichloromethane	ND	5.0		µg/Kg	1	1/3/2005
Bromoform	ND	5.0		µg/Kg	1	1/3/2005
Bromomethane	ND	5.0		µg/Kg	1	1/3/2005
Carbon tetrachloride	ND	5.0		µg/Kg	1	1/3/2005
Chlorobenzene	ND	5.0		µg/Kg	1	1/3/2005
Chloroethane	ND	5.0		µg/Kg	1	1/3/2005
Chloroform	ND	5.0		µg/Kg	1	1/3/2005
Chloromethane	ND	5.0		µg/Kg	1	1/3/2005
cis-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
cis-1,3-Dichloropropene	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories

3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT:	Geocon Consultants, Inc.	**Client Sample ID:**	B7-10
Lab Order:	073244		
Project:	Greenway Trail Project, S8766-06-01	**Collection Date:**	12/30/2004 10:15:00 AM
Lab ID:	073244-004A	**Matrix:**	SOIL

VOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 8260B

RunID: MS3_050103A QC Batch: R05VS001 PrepDate Analyst: **JPC**

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
Dibromochloromethane	ND	5.0		µg/Kg	1	1/3/2005
Dibromomethane	ND	5.0		µg/Kg	1	1/3/2005
Dichlorodifluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Ethylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Hexachlorobutadiene	ND	5.0		µg/Kg	1	1/3/2005
Isopropylbenzene	ND	5.0		µg/Kg	1	1/3/2005
m,p-Xylene	ND	5.0		µg/Kg	1	1/3/2005
Methylene chloride	ND	5.0		µg/Kg	1	1/3/2005
n-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
n-Propylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Naphthalene	ND	5.0		µg/Kg	1	1/3/2005
o-Xylene	ND	5.0		µg/Kg	1	1/3/2005
sec-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Styrene	ND	5.0		µg/Kg	1	1/3/2005
tert-Butylbenzene	ND	5.0		µg/Kg	1	1/3/2005
Tetrachloroethene	ND	5.0		µg/Kg	1	1/3/2005
Toluene	ND	5.0		µg/Kg	1	1/3/2005
trans-1,2-Dichloroethene	ND	5.0		µg/Kg	1	1/3/2005
Trichloroethene	10	5.0		µg/Kg	1	1/3/2005
Trichlorofluoromethane	ND	5.0		µg/Kg	1	1/3/2005
Vinyl chloride	ND	5.0		µg/Kg	1	1/3/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike/Surrogate outside of limits due to matrix interfere
H - Sample exceeded analytical holding time
E - Value above quantitation range
R - RPD outside acceptable recovery limits

Results are wet unless otherwise specified

Advanced Technology Laboratories *3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040*

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *12-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073244
Project: Greenway Trail Project, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID **R050103MB2** SampType: **MBLK** TestCode: **8260_S** Units: **µg/Kg** Prep Date: Run ID: **MS3_050103A**
Client ID: **ZZZZZ** Batch ID: **R05VS001** TestNo: **EPA 8260B** Analysis Date: **1/3/2005** SeqNo: **659671**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5.0									
1,1,1-Trichloroethane	ND	5.0									
1,1,2,2-Tetrachloroethane	ND	5.0									
1,1,2-Trichloroethane	ND	5.0									
1,1-Dichloroethane	ND	5.0									
1,1-Dichloroethene	ND	5.0									
1,1-Dichloropropene	ND	5.0									
1,2,3-Trichlorobenzene	ND	5.0									
1,2,3-Trichloropropane	ND	5.0									
1,2,4-Trichlorobenzene	ND	5.0									
1,2,4-Trimethylbenzene	ND	5.0									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5.0									
1,2-Dichlorobenzene	ND	5.0									
1,2-Dichloroethane	ND	5.0									
1,2-Dichloropropane	ND	5.0									
1,3,5-Trimethylbenzene	ND	5.0									
1,3-Dichlorobenzene	ND	5.0									
1,3-Dichloropropane	ND	5.0									
1,4-Dichlorobenzene	ND	5.0									
2,2-Dichloropropane	ND	5.0									
2-Chlorotoluene	ND	5.0									
4-Chlorotoluene	ND	5.0									
4-Isopropyltoluene	ND	5.0									
Benzene	ND	5.0									
Bromobenzene	ND	5.0									
Bromodichloromethane	ND	5.0									
Bromoform	ND	5.0									
Bromomethane	ND	5.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073244
Project: Greenway Trail Project, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID	R050103MB2	SampType:	MBLK	TestCode:	8260_S	Units:	µg/Kg	Prep Date:			Run ID:	MS3_050103A
Client ID:	ZZZZZ	Batch ID:	R05VS001	TestNo:	EPA 8260B			Analysis Date:	1/3/2005		SeqNo:	659671

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon tetrachloride	ND	5.0									
Chlorobenzene	ND	5.0									
Chloroethane	ND	5.0									
Chloroform	ND	5.0									
Chloromethane	ND	5.0									
cis-1,2-Dichloroethene	ND	5.0									
cis-1,3-Dichloropropene	ND	5.0									
Dibromochloromethane	ND	5.0									
Dibromomethane	ND	5.0									
Dichlorodifluoromethane	ND	5.0									
Ethylbenzene	ND	5.0									
Hexachlorobutadiene	ND	5.0									
Isopropylbenzene	ND	5.0									
m,p-Xylene	ND	5.0									
Methylene chloride	ND	5.0									
n-Butylbenzene	ND	5.0									
n-Propylbenzene	ND	5.0									
Naphthalene	ND	5.0									
o-Xylene	ND	5.0									
sec-Butylbenzene	ND	5.0									
Styrene	ND	5.0									
tert-Butylbenzene	ND	5.0									
Tetrachloroethene	ND	5.0									
Toluene	ND	5.0									
trans-1,2-Dichloroethene	ND	5.0									
Trichloroethene	ND	5.0									
Trichlorofluoromethane	ND	5.0									
Vinyl chloride	ND	5.0									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

CLIENT: Geocon Consultants, Inc.
Work Order: 073244
Project: Greenway Trail Project, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 8260_S

Sample ID **R050103LC1** SampType: **LCS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: Run ID: **MS3_050103A**
Client ID: **ZZZZZ** Batch ID: **R05VS001** TestNo: **EPA 8260B** Analysis Date: **1/3/2005** SeqNo: **659668**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	89.16	5.0	100	0	89.2	63	127	0	0		
Benzene	98.05	5.0	100	0	98	88	126	0	0		
Chlorobenzene	101.9	5.0	100	0	102	91	133	0	0		
Toluene	99.36	5.0	100	0	99.4	87	126	0	0		
Trichloroethene	103.8	5.0	100	0	104	86	134	0	0		

Sample ID **073244-002AMS** SampType: **MS** TestCode: **8260_S** Units: **µg/Kg** Prep Date: Run ID: **MS3_050103A**
Client ID: **B6-10** Batch ID: **R05VS001** TestNo: **EPA 8260B** Analysis Date: **1/3/2005** SeqNo: **659669**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	90.06	5.0	100	0	90.1	51	128	0	0		
Benzene	99.76	5.0	100	0	99.8	65	136	0	0		
Chlorobenzene	102.8	5.0	100	0	103	52	152	0	0		
Toluene	99.47	5.0	100	0	99.5	56	142	0	0		
Trichloroethene	107.6	5.0	100	0	108	54	155	0	0		

Sample ID **073244-002AMSD** SampType: **MSD** TestCode: **8260_S** Units: **µg/Kg** Prep Date: Run ID: **MS3_050103A**
Client ID: **B6-10** Batch ID: **R05VS001** TestNo: **EPA 8260B** Analysis Date: **1/3/2005** SeqNo: **659670**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	72.61	5.0	100	0	72.6	51	128	90.06	21.5	30	
Benzene	83.88	5.0	100	0	83.9	65	136	99.76	17.3	30	
Chlorobenzene	88.12	5.0	100	0	88.1	52	152	102.8	15.4	30	
Toluene	85.08	5.0	100	0	85.1	56	142	99.47	15.6	30	
Trichloroethene	87.65	5.0	100	0	87.6	54	155	107.6	20.5	30	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

