January 7, 2019
Project 2018-222
Via E-mail

Sara Vela
Project Manager
DTSC-Brownfields and Environmental Restoration Program
9211 Oakdale Avenue
Chatsworth, CA 91311

Re*: *FINAL DRAFT - Soil Management Plan, City of Beverly Hills - New Tree Planting, Civic Center Drive ROW, Beverly Hills, California 90210

Dear Ms. Vela:

Lindmark Engineering (LE) has prepared this *Final Draft - Soil Management Plan* (SMP) detailing the procedures for management of soil generated by excavations during the proposed planting of 51 new trees at the referenced site.

This SMP has been revised in accordance with your comments submitted in a letter dated, December 20, 2018.

If you have any questions, please call me at 818-707-6100.

Best regards,

Ulf Lindmark, PE, BCEE
President

UML:dws

cc: Tristan Malabanan, City of Beverly Hills (pdf)
David Yelton, City of Beverly Hills (pdf)

FINAL DRAFT
Soil Management Plan

City of Beverly Hills – New Tree Planting

Civic Center Drive ROW
California 90210

Prepared for

CITY OF BEVERLY HILLS
345 Foothill Road
Beverly Hills, CA 90210

January 7, 2019

By

LINDMARK ENGINEERING
2625 Townsgate Road, Suite 330
Westlake Village, California 91361

Project No. 2018-222

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PROFESSIONAL CERTIFICATION

This report has been prepared by

David W. Smith, PG
Senior Project Geologist

under the professional supervision and review of

Ulf Lindmark, PE, BCEE
President

STATEMENT OF LIMITATIONS

The services described in this report were performed in a manner consistent with Lindmark Engineering's agreement with the client and in accordance with generally accepted professional consulting principles and practices.

Opinions and recommendations contained in this report apply to conditions existing at certain locations when services were performed and are intended only for the specific purposes, locations, time frames, and project parameters indicated. Lindmark Engineering cannot be responsible for the impact of any changes in environmental standards, practices, or regulations after performance of services.

This report is issued with the understanding that the client, the property owner, or its representative is responsible for ensuring that the information, conclusions and recommendations contained herein are brought to the attention of the appropriate regulatory agencies, as required.

1. INTRODUCTION

On behalf of the City of Beverly Hills (City), Lindmark Engineering, Inc. (LE) has prepared this Soil Management Plan (SMP) for the excavations related to the proposed new tree planting at the City right-of-way, located adjacent to Civic Center Drive (site), Beverly Hills, California. The site location is shown on Figure 1. The purpose of the project is to plant 51 new trees across the site. The tree planting activities will involve soil excavation at each of the 51 new tree sites and soil export. The proposed new tree planting locations are shown on Figures 2 through 6.

Adjoining the site to the north is Lot 13, which is impacted with arsenic and is under the regulatory oversight by the Department of Toxic Substances and Control (DTSC). Previous assessments of Lot 13 have found arsenic concentrations in soil above normal background for California soils, with a maximum concentration of 996 mg/kg. The DTSC has established a local arsenic background level of 25 mg/kg.

In September of 2018, LE collected soil samples at each of the 51 tree sites for analysis of arsenic and waste profiling. The soil that will be excavated for the trees was profiled as non-hazardous and will be accepted at permitted facilities that take non-hazardous soil with arsenic concentrations above normal background in California soils.

The soil sampling results were submitted to DTSC, and subsequently LE and the City met with DTSC to discuss the findings. Based on the conclusions of this meeting, the scope of work for this SMP was determined. LE submitted a Draft SMP to the DTSC for approval on November 5, 2018. The DTSC approved the SMP but required their comments on the SMP to be addressed. Therefore this Final Draft SMP addresses these comments. A Site Health and Safety Plan has been prepared as a separate document and will be submitted to DTSC with their comments addressed. DTSC's comments and LE's responses are contained in Appendix A.

1.1 Soil Management Objectives

The primary objective is to implement dust source and receptor control and monitoring measures during removal of arsenic impacted soil. The primary dust sources at the site will be exposed soil during excavation, potential stockpiling, and truck-loading activities. Potential dust receptors include construction workers, the nearby community, offsite pedestrians, and vehicle traffic around the site.

2. SITE DESCRIPTION AND BACKGROUND

2.1 Site Description

The site consists of a City street right-of-way that extends 20 feet from the face of the curb along Civic Center Drive, and adjoins Lot 13, between North Oakhurst Drive to the east and Beverly Boulevard to the west, in the City of Beverly Hills, California. The site is located in an area primarily comprised of residential land use, mixed-use commercial businesses, a car dealership, and a cafe.

2.2 Surrounding Land Use and Receptors

Adjacent to the site is Lot 13, an approximately 60-foot-wide railroad right-of-way, previously existed for a railroad operated by the Pacific Electric Railway Company from approximately 1926 to 1954 when passenger service ended. Freight service continued past 1954, but in the 1960s, all service ended and the railroad was removed. Arsenic contamination on Lot 13 is documented between Beverly Boulevard and Doheny Drive.

Previous assessments at Lot 13 have found arsenic concentrations in soil above normal background for California soils with a maximum concentration of 996 milligrams per kilogram (mg/kg). Given the known site conditions and potential for dust generation, LE has previously conducted dust monitoring at the site during tree trimming and landscaping maintenance, on behalf of the City, including analytical testing for total arsenic in air and in plants, but arsenic was not detected in those samples as presented in previous reports. The reports also found the daily time-weighted average of total dust concentrations recorded during site work did not exceed a difference of 50 micrograms per cubic meter ($\mu g/m^3$) between upwind and downwind monitoring stations.

2.3 Topography

The current USGS topographic map (Beverly Hills Quadrangle, 1995) indicates that the site is situated at an elevation of approximately 230 feet above mean sea level with generally a flat topography (USGS,1995). The topography in the site vicinity generally slopes downward to the southeast. See Figure 1 for an elevation contour topographic map of the site vicinity.

2.4 Site Geology and Hydrogeology

2.4.1 Site Specific Geology

As mapped by Dibblee on the Geologic Map of the Beverly Hills-Van Nuys (South ½) Quadrangles, (1991), the site is located on Quaternary age (present day to 1.8 million years old) alluvium. These Quaternary age sediments are stream deposits that have overlain the Beverly Hills area. They are derived from the erosion of the nearby Santa Monica Mountains, north of the site.

Soil across the site is generally very compacted silty sand with gravel in the uppermost 6-inches to 1-foot below ground surface (bgs). In some areas, the uppermost layer is softer silty sand mixed with abundant decomposed plant material or roots. Below the surface layer are generally looser silty sands and silts, with a minor component of gravel.

2.4.2 Site Specific Hydrogeology

Groundwater in the site vicinity is approximately 40 feet bgs. Excavations are not expected to encounter groundwater. No groundwater was encountered during drilling at the site in September 2018 to a depth of 2 feet bgs.

2.5 Meteorology

The site is located 0.5 miles northeast of the Beverly Hills City Hall weather station (34.07 °N, 118.40 °W). The project is expected to be performed in January 2019. The maximum and average wind speed, and direction data were reviewed for the period January 1 through January 31, 2018 (Weather Underground, 2018). The maximum wind speed was 18 miles per hour, with wind gusts up to 29 miles per hour. The prevailing wind direction blows from the southwest. LE has observed this prevailing wind direction during our monitoring in 2016 through 2018.

2.6 Site Assessment

On September 4 and 5, 2018, LE advanced 51 borings (LE1 through LE51) at each of the new planting sites, for the purpose of assessing the arsenic concentrations at the new planting sites, and to develop a waste profile for soil disposal requirements. The scope of work for the assessment was based on LE's Technical Memorandum, dated August 20, 2018. Each boring was advanced to a depth of 2 feet bgs using a hand auger, and a soil sample was collected at 2 feet bgs. Following drilling and soil sampling,

the drill cuttings were used to backfill the boreholes. The approximate locations of the borings and associated proposed planting sites are depicted on Figures 2 through 6.

Soil encountered generally consisted of loose silty sand with gravel, which in most locations underlie a 6-inch to 1-foot thick very dense uppermost layer of sand with gravel. No staining or odors were observed from any of the soil samples. Soil samples were retained in 4 oz glass jars, and submitted to American Scientific Laboratories, LLC (ASL), a state-certified laboratory, for analysis. Each soil sample was analyzed for arsenic by EPA Method 6010B, and a representative composite waste profile sample was analyzed for Title 22 Metals by EPA Method 6010B/7471A, volatile organic compounds by EPA Method 8260B, and total petroleum hydrocarbons (gasoline, diesel and oil) by EPA Method 8015M. The waste profile report is contained in Appendix B.

Based on the results of soil sampling, the maximum arsenic concentration detected at the site was 88 mg/kg, with a mean concentration of 22.2 mg/kg, and 95% UCL of 27.9 mg/kg. Based on review with the DTSC, LE concludes that concentrations of arsenic are above background at the site. The DTSC concluded that a Soil Management Plan would be required to address the proposed scope of work for the new tree planting, and that HAZWOPR-certified workers would be required when handing soil. The results of the soil sampling also indicated the soil removed would be classified as non-hazardous for disposal purposes.

3. NATURE AND DISTRIBUTION OF CHEMICAL OF CONCERN

3.1 Chemical of Concern

Arsenic has been identified as the chemical of concern (COC) at the site. The maximum and range of detections of the COC across the site are presented below:

Chemical of Concern	Maximum Detection	Range of Detection
Arsenic	88 mg/kg	6.41 mg/kg to 88 mg/kg

3.2 Subsurface Distribution and Impacted Matrices

Based on LE's soil sampling at the site, arsenic impacted soil exists beneath the entire site, above the DTSC-established local background concentration of 25 mg/kg. The matrices impacted include soil, and soil covered plant debris.

4. HUMAN HEALTH RISK EVALUATION

Using the data from LE's soil assessment, Charles Lambert, Ph.D., DABT of Intrinsik performed a health risk assessment of construction worker exposure to arsenic in dust. Intrinsik's report is contained in Appendix C.

Intrinsik's evaluation focused on potential short-term exposures via incidental ingestion of and dermal contact with arsenic in soil and inhalation of soil-associated dust particulates. Intrinsik determined the arsenic soil exposure point concentration of 34.8 mg/kg is below the calculated construction worker non-cancer risk-based screening level for arsenic in soil (44 mg/kg). Based on this, measurements of dust levels in the immediate worker space will not be required, however dust monitoring in

compliance with South Coast Air Quality Management District (AQMD) requirements, and in response to community concerns, will be performed as outlined in this SMP.

5. REMOVAL ACTION IMPLEMENTATION

5.1 Site Preparation and Control Measures

Prior to equipment mobilization for the proposed excavation operations, site preparation activities may include, but are not necessarily limited to, site inspections, surveying, boundary staking, and fencing removal or installation.

5.1.1 Clearing and Grubbing

Clearing and grubbing of the existing landscaping and overlaying foliage to provide access to the new tree planting sites will be performed for each site where this is needed before excavation.

5.1.2 Location and Size of Excavation Areas, and Sequence of Work

The excavation areas delineation and depth, and sequence of work will be in strict accordance with the City's directions given to the contractor.

5.1.3 Security Measures

Appropriate barriers will be installed prior to the beginning of the excavation process to ensure that all work areas are secure and safe. To ensure trespassers or unauthorized personnel are not allowed near work areas, security measures may include, but are not limited to:

- Visitors must have prior approval to enter the site. Visitors shall not be permitted to enter the site without first receiving site-specific health and safety information from the site safety coordinator.
- Providing adequate site security to ensure unauthorized personnel have no access to work areas and/or excavated soil.
- Maintaining a safe and secure work area, including areas where equipment is stored or placed, at the close of each workday.

5.1.4 Contaminant Control and Stockpile Procedures

A stockpile is any accumulation of soil, which is not fully enclosed, covered, or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 square feet or more. Based on this definition, LE does not anticipate any soil stockpiles will be generated. However, if stockpiles are generated, the following measures will be taken during soil excavation activities to minimize any potential exposure to arsenic impacted soil:

- Air and dust monitoring procedures will be implemented during excavation activities.
- Dust control measures will be implemented during excavation activities.
- Excavation activities will only be conducted during hours specified by the City.

If it is necessary to temporarily store the excavated soil on-site until off-site transportation and disposal are available, the following may apply. Plastic sheeting will be used to separate stockpiles of impacted soil from the ground during excavation activities. Stockpiles will be covered or kept moist during non-work hours or overnight to minimize the potential for fugitive dust until truck load-out occurs. Stockpiling is further discussed in Section 5.4.2.1.

5.2 Agency Requirements

In addition to permits and approvals required by the City, the following approvals/permits from State and local agencies will be required to conduct all work:

- DTSC approval of this Soil Management Plan

These and all other necessary permits or approvals will be obtained prior to the implementation of the excavation operations.

5.2.1 South Coast Air Quality Management District (AQMD)

Fugitive dust emissions will be controlled in compliance with requirements contained in AQMD Rule 403, and certain requirements that are more stringent contained in AQMD Rule 1466. Several measures will be performed at the site during the soil removal, including:

- Application of water to control dust generation at the working face and other points of dust/odor generation;
- Stockpile control – covers, wetting;
- Cease work conditions – wind speed, odor, and/or particulate monitoring thresholds;
- Truck loading, covering and soil track-out removal procedures; and
- Housekeeping (street cleaning if necessary).

Notification of the AQMD is required only for large operations (disturbing more than 100 acres or moving more than 10,000 cubic yards per day). The estimated total mass of material removed from the site will be less than 1,500 cubic yards. Therefore, no notification or filing of a Fugitive Dust Emission Control Plan is required due to project size.

5.2.2 Stormwater Management and Erosion Control

As required by the City, the contractor shall implement storm water pollution control to minimize off-site sediment transport during storm events during the project.

5.2.3 Licenses and Certifications

Contractors that will excavate and handle soil will be responsible for operating in accordance with the most current OSHA regulations, including 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response," 29 CFR 1926, "Construction Industry Standards," and 8 CCR 1540 and 1541.1, as well as other applicable Federal, State and local laws and regulations. During excavating and handling soil, the contractor shall have an on-site dust control supervisor that has completed certification in the AQMD Fugitive Dust Control Class.

5.2.4 Field Documentation

Field logbooks or daily field reports will be used to document where, when, how, and from whom any vital project information was obtained. Logbook or field report entries will be complete and accurate enough to permit reconstruction of field activities. Logbooks will be bound with consecutively numbered pages or daily field records will be collected in binders. Each page will be dated and the time of entry noted in military time. All entries will be legible, written in black ink, and signed by the individual making the entries. Language will be factual, objective, and free of personal opinions or other terminology, which might prove inappropriate. If an error is made, corrections will be made by

crossing a line through the error and entering the correct information. Corrections will be dated and initialed. No entries will be obliterated or rendered unreadable.

Entries in the field logbook or daily field reports will include at a minimum the following for each fieldwork date:

- Site name and address
- Recorder's name
- Team members and their responsibilities
- Time of site arrival/entry on site and time of site departure
- Other personnel on-site
- A summary of any on-site meetings
- Quantity of soils excavated
- Quantity of soils temporarily stored on-site
- Quantity of excavated soils in truckloads transported off-site
- Names of waste transporters and proposed disposal facilities
- Copies or numbers of manifests or other shipping documents (such as bill of landing) for waste shipments
- Quantity of imported fill material in truckloads
- Deviations from this SMP and Site Health and Safety Plan (SHSP)
- Changes in personnel and responsibilities as well as reasons for the changes
- Levels of safety protection
- Calibration readings for any equipment used and equipment model and serial number

At a minimum, the following information will be recorded during the collection of each sample if any contaminated soil is encountered based on field observation:

- Sample identification number
- Sample location and description
- Site sketch showing sample location and measured distances
- Sampler's name(s)
- Date and time of sample collection
- Designation of sample as composite or grab
- Type of sample (i.e., matrix)
- Type of preservation
- Type of sampling equipment used
- Field observations and details important to analysis or integrity of samples (e.g., heavy rains, odors, colors, etc.)
- Chain-of-custody form numbers
- Transport arrangements (courier delivery, laboratory pickup, etc.)
- Recipient laboratory(ies)

Photographs will be taken of the excavation areas, stockpiles and locations, and other areas of interest on-site to document the excavation operations. They will serve to verify information entered in the field logbook. When a photograph is taken, the following information will be recorded in the field documentation:

- Time, date, location, and, if appropriate, weather conditions
- Description of the subject photographed

5.3 Segregation of Soil and Other Materials

During the soil removal action at the site, it is anticipated that three types of materials may be generated and segregated:

- Construction and plant debris (asphalt, brick, concrete and metal debris, roots and leaves);
- Personnel protective equipment (PPE), described in SHSP; and,
- Non-hazardous soil.

