CORRECTIVE MEASURES IMPLEMENTATION WORKPLAN

CLOW VALVE COMPANY
1375 MAGNOLIA AVENUE
CORONA, CALIFORNIA

PREPARED FOR:

CLOW VALVE COMPANY
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CORONA, CALIFORNIA 92879

PREPARED BY:

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Signed:

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Senior Scientist

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1.0 INTRODUCTION

Clow Valve Company (Clow), a Division of McWane, contracted EarthCon Consultants CA, Inc. (EarthCon) to prepare this Corrective Measures Implementation Workplan (CMIWP) for the facility located on the northwest corner of the intersection at 1375 Magnolia Avenue in Corona, California (Site; see Figure 1 and Figure 2). The proposed CMIWP activities will be conducted under the supervision of the Department of Toxic Substances Control (DTSC) and in accordance with the Corrective Action Consent Agreement between the California Department of Toxic Substances Control (DTSC) and Clow [Docket No. SPRD 00/01SCC-4208, March 2002]. The scope of work associated with the CMIWP is provided in the following sections.

2.0 SITE BACKGROUND

2.1 Property Description

As mentioned previously, the Site is located to the northeast of the intersection of Magnolia Avenue and El Camino Avenue, at 1375 Magnolia Avenue in Corona, California. The Site is identified as Riverside County Assessor Parcel Number 107-030-022-3 and covers approximately 16 acres. Approximately 60% of the property is currently used for machining, product finishing and testing, and product storage. The remaining 40% includes asphalt-paved parking areas and unpaved areas (approximately 13% is unpaved including a small section along the northwest property boundary, AOC-1, AOC-5, and the product storage yard – See Figure 2). Unused foundry buildings, small offices and open areas are leased to other tenants. In addition to Clow, three other McWane Divisions have operations on the Site.

2.2 Operational History

Current manufacturing processes include machining, testing, coating and shipping wet barrel fire hydrants. Finished valves are also stored and distributed from this location. Anaco, Clow Valve's sister company, is also on-Site and is engaged in the manufacturing of rubber soil pipe couplings. Two other McWane Divisions, McWane Ductile-Utah and Tyler Union, operate product distribution centers on the Site.

The Site was originally developed for the production of iron pipes and connections by American Foundry in approximately 1950 (AESI, 2002). In 1960, Rich Manufacturing of Los Angeles acquired the property and moved their iron pipe manufacturing business to the Corona location, adding additional structures in 1967 for the machine shop and brass foundry (AESI, 2002). Clow Valve, a jobber of wrought iron pipe and other foundry products as early as 1878, acquired Rich Manufacturing Company of Corona in 1972. This acquisition added the wet barrel fire hydrant to Clow Valve's product line of waterworks products. In 1985, McWane, Inc. purchased all of Clow Corporation's stock and Clow became a wholly owned subsidiary and eventually operating division of McWane[1].

EarthCon understands that the Site is currently involved in a pending sale agreement with a potential new property owner. This agreement between Clow and the potential new property owner assumes that the entire Site will be restricted for industrial use in accordance with the future Land Use Covenant/Deed Restriction.

1 http://www.clowvalve.com/about-us/company-history

2.3 Site Geology and Hydrology

The geology and hydrogeology were identified in the report titled *Addendum to Preliminary Endangerment Assessment and Facility Investigation* (Environmental Support Technologies, July 24, 2003) and excerpts are provided below:

Regional Geology

The Site is located in Riverside County within the Corona-Elsinore Trough, a graben-like-valley that extends from Corona to Elsinore. The Corona-Elsinore Trough is located within the Peninsular Ranges geomorphic province. The Santa Ana Mountains and the Elsinore Fault Zone bound the Corona-Elsinore Trough on the southwest. The Gavilan Hills, part of the Perris Block, bounds the Corona-Elsinore Trough on the northeast. The Site is situated on the northeast edge of the alluvial fan surface that slopes gently from the Santa Ana Mountains, extending northeasterly through Corona toward Temescal Wash. Temescal Wash is approximately ½ mile southeasterly of the Site.

Local and Site Geology

Surficial materials at the Site are comprised of Holocene Older and Younger alluvium and bedrock. The younger alluvium consists of unconsolidated sand, gravel, and silt associated with the intermittent Temescal Wash. The active channel for the Temescal wash bounds the northeast portion of the Site and flows to the west as a cemented flood channel. The older alluvium consists of semi-consolidated buff to dark brown, sand, gravel, and silt associated with the alluvial deposits upgradient (south) of the Site. The bedrock consists of siltstone units possibly associated with the Miocene-Puente formation and weathered metamorphosed volcanic rock (Santiago Peak Volcanic). The siltstone is exposed in the hills located immediately south of the Site at 750 feet above mean sea level (msl). Crystalline bedrock thought to be Corona Hornblende Granodiorite Porphyry crops out in the foothills approximately 3 miles south of the Site.

Previous consultants investigating surrounding properties identified layers of gravelly sand (1-5 feet below ground surface [ft bgs]), sand and silty clay (20-30 ft bgs), gravelly sand (25-40 ft bgs) and clay 55-60 ft bgs). Drilling refusal has occurred several times at approximately 20 ft bgs indicating the presence of dense consolidated silty clay and gravelly material at that depth. Multiple dense, laterally discontinuous clay lenses have been reported to occur between 40-50 ft bgs, 62-81 ft bgs, and 90-103 ft bgs (AESI, 2002). Investigations conducted on-Site encountered sand and gravel mixtures with refusal on cobbles occurring commonly (EST, 2006; Fero, 2006b).

Local Hydrogeology

Groundwater depths in the vicinity of the Site have been reported to range from 23-28 ft bgs and from 42-47 ft bgs (AESI, 2002), presumably as perched layers related to the clay layers described

above. The regional aquifer is reported to start at 124 ft bgs. Recovery depths of groundwater in Corona municipal wells in the early 2000's were approximately 190-193 ft bgs. In addition, a westerly gradient was observed following the overall direction of discharge from the Temescal River to the Santa Ana River. Groundwater was also estimated to be approximately 45 ft bgs traveling into the gravely Temescal Wash downgradient of the Site (AESI, 2002). Groundwater beneath the Site was encountered at approximately 47 ft bgs in coarse granular material composed of sand and gravel (Fero, 2006b).

In addition, the groundwater beneath the Site is identified as Temescal Hydrologic Sub Area within the Middle Santa Ana River Basin with beneficial use designations including municipal and domestic supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PROC)[2].

2 http://waterboards.ca.gov/santaana/water_issues/programs/basin_plan/docs/2016/Chapter_3_Feb_2016.pdf

3.0 SUMMARY OF PREVIOUS INVESTIGATIONS

In October of 2000, the DTSC conducted a Compliance Evaluation Inspection at the Site and determined that there may have been potential releases of hazardous waste into the environment from the abandoned rail spur area (SWMU 1), the chip storage area (SMWU 2), and the area adjacent to the pressure test area (SWMU 3). The DTSC determined that further investigation was required to determine the nature, constituents, and extent of the release. Therefore, a Corrective Action Consent Agreement (CACA) was prepared for the Site on October of 2001 and was subsequently revised on March 6, 2002.

As required by the CACA, Advanced Environmental Services, Inc. (AESI), prepared the *Preliminary Endangerment Assessment and Facility Workplan* (PEA – March 28, 2002). The PEA proposed a soil sampling plan for the three SWMUs identified above. The DTSC subsequently provided written comments upon review of the PEA. Due to the amount of comments and the extensive scope of work required by the DTSC, Clow contracted Environmental Services Technologies (EST) to revise the PEA. After multiple meetings with the DTSC, EST prepared the revised PEA dated June 21, 2004 which identified the following nine (9) areas of concern (AOC) at the Site (see Figure 2):

- AOC-1 – Rail Spur Area (including area of diesel impact)
- AOC-2 – Chip-Bin Storage Area
- AOC-3 – Water Pressure Test Area
- AOC-4 – Former Iron Foundry Sand Cleanup Area
- AOC-5 – Oil-Stained Pad (eastern portion of AOC1)
- AOC-6 – Former Asphalt Dip Tank
- AOC-7 – Transformer Area 1
- AOC-8 – Transformer Area 2
- AOC-9 – Former Test-Pond (filled)

Upon review of the revised PEA, the DTSC determined that interim measures were necessary due to the presence of a stockpile of dry, unconsolidated foundry sand waste located in the Rail Spur Area (AOC-1). The removal of the stockpile in AOC-1 was identified in the revised PEA because characterization results indicated elevated levels of copper, lead and zinc, but also to provide access to the area for sampling and further evaluation of potential soil impact to the native soil below. Therefore, EST prepared a document titled *Interim Measures Work Plan* (IWMP) dated

January 13, 2005 to address the removal of the foundry sand stockpile as required by the DTSC. The IMWP evaluated the various interim measures that could potentially be used to mitigate the impact of potential contaminant dispersion arising from the stockpile foundry sand on-Site. Excavation and subsequent off-site transport was selected as the most feasible interim remedial measure.

The stockpiled material was removed from the Site on June 13, 20, and 21, 2005 and approximately 393 cubic yards was transported to the Chemical Waste Management Class I disposal facility located at 35251 Old Skyline Road in Kettleman City, California.

A soil and soil gas sampling investigation was subsequently conducted in June and July of 2005 and the results were provided in a document titled *Preliminary Summary of Site Assessment Results and Proposed Further Assessment* (November 29, 2005). DTSC provided comments on the report and, as a result, EST prepared an *Addendum Report – Summary of Site Assessment Results Clow Valve* dated July 28, 2006. Clow replaced EST with Fero Environmental Engineering, Inc. (Fero) as the consultant for the Site and during a meeting with the DTSC on July 11, 2006, Fero determined that the sampling indicated in the EST summary report was generally acceptable. Fero subsequently prepared the *Further Investigation Workplan* (Workplan – July 27, 2006) in order to further define the vertical and lateral extent of subsurface impacts as needed based on the previous EST reports as well as incorporation of DTSC comments. Therefore, in September 2006, Fero conducted soil sampling activities at AOC-1, AOC-2, AOC-3, AOC-5, and AOC-7. To address further DTSC comments, Site wide near surface soil sampling was also conducted, including an unpaved storage area not previously sampled, to address the concern related to the potential occurrence of metal impacted fill material that may have been used on-Site. In addition, one groundwater well was installed at AOC-1 to facilitate groundwater sampling. Results from this investigation were provided in a document titled *Report of Findings* (Fero, December 18, 2006) and provided to Clow in preparation for sale of the property to a potential buyer.

Clow attended a meeting with the DTSC in February of 2007 to discuss future Site remediation activities. In a follow up letter, Fero discussed how remediation efforts were not anticipated prior to February of 2008 (Fero, February 8, 2007). In addition, the letter also discussed groundwater sampling results from their 2006 investigation, which showed a low level of TCE (1.43 ug/L, which is below the Maximum Contaminant Level of 5 ug/L) in groundwater beneath the Site. Given the absence of any chlorinated solvent use at the Site, the letter postulated that the TCE detection may be the result of an off-site source. Subsequently, groundwater monitoring was conducted on a quarterly basis from the fourth quarter of 2006 (reported in October 2006) to the second quarter of 2008 (reported August 2008). TCE has not been detected since April of 2007.

In 2009, Fero prepared a *Corrective Measures Workplan* (CMW) addressing the results from the previous investigations at the Site, the selected remediation, and a proposed schedule for implementation of the CMW. The CMW identified that the most cost effective remediation would be to remove impacted soils exceeding the industrial Regional Screening Levels (RSLs – formerly

PRGs) and restrict the deed for the Site limiting it to commercial and/or industrial use only. Originally, the Site was to be remediated as part of a redevelopment project after the existing operations had been moved to an alternate location being developed by the City of Corona. However, economic conditions delayed the development of the alternate location which stalled the move indefinitely. Therefore, Clow requested that DTSC would allow them to delay the remediation until it could be implemented as a part of the comprehensive demolition and redevelopment project citing such reasons as it being "more cost effective, logistically much simpler, be reflective of the anticipated use, and will not disrupt ongoing manufacturing operations".

In 2010, Clow submitted a letter in response to the DTSC's inquiry regarding the discovery of an area of foundry sand fill in AOC-4. This area was identified during a sewer line replacement project in a paved area just north of the Anaco building. The stockpiled material was sampled and was characterized as hazardous for lead and approximately 60.5 tons was transported to Beatty, Nevada for disposal. This letter also addressed the status of the Site remediation and redevelopment. McWane explained that the project was "on indefinite hold pending recovery of the local Corona economy" as stated in the CMW.

In October 2015, Clow and DTSC reached a mutual decision to restart the stalled process due to the economic uncertainty associated with Site redevelopment. Clow subsequently contracted with EarthCon to assist with restarting the process and revising the Site Corrective Measures Study in the absence of site redevelopment. EarthCon and Clow met with the DTSC on March 15, 2016 to provide an overall project update and identify a path to move forward as requested. EarthCon evaluated the previous environmental activities, site assessment investigations, and the associated analytical results. The analytical results from the previous investigations are illustrated on Figures 1 through 3K. The results from the previous investigations were evaluated and subsequently included in a Site-specific Human Health Risk Assessment (see Section 4.0).

In February 2017, two additional groundwater monitoring wells were installed on-Site as identified by the locations illustrated on Figure 2. Installation of these wells allowed for calculation of the Site-specific groundwater flow direction and gradient to confirm that the existing well (MW-1) is appropriately positioned to evaluate potential groundwater impacts related to the former TPH-d release at AOC-1. Groundwater monitoring events were conducted in March 2017 and subsequently in May 2017. Groundwater samples reported concentrations of various compounds below their associated MCLs with the exception of arsenic (March 2017 event only). However, the arsenic concentrations reported in MW-1 through MW-3 are within the local background arsenic concentrations. Therefore, it was determined that groundwater would not be incorporated into the overall scope of this CMS.

The DTSC requested further vertical delineation of soil impacts at locations where previous investigations had encountered difficult drilling conditions and refusal of the drill string and associated sampling equipment. Therefore, soil borings were advanced at the former sample locations SW6 and CV-BG2 and analyzed for metals and two borings were also advance in AOC-1

and soil samples were analyzed for lead. The metal concentrations in the soil samples were not reported above their associated criteria.

The historical data, Human Health Risk Assessment, and current Site operations were used to prepare a CMS for the Site (EarthCon, 2018). The CMS identified that excavation (AOC-7) and capping in place (AOC-1, AOC-5, and AOC-7) as the selected remedy. However, due to the presence of PCBs at AOC-7, additional Site assessment activities were conducted in July 2018, October 2018, and January 2019 under the oversight of the USEPA. The USEPA also required that further assessment of potential PCB impacted soil would be evaluated at AOC-3 and AOC-6 as well. The results were summarized in a document titled Risk-Based Approval Application 40 CFR 761.61 (c)(1) (EarthCon, 2019). Based on the results from the PCB related Site assessment activities, EarthCon recommended that rather than excavating PCB-impacted soil at AOC-7 that the Site remained capped, with the existing concrete cap having the ability to protect industrial workers from exposure to PCB concentration in the underlying soil. In a letter dated April 23, 2019, the USEPA approved the application with the conditions including preparation of the following: Deed Restriction, Operations and Maintenance Plan, and Soil Management Plan PCB Cleanup Report.

Upon receipt of the approval letter from the USEPA, the DTSC approved the CMS in a letter dated May 16, 2019. Therefore, the following CMIWP is associated with the cap design, installation and implementation schedule for AOC-1 and AOC-5. The proposed schedule for the evaluation and repair of the exiting ground cover in AOC-2, AOC-4, and AOC-9 is also addressed. Additionally, potential cap repair and/or construction, if necessary, associated with AOC-3, AOC-6, and AOC-7 will be under the oversight of the USEPA.

4.0 SELECTED REMEDY

As noted previously, excavation of AOC-7 is no longer required. Therefore, an engineering control (capping system) along with institutional controls (See Section 4.3) are the selected remedy for the Site. AOC-1 and AOC-5 are currently unpaved and will require grading and subsequent placement of paving materials. The following sections discuss the proposed scope of work for the selected remedy.

4.1 Capping-in-Place

4.1.1 Pre-Field Activities

Prior to the commencement of field activities at AOC-1 and AOC-5, EarthCon will ensure that all proper underground utility clearances are conducted. The locations proposed for subsurface work will be identified using white paint, and the Underground Services Alert (USA) will be subsequently notified at least 72-hours prior to initiation of field activities. EarthCon will also notify the DTSC a minimum of 72 hours before field work begins. EarthCon will coordinate with the property owner to determine location of subsurface utilities and a geophysical survey will be conducted, if necessary. Fieldwork will also be conducted in accordance with the Site Health and Safety Plan (See Appendix A). In addition, the scope of work and elements of the HASP will be discussed daily during the tail-gate safety meetings. Updated health and safety documentation (e.g. HAZWOPER) for on-Site personnel will be provided to the DTSC prior to implementing field work.

Grading Permit

Permits required for grading will be obtained by EarthCon prior to the initiation of excavation activities and subsequent capping activities. The Grading Plan will be prepared in accordance with the City of Corona requirements and will include, but not be limited to, the design specifications for the engineered cap, stormwater management, and air quality management as discussed further in the following sections.

Storm Water Management

The proposed work area is less than 1 acre, therefore, a Storm Water Pollution Prevention Plan associated with construction activities is not required. However, the placement of the cap in AOC-1/AOC-5 is greater than 5,000 square feet which subsequently identifies the remedy as a "Significant Redevelopment Project". This designation requires preparation of a Water Quality Management Plan (WQMP) per the City of Corona Public Works Department. EarthCon will prepare the WQMP in accordance with the City of Corona requirements prior to initiating field work, elements of which will be incorporated into the future Grading Plans for the Site activities.

Air Quality Management

The CMS does not involve VOC contaminated soil. Therefore, Site activities are not expected to utilize a Rule 1166 permit under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). However, based on the metal and PCB concentrations present in the soil, earth-moving activities (excavation, grading, etc.) are required to be conducted in accordance with SCAMD Rule 1466. Rule 1466 requires training and certification, monitoring, notification and record keeping as discussed further in Section 6.1.6.

4.2 Field Activities

4.2.1 Capping

As noted previously, areas of exposed/pervious surfaces in AOC-1 (Figure 3A) and AOC-5 (Figure 3E) will be capped to prevent or minimize human exposure to the lead contaminated soil, infiltration of water, and erosion. As described in the table below, AOC-1 is unpaved. In comparison, AOC-5 is primarily unpaved with partial/discontinuous covering of pavement. Prior to capping debris will be removed, categorized, tested, and disposed; moisture will be applied to the soil for dust control; and the soil surface will be compacted to the specifications required to support the final designated surface seal. The surface seal will consist of a uniform placement of asphalt, or similar material placed over the area. These activities will not involve excavation of lead contaminated soil and transportation to other areas of the project. If grading activities necessitate soil excavation, excavated soil will be tested for lead and transported under a manifest to an appropriate offsite treatment and disposal facility. Placement of the cap will render the direct contact pathway incomplete.

The AOCs are currently covered to varying degrees. The status of each AOC and requirements to provide adequate capping are detailed below:

Location	Status	Further Requirements
AOC-1	Unpaved.	Grading/ Engineered Cap
AOC-2	Covered with asphalt, minor localized cracking	Evaluate cracks, slurry seal or repair as needed
AOC-3	Covered with asphalt, minor localized cracking and degradation	Evaluate cracks and degradation, slurry seal or

Location	Status	Further Requirements
		repair as needed
AOC-4	Covered with asphalt, minor localized cracking	Evaluate cracks, slurry seal or repair as needed
AOC-5	Partially covered with discontinuous and locally broken concrete	Engineered Cap - Adjacent to AOC-1, incorporate into continuous cap over both areas.
AOC-6	Interior space, covered with concrete	No further action
AOC-7	Covered with concrete.	No further action
AOC-8	Partially covered with concrete	No further action – concentrations below industrial RSLs; therefore, no significant impacts detected.
AOC-9	Covered with asphalt, minor localized cracking	Evaluate cracks, slurry seal or repair as needed
Site Wide	--	Institutional Controls: Soil Management Plan, Land Use Covenant, and Operations and Management Plan.

In May 2019, a geotechnical investigation was conducted at the Site at AOC-1 and AOC-5. The purpose of the investigation was to evaluate the existing geotechnical conditions as they relate to the design and construction of the proposed improvements on-Site. The recommendations will be incorporated into the grading plans in addition to the information required by the City of Corona. Capping activities will be conducted in accordance with the City of Corona, upon approval of the Grading Plans/Permit. A copy of the Geotechnical Investigation is provided in Appendix B.

Additionally, subsequent activities associated with the surface cover in the remaining areas of the Site will be addressed based on future development of the Site. Such activities will be conducted by the potential new owner in accordance with the Soil Management Plan (SMP) and Operations and Maintenance Plan (O&M Plan) (see Section 4.3).

4.2.2 Waste Material

Grading and/or earthmoving activities in support of capping installation will require the removal of vegetation, surface structures/debris, railroad lines, and areas of partial pavement. As noted previously, soil exhibiting elevated concentrations of lead within AOC1 and AOC5 will remain within the area of proposed capping depicted on Figure 3A and Figure 3E. The waste material will be segregated by vegetation, metal, and concrete/pavement debris stockpiles. The metal and vegetation will be transported off-Site for recycling or as green waste, as applicable. The concrete/pavement debris will be segregated in separate roll-off bins awaiting characterization. Disposal will be based on the analytical results for the characterization samples. Belshire Environmental Services will be utilized to facilitate waste disposal management. In addition, Belshire will notify EarthCon of the facility disposal requirements including the necessary laboratory analyses required for the appropriate characterization. If grading activities necessitate soil excavation, excavated soil will be tested for lead and transported under a manifest to an appropriate offsite treatment and disposal facility. Excavated soil or material will be placed on plastic sheeting and covered with tarp. Laboratory reports and facility disposal information associated with waste characterization will also be provided to the DTSC prior to transportation off-Site.

4.2.3 Backfill

Depending on potential voids resulting from removal of waste material on-Site, backfill in the vicinity of AOC-1 and AOC-5 may be required to meet design grades and allow proper drainage. . Should import backfill be required, the backfill material will include clean import fill from an off-Site source and approval of material following the guidance of the document entitled *Information Advisory Clean Imported Fill Material* (DTSC, 2001). The sample analyses for the import soil will be selected once a supplemental fill source has been identified. The advisory provides analytical suites that are tailored to the previous use(s) of the property that will be the source of the import fill. The potential void areas will be backfilled and compacted prior to capping with asphalt or concrete. Laboratory reports associated with the characterization of the backfill source will be provided to the DTSC prior to implementation on-Site.

4.2.4 Ambient Air Monitoring & Dust Control

Ambient air monitoring (AAM) will be conducted during on-Site activities to quantify dust concentrations in the work area breathing zone and at the Site fence line.

In accordance with SCAQMD Rule 1466, AAM will be conducted to determine if a two (2) hour average PM_{10} concentration exceeds 25 micrograms per cubic meter (ug/m^3). If the average

concentration has been exceeded, earth-moving activities will cease and dust suppression measures will be implemented as needed until the PM_{10} concentration is equal to or less than 25 ug/m^3 averaged over 30 minutes. At a minimum, PM_{10} AAM will include one (1) upwind monitor and one (1) downwind monitor which will record the collected direct-reading data every 10 minutes or less using a DustTrak, or equivalent. In addition, when earth-moving activities occur, the wind direction and speed will also be monitored using a weather station.