CHAIN OF CUSTODY RECORD

Pg 1 of 1

Advanced Technology Laboratories
3275 Walnut Avenue
Signal Hill, CA 90755
(562) 989-4045 • Fax (562) 989-4040

FOR LABORATORY USE ONLY:

P.O.#:
Logged By: AL Date: 12/30/04

Method of Transport: Client ☐ ATL ☐ CA OverN ☐ FEDEX ☐ Other:

Sample Condition Upon Receipt
1. CHILLED 5-0 Y☑ N☐ 4. SEALED Y☐ N☐
2. HEADSPACE (VOA) Y☐ N☐ 5. # OF SPLS MATCH COC Y☑ N☐
3. CONTAINER INTACT Y☑ N☐ 6. PRESERVED Y☐ N☑

Client: GEOCON ENVIRONMENTAL
Attn: John Johrend
Address: 6970 Flanders Drive
City: San Diego State: CA Zip Code: 92121
TEL: (858) 558-6100
FAX: (858) 558-8437

Project Name: Greenway Trail Project
Project #: S8875-06-02
Sampler: (Printed Name) TMR (Signature)

Relinquished by: (Signature and Printed Name) Tyler Renfro Date: 12/30/04 Time: 14:45
Received by: (Signature and Printed Name) [signature] ATL Date: 12/30/04 Time: 1445
Relinquished by: (Signature and Printed Name) Date: Time:
Received by: (Signature and Printed Name) Date: Time:
Relinquished by: (Signature and Printed Name) Date: Time:
Received by: (Signature and Printed Name) Date: Time:

I hereby authorize ATL to perform the work indicated below:
Project Mgr /Submitter: Tyler Renfro 12/30/04
Print Name Date
Signature

Send Report To:
Attn: John Johrend
Co:
Address: 3160 Gold Valley Dr #800
City: Rancho Cordova State: CA Zip: 95742

Bill To:
Attn:
Co:
Address:
City State Zip

Special Instructions/Comments:

Sample/Records - Archival & Disposal
Unless otherwise requested by client, all samples will be disposed 45 days after receipt and records will be disposed 1 year after submittal of final report.
Storage Fees (applies when storage is requested):
- Sample : $2.00 / sample / mo (after 45 days)
- Records : $1.00 / ATL workorder / mo (after 1 year)

Circle or Add Analysis(es) Requested

ITEM	LAB USE ONLY: Batch #: / Lab No.	Sample Description: Sample I.D. / Location	Date	Time	8081A (Pesticides)	8082 (PCB)	8260B (Volatiles)	8270C (BNA)	6010B (Total Metal)	8015B (GRO) / BTEX	8015B (DRO)	SPECIFY APPROPRIATE MATRIX: SOIL	WATER	GROUND WATER	WASTEWATER	TAT	Container(s) #	Container(s) Type	PRESERVATION	QA/QC: RTNE ☑ CT ☐ SWRCB ☐ Logcode ___ OTHER ___ REMARKS
	843244-001	B6-5	12/30	0945			X					X				E	1	T P	C	
	002	B6-10		1000			X													
	003	B7-5		1010			X													
	004	B7-10		1015			X													

• TAT starts 8 a.m. following day if samples received after 3 p.m.

TAT: A= Overnight ≤ 24 hr B= Emergency Next workday C= Critical 2 Workdays D= Urgent 3 Workdays E= Routine 7 Workdays

Container Types: T=Tube V=VOA L=Liter P=Pint J=Jar B=Tedlar G=Glass P=Plastic M=Metal

Preservatives: H=Hcl N=HNO_3 S=H_2SO_4 C=4°C Z=$Zn(AC)_2$ O=NaOH T=$Na_2S_2O_3$

DISTRIBUTION: **White** with report, **Yellow** to folder, **Pink** to submitter.

RECEIVED
FEB 07 2005
BY: GEOCON

January 24, 2005

ACCREDITED IN ACCORDANCE WITH nelac

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

Workorder No.: 073011

RE: GREENWAY TRAIL, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 21, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Project: GREENWAY TRAIL, S8766-06-01

Lab Order: 073011

Lab ID: 073011-001 **Collection Date:** 12/21/2004 12:22:00 PM
Client Sample ID: B1-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	55	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-002 **Collection Date:** 12/21/2004 12:25:00 PM
Client Sample ID: B1-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	ND	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-003 **Collection Date:** 12/21/2004 12:50:00 PM
Client Sample ID: B2-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	22	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-004 **Collection Date:** 12/21/2004 12:53:00 PM
Client Sample ID: B2-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	ND	1.0		mg/Kg	1	1/13/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H-Sample exceding holding time

Results are wet unless othewise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Project: GREENWAY TRAIL, S8766-06-01
Lab Order: 073011

Lab ID: 073011-005 **Collection Date:** 12/21/2004 12:58:00 PM
Client Sample ID: B3-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	44	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-006 **Collection Date:** 12/21/2004 1:01:00 PM
Client Sample ID: B3-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	66	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-007 **Collection Date:** 12/21/2004 1:08:00 PM
Client Sample ID: B4-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	16	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-008 **Collection Date:** 12/21/2004 1:15:00 PM
Client Sample ID: B4-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871			PrepDate	1/12/2005	Analyst: **RQ**
Arsenic	13	1.0		mg/Kg	1	1/13/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H-Sample exceding holding time

Results are wet unless othewise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Project: GREENWAY TRAIL, S8766-06-01

Lab Order: 073011

Lab ID: 073011-009 **Collection Date:** 12/21/2004 12:32:00 PM
Client Sample ID: B5-S **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871				PrepDate 1/12/2005	Analyst: **RQ**
Arsenic	ND	1.0		mg/Kg	1	1/13/2005

Lab ID: 073011-010 **Collection Date:** 12/21/2004 12:38:00 PM
Client Sample ID: B5-1.5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP5_050113A	QC Batch: 20871				PrepDate 1/12/2005	Analyst: **RQ**
Arsenic	ND	1.0		mg/Kg	1	1/13/2005

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H-Sample exceding holding time

Results are wet unless othewise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *24-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073011
Project: GREENWAY TRAIL, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
MB-20871	MBLK	6010_S	mg/Kg	1/12/2005	ICP5_050113A
Client ID: ZZZZZ	Batch ID: 20871	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/13/2005	SeqNo: 664576

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0									

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073011-010AMS	MS	6010_S	mg/Kg	1/12/2005	ICP5_050113A
Client ID: B5-1.5	Batch ID: 20871	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/13/2005	SeqNo: 664588

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	108.2	1.0	125	0	86.6	64	111	0	0		

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073011-010AMSD	MSD	6010_S	mg/Kg	1/12/2005	ICP5_050113A
Client ID: B5-1.5	Batch ID: 20871	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/13/2005	SeqNo: 664589

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	104.6	1.0	125	0	83.7	64	111	108.2	3.43	20	

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073011-010ADUP	DUP	6010_S	mg/Kg	1/12/2005	ICP5_050113A
Client ID: B5-1.5	Batch ID: 20871	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/13/2005	SeqNo: 664587

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0	0	0	0	0	0	0	0	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Galvan, Diane

From: Rebecca Silva [silva@geoconinc.com]
Sent: Thursday, January 06, 2005 10:48 AM
To: Galvan, Diane
Subject: Greenway Trail

Diane,

Please analyze the samples collected for the Greenway Trail project (S8766-06-01) for total arsenic under standard TAT.