These materials will be segregated and disposed in accordance with federal, state and local regulations. It is assumed that all excavated soil will be classified as non-hazardous waste based upon prior waste profiling conducted.

5.4 Soil Excavation Plan

5.4.1 Excavation Implementation

The excavation involves the removal of soil containing concentrations of arsenic above local background. Excavation operations may generate fugitive dust emissions. Suppressant foam, water spray and other forms of vapor and dust control are required during excavation, and workers are required to use personal protective equipment (PPE) to reduce exposure to the arsenic.

All fieldwork will be completed by properly trained and equipped workers. Impacted soil will be removed with a backhoe, bulldozer, tracked excavator, shovels or other types of earth moving equipment, as necessary. As soil is excavated, it will be loaded directly onto transportation trucks or temporarily stored in staging areas on-site. During loading efforts will be made to minimize the soil drop height from the loader's bucket into the transport trucks. Excavation sloping protocols will be performed in accordance with the requirements of 8 CCR 1541.1(b). Dust control and air quality monitoring activities will be conducted as described in other sections of this SMP.

5.4.2 Soil Management Procedures

Conventionally accepted soil management procedures will prevent fugitive dust emissions during excavation and stockpiling, contain site soil, and other sediment material sourced from the excavation activities.

5.4.2.1 Soil Staging and Storage Operations

If it is necessary to temporarily store the excavated soil on-site until off-site transportation and disposal are available, the following may apply. The staging process will be conducted in a manner to minimize the generation of dust. At the staging areas, excavated soil will be placed on an impermeable barrier base (e.g., plastic sheeting) and covered with plastic sheeting to prevent any run-on and/or dust generation until truck load-out occurs.

The temporary on-site storage of excavated soil wastes will be secured as noted above. Direct loading may take place concurrently with excavation operations, with access of loaders to the stockpile from outside of the excavation areas, while excavation operations deposit impacted soil from the excavation areas to the staging areas.

If soil is stockpiled, it will be placed on 10-mil-thick polyethylene sheeting, or equivalent with a minimum of 18 inches overlap of individual sheets. The designated stockpile area will be relatively flat and free of sharp objects such as large rocks, concrete, or other debris. Sandbags or equivalent will be

used to anchor the sheeting to ensure that it remains in place. Any damage to the liner will be repaired promptly.

All soil stockpiles will be covered with a minimum of one layer of 10-mil-thick sheeting, or equivalent, when not being worked. The stockpile cover will be secured using sandbags, or equivalent. The stockpiles will be covered to prevent wind erosion and to reduce hydration by atmospheric condensation.

Each completed stockpile will be finished to a uniform shape and the top will be sloped at a minimum grade of two percent to provide drainage. The maximum height of any stockpiled soil will be 4 feet.

5.4.2.2 Decontamination Procedures

Disposable equipment intended for one-time use will not be decontaminated, but will be packaged for appropriate disposal. Decontamination will occur prior to and after each designated use of a piece of equipment, using the following procedures:

- Non-phosphate detergent and tap water wash, using a brush if necessary
- Tap-water rinse
- Initial deionized/distilled water rinse
- Final deionized/distilled water rinse

Equipment that comes into direct contact with soil at the site will be decontaminated prior to leaving the site to prevent the off-site tracking of contaminated soil. Equipment will be visually inspected before leaving the site, and any soil adhering to the exterior surfaces will be brushed off and collected on plastic sheeting.

To further control dust emissions, the contractor may use a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe or grates) to remove bulk material from tires and vehicle undercarriages prior to vehicular egress of the site. The wheel shakers/wheel spreading device will be placed at each vehicle egress from the site to a paved road before vehicles exit the excavation area.

The paved road where vehicle egress occurs will be monitored for the presence of all visible/removable soil track-out or other material that may fall off of the vehicles. All track-out will be removed at the conclusion of each work shift or as warranted using a street sweeper. On-site workers will be provided with disposable, water resistant slip-on shoe covers that will be removed during site exit to minimize track out.

Eating or drinking on-site is prohibited, and workers will be instructed to wash their hands before eating or drinking. A portable toilet with an exterior sink, towel and soap dispenser will be available for on-site workers to wash their hands and face.

5.5 Air and Dust Monitoring

The action levels for dust monitoring and exposure guidelines for arsenic are summarized in the table below.

Exposure Guidelines for Site Chemical Hazards			
Chemical Name	**CAL/OSHA PEL [a]**	**ACGIH TLV [b]**	**Community Action Level (Fence Line) [d]**
Total Dust	10 mg/m^3	10 mg/m^3	25 µg/m^3
Arsenic	0.01 mg/m^3	0.01 mg/m^3	Not Detected

Notes:

a Permissible Exposure Limits (Cal/OSHA Article 107, Table AC1)

b Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, ACGIH

c Site action levels are calculated as 10 percent of threshold limit value or PEL (as measured by NIOSH methods), whichever is lower.

d Community action level for total dust/particulate is based on AQMD regulations.

mg/m3 = milligrams per cubic meter
µg/m3 = micrograms per cubic meter

The field data sheet entitled "Dust and Weather Field Monitoring Log" (included in Appendix D) will be used during excavation activities.

The air and dust monitoring will include one weather station to monitor ambient weather conditions (wind speed, wind direction, and relative humidity), two monitoring locations for total dust, and two for arsenic (co-located). Total dust will be continuously monitored with MIE Model 1000 personal dust monitors. The ambient arsenic levels will be monitored daily with low-flow sampling pumps and 37 mm MCE cartridges analyzed utilizing NIOSH Method 7300, however if no visible dust is generated, or the total dust concentration does not exceed project limits, the arsenic samples will not be analyzed. In any event, the total dust monitoring will continue through the end of the project.

The two monitoring stations for dust will be positioned at locations upwind and downwind of the work areas. The downwind location will be selected to be protective of the community. Arsenic sampling stations will be positions at locations upwind and downwind of the work areas only. LE will monitor the weather station and monitoring locations approximately every 10 minutes during site work. If, during site work, dust levels resulting from site activities are recorded greater than 25 micrograms per cubic meter (µg/m^3) averaged over 30 minutes, LE will immediately notify the on-site field manager and dust suppression methods (e.g., water misting, covering soil stockpiles, loading smaller loads, etc.) will be implemented to reduce the dust levels below 25 µg/m3.

High wind conditions can lead to higher dust emissions. Thus, based on the information collected by the on-site meteorological station, work will be stopped during high wind conditions, which are either a wind speed greater than 15 miles per hour (mph) averaged over a 15-minute period, or instantaneous wind speeds exceeding 25 mph.

5.6 Health and Safety Plan

All contractors will be responsible for operating in accordance with the most current requirements of Title 8, California Code of Regulations, Section 5192 (8 CCR 5192) and Title 29, Code of Federal Regulations, Section 1910.120 (29 CFR 1910.120), Standards for Hazardous Waste Operations and Emergency Response (HAZWOPER). On-site personnel will be responsible for operating in accordance with all applicable regulations of the OSHA outlined in 8 CCR General Industry and Construction Safety Orders and 29 CFR 1910 and 29 CFR 1926, Construction Industry Standards, as well as other applicable federal, state and local laws and regulations. All personnel shall operate in compliance with all California OSHA requirements.

A SHSP for work conducted in environmentally impacted areas has been prepared and was submitted to the DTSC, also dated January 7, 2019 (LE, 2019).

All on-site personnel shall read the SHSP and sign its acknowledgement page.

5.7 Contingency Sampling

Confirmation soil sampling post excavation activities is not planned or anticipated, as soils have previously been adequately classified and characterized. However, during excavation activities, should staining or odors be observed, this may be an indication of a "hot spot". In such a circumstance, the work in that area will be stopped and all excavated soil potentially having impacts will be segregated in a separate stockpile. Additional soil samples will then be collected from the stockpiled soil and analyzed on a rush basis to identify the chemical contamination.

The above-described soil samples will be collected using a clean trowel or single-use, disposable nitrile glove and transferred directly into sampling jars, thereby reducing the quantity of sampling equipment, which will significantly reduce the possibility of cross-contamination. Samples will be delivered to the laboratory on the same day collected, if time permits, and no later than the day following collection. The samples will be secured under proper chain-of-custody documentation.

Soil samples will be analyzed in accordance with standard EPA protocols for at least the following:

- Total petroleum hydrocarbons (full carbon chain) by EPA Method 8015;
- Volatile organic compounds (VOCs) by EPA Method 8260B; and
- California Code of Regulations Title 22, California Assessment Manual (CAM) metals by EPA Method 6010B/7470A

Further action will be determined based on the laboratory results.

5.8 Soil Characterization for Disposal

In order to minimize delays during construction, on September 4 and 5, 2018, LE collected 51 discrete soil samples at each of the new tree planting sites. These samples were each collected at a depth of 2 feet below ground bgs. The discrete samples were field composited into four representative composites, which were then composited at the laboratory. This sample was analyzed for Title 22 Metals by EPA Method 6010B/7471A, volatile organic compounds by EPA Method 8260B, and total petroleum hydrocarbons (gasoline, diesel and oil) by EPA Method 8015M, per disposal facility requirements. See discussion and results in Section 2.6.

5.9 Quality Control Procedures

An integral part of sampling and analysis is quality assurance and quality control (QA/QC) procedures to ensure the reliability and compatibility of all data generated during the proposed soil removal. In the event soil sampling is required, activities will be conducted in general accordance with DTSC guidance document procedures. It is critical that the chemical data be the highest confidence and quality. Consequently, strict QA/QC procedures will be adhered to. The procedures include:

- Adherence to strict protocols for field sampling and decontamination procedures;
- Collection and laboratory analysis of appropriate field equipment blanks to monitor for contamination of samples in the field or the laboratory;
- Collection of soil-matrix duplicate samples to evaluate field precision and accuracy;

- Collection of and laboratory analysis of matrix spike, matrix spike duplicate, and blind split samples to evaluate analytical precision and accuracy; and

- Attainment of completeness goals.

The following QA/QC samples will be collected and measures implemented for confirmatory soil sampling:

1. Minimum of 10 percent field duplicate samples;

2. One equipment blank (reinstate blank) per field day; and

3. Temperature monitoring of coolers.

5.10 Manifests

The non-hazardous waste manifest form will be used to track the movement of soil sent off-site as designated non-hazardous waste from the point of generation to the point of ultimate disposition. The non-hazardous waste manifests will include information such as:

- Name and address of the generator, transporter, and the destination facility
- Description of the waste being transported and any associated hazards
- Waste quantity
- Name and phone number of a contact in case of an emergency
- Other information required either by the disposal facility or the City

Before transport of the excavated soil off-site, an authorized representative of the City will sign each waste manifest. The contractor's site manager will maintain one copy of the waste manifest on-site.

5.11 Traffic Control and Loading Procedures

It is anticipated that the soil will be loaded from the site into the dump trucks staged on Civic Center Drive. While the soil is being loaded into the trucks, dust suppression will be performed by lightly spraying or misting the work areas with water. Efforts will be made to minimize the soil drop height from loader's bucket into the transport trucks. After the soil is loaded into the transport trucks, the soil will be covered and otherwise contained to prevent soil from blowing or spilling out of the truck during transport to the disposal facility. The contractor will be required to provide trucks that do not allow soil to be spilled or blown out from the bottom, sides or tops of the trucks.

Prior to and during removal activities, the contractor will coordinate with the designated disposal facility regarding the daily number of truckloads to be sent to the facility. Before the trucks leave, the contractor will be responsible for inspecting each truck to ensure that the payloads are adequately covered, and the soil is properly manifested.

5.12 Truck Transportation

The contractor will be responsible for preparing and providing a transportation route for the City. Truck traffic through the City of Beverly Hills is limited to between 7:30 AM and 4:00 PM. The allowable truck transportation route map for the proposed soil disposal activities is included as Appendix E.

5.13 Import Soil

Clean import soil or other fill material will be brought to the site to backfill areas where impacted soil was removed. Import soil and/or other fill material will be accompanied by certificates, analytical data, and/or other supporting documents that indicate the import material is clean.

5.14 Variance

As conditions in the field may vary, it may become necessary to implement minor modifications to soil excavation, potential stockpiling and sampling activities as presented in this SMP. Field personnel will notify the project manager when deviations from this SMP are necessary. The City will be notified of the modification immediately, and a verbal or written approval will be obtained before the modifications are implemented, as appropriate. Modifications to the approved SMP will be documented in the field records.

5.15 Project Completion Report

Once the fieldwork has been completed, and all documents have been received, LE will summarize all findings and prepare a project completion report that will attach the following documents:

- Updated site maps;
- Air monitoring data;
- Daily field reports;
- Chart or map identifying daily work areas;
- Analytical data and chain-of-custody documents;
- Waste manifests ; and
- Photographs.

6. REFERENCES

1. Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Arsenic*, August 2007

2. California Department of Water Resources, "*Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County,*" *Bulletin No. 104*, 1961, http://www.water.ca.gov/waterdatalibrary/docs/historic/Bulletins/Bulletin_104/Bulletin_104-A__1961.pdf

3. Cal/EPA, *Determination of a Southern California Regional Background Arsenic Concentration in Soil*, Department of Toxic Substances Control, undated, https://dtsc.ca.gov/upload/Background-Arsenic.pdf

4. Cal/EPA, *Preliminary Endangerment Assessment Guidance Manual,* Department of Toxic Substances Control, 2013, http://www.dtsc.ca.gov/SiteCleanup/Brownfields/upload/Preliminary-Endangerment-Assessment-Guidance-Manual.pdf

5. CH2MHill, *Removal Action Work Plan-Draft Final, Beverly Hills Lots 12 and 13,* June 15, 2015

6. Lindmark Engineering, *Final Draft Site Health and Safety Plan*, City of Beverly Hills Right-of-Way New Tree Planting, January 7, 2019.