AAM data will be collected by a qualified designee at each monitoring location (which will include on-Site and fence line locations). Measurements will be recorded via electronic data logging and/or an air monitoring log. Windspeed and direction will be monitored and, if the wind speed is greater than 15 mph average over a 15-minute period or instantaneous wind speeds greater than 25 mph, earth moving activities will cease.

AAM monitoring for dust within the on-Site work zones will be conducted on a continuous basis using a direct reading instrument such as a Miniram, or equivalent. The detected values will be compared to the DTSC required criteria for total dust of 0.05 mg/m^3, as presented in the HASP (Appendix A).

During earth moving activities, Site workers will implement standard engineering controls available in the industry to manage dust emissions. Minimizing dust will also minimize potential hazards associated with airborne contaminants. The following table summarizes the control measures for the different activities:

Activity	Control Measure
Earth Moving Activities/Grading	- Apply water to prevent generation of visible dust plumes - Adequately wet to the depth of earth moving activity and allow time for penetration - Setup fencing with windscreen (50+/-5% porosity) - Stabilize soil once earth-moving activities are completed. - If earth-moving activities will not occur for three (3) or more consecutive days, application of a chemical stabilizer to potential sources of fugitive dusts, diluted to the concentration required to maintain a stabilized surface for the period of inactivity, is required.
Off-Site Perimeter	- Track-out will not extend beyond 25 feet of property line. Remove track-out each day using a vacuum equipped with a filter(s) rated by the manufacturer to achieve 99.97% capture efficiency for 0.3 micron particles. - Use shaker plates (minimum of 24 feet long and 10 feet wide) and

Activity	Control Measure
	stabilized construction entrance - Sweep the immediate surroundings continuously or on an as-needed basis - Clean soil from exterior of trucks prior to leaving site, if applicable. - Apply water as required

4.2.5 Noise

CMIWP implementation activities will be conducted from Monday through Friday between the hours of 7:00 AM and 5:00 PM, without causing a nuisance, as defined in the City of Corona municipal code. Noise will be monitored on an as-needed basis with a calibrated noise level meter at the perimeter of the Site and recorded on field logs.

Whenever possible, Site workers will conduct the more noise intense activities during less intrusive times such as mid-morning to mid-afternoon. Internal combustion equipment will be equipped with proper and well-maintained mufflers. Access doors and hatches will remain closed when the units are in operation. The Site is located in an industrial area; therefore, noise is not expected to be a concern.

4.2.6 Odor Control

VOCs are not expected to be a concern at the Site. However, if excessive airborne VOCs or objectionable odors are detected at the Site fence line, vapor suppression/odor control may be warranted. The criteria presented in the HASP will determine the level and duration of vapor/odor control response. Vapor suppression/odor control will be accomplished by water spray, limiting the area of the working face, use of commercial odor suppressants (non toxic[3]), use of foam-based vapor suppressants, or a combination of these methods. Stockpiled, materials will be covered with plastic sheeting until they are tested and prepared for offsite disposal.

Water spray will be used for dust suppression at the Site and will also provide significant VOC and odor control. In the event that VOCs are detected at the property boundary by the air monitoring activities, or objectionable odors are encountered, water sprays will be initiated or increased. Water sprays will be used to keep the soil damp but not saturated as saturation would potentially lead to excessive track-out, runoff, or water management issues.

3 It is anticipated that water suppression will be sufficient for proposed Site activities. In the event a commercial odor suppressant is warranted, the material specifications for the proposed suppressant will be provided to the DTSC.

4.2.7 Traffic/Haul Route

As discussed above, waste material resulting from grading activities will be segregated, managed, and transported off-Site to the appropriate disposal facility, as applicable. Trucks will be staged on the Site and out of traffic lanes to the extent possible. Once on the Site, each truck will be loaded by a front end loader. Water will be sprayed on the material to limit dust emissions during the loading process. Once loaded, the trucks will proceed to the decontamination area where loads will be covered with a tarp, and material will be removed from the tires and flat surfaces of the trailer as necessary prior to leaving the Site. A stabilized entrance/exit will be used to clean the truck tires. The area outside the access gate will be swept as necessary to remove any residual material.

4.3 Institutional Controls

4.3.1 Soil Management Plan

To guide future on-Site activities that have the potential to disturb the soil, a Soil Management Plan (SMP) will be prepared as part of the selected remedy as the institutional controls. The purpose of a SMP is to provide guidance for management of soils in the event excavation or soil disturbance is required during future on-Site activities such as building construction, utility installation, etc. A SMP will be prepared in order to facilitate effective future project implementation and to ensure compliance with applicable laws. The SMP will include procedures for health and safety; engineering controls; stockpile management; characterization of soil brought up to the surface, if generated; and disposal of excess soil, if necessary. It should be noted that Clow has had a detailed soil management plan since 2010 and that this plan will serve as the basis for the new SMP. The new SMP will be provided as a separate document. In addition, a SMP is also identified as a condition of approval by the USEPA for the associated PCB impacted soil (Appendix C).

4.3.2 Land Use/Deed Restriction

As part of the selected remedy for the Site, a Land Use Covenant (LUC) will be recorded to restrict the future use of the entire Site to commercial/industrial uses appropriate for the human health risk hazard and prohibits the Site development for residential and sensitive receptor uses for the entire Site. In addition, for AOC-3, AOC-6, and AOC-7, specific requirements of 40 CFR 761.61(a)(8) must also be met, including:

- Record deed restriction within 60 days of completion of cleanup activity
- Indicate that land has been used for PCB remediation waste disposal and is restricted to use as a low occupancy area as defined in 40 CFR 761.3

- Identify the existence of the cap and the requirement to maintain the cap
- Denote the applicable cleanup levels used at the site, under the cap
- Submit a certification, signed by the owner, that he/she has recorded the notation specified in 40 CFR 761.61 (a)(8)(i)(A) to the EPA Regional Administrator
- If, in the future, additional cleanup activities are conducted to remove PCBs to achieve cleanup levels specified in 40 CFR 761.61(a)(4), which do not require a cap, the owner may remove the notice on the deed no earlier than 30 days after achieving the applicable cleanup levels.
- The LUC will identify the SMP required for soil disturbing activities at the Site and will also identify the Operations and Maintenance Plan (See Section 4.3.3) required for surface cover/engineering control.
- A land survey will be prepared by a California licensed Professional Land Surveyor and will provide a basis for the LUC. This survey will depict the Site, area subject to 40 CFR 761.3 (PCB impacted soil), and the area subject to soil cover O&M (lead impacted soil) (See Figure 4).
- In addition, elements of the deed restriction are identified in the USEPA conditional approval letter (Appendix C).

4.3.3 Operations and Maintenance Plan

In support of the LUC, an Operations and Maintenance Plan (O&M Plan) will be prepared for the Site as a separate document. The O&M Plan will include, but is not limited to, the following elements:

- Ensure clarity of the ongoing requirements for the remedial surface cover.
- Annual inspections of the surface cover will continue in perpetuity until the contaminated material is removed or demonstrated to no longer represent a risk to human health or the environment.
- Additional inspections will be identified in the case of unexpected events (i.e. earthquake or onsite fire) and indicate a time period for notification of DTSC of such an event. In the case of an earthquake, identify a magnitude and proximity to the site which would trigger an unexpected event inspection.
- Written reporting of inspections will be submitted to DTSC for review and a schedule for

submittal will be identified.

- Each inspection report and Five Year Review will include a statement that the remedial cover is functioning as designed.

- Any crack visible at the surface would be a "penetrating crack". Clarification of the definition a surface crack that requires repair will ensure clarity for all parties and eliminate future confusion. Further, the repair method for cracks will be identified.

- Statements sill be included that in the event that evidence of water ponding on the surface is identified, repairs will be made.

- The DTSC will be notified prior to each inspection.

- In addition, an O&M Plan is also identified as a condition of approval by the USEPA for the associated PCB impacted soil (Appendix C).

5.0 CAP DESIGN AND INSTALLATION

As noted previously, areas of exposed/pervious surfaces in AOC-1 and AOC-5 will be capped to prevent or minimize human exposure, infiltration of water, and erosion. The capping method will involve grading and compacting the soil surface to the specifications required to support the final designated surface seal and/or future construction. The surface seal will consist of a uniform placement of concrete, asphalt, or similar material over the area. Placement of the cap will render the direct contact pathway incomplete.

In May 2019, a geotechnical investigation was conducted at AOC-1 and AOC-5. The purpose of the investigation was to evaluate the existing geotechnical conditions as they relate to the design and construction of the proposed improvements on-Site. The recommendations will be incorporated into the grading plans in addition to the information required by the City of Corona. Capping activities will be conducted in accordance with the City of Corona requirements, upon approval of the Grading Plans/Permit.

CMIWP activities will be completed and future Site development, by the new owner, will be in accordance with the SMP and O&M Plan. In addition, any subsequent grading and/or construction will require permits and approval from the City of Corona, as applicable.

6.0 FUTURE CHANGES TO SITE

Future changes to the Site, such as redevelopment, will only be undertaken after notice is given to DTSC and all requirements of the LUC, O&M Plan and SMP are complied with.

7.0 REPORTING

The Corrective Measures Implementation (CMI) Report (Report) will be prepared and submitted to DTSC for review, approval, and concurrence that the remedial action is complete. In addition, the Report will be submitted to the USEPA in lieu of an individual PCB cleanup completion Report. The Report will include a summary of field activities, the quantity of debris material removed, waste characterization data and transport documentation, as applicable. A California Professional Geologist and/or California Professional Engineer will sign the final Report. In addition, a land survey will be prepared by a California Professional Land Surveyor, which will be included in the Report and will provide a basis for the LUC. This survey will depict the Site, area subject to 40 CFR 761.3 (PCB impacted soil), and the area subject to soil cover O&M (lead impacted soil).

During field activities, the DTSC will be kept apprised of Site activities, progress with respect to schedules, and upcoming events. Any anomalous results will be reported as soon as possible.

8.0 SCHEDULE

The proposed schedule for implementation of the CMS is as follows:

TASK	ESTIMATED SCHEDULE
Submittal of CMIWP Submittal of SMP and O&M Plan	September 2019
Approval by DTSC	October 2019
Obtain Permits (Grading, etc)	Fall 2019
Implement Field Activities • Installation of Cap (AOC-1 & AOC-5) • Evaluation and repair of existing ground cover (AOC-2, AOC-4, and AOC-9)	Fall/Winter 2019
Completion of Field Activities	Approximately 30 days – December 2019
Submittal of Corrective Measures Implementation Report to DTSC	Approximately 2-3 weeks after receipt of analytical data. – January 2019
Approval of Corrective Measures Implementation Report by DTSC	Approximately 30 days after receipt of Corrective Measures Implementation Report – February 2019
Submittal of SMP to DTSC and USEPA	90 days after approval of Corrective Measures Implementation Report
Submittal of O&M Plan to DTSC and USEPA	90 days after approval of Corrective Measures Implementation Report
Submittal of LUC/Deed Restriction to DTSC and USEPA	60 days after approval of Corrective Measures Implementation Report

9.0 RECORD KEEPING

Project related documents including, but not limited to: reports, laboratory data, permits and associated documentation, PCB related records, waste manifests, etc. as applicable, will be maintained on-Site in the office of the Environmental Manager.

10.0 REFERENCES

Advanced Environmental Services, Inc. (AESI). 2002. *Clow Valve Company Preliminary Endangerment Assessment and Facility Workplan 1375 Magnolia Avenue, Corona, California 91719*. March 28, 2002.

Department of Toxic Substances Control (DTSC). 2002. Corrective Action Consent Agreement. Docket HWCA: SRPD 00/01 SCC-4208. March 6, 2002.

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EST. 2004. Preliminary Endangerment Assessment and Facility Investigation Workplan. Clow Valve Company, 1375 Magnolia Avenue, Corona, California. June 21, 2004.

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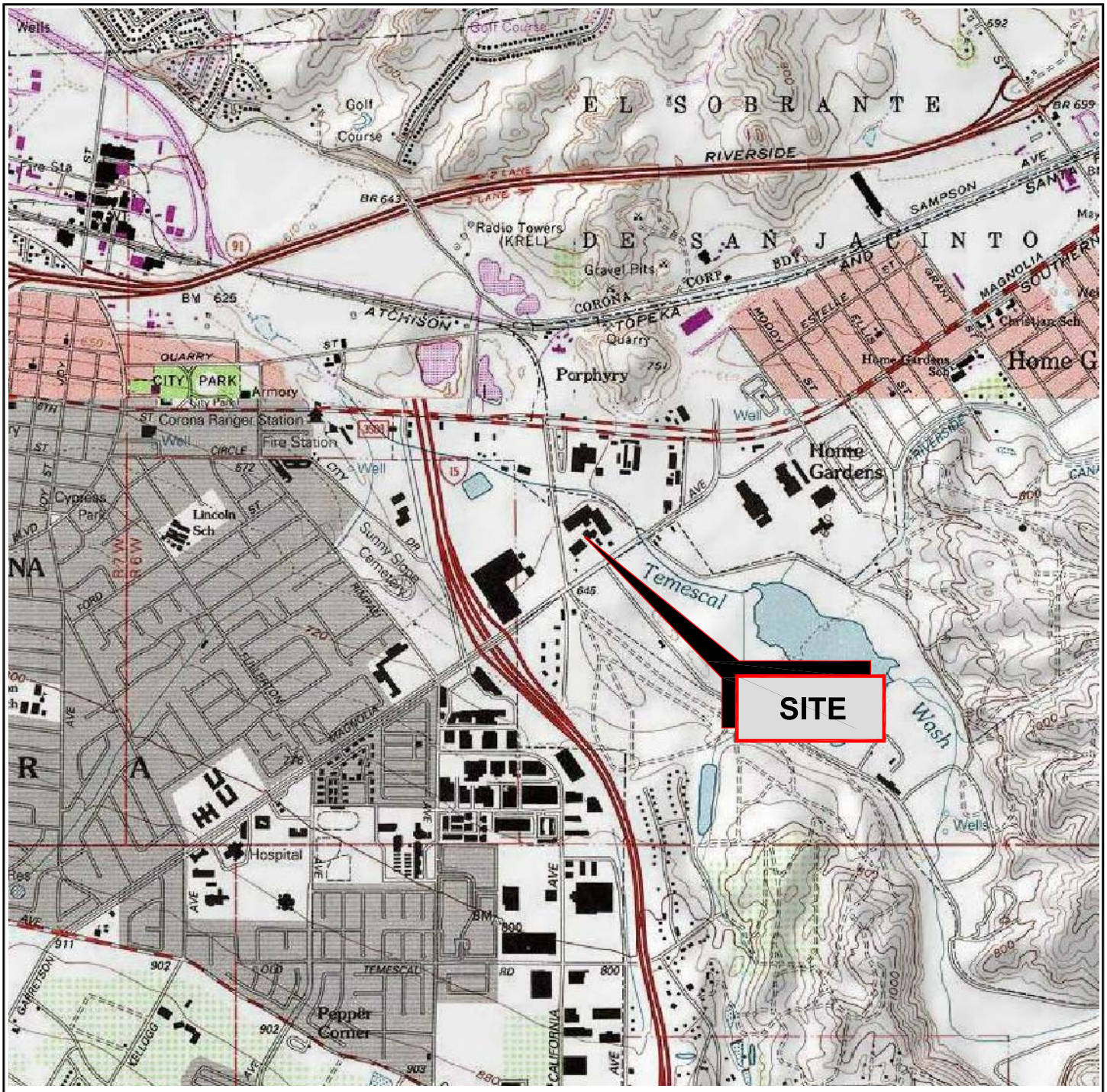
Fero. 2006. Report of Findings. Clow Valve Company, 1375 Magnolia Avenue, Corona, California 93446. December 18, 2006.

Fero. 2007. Letter Response from Meeting of February 2, 2007. Clow Valve Company. 1375 Magnolia Avenue, Corona, California 93446. EPA ID Number CAD063115133. February 8, 2007.

Fero. 2009. Corrective Measures Workplan. Report of Findings. Clow Valve Company, 1375 Magnolia Avenue, Corona, California 93446. EPA ID Number CAD063115133. March 2009.

FIGURES



FROM: U.S. GEOLOGICAL SURVEY, 1997
QUADRANGLE: CORONA SOUTH
COUNTY: RIVERSIDE
SERIES: 7.5-MINUTE QUAD

NOTE: ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N
W E
S

0 2000 Feet
SCALE

CLOW VALVE

1375 MAGNOLIA AVENUE
CORONA, CA 92879

PROJECT NO. 04.20150013.00

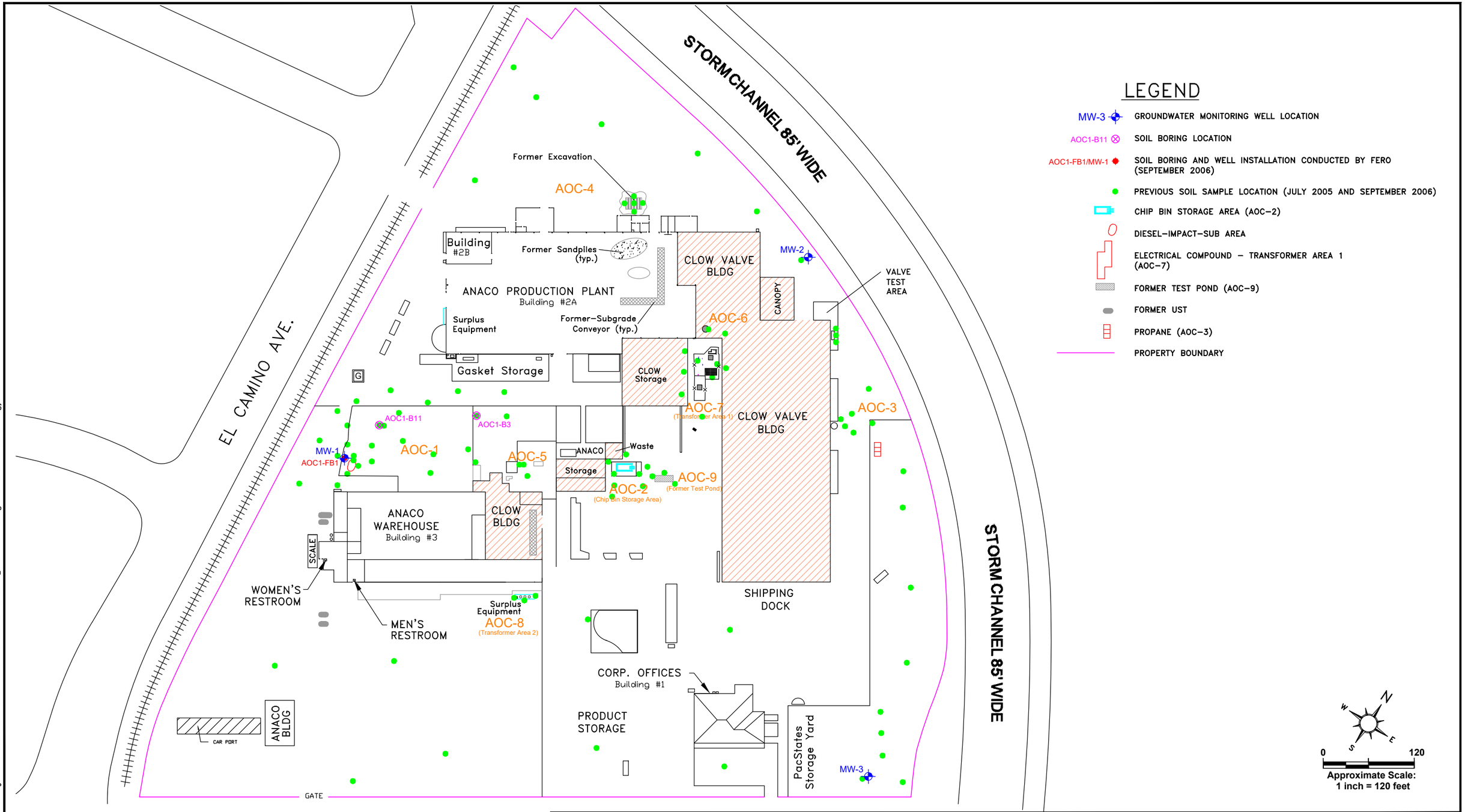
EARTHCON®

EARTHCON CONSULTANTS CA, INC
1914 W. ORANGEWOOD AVENUE, SUITE 102, ORANGE, CA 92868

VICINITY MAP

DRAWN:	CHECKED:	DATE:	FIGURE:
DCN	JB	12/30/15	1

FILENAME: S:\CAD\EARTHCON CAD\CLOW VALVE 1375 MAGNOLIA AVENUE, CORONA, CA_VICINITY MAP



LEGEND

- MW-3 — GROUNDWATER MONITORING WELL LOCATION
- AOC1-B11 — SOIL BORING LOCATION
- AOC1-FB1/MW-1 — SOIL BORING AND WELL INSTALLATION CONDUCTED BY FERO (SEPTEMBER 2006)
- PREVIOUS SOIL SAMPLE LOCATION (JULY 2005 AND SEPTEMBER 2006)
- CHIP BIN STORAGE AREA (AOC-2)
- DIESEL-IMPACT-SUB AREA
- ELECTRICAL COMPOUND – TRANSFORMER AREA 1 (AOC-7)
- FORMER TEST POND (AOC-9)
- FORMER UST
- PROPANE (AOC-3)
- PROPERTY BOUNDARY

N W E S

0 120

Approximate Scale: 1 inch = 120 feet

CLOW VALVE
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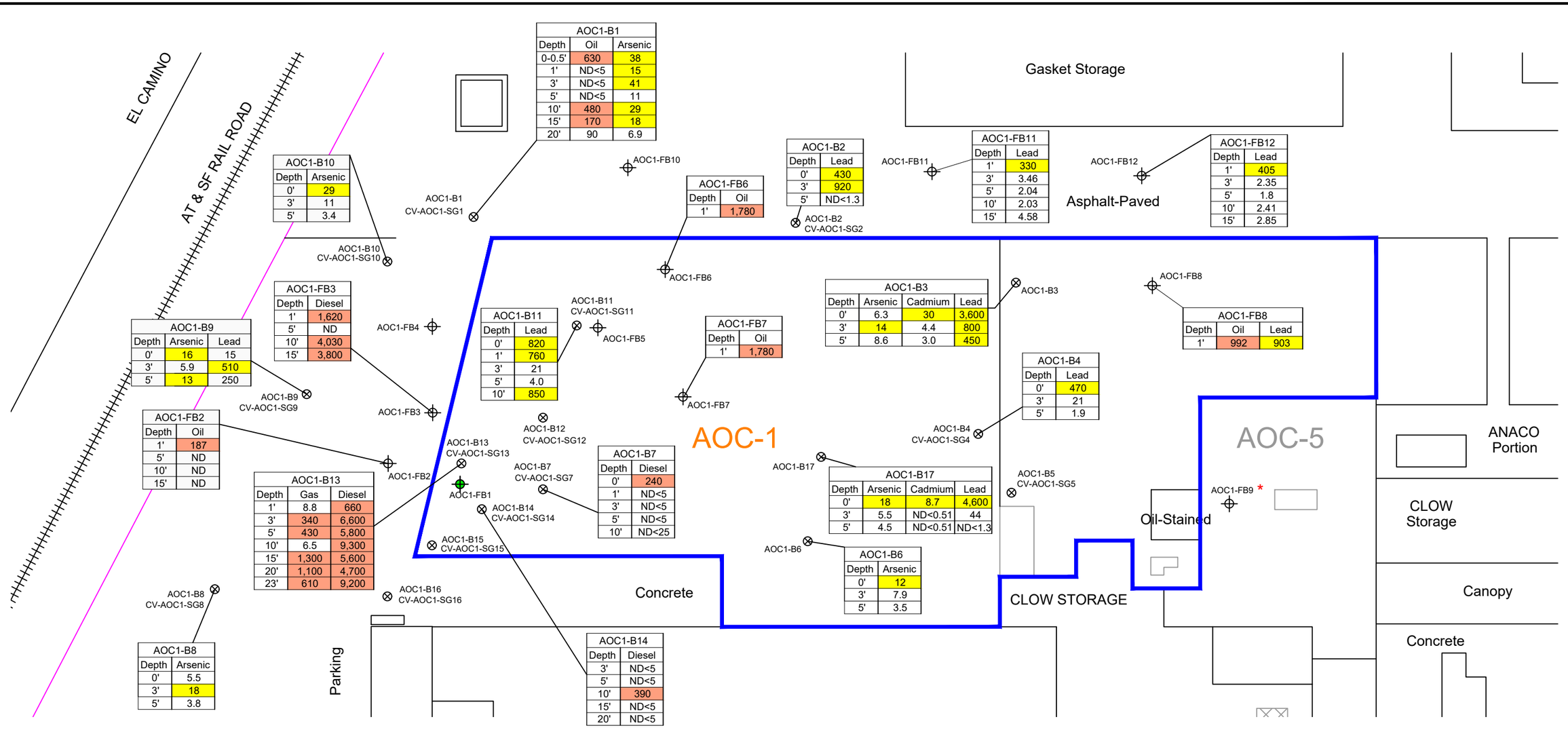
SITE PLAN

DRAWN:	CHECKED:	DATE:	FIGURE:
KG	JB	10/21/19	2

FILENAME: S:\Common\DrangeCADProjects\04.20150013.00-Clow Valve\CAD 2019\SP 10-21-19_Site Plan F2.dwg (F2) 10/21/19 15:40 - kgyawali



LEGEND

- AOC7-B3 ⊗ — PREVIOUS BORING CONDUCTED BY EST (JULY 2005)
- AOC1-FB7 ⊕ — SOIL BORING LOCATION BY FERO (SEPTEMBER 2006)
- AOC1-FB1 ⊕ — SOIL BORING AND WELL INSTALLATION CONDUCTED BY FERO (SEPTEMBER 2006)
- * — ORIGINALLY IDENTIFIED AS AOC1–FB9
- PROPOSED AREA OF CAPPING AT AOC–1 (UNPAVED)

ND = not detected
LUFT = Leaking Underground Fuel Tank (California Guidance 2012)
RSLs = USEPA Regional Soil Screening Levels. November 2015. HQ=1.0
(1) = General California Background Concentration (DTSC, January 2009)
(2) = DTSC HHRA Note 3 (August 2017)
(3) = OEHHA CHHSL (September 2009)
= meet/exceeds the LUFT criteria
= meet/exceeds the associated RSL

Notes: All sample results reported in milligrams per kilogram (mg/kg). Remaining sample location reported analytical results below their associated criteria and/or below the laboratory reporting limits.