There are two sets of samples - 10 samples collected on 12/21 and four samples collected on 12/30.

We need these reported separately as they will go into a different document.

Please contact me with any questions.

Thanks, Rebecca

****
Rebecca L. Silva, REA
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742

916.852.9118 tel
916.852.9132 fax

silva@geoconinc.com
****

January 13, 2005

RECEIVED
FEB 07 2005
BY: GEOCON

ACCREDITED IN ACCORDANCE WITH nelac

ELAP No.: 1838
NELAP No.: 02107CA
CSDLAC No.: 10196

John Juhrend
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, CA 95742

TEL: (916) 852-9118
FAX: (916) 852-9132

Workorder No.: 073244

RE: Greenway Trail Project, S8766-06-01

Attention: John Juhrend

Enclosed are the results for sample(s) received on December 30, 2004 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

This is an addendum report. Please incorporate with documentation previously submitted.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

The cover letter is an integral part of this analytical report. This Laboratory Report cannot be reproduced in part or in its entirety without written permission from the client and Advanced Technology Laboratories.

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *13-Jan-05*

CLIENT: Geocon Consultants, Inc.
Project: Greenway Trail Project, S8766-06-01
Lab Order: 073244

Lab ID: 073244-001 **Collection Date:** 12/30/2004 9:45:00 AM
Client Sample ID: B6-5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP6_050112B	QC Batch: 20875			PrepDate	1/12/2005	Analyst: **NS**
Arsenic	4.9	1.0		mg/Kg	1	1/12/2005

Lab ID: 073244-002 **Collection Date:** 12/30/2004 10:00:00 AM
Client Sample ID: B6-10 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP6_050112B	QC Batch: 20875			PrepDate	1/12/2005	Analyst: **NS**
Arsenic	1.5	1.0		mg/Kg	1	1/12/2005

Lab ID: 073244-003 **Collection Date:** 12/30/2004 10:10:00 AM
Client Sample ID: B7-5 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP6_050112B	QC Batch: 20875			PrepDate	1/12/2005	Analyst: **NS**
Arsenic	2.2	1.0		mg/Kg	1	1/12/2005

Lab ID: 073244-004 **Collection Date:** 12/30/2004 10:15:00 AM
Client Sample ID: B7-10 **Matrix:** SOIL

Analyte	Result	PQL	Qual	Units	DF	Date Analyzed
ICP METALS						
	(EPA 3050B)			**EPA 6010B**		
RunID: ICP6_050112B	QC Batch: 20875			PrepDate	1/12/2005	Analyst: **NS**
Arsenic	1.3	1.0		mg/Kg	1	1/12/2005

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DO - Surrogate Diluted Out
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
H-Sample exceding holding time

Results are wet unless othewise specified

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories
3275 Walnut Avenue Signal Hill, CA 90755 Tel: 562 989-4045 Fax: 562 989-4040

Advanced Technology Laboratories

Date: *13-Jan-05*

CLIENT: Geocon Consultants, Inc.
Work Order: 073244
Project: Greenway Trail Project, S8766-06-01

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
MB-20875	MBLK	6010_S	mg/Kg	1/12/2005	ICP6_050112B
Client ID: ZZZZZ	Batch ID: 20875	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/12/2005	SeqNo: 663996

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0									

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
LCS-20875	LCS	6010_S	mg/Kg	1/12/2005	ICP6_050112B
Client ID: ZZZZZ	Batch ID: 20875	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/12/2005	SeqNo: 663995

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	52.64	1.0	50	0	105	80	120	0	0		

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073535-003AMS	MS	6010_S	mg/Kg	1/12/2005	ICP6_050112B
Client ID: ZZZZZ	Batch ID: 20875	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/12/2005	SeqNo: 664200

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	511.1	40	500	0	102	64	111	0	0		

Sample ID	SampType	TestCode	Units	Prep Date	Run ID
073535-003AMSD	MSD	6010_S	mg/Kg	1/12/2005	ICP6_050112B
Client ID: ZZZZZ	Batch ID: 20875	TestNo: EPA 6010B	(EPA 3050B)	Analysis Date: 1/12/2005	SeqNo: 664201

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	524.6	40	500	0	105	64	111	511.1	2.61	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
Calculations are based on raw values
DO- Surrogate dilute out
H - Sample exceeded holding time

Galvan, Diane

From: Rebecca Silva [silva@geoconinc.com]
Sent: Thursday, January 06, 2005 10:48 AM
To: Galvan, Diane
Subject: Greenway Trail

Diane,

Please analyze the samples collected for the Greenway Trail project (S8766-06-01) for total arsenic under standard TAT.

There are two sets of samples - 10 samples collected on 12/21 and four samples collected on 12/30.

We need these reported separately as they will go into a different document.

Please contact me with any questions.

Thanks, Rebecca

****
Rebecca L. Silva, REA
Geocon Consultants, Inc.
3160 Gold Valley Drive, Suite 800
Rancho Cordova, California 95742

916.852.9118 tel
916.852.9132 fax

silva@geoconinc.com
****

APPENDIX F

E-1. Recreational Risk/Hazard Calculations for Chemicals of Interest in Soil (Using Maximum Values)

Exposure Parameters

	Adult Incidental Ingestion	Child Incidental Ingestion	Adult Incidental Dermal Contact	Child Incidental Dermal Contact	Adult Vapor Inhalation	Child Vapor Inhalation	
Body Weight (BW):	70	15	70	15	70	15	kg
Averaging Time-noncarcinogenic (Atnc):	8,760	2,190	8,760	2,190	8,760	2,190	days
Averaging Time-carcinogenic (Atcan):	25,550	25,550	25,550	25,550	25,550	25,550	days
Exposure Duration (ED):	24	6	24	6	24	6	years
Exposure Frequency (EF):	196	196	196	196	196	196	days/year
Fraction Exposed (FE):	0.17	0.17	0.17	0.17	0.17	0.17	unitless
Inhalation Rate (IR):					20	10	m3/day
Conversion Factor (CF):	1.00E-06	1.00E-06	1.00E-06	1.00E-06			kg/mg
Soil Ingestion rate (SIR):	100	200					mg/day
Skin surface area (SA):			5700	2800			cm2
Soil-to-Skin adherence factor (AF):			0.07	0.2			mg/cm2
Particulate Emission Factor (PEF):					1.32E+09	1.32E+09	m3/kg

Chemical-specific parameters

Chemical	Soil EPC Maximum (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	100	8.57E-06	1.20E+01	3.00E-04	1.50E+00	1.32E+09	3.00E-02
Thallium	10	6.60E-05	NA	6.60E-05	NA	1.32E+09	1.00E-02
Vanadium	1000	7.00E-03	NA	7.00E-03	NA	1.32E+09	1.00E-02
4,4'-DDE	2.4	NA	2.40E-01	NA	2.40E-01	1.32E+09	1.00E-01
Dieldrin	0.25	5.00E-05	1.60E+01	5.00E-05	1.60E+01	1.32E+09	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	1.32E+09	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic	1.46E-05	1.38E-06	1.05E-09	2.40E-05	95.6%
Thallium	1.46E-06	4.61E-08	1.05E-10	NA	NA
Vanadium	1.46E-04	4.61E-06	1.05E-08	NA	NA
4,4'-DDE	3.51E-07	1.11E-07	2.52E-11	1.11E-07	0.4%
Dieldrin	3.65E-08	1.15E-08	2.63E-12	7.69E-07	3.1%
Aroclor 1260	3.21E-08	1.42E-08	2.31E-12	2.32E-07	0.9%
			Total:	**3E-05**	