7. Lindmark Engineering, *Technical Memorandum– Draft Soil Sampling Work Plan*, August 20, 2018

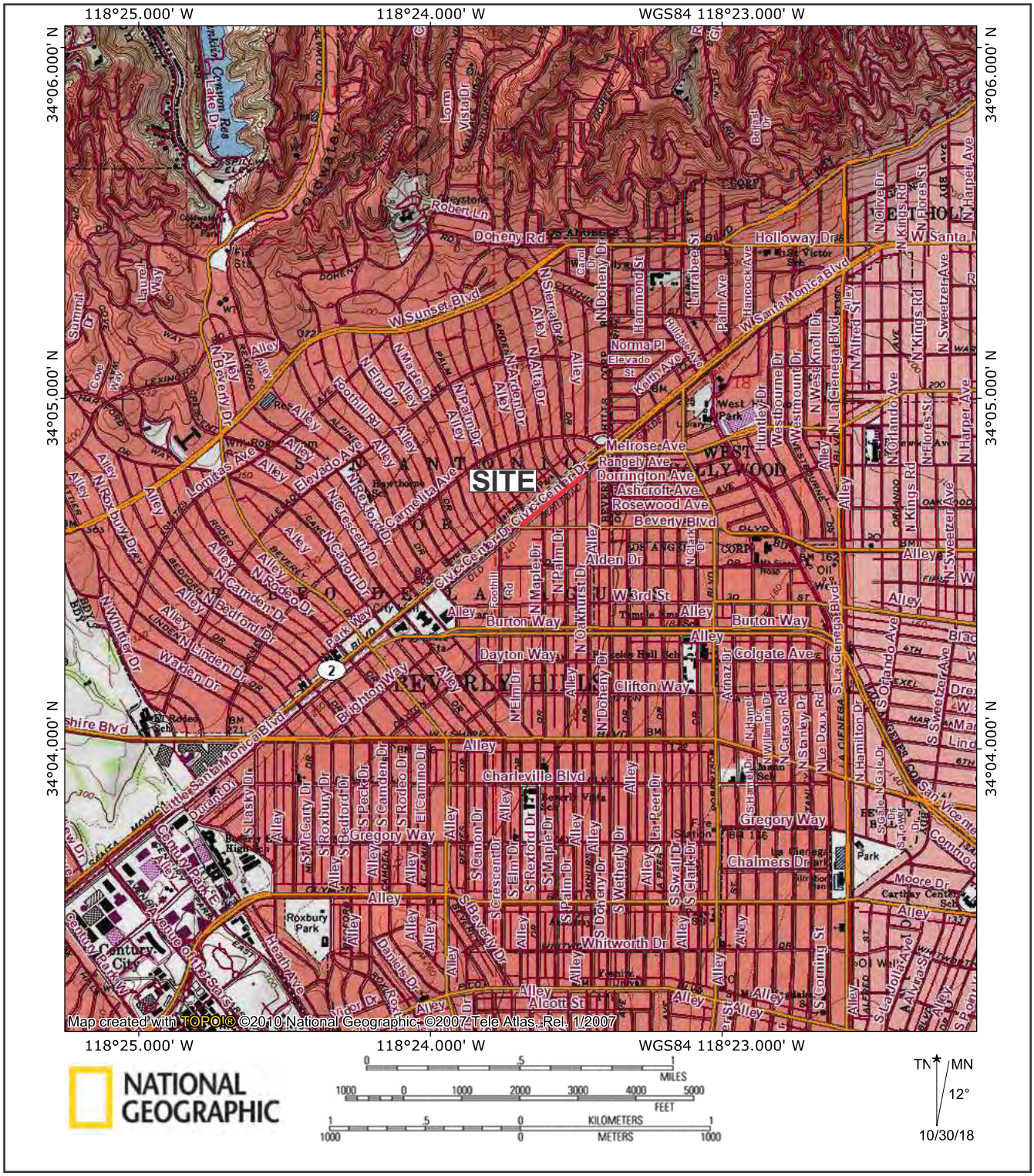
8. South Coast Air Quality Control District, *Fugitive Dust,* Amended June 3, 2005

9. South Coast Air Quality Control District, *Control of Particulate Emissions From Soils with Toxic Air Contaminants,* Adopted July 7, 2017

10. Weather Underground, *Weather History for Beverly Hills, CA [KCABEVER26]*, January 1 through January 31, 2018, < https://www.wunderground.com/personal-weather-station/dashboard?ID=KCABEVER26#history/s20180101/e20180131/mmonth>

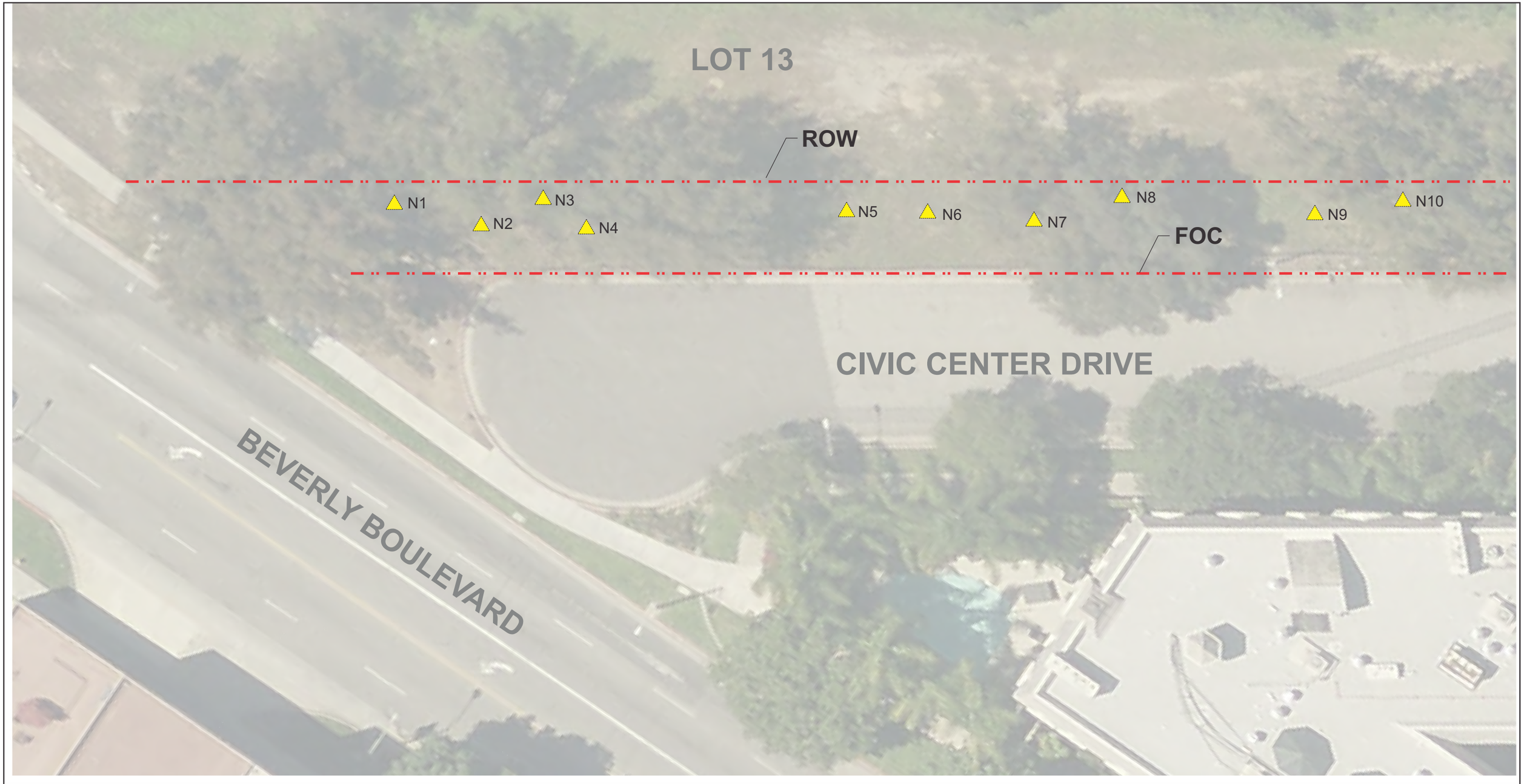
FIGURES

Figures 1 through 6



N

Project Name: TREE PLANTING PROJECT CIVIC CENTER DRIVE RIGHT-OF-WAY				
Title: SITE VICINITY MAP				
Drafted By: DWS	**Approved By:** UML	**Project No.:** 2018-222	**Date:** 10/18	**Figure No.:** 1



Legend

N10
PROPOSED NEW PLANTING SITE

NORTH

SCALE: 1" = 20'

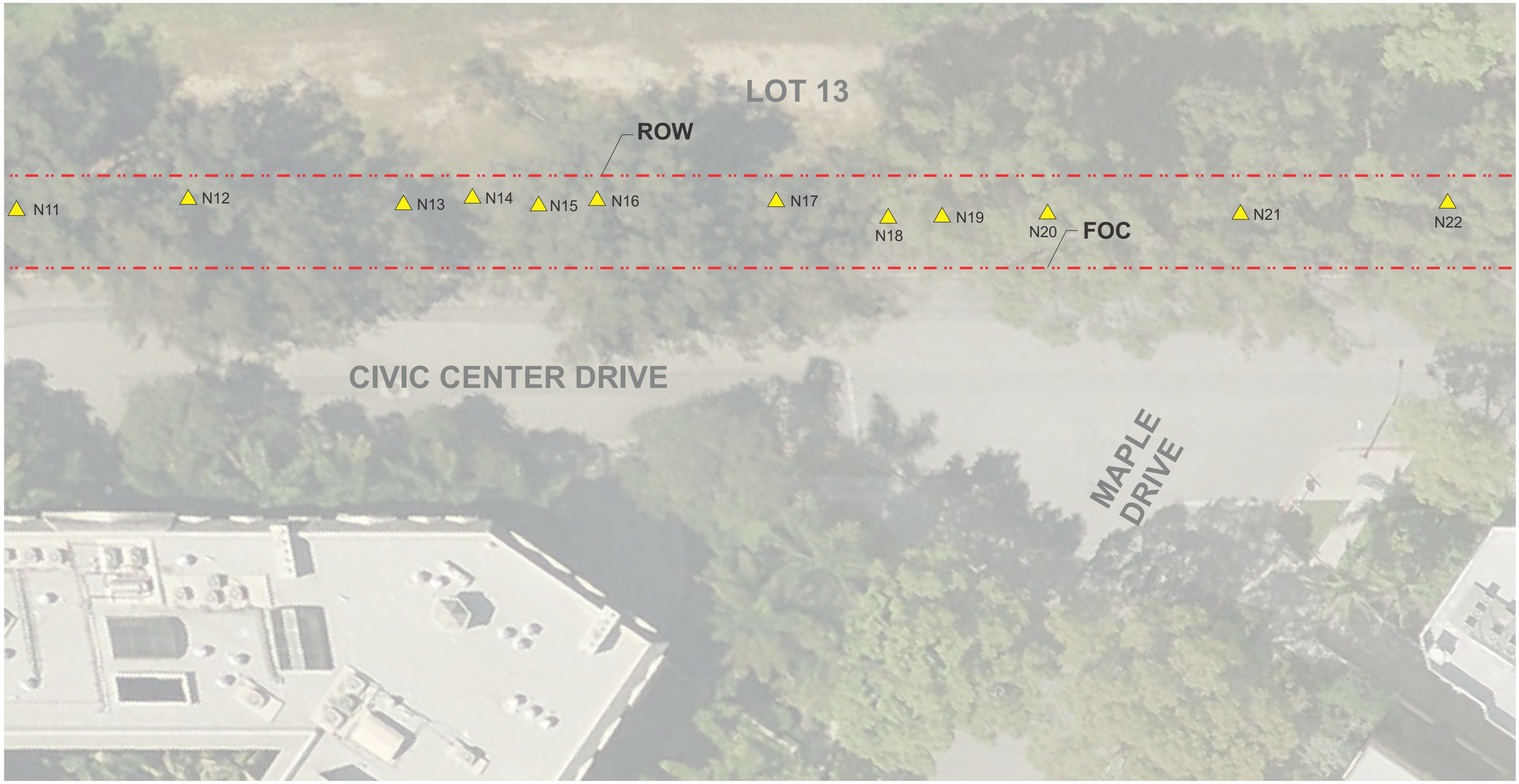
0" 1" 2"
0' 20' 40'

LINDMARK ENGINEERING

TREE PLANTING PROJECT (N1-N10)

CBH RIGHT-OF-WAY BEVERLY HILLS, CA

Drafted by:	Approved By:	Date:	Figure No.:
DWS	UL	10/18	2



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N22
PROPOSED NEW PLANTING SITE

NORTH

SCALE: 1" = 20'

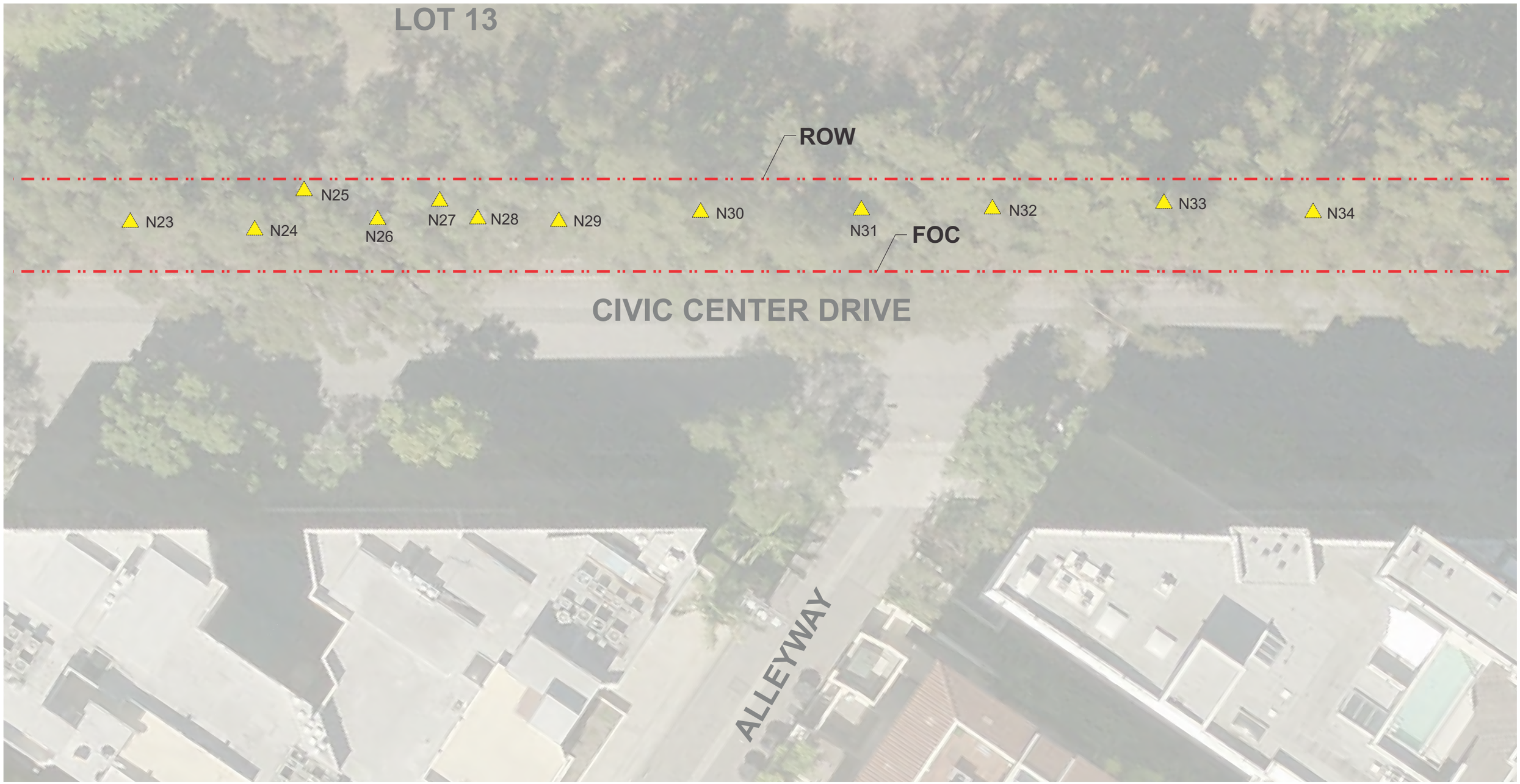
0" 1" 2"
0' 20' 40'

LINDMARK ENGINEERING

TREE PLANTING PROJECT (N11-N22)

CBH RIGHT-OF-WAY BEVERLY HILLS, CA

Drafted by:	Approved By:	Date:	Figure No.:
DWS	UL	10/18	3



Legend

N34
△ PROPOSED NEW PLANTING SITE

NORTH

SCALE: 1" = 20'