	LUFT	RSLs
TPH-gas	100	--
TPH-diesel	100	--
TPH-oil	100	--
Arsenic	--	12 (1)
Cadmium	--	7.3 (2)
Lead	--	320 (3)

N W E S
0 30
Approximate Scale: 1 inch = 30 feet

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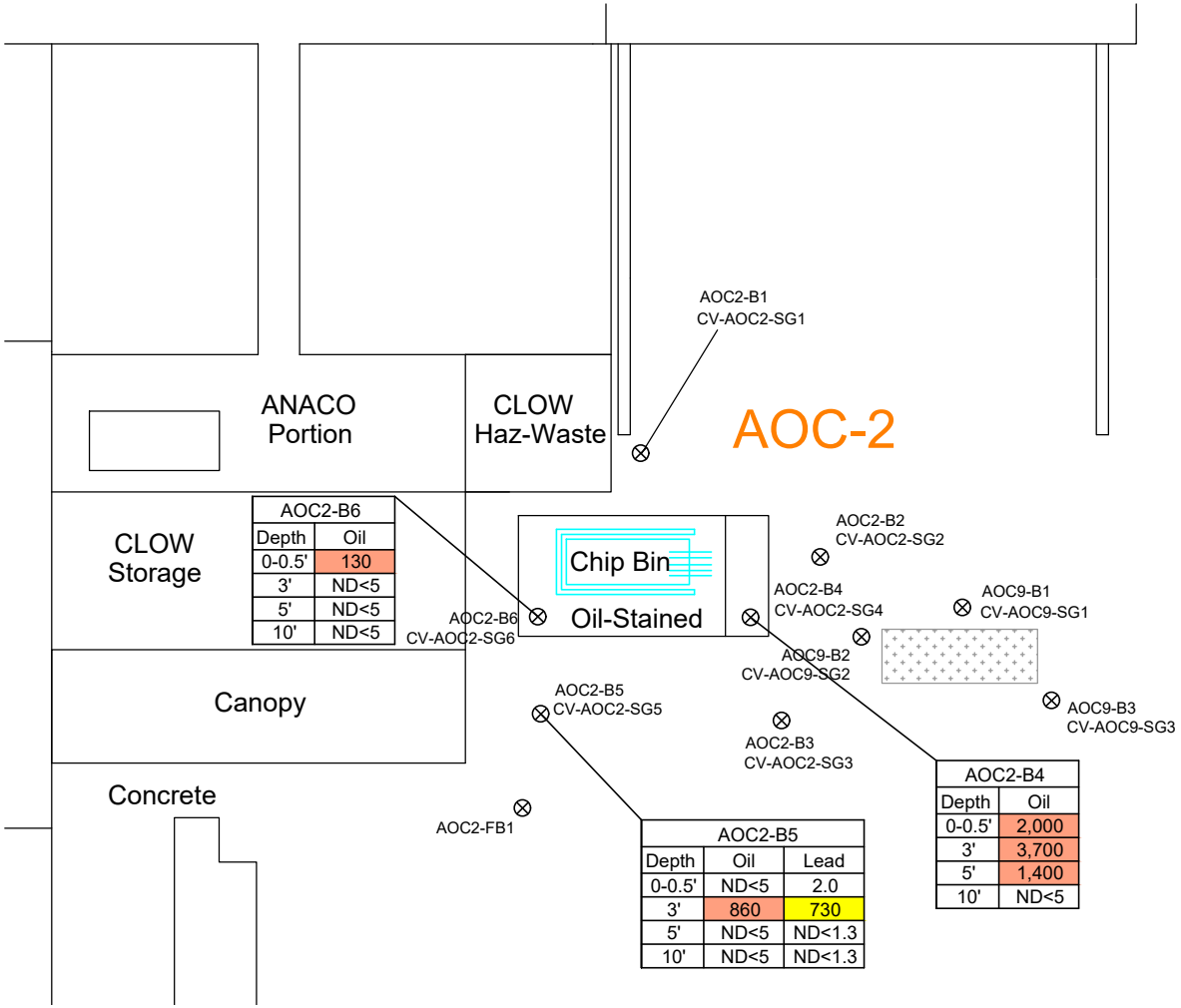
AOC1 - RAIL SPUR AREA

DRAWN:	CHECKED:	DATE:	FIGURE:
KG	JB	03/26/20	3A

FILENAME: S:\Common\DrangeCADProjects\04.20150013.00-Clow Valve\CAD2020\SP 03-26-20_F3A.dwg (3A(ADC)) 03/26/20 0906 - kgvawall



AOC2-B6	
Depth	Oil
0-0.5'	130
3'	ND<5
5'	ND<5
10'	ND<5

AOC2-B4	
Depth	Oil
0-0.5'	2,000
3'	3,700
5'	1,400
10'	ND<5

AOC2-B5		
Depth	Oil	Lead
0-0.5'	ND<5	2.0
3'	860	730
5'	ND<5	ND<1.3
10'	ND<5	ND<1.3

LEGEND

AOC7-B3 ⊗ PREVIOUS BORING CONDUCTED BY EST (JULY 2005)

Notes: All sample results reported in milligrams per kilogram (mg/kg). Remaining sample location reported analytical results below their associated criteria and/or below the laboratory reporting limits.

ND = not detected
LUFT = Leaking Underground Fuel Tank (California Guidance 2012)
RSLs = USEPA Regional Soil Screening Levels. June 2017. HQ=1.0
(2) = DTSC HHRA Note 3 (August 2017)
= meet/exceeds the LUFT criteria
= meet/exceeds the associated RSL

	LUFT	RSLs
TPH-oil	100	--
Lead	--	320 (2)

N W E S

0 30

Approximate Scale: 1 inch = 30 feet

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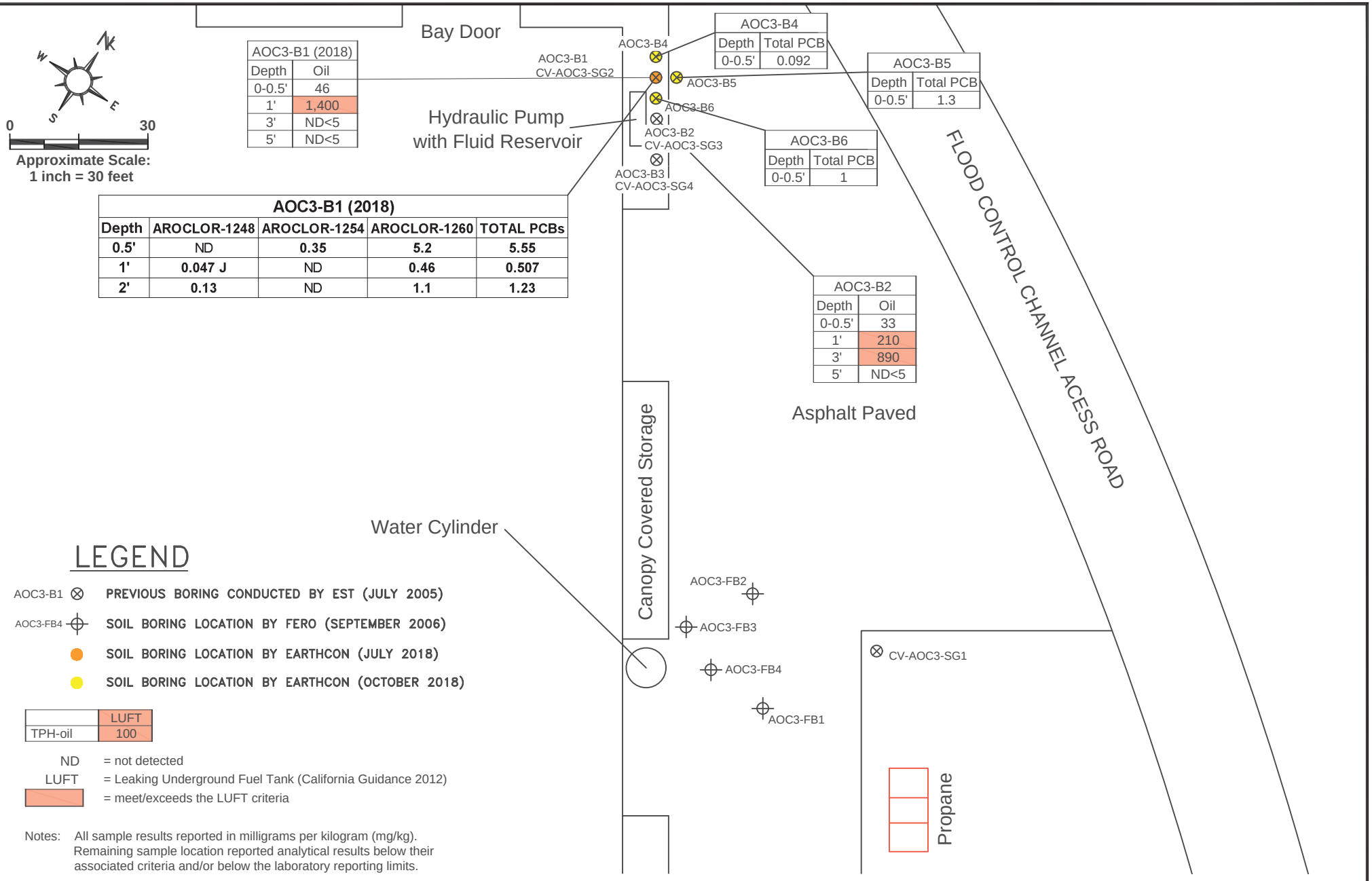
AOC 2 - CHIP BIN AREA

DRAWN:	CHECKED:	DATE:	FIGURE:
KG	JB	10/18/19	3B

FILENAME: S:\Common\OrangeCADProjects\04.20150013.00-Clow Valve\CAD 2019\SP 10-18-19_F3BDJ.dwg (3B (ADC 2)) 10/18/19 10:44 - kgyawali



AOC3-B1 (2018)

Depth	AROCLOR-1248	AROCLOR-1254	AROCLOR-1260	TOTAL PCBs
0.5'	ND	**0.35**	**5.2**	**5.55**
1'	**0.047 J**	ND	**0.46**	**0.507**
2'	**0.13**	ND	**1.1**	**1.23**

LEGEND

AOC3-B1 ⊗ PREVIOUS BORING CONDUCTED BY EST (JULY 2005)

AOC3-FB4 ⊕ SOIL BORING LOCATION BY FERO (SEPTEMBER 2006)

● SOIL BORING LOCATION BY EARTHCON (JULY 2018)

● SOIL BORING LOCATION BY EARTHCON (OCTOBER 2018)

	LUFT
TPH-oil	100

ND = not detected

LUFT = Leaking Underground Fuel Tank (California Guidance 2012)

= meet/exceeds the LUFT criteria

Notes: All sample results reported in milligrams per kilogram (mg/kg). Remaining sample location reported analytical results below their associated criteria and/or below the laboratory reporting limits.

CLOW VALVE

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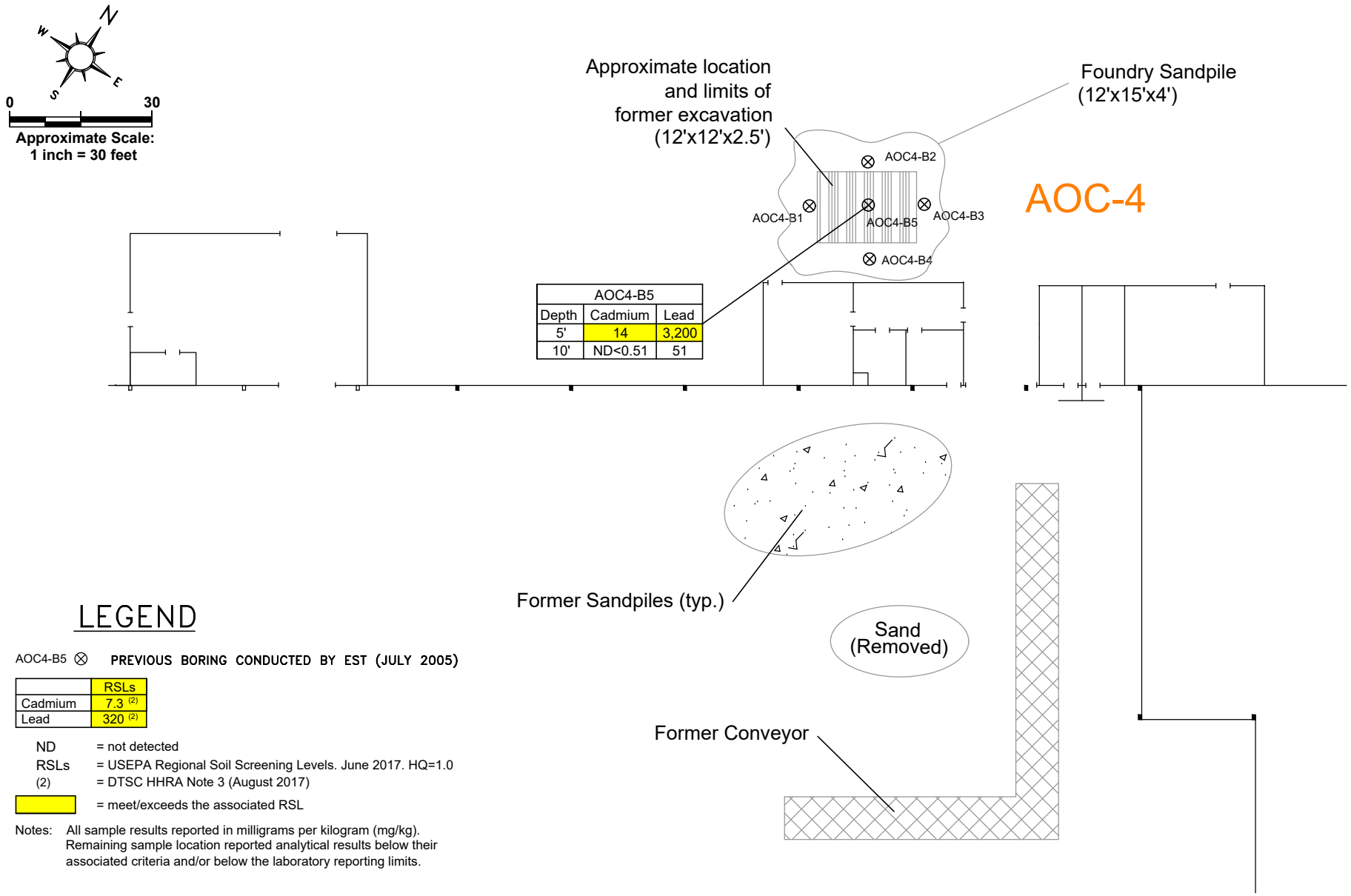
AOC 3 - WATER PRESSURE TEST AREA

DRAWN:	CHECKED:	DATE:	FIGURE:
KNB	JB	03/05/2019	3C

FILENAME:S:\Common\OrangeCADProJects\04.20150013.00-Clow Valve\SP 03-26-18_F3C_3E_3F AND 3H_3I__PCB SAMPLING_08-23-2018.dwg (3C (AOC 3)) 03/05/19 13:57 - kbarfield



LEGEND

AOC4-B5 ⊗ PREVIOUS BORING CONDUCTED BY EST (JULY 2005)

	RSLs
Cadmium	7.3 (2)
Lead	320 (2)

ND = not detected
RSLs = USEPA Regional Soil Screening Levels. June 2017. HQ=1.0
(2) = DTSC HHRA Note 3 (August 2017)
= meet/exceeds the associated RSL

Notes: All sample results reported in milligrams per kilogram (mg/kg). Remaining sample location reported analytical results below their associated criteria and/or below the laboratory reporting limits.

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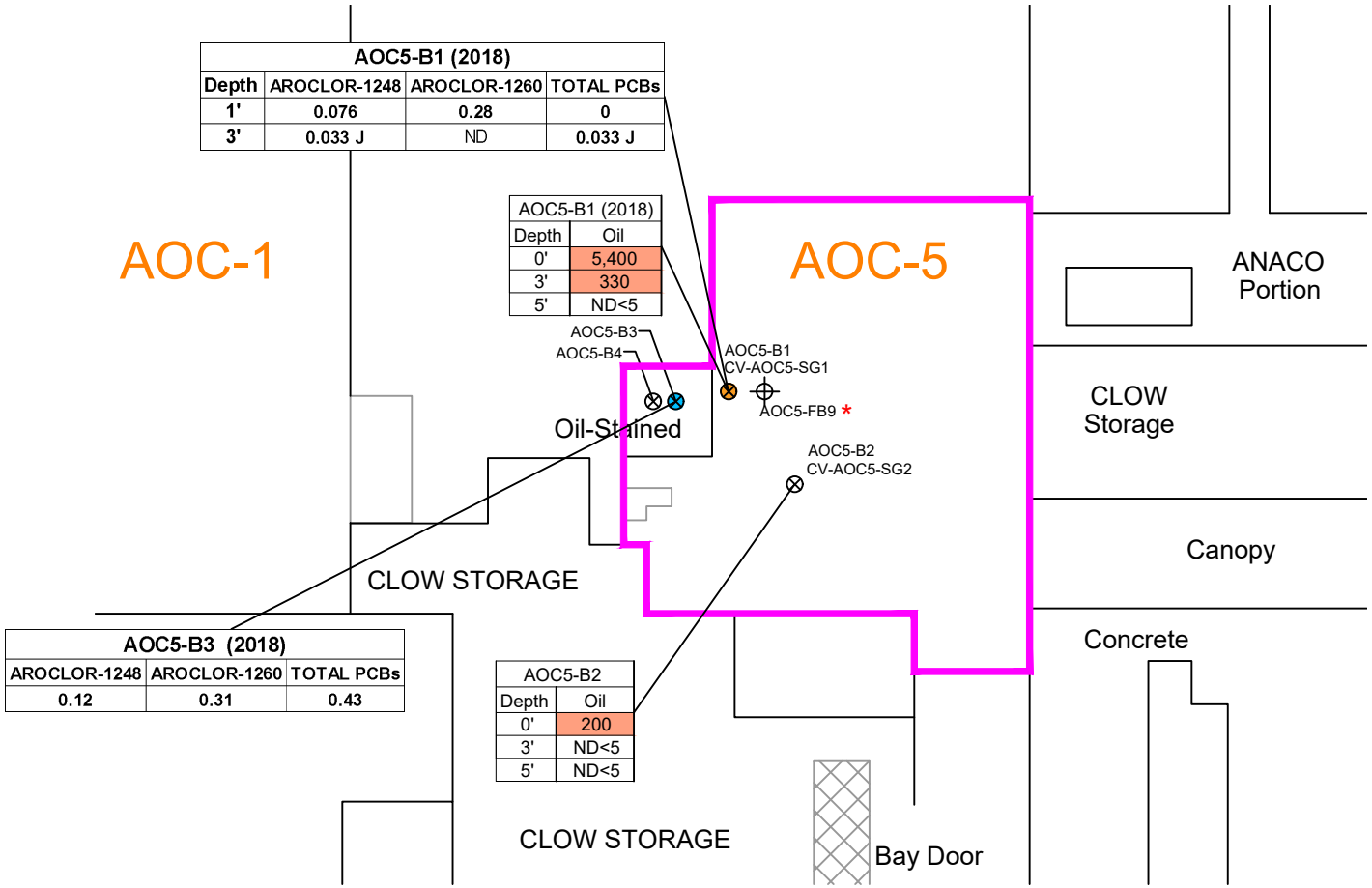
AOC 4 - FORMER IRON
FOUNDRY SAND CLEANUP AREA

DRAWN:	CHECKED:	DATE:	FIGURE:
KG	JB	10/18/19	3D

FILENAME: S:\Common\OrangeCADProjects\04.20150013.00-Clow Valve\CAD 2019\SP 10-18-19_F3BDJ.dwg (3D (AOC 4)) 10/18/19 10:44 - kgyawali



LEGEND

AOC5-FB9 ⊗ PREVIOUS BORING CONDUCTED BY EST (JULY 2005)

AOC5-B2 ⊕ SOIL BORING LOCATION BY FERO (SEPTEMBER 2006)

● SOIL BORING LOCATION BY EARTHCON (JULY 2018)

● CONCRETE SAMPLE LOCATION BY EARTHCON (JULY 2018)

* ORIGINALLY IDENTIFIED AS AOC1-FB9

ND = not detected

LUFT = Leaking Underground Fuel Tank (California Guidance 2012)

= meet/exceeds the LUFT criteria

= Proposed Area of Capping at AOC- 5 (Primarily Unpaved)

	LUFT
TPH-oil	100

Notes: All sample results reported in milligrams per kilogram (mg/kg). Remaining sample location reported analytical results below their associated criteria and/or below the laboratory reporting limits.