Noncarcinogenic Effects

	Adult					Child				
Chemical	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution
Arsenic	1.28E-05	1.53E-06	1.94E-09	4.79E-02	53.2%	1.19E-04	1.00E-05	1.94E-09	4.31E-01	52.7%
Thallium	1.28E-06	5.10E-08	1.94E-10	2.01E-02	22.3%	1.19E-05	3.34E-07	1.94E-10	1.86E-01	22.7%
Vanadium	1.28E-04	5.10E-06	1.94E-08	1.90E-02	21.1%	1.19E-03	3.34E-05	1.94E-08	1.75E-01	21.4%
4,4'-DDE	3.07E-07	1.22E-07	4.65E-11	NA	NA	2.86E-06	8.02E-07	4.65E-11	NA	NA
Dieldrin	3.20E-08	1.28E-08	4.84E-12	8.94E-04	1.0%	2.98E-07	8.35E-08	4.84E-12	7.64E-03	0.9%
Aroclor 1260	2.81E-08	1.57E-08	4.26E-12	2.19E-03	2.4%	2.63E-07	1.03E-07	4.26E-12	1.83E-02	2.2%
			Total:	**9E-02**				**Total:**	**8E-01**	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDinhalation = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atcanadult) + (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atcanchild)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (Inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

ADDingestion, child = (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, child = (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDinhalation, adult = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

LADDinhalation, child = (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atncchild)

Hazard $Index_{adult}$ = ($ADD_{inhalation,\ adult}$/inhalation RfD) + ($ADD_{ingestion,\ adult}$/oral RfD) + ($ADD_{dermal,\ adult}$/oral RfD)

Hazard $Index_{child}$ = ($ADD_{inhalation,\ child}$/inhalation RfD) + ($ADD_{ingestion,\ child}$/oral RfD) + ($ADD_{dermal,\ child}$/oral RfD)

E-2. Recreational Risk/Hazard Calculations for Chemicals of Interest in Soil (Using 95% UCL)

Exposure Parameters

	Adult Incidental Ingestion	Child Incidental Ingestion	Adult Incidental Dermal Contact	Child Incidental Dermal Contact	Adult Vapor Inhalation	Child Vapor Inhalation	
Body Weight (BW):	70	15	70	15	70	15	kg
Averaging Time-noncarcinogenic (Atnc):	8,760	2,190	8,760	2,190	8,760	2,190	days
Averaging Time-carcinogenic (Atcan):	25,550	25,550	25,550	25,550	25,550	25,550	days
Exposure Duration (ED):	24	6	24	6	24	6	years
Exposure Frequency (EF):	196	196	196	196	196	196	days/year
Fraction Exposed (FE):	0.17	0.17	0.17	0.17	0.17	0.17	unitless
Inhalation Rate (IR):					20	10	m3/day
Conversion Factor (CF):	1.00E-06	1.00E-06	1.00E-06	1.00E-06			kg/mg
Soil ingestion rate (SIR):	100	200					mg/day
Skin surface area (SA):			5700	2800			cm2
Soil-to-Skin adherence factor (AF):			0.07	0.2			mg/cm2
Particulate Emission Factor (PEF):					1.32E+09	1.32E+09	m3/kg

Chemical-specific parameters

Chemical	Soil EPC (95% UCL) (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	30.7	8.57E-06	1.20E+01	3.00E-04	1.50E+00	1.32E+09	3.00E-02
Thallium	2.2	6.60E-05	NA	6.60E-05	NA	1.32E+09	1.00E-02
Vanadium	403	7.00E-03	NA	7.00E-03	NA	1.32E+09	1.00E-02
4,4'-DDE	1.76	NA	2.40E-01	NA	2.40E-01	1.32E+09	1.00E-01
Dieldrin	0.22	5.00E-05	1.60E+01	5.00E-05	1.60E+01	1.32E+09	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	1.32E+09	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic	5.19E-06	4.91E-07	3.73E-10	8.52E-06	89.6%
Thallium	3.20E-07	1.01E-08	2.30E-11	NA	NA
Vanadium	5.88E-05	1.86E-06	4.23E-09	NA	NA
4,4'-DDE	2.58E-07	8.14E-08	1.86E-11	8.14E-08	0.9%
Dieldrin	3.19E-08	1.01E-08	2.30E-12	6.72E-07	7.1%
Aroclor 1260	3.21E-08	1.42E-08	2.31E-12	2.32E-07	2.4%
			Total:	1E-05	

Noncarcinogenic Effects

	Adult					Child				
Chemical	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution
Arsenic	4.54E-06	5.43E-07	6.88E-10	1.70E-02	53.1%	4.24E-05	3.56E-06	6.88E-10	1.53E-01	52.9%
Thallium	2.80E-07	1.12E-08	4.24E-11	4.41E-03	13.8%	2.61E-06	7.31E-08	4.24E-11	4.07E-02	14.1%
Vanadium	5.15E-05	2.05E-06	7.80E-09	7.65E-03	23.9%	4.80E-04	1.35E-05	7.80E-09	7.06E-02	24.4%
4,4'-DDE	2.26E-07	9.00E-08	3.42E-11	NA	NA	2.11E-06	5.90E-07	3.42E-11	NA	NA
Dieldrin	2.79E-08	1.11E-08	4.23E-12	7.81E-04	2.4%	2.61E-07	7.30E-08	4.23E-12	6.67E-03	2.3%
Aroclor 1260	2.81E-08	1.57E-08	4.26E-12	2.19E-03	6.8%	2.63E-07	1.03E-07	4.26E-12	1.63E-02	6.3%
			Total:	3E-02				Total:	3E-01	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDinhalation = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atcanadult) + (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atcanchild)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (Inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

ADDingestion, child = (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, child = (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDinhalation, adult = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

LADDinhalation, child = (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atncchild)

Hazard $Index_{adult}$ = ($ADD_{inhalation, adult}$/inhalation RfD) + ($ADD_{ingestion, adult}$/oral RfD) + ($ADD_{dermal, adult}$/oral RfD)

Hazard $Index_{child}$ = ($ADD_{inhalation, child}$/inhalation RfD) + ($ADD_{ingestion, child}$/oral RfD) + ($ADD_{dermal, child}$/oral RfD)

E-3. Construction Worker Risk/Hazard Calculations for Chemicals of Interest in Soil (Using 95%UCL)

Exposure Parameters

	Incidental Ingestion	Incidental Dermal Contact	Inhalation	
Body Weight (BW):	70	70	70	kg
Averaging Time-noncarcinogenic (Atnc):	183	183	183	days
Averaging Time-carcinogenic (Atcan):	25,550	25,550	25,550	days
Exposure Duration (ED):	0.5	0.5	0.5	years
Exposure Frequency (EF):	250	250	250	days/year
Fraction Exposed (FE):	1.00	1.00	1.00	unitless
Inhalation Rate (IR):			20	m3/day
Conversion Factor (CF):	1.00E-06	1.00E-06		kg/mg
Soil ingestion rate (SIR):	330			mg/day
Reduced Absorption Factor (RAF):	100%			
Skin surface area (SA):		3300		cm2
Soil-to-Skin adherence factor (AF):		0.3		mg/cm2
Particulate air concentration (PA):			1.36E+09	m3/kg

Chemical-specific parameters

Chemical	Soil EPC 95%UCL (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	30.7	8.57E-06	1.20E+01	3.00E-04	1.50E+00	1.36E+09	3.00E-02
Thallium	2.2	6.60E-05	NA	6.60E-05	NA	1.36E+09	1.00E-02
Vanadium	403	7.00E-03	NA	7.00E-03	NA	1.36E+09	1.00E-02
4,4'-DDE	1.76	NA	2.40E-01	NA	2.40E-01	1.36E+09	1.00E-01
Dieldrin	0.22	5.00E-05	1.60E+01	5.00E-05	1.60E+01	1.36E+09	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	1.36E+09	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic	7.08E-07	6.37E-08	3.16E-11	1.16E-06	88.2%
Thallium	5.07E-08	1.52E-09	2.26E-12	NA	NA
Vanadium	9.29E-06	2.79E-07	4.14E-10	NA	NA
4,4'-DDE	4.06E-08	1.22E-08	1.81E-12	1.27E-08	1.0%
Dieldrin	5.07E-09	1.52E-09	2.26E-13	1.06E-07	8.0%
Aroclor 1260	5.07E-09	2.13E-09	2.26E-13	3.60E-08	2.7%
			Total:	**1E-06**	
			Total w/o arsenic:	**2E-07**	