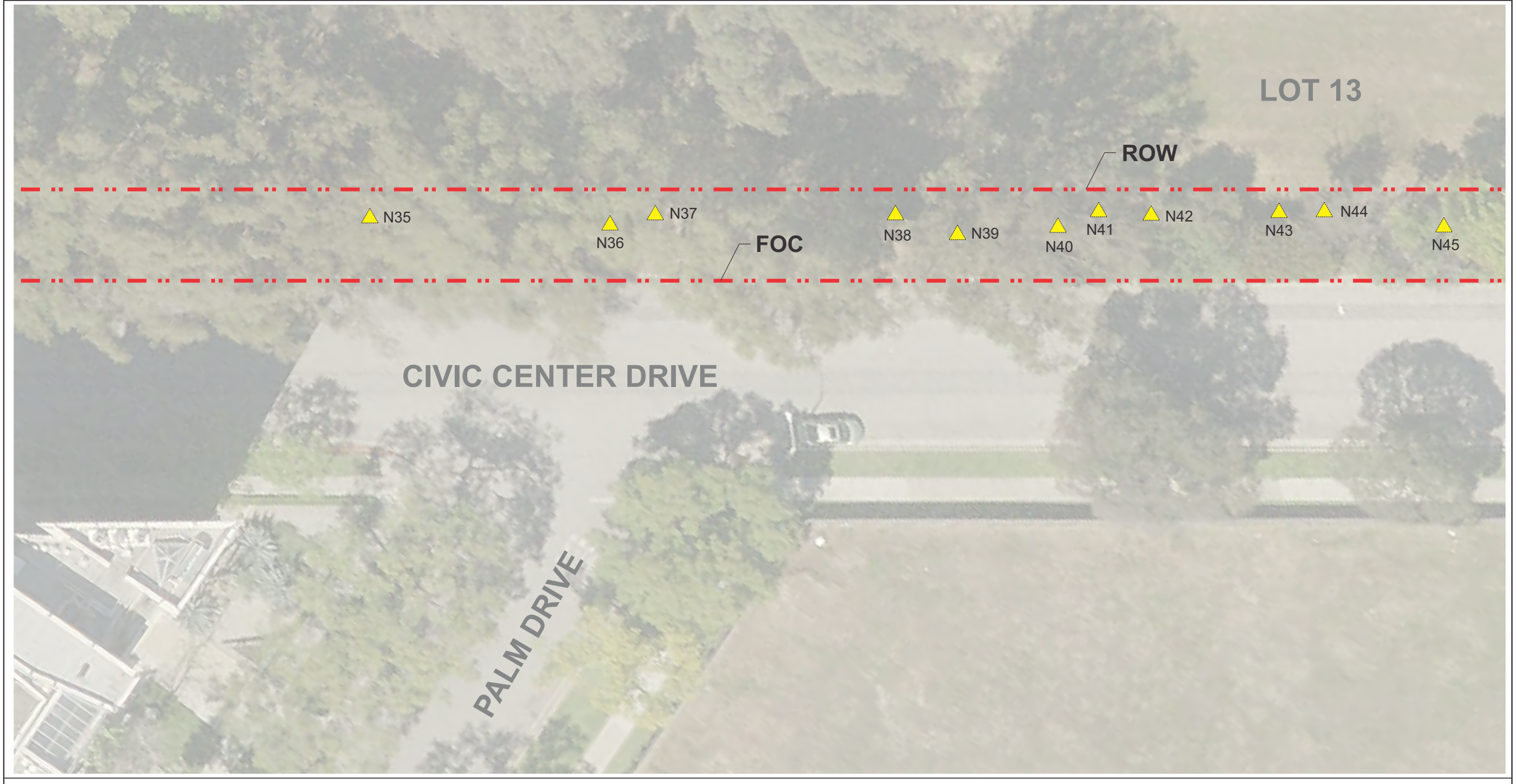
0" 1" 2"
0' 20' 40'

LINDMARK ENGINEERING

TREE PLANTING PROJECT (N23-N34)

CBH RIGHT-OF-WAY BEVERLY HILLS, CA

Drafted by:	Approved By:	Date:	Figure No.:
DWS	UL	10/18	4



Legend

N45
PROPOSED NEW PLANTING SITE

NORTH

SCALE: 1" = 20'

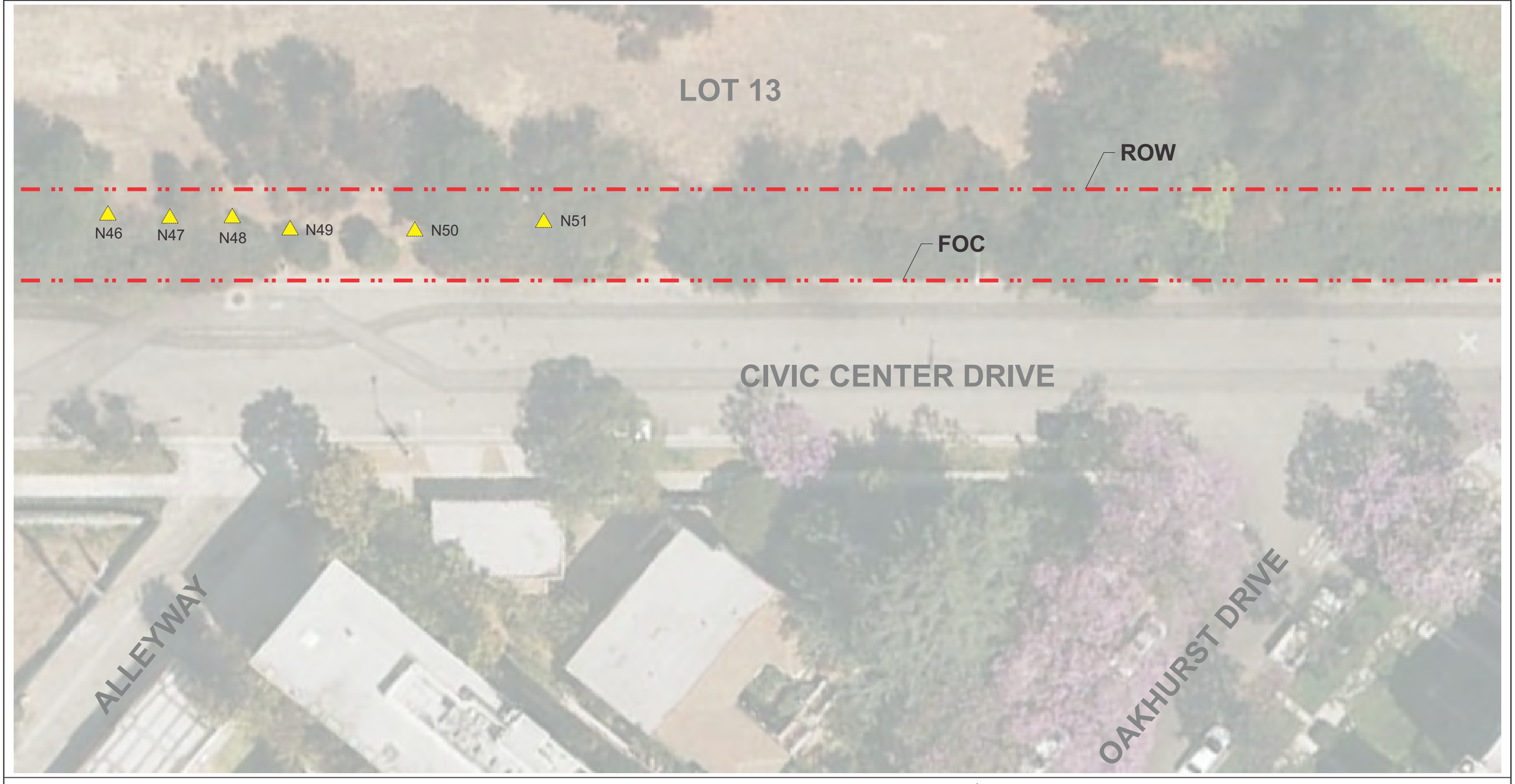
0" 1" 2"
0' 20' 40'

LINDMARK ENGINEERING

TREE PLANTING PROJECT (N35-N45)

CBH RIGHT-OF-WAY BEVERLY HILLS, CA

Drafted by:	Approved By:	Date:	Figure No.:
DWS	UL	10/18	5



Legend

N51
△ PROPOSED NEW PLANTING SITE

NORTH

SCALE: 1" = 20'

0" 1" 2"
0' 20' 40'

LINDMARK ENGINEERING

TREE PLANTING PROJECT (N46-N51)

CBH RIGHT-OF-WAY BEVERLY HILLS, CA

Drafted by:	Approved By:	Date:	Figure No.:
DWS	UL	10/18	6

APPENDIX A

Response to Comments – DTSC Letter December 20, 2018

Final Draft – Soil Management Plan

Response to DTSC's 12/20/18 Comments

DTSC Ref. No.	DTSC Comment	Lindmark Engineering Response
General Comments	The HASP is required to be a stand-alone document. The minimum required information necessary to ensure the health and safety of personnel on the "Site" must be contained within the HASP. The HASP may refer to other documents for community safety and health information, such as an air monitoring plan, which is often located in the work plan for a Site.	LE has created a separate Site Health and Safety Plan (SHSP) that will be submitted to DTSC.
	The Department of Toxic Substances Control (DTSC) has reviewed the HASP for conformance with Title 8, California Code of Regulations (8 CCR), section 5192: "Health and Safety for Hazardous Waste Operations and Emergency Response"; and 8 CCR, subchapter 4 "Construction Safety Orders." The requirements of 40 CFR, 22 CCR, the California Health and Safety Code, as well as DTSC Policies and Procedures may also be considered in the DTSC review. Some of the general areas of concern include field safety issues such as electrical hazards (including overhead and buried electrical lines); confined spaces; excavations; controlling hazards through engineering, administrative, work practice controls and personal protective equipment; slip trip and fall hazards; lighting issues; heavy equipment safety; heat and cold stress; noise; radiation; and chemical hazards. Please note that in addition to the requirements of these citations, the employer is responsible for the implementation of an effective Injury and Illness Prevention Program which is required by 8 CCR, sections 1509 and 3203. The requirements of those sections have not been included in this review.	All construction activities will be performed by companies that will contract with the City of Beverly Hills (City) directly, or as a subcontractor to the general contractor. These contractors are required to have their own Injury and Illness Prevention Program (IIPP) as applicable for all their activities. LE has added a clarifying statement at the end of Section 2 of the SHSP.
	The DTSC review of the HASP does not constitute a guarantee that all potential hazards have been anticipated, recognized, and addressed, or that the HASP will be properly and safely implemented. The DTSC is unable to foresee every health and safety hazard in the work-place by reviewing the HASP. Effective implementation and regulatory compliance are the employer's responsibilities. Continuous surveillance of the Site and creation of an effective health and safety program by the employer will reduce work place injuries and liability.	Acknowledged.
	The HASP was reviewed for scientific content. Minor grammatical or typographical errors that do not affect interpretation have not been noted; however, these errors, if any, should be corrected in future versions of the document.	Acknowledged
	An industrial hygienist from the DTSC may perform a field audit in order to confirm the implementation of the provisions and specifications presented in the HASP. The DTSC review of the HASP and field audit does not guarantee that the HASP will be properly implemented.	Acknowledged
1)	Page 3, Section 1.6, General Worker Health and Safety. Please describe what decontamination equipment and supplies will be available on-site for workers so that they may wash their face and hands before eating or drinking.	On-site workers will be provided with disposable, water resistant slip-on shoe covers that will be removed during site exit to minimize track out. Text in Section 5.4.2.2 of the SMP and 1.5 of the SHSP has been updated. Eating or drinking on-site is prohibited, and workers will be instructed to wash their hands before eating or drinking. A portable toilet with an exterior sink, towel and soap dispenser will be available for on-site workers. Text in Section 5.4.2.2 of the SMP and 4.3.10 of the SHSP have

		been updated
2)	Page 6, Section 4.3.1, Noise. An employer is obligated to quantify their employees' exposure to noise when there is a possibility of exposure to an eight- hour time-weighted average of 85 dBA. Provide personnel monitoring data from previous similar site activities or describe noise-monitoring protocols to be employed on site, including a description of the instrumentation, frequency of monitoring, and corresponding action levels. Cal-OSHA does not allow reliance upon subjective methods to demonstrate compliance with the PEL. Noise levels present on site must be considered when selecting the appropriate hearing protective devices (HPDs) to verify that the selected HPD will provide an adequate noise reduction rating. [8 CCR Group 15, Article 105 (Control of Noise Exposure)].	The contractors are required to provide noise protection and outline noise control in their IIPP. Based on the anticipated work involving equipment such as backhoes, continuous or impact noise may be produced at or above the action level of 85 dBA. All personnel within 25 feet of operating equipment, or near an operation that creates noise levels high enough to impair conversation, shall wear hearing protective devices. Text in Section 4.3.1 of the SHSP has been updated.
3)	Page 8, Section 4.3.7, Underground and Overhead Utilities. Please address the requirements to notify Regional Notification Centers (811) a minimum of 2 working days prior to the initiation of sub-surface activities. [8 CCR 1541(b)(2)]. 8 CCR 2946, Table 2 specifies minimum safe distances to be maintained from energized overhead high-voltage lines for boom-type lifting or hoisting equipment (e.g., drill rigs, excavators). Please include language discussing the potential for such hazards to exist on site. Please reconcile the minimum clearance distances referenced in the HASP with those found in 8 CCR.	The proposed excavation areas will be pre-marked and the contractor is required to notify Underground Service Alert (USA) at least 48 hours before commencing work at the site. USA will notify companies and agencies that may have underground utilities in the vicinity to mark their respective utilities on the ground with spray paint so that they can be avoided during excavation. Text in Section 4.3.7 of the SHSP has been updated. There are no overhead high-voltage lines at the site within at least 45 feet to present a hazard while working with boom-type lifting equipment. Street lighting does present a hazard at the Site, however the SHSP is consistent with 8 CCR 2946, Table 2, in so far that equipment with articulated upright booms or masts will not be permitted to pass within 20 feet of an overhead utility line, and the line is energized below 250,000 volts. Text in Section 4.3.7 of the SHSP has been updated.
4)	Page 10. Section 4.3.9, Excavation and Loading. Work activities performed at this Site are under the regulatory authority of the California Department of Industrial Relations. As such, OSHA regulatory citations found throughout this document should typically reference the relevant Cal-OSHA citations. This is important not purely from the standpoint of citing the correct regulation and knowing where to find the relevant requirements, but rather adhering to the appropriate California-specific requirements. Accordingly, the reference to 29 CFR 1926, section 651 and 652 should be augmented with 8 CCR 1540 and 1541.1. Excavation sloping protocols must be performed in accordance with the requirements of 8 CCR 1541.1(b).	The reference to 29 CFR 1926, section 651 and 652 has been augmented with 8 CCR 1540 and 1541.1. Excavation sloping protocols will be performed in accordance with the requirements of 8 CCR 1541.1(b). Text in Section 5.2.3 and 5.4.1 of the SMP and 4.3.9 of the SHSP have been updated.
5)	Page 13, Section 5. Air and Dust Monitoring Protocols. The HSP recommends that the protocol for analyzing arsenic air samples be discussed with DTSC's Project Toxicologist and that visible dust not be the primary decision criteria for sample analysis.	In accordance with the SMP, Section 5.5, and SHSP, Section 5, there are two primary decision criteria, i.e. not only one, for arsenic sample analysis. These criteria are: 1) observations of visible dust, and 2) dust levels resulting from site activities greater than 25 micrograms per cubic meter ($\mu g/m^3$) averaged over 30 minutes, resulting from monitoring data collected at locations upwind and downwind at the fence line (i.e. the difference between the upwind and downwind concentrations). LE has contacted DTSC to discuss the protocol.

APPENDIX B

Analytical Waste Profile Report

AMERICAN SCIENTIFIC LABORATORIES, LLC
Environmental Testing Services
2520 N. San Fernando Road, LA CA 90065 Tel: (323) 223-9700 • Fax: (323) 223-9500

13 September 2018

Ulf Lindmark

Lindmark Engineering

2625 Townsgate Road Suite # 330

Westlake Village, CA 91361

Work Order #: 1809022

Project Name: CBH Tree Planting

Project ID: 2018-222

Site Address: Civic Center Dr. / Lot 13 Beverly Hills

Enclosed are the results of analyses for samples received by the laboratory on September 05, 2018. If you have any questions concerning this report, please feel free to contact us.