N W E S

0 30

Approximate Scale:
1 inch = 30 feet

CLOW VALVE

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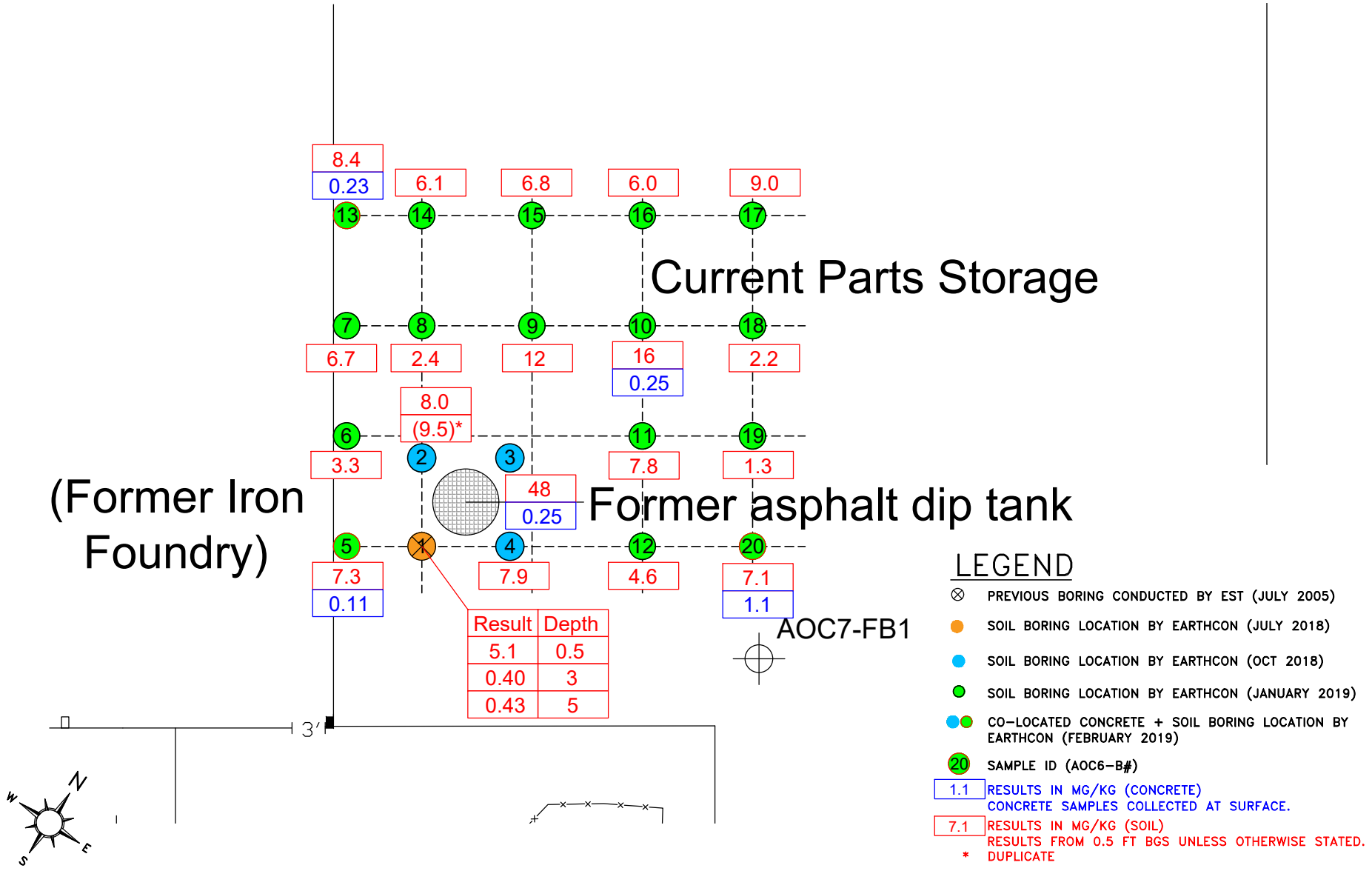
AOC 5 - OIL STAINED PAD AREA
PCB SAMPLE LOCATIONS

DRAWN:	CHECKED:	DATE:	FIGURE:
KG	JB	03/26/20	3E

FILENAME:S:\Common\DrongeCADProjects\04.20150013.00-Clow Valve\CAD2020\SP 03-26-20_F3EFHI.dwg (3E (AOC 5)) 03/26/20 09:19 - kgyawall



CLOW VALVE

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AOC 6 - FORMER ASPHALT DIP TANK AREA

DRAWN:	CHECKED:	DATE:	FIGURE:
KG	JB	10/18/19	3F

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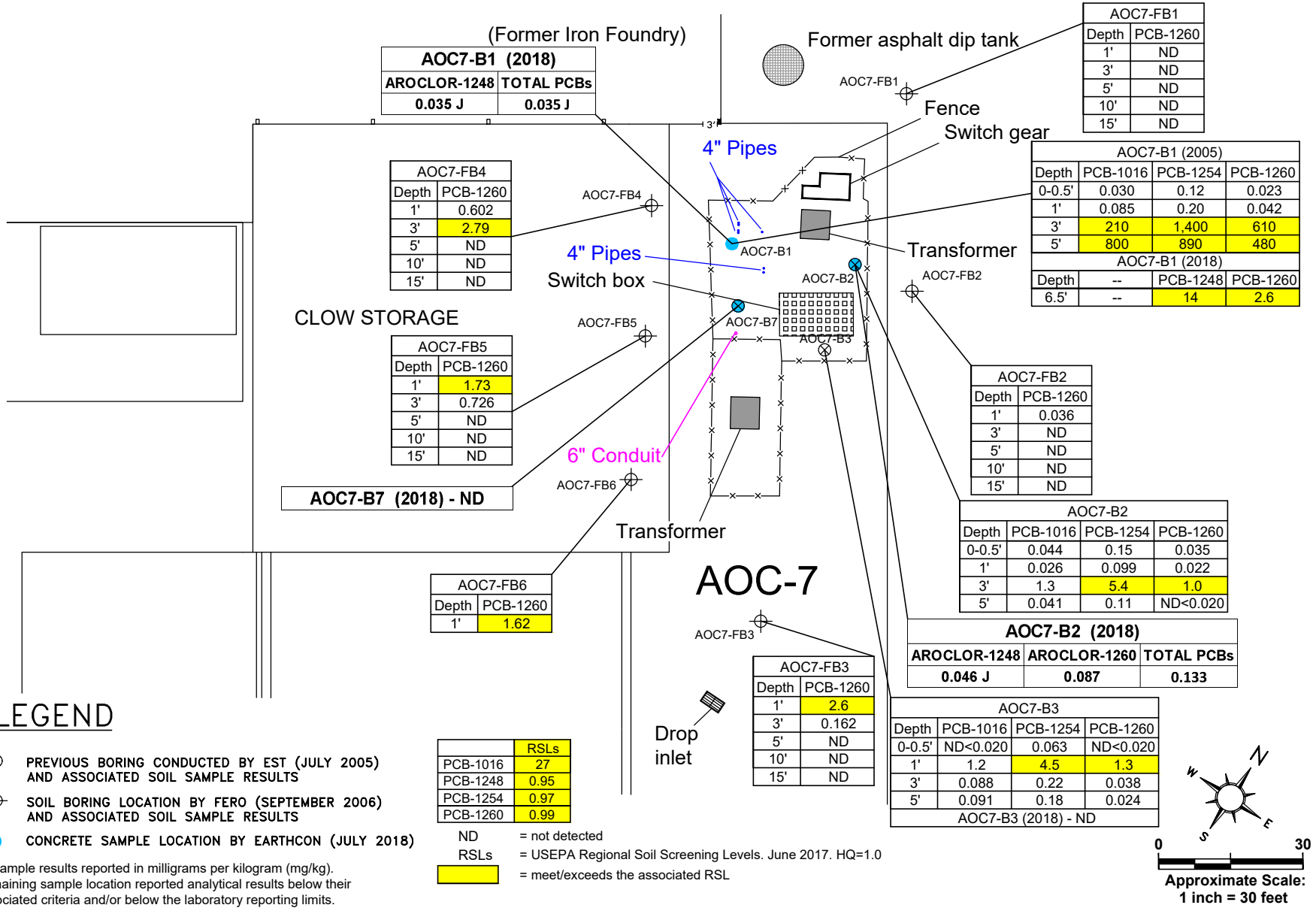

AOC7-B1 (2018)	
AROCLOR-1248	TOTAL PCBs
0.035 J	0.035 J

AOC7-FB1	
Depth	PCB-1260
1'	ND
3'	ND
5'	ND
10'	ND
15'	ND

AOC7-B1 (2005)			
Depth	PCB-1016	PCB-1254	PCB-1260
0-0.5'	0.030	0.12	0.023
1'	0.085	0.20	0.042
3'	210	1,400	610
5'	800	890	480
AOC7-B1 (2018)			
Depth	--	PCB-1248	PCB-1260
6.5'	--	14	2.6

AOC7-FB4	
Depth	PCB-1260
1'	0.602
3'	2.79
5'	ND
10'	ND
15'	ND

AOC7-FB5	
Depth	PCB-1260
1'	1.73
3'	0.726
5'	ND
10'	ND
15'	ND

AOC7-FB2	
Depth	PCB-1260
1'	0.036
3'	ND
5'	ND
10'	ND
15'	ND

AOC7-B2			
Depth	PCB-1016	PCB-1254	PCB-1260
0-0.5'	0.044	0.15	0.035
1'	0.026	0.099	0.022
3'	1.3	5.4	1.0
5'	0.041	0.11	ND<0.020

AOC7-B2 (2018)		
AROCLOR-1248	AROCLOR-1260	TOTAL PCBs
0.046 J	0.087	0.133

AOC7-FB6	
Depth	PCB-1260
1'	1.62

AOC7-FB3	
Depth	PCB-1260
1'	2.6
3'	0.162
5'	ND
10'	ND
15'	ND

AOC7-B3			
Depth	PCB-1016	PCB-1254	PCB-1260
0-0.5'	ND<0.020	0.063	ND<0.020
1'	1.2	4.5	1.3
3'	0.088	0.22	0.038
5'	0.091	0.18	0.024
AOC7-B3 (2018) - ND			

LEGEND

AOC7-B3 ⊗ PREVIOUS BORING CONDUCTED BY EST (JULY 2005) AND ASSOCIATED SOIL SAMPLE RESULTS

AOC7-FB6 ⊕ SOIL BORING LOCATION BY FERO (SEPTEMBER 2006) AND ASSOCIATED SOIL SAMPLE RESULTS

● CONCRETE SAMPLE LOCATION BY EARTHCON (JULY 2018)

	RSLs
PCB-1016	27
PCB-1248	0.95
PCB-1254	0.97
PCB-1260	0.99

ND = not detected

RSLs = USEPA Regional Soil Screening Levels. June 2017. HQ=1.0

= meet/exceeds the associated RSL

Notes: All sample results reported in milligrams per kilogram (mg/kg). Remaining sample location reported analytical results below their associated criteria and/or below the laboratory reporting limits.

CLOW VALVE

1375 MAGNOLIA AVENUE

CORONA, CA 92879

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AOC 7 - TRANSFORMER AREA 1

DRAWN:	CHECKED:	DATE:	FIGURE:
KG	JB	10/18/19	3G

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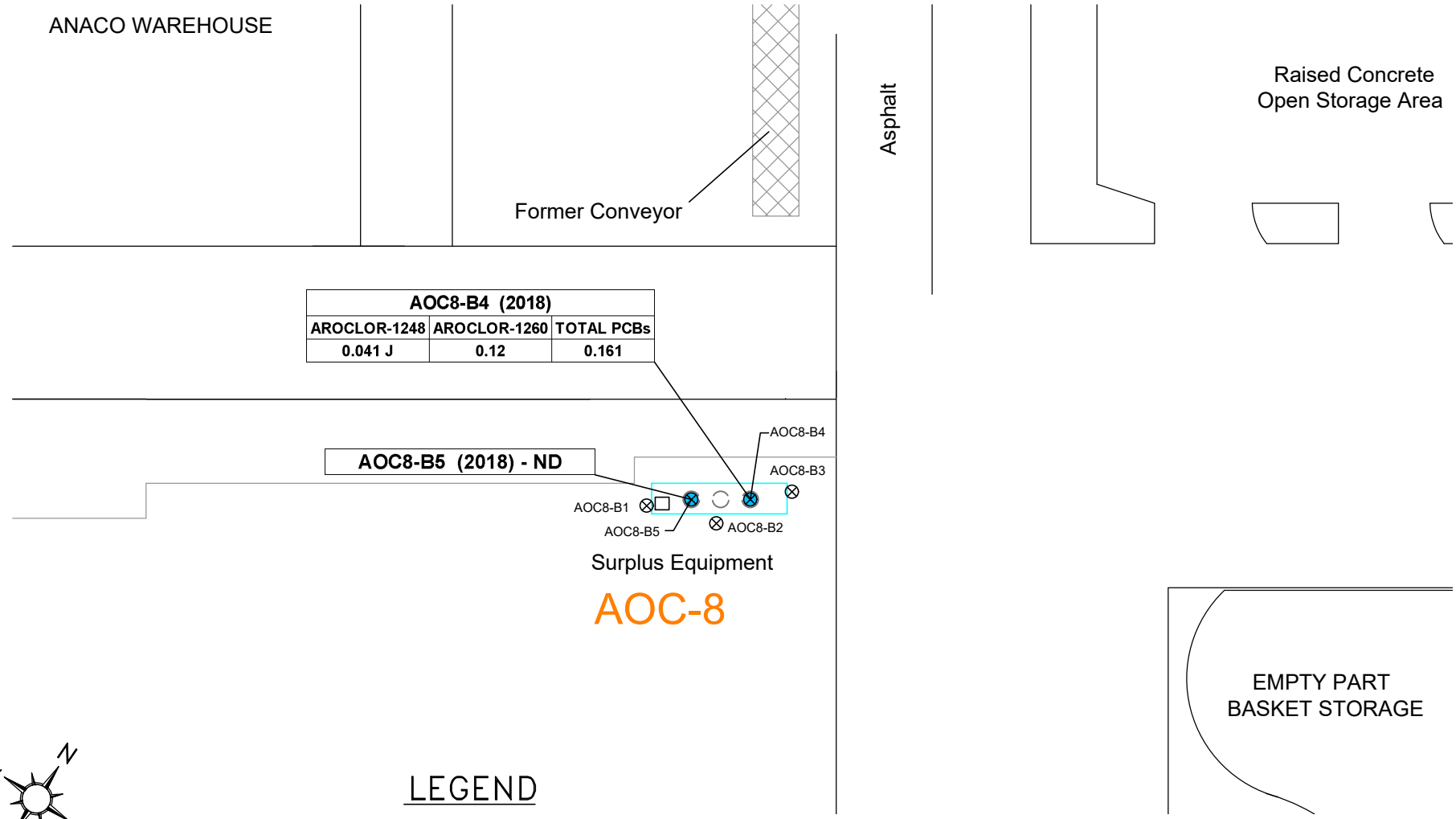

CLOW VALVE

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CORONA, CA 92879

PROJECT NO. 04.20150013.00

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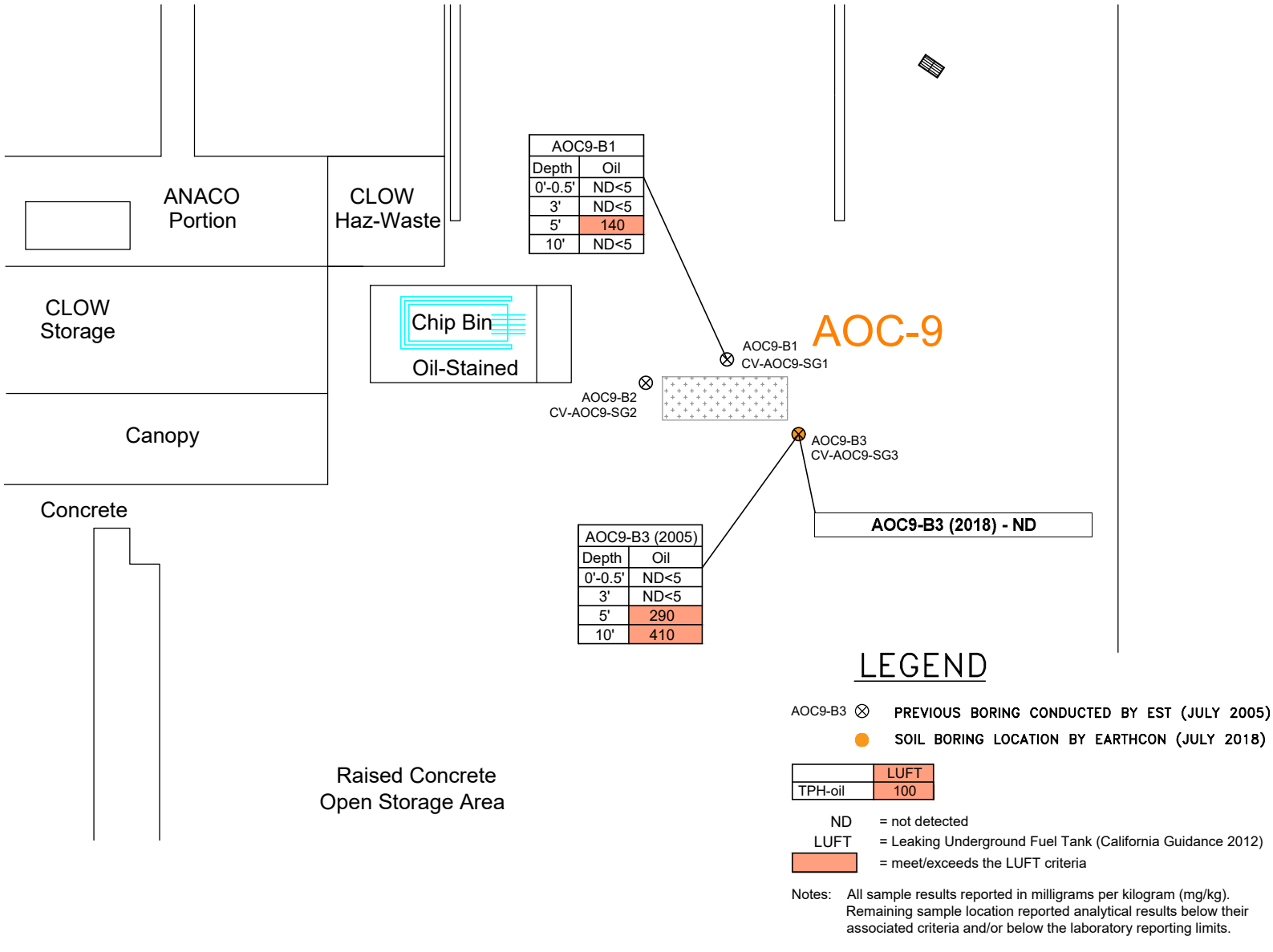
AOC 8 - TRANSFORMER AREA 2
PCB SAMPLE LOCATIONS

DRAWN:	CHECKED:	DATE:	FIGURE:
KG	JB	10/18/19	3H

FILENAME:S:\Common\DrangeCADProjects\04.20150013.00-Clow Valve\CAD 2019\SP 10-18-19_F3EFHI.dwg (3H (ADC8)) 10/21/19 13:24 - kgyawali



CLOW VALVE

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CORONA, CA 92879

PROJECT NO. 04.20150013.00

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AOC 9 - FORMER TEST POND PCB SAMPLE LOCATIONS

DRAWN:	CHECKED:	DATE:	FIGURE:
KG	JB	10/18/19	3I

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SW2			
Depth	Arsenic	Cadmium	Lead
1'	6.28	43.9	7,360
3'	24.6	ND	5.25
5'	10.0	ND	4.16

CV-BG3	
Depth	Lead
1'	360
3'	130
5'	3.6
10'	3.3
15'	4.9
20'	3.2
25'	6.6

SW1		
Depth	Arsenic	Lead
1'	3.37	828
3'	17.2	2.41
5'	6.28	2.23

SW3		
Depth	Cadmium	Lead
1'	25	4,650
3'	ND	74.1
5'	ND	253

SW4	
Depth	Lead
1'	209
3'	185
5'	352

SW5	
Depth	Lead
1'	218
3'	533
5'	1.98

SW6	
Depth	Lead
1'	239
3'	182
5'	897

CV-BG4	
Depth	Diesel
1'	ND<5
3'	ND<5
5'	ND<5
10'	ND<5
15'	110
20'	ND<5

SW21	
Depth	Arsenic
1'	52.9
3'	1.68
5'	2.11

CV-BG2	
Depth	Hex Cr
1'	ND<0.5
3'	4.2
5'	3.3
10'	ND<0.5
15'	ND<0.5
20'	6.6

LEGEND

- CV-BG4 — BACKGROUND SOIL BORING BY EST (JULY 2005)
- AOC7-B3 — PREVIOUS BORING CONDUCTED BY EST (JULY 2005)
- SW9 — SOIL BORING LOCATION BY FERO (SEPTEMBER 2006)
- AOC1-FB1 — SOIL BORING AND WELL INSTALLATION CONDUCTED BY FERO (SEPTEMBER 2006)

	LUFT	RSLs
TPH-diesel	100	--
Arsenic	--	12 (1)
Cadmium	--	7.3 (2)
Hex Cr	--	6.3
Lead	--	320 (2)

ND = not detected
LUFT = Leaking Underground Fuel Tank (California Guidance 2012)
RSLs = USEPA Regional Soil Screening Levels. June 2017. HQ=1.0
(1) = General California Background Concentration (DTSC, January 2009)
(2) = DTSC HHRA Note 3 (August 2017)
= meet/exceeds the LUFT criteria
= meet/exceeds the associated RSL

Notes: All sample results reported in milligrams per kilogram (mg/kg). Remaining sample location reported analytical results below their associated criteria and/or below the laboratory reporting limits.

STORM CHANNEL 85' WIDE

EL CAMINO AVE.

Former Excavation

Building #2B

Former Sandpiles (typ.)

CLOW VALVE BLDG

ANACO PRODUCTION PLANT
Building #2A

CANOPY

VALVE TEST AREA

Surplus Equipment

Former-Subgrade Conveyor (typ.)