Noncarcinogenic Effects

Chemical	Ingestion ADD mg/kg-day	Dermal ADD mg/kg-day	Inhalation ADD mg/kg-day	Hazard Index	% Contribution
Arsenic	9.91E-05	8.92E-06	4.42E-09	3.61E-01	49.3%
Thallium	7.10E-06	2.13E-07	3.17E-10	1.11E-01	15.1%
Vanadium	1.30E-03	3.90E-05	5.80E-08	1.91E-01	26.2%
4,4'-DDE	5.68E-06	1.70E-06	2.53E-10	NA	NA
Dieldrin	7.10E-07	2.13E-07	3.17E-11	1.85E-02	2.5%
Aroclor 1260	7.10E-07	2.98E-07	3.17E-11	5.04E-02	6.9%
			Total:	**7E-01**	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult)

LADDinhalation = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atcanadult)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (Inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDinhalation, adult = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

Hazard $Index_{total}$ = ($ADD_{inhalation,\ adult}$/inhalation RfD) + ($ADD_{ingestion,\ adult}$/oral RfD) + ($ADD_{dermal,\ adult}$/oral RfD)

E-4. Off-Site Residential Inhalation Scenario Risk/Hazard Calculations for Chemicals of Interest in Soil (Using Maximum Values)

Exposure Parameters

	Adult Incidental Ingestion	Child Incidental Ingestion	Adult Incidental Dermal Contact	Child Incidental Dermal Contact	Adult Inhalation	Child Inhalation	
Body Weight (BW):					70	15	kg
Averaging Time-noncarcinogenic (Atnc):					183	183	days
Averaging Time-carcinogenic (Atcan):					25,550	25,550	days
Exposure Duration (ED):					0.5	0.5	years
Exposure Frequency (EF):					350	350	days/year
Fraction Exposed (FE):					1.00	1.00	unitless
Inhalation Rate (IR):					20	10	m3/day
Conversion Factor (CF):							kg/mg
Soil ingestion rate (SIR):							mg/day
Reduced Absorption Factor (RAF):							
Skin surface area (SA):							cm2
Soil-to-Skin adherence factor (AF):							mg/cm2
Particulate air concentration (PA):					4.40E+08	4.40E+08	m3/kg

Chemical-specific parameters

Chemical	Soil EPC Maximum (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	100	8.57E-06	1.20E+01	3.00E-04	1.50E+00	4.40E+08	3.00E-02
Thallium	10	6.60E-05	NA	6.60E-05	NA	4.40E+08	1.00E-02
Vanadium	1000	7.00E-03	NA	7.00E-03	NA	4.40E+08	1.00E-02
4,4'-DDE	2.4	NA	2.40E-01	NA	2.40E-01	4.40E+08	1.00E-01
Dieldrin	0.25	5.00E-05	1.60E+01	5.00E-05	1.60E+01	4.40E+08	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	4.40E+08	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic			1.48E-09	1.78E-08	99.6%
Thallium			1.48E-10	NA	NA
Vanadium			1.48E-08	NA	NA
4,4'-DDE			3.56E-11	8.54E-12	0.0%
Dieldrin			3.71E-12	5.93E-11	0.3%
Aroclor 1260			3.26E-12	6.52E-12	0.0%
			Total:	**2E-08**	
			Total w/o arsenic:	**7E-11**	

Noncarcinogenic Effects

Chemical	Adult Ingestion ADD mg/kg-day	Adult Dermal ADD mg/kg-day	Adult Inhalation ADD mg/kg-day	Adult Hazard Index	Adult % Contribution	Child Ingestion ADD mg/kg-day	Child Dermal ADD mg/kg-day	Child Inhalation ADD mg/kg-day	Child Hazard Index	Child % Contribution
Arsenic			6.23E-08	7.27E-03	97.4%			1.45E-07	1.70E-02	97.4%
Thallium			6.23E-09	9.43E-05	1.3%			1.45E-08	2.20E-04	1.3%
Vanadium			6.23E-07	8.90E-05	1.2%			1.45E-06	2.08E-04	1.2%
4,4'-DDE			1.49E-09	NA	NA			3.49E-09	NA	NA
Dieldrin			1.56E-10	3.11E-06	0.0%			3.63E-10	7.26E-06	0.0%
Aroclor 1260			1.37E-10	6.85E-06	0.1%			3.20E-10	1.60E-05	0.1%
			Total:	**7E-03**				**Total:**	**2E-02**	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atcanchild)

LADDinhalation = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atcanadult) + (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atcanchild)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

ADDingestion, child = (EPC x SIRchild x RAF x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x Fladult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, child = (EPC x SAchild x AFchild x ABS x EFchild x Flchild x EDchild x CF)/(BWchild x Atncchild)

LADDinhalation, adult = (EPC x IRadult x EFadult x Fladult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

LADDinhalation, child = (EPC x IRchild x EFchild x Flchild x EDchild x CF)/(BWchild x VForPEF x Atncchild)

Hazard $Index_{adult}$ = ($ADD_{inhalation,\ adult}$/inhalation RfD) + ($ADD_{ingestion,\ adult}$/oral RfD) + ($ADD_{dermal,\ adult}$/oral RfD)

Hazard $Index_{child}$ = ($ADD_{inhalation,\ child}$/inhalation RfD) + ($ADD_{ingestion,\ child}$/oral RfD) + ($ADD_{dermal,\ child}$/oral RfD)

E-5. Off-Site Residential Inhalation Scenario Risk/Hazard Calculations for Chemicals of Interest in Soil (Using 95% UCL)

Exposure Parameters

	Adult Incidental Ingestion	Child Incidental Ingestion	Adult Incidental Dermal Contact	Child Incidental Dermal Contact	Adult Inhalation	Child Inhalation	
Body Weight (BW):				15	70	15	kg
Averaging Time-noncarcinogenic (Atnc):				183	183	183	days
Averaging Time-carcinogenic (Atcan):				25,550	25,550	25,550	days
Exposure Duration (ED):				0.5	0.5	0.5	years
Exposure Frequency (EF):				350	350	350	days/year
Fraction Exposed (FE):				1.00	1.00	1.00	unitless
Inhalation Rate (IR):					20	10	m3/day
Conversion Factor (CF):				1.00E-06			kg/mg
Soil ingestion rate (SIR):							mg/day
Reduced Absorption Factor (RAF):							
Skin surface area (SA):				2800			cm2
Soil-to-Skin adherence factor (AF):				0.2			mg/cm2
Particulate air concentration (PA):					4.40E+08	4.40E+08	m3/kg

Chemical-specific parameters

Chemical	Soil EPC (95% UCL) (mg/kg)	Inhalation RfD mg/kg-day	Inhalation SF (mg/kg-day)-1	Oral RfD mg/kg-day	Oral SF (mg/kg-day)-1	Ambient Soil PEF/VF m3/kg	ABS Fraction (unitless)
Arsenic	30.7	8.57E-06	1.20E+01	3.00E-04	1.50E+00	4.40E+08	3.00E-02
Thallium	2.2	6.60E-05	NA	6.60E-05	NA	4.40E+08	1.00E-02
Vanadium	403	7.00E-03	NA	7.00E-03	NA	4.40E+08	1.00E-02
4,4'-DDE	1.8	NA	2.40E-01	NA	2.40E-01	4.40E+08	1.00E-01
Dieldrin	0.22	5.00E-05	1.60E+01	5.00E-05	1.60E+01	4.40E+08	1.00E-01
Aroclor 1260	0.22	2.00E-05	2.00E+00	2.00E-05	5.00E+00	4.40E+08	1.40E-01