Wendy Lu

Laboratory Supervisor

Rojert G. Araghi

Laboratory Director

AMERICAN SCIENTIFIC LABORATORIES, LLC
Environmental Testing Services
2520 N. San Fernando Road, LA, CA 90065 Tel: (323) 223-9700 • Fax: (323) 223-9500

COC# 81819 GLOBAL ID _____ E REPORT: ☐ PDF ☐ EDF ☐ EDD ASL JOB# 1809022

CHAIN OF CUSTODY RECORD

Company: Lindmark Engineering		Report To:	ANALYSIS REQUESTED
Address: 2625 Townsgate Rd ste 330, Westlake Village	Project Name: CBH Tree Planting Site Address: Civic Center Dr./Lot 13 Beverly Hills	Address:	
Telephone: Fax: 818-707-6100		Invoice To:	
Special Instruction:	Project ID: 2018-222	Address:	
E-mail: dsmith@lindmarkeng.com	Project Manager: Ulf Lindmark	P.O.#:	

ITEM	LAB USE ONLY Lab ID	SAMPLE DESCRIPTION Sample ID	Date	Time	Container(s) #	Type	Matrix	Preservation	Title 22 Metals	TPHgd,o by 8015m	8260B VOCs	Remarks
1		B1-12	9/4/18	8:51	1	Jar	Soil	none				
2		B13-25	9/4/18	11:00	1	↓	↓	↓				
3		B26-38	9/5/18	9:00	1							
4		B39-51	9/5/18	10:22	1							
	1809022-01	Composite 1-4			4	Jar	Soil	none	X	X	X	

Collected By:	Date 9/5/18	Time	Relinquished By:	Date	Time
Relinquished By:	Date 9/5/18	Time 1320	Received For Laboratory	Date 9-5-18	Time 1320
Received By:	Date	Time	Condition of Sample:		

TAT: ☒ Normal ☐ Rush

White - Report Yellow - Laboratory Pink - Client

Job# 1809022

ASL Sample Receipt Form

Client: Lindmark Engineering

Date: 9.5.18

Sample Information:

Temperature: 5.2 °C ☐ Blank ☒ Sample

Custody Seal: ☐ Yes ☒ No ☐ Not Available

Received Within Holding Time: ☒ Yes ☐ No

Container:

Proper Containers and Sufficient Volume: ☒ Yes ☐ No

Soil: ☒ 4oz ☐ 8oz ☐ Sleeve ☐ VOA

Water: ☐ 500AG ☐ 1AG ☐ 125PB ☐ 250PB ☐ 500PB ☐ VOA ☐ Other _____

Air: ☐ Tedlar®

Sample Containers Intact: ☒ Yes ☐ No

Trip Blank ☐ Yes ☒ No

Chain-of-Custody (COC):

Received: ☒ Yes ☐ No

Samplers Name: ☒ Yes ☐ No

Container Labels match COC: ☒ Yes ☐ No

COC documents received complete: ☒ Yes ☐ No

Proper Preservation Noted: ☒ Yes ☐ No

Completed By: Janet Chin

AMERICAN SCIENTIFIC LABORATORIES, LLC
Environmental Testing Services
2520 N. San Fernando Road, LA CA 90065 Tel: (323) 223-9700 • Fax: (323) 223-9500

Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

ANALYTICAL SUMMARY REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Composite 1-4	1809022-01	Solid	09/05/2018 11:00	09/05/2018 13:20

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Wendy Lu, Laboratory Supervisor

AMERICAN SCIENTIFIC LABORATORIES, LLC
Environmental Testing Services
2520 N. San Fernando Road, LA CA 90065 Tel: (323) 223-9700 • Fax: (323) 223-9500

Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Analytical Results

Client Sample ID: Composite 1-4

Laboratory Sample ID: 1809022-01 (Solid)

Analyte	Result	Notes	MDL	PQL	Units	Dilution	Prep Method	Analyzed	Analyst	Method
Total Mercury (CVAA)				Batch ID: BI80329			Prepared: 09/10/2018 10:16			
Mercury	**0.0226**	J	0.0100	0.0500	mg/kg	1	7471A	09/10/2018 17:49	LVE	7471A
Total ICP Metals				Batch ID: BI80323			Prepared: 09/10/2018 10:42			
Antimony	**0.430**		0.200	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Arsenic	**21.1**		0.150	0.250	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Barium	**88.6**		0.0500	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Beryllium	**0.353**	J	0.0400	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Cadmium	**2.32**		0.0400	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Chromium	**29.2**		0.0500	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Cobalt	**9.17**		0.0500	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Copper	**26.0**		0.0500	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Lead	**15.3**		0.100	0.250	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Molybdenum	**1.59**		0.0500	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Nickel	**18.5**		0.100	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Selenium	ND		0.200	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Silver	ND		0.0500	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Thallium	ND		0.150	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Vanadium	**45.4**		0.0500	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Zinc	**55.7**		0.350	0.500	mg/kg	1	3050B	09/10/2018 16:02	LVE	SW846 6010B
Total Petroleum Hydrocarbons(TPH-g)				Batch ID: BI80147			Prepared: 09/07/2018 09:00			
Gasoline Range Organics	ND		250	500	ug/kg	1	5030A	09/07/2018 18:20	JOI	8015B
Surrogate: Bromofluorobenzene			*80.4 %*	*70-120*			5030A	09/07/2018 18:20	JOI	*8015B*
Total Petroleum Hydrocarbons(TPH DROORO)				Batch ID: BI80181			Prepared: 09/07/2018 09:00			
Diesel range organics	ND		1.00	10.0	mg/kg	1	3550B-US	09/08/2018 06:58	JOI	8015B
Oil Range Organics	ND		17.0	50.0	mg/kg	1	3550B-US	09/08/2018 06:58	JOI	8015B
Surrogate: Chlorobenzene			*82.1 %*	*70-120*			3550B-US	09/08/2018 06:58	JOI	*8015B*

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Wendy Lu, Laboratory Supervisor

American Scientific Laboratories, LLC
Environmental Testing Services
2520 N. San Fernando Road, LA CA 90065 Tel: (323) 223-9700 • Fax: (323) 223-9500

Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Analytical Results

Client Sample ID: Composite 1-4

Laboratory Sample ID: 1809022-01 (Solid)

Analyte	Result	Notes	MDL	PQL	Units	Dilution	Prep Method	Analyzed	Analyst	Method
Volatile Organic Compounds				Batch ID: BI80184			Prepared: 09/07/2018 09:00			
Acetone	ND		12.7	50.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Benzene	ND		0.930	2.00	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Bromobenzene	ND		3.39	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Bromochloromethane	ND		0.380	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Bromodichloromethane	ND		0.630	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Bromoform	ND		3.39	50.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Bromomethane	ND		2.75	30.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
2-Butanone	ND		5.83	50.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
n-Butylbenzene	ND		2.05	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
sec-Butylbenzene	ND		3.04	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
tert-Butylbenzene	ND		1.34	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Carbon disulfide	ND		5.53	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Carbon tetrachloride	ND		2.48	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Chlorobenzene	ND		0.890	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Chloroethane	ND		2.15	30.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
2-Chloroethylvinyl Ether	ND		5.53	50.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Chloroform	ND		1.24	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Chloromethane	ND		1.74	30.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
4-Chlorotoluene	ND		1.34	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
2-Chlorotoluene	ND		2.35	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,2-Dibromo-3-chloropropane	ND		2.69	50.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Dibromochloromethane	ND		0.650	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,2-Dibromoethane	ND		2.75	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Dibromomethane	ND		2.30	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,2-Dichlorobenzene	ND		1.65	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,3-Dichlorobenzene	ND		1.03	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,4-Dichlorobenzene	ND		2.23	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Dichlorodifluoromethane	ND		2.07	30.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,1-Dichloroethane	ND		1.30	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,2-Dichloroethane	ND		1.57	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,1-Dichloroethene	ND		1.60	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
cis-1,2-Dichloroethene	ND		2.16	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
trans-1,2-Dichloroethene	ND		2.60	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,1-Dichloropropene	ND		0.660	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,2-Dichloropropane	ND		0.920	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,3-Dichloropropane	ND		1.36	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B

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Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Analytical Results

Client Sample ID: Composite 1-4

Laboratory Sample ID: 1809022-01 (Solid)

Analyte	Result	Notes	MDL	PQL	Units	Dilution	Prep Method	Analyzed	Analyst	Method
Volatile Organic Compounds				Batch ID: BI80184			Prepared: 09/07/2018 09:00			
2,2-Dichloropropane	ND		1.12	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
cis-1,3-Dichloropropene	ND		0.980	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
trans-1,3-Dichloropropene	ND		0.960	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Ethylbenzene	ND		1.00	2.00	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Hexachlorobutadiene	ND		2.77	30.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
2-Hexanone	ND		3.18	50.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Isopropylbenzene	ND		1.42	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
p-Isopropyltoluene	ND		3.86	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Methyl tert-Butyl Ether (MTBE)	ND		1.81	5.00	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
4-Methyl-2-pentanone (MIBK)	ND		3.14	50.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Methylene chloride	ND		3.31	50.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Naphthalene	ND		1.14	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
n-Propylbenzene	ND		1.14	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Styrene	ND		0.800	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,1,1,2-Tetrachloroethane	ND		1.28	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,1,2,2-Tetrachloroethane	ND		3.25	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Tetrachloroethene	ND		0.930	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Toluene	ND		1.00	2.00	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,2,3-Trichlorobenzene	ND		1.23	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,2,4-Trichlorobenzene	ND		2.82	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,1,1-Trichloroethane	ND		2.03	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,1,2-Trichloroethane	ND		1.74	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Trichloroethene	ND		1.15	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Trichlorofluoromethane	ND		3.15	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,2,3-Trichloropropane	ND		1.74	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,2,4-Trimethylbenzene	ND		3.19	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
1,3,5- Trimethylbenzene	ND		1.23	10.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Vinyl acetate	ND		10.8	50.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Vinyl chloride	ND		2.79	30.0	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
m,p-Xylenes	ND		1.80	4.00	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
o-Xylene	ND		1.00	2.00	ug/kg	1	5030A	09/07/2018 17:27	JOI	8260B
Surrogate: 4-Bromofluorobenzene			*100 %*		*70-120*		5030A	09/07/2018 17:27	JOI	*8260B*
Surrogate: Dibromofluoromethane			*102 %*		*70-120*		5030A	09/07/2018 17:27	JOI	*8260B*
Surrogate: Toluene-d8			*96.3 %*		*70-120*		5030A	09/07/2018 17:27	JOI	*8260B*

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Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Total Mercury (CVAA) - Quality Control Report

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BI80329 - 7471A - 7471A											
Blank (BI80329-BLK1)					Prepared & Analyzed: 09/10/201						
Mercury	ND	0.0100	0.0500	mg/kg							
LCS (BI80329-BS1)					Prepared & Analyzed: 09/10/201						
Mercury	111	10.0	50.0	mg/kg	100		111	80-120			
LCS Dup (BI80329-BSD1)					Prepared & Analyzed: 09/10/201						
Mercury	105	10.0	50.0	mg/kg	100		105	80-120	5.48	20	

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Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Total ICP Metals - Quality Control Report

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BI80323 - 3050B - SW846 6010B											
Blank (BI80323-BLK1)					Prepared & Analyzed: 09/10/201						
Antimony	ND	0.200	0.500	mg/kg							
Arsenic	ND	0.150	0.250	"							
Barium	ND	0.0500	0.500	"							
Beryllium	ND	0.0400	0.500	"							
Cadmium	ND	0.0400	0.500	"							
Chromium	ND	0.0500	0.500	"							
Cobalt	ND	0.0500	0.500	"							
Copper	ND	0.0500	0.500	"							
Lead	ND	0.100	0.250	"							
Molybdenum	ND	0.0500	0.500	"							
Nickel	ND	0.100	0.500	"							
Selenium	ND	0.200	0.500	"							
Silver	ND	0.0500	0.500	"							
Thallium	ND	0.150	0.500	"							
Vanadium	ND	0.0500	0.500	"							
Zinc	ND	0.350	0.500	"							
LCS (BI80323-BS1)					Prepared & Analyzed: 09/10/201						
Antimony	101	0.400	1.00	mg/kg	100		101	80-120			
Arsenic	106	0.300	0.500	"	100		106	80-120			
Barium	109	0.100	1.00	"	100		109	80-120			
Beryllium	118	0.0800	1.00	"	100		118	80-120			
Cadmium	113	0.0800	1.00	"	100		113	80-120			
Chromium	106	0.100	1.00	"	100		106	80-120			
Cobalt	107	0.100	1.00	"	100		107	80-120			
Copper	112	0.100	1.00	"	100		112	80-120			
Lead	108	0.200	0.500	"	100		108	80-120			
Molybdenum	103	0.100	1.00	"	100		103	80-120			
Nickel	106	0.200	1.00	"	100		106	80-120			
Selenium	104	0.400	1.00	"	100		104	80-120			
Silver	119	0.100	1.00	"	100		119	80-120			
Thallium	111	0.300	1.00	"	100		111	80-120			
Vanadium	107	0.100	1.00	"	100		107	80-120			
Zinc	95.9	0.700	1.00	"	100		95.9	80-120			

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Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Total ICP Metals - Quality Control Report

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BI80323 - 3050B - SW846 6010B											
LCS Dup (BI80323-BSD1)					Prepared & Analyzed: 09/10/201						
Antimony	101	0.400	1.00	mg/kg	100		101	80-120	0.398	30	
Arsenic	106	0.300	0.500	"	100		106	80-120	0.340	30	
Barium	108	0.100	1.00	"	100		108	80-120	0.675	30	
Beryllium	116	0.0800	1.00	"	100		116	80-120	1.56	30	
Cadmium	112	0.0800	1.00	"	100		112	80-120	1.45	30	
Chromium	105	0.100	1.00	"	100		105	80-120	0.211	30	
Cobalt	107	0.100	1.00	"	100		107	80-120	0.140	20	
Copper	108	0.100	1.00	"	100		108	80-120	3.70	20	
Lead	109	0.200	0.500	"	100		109	80-120	1.49	20	
Molybdenum	103	0.100	1.00	"	100		103	80-120	0.0822	20	
Nickel	108	0.200	1.00	"	100		108	80-120	1.41	20	
Selenium	104	0.400	1.00	"	100		104	80-120	0.0616	20	
Silver	116	0.100	1.00	"	100		116	80-120	2.68	20	
Thallium	111	0.300	1.00	"	100		111	80-120	0.0531	20	
Vanadium	106	0.100	1.00	"	100		106	80-120	1.43	20	
Zinc	99.5	0.700	1.00	"	100		99.5	80-120	3.71	20	

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Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Total Petroleum Hydrocarbons(TPH-g) - Quality Control Report

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BI80147 - 5030A - 8015B											
Blank (BI80147-BLK1)					Prepared & Analyzed: 09/07/201						
Gasoline Range Organics	ND	250	500	ug/kg							
Surrogate: Bromofluorobenzene	*7.06*			"	*10.0*		*70.6*	*70-120*			
Matrix Spike (BI80147-MS1)		**Source: 1809037-02**			Prepared & Analyzed: 09/07/201						
Benzene	9.44			ug/kg	10.0	0.00	94.4	75-120			
Toluene	9.27			"	10.0	0.00	92.7	75-120			
Surrogate: Bromofluorobenzene	*11.0*			"	*10.0*		*110*	*70-120*			
Matrix Spike Dup (BI80147-MSD1)		**Source: 1809037-02**			Prepared & Analyzed: 09/07/201						
Benzene	9.64			ug/kg	10.0	0.00	96.4	75-120	2.17	15	
Toluene	9.26			"	10.0	0.00	92.6	75-120	0.205	15	
Surrogate: Bromofluorobenzene	*10.8*			"	*10.0*		*108*	*70-120*			

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Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Total Petroleum Hydrocarbons(TPH DROORO) - Quality Control Report