Gasket Storage

CLOW Storage

ANACO

Waste

Storage

ANACO WAREHOUSE
Building #3

CLOW BLDG

SCALE

Surplus Equipment

SHIPPING DOCK

CORP. OFFICES
Building #1

PRODUCT STORAGE

PacStates Storage Yard

CAR PORT

ANACO BLDG

GATE

MAGNOLIA AVE

SW1 SW2 SW3 SW4 SW5 SW6 SW7 SW8 SW9 SW10 SW11 SW12 SW13 SW14 SW15 SW16 SW17 SW18 SW19 SW20 SW21

CV-BG1 CV-BG2 CV-BG3 CV-BG4

0 120

Approximate Scale: 1 inch = 120 feet

CLOW VALVE
1375 MAGNOLIA AVENUE
CORONA, CA 92879

PROJECT NO. 04.20150013.00

EARTHCON®
EARTHCON CONSULTANTS CA, INC
1500 SOUTH SUNKIST STREET, SUITE D, ANAHEIM, CA 92806

BACKGROUND AND SITEWIDE SOIL BORINGS

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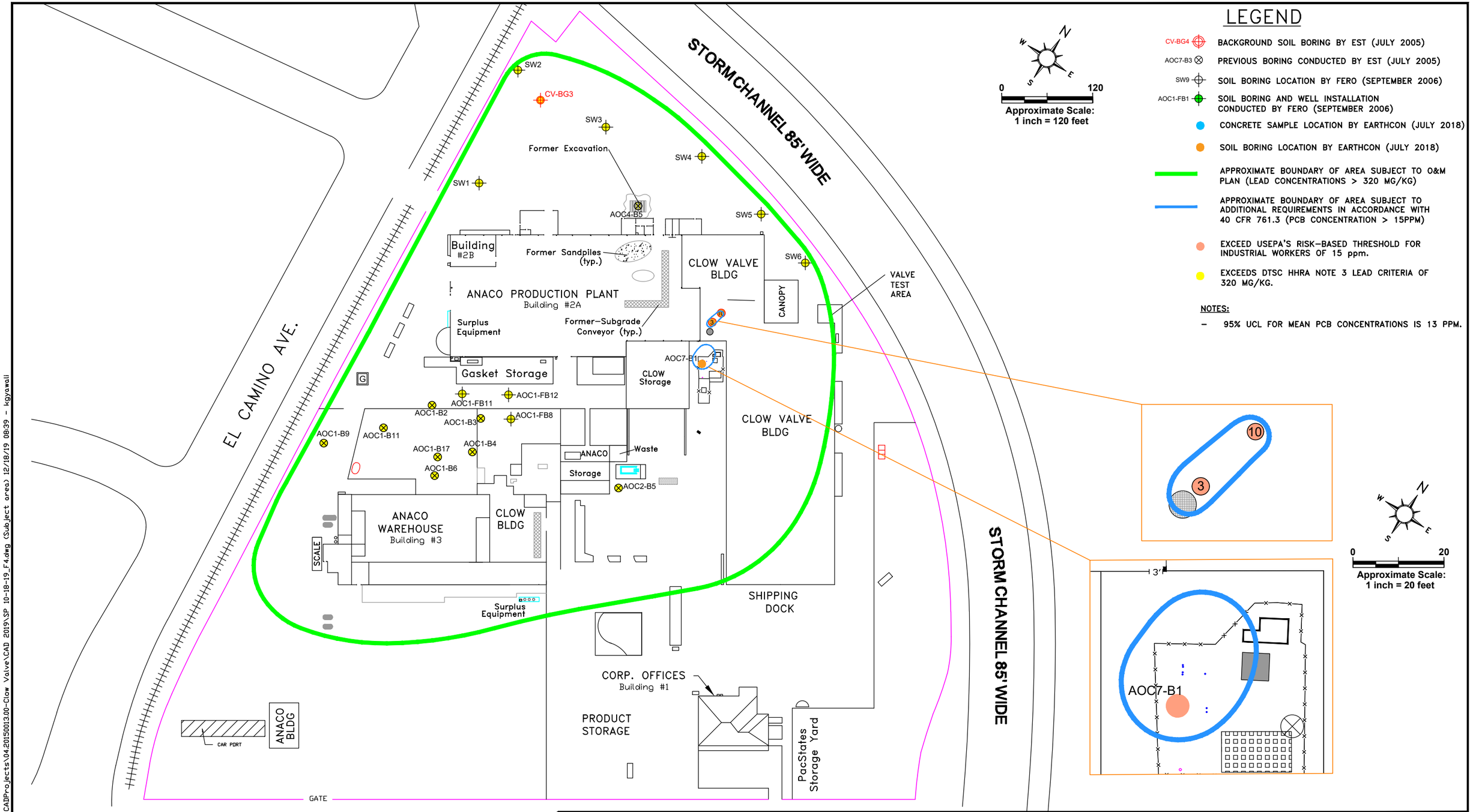

CLOW VALVE
1375 MAGNOLIA AVENUE
CORONA, CA 92879

PROJECT NO. 04.20150013.00

EARTHCON®
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SUBJECT AREA BOUNDARIES

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APPENDIX A

PROJECT HEALTH & SAFETY PLAN (HASP)

Corrective Measures Study
Clow Valve
1375 Magnolia Avenue
Corona, California

EarthCon Project No. 04.20150013.00

August 22, 2016
Revised October 2, 2017

Project Health and Safety Plan (HASP)

Project Name: Corrective Measures Study - Clow Valve
1375 Magnolia Avenue
Corona, California

Project Number: 04.20150013.00

Prepared by:	Jennifer McGervey EarthCon Consultants CA, Inc.	8/19/16
Project Manager:	Jeff Bennett, PG EarthCon Consultants CA, Inc.	8/19/16
Approved by:	J. Ryan Clarke EarthCon HASP Reviewer	08/20/2016

Brief Description of Amendment	**Amendment Date**
Update field scope to include capping; updated dust action level;	10/2/17
Update of EarthCon H&S personnel	10/2/17

Health and Safety Plan Consent Agreement

Because of the potentially hazardous nature of this site and activity occurring at the site, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth in this document will reduce, but may not eliminate, the potential for injury and illness at this site. Guidelines in this Plan were prepared specifically for this site and should not be used on any other site without prior evaluation by trained health and safety personnel.

Site workers must also review this HASP. The Site Safety Officer (SSO) must conduct a pre-work briefing prior to initiating this project. All sections of this HASP must be reviewed during this briefing and documented via **Appendix A**. Any worker not attending the initial meeting must be trained by the SSO on the information covered in the pre-work briefing meeting. ***The SSO must hold tailgate meetings at the beginning of each work shift to discuss important safety and health issues concerning tasks to be performed on that day.***After reading the HASP and attending a pre-work briefing, workers must sign the following acknowledgment statement.

I have read, understand, and will abide by the information set forth in this HASP. I have also attended a pre-work briefing. I agree to perform my work in accordance with this HASP **(See Appendix F).**

Name (Print)		Signature	Date
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

TABLE OF CONTENTS

1.0 HASP SUMMARY INFORMATION

The first phase of this project is anticipated to include the collection of soil samples, using a direct push drill rig, at a total depth of 10 feet below ground surface (ft bgs) and installation of two groundwater monitoring wells. The second phase is to implement the CMS activities which includes removing impacted soil, collection of soil confirmation samples, and capping the identified exposed surfaces. This HASP will be updated or amended, as necessary, to reflect any changes that may be encountered. Personnel responsibilities are described in **Table 1** and personnel training requirements are provided in **Table 2.**

Project Name…….	Corrective Measures Study
Project Location…..……..…….	Clow Valve 1375 Magnolia Avenue Corona, California (see Figures 1 and 2)
Project Number……..	04.20150013.00
Project Manager……	Jeff Bennett714-500-5400 ext.5454
Start Date / End Date	September 2016-October 2016
Site Safety Officer(s)…….	Tim Eyres
Client Contact	Larry Bowers 256-388-0001
Supervisor……...	Jeff Bennett 714-500-5400 ext. 5454
Regional Health & Safety Coordinator…..	Hugh Walker, Jr. – 662-871-8753 (Cell)
Planned Activities……..	Monitoring well install & sampling; soil sampling, capping
Chemical Hazards…….	PCBs, Lead, Cadmium, Arsenic, Diesel, Gasoline
Initial PPE……..	Level D
Emergency Phone……..	**911**
Hospital Information……	**(951) 737-4343** **Corona Regional Medical Center** **800 S Main St, Corona, CA 92882**

2.0 INTRODUCTION

This HASP serves the following purposes:

- Identifies and describes the potentially hazardous substances and working conditions that may be encountered during the field work;
- Specifies personal protective and monitoring equipment to be used during onsite activities; and
- Outlines measures to be implemented in the event of an emergency.

2.1 Site Location and Description

The Site is southwest corner of the intersection at 1375 Magnolia Avenue in Corona, California. **Figure 1** shows the site location. **Figure 2** provides a site layout for the facility. It is identified as Riverside County Assessor Parcel Number 107-030-022-3 and covers approximately 16 acres. Approximately 60% of the property is currently used for machining, product finishing and testing, and product storage. The remaining 40% includes asphalt-paved parking areas and unpaved areas. Unused foundry buildings, small offices and open areas are leased to other tenants.

2.2 Project Objectives

EarthCon will collect soil samples to assess the extent of soil contamination on-Site. The soil samples will be managed according to the workplan protocol.

EarthCon will provide oversight of advancement for well installation using a subcontracted drilling company. EarthCon will collect and manage water samples according to the workplan protocol.

EarthCon will provide oversight of the grading and asphalt cap placement associated with AOC-1 and AOC-5.

The ultimate objective is to conduct all activities in a safe and compliant manner.

2.3 Personnel Requirements and Responsibilities

Provisions of this HASP apply to all EarthCon personnel and subcontractors that will be participating in the above noted field activities. On-site personnel will be required to review the HASP prior to commencement of field activities and conduct all field activities in accordance with plan specifications. Other personnel on the site are expected to follow the provisions of the health and safety procedures outlined in this HASP as a minimum base standard but will retain full responsibility for the health and safety of their own employees or sub-subcontractors.

General safe work practices that must be implemented during work activities at this site are included in **Table 3**.

EarthCon considers each subcontractor to be an expert in all aspects of the work operations which they are tasked to provide, and each subcontractor is responsible for compliance with those regulatory and/or legal requirements which pertain to those services. While the EarthCon HASP will be the minimum H&S requirements for the work completed by EarthCon and its subcontractors, each subcontractor, in coordination with EarthCon's H&S personnel, is expected to perform its operations in accordance with its own H&S plans, policies and procedures unique to the subcontractor's work to ensure that hazards associated with the performance of the subcontractor's work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to EarthCon for review prior to the start of on-site activities. No review of any subcontractor plan or document by EarthCon will serve as an approval or ratification of such plan by or on behalf of EarthCon, and no such review will operate as any assumption of any duty or responsibility on the part of EarthCon (or any EarthCon employee or representative) for or as to any aspect of any subcontractor's own H&S responsibilities. Any comments or feedback from EarthCon to any subcontractor following any review by EarthCon of any subcontractor document or practice is provided solely for informational purposes and not for reliance.

In the event that the subcontractor's procedures/requirements conflict with requirements specified in this HASP, the more stringent guidance will be adopted after discussion and agreement between the subcontractor and EarthCon project H&S personnel. Hazards not listed in this HASP, but known to the subcontractor or known to be associated with the subcontractor's services, must be identified by the subcontractor and addressed to the EarthCon Project Manager prior to beginning work operations.

EarthCon personnel who have responsibility for the safe operations of this project include the Project Manager (PM), EarthCon Corporate Safety and Health Manager (CSHM), the Site Safety Officer (SSO) and the Project Field Staff. Responsibilities of each of the above referenced personnel as they relate to project safety and health are provided in **Table 1**.

2.4 Site Control

Site control procedures must be implemented **before** the start of site tasks to control worker exposures to hazardous substances. A Vicinity Map that shows the site location is included as **Figure 1**. A Site Layout Plan with proposed sampling locations is included as **Figure 2**. Changes may be made to the site map by the SSO, as needed, based on site conditions. The site map should be posted in the work area and/or field notebook.This site control program is designed to reduce the spread of hazardous substances from contaminated areas to clean areas, to identify and isolate contaminated areas of the site, to facilitate emergency evacuation and medical care, to prevent unauthorized entry to the site, and to deter vandalism and theft. The Site Safety Officer is responsible for evaluating site conditions and for verifying that the

site control program functions effectively. The site control program will be updated regularly to reflect current site conditions, work operations, and procedures.

2.4.1 Site Access

Access to the site shall be controlled using the following method(s):

☐	Security fence	☒	Temporary barricades and/or warning tape
☐	Sign in/Sign out log	☐	Guard
☐	Identification badges	☐	Other: Onsite Manager

2.4.2 Work Zones

Restricted work zones may be established to limit the spread of hazardous substances (when applicable) by workers from potentially affected areas to non-affected areas. The exact location and extent of the work zones will be modified as necessary as site investigation information becomes available. Delineation of work zones is as follows:

- Exclusion Zone: The Exclusion Zone is the area where the potential for exposure to hazards and contact with hazardous materials could occur. The zone may be marked by caution tape. Personnel working within the Exclusion Zone will be expected to follow protective measures as prescribed by the SSO.

- Contamination Reduction Zone: The Contamination Reduction Zone is a transition area between the potentially affected areas/materials and assumed non-affected areas/materials. Decontamination of personnel and equipment, if necessary, shall be conducted in this area to reduce the probability of contamination transfer to a non-affected area. The Contamination Reduction Zone shall be situated upwind of the Exclusion Zone.

- Support Zone: The Support Zone is the area, outside the Exclusion and Contamination Reduction Zone, where administrative and other project support functions are performed. The Support Zone shall be situated upwind of the Contamination Reduction Zone and/or the Exclusion Zone.

See Figure 2A for the location of the work zones.

2.4.3 Communications

Typical on-site communications may be conducted through the use of:

☒	Verbal		
☐	Two-way radio	☐	Horn
☒	Cellular telephone	☐	Siren
☒	Hand signals	☐	Other:_____

Off-site communications may be conducted through the use of:

☒ Cellular telephone: Verify cell phone reception in all work areas prior to starting work.
☐ Site Phone: Location & No. _____
☐ Pay phone: Location & No. _____
☐ Other: _____

Cell Phone reception should be verified throughout the site prior to commencing work.

2.4.4 Visitors

Visitors to the Site shall be continually escorted in order to assure their safety. Visitors will not be allowed past the Support Zone (if such a zone is established at this Site) unless they read, understand, sign, and abide by the requirements outlined in this HASP.

2.5 Worker Training

Table 2 will be used to document on-site workers who have received the appropriate training according to the company Environmental, Health, and Safety (EH&S) Training Program**. Table 2** must be completed prior to initiation of field activities. Pre-work briefing and routine tailgate meetings will be conducted to facilitate on-site training. Subcontractors must provide information requested in **Appendix G** prior to starting to work.

2.6 Safety Meetings

Project personnel who will be involved with on-site field activities must be appropriately trained in accordance with 29 CFR Part 1910.120 "Hazardous Waste Operations and Emergency Response". Before field work begins, the SSO will review the HASP with the field workers addressing the potential hazards associated with the proposed field activities. Components of the safety meeting will include, but will not be limited to, a review of the following:

- Location of sanitation facilities as seen on site plan.
- Potential chemical, operational and physical hazards present at the site.
- Personal protective equipment (PPE)/personal protection procedures.
- Hazardous materials handling procedures.
- Buddy system.
- Personal hygiene - general guidelines.
- Personal and equipment decontamination procedures.
- Emergency response procedures.
- Symptom awareness.
- Stop Work Authority

Periodic meetings with project personnel may be conducted by the SSO pending changes to the scope of work or modification to this HASP. To document the meetings, the SSO will complete

the Site Safety Meeting Minutes Form provided in **Appendix A**. Verification will be provided to the CHSM upon request.

2.7 Medical Monitoring Requirements

OSHA requires medical monitoring for personnel potentially exposed to chemical hazards at concentrations in excess of the PEL for more than 30 days per year and for personnel who must use respiratory protection for more than 30 days per year.

Will personnel working at this site be enrolled in a medical monitoring program? ☐**Yes** ☒**No**

Personnel who are diagnosed as having medical conditions which could directly or indirectly be aggravated by either exposure to chemical substances suspected of being present at the Site, or by the use of Personal Protective Equipment (PPE), will not be allowed to participate in field activities. In addition, personnel with injuries or illnesses involving open wounds may not be allowed on-site. Field personnel who develop an illness or injury during the project may be examined by a physician. A physician must determine if the employee is fit to return to work before they can return to field activities. In addition, the CHSM, SSO, or Site employees may request additional medical testing if a chemical exposure is suspected.

2.8 Hazard Communication Requirements

When chemicals are used on-site, EarthCon workers must adhere to the company's Hazard Communication Program (29 CFR §1910.1200). The following procedures must be followed for chemicals brought on-site (i.e., decontamination solution, sampling preservatives, etc.):

- Labels on incoming primary chemical containers must not be defaced (until after the container is empty, decontaminated and ready for disposal).
- Chemical containers must be stored in appropriate storage cabinets.
- Secondary containers and storage cabinets must be correctly and clearly labeled using the Hazardous Materials Identification System (HMIS).
- Incompatible chemicals must not be stored together.
- Workers must receive training on the hazards indicated in **Table 4.**
- Containers must be secured closed unless adding to or removing something from the container.
- Safety Data Sheets for the chemicals should be recent and are included in **Appendix B**.; they should be made available to workers upon request and applicable hazards covered during safety meetings.
- Workers must receive training on the hazards of the chemicals indicted in **Appendix C.**
- Include a safety training sign off sheet to document this training and provide a copy to the CHSM.
- Training on this information should be documented in **Appendix F**.

3.0 GENERAL PERFORMANCE REQUIREMENTS

General safe work practices that must be implemented during work activities at this site are included in **Table 3**.

3.1 Performance Requirements

- Workers are expected to show up alert and ready to work. No sleeping is allowed on the job.
- Any unsafe equipment, condition or work practice and injuries, no matter how slight, must be reported to the SSO immediately.
- Procedures for the proper set up and control of the worksite task area should be planned and implemented prior to starting individual tasks.
- Field personnel must have ready access to a telephone and a vehicle in case of emergency.
- Field personnel working in the Exclusion Zone are to work with another person at all times. The subcontractor's representative can serve as the second person while the work is being conducted in the field.

3.2 Hygiene Requirements

- Long hair will be secured away from the face so it does not interfere with any activities.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated as being potentially affected by site related chemicals.
- Hands and face must be thoroughly washed upon leaving the work area, and before eating, drinking, or other non-project activities.
- Personnel leaving potentially contaminated areas will shower (including washing hair) and change to clean clothing as soon as possible after leaving the site.
- Kneeling, sitting, leaning, or general contact with potentially affected surfaces or with surfaces suspected of being potentially affected by hazardous materials (i.e., puddles, mud, leachate, etc.) should be avoided.
- Medicine and alcohol can potentiate the effects of exposure to toxic chemicals. Neither should be taken by personnel if the likelihood of risk exists. Ingestion of alcohol during and immediately prior to field activities is prohibited.
- Sanitation facilities are provided on site. Potable water and restroom facilities are available and in accordance with 8 CCR 5192 for all employees and visitors.

4.0 HAZARD EVALUATION

A preliminary hazard evaluation was performed to identify existing site conditions and is documented in **Table 4**. The preliminary hazard evaluation addressed the following, where applicable:

- Identification of the suspected hazardous materials/wastes on-site;
- Toxicological aspects of the suspected hazardous materials on-site;
- Suspected chemical/elemental concentrations within the various media on-site;
- Inherent site hazards;
- Operational hazards; and
- Climate extremes.

Environmental site personnel have indicated fire, inhalation and skin absorption to pose a hazard on site. Reactivity including ionizing radiation is not of concern for the site due to past investigations and the operational history. All scrap steel and raw steel entering the site has been screened by radiation detection devices. Further information is documented in **Table 4**.

4.1 Suspected Chemical/Elemental Hazards

To select those contaminants that may cause health and safety concerns, henceforth referred to as potential Contaminants of Concern (COCs), a review of the site remediation and sampling history was performed. Based on this review, potential COCs were selected and are listed in **Table 5**. Chemical information for each of the potential COCs are provided in the NIOSH Pocket Guide pages located in **Appendix C**.

Information from the NIOSH Pocket Guide (e.g., flash point, water reactive, etc.) has been used in performing the chemical hazard analysis in **Table 5** (e.g., fire, inhalation, reactivity, and skin absorption hazards). If, based on the hazard analysis, chemical hazards exist, hazard mitigators must be implemented (**Appendix D**). In addition, air monitoring and personal protective equipment must also be used to evaluate airborne concentrations and protect workers.

After review of the relevant background information and data, if there is a potential for dermal and/or respiratory exposure to the materials or contaminants of concern, personnel shall perform the monitoring requirements summarized in **Section 5.2** and execute actions as appropriate. If action levels are exceeded, work shall be suspended until on-site conditions can be re-assessed and this HASP modified.

4.2 Operational/Physical Hazards/Biological Hazards

Potential operational/physical associated with tasks to be performed and the site have been analyzed in **Table 4**. If, based on the hazard analysis, these hazards exist; the hazard mitigators described in **Appendix D** must be implemented.

- **Utility (e.g., Electrical) hazards:** Utility hazards include buried cables, which pose a danger of shock or electrocution if workers or equipment contact or sever them during site operations. Onsite personnel are advised to pay special attention to the presence of utility hazards. Observe as built plans (if available) for the presence of underground hazards and advance the borings cautiously. A subsurface survey shall be conducted at each of the suspect locations, if necessary.

Lockout/Tag out procedures, in accordance with the EarthCon Lockout/Tag out Program, will be followed when working in the vicinity of electrical equipment. Electrical equipment will be considered energized unless tested and determined otherwise. Energized parts will be insulated or guarded from personal contact. Extension cords used with electrical tools will be the 3-wire type and connected to a ground fault circuit interrupter (GFCI). Wooden or fiberglass ladders will be used. Metal ladders will not be used in the work area.

- **Mechanical hazards:** Mechanical hazards include being struck by heavy equipment and being injured by excavation cave-ins. Onsite personnel are advised to stand at least 15 feet clear of heavy equipment and excavations, and wear appropriate protective equipment, including steel-toe boots and hard hats during the field activities. Fall, slip, and/or trip hazards exist when working with equipment and tools. Field personnel will observe walking surfaces in the work area to prevent tripping on equipment/tools placed on the ground. Good housekeeping will also be practiced. All walking surfaces with a drop of more than six feet will have fall protection devices. Fall protection devices may include adequate delineation of the excavation and trenches, guardrails, or climbing devices such as a harness and lanyard.

- **Noise Hazards:** Noise hazards may exist when working around heavy equipment. Loud noises interfere with communication and also lead to temporary and/or permanent hearing loss. Noise hazards may exist wherever heavy equipment such as loaders and any operating machinery, produce noise levels at or above the Action Level of 85 dBA for 8-hr Time Weighted Average (TWA). Noise in excess of 85 dBA may produce the following effects:

  1. Distraction, annoyance, or sudden surprise
  2. Inability to effectively communicate with co-workers
  3. Physical damage expressed initially as a Temporary Threshold Shift (TTS) and then, as a Permanent Threshold Shift (PTS), or immediately as a Permanent Threshold Shift if the impact noise is sufficient enough (usually greater than 100 dBA)

  Appropriate hearing protection must be utilized in areas of unacceptable noise levels.

If, based on the hazard analysis (**Table 4**), biological hazards exist associated with tasks to be performed and site location (e.g., allergic reactions to poisonous plants or insects indigenous to the area, etc.); hazard mitigators (**Appendix D**) must be implemented.

5.0 PERSONAL PROTECTION

5.1 Personal Protective Equipment (PPE)

The levels of personal protection required for each task are provided **in Appendix E.** This PPE is based on the hazards identified in **Section 4.** Required equipment and types of protective clothing materials are listed, as well as an indication of the initial level of protection.

Is there potential for a respirator to be donned during fieldwork? ☐Yes ☒No

It is not anticipated that the use of respirators will be needed, however during the drilling work and sampling the area will be monitored via dust particulate monitor (MiniRam or equivalent). If there is an indication that a respirator is required work will be halted until tasks have been re-evaluated and the HASP has been updated as needed.

The general use of PPE is acceptable when engineering controls cannot adequately eliminate the hazard. The use of PPE is intended to provide protection for on-site personnel from chemical, physical, and operational hazards that cannot be controlled through other safety procedures. Initially, Level D Protection will be employed by on-site personnel and will include varying levels of eye, head, body, hand, foot, and hearing protection.