Carcinogenic Effects

Chemical	Ingestion LADD mg/kg-day	Dermal LADD mg/kg-day	Inhalation LADD mg/kg-day	Theoretical Excess Cancer Risk	% Contribution
Arsenic			4.55E-10	5.46E-09	98.8%
Thallium			3.26E-11	NA	NA
Vanadium			5.97E-09	NA	NA
4,4'-DDE			2.67E-11	6.40E-12	0.1%
Dieldrin			3.26E-12	5.22E-11	0.9%
Aroclor 1260			3.26E-12	6.52E-12	0.1%
			Total:	**6E-09**	
			Total w/o arsenic:	**7E-11**	

Noncarcinogenic Effects

Chemical	Adult Ingestion ADD mg/kg-day	Adult Dermal ADD mg/kg-day	Adult Inhalation ADD mg/kg-day	Adult Hazard Index	Adult % Contribution	Child Ingestion ADD mg/kg-day	Child Dermal ADD mg/kg-day	Child Inhalation ADD mg/kg-day	Child Hazard Index	Child % Contribution
Arsenic			1.91E-08	2.23E-03	97.1%			4.46E-08	5.20E-03	97.1%
Thallium			1.37E-09	2.08E-05	0.9%			3.20E-09	4.84E-05	0.9%
Vanadium			2.51E-07	3.58E-05	1.6%			5.86E-07	8.36E-05	1.6%
4,4'-DDE			1.12E-09	NA	NA			2.62E-09	NA	NA
Dieldrin			1.37E-10	2.74E-06	0.1%			3.20E-10	6.39E-06	0.1%
Aroclor 1260			1.37E-10	6.85E-06	0.3%			3.20E-10	1.60E-05	0.3%
			Total:	**2E-03**				**Total:**	**5E-03**	

Equations - Carcinogenic:

LADDingestion = (EPC x SIRadult x RAF x EFadult x FIadult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SIRchild x RAF x EFchild x FIchild x EDchild x CF)/(BWchild x Atcanchild)

LADDdermal = (EPC x SAadult x AFadult x ABS x EFadult x FIadult x EDadult x CF)/(BWadult x Atcanadult) + (EPC x SAchild x AFchild x ABS x EFchild x FIchild x EDchild x CF)/(BWchild x Atcanchild)

LADDinhalation = (EPC x IRadult x EFadult x FIadult x EDadult x CF)/(BWadult x VForPEF x Atcanadult) + (EPC x IRchild x EFchild x FIchild x EDchild x CF)/(BWchild x VForPEF x Atcanchild)

Theoretical Excess Cancer Risk = (oral SF x $LADD_{ingestion}$) + (oral SF x $LADD_{dermal}$) + (Inhalation SF x $LADD_{inhalation}$)

Equations - Noncarcinogenic:

ADDingestion, adult = (EPC x SIRadult x RAF x EFadult x FIadult x EDadult x CF)/(BWadult x Atncadult)

ADDingestion, child = (EPC x SIRchild x RAF x EFchild x FIchild x EDchild x CF)/(BWchild x Atncchild)

LADDdermal, adult = (EPC x SAadult x AFadult x ABS x EFadult x FIadult x EDadult x CF)/(BWadult x Atncadult)

LADDdermal, child = (EPC x SAchild x AFchild x ABS x EFchild x FIchild x EDchild x CF)/(BWchild x Atncchild)

LADDinhalation, adult = (EPC x IRadult x EFadult x FIadult x EDadult x CF)/(BWadult x VForPEF x Atncadult)

LADDinhalation, child = (EPC x IRchild x EFchild x FIchild x EDchild x CF)/(BWchild x VForPEF x Atncchild)

Hazard $Index_{adult}$ = ($ADD_{inhalation,\ adult}$/inhalation RfD) + ($ADD_{ingestion,\ adult}$/oral RfD) + ($ADD_{dermal,\ adult}$/oral RfD)

Hazard $Index_{child}$ = ($ADD_{inhalation,\ child}$/inhalation RfD) + ($ADD_{ingestion,\ child}$/oral RfD) + ($ADD_{dermal,\ child}$/oral RfD)

Table E-6a. Arsenic 95% UCL

Data File

Variable: Arsenic

Raw Statistics	
Number of Valid Samples	73
Number of Unique Samples	39
Minimum	0.25
Maximum	100
Mean	24.84452
Median	16
Standard Deviation	24.41036
Variance	595.8658
Coefficient of Variation	0.982525
Skewness	1.46221

Gamma Statistics	
k hat	0.973088
k star (bias corrected)	0.942231
Theta hat	25.53161
Theta star	26.36776
nu hat	142.0709
nu star	137.5657
Approx.Chi Square Value (.05)	111.4606
Adjusted Level of Significance	0.046712
Adjusted Chi Square Value	110.9894

Log-transformed Statistics	
Minimum of log data	-1.386294
Maximum of log data	4.60517
Mean of log data	2.617542
Standard Deviation of log data	1.3265
Variance of log data	1.759601

RECOMMENDATION

Data follow gamma distribution (0.05)

Use Approximate Gamma UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.208795
Lilliefors 5% Critical Value	0.103698
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	29.60515

Gamma Distribution Test	
A-D Test Statistic	0.649281
A-D 5% Critical Value	0.782194
K-S Test Statistic	0.100868
K-S 5% Critical Value	0.107591
Data follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	30.66333
Adjusted Gamma UCL	30.79351

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.155631
Lilliefors 5% Critical Value	0.103698
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	49.47701
95% Chebyshev (MVUE) UCL	60.78445
97.5% Chebyshev (MVUE) UCL	73.10487
99% Chebyshev (MVUE) UCL	97.30595

95% Non-parametric UCLs	
CLT UCL	29.5439
Adj-CLT UCL (Adjusted for skewness)	30.06634
Mod-t UCL (Adjusted for skewness)	29.68664
Jackknife UCL	29.60515
Standard Bootstrap UCL	29.54804
Bootstrap-t UCL	30.3936
Hall's Bootstrap UCL	30.04302
Percentile Bootstrap UCL	29.66712
BCA Bootstrap UCL	29.80342
95% Chebyshev (Mean, Sd) UCL	37.29797
97.5% Chebyshev (Mean, Sd) UCL	42.68659
99% Chebyshev (Mean, Sd) UCL	53.27148

Table: E-6b. Lead 95% UCL

Data File

Variable: Lead

Raw Statistics

Number of Valid Samples	40
Number of Unique Samples	26
Minimum	2
Maximum	630
Mean	44.2
Median	6.75
Standard Deviation	112.1463
Variance	12576.79
Coefficient of Variation	2.537247
Skewness	4.327055

Gamma Statistics

k hat	0.484217
k star (bias corrected)	0.464567
Theta hat	91.28139
Theta star	95.14228
nu hat	38.73736
nu star	37.16539
Approx.Chi Square Value (.05)	24.20634
Adjusted Level of Significance	0.044
Adjusted Chi Square Value	23.81353

Log-transformed Statistics

Minimum of log data	0.693147
Maximum of log data	6.44572
Mean of log data	2.470389
Standard Deviation of log data	1.433892
Variance of log data	2.056047

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test

Shapiro-Wilk Test Statisitic	0.412197
Shapiro-Wilk 5% Critical Value	0.94

Data not normal at 5% significance level

95% UCL (Assuming Normal Distribution)

Student's-t UCL	74.07601

Gamma Distribution Test

A-D Test Statistic	3.579094
A-D 5% Critical Value	0.816636
K-S Test Statistic	0.213314
K-S 5% Critical Value	0.147866