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BI80181 - 3550B-US - 8015B											
Blank (BI80181-BLK1)					Prepared: 09/07/201 Analyzed: 09/08/201						
Diesel range organics	ND	1.00	10.0	mg/kg							
Oil Range Organics	ND	17.0	50.0	"							
Surrogate: Chlorobenzene	*87.9*			*"*	*100*		*87.9*	*70-120*			
Matrix Spike (BI80181-MS1)		**Source: 1809019-01**			Prepared: 09/07/201 Analyzed: 09/08/201						
Diesel range organics	524			mg/kg	500	0.00	105	75-120			
Surrogate: Chlorobenzene	*86.6*			*"*	*100*		*86.6*	*70-120*			
Matrix Spike Dup (BI80181-MSD1)		**Source: 1809019-01**			Prepared: 09/07/201 Analyzed: 09/08/201						
Diesel range organics	523			mg/kg	500	0.00	105	75-120	0.222	15	
Surrogate: Chlorobenzene	*84.2*			*"*	*100*		*84.2*	*70-120*			

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Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Volatile Organic Compounds - Quality Control Report

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BI80184 - 5030A - 8260B											
Blank (BI80184-BLK1)					Prepared & Analyzed: 09/07/201						
Acetone	12.9	12.7	50.0	ug/kg							J
Benzene	ND	0.930	2.00	"							
Bromobenzene	ND	3.39	10.0	"							
Bromochloromethane	ND	0.380	10.0	"							
Bromodichloromethane	ND	0.630	10.0	"							
Bromoform	ND	3.39	50.0	"							
Bromomethane	ND	2.75	30.0	"							
2-Butanone	ND	5.83	50.0	"							
n-Butylbenzene	ND	2.05	10.0	"							
sec-Butylbenzene	ND	3.04	10.0	"							
tert-Butylbenzene	ND	1.34	10.0	"							
Carbon disulfide	ND	5.53	10.0	"							
Carbon tetrachloride	ND	2.48	10.0	"							
Chlorobenzene	ND	0.890	10.0	"							
Chloroethane	ND	2.15	30.0	"							
2-Chloroethylvinyl Ether	ND	5.53	50.0	"							
Chloroform	ND	1.24	10.0	"							
Chloromethane	ND	1.74	30.0	"							
4-Chlorotoluene	ND	1.34	10.0	"							
2-Chlorotoluene	ND	2.35	10.0	"							
1,2-Dibromo-3-chloropropane	ND	2.69	50.0	"							
Dibromochloromethane	ND	0.650	10.0	"							
1,2-Dibromoethane	ND	2.75	10.0	"							
Dibromomethane	ND	2.30	10.0	"							
1,2-Dichlorobenzene	ND	1.65	10.0	"							
1,3-Dichlorobenzene	ND	1.03	10.0	"							
1,4-Dichlorobenzene	ND	2.23	10.0	"							
Dichlorodifluoromethane	ND	2.07	30.0	"							
1,1-Dichloroethane	ND	1.30	10.0	"							
1,2-Dichloroethane	ND	1.57	10.0	"							
1,1-Dichloroethene	ND	1.60	10.0	"							
cis-1,2-Dichloroethene	ND	2.16	10.0	"							
trans-1,2-Dichloroethene	ND	2.60	10.0	"							
1,1-Dichloropropene	ND	0.660	10.0	"							
1,2-Dichloropropane	ND	0.920	10.0	"							
1,3-Dichloropropane	ND	1.36	10.0	"							
2,2-Dichloropropane	ND	1.12	10.0	"							
cis-1,3-Dichloropropene	ND	0.980	10.0	"							
trans-1,3-Dichloropropene	ND	0.960	10.0	"							
Ethylbenzene	ND	1.00	2.00	"							
Hexachlorobutadiene	ND	2.77	30.0	"							

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2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Volatile Organic Compounds - Quality Control Report

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BI80184 - 5030A - 8260B											
Blank (BI80184-BLK1)					Prepared & Analyzed: 09/07/201						
2-Hexanone	ND	3.18	50.0	ug/kg							
Isopropylbenzene	ND	1.42	10.0	"							
p-Isopropyltoluene	ND	3.86	10.0	"							
Methyl tert-Butyl Ether (MTBE)	ND	1.81	5.00	"							
4-Methyl-2-pentanone (MIBK)	ND	3.14	50.0	"							
Methylene chloride	ND	3.31	50.0	"							
Naphthalene	ND	1.14	10.0	"							
n-Propylbenzene	ND	1.14	10.0	"							
Styrene	ND	0.800	10.0	"							
1,1,1,2-Tetrachloroethane	ND	1.28	10.0	"							
1,1,2,2-Tetrachloroethane	ND	3.25	10.0	"							
Tetrachloroethene	ND	0.930	10.0	"							
Toluene	ND	1.00	2.00	"							
1,2,3-Trichlorobenzene	ND	1.23	10.0	"							
1,2,4-Trichlorobenzene	ND	2.82	10.0	"							
1,1,1-Trichloroethane	ND	2.03	10.0	"							
1,1,2-Trichloroethane	ND	1.74	10.0	"							
Trichloroethene	ND	1.15	10.0	"							
Trichlorofluoromethane	ND	3.15	10.0	"							
1,2,3-Trichloropropane	ND	1.74	10.0	"							
1,2,4-Trimethylbenzene	ND	3.19	10.0	"							
1,3,5- Trimethylbenzene	ND	1.23	10.0	"							
Vinyl acetate	ND	10.8	50.0	"							
Vinyl chloride	ND	2.79	30.0	"							
m,p-Xylenes	ND	1.80	4.00	"							
o-Xylene	ND	1.00	2.00	"							
Surrogate: 4-Bromofluorobenzene	*43.0*			"	*50.0*		*85.9*	*70-120*			
Surrogate: Dibromofluoromethane	*51.8*			"	*50.0*		*104*	*70-120*			
Surrogate: Toluene-d8	*48.4*			"	*50.0*		*96.8*	*70-120*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Wendy Lu, Laboratory Supervisor

American Scientific Laboratories, LLC
Environmental Testing Services
2520 N. San Fernando Road, LA CA 90065 Tel: (323) 223-9700 • Fax: (323) 223-9500

Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Volatile Organic Compounds - Quality Control Report

Analyte	Result	MDL	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch BI80184 - 5030A - 8260B											
Matrix Spike (BI80184-MS1)		**Source: 1809019-15**			Prepared & Analyzed: 09/07/201						
Benzene	45.3			ug/kg	50.0	0.0100	90.6	75-120			
Chlorobenzene	56.2			"	50.0	0.0200	112	75-120			
1,1-Dichloroethene	49.6			"	50.0	0.00	99.1	75-120			
Methyl tert-Butyl Ether (MTBE)	54.1			"	50.0	0.00	108	75-120			
Toluene	47.9			"	50.0	0.0200	95.7	75-120			
Trichloroethene	47.4			"	50.0	0.00	94.9	75-120			
Surrogate: 4-Bromofluorobenzene	*40.7*			*"*	*50.0*		*81.3*	*70-120*			
Surrogate: Dibromofluoromethane	*50.8*			*"*	*50.0*		*102*	*70-120*			
Surrogate: Toluene-d8	*47.8*			*"*	*50.0*		*95.5*	*70-120*			
Matrix Spike Dup (BI80184-MSD1)		**Source: 1809019-15**			Prepared & Analyzed: 09/07/201						
Benzene	43.5			ug/kg	50.0	0.0100	86.9	75-120	4.10	15	
Chlorobenzene	54.7			"	50.0	0.0200	109	75-120	2.70	15	
1,1-Dichloroethene	49.1			"	50.0	0.00	98.3	75-120	0.831	15	
Methyl tert-Butyl Ether (MTBE)	54.7			"	50.0	0.00	109	75-120	1.19	15	
Toluene	45.0			"	50.0	0.0200	89.9	75-120	6.20	15	
Trichloroethene	46.6			"	50.0	0.00	93.1	75-120	1.87	15	
Surrogate: 4-Bromofluorobenzene	*41.1*			*"*	*50.0*		*82.2*	*70-120*			
Surrogate: Dibromofluoromethane	*50.5*			*"*	*50.0*		*101*	*70-120*			
Surrogate: Toluene-d8	*46.5*			*"*	*50.0*		*92.9*	*70-120*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Wendy Lu, Laboratory Supervisor

AMERICAN SCIENTIFIC LABORATORIES, LLC
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2520 N. San Fernando Road, LA CA 90065 Tel: (323) 223-9700 • Fax: (323) 223-9500

Lindmark Engineering	Project: CBH Tree Planting	Work Order No: 1809022
2625 Townsgate Road Suite # 330	Project Number: 2018-222	**Reported:**
Westlake Village CA, 91361	Project Manager: Ulf Lindmark	09/13/2018 17:14

Notes and Definitions

J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the practical quantitation limit (PQL)
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

APPENDIX C

Intrinsik's Health Risk Evaluation

Intrinsik Environmental Sciences (US) Inc.
1608 Pacific Avenue, Suite 201
Venice, CA 90291
Phone: 310.392.6462
www.intrinsik.com

October 24, 2018

Mr. Ulf Lindmark, PE, BCEE
Lindmark Engineering
2625 Townsgate Rd, Suite 330
Westlake Village, CA 91361

Via email: ulindmark@lindmarkeng.com

Subject: Construction Worker Health Risk Evaluation of Arsenic in Soil Samples Collected from the City of Beverly Hills Tree Planting Project Site, Beverly Hills, California

Dear Mr. Lindmark,
At your request, Intrinsik prepared this letter report summarizing the potential health impacts from arsenic in dust generated during planned excavation work based on soil samples recently collected from the City of Beverly Hills Tree Planting Project site in Beverly Hills, California (the Site). The Site includes an approximate 20-foot right-of-way off Civic Center Drive, south of the California Environmental Protection Agency (Cal/EPA), Department of Toxic Substance Control (DTSC) Lot 13 cleanup site.

This health risk evaluation focused exclusively on the potential human health impacts to construction workers who may be exposed to arsenic in soil during planned excavation and tree planting activities at the Site. This health risk evaluation is based on Lindmark Engineering's 2018 arsenic characterization activities for the Site (Lindmark Engineering 2018). It is our understanding that this letter report, which includes the calculation of the ninety-five percent upper confidence level of the arithmetic mean (95% UCL) as the arsenic exposure point concentration (EPC), calculation of a conservative construction worker risk-based screening level (RBSL) consistent with United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs; USEPA 2018a), and comparison of the estimated EPC to the conservative RBSL, will be included as supporting material to Lindmark Engineering's *Soil Management Plan* (Lindmark Engineering 2018); therefore detailed descriptions of sampling activities, as well as figures depicting the sampling locations, should be found therein.

As detailed herein, this construction worker health risk evaluation focuses on potential short-term exposures via incidental ingestion of and dermal contact with arsenic in soil and inhalation of soil-associated dust particulates. The soil EPC of 34.8 milligrams per kilogram (mg/kg) is below the calculated construction worker RBSL for arsenic in soil (44 mg/kg for noncancer health effects; USEPA 2018) and therefore corresponds to a hazard quotient below the target level of 1.0.

1. Background

The City of Beverly Hills is planning to plant 51 new trees in the 20-foot wide right-of-way off Civic Center Drive adjacent to Lot 13. According to Lindmark Engineering, the Site is adjacent to a former railroad right-of-way known to be impacted with arsenic. Residential apartment buildings are located south of Civic Center Drive, as well as north of Lot 13, across Santa Monica Boulevard.

Lindmark Engineering performed arsenic assessment activities in September 2018 to assess site-specific arsenic concentrations at the 51 proposed tree locations along Civic Center Drive (Lindmark Engineering 2018). Specifically, between September 4 and 5, 2018, 57 samples, including 6 duplicates, were collected from the proposed locations within the 20-foot right-of-way.

2. Arsenic Dataset

Lindmark Engineering provided Intrinsik with the arsenic data for the soil samples collected at the Site (see Attachment 1). In total, 57 samples, including 6 duplicates, were included in the health risk evaluation. The maximum result for each pair of duplicate samples, which were all detections, was included in the dataset.

Summary statistics for the HHRA dataset, shown in Table 1 below, were calculated using USEPA's ProUCL Software (version 5.1; USEPA 2016). Arsenic was detected in each of the soil samples collected, with concentrations ranging from 6.41 mg/kg (B36) to 88 mg/kg (B7). The arsenic data were neither normal nor lognormal at the 5% significance level (see Attachment 2). Thirteen arsenic concentrations exceed the arsenic ambient background concentration of 25 mg/kg for the adjacent arsenic impacted site (Lots 12 and 13) established by DTSC (Cal/EPA 2010; Appendix D to CH2MHill 2015).[1]

Table 1. Arsenic Dataset Descriptive Statistics

Statistic	Value
Number of samples	51
Number of detects	51
Minimum detected value	6.4
Maximum detected value	88.0
Mean	23.6
First quartile (Q1)	13.5
Median	18.1
Third quartile (Q3)	25.2
95th percentile	68.4
95% Chebyshev (Mean, Sd) UCL	34.8
Standard deviation	18.3
Coefficient of Variation	0.777

All concentrations in mg/kg wet weight.

3. Potential Human Health Exposure Evaluation

To provide risk managers with additional information beyond the arsenic soil background comparison, this human health exposure evaluation describes potential human health risks associated with the excavation of arsenic-containing soil during the tree planting project. This health risk evaluation focuses on potential arsenic exposures to construction workers engaged in excavation/planting activities. The potential exposure pathways associated with soil excavation and planting activities are incidental ingestion of and dermal contact with arsenic in soil and inhalation of soil-associated dust particulates. Given that the duration of the project is limited to approximately five weeks, this health

[1] Arsenic concentrations exceeded the arsenic ambient background concentration of 25 mg/kg in soil samples collected from B-3 through -5, -7, -10, -11, -21, -43, -44, -46, and -48 through -50.

risk evaluation focuses on only the potential noncancer health effects; the assessment of the cancer endpoint is not appropriate given the short duration of the project.

Construction Worker Soil Risk-based Screening Level for Arsenic

The site-specific construction worker soil RBSL for arsenic was calculated using the USEPA's RSL Calculator (USEPA 2018b). The construction worker exposure parameters used generally are consistent with those recommended by Cal/EPA (2014) and by USEPA in the most recent update of the RSLs (USEPA 2018a). Exposure and chemical-specific parameters (including toxicity values) and equations used in the derivation of the site-specific construction worker soil RBSL for arsenic are detailed in Attachment 2. As shown in Table 2 below (see also Attachment 2), the calculated site-specific construction worker noncancer risk-based screening level arsenic is 44 mg/kg (USEPA 2018b).

Exposure Estimate – Soil Arsenic Exposure Point Concentration

To quantify exposures, a statistically representative EPC was estimated for arsenic in soil. As reported in Tables 1 and 2 (see also Attachment 3), the arsenic dataset follows a nonparametric distribution and therefore ProUCL software recommends a 95% Chebyshev (Mean, Sd) UCL of 34.8 mg/kg.

Toxicity Evaluation – Comparison to Conservative Screening Level

Based on a 95% UCL arsenic soil EPC of 34.8 mg/kg for the samples collected within the right-of-way off Civic Center Drive, the construction worker EPC is below the calculated construction worker noncancer risk-based screening level (44 mg/kg), corresponding to a hazard index of 0.8. The HI is below the Cal/EPA and USEPA target level of 1.0.