Respiratory protection will not be required. However, if respirators are worn, workers must adhere to the company's Respiratory Protection Program (29 CFR §1910.134). **Table 2** should be used to provide a record of the site workers' last fit test. Beards (i.e., facial hair interfering with the respirator seal) are not allowed.

Acceptable PPE are further described below.

- Eye Protection: Eye protection will include the use of chemical splash goggles and/or face shields and impact resistant safety glasses with side shield protection that meet the current ANSI standard Z87.1.

- Head Protection: Non-metallic hard hats meeting the current ANSI standard Z89.1 will be worn by on-site personnel as required during field activities.

- Body Protection: Body protection will include the use of long sleeved shirt and pants work clothes.

- Hand Protection: Hand protection will include the use of nitrile gloves when hand contact with affected materials (e.g., groundwater and soil) may occur. Otherwise use work gloves of leather or other appropriate material.

- Foot Protection: Foot protection will include the use of impact resistant boots meeting the current ANSI standard Z41.1.

These levels shall only be downgraded upon approval by either the CSHM or SSO. Project personnel are not permitted to deviate from the specified levels of protection without prior approval of the SSO.

5.2 Personal Air Monitoring

Corrective measure activities may have the potential to generate dust; therefore, dust monitoring will be conducted on-Site. Airborne particulate concentrations will be measured with a portable particulate monitor (MiniRam or equivalent) to ensure compliance with the action levels (stop work level) and Cal OSHA Permissible Exposure Limits (PELs). The PELs for COCs potentially present on-Site, along with stop work levels are provided in Table 5.

According to calculations using the site specific maximum concentrations documented in **Table 5** and the OSHA Permissible Exposure Limit (PEL) for total dust, the only constituent of concern is lead. Total dust must measure below 6.8 mg per cubic meter (mg/m^3) to remain below the PEL for lead. However, at the direction of the DTSC the action level for total dust is 0.05 mg/m^3. A MiniRam will be on site at all times monitoring dust concentrations. The MiniRam is gravimetrically calibrated in mg/m^3using the standard SAE Fine (ISO fine) test dust. A zeroing kit will be present to accomplish zeroing in particle free air when on-site. In the case where dust levels measure over 0.05 mg/m3, work will be suspended and on-site conditions will be re-assessed.

5.3 Vehicle Safety

Vehicle safety requires the following:

- Vehicles are to be operated in a safe manner and in compliance with statutory traffic regulations and ordinances.
- Operators are to practice defensive driving and drive in a courteous manner.
- Operators are required to have a valid driver's license and liability insurance (per local/state laws).
- Seat belts are to be worn by the driver and passengers.
- No persons are allowed to ride in the back of any trucks or vans.
- Vehicles are to be driven in conformance with local speed limits.
- Personnel who are impaired by fatigue, illness, alcohol, illegal or prescription drugs, or who are otherwise physically unfit, are not allowed to drive.
- Personnel are to avoid using cellular phones or engaging in other distractions while driving.
- Vehicles should be maintained in a safe and clean condition.
- Field vehicles should be equipped with the following items; first-aid kit, fire extinguisher, spares tire and jack.
- Motor vehicle accidents shall be reported to the responsible law enforcement agency (when appropriate), the EarthCon CHSM, the EarthCon HR Director, the SSO and the EarthCon PM.
- Daily and monthly check lists to verify safe operations have been generated and should be utilized prior to operating a vehicle.
- If the site has specific driving rules, these should be reviewed and adhered to.

5.4 Illumination

Work will be completed during daylight hours only. This will ensure all work is done in accordance with 8 CCR 5192(m) illumination requirements.

6.0 DECONTAMINATION

The following decontamination (cleansing) procedures for the sampling equipment and PPE have been developed with the intent of reducing the potential for the transfer of hazardous chemicals.

6.1 Sampling Equipment

To reduce the potential for the distribution of contaminants or cross contamination of samples, the following procedures will be used. Decontamination of the sampling equipment will include washing the equipment in a detergent solution (Liqui-nox and water), rinse with potable water, rinse with organic-free/distilled water, and allow to air dry. Disposable equipment will be used when practical to eliminate the need for on-site decontamination.

6.2 Personnel and PPE

During this project the goal will be to use disposal PPE (nitrile gloves), therefore no PPE decontamination will be required. If this cannot be accomplished, PPE must be decontaminated (cleaned) per 29 CFR §1910.120(k). In an emergency, the primary concern is *to prevent the loss of life or severe injury to site personnel. If immediate medical treatment is* required to save a life, decontamination should be delayed until the victim is stabilized. If decontamination can be performed without interfering with essential life saving measures or first-aid, or if a worker has been contaminated with an extremely toxic or corrosive material that could cause severe injury or loss of life, decontamination must be performed in coordination with or prior to initial medical treatment at the scene.

Decontamination of PPE (e.g., gloves) shall be accomplished by passing personnel through appropriate stages of contamination reduction and removing contaminated clothing and equipment in decreasing order of the degree of potential contamination. Personnel who have entered areas suspected of containing hazardous materials (i.e., the Exclusion Zone) will be subjected to decontamination. The personnel decontamination corridor may be comprised of the following procedural stages. These stages/procedures are listed sequentially below.

Stage No. 1: Segregated Equipment Drop – Personnel will brush off loose dirt and wash off remaining soil, sediment, and dirt from clothes and shoes upon completion of sampling and field work. Equipment and consumables that require either disposal or special handling (e.g., special and/or equipment decontamination) shall remain in this area and be decontaminated, if appropriate, or disposed of with the excavated materials or other potentially contaminated materials.

Stage No. 2: PPE Decontamination - PPE that has been potentially contaminated will be washed with a TSP and water mixture followed by a water rinse.

Stage No. 3: General Field Wash - Personnel shall wash and rinse face and hands with soap and water before leaving the site and/or eating. If a change of clothing is necessary, it shall be done at this time.

6.3 Decontamination Fluids and Investigation-Derived Waste Disposal

Decontamination water and drill cuttings will be placed in appropriate containers. Disposal methods will be determined after characterizations have been completed. Solid waste generated during decontamination and field activities (i.e., paper towels, plastic tarps, used PPE) will be removed from the Site and disposed as refuse/trash.

6.4 Vehicles

Typically, vehicles will not be allowed inside the exclusion zone. If vehicles are required in the exclusion zone (e.g., drill rigs) the following procedures will be used. Personnel will wash or remove boots and change to dry clothing prior to vehicle entry. Non-disposable equipment will be washed or bagged before placement into field vehicles. Drill rigs will be decontaminated with detergent solution and rinsed with water before leaving the exclusion zone.

7.0 EMERGENCY PROCEDURES

A list of Emergency Response contacts and telephone numbers for applicable local off-site emergency responders is provided in **Table 6**. The following emergency response equipment is required for this project:

☒ Fire Extinguisher(s): ☐ Type A ☐ Type B ☐ Type C ☒ Type ABC
☒ Air Monitoring: ☐ PID ☐ Air Sampling Pumps ☐ CG/O2 meter
☒ MiniRam ☐ H2S Meter ☐ Radiation Meter
☐ Draeger Pump w/ Sample Tubes ☐ Other:
☒ Eyewash (Note: portable eyewash bottle)
☐ SCBA
☒ First Aid Kit
☐ Shower (Note: for acids and caustics)
☐ Personal Flotation Device(s)
☐ Windsock
☐ Stop Watch &Thermoscan for Measuring Heart Rate and Heat Stress
☐ Global Positioning System
☐ Other:

As a minimum, the project shall have the following equipment available during field activities:

- A first aid kit (mandatory, including adhesive Band-Aids, gauze, tape, gloves, CPR shield, triangle bandage) shall be available in the Support Zone at all times.

  Check additional items required for the site.

  ☐ Emergency Blanket ☒ Sunscreen (as needed)

  ☒ Insect Repellent (as needed) ☐ Other: ointment for poison plants and insect bites_____

- Copious amounts of cool potable water shall be readily available for both drinking purposes and for personal hygiene purposes (e.g., washing, rinsing, and cooling of face and body, etc.).
- Emergency references (e.g., nearest phone, emergency phone numbers and services, etc.) shall accompany the first aid kit.
- Communication equipment such as a cellular phone will be accessible in case of an emergency.
- A vehicle shall be easily accessible for transport/emergency.

The emergency response communication system for the site is:

- ☒ Verbal
- ☐ Two-way radio
- ☒ Hand signals: Hand gripping throat =“Out of Air, Can’t Breathe”
  Grip partner’s wrist or both hands around waist =“Leave area immediately”
  Hands on top of head =“Need assistance”
  Thumps up =“OK; I am all right; I understand”
  Thumps down =“No; negative”
- ☐ Horn
- ☐ Siren
- ☒ Other: Cellular Phone

If an on-site emergency develops, the procedures outlined in **Table 7** shall be followed immediately.

7.1 Natural Disasters

In the event of emergency conditions associated with natural disasters, such as severe weather, site personnel will remain calm, turn off equipment and ignition sources, and move away from buildings, cranes, and overhead utilities. Following an emergency, personnel will proceed to a designated meeting place. The SSO will take a head count to ensure that all personnel are present. Crews must remain together until accounted for. The SSO will assess any injuries and the need for emergency assistance.

7.2 Workplace Violence

If any employee or visitor is confronted by a potentially hostile person, he/she will remain calm and refrain from further aggravating the individual. Site personnel should contact the SSO. Protocol established by the site will be followed or local police will be contacted for assistance when needed.

8.0 SHIPMENT OF RESTRICTED ARTICLES

Federal laws and international guidelines place restrictions on what materials may be shipped by passenger and cargo aircraft. In the course of field activities, the following items may be shipped to and from the site in the following manner.

Item	Hazardous Constituent	Quantity	Packaging	How Shipped
Soil samples	*NA	5	8 oz. glass jar with Teflon lid. Laboratory provided	EarthCon Personnel

Item	Hazardous Constituent	Quantity	Packaging	How Shipped
Groundwater Samples	HCL & HNO3 – lab preservatives	3	VOAs and HDPE laboratory provided containers	EarthCon Personnel

*soil samples do not have preservatives

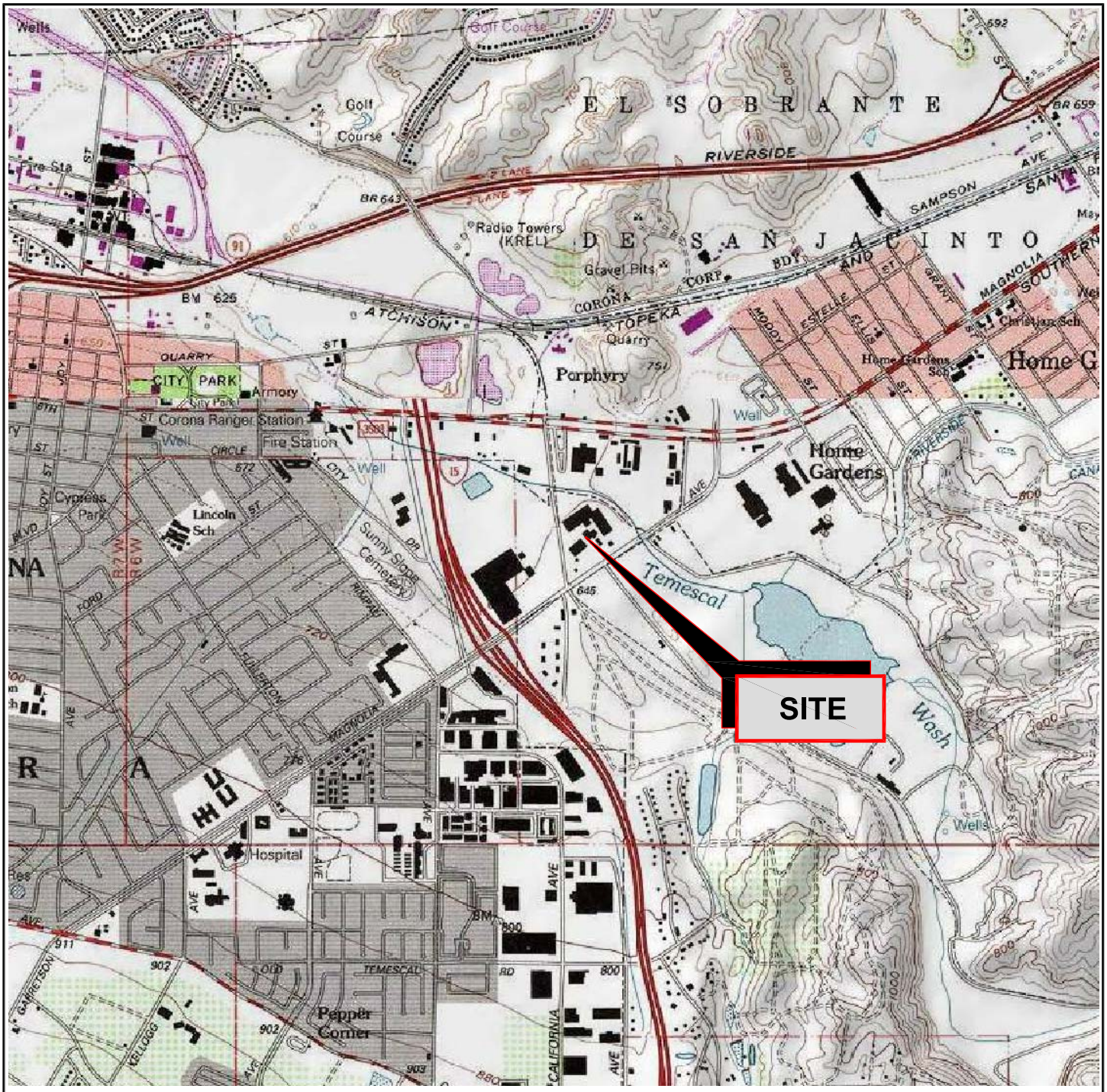
9.0 SPILL CONTAINMENT

An evaluation was conducted to determine the potential for hazardous substance spills at this site. That evaluation indicates that there is no potential for a hazardous substance spill of a sufficient quantity to require containment planning, equipment, and procedures. For that reason, no spill containment program is implemented at this site. Employee training on how to respond and take protective measures during incidental releases of hazardous substances are provided consistent with the Hazard Communication Standard, 29 CFR 1910.12

Incidental spills are different from emergency releases. Incidental spills can safely be absorbed, neutralized, or otherwise controlled by EarthCon employees or contractors with the appropriate training.

Figure 1

Vicinity Map



FROM: U.S. GEOLOGICAL SURVEY, 1997
QUADRANGLE: CORONA SOUTH
COUNTY: RIVERSIDE
SERIES: 7.5-MINUTE QUAD

NOTE: ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N
W E
S

0 2000 Feet
SCALE

CLOW VALVE

1375 MAGNOLIA AVENUE
CORONA, CA 92879

PROJECT NO. 04.20150013.00

EARTHCON®

EARTHCON CONSULTANTS CA, INC
1914 W. ORANGEWOOD AVENUE, SUITE 102, ORANGE, CA 92868

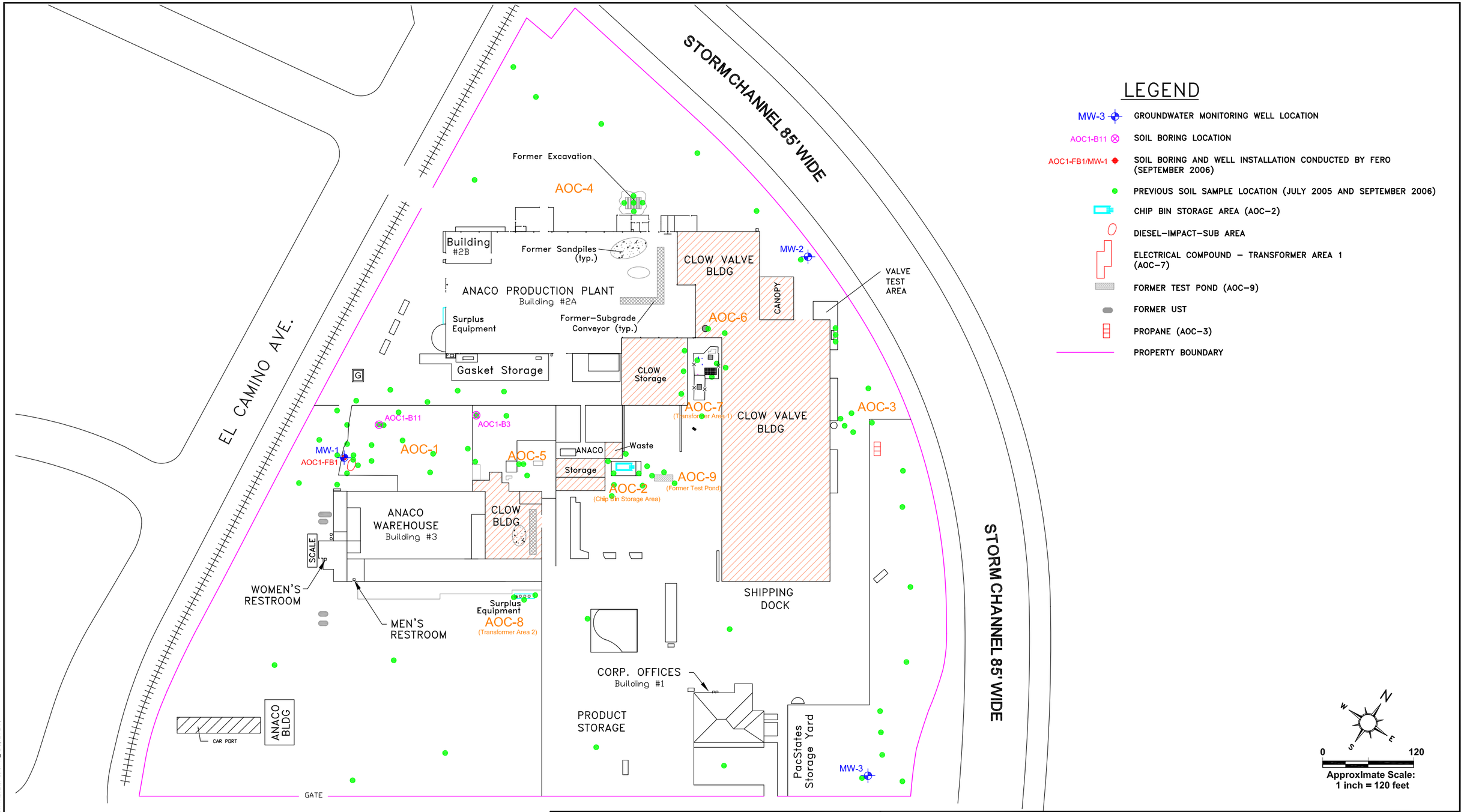
VICINITY MAP

DRAWN:	CHECKED:	DATE:	FIGURE:
DCN	JB	12/30/15	1

FILENAME: S:\CAD\EARTHCON CAD\CLOW VALVE 1375 MAGNOLIA AVENUE, CORONA, CA_VICINITY MAP

Figure 2

Site Plan



LEGEND

- MW-3 — GROUNDWATER MONITORING WELL LOCATION
- AOC1-B11 — SOIL BORING LOCATION
- AOC1-FB1/MW-1 — SOIL BORING AND WELL INSTALLATION CONDUCTED BY FERO (SEPTEMBER 2006)
- PREVIOUS SOIL SAMPLE LOCATION (JULY 2005 AND SEPTEMBER 2006)
- CHIP BIN STORAGE AREA (AOC-2)
- DIESEL-IMPACT-SUB AREA
- ELECTRICAL COMPOUND – TRANSFORMER AREA 1 (AOC-7)
- FORMER TEST POND (AOC-9)
- FORMER UST
- PROPANE (AOC-3)
- PROPERTY BOUNDARY

N W E S

0 120

Approximate Scale:
1 inch = 120 feet

CLOW VALVE
1375 MAGNOLIA AVENUE
CORONA, CA 92879

PROJECT NO. 04.20150013.00

EARTHCON®
EARTHCON CONSULTANTS CA, INC
1914 W. ORANGEWOOD AVE., SUITE 102, ORANGE, CA 92868

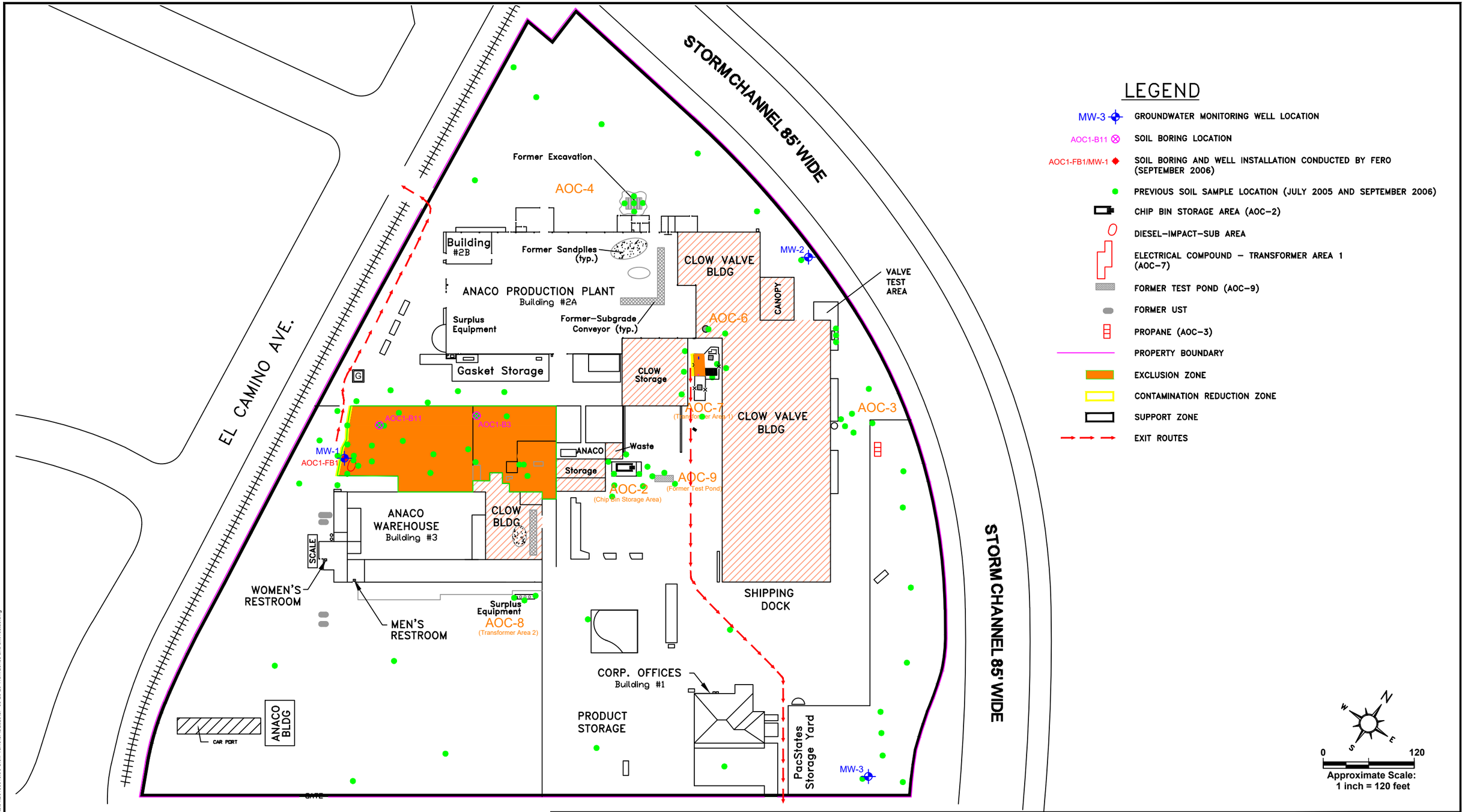
SITE PLAN

DRAWN:	CHECKED:	DATE:	FIGURE:
DCN	JB	09/07/17	2

FILENAME: S:\CAD\EARTHCON CAD\CLOW VALVE\SP 09-07-17_F2 SITE PLAN

Figure 2A

Site Plan with Work Zones and Exit Routes



LEGEND

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- ELECTRICAL COMPOUND – TRANSFORMER AREA 1 (AOC-7)
- FORMER TEST POND (AOC-9)
- FORMER UST
- PROPANE (AOC-3)
- PROPERTY BOUNDARY
- EXCLUSION ZONE
- CONTAMINATION REDUCTION ZONE
- SUPPORT ZONE
- EXIT ROUTES