Data do not follow gamma distribution at 5% significance level

95% UCLs (Assuming Gamma Distribution)

Approximate Gamma UCL	67.86282
Adjusted Gamma UCL	68.98223

Lognormal Distribution Test

Shapiro-Wilk Test Statisitic	0.890609
Shapiro-Wilk 5% Critical Value	0.94

Data not lognormal at 5% significance level

95% UCLs (Assuming Lognormal Distribution)

95% H-UCL	64.35999
95% Chebyshev (MVUE) UCL	71.44296
97.5% Chebyshev (MVUE) UCL	88.73139
99% Chebyshev (MVUE) UCL	122.6912

95% Non-parametric UCLs

CLT UCL	73.36636
Adj-CLT UCL (Adjusted for skewness)	86.32913
Mod-t UCL (Adjusted for skewness)	76.09794
Jackknife UCL	74.07601
Standard Bootstrap UCL	72.83904
Bootstrap-t UCL	131.9612
Hall's Bootstrap UCL	192.7492
Percentile Bootstrap UCL	74.5375
BCA Bootstrap UCL	91.475
95% Chebyshev (Mean, Sd) UCL	121.4915
97.5% Chebyshev (Mean, Sd) UCL	154.9356
99% Chebyshev (Mean, Sd) UCL	220.63

ProUCL Output

Table E-6c. Thallium 95% UCL

Data File

Variable: Thallium

Raw Statistics	
Number of Valid Samples	40
Number of Unique Samples	10
Minimum	0.125
Maximum	10
Mean	1.117375
Median	0.75
Standard Deviation	1.554394
Variance	2.41614
Coefficient of Variation	1.391112
Skewness	5.062069

Gamma Statistics	
k hat	1.57074
k star (bias corrected)	1.469601
Theta hat	0.711369
Theta star	0.760325
nu hat	125.6592
nu star	117.5681
Approx.Chi Square Value (.05)	93.52804
Adjusted Level of Significance	0.044
Adjusted Chi Square Value	92.72536

Log-transformed Statistics	
Minimum of log data	-2.079442
Maximum of log data	2.302585
Mean of log data	-0.239941
Standard Deviation of log data	0.743763
Variance of log data	0.553183

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.44419
Shapiro-Wilk 5% Critical Value	0.94
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	1.531469

Gamma Distribution Test	
A-D Test Statistic	2.829202
A-D 5% Critical Value	0.764851
K-S Test Statistic	0.228051
K-S 5% Critical Value	0.141914
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	1.40458
Adjusted Gamma UCL	1.416739

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.894242
Shapiro-Wilk 5% Critical Value	0.94
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	1.333299
95% Chebyshev (MVUE) UCL	1.608091
97.5% Chebyshev (MVUE) UCL	1.858929
99% Chebyshev (MVUE) UCL	2.351653

95% Non-parametric UCLs	
CLT UCL	1.521633
Adj-CLT UCL (Adjusted for skewness)	1.731821
Mod-t UCL (Adjusted for skewness)	1.564254
Jackknife UCL	1.531469
Standard Bootstrap UCL	1.516826
Bootstrap-t UCL	2.201538
Hall's Bootstrap UCL	3.094474
Percentile Bootstrap UCL	1.558375
BCA Bootstrap UCL	1.955625
95% Chebyshev (Mean, Sd) UCL	2.188667
97.5% Chebyshev (Mean, Sd) UCL	2.652216
99% Chebyshev (Mean, Sd) UCL	3.562768

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Table E-6d. Vanadium 95% UCL

Data File

Variable: Vanadium

Raw Statistics	
Number of Valid Samples	40
Number of Unique Samples	30
Minimum	0.5
Maximum	1000
Mean	94.075
Median	36
Standard Deviation	196.1011
Variance	38455.62
Coefficient of Variation	2.084518
Skewness	3.703836

Gamma Statistics	
k hat	0.685517
k star (bias corrected)	0.650769
Theta hat	137.2323
Theta star	144.5596
nu hat	54.84132
nu star	52.06156
Approx.Chi Square Value (.05)	36.48585
Adjusted Level of Significance	0.044
Adjusted Chi Square Value	35.99657

Log-transformed Statistics	
Minimum of log data	-0.693147
Maximum of log data	6.907755
Mean of log data	3.659916
Standard Deviation of log data	1.261972
Variance of log data	1.592574

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.432823
Shapiro-Wilk 5% Critical Value	0.94
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	146.3167

Gamma Distribution Test	
A-D Test Statistic	3.733193
A-D 5% Critical Value	0.795296
K-S Test Statistic	0.270824
K-S 5% Critical Value	0.145616
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	134.2353
Adjusted Gamma UCL	136.0599

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.896471
Shapiro-Wilk 5% Critical Value	0.94
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	148.1182
95% Chebyshev (MVUE) UCL	172.9275
97.5% Chebyshev (MVUE) UCL	211.7162
99% Chebyshev (MVUE) UCL	287.9091

95% Non-parametric UCLs	
CLT UCL	145.0758
Adj-CLT UCL (Adjusted for skewness)	164.4781
Mod-t UCL (Adjusted for skewness)	149.3431
Jackknife UCL	146.3167
Standard Bootstrap UCL	145.4762
Bootstrap-t UCL	212.5185
Hall's Bootstrap UCL	160.0311
Percentile Bootstrap UCL	149.6
BCA Bootstrap UCL	187.0375
95% Chebyshev (Mean, Sd) UCL	229.2283
97.5% Chebyshev (Mean, Sd) UCL	287.7093
99% Chebyshev (Mean, Sd) UCL	402.5838

ProUCL Output

Table E-6e. 4,4- DDE 95% UCL

Data File

Variable: 4,4'DDE

Raw Statistics	
Number of Valid Samples	15
Number of Unique Samples	8
Minimum	0.001
Maximum	2.4
Mean	0.187093
Median	0.001
Standard Deviation	0.614129
Variance	0.377155
Coefficient of Variation	3.282475
Skewness	3.831501

Gamma Statistics	
k hat	0.220661
k star (bias corrected)	0.220973
Theta hat	0.847878
Theta star	0.846679
nu hat	6.619822
nu star	6.629191
Approx.Chi Square Value (.05)	1.96885
Adjusted Level of Significance	0.03235
Adjusted Chi Square Value	1.672271

Log-transformed Statistics	
Minimum of log data	-6.907755
Maximum of log data	0.875469
Mean of log data	-4.960028
Standard Deviation of log data	2.538514
Variance of log data	6.444052

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.337226
Shapiro-Wilk 5% Critical Value	0.881
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.46638

Gamma Distribution Test	
A-D Test Statistic	2.109431
A-D 5% Critical Value	0.86823
K-S Test Statistic	0.285994
K-S 5% Critical Value	0.244035
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.62995
Adjusted Gamma UCL	0.741672

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.782901
Shapiro-Wilk 5% Critical Value	0.881
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	8.041217
95% Chebyshev (MVUE) UCL	0.397049
97.5% Chebyshev (MVUE) UCL	0.527809
99% Chebyshev (MVUE) UCL	0.784661

95% Non-parametric UCLs	
CLT UCL	0.447914
Adj-CLT UCL (Adjusted for skewness)	0.615531
Mod-t UCL (Adjusted for skewness)	0.492525
Jackknife UCL	0.46638
Standard Bootstrap UCL	0.435929
Bootstrap-t UCL	3.074686
Hall's Bootstrap UCL	2.907113
Percentile Bootstrap UCL	0.498827
BCA Bootstrap UCL	0.669587
95% Chebyshev (Mean, Sd) UCL	0.878273
97.5% Chebyshev (Mean, Sd) UCL	1.177347
99% Chebyshev (Mean, Sd) UCL	1.76482