Table 2. Health Risk Evaluation Summary

Receptor	Soil EPC (mg/kg)	Source	CW Soil RBSL (mg/kg)	Source
Construction Worker	34.8	95% Chebyshev (Mean, Sd) UCL	44	Calculated using USEPA RSL Calculator (USEPA 2018b)

RBSL = risk-based screening level for noncancer health effects
UCL = upper confidence limit of the mean

4. Uncertainties

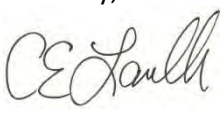
Exposure pathways evaluated in this heath risk evaluation include incidental ingestion of, and dermal contact with, arsenic in soil, and inhalation of soil-associated dust particulates. However, it is assumed that workers engaged in soil-disturbance work and tree planting will wear appropriate protective clothing (e.g. gloves and work boots) and that this clothing is removed and cleaned at the end of each work day. This protective gear should prevent dermal contact with soil. Similarly, while incidental ingestion of soil is possible, workers are assumed to take proper precautions regarding eating and drinking while working. Therefore, inclusion of these two exposure pathways likely overestimate potential construction works health risks.

5. Conclusions

This construction worker health risk evaluation focuses on potential short-term exposures via incidental ingestion of and dermal contact with arsenic in soil and inhalation of soil-associated dust particulates. As calculated herein, the arsenic soil EPC of 34.8 mg/kg is below the calculated construction worker noncancer risk-based screening level for arsenic in soil (44 mg/kg; USEPA 2018b).

Please feel free to contact me with any questions.

Sincerely,



Charles Lambert, Ph.D., DABT

Andrew Thomason, MS

Attachments
Attachment 1: Arsenic Laboratory Results
Attachment 2: Construction Worker Soil Risk-based Screening Level for Arsenic
Attachment 3: ProUCL Output

6. References

California Environmental Protection Agency (Cal/EPA). 2014a. Human Health Risk Assessment Note Number 1: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities. Department of Toxic Substances Control, Office of Human and Ecological Risk. September. Available online: https://www.dtsc.ca.gov/AssessingRisk/upload/HHRA_Note1-2.pdf

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U.S. Environmental Protection Agency (USEPA). 1992. Guidance for Data Usability in Risk Assessment, Interim Final. Office of Emergency and Remedial Response. EPA/540/G90/008.

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U.S. Environmental Protection Agency (USEPA). 2018b. Regional Screening Levels (RSLs) Calculator. May. Available online: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

ATTACHMENTS

ATTACHMENT 1

Arsenic Laboratory Results

Attachment 1
Arsenic Laboratory Results

Project	Sample Name	Sample Date	Result	Reporting Limit	Units
CBH Tree Planting	B1	09/04/2018 07:40:00	19.3	0.250	mg/kg
CBH Tree Planting	B1-DUP	09/04/2018 07:41:00	20.1	0.250	mg/kg
CBH Tree Planting	B2	09/04/2018 07:46:00	18.4	0.250	mg/kg
CBH Tree Planting	B3	09/04/2018 07:51:00	45.4	0.250	mg/kg
CBH Tree Planting	B4	09/04/2018 07:59:00	37.4	0.250	mg/kg
CBH Tree Planting	B5	09/04/2018 08:06:00	35.5	0.250	mg/kg
CBH Tree Planting	B6	09/04/2018 08:12:00	17.0	0.250	mg/kg
CBH Tree Planting	B7	09/04/2018 08:20:00	88.0	0.250	mg/kg
CBH Tree Planting	B8	09/04/2018 08:27:00	18.1	0.250	mg/kg
CBH Tree Planting	B9	09/04/2018 08:33:00	20.2	0.250	mg/kg
CBH Tree Planting	B10	09/04/2018 08:40:00	21.1	0.250	mg/kg
CBH Tree Planting	B10-DUP	09/04/2018 08:41:00	26.5	0.250	mg/kg
CBH Tree Planting	B11	09/04/2018 08:47:00	53.6	0.250	mg/kg
CBH Tree Planting	B12	09/04/2018 08:55:00	19.6	0.250	mg/kg
CBH Tree Planting	B13	09/04/2018 08:58:00	18.1	0.250	mg/kg
CBH Tree Planting	B14	09/04/2018 09:18:00	20.0	0.250	mg/kg
CBH Tree Planting	B15	09/04/2018 09:28:00	23.9	0.250	mg/kg
CBH Tree Planting	B16	09/04/2018 09:33:00	21.8	0.250	mg/kg
CBH Tree Planting	B17	09/04/2018 09:39:00	21.0	0.250	mg/kg
CBH Tree Planting	B18	09/04/2018 09:45:00	11.7	0.250	mg/kg
CBH Tree Planting	B19	09/04/2018 09:53:00	19.3	0.250	mg/kg
CBH Tree Planting	B20	09/04/2018 10:00:00	17.1	0.250	mg/kg
CBH Tree Planting	B20-DUP	09/04/2018 10:01:00	17.8	0.250	mg/kg
CBH Tree Planting	B21	09/04/2018 10:07:00	26.6	0.250	mg/kg
CBH Tree Planting	B22	09/04/2018 10:13:00	16.6	0.250	mg/kg
CBH Tree Planting	B23	09/04/2018 10:45:00	19.2	0.250	mg/kg
CBH Tree Planting	B24	09/04/2018 10:50:00	18.1	0.250	mg/kg
CBH Tree Planting	B25	09/04/2018 10:58:00	19.1	0.250	mg/kg
CBH Tree Planting	B26	09/04/2018 11:10:00	19.2	0.250	mg/kg
CBH Tree Planting	B27	09/04/2018 11:28:00	14.4	0.250	mg/kg
CBH Tree Planting	B28	09/05/2018 07:10:00	11.1	0.250	mg/kg
CBH Tree Planting	B29	09/05/2018 07:15:00	10.4	0.250	mg/kg
CBH Tree Planting	B30	09/05/2018 07:27:00	11.5	0.250	mg/kg
CBH Tree Planting	B30-DUP	09/05/2018 07:28:00	8.76	0.250	mg/kg
CBH Tree Planting	B31	09/05/2018 07:37:00	8.41	0.250	mg/kg
CBH Tree Planting	B32	09/05/2018 07:43:00	8.76	0.250	mg/kg
CBH Tree Planting	B33	09/05/2018 07:47:00	16.2	0.250	mg/kg
CBH Tree Planting	B34	09/05/2018 07:52:00	13.3	0.250	mg/kg
CBH Tree Planting	B35	09/05/2018 07:57:00	11.1	0.250	mg/kg
CBH Tree Planting	B36	09/05/2018 08:03:00	6.41	0.250	mg/kg
CBH Tree Planting	B37	09/05/2018 08:08:00	11.7	0.250	mg/kg
CBH Tree Planting	B38	09/05/2018 08:13:00	6.69	0.250	mg/kg

Attachment 1
Arsenic Laboratory Results

Project	Sample Name	Sample Date	Result	Reporting Limit	Units
CBH Tree Planting	B39	09/05/2018 08:19:00	15.0	0.250	mg/kg
CBH Tree Planting	B40	09/05/2018 08:24:00	11.7	0.250	mg/kg
CBH Tree Planting	B40-DUP	09/05/2018 08:25:00	12.8	0.250	mg/kg
CBH Tree Planting	B41	09/05/2018 09:08:00	13.3	0.250	mg/kg
CBH Tree Planting	B42	09/05/2018 09:22:00	13.6	0.250	mg/kg
CBH Tree Planting	B43	09/05/2018 09:26:00	29.7	0.250	mg/kg
CBH Tree Planting	B44	09/05/2018 09:33:00	26.9	0.250	mg/kg
CBH Tree Planting	B45	09/05/2018 09:37:00	16.1	0.250	mg/kg
CBH Tree Planting	B46	09/05/2018 09:42:00	85.4	0.250	mg/kg
CBH Tree Planting	B47	09/05/2018 09:49:00	16.0	0.250	mg/kg
CBH Tree Planting	B48	09/05/2018 09:53:00	83.2	0.250	mg/kg
CBH Tree Planting	B49	09/05/2018 10:08:00	41.5	0.250	mg/kg
CBH Tree Planting	B50	09/05/2018 10:12:00	25.7	0.250	mg/kg
CBH Tree Planting	B50-DUP	09/05/2018 10:13:00	30.2	0.250	mg/kg
CBH Tree Planting	B51	09/05/2018 10:22:00	16.4	0.250	mg/kg

ATTACHMENT 2

Construction Worker Soil Risk-based Screening Level for Arsenic

EPA United States Environmental Protection Agency

RSL Calculator

Regional Screening Levels (RSLs)

- Home Page
- User's Guide
- What's New
- Frequent Questions
- Equations
- RSL Calculator
- Generic Tables
- Contact Us

Jump to Media Selections

- Soil - Unpaved Road Traffic

Construction Worker Exposure to Soil

Substitute Soil-Saturation Concentration (CSAT) for soil inhalation RSL?

Substitute theoretical ceiling limit for total soil RSL?

Time Spent on Site

5 DW_{cw} (days worked - construction worker) days/week	840 t_c (overall duration of construction) hours
5 EW_{cw} (weeks worked - construction worker) weeks/year	3024000 T_c (overall duration of construction) s
0.191559801870 F_D Unitless Dispersion Correction Factor	720000 T_t (overall duration of traffic) s

NOTES:

1. t_c = ED * EW * 7 days/week * 24 hours/day
2. T_t = ED * EF * ET * 3600 s/hour
3. T_c = ED * EW * 7 days/week * 24 hours/day * 3600 s/hour
4. $F_D = 0.1852 + (5.3537/t_c) + (-9.6318/t_c^2)$

Unpaved Road Traffic

Carcinogenic Soil Dermal - Standard

Carcinogenic Soil Ingestion - Standard

Carcinogenic Soil Inhalation - Standard

Non-Carcinogenic Soil Dermal - Standard

$$SL_{cw\text{-}soil\text{-}nc\text{-}der}\,(mg/kg) = \frac{THQ \times AT_{cw\text{-}a}\left(EW_{cw}\frac{50\ weeks}{year}\times\frac{7\ days}{week}\times ED_{cw}\,(1\ year)\right)\times BW_{cw}\,(80\ kg)}{EF_{cw}\left(EW_{cw}\frac{50\ weeks}{year}\times DW_{cw}\ \frac{5\ days}{week}\right)\times ED_{cw}\,(1\ year)\times\left(\frac{1}{RfD_o\left(\frac{mg}{kg\text{-}day}\right)\times GIABS}\right)\times SA_{cw}\left(\frac{3527\ cm^2}{day}\right)\times AF_{cw}\left(\frac{0.3\ mg}{cm^2}\right)\times ABS_d\times\left(\frac{10^{-6}\ kg}{1\ mg}\right.}$$

Non-Carcinogenic Soil Ingestion - Standard

$$SL_{cw\text{-}soil\text{-}nc\text{-}ing}\,(mg/kg) = \frac{THQ \times AT_{cw\text{-}a}\left(EW_{cw}\frac{50\ weeks}{year}\times\frac{7\ days}{week}\times ED_{cw}\,(1\ year)\right)\times BW_{cw}\,(80\ kg)}{EF_{cw}\left(EW_{cw}\frac{50\ weeks}{year}\times DW_{cw}\ \frac{5\ days}{week}\right)\times ED_{cw}\,(1\ year)\times\frac{RBA}{RfD_o\left(\frac{mg}{kg\text{-}day}\right)}\times IR_{cw}\left(330\frac{mg}{day}\right)\times\left(\frac{10^{-6}\ kg}{1\ mg}\right.}$$

Non-Carcinogenic Soil Inhalation - Standard

$$SL_{cw\text{-}soil\text{-}nc\text{-}inh}\,(mg/kg) = \frac{THQ \times AT_{cw\text{-}a}\left(EW_{cw}\frac{50\ weeks}{year}\times\frac{7\ days}{week}\times ED_{cw}\,(1\ year)\right)}{EF_{cw}\left(EW_{cw}\frac{50\ weeks}{year}\times DW_{cw}\ \frac{5\ days}{week}\right)\times ED_{cw}\,(1\ year)\times ET_{cw}\left(\frac{8\ hours}{day}\right)\times\left(\frac{1\ day}{24\ hours}\right)\times\frac{1}{RfC\left(mg/m^3\right)}\times\left(\frac{1}{VF_{ulim\text{-}sc}\left(\frac{m^3}{kg}\right)}+\frac{1}{PEF_{sc}\left(\frac{m^3}{kg}\right.}\right.}$$

0.3

AF_{cw} (skin adherence factor - construction worker) mg/cm^2

35

AT_{cw} (averaging time - construction worker) days

80

BW_{cw} (body weight - construction worker) kg

1

ED_{cw} (exposure duration - construction worker) yr

25

EF_{cw} (exposure frequency - construction worker) day/yr

8

ET_{cw} (exposure time - construction worker) hr/day

1

THQ (target hazard quotient) unitless

330

IR_{cw} (soil ingestion rate - construction worker) mg/day

70

LT (lifetime) yr

3527

SA_{cw} (surface area - construction worker) cm^2/day

1E-06

TR (target cancer risk) unitless

NOTES:

1. CSF_o=ingestion slope factor $(mg/kg\text{-}day)^{-1}$. chemical-specific
2. IUR=inhalation unit risk $(mg/m^3)^{-1}$. chemical-specific
3. RfD_o=ingestion reference dose (mg/kg-day). chemical-specific
4. RfC=inhalation reference concentration (mg/m^3). chemical-specific
5. $EF_{cw} = DW_{cw}$ (days/week) * EW_{cw} (weeks/year);

Particulate Emission Factor Mechanically Driven - Unpaved Road Traffic

PEF_{sc} Equation

$$PEF_{sc}\left(\frac{m^3_{air}}{kg_{soil}}\right) = \frac{Q}{C_{sr}}\left(\frac{\left(\frac{g}{m^2 \cdot s}\right)}{\left(\frac{kg}{m^3}\right)}\right) \times \frac{1}{F_D} \times \left[\frac{T_t(s) \times A_R(m^2)}{\frac{2.6 \times \left(\frac{s}{12}\right)^{0.8} \times \left(\frac{W(tons)}{3}\right)^{0.4}}{\left(\frac{M_{dry}}{0.2}\right)^{0.3}} \times \frac{\left(365\left(\frac{days}{year}\right) - p\left(\frac{days}{year}\right)\right)}{365\left(\frac{days}{year}\right)} \times 281.9 \times \Sigma VKT(km)} \right]$$

$$\frac{Q}{C_{sr}}\left(\frac{\left(\frac{g}{m^2 \cdot s}\right)}{\left(\frac{kg}{m^3}\right)}\right) = A \times \exp\left[\frac{\left(\ln A_s(acre) - B\right)^2}{C}\right]$$

$$A_R(m^2) = L_R(ft) \times W_R(20\ feet) \times 0.092903\left(\frac{m^2}{feet^2}\right)$$

$$W(tons) = \frac{\left(number\ of\ cars \times \frac{tons}{car} + number\ of\ trucks \times \frac{tons}{truck}\right)}{total\ vehicles}$$

$$\Sigma VKT(km) = total\ vehicles \times distance\left(\frac{km}{day}\right) \times EW_{cw}\left(\frac{weeks}{year}\right) \times DW_{cw}\left(\frac{days}{week}\right)$$

$$T_t(7200000\ s) = ED_{cw}(1\ years) \times EF_{cw}\left(\frac{250\ days}{year}\right) \times ET_{cw}\left(\frac{8\ hours}{day}\right) \times \left(\frac{3600\ s}{hour}\right)$$

$$F_D(0.18584) = 0.1852 + \left(5.3537 / t_c\right) + \left(-9.6318 / t_c^2\right)$$

$$t_c(8400\ hours) = ED_{cw}(1\ years) \times EW_{cw}\left(\frac{50\ weeks}{year}\right) \times \left(\frac{7\ days}{week}\right) \times \left(\frac{24\ hours}{day}\right)$$

20 W_R (width of road segment) ft	. tons/truck
0.2 M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	. p (days per year with at least .01" of precipitation) days/year
. number of cars	8.5 s (road surface silt content) %
. number of trucks	0.5 A_s (acres)
. tons/car	

147.58077 L_R (length of road segment) ft	0 ΣVKT (sum of fleet vehicle km traveled) km
12.9351 A (Dispersion Constant)	 W (mean vehicle weight) tons
274.21393 A_R (surface area of contaminated road segment) m^2	0.04498 distance (road length) km/day
5.7383 B (Dispersion Constant)	1.00E+06 PEF_{sc} (particulate emission factor) m^3/kg
71.7711 C (Dispersion Constant)	23.01785 Q/C_{sr} (inverse of the ratio of the geometric mean air concentration to the emission flux along a straight road segment bisecting a square site) g/m^2-s per kg/m^3
 total number of vehicles	

NOTES:

1. Contact your regional risk assessor for assistance.
2. When calculating ΣVKT, distance (road length) is calculated by assuming the contaminated area of surface soil (A_s) is a square and that the road divides the square evenly. For example, if A_s is 0.5 acres (A_{surf} = 2,024 m^2), the road length would be the square root of 2,024, or .045 km.
3. The Q/C_{sr} equation and dispersion constants A, B and C were taken from Equation E-19 of the Supplemental Soil Screening Guidance.
4. The PEF equation is Equation E-18 in the Supplemental Soil Screening Guidance.