N W E S

0 120

Approximate Scale:
1 inch = 120 feet

CLOW VALVE
1375 MAGNOLIA AVENUE
CORONA, CA 92879

PROJECT NO. 04.20150013.00

EARTHCON®

EARTHCON CONSULTANTS CA, INC
1914 W. ORANGEWOOD AVE., SUITE 102, ORANGE, CA 92868

SITE PLAN WITH WORK ZONES AND EXIT ROUTES

DRAWN:	CHECKED:	DATE:	FIGURE:
DCN	JB	03/26/20	2A

FILENAME: S:\Common\Orange\CAD\Projects\04.20150013.00-Clow Valve\CAD\2020\SP 03-26-20-Work zones and exit routes.dwg

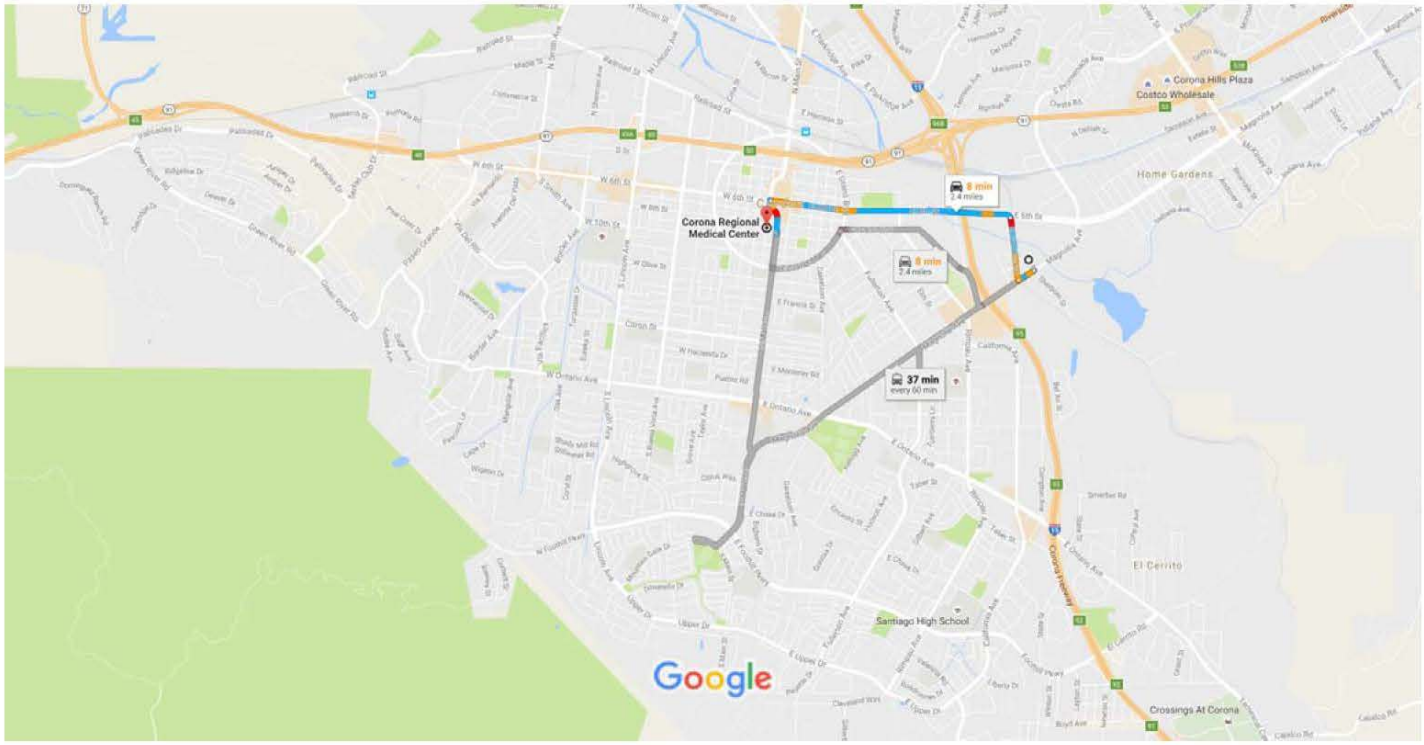
Figure 3

Hospital Location Map

Google Maps

1375 Magnolia Avenue, Corona, CA 92879 to Corona Regional Medical Center

Drive 2.4 miles, 8 min



Map data ©2016 Google 2000 ft

1375 Magnolia Avenue

Corona, CA 92879

Head southwest on Magnolia Ave toward Sherborn St

0.1 mi

Turn right onto El Camino Ave

0.4 mi

Turn left onto E 6th St

1.6 mi

Turn left onto S Main St

0.2 mi

Corona Regional Medical Center

800 South Main Street, Corona, CA 92882

Table 1

Key Personnel and Health & Safety Responsibilities

Project Manager (PM) Jeff Bennett	**Regional H&S Coordinator** Hugh Walker	**Site Safety Officer (SSO)** Lindsey Langer/Jenn McGervey	**Project Field Staff** Lindsey Langer/Jenn McGervey
• Coordinate, approve, implement and manage this HASP and amendments, if any. • Incorporate H&S planning, implementation, and supplies (PPE, decontamination materials) into project plans and budget. • Select and assign responsibility to the SSO to implement HASP. • Monitor the Field Logbooks for health and safety work practices employed. • Coordinate with SSO so that emergency response procedures are implemented, if needed. • Inform CSHM of HASP violations, if any, and verify corrective actions are implemented. • Ensure personnel receive this plan, are aware of its provisions, are aware of the potential hazards associated with site operations, are instructed in safe work practices, are familiar with emergency response procedures and document this information • Coordinate with Client and SSO. • In the event of an incident or other emergency complete & submit appropriate forms and make proper notifications.	• Review and approve HASP; approve any associated amendments. • Evaluate documentation presented of site hazards for HASP preparation. Maintain a final copy of the completed HASP. • Perform periodic audits of documentation of project activities to evaluate general compliance with policies, procedures, directives and guidelines presented in this HASP. • Assist with the implementation of the Corporate Health and Safety Program. • Provide environmental, health and industrial hygiene consultation as needed. • In the event of an emergency, if required set up an incident investigation team and notify applicable outside agencies.	• Be present on-site, as appropriate, with the authority to implement HASP and EarthCon H&S protocols. • Confirm that site personnel meet the training and medical requirements. • Verify that monitoring equipment and personal protective equipment is operating correctly according to manufacturer's instructions and such equipment is utilized by on site personnel. Calibrate or verify calibration of monitoring equipment and record results. • Verify that decontamination procedures are being implemented and Site Control Plan is in place. • Provide and document pre-work briefing and daily tailgate safety meetings, monitor activities for safe work practices and HASP compliance. • Perform routine H&S inspections. Document meetings and inspections. Provide copies to CHSM as requested. • Report to the Project Manager deviations from the anticipated conditions, and authorize the cessation of work if necessary. • Notify the PM and CSHM in the event an emergency occurs, and implement site emergency response and follow-up procedures, provide First Aid, as needed. • Work with PM to verify appropriate notifications and forms are completed for any incident or near miss. • Secure the scene after an emergency until given notification to release the scene by the CHSM.	• Provide verification of required health and safety training and medical surveillance prior to arriving at the site. • Notify the SSO of any special medical conditions (e.g., allergies). • Review, be familiar with and abide by the HASP. • Attend pre-work briefings and daily tailgate safety meetings. • Comply with requests of PM, SSO, and HASP. • Perform work using safe techniques; be responsible for their personal safety. • Immediately report any accidents and/or unsafe conditions to the SSO.

Table 2

Training / Medical Surveillance / Respirator Fit Test Records

Name	*EHS Category*	*Initial 40-Hour*	*Annual 8-Hour Refresher*	*8-Hour Supervisor (if applicable)*	*CPR/ First Aid[1] (initial or refresher)*	*Medical Surveillance[2] (if applicable)*	*Annual Respirator Fit Test[3] (if applicable)*	*Other:[4]*
		Date	***Date***	***Date***	***Date***	***Date***	***Date***	***Date***
Jeff Bennett	I	1990	1/2017	6/1990	1/2016	N/A	N/A	---
Jenn McGervey	I	8/2015	1/2017		1/2016	NA	NA	---
Lindsey Langer	I	8/2019						

Footnotes:

1 CPR Refresher: every year; First Aid Refresher: every three years.
2 Annual Medical Surveillance for EHS Category I.
3 For EHS Categories I & II only.
4 Could include task-specific training, project-specific training, or project-specific medical surveillance.

Table 3

General Safe Work Practices

- Report to work alert and ready to perform assigned duties; no sleeping is allowed at the jobsite.
- Immediately report any unsafe acts, incidents, accidents, or near misses. Utilize Stop Work Authority if needed.
- Minimize contact with excavated or contaminated materials. Do not place equipment on the ground. Do not sit or kneel on potentially contaminated surfaces.
- Smoking, eating, or drinking after entering the work zone and before decontamination is prohibited. Use of illegal drugs and alcohol are prohibited. Workers taking prescribed medication that may cause drowsiness should not be operating heavy equipment, and should be prohibited from performing tasks where Level C, B, or A personal protective equipment is required.
- Practice good housekeeping. Keep everything orderly and out of potentially harmful situations.
- Use of contact lenses on-site shall only be allowed when dictated by working conditions.
- The following conditions must be observed when operating a motor vehicle.
  - Wearing of seat belts is mandatory
  - During periods of rain, fog, or other adverse weather conditions, the use of headlights is mandatory
  - A backup warning system or use of vehicle horn is mandatory when the vehicle is engaged in a backward motion
  - Posted traffic signs and directions from flagmen must be observed
  - Equipment and/or samples transported in vehicles must be secured from movement
  - The use of contractor acquired vehicles by non-contractor personnel is prohibited
  - Daily inspection sheets should be completed by driver and kept with equipment for the duration of the project.
- In an unknown situation, always assume the worst conditions.
- Be observant of your immediate surroundings and the surroundings of others. It is a team effort to notice and warn of impending dangerous situations. Withdrawal from a hazardous situation to reassess procedures is the preferred course of action.
- Conflicting situations may arise concerning safety requirements and working conditions and must be addressed and resolved rapidly by the SSO and PM to relieve any motivations or pressures to circumvent established safety policies.
- Unauthorized breaches of specified safety protocol must not be allowed. Workers unwilling or unable to comply with the established procedures must be removed from the site immediately.

Table 4

Hazard Analysis

Tasks	
① Capping	⑤
② Soil Sampling	⑥
③ Well Installation	⑦
④ GW Sampling	⑧

	①	②	③	④	⑤	⑥		
I. Chemical Hazards								
Fire	X	X	X	X				
Inhalation	X	X	X	X				
Reactivity								
Skin absorption	X	X	X	X				
Cold Stress	X	X	X	X				
Compressed Gas Cylinder								
Drowning								
Drum Handling	X	X	X	X				
Electrocution	X	X	X	X				
Excavation/Trenching			X					
Eye Injury	X	X	X	X				
Hand/Foot Injury	X	X	X	X				
Heat Stress	X	X	X	X				
Heavy Equipment	X		X					
Lifting Heavy Loads	X		X					
Noise	X		X					
Portable Power/Hand Tool	X	X	X	X				
Radiation Exposure								
Slipping/Tripping/Falling	X	X	X	X				
III. Biological Hazards								
Poisonous Plants								
Insect/Vermin/Snake Bites								
Medical Waste								

Instructions: For each task, place an "X" in the blank corresponding to associated hazards.

Table 5

Potential Contaminants of Concern

Contaminant	***IP(eV)***	***REL** (ppm) or **PEL*** (mg/m3)	***IDLH*** (mg/m3)	***LEL/UEL %***	***Flash Point (°F)***	***Routes of Exposure***	***Hazards***	***Medium***[1]	***Maximum Concentration***[2]
Total Dust	--	0.05	--	--	--	--	--	soil/dust	--
PCBs	N/A	PEL – 1.0 TWA	5	N/A	N/A	Skin, Inhalation, Ingestion	C	soil	1,400 mg/kg
Lead	N/A	PEL – 0.05 TWA	100	N/A	N/A	Skin, Inhalation, Ingestion	C	soil	7,360 mg/kg
Cadmium	N/A	PEL - 0.005 TWA	9	N/A	N/A	Skin, Inhalation, Ingestion	C,T	soil	43.9 mg/kg
Arsenic	N/A	PEL - 0.01 TWA	5	N/A	N/A	Skin, Inhalation, Ingestion	C,T	soil	52.90 mg/kg
Diesel	--	REL – 100TWA	--	0.6/6.5	125.6	Skin, Inhalation, Ingestion	F,C,Co	soil	9,300 mg/kg
Gasoline	'--	None cited/300	--	1.4/7.6	-45	Skin, Inhalation, Ingestion	F, C, Co	soil	1,300 mg/kg

-- - none established *IDLH* - immediately dangerous to life and health *R* - reactive *C* - carcinogen *O-Oxidizer*
IP(eV) - ionization potential *PEL* - permissible exposure level *SC* - suspected carcinogen *Co* - corrosive
E- explosive *STEL* - short term exposure level *F* - flammable *NA* - not applicable
P- poison *V* - varies depending on compound mixture ND – Not determined

Footnotes:

[1] Indicate type of medium (i.e. soil, water, sludge, etc.).

[2] Indicate the maximum concentration detected for the contaminant

Table 6

Emergency Response Contacts

Name	*Telephone Numbers*		*Date of Pre-Emergency Notification*
	Office	*Mobile*	
Fire Department	**911**	NA	NA
Hospital – Corona Regional Medical Center	**911** or (951) 737-4343	NA	NA
Police Department	**911**	NA	NA
Site Safety Officer – Lindsey Langer	--	562-322-7934	NA
Project Manager – Jeff Bennett	714-500-5400 ext 5454	714-743-0482	NA
Regional Manager – Larry Lew	281-240-5200 X 2761	713-829-3215	NA
Corp. HR Manager – Glenda Croft	770-973-2100 x2870	NA	NA
Regional Health & Safety Coordinator – Julia Wlson	281-240-5200 X 2705	551-486-4382	NA

NA – Not applicable in general or for the level of hazard at this Site.

WRITTEN DIRECTIONS TO HOSPITAL: (See Figure 3).

1375 Magnolia Avenue

Corona, CA 92879

Head southwest on Magnolia Ave toward Sherborn St

0.1 mi

Turn right onto El Camino Ave

0.4 mi

Turn left onto E 6th St

1.6 mi

Turn left onto S Main St

0.2 mi

Corona Regional Medical Center

800 South Main Street, Corona, CA 92882

Table 7

Emergency Response Procedures

- This plan must be discussed with verbal training for onsite EarthCon employees and subcontractors
- This training should be documented and a copy provided to the CHSM.
- The SSO (or alternate) should be immediately notified via the on-site communication system.
- If applicable, the SSO must notify off-site emergency responders (i.e., fire department, hospital, police department, etc.) and must inform the response team as to the nature and location of the emergency on site.
- If applicable, the SSO evacuates the site. Site workers should move to their respective refuge stations using the evacuation routes provided on the Site Map. SSO must account for all workers associated with the project.
- The SSO notifies the PM, Principal, and the CHSM of the emergency. If an EarthCon employee is injured, the SSO must contact the worker's Regional Manager/Branch Office Manager immediately. If the Regional Manager/Branch Office Manager cannot be contacted, then the Corporate Human Resources Department must be notified.
- For small fires, flames should be extinguished using the fire extinguisher. Large fires should be handled by the local fire department.
- In an unknown situation or if responding to toxic gas emergencies, appropriate PPE, including SCBAs, should be donned.
- If chemicals are accidentally spilled or splashed into eyes or on skin, use eyewash and/or shower.
- Before continuing site operations after an emergency involving toxic gas, the appropriate responder will don a SCBA and utilize appropriate air monitoring equipment to verify that the site is safe.
- An injured worker must be decontaminated appropriately.
- If a worker is injured, first aid will be administered by workers certified in first aid.
- If necessary, the SSO will secure the scene after the response. The scene should not be released until notification from the CHSM.
- After the response, the SSO and /or PM must complete and submit the appropriate incident reports.
- The PM or SSO should secure written /signed witness statements as appropriate, take pictures, etc. immediately and before the end of the shift.
- If an investigation is required, the CHSM and Safety Team will set up a team to start the investigation with input from the DL.
- The CHSM will notify outside agencies as appropriate.

Appendix A

Site Safety Meeting Minutes

Site Name: _____ Contract No. _____

Meeting Location _____

Meeting Date _____ Time _____ Conducted By _____

_____ Pre-Fieldwork Orientation _____ Weekly Site Meeting _____ Other

Subjects Discussed:

Safety Officer Comments:

Name and Signature of Participating Personnel (list company name if subcontractor)

Note: Attach additional pages if necessary. Send this form to the EarthCon Project Manager. Copies will be placed in the appropriate project files.

Appendix B

Safety Data Sheets

Chlorodiphenyl (42% chlorine)

Synonyms & Trade Names

Aroclor® 1242, PCB [Chlorodiphenyl (42% chlorine)], Polychlorinated biphenyl [Chlorodiphenyl (42% chlorine)]

CAS No.

53469-21-9

RTECS No.

TQ1356000

DOT ID & Guide

2315 171

Formula

$C_6H_4ClC_6H_3Cl_2$ (approx)

Conversion

IDLH

Ca [5 mg/m^3]
See: 53469219

Exposure Limits

NIOSH REL

Ca TWA 0.001 mg/m^3 See Appendix A (nengapdxa.html) [*Note: The REL also applies to other PCBs.]

OSHA PEL

TWA 1 mg/m^3 [skin]

Measurement Methods

NIOSH 5503 ;

OSHA PV2089

See: NMAM or OSHA Methods

Physical Description

Colorless to light-colored, viscous liquid with a mild, hydrocarbon odor.

Molecular Weight

258 (approx)

Boiling Point

617-691°F

Freezing Point

-2°F

Solubility

Insoluble

Vapor Pressure

Vapor Pressure
0.001 mmHg

Ionization Potential
?

Specific Gravity
(77°F): 1.39

Flash Point
NA

Upper Exposive Limit
NA

Lower Explosive Limit
NA

Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans & chlorinated dibenzo-p-dioxins.

Incompatibilities & Reactivities
Strong oxidizers

Exposure Routes
inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms
irritation eyes; chloracne; liver damage; reproductive effects; [potential occupational carcinogen]

Target Organs
Skin, eyes, liver, reproductive system

Cancer Site
[in animals: tumors of the pituitary gland & liver, leukemia]

Personal Protection/Sanitation
(See protection codes (protect.html))
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily
Provide: Eyewash, Quick drench

First Aid
(See procedures (firstaid.html))
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter.

Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.

Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also

INTRODUCTION MEDICAL TESTS: 0175

Page last reviewed: April 11, 2016

Page last updated: April 11, 2016

Content source: National Institute for Occupational Safety and Health (NIOSH) (/niosh/) Education and Information Division

Chlorodiphenyl (54% chlorine)

Synonyms & Trade Names

Aroclor® 1254, PCB [Chlorodiphenyl (54% chlorine)], Polychlorinated biphenyl [Chlorodiphenyl (54% chlorine)]

CAS No.

11097-69-1

RTECS No.

TQ1360000

DOT ID & Guide

2315 171

Formula

$C_6H_3Cl_2C_6H_2Cl_3$ (approx)

Conversion

IDLH

Ca [5 mg/m^3]
See: IDLH INDEX

Exposure Limits

NIOSH REL

Ca TWA 0.001 mg/m^3 See Appendix A (nengapdxa.html) [*Note: The REL also applies to other PCBs.]

OSHA PEL

TWA 0.5 mg/m^3 [skin]

Measurement Methods

NIOSH 5503 ;

OSHA PV2088

See: NMAM or OSHA Methods

Physical Description

Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocarbon odor.

Molecular Weight

326 (approx)

Boiling Point

689-734°F

Freezing Point

50°F

Solubility

Insoluble

Vapor Pressure

Vapor Pressure
0.00006 mmHg

Ionization Potential
?

Specific Gravity
(77°F): 1.38

Flash Point
NA

Upper Exposive Limit
NA

Lower Explosive Limit
NA

Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans, and chlorinated dibenzo-p-dioxins.

Incompatibilities & Reactivities
Strong oxidizers

Exposure Routes
inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms
irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen]

Target Organs
Skin, eyes, liver, reproductive system

Cancer Site
[in animals: tumors of the pituitary gland & liver, leukemia]

Personal Protection/Sanitation
(See protection codes (protect.html))
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: Daily
Provide: Eyewash, Quick drench

First Aid
(See procedures (firstaid.html))
Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter.

Click here (pgintrod.html#nrp) for information on selection of N, R, or P filters.

Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also

INTRODUCTION ICSC CARD: 0939 MEDICAL TESTS: 0176

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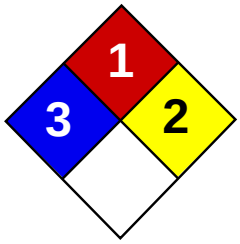
Content source: National Institute for Occupational Safety and Health (NIOSH) (/niosh/) Education and Information Division



Material Safety Data Sheet
Arsenic MSDS

Section 1: Chemical Product and Company Identification

Product Name: Arsenic

Catalog Codes: SLA1006

CAS#: 7440-38-2

RTECS: CG0525000

TSCA: TSCA 8(b) inventory: Arsenic

CI#: Not applicable.

Synonym:

Chemical Name: Arsenic

Chemical Formula: As

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

Toxicological Data on Ingredients: Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 74.92 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: Not available.

Melting Point: Sublimation temperature: 615°C (1139°F)

Critical Temperature: Not available.

Specific Gravity: 5.72 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, acids, moisture.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 145 mg/kg [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

Other Toxic Effects on Humans:
Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Arsenic UNNA: UN1558 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R22- Harmful if swallowed. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 2

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 2

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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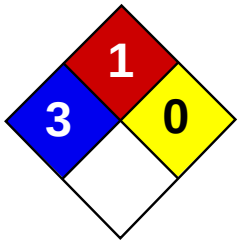

Health	3
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Cadmium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cadmium

Catalog Codes: SLC3484, SLC5272, SLC2482

CAS#: 7440-43-9

RTECS: EU9800000

TSCA: TSCA 8(b) inventory: Cadmium

CI#: Not applicable.