ProUCL Output

Table E-6f. Dieldrin 95% UCL

Data File

Variable: Dieldrin

Raw Statistics	
Number of Valid Samples	15
Number of Unique Samples	7
Minimum	0.001
Maximum	0.25
Mean	0.034693
Median	0.001
Standard Deviation	0.071534
Variance	0.005117
Coefficient of Variation	2.061894
Skewness	2.418641

Gamma Statistics	
k hat	0.337898
k star (bias corrected)	0.314763
Theta hat	0.102674
Theta star	0.110221
nu hat	10.13693
nu star	9.442876
Approx.Chi Square Value (.05)	3.595842
Adjusted Level of Significance	0.03235
Adjusted Chi Square Value	3.164375

Log-transformed Statistics	
Minimum of log data	-6.907755
Maximum of log data	-1.386294
Mean of log data	-5.362717
Standard Deviation of log data	2.012285
Variance of log data	4.049293

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.554425
Shapiro-Wilk 5% Critical Value	0.881
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.067225

Gamma Distribution Test	
A-D Test Statistic	1.95586
A-D 5% Critical Value	0.827453
K-S Test Statistic	0.299621
K-S 5% Critical Value	0.238843
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.091107
Adjusted Gamma UCL	0.103529

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.766558
Shapiro-Wilk 5% Critical Value	0.881
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	0.418686
95% Chebyshev (MVUE) UCL	0.093669
97.5% Chebyshev (MVUE) UCL	0.122953
99% Chebyshev (MVUE) UCL	0.180476

95% Non-parametric UCLs	
CLT UCL	0.065074
Adj-CLT UCL (Adjusted for skewness)	0.077398
Mod-t UCL (Adjusted for skewness)	0.069147
Jackknife UCL	0.067225
Standard Bootstrap UCL	0.063062
Bootstrap-t UCL	0.106673
Hall's Bootstrap UCL	0.075024
Percentile Bootstrap UCL	0.066247
BCA Bootstrap UCL	0.08558
95% Chebyshev (Mean, Sd) UCL	0.115202
97.5% Chebyshev (Mean, Sd) UCL	0.150038
99% Chebyshev (Mean, Sd) UCL	0.218467

Table 7a: Raw Data for Calculation of 95 % UCL

SAMPLE I.D.	Arsenic	Lead	Thallium	Vanadium
T7-2	45	3.5	0.5	36
T7-1	46	20	1	83
T7-.5	46	190	1	88
T6-2	9.5	3	0.5	38
T6-1	84	3.5	0.5	35
T6-.5	44	20	1	79
T5-2	100	3.5	1.5	40
T5-1	45	15	1.5	25
T5-.5	7.5	25	3	500
T4-2	90	3.5	1	35
T4-1	60	2.5	1	24
T4-.5	4	3.5	<0.25	5.5
T30-2	28	3.5	0.5	38
T30-1	28	3	0.5	20
T30-.5	64	28	1.5	110
T28-2	20	6	1.5	50
T28-1	16	4.5	0.5	16
T28-.5	34	42	1.5	130
T26-2	41	4.5	1	50
T26-1	16	2	0.48	15
T26-.5	12	18	10	710
T25-2	16	4	1.5	46
T25-1	20	6.5	0.5	20
T25-.5	20	43	1	120
T24-2	9	8	0.5	32
T24-1	32	10	0.5	16
T24-.5	70	330	0.28	8
T19-2	18	29	0.5	16
T19-1	9.5	28	1	30
T19-.5	13	84	0.5	34
T16-2	15	6.5	1	42
T16-1	18	5.5	0.5	36
T16-.5	18	7	2.5	1000
T15-2	8	2.5	0.5	32
T15-1	16	5.5	0.5	40
T15-.5	60	94	0.5	22
T12-2	10	3	1	40
T12-1	44	38	0.5	73
T12-.5	32	630	0.31	0.5
S16-0	7.5	29	1	28
B7-5	2.2			
B7-10	1.3			
B6-5	4.9			
B6-10	1.5			
B5-S	<1			
B5-1.5	<1			
B4-S	16			
B4-1.5	13			
B3-S	44			
B3-1.5	66			
B2-S	22			
B2-1.5	<1			
B1-S	55			
B1-1.5	<1			
T9-1	9.5			
T10-1	7			
T11-2	99			
T13-2	7			
T14-1	8			
T17-1.5	36			
T18-1	22			

Raw Data

T20-2	8				
T22-2	8				
T23-1	16				
T27-1	9				
T29-1	<0.25				
S1-.5	25				
S2-.5	8				
S5-.5	7.5				
S6-.5	12				
S7-.5	9				
S8-0	6.5				
S9A-0	12				
Min	**1.3**	**2**	**0.28**	**0.5**	**mg/kg**
Max	**100**	**630**	**10**	**1000**	**mg/kg**
Mean	**26.63823529**	**44.2**	**1.142820513**	**94.075**	**mg/kg**
No. Detected	**68**	**40**	**39**	**40**	**mg/kg**
No. Samples	**73**	**40**	**40**	**40**	**mg/kg**

Raw Data

SAMPLE I.D.	4,4'DDE	Dieldrin	Aroclor 1260
S1-.5	20	5.7	220
S2-.5	ND	ND	ND
S5-.5	ND	ND	ND
S6-.5	14	10	ND
S7-.5	110	250	ND
T14-1	ND	ND	ND
T17-1.5	ND	ND	ND
T27-1	ND	ND	ND
B1-S	2400	130	
B1-1.5	ND	ND	
B2-S	150	100	
B2-1.5	ND	ND	
B3-S	ND	5.7	
B4-S	4.4	ND	
B5-S	100	11	
Min	**4.4**	**5.7**	**220 ug/kg**
Max	**2400**	**250**	**220 ug/kg**
Mean	**399.7714286**	**73.2**	**220 ug/kg**
No. Detected	**7**	**7**	**1 ug/kg**
No. Samples	**15**	**15**	**8 ug/kg**
	DL = 2.0	*DL = 2.0*	

Table 7b: Pro UCL input

Arsenic	Lead	Thallium	Vanadium	4,4'DDE	Dieldrin
100	630	10	1000	0.001	0.001
99	330	3	710	0.001	0.001
90	190	2.5	500	0.001	0.001
84	94	1.5	130	0.001	0.001
70	84	1.5	120	0.001	0.001
66	43	1.5	110	0.001	0.001
64	42	1.5	88	0.001	0.001
60	38	1.5	83	0.001	0.001
60	29	1.5	79	2.4	0.25
55	29	1	73	0.15	0.13
46	28	1	50	0.11	0.1
46	28	1	50	0.1	0.011
45	25	1	46	0.02	0.01
45	20	1	42	0.014	0.0057
44	20	1	40	0.0044	0.0057
44	18	1	40		
44	15	1	40		
41	10	1	38		
36	8	1	38		
34	7	1	36		
32	6.5	0.5	36		
32	6.5	0.5	35		
28	6	0.5	35		
28	5.5	0.5	34		
25	5.5	0.5	32		
22	4.5	0.5	32		
22	4.5	0.5	30		
20	4	0.5	28		
20	3.5	0.5	25		
20	3.5	0.5	24		
18	3.5	0.5	22		
18	3.5	0.5	20		
18	3.5	0.5	20		
16	3.5	0.5	16		
16	3	0.5	16		
16	3	0.5	16		
16	3	0.48	15		
16	2.5	0.31	8		
16	2.5	0.28	5.5		
15	2	0.125	0.5		
13					
13					
12					
12					
12					
10					
9.5					
9.5					
9.5					
9					
9					
9					
8					
8					
8					
8					
8					
7.5					
7.5					
7.5					
7					
7					
6.5					
4.9					
4					
2.2					
1.5					
1.3					
0.5					
0.5					
0.5					
0.5					
0.25					