Volitization Factor - Unlimited Reservoir (at center of source)

C_{sat} Equation

Diffusivity in air (D_{ia}) Equation

Diffusivity in water (D_{iw}) Equation

H` Determination at Temperature other than 25 degrees Celsius

VF Unlimited Reservoir Equation - Method 1

0.006 foc (fraction organic carbon in soil) g/g	0.5 A_s (acres)
1.5 ρ_b (dry soil bulk density) g/cm^3	25 T_w (groundwater temperature) degrees Celsius
2.65 ρ_s (soil particle density) g/cm^3	0.15 θ_w (water-filled soil porosity) L_{water}/L_{soil}

2.4538 A (Dispersion Constant)	0.43396 n (total soil porosity) L_{pore}/L_{soil}
17.5660 B (Dispersion Constant)	14.31407 Q/C_{sa} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m²-s per kg/m³
189.0426 C (Dispersion Constant)	0.28396 θ_a (air-filled soil porosity) L_{air}/L_{soil}

NOTES:

1. Contact your regional risk assessor for assistance.
2. The VF Method 1 equation is used by default. Enter values for the missing variables in the section below if you would like to use the VF Method 2 equation.
3. The Q/C_{sa} equation and the dispersion constants A, B and C were taken from Equation 5-15 of the Supplemental Soil Screening Guidance.
4. The VF equation is from Equation 5-14 in the Supplemental Soil Screening Guidance.

Volitization Factor - Mass Limit (at center of source)

VF Mass Limit Equation - Method 2

. d_s (average source depth) m	0.5 A_s (acres)
1.5 ρ_b (dry soil bulk density) g/cm³	
2.4538 A (Dispersion Constant)	14.31407 Q/C_{vol} (inverse of the ratio of the geometric mean air concentration to the emission flux at the center of a square source) g/m²-s per kg/m³
17.5660 B (Dispersion Constant)	
189.0426 C (Dispersion Constant)	0 $VF_{mlim-sc}$ (volitization factor) m^3_{air}/kg_{soil}

NOTES:

1. Contact your regional risk assessor for assistance.
2. Enter values for the missing variables in this section if you would like to use the VF Method 2 equation.
3. The Q/C_{sa} equation and the dispersion constants A, B and C were taken from Equation 5-15 of the Supplemental Soil Screening Guidance.
4. The VF equation is from Equation 5-17 in the Supplemental Soil Screening Guidance.
5. Mg = megagram

Retrieve **Clear**

Right-click and select "Save target as..." to download database-ready files that can be read into EQuIS and SADA.

- EQuIS Format THQ=1.0 and TR=1E-06
- EQuIS Format THQ=0.1 and TR=1E-06
- SADA Format THQ=1.0 and TR=1E-06
- SADA Format THQ=0.1 and TR=1E-06

{LAST UPDATED DATE}

Site-specific
Construction Worker Equation Inputs for Soil - Unpaved Road Traffic

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
L_p (length of road segment) ft	147.58077	147.58077
A (PEF Dispersion Constant)	12.9351	12.9351
A_R (surface area of contaminated road segment) m^2	274.21393	274.21393
A (VF Dispersion Constant)	2.4538	2.4538
W_p (width of road segment) ft	20	20
B (PEF Dispersion Constant)	5.7383	5.7383
B (VF Dispersion Constant)	17.5660	17.5660
C (PEF Dispersion Constant)	71.7711	71.7711
C (VF Dispersion Constant)	189.0426	189.0426
distance (road length) km/day	0.04498	0.04498
F_D Unitless Dispersion Correction Factor	0.185837208	0.1915598018707
foc (fraction organic carbon in soil) g/g	0.006	0.006
M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	0.2	0.2
n (total soil porosity) L_{pore}/L_{soil}	0.43396	0.43396
p_b ($VF_{ulim-sc}$ dry soil bulk density) g/cm^3	1.5	1.5
p_b ($VF_{mlim-sc}$ dry soil bulk density) g/cm^3	1.5	1.5
p_s (soil particle density) g/cm^3	2.65	2.65
Q/C_{sr} (g/m^2-s per kg/m^3)	23.01785	23.01785
Q/C_{vol} (g/m^2-s per kg/m^3)	14.31407	14.31407
Q/C_{sa} (g/m^2-s per kg/m^3)	14.31407	14.31407
s (road surface silt content) %	8.5	8.5
A_s (PEF_{sc} - acres)	0.5	0.5
A_s ($VF_{mlim-sc}$ acres)	0.5	0.5
A_s ($VF_{ulim-sc}$ acres)	0.5	0.5
AF_{cw} (skin adherence factor - construction worker) mg/cm^2	0.3	0.3
AT_{cw} (averaging time - construction worker) days	365	35
BW_{cw} (body weight - construction worker) kg	80	80
ED_{cw} (exposure duration - construction worker) yr	1	1

Output generated 22OCT2018:12:50:12

Site-specific
Construction Worker Equation Inputs for Soil - Unpaved Road Traffic

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
EF_{cw} (exposure frequency - construction worker) day/yr	250	25
ET_{cw} (exposure time - construction worker) hr/day	8	8
THQ (target hazard quotient) unitless	0.1	1
IR_{cw} (soil ingestion rate - construction worker) mg/day	330	330
LT (lifetime) yr	70	70
SA_{cw} (surface area - construction worker) cm^2/day	3527	3527
TR (target cancer risk) unitless	1.0E-06	1.0E-06
t_c (overall duration of construction) hours	8400	840
T_c (overall duration of construction) s	30240000	3024000
T_w (groundwater temperature) C	25	25
$Theta_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396	0.28396
$Theta_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15	0.15
T_t (overall duration of traffic) s	7200000	720000
$VF_{mlim-sc}$ (volitization factor) m^3_{air}/kg_{soil}	.	0

Output generated 22OCT2018:12:50:12

Site-specific

Construction Worker Regional Screening Levels (RSL) for Soil - Unpaved Road Traffic

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); U = User-provided

Chemical	CAS Number	Mutagen?	Volatile?	Ingestion SF (mg/kg-day) $^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m ^{3})$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m ^{3})	RfC Ref	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)
Arsenic, Inorganic	7440-38-2	No	No	1.50E+00	I	4.30E-03	I	3.00E-04	I /Chronic	1.50E-05	C /Chronic	1	0.03	0.6	-

Chemical	S (mg/L)	K_{oc} \ (cm ^{3}/g)	K_d \ (cm ^{3}/g)	HLC (atm-m ^{3}/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point T_{boil} \ (K)	BP Ref	Critical Temperature T_{crit} \ (K)	T_{crit} \ Ref	CHEMTYPE	D_{ia} \ (cm ^{2}/s)	D_{iw} \ (cm ^{2}/s)	D_A \ (cm ^{2}/s)
Arsenic, Inorganic	-	-	2.90E+01	-	-		888.15	PHYSPROP	1673	CRC89	INORGANIC	-	-	-

Chemical	Particulate Emission Factor (m ^{3}/kg)	Volatilization Factor (m ^{3}/kg)	Ingestion SL TR=1E-06 (mg/kg)	Dermal SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Dermal SL THQ=1 (mg/kg)	Inhalation SL THQ=1 (mg/kg)	Noncarcinogenic SL THI=1 (mg/kg)	Screening Level (mg/kg)
Arsenic, Inorganic	1.00E+06	-	2.75E+02	1.72E+03	7.13E+02	1.78E+02	1.70E+02	1.06E+03	6.30E+01	4.40E+01	4.40E+01 nc

ATTACHMENT 3

ProUCL Output

Attachment 3
ProUCL Output

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.110/18/2018 9:26:01 AM
From File	Data_101818.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic (mg/kg)

General Statistics

Total Number of Observations	51	Number of Distinct Observations	45
		Number of Missing Observations	0
Minimum	6.41	Mean	23.57
Maximum	88	Median	18.1
SD	18.33	Std. Error of Mean	2.566
Coefficient of Variation	0.777	Skewness	2.457

Normal GOF Test

Shapiro Wilk Test Statistic	0.686	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	2.296E-13	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.264	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.123	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	27.88	95% Adjusted-CLT UCL (Chen-1995)	28.74
		95% Modified-t UCL (Johnson-1978)	28.02

Gamma GOF Test

A-D Test Statistic	2.205	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.758	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.204	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.125	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.752	k star (bias corrected MLE)	2.603
Theta hat (MLE)	8.565	Theta star (bias corrected MLE)	9.055
nu hat (MLE)	280.7	nu star (bias corrected)	265.5
MLE Mean (bias corrected)	23.57	MLE Sd (bias corrected)	14.61
		Approximate Chi Square Value (0.05)	228.8
Adjusted Level of Significance	0.0453	Adjusted Chi Square Value	227.8

Attachment 3
ProUCL Output

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	27.36	95% Adjusted Gamma UCL (use when n<50)	27.48

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk P Value	0.00998	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.16	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.123	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.858	Mean of logged Data	2.968
Maximum of Logged Data	4.477	SD of logged Data	0.581

Assuming Lognormal Distribution

95% H-UCL	26.99	90% Chebyshev (MVUE) UCL	28.92
95% Chebyshev (MVUE) UCL	31.63	97.5% Chebyshev (MVUE) UCL	35.39
99% Chebyshev (MVUE) UCL	42.77		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	27.8	95% Jackknife UCL	27.88
95% Standard Bootstrap UCL	27.74	95% Bootstrap-t UCL	29.68
95% Hall's Bootstrap UCL	28.81	95% Percentile Bootstrap UCL	27.85
95% BCA Bootstrap UCL	29.07		
90% Chebyshev(Mean, Sd) UCL	31.27	95% Chebyshev(Mean, Sd) UCL	34.76
97.5% Chebyshev(Mean, Sd) UCL	39.6	99% Chebyshev(Mean, Sd) UCL	49.11

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	34.76

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

APPENDIX D

Dust and Weather Field Monitoring Logs

Dust and Weather Field Monitoring Log

Project Name: CBH New Tree Planting	Project Number: 2018-222	Calibration (Dust): Air (filter bag)
Weather:	Project Address: Civic Center Drive ROW	Calibration (Weather): None
Date:	Equipment: pDR1000, GilAir Pumps, Kestrel Weather	Signature:

Action Levels: Site Dust >25 μg/m^3, across the site (30 minute average)

Time	Total Dust Readings (μg/m^3)			Wind (Coming From)	Wind Speed (mph)	Notes

Field Report

Sheet ___ of ___

2625 Townsgate Road, Suite 330,
Westlake Village, California 91361
T 818-707-6100
F 818-483-7810
www.lindmarkeng.com

Proj. # **Proj. Name**

Date **Proj. Addr.**

Arrival Time **Departure Time**

LE Personnel

Contractors on-site

Client representatives on-site

Agency representatives on-site

Equipment on-site (LE)

Equipment on-site (Contractors)

SUMMARY OF WORK PERFORMED

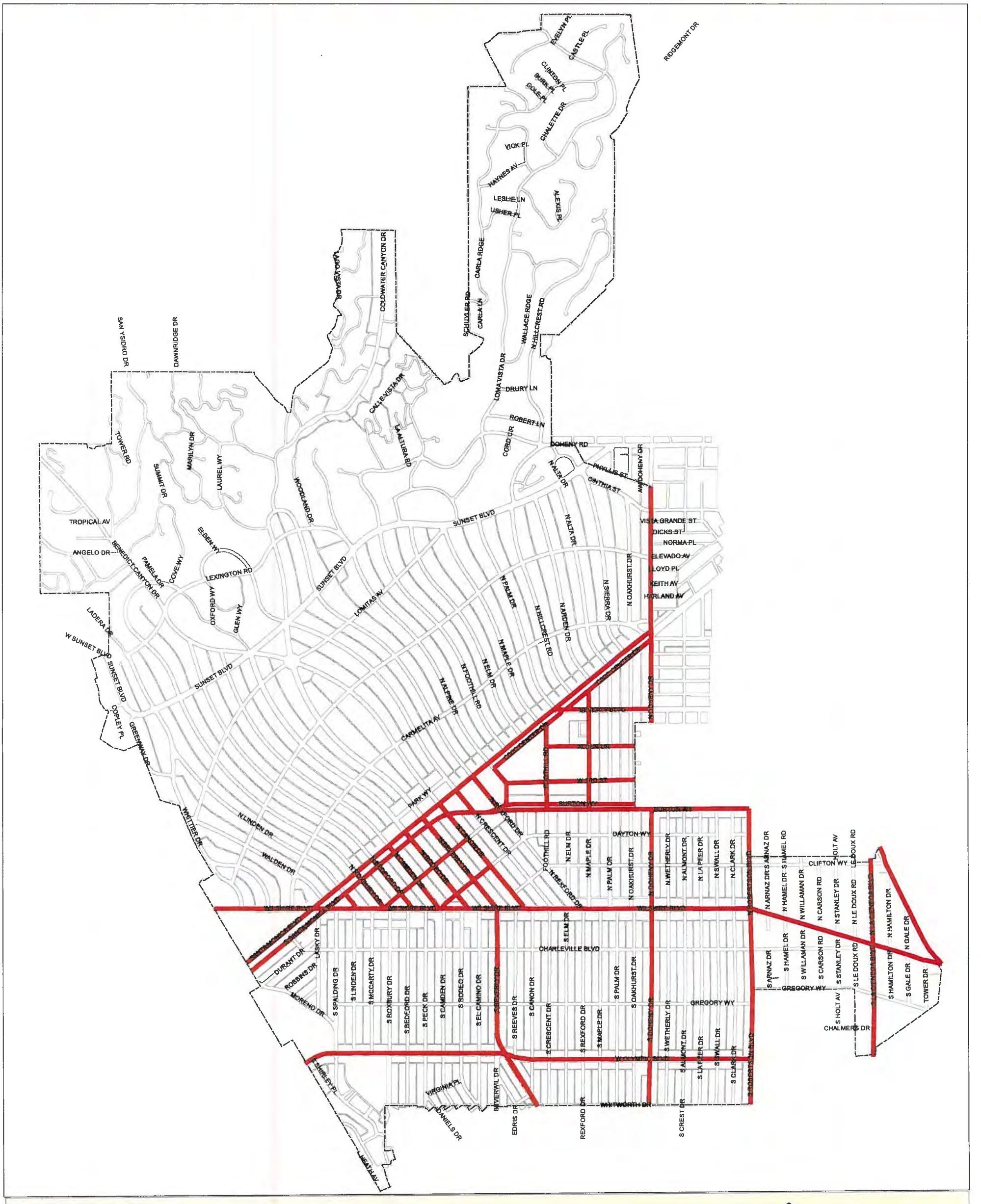
Action Required

Signature

APPENDIX E

CBH Truck Routes

Approved Heavy Haul Routes - City of Beverly Hills, California



Heavy Haul Route

City Boundry

0 0.1 0.2 0.4 0.6 0.8 1 Miles

This map is for informational purposes. The City of Beverly Hills makes no representations or warranties of any kind with respect to the accuracy of the information or data furnished herein.

Map produced by: City of Beverly Hills - Information Technology - GIS
455 N. Rexford Dr. Beverly Hills, CA 90210
March 2009