Synonym:

Chemical Name: Cadmium

Chemical Formula: Cd

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Cadmium	7440-43-9	100

Toxicological Data on Ingredients: Cadmium: ORAL (LD50): Acute: 2330 mg/kg [Rat.]. 890 mg/kg [Mouse]. DUST (LC50): Acute: 50 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant). Severe over-exposure can result in death.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to kidneys, lungs, liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: No known effect on eye contact, rinse with water for a few minutes.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 570°C (1058°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:
Non-flammable in presence of open flames and sparks, of heat, of oxidizing materials, of reducing materials, of combustible materials, of moisture.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:
Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.01 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 112.4 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 765°C (1409°F)

Melting Point: 320.9°C (609.6°F)

Critical Temperature: Not available.

Specific Gravity: 8.64 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Reacts violently with potassium.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 890 mg/kg [Mouse]. Acute toxicity of the dust (LC50): 229.9 mg/m3 4 hour(s) [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. The substance is toxic to kidneys, lungs, liver.

Other Toxic Effects on Humans:
Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: An allergen. 0047 Animal: embryotoxic, passes through the placental barrier.

Special Remarks on other Toxic Effects on Humans: May cause allergic reactions, exzema and/or dehydration of the skin.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport:

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Cadmium California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Cadmium Pennsylvania RTK: Cadmium Massachusetts RTK: Cadmium TSCA 8(b) inventory: Cadmium SARA 313 toxic chemical notification and release reporting: Cadmium CERCLA: Hazardous substances.: Cadmium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R26- Very toxic by inhalation. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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Gasoline

Synonyms & Trade Names

Motor fuel, Motor spirits, Natural gasoline, Petrol [Note: A complex mixture of volatile hydrocarbons (paraffins, cycloparaffins, and aromatics).]

CAS No.

8006-61-9

RTECS No.

LX3300000

DOT ID & Guide

1203 128

Formula

Conversion

1 ppm = 4.5 mg/m^3 (approx)

IDLH

Ca [N.D.]
See: IDLH INDEX

Exposure Limits

NIOSH REL

Ca See Appendix A (nengapdxa.html)

OSHA PEL

none See Appendix G (nengapdxg.html)

Measurement Methods

OSHA PV2028

See: NMAM or OSHA Methods

Physical Description

Clear liquid with a characteristic odor.

Molecular Weight

110 (approx)

Boiling Point

102°F

Freezing Point

?

Solubility

Insoluble

Vapor Pressure

Vapor Pressure
38-300 mmHg

Ionization Potential
?

Specific Gravity
(60°F): 0.72-0.76

Flash Point
-45°F

Upper Exposive Limit
7.6%

Lower Explosive Limit
1.4%

Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.

Incompatibilities & Reactivities
Strong oxidizers such as peroxides, nitric acid & perchlorates

Exposure Routes
inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms
irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen]

Target Organs
Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site
[in animals: liver & kidney cancer]

Personal Protection/Sanitation
(See protection codes (protect.html))
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid
(See procedures (firstaid.html))
Eye: Irrigate immediately
Skin: Soap flush immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister

Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also

INTRODUCTION

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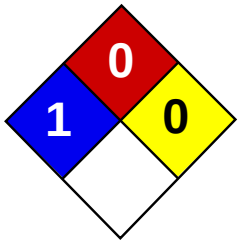
Page last updated: April 11, 2016

Content source: National Institute for Occupational Safety and Health (NIOSH) (/niosh/) Education and Information Division



Health	1
Fire	0
Reactivity	0
Personal Protection	E

Material Safety Data Sheet
Lead MSDS

Section 1: Chemical Product and Company Identification

Product Name: Lead

Catalog Codes: SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

CAS#: 7439-92-1

RTECS: OF7525000

TSCA: TSCA 8(b) inventory: Lead

CI#: Not available.

Synonym: Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

Chemical Name: Lead

Chemical Formula: Pb

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

Toxicological Data on Ingredients: Lead LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Non-flammable in presence of open flames and sparks, of shocks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards: When heated to decomposition it emits highly toxic fumes of lead.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 0.05 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m3) from OSHA (PEL) [United States] TWA: 0.03 (mg/m3) from NIOSH [United States] TWA: 0.05 (mg/m3) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Metal solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 207.21 g/mole

Color: Bluish-white. Silvery. Gray

pH (1% soln/water): Not applicable.

Boiling Point: 1740°C (3164°F)

Melting Point: 327.43°C (621.4°F)

Critical Temperature: Not available.

Specific Gravity: 11.3 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, excess heat

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Inhalation. Ingestion.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:
Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungsby mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually abssorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, deliriuim, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead cholic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Appendix C

Chemical Information Directory

Included in HASP	*Chemical Name*	*Synonyms*
	Acetone	Dimethyl Ketone; Ketone propane; 2-Propanone
	Aldrin	HHDN; Octalene
	Aniline	Aminobenzene; Aniline Oil; Benzeneamine
X	Arsenic	Arsenic metal; Arsenia
	Barium	Barium metal
	Benzene	Benzol; Phenyl hydride
	Bis(2-ethylhexyl)phthalate	Di(2-ethylhexyl)phthalate
X	Cadmium	Cadmium metal
	Carbon disulfide	Carbon bisulfide
	Chlorobenzene	Benzene chloride; Chlorobenzyl; MCB; Phenyl chloride
	Chloroethane	Ethyl chloride
	Chloroform	Methane trichloride; Trichloromethane
	Chromic Acid	Chromic anhydride; Chromium trioxide
	Chromium	Chromium metal
	Cobalt	Cobalt metal dust, cobalt metal fume
	Copper	Copper metal dusts; Copper metal mists
	Cyanide	Cyanide
	Cyclohexane	Benzene Hexahydride; hexamethylene
	Dieldrin	Dieldrin
	DIPE	Diisopropyl ether
	Dioxin	Dioxin
	1,2-Dichlorobenzene	O-DCB; Orthodichlorobenzene
	1,1-Dichloroethane	Ethylidene chloride
	1,2-Dichloroethane	Ethylene dichloride; Glycol dichloride
	1,1-Dichloroethylene	1,1-Dichloroethene, vinylidene chloride
	1,2-Dichloroethylene	1,2-Dichloroethene; (cis, trans, or sym-) Acetylene dichloride
	1,2-Dichloropropane	Propylene dichloride; Dichloro-1,2-propane
	2,4-Dinitrotoluene	Dinitrotoluene; DNT; Methyldinitrobenzene
	1,4-Dioxane	Dioxane, Diethylene dioxide, Diethylene ether

Appendix C

Chemical Information Directory
(continued)

Included in HASP	*Chemical Name*	*Synonyms*
	Ethylbenzene	Ethylbenzol; Phenylethane
	ETBE	Ethyl tert-butyl ether
	Ethylene Dibromide	EDB; 1,2-Dibromoethane, Ethylene bromide, Glycol dibromide
	Formaldehyde	Methanal; Methyl aldehyde; Methylene oxide
X	Gasoline& Diesel	Motor fuel; Motor spirits; Natural gasoline; Petrol
	Motor oil	Motor oil
	Hexachloroethane	Carbon hexachloride; Ethane hexachloride; Perchloroethane
	Hydrochloric Acid	Anhydrous hydrogen chloride; Aqueous hydrogen chloride; Muriatic acid
	Hydrogen Sulfide	Hydrosulfuric acid; Sewer gas; Sulfuretted hydrogen
	Iron	Iron
	Isophorone	Isoacetophorone; 3,5,5-Trimethyl 2- cyclohexenone
	Isopropanol	Isopropyl alcohol; IPA; 2-Propanol
X	Lead (inorganic)	Lead metal
	Manganese	Manganese
	MTBE	Methyl Tert Butyl Ether
	Mercury	Colloidal mercury; Metallic mercury; Quicksilver
	Methane	Fire damp; March gas; Methyl hydride
	Methanol	Carbinol; Columbian spirits; Pyroligneous spirit; Wood alcohol; Wood naphtha; Wood spirit
	Methoxyclor	p,p-Dimethoxydiphenyl/trichlorethane; DMDY
	Methyl chloroform	1,1,1-Trichloroethane
	Methylcyclohexane	Cyclohexylmethane; Hexahydrotoluene
	Methylene chloride	Dichloromethane; Methylene Dichloride
	Naphthalene	Naphthalin; Tar Camphor; White Tar
	Nickel	Nickel catalyst

Appendix C

Chemical Information Directory
(continued)

Included in HASP	*Chemical Name*	*Synonyms*
	Nitrobenzene	Essence of mirbane; Nitrobenzol; Oil of mirbane
	PAHs	Poly Aromatic Hydrocarbons
	Pentachlorophenol	PCP; Penta; 2,3,4,5,6-Pentachlorophenol
	Phenol	Carbonic acid; Hydroxybenzene; Monohydroxybenzene; Phenol alcohol; Phenyl hydroxide
	Phosgene	Carbonyl chloride; Carbon oxychloride; Chloroformyl chloride
X	Polychlorinated biphenyls (54%)	PCBs; Chlorodiphenyl
	Sodium bisulfate	
	Synergist-D	Proprietary product
	Silver	Silver metal; Argentum
	TAME	Tertiary-amyl methyl ether
	TBA	Tert butyl alchol
	Tetrachloroethylene	Tetrachloroethylene; Perchlorethylene; Perk
	Toluene	Methyl benzene; Methyl benzol
	Toxaphene	Chlorinated camphene
	1,1,2-Trichloroethane	Ethane trichloride; B-Trichloroethane; Vinyl trichloride
	1,2,4-Trichlorobenzene	Trichlorobenzene; 1,2,4-Trichlorobenzel
	Trichloroethene	Trichloroethylene; TCE
	Trichlorofluoromethane	Fluorotrichloromethane; Freon II
	Trichlorotrifluoroethane	Freon 113; 1,1,2-Trichloro-1,2,2-trifluoroethane; CFC-113
	1,2,3-Trichloropropane	Allyl trichloride, Glycerol trichorohydrin, Glyceryl trichlorohydrin; Trichlorohydrin
	1,2,3-Trimethylbenzene	Hemellitol
	1,2,4-Trimethylbenzene	psi-Cumene; Pseudocumene
	1,3,5-Trimethylbenzene	Mesitylene; sym-Trimethylbenzene
	Vinyl chloride	Chloroethene; VC; VCM
	Xylene (Mixed Isomers)	o-xylene; p-xylene; m-xylene

Appendix D

Hazard Mitigators Directory

Included in HASP	*Hazards*
X	Fire
X	Inhalation
	Reactivity
X	Skin Absorption
Physical Hazards	
	Compressed Gas Cylinder
X	Drilling
	Drowning
X	Drum Handling
X	Electrocution
X	Excavation/Trenching
X	Eye Injury
X	Hand/Foot Injury
X	Heat Stress
X	Cold Stress
X	Heavy Equipment
X	Lifting Heavy Loads
X	Noise
X	Portable Power/Hand Tool
	Radiation Exposure
X	Slipping/Tripping/Falling
	Allergic Reaction to Poisonous Plants
	Insect/Vermin/Snake Bites
	Medical Waste

* All members of the drilling crews shall be trained in the safety features and procedures to be utilized during operation, inspection, and maintenance of the equipment.
* Conduct a survey, prior to bringing drilling equipment to the job site, to identify overhead electrical hazards, potential subsurface hazards, and terrain hazard. Once on-site, before drilling equipment is moved, the travel route shall again be visually surveyed for overhead and terrain hazards.
* Use only drilling equipment equipped with two easily accessible emergency shutdown devices, one for the operator and one for the helper.
* Do not transport drilling equipment with the mast in the upward position.
* Set up equipment on stable ground. Cribbing (a system of timbers, arranged in a rectangular pattern, used to support and distribute the weight of the equipment) shall be used when necessary.
* Extend outriggers per the manufacturer's specifications.
* Monitor weather conditions. Operations shall cease during electrical storms or when electrical storms are imminent.
* Wearing of loose clothing or equipment is not permitted.
* Use auger guides on hard surfaces.
* Verbally alert employees and visually ensure employees are clear from dangerous parts of equipment prior to starting or engaging equipment.
* Channel the discharge of drilling fluids away from the work area to prevent the pooling of water.
* Use hoists only for their designed intent. Hoists shall not be loaded beyond their rated capacity. Steps shall be taken to prevent two-blocking of hoists (the condition when the lower load block or hook assembly comes in contact with the upper load block, or when the load block comes in contact with the boom tip).
* Follow the equipment manufacturer's procedures if ropes become caught in, or objects are pulled into a cathead.

* Do not run or rotate drill rods through rod slipping devices. No more than one foot of drill rod column shall be hoisted above the top of the drill mast. Drill rod tool joints shall not be made up, tightened, or loosened while the rod column is supported by a rod slipping device.
* Control dust using dust suppression techniques.
* Clean augers only when the rotating mechanism is in neutral and the auger is stopped. Tools such as long handled shovels shall be used to remove cuttings from the auger.
* Cap and flag open boreholes; open excavations shall be barricaded.
* Keep all hand tool used during drilling operations clean and in good working condition.
* Wear hard hats and steel-toed boots at all times when performing drilling operations.
* Wear hearing protection when required.

During Geoprobe drilling

- Pay close attention to acetate sampling sleeves; can cause minor cuts when they become jiggered
- Probes /rods can have pinch points; take care when removing or adjusting.
- There will be noise so use hearing protections

- Be aware of the potential hazards of the contents of drums or containers before handling.
- Inspect the integrity of the drum or container before moving. Any drum or container lacking integrity shall be over packed.
- Consider any unlabeled drum or container as containing a hazardous substance and leave alone until contents are properly identified and labeled.
- Organize site operations to minimize the amount of drum or container movement.
- Never stand on drums or containers.
- Know that bulging drums or containers are an indication of pressure build-up. Pressure can be relieved slowly by carefully loosening the bung. If the possibility of fire or explosion exists, protective shield and/or remote opening devices should be used.
- Utilize drum/container handling equipment whenever possible. The equipment utilized should have a sufficiently rated load capacity, and should be able to operate smoothly on the available surface.
- Use proper lifting and moving techniques to prevent back injuries, if handling equipment is not available.
- Have a clear view of the available pathway when moving drums. If needed, an additional person should be available to provide guidance.
- Set up drum/container staging areas to safely identify and classify contents for proper shipment. Staging areas shall be provided with adequate ingress and egress routes.
- Label and identify drums and containers as to their contents when moved to the staging areas.
- Cease all site operations immediately if site activities uncover buried drums or containers. The SSO must be notified. The SSO will evacuate the site. All unknown situations must be evaluated before site activities are resumed. The services of a specialized contractor trained in handling unknown contaminants may be needed. If, after evaluating the situation, only a portion of the site is affected, that
- Use only drums and containers that meet the appropriate DOT, OSHA, and EPA regulations.

- When scheduling or work conditions necessitate leaving excavations open overnight, security fencing will be erected to restrict access to the site or work zones. An exclusion zone, contamination reduction zone and support zone will be identified for each soil disturbance site, as described in Section 2.4.5.

- Underground Service Alert must be notified of subsurface work at a minimum of 48 hours prior to the commencement of field activities.

- As part of the on-site health and safety meeting, a Site walk with the operators will be conducted to identify work locations (locations shown on the work plan/site plan will be in areas free of utilities/subsurface structures). Mark outs of all utilities will be verified.

- If pea-gravel is encountered while excavating all work must stop and the SSO will be contacted for further instruction. Pea-gravel is a potential indication of underground storage tank(s) or utility bedding/backfilling material.

- If any utility/subsurface feature is hit or damaged the SSO will be IMMEDIATELY contacted for further instruction. If the SSO cannot be reached contact the Project Manager for further instruction.

* A minimum clearance of 12 feet (radius) will be maintained between heavy equipment (i.e., drill rig) and any overhead power lines, regardless of voltage.
* Before subsurface work, a utilities search for underground lines will occur and will be documented.
* Installation and maintenance of electrical facilities or equipment must only be performed by qualified and properly authorized personnel or electrical subcontractors. Apprentice personnel permitted to work on electrical equipment shall be under the surveillance of a fully qualified electrician.
* Electricians shall be familiar with the National Electrical Code; state and local electric codes; OSHA standards, including 29 CFR 1926, Subpart K; and applicable sections of the National Fire Protection Association Codes.
* When working on energized circuits of 440 volts or higher, at least one qualified electrician and one other employee shall be present.
* Do not wear rings, watches or metallic objects that could act as conductors when working with electrical circuits.
* Do not use metal ladders and un-insulated tools while working with electrical circuits and equipment.
* Follow the company Lock-out/Tag-out procedures when applicable. Electrical equipment and lines shall always be considered “energized” until proven “de-energized”. Before beginning work, each electrical circuit shall be inspected, tested, and where possible, isolated from the power source. Extreme care shall be exercised as wires designed to operate at ground potential may become energized by faulty or inadequate connections.
* Use only approved grounding equipment as a ground for electrical equipment. Metal frames on electricity powered equipment, electrical facilities, and transmission equipment shall be connected to the grounding system. Alternative grounding systems complying with applicable electrical codes may be used for temporary portable equipment.
* Protect electrical wires with suitable protective conduits or devices where they are exposed to possible damage.
* Connect grounding devices to a ground before contacting any conductor of a circuit. When grounding devices are removed, they shall be disconnected from the circuit before being disconnected from ground.
* Equip all portable extension cords with a non-conducting plug and/or another socket shell. All electrical cords shall be equipped with three-blade grounding type plugs.

* Use only heavy duty electrical cords that are not subjected to excessive bending, stretching, or kicking. All cords and wires shall be frequently inspected for signs of defects. Damaged or frayed electrical wires, cords, and plugs shall be immediately replaced by a qualified electrician or other properly trained personnel.
* Install adequate warning signs and barriers (in plain sight) in all areas where hazardous electrical facilities exist.
* Do not permit overloading of electrical circuits at any time. The replacement of fuses or circuit breakers with makeshift materials or over-capacity fuses is strictly prohibited.
* The type of circuit shall determine the type of protective equipment required. Rubber gloves, sleeves, blankets, mats, and insulated platforms shall be used as required. Questions regarding PPE should be directed to the SSO.
* Inspect all insulated protective equipment continuously for defects or damages. Any defective equipment shall be replaced before using.
* Establish and enforce testing schedules for insulation qualities for protective equipment. All users shall verify that equipment has been satisfactorily tested prior to use.

* Wear appropriate eye protection according to the task at hand (e.g., goggles if liquid splash could occur, welding lenses, etc.).

* Minimize the amount of vapor or particulate matter generated, if possible.

* Avoid touching the face and eyes.

* Flush eye with water for at least 15 minutes if chemicals do get into the eye.

* Be aware of “pinch points” when working with tools and heavy equipment.
* Use proper lifting techniques to avoid dropping heavy loads on hands and feet.
* Be aware of moving machinery and heavy equipment in the work area.
* Wear protective gloves as required in the Health and Safety Plan.
* Wear steel-toed boots as required in the Health and Safety Plan.

Fatal exposures to cold among workers have almost always resulted from accidental exposures involving failure to escape from low environmental air temperatures or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is the fall in the deep core temperature of the body. Workers should be protected from exposure to cold so that the deep core temperature does not fall below 96.8°F; lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision making, or loss of consciousness with the threat of fatal consequences. Pain in the extremities may be the first early warning of danger to cold stress. During exposure to cold, maximum severe shivering develops when the body temperature has fallen to 95°F. This must be taken as a sign of danger to the workers and exposure to cold should be immediately terminated for any workers when severe shivering becomes evident. Since prolonged exposure to cold air, or to immersion in cold water, at temperatures well above freezing can lead to dangerous hypothermia, whole body protection must be provided.

Adequate insulating dry clothing to maintain core temperatures above 96.8°F must be provided to workers if work is performed in air temperatures below 40°F. Wind chill cooling rate must also be considered when determining protective clothing. The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the deep body core temperature.

Unless there are unusual or extenuating circumstances, cold injury to other than hands, feet, and head is not likely to occur without the development of the initial signs of hypothermia. Older workers or workers with circulatory problems require special precautionary protection against cold injury. The use of extra insulating clothing and/or a reduction in the duration of the exposure period are among the special precautions which should be considered.

Workers handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below 39.2°F should take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling. Special note should be taken of the particularly acute effects of splashes of “cryogenic fluids” or those liquids and gases with a boiling point that is just above ambient temperature.

Heat stress is a medical condition where a worker exerts energy above his body's ability to adapt to the stress. Malfunctioning or overload of the body's temperature and sweat mechanisms results in heat stress. Poor adaptation to heat may lead to heat cramps, heat exhaustion, or heat stroke. There are three primary causes of heat stress: insufficient water intake; insufficient salt intake; and a deficiency in the production of sweat, the evaporation of which helps to cool the body naturally. Heat stress or heat exhaustion can result in a more life-threatening condition called heat stroke, which is an overexposure to extreme heat, where the body can no longer provide natural regulation of heat. The body overheats and core temperatures may reach 107F which can result in a coma and death

Field team members shall be observed for signs and symptoms of heat stress that include: confusion, dizziness, profuse sweating, skin color change, increased heart rate and vision problems. Personnel who exhibit any of these symptoms shall be removed from field work and requested to consume two to four pints of electrolyte fluid or cool water every hour while resting in a shaded area. The individual should not return to work until the symptoms are no longer recognizable. If symptoms appear critical, persist, or get worse, seek immediate medical attention.

To control the potential occurrence of heat stress, preventive measures will be evaluated and implemented on a daily basis. These measures may include:

- Frequent rest periods;
- Inducement of fluids (e.g., water, Gatorade, etc.) at a rate of one-half to one cup of cool (55ºF) water every 20 minutes of the workday; and
- Periodic cooling of personnel (e.g., via shaded areas, hose-downs with water, etc.).
- Sensitive personnel should wear sunscreen containing a minimum Sun Protection Factor of 15 when working outdoors in the sun. Sunscreen lotion should be applied prior to entering the work zones.

ainst heat, sun exposure, and other hazards. Employers and employees should know the potential hazards in their workplaces and how to manage them.

Sun

Sunlight contains ultraviolet (UV) radiation, which causes premature aging of the skin, wrinkles, cataracts, and skin cancer. There are no safe UV rays or safe suntans. Be especially careful in the sun if you burn easily, spend a lot of time outdoors, or have any of the following physical features: numerous, irregular, or large moles; freckles; fair skin; or blond, red, or light brown hair. Here's how to block those harmful rays:

- Cover up. Wear loose-fitting, long-sleeved shirts and long pants.
- Use sunscreen with a sun protection factor (SPF) of at least 30. Be sure to follow application directions on the bottle or tube.
- Wear a hat. A wide brim hat, not a baseball cap, works best because it protects the neck, ears, eyes, forehead, nose, and scalp.
- Wear UV-absorbent sunglasses (eye protection). Sunglasses don't have to be expensive, but they should block 99 to 100 percent of UVA and UVB radiation. Before you buy sunglasses, read the product tag or label.
- Limit exposure. UV rays are most intense between 10 a.m. and 4 p.m.

OSHA Card—Protecting Yourself in the Sun
www.osha.gov/Publications/osha3166.pdf

Heat

The combination of heat and humidity can be a serious health threat during the summer months. If you work outside (for example, at a beach resort, on a farm, at a construction site) or in a kitchen, laundry, or bakery you may be at increased risk for heat-related illness. So, take precautions. Here's how:

- Drink small amounts of water frequently.
- Wear light-colored, loose-fitting, breathable clothing—cotton is good.
- Take frequent short breaks in cool shade.
- Eat smaller meals before work activity.
- Avoid caffeine and alcohol or large amounts of sugar.
- Work in the shade.
- Find out from your health care provider if your medications and heat don't mix.
- Know that equipment such as respirators or work suits can increase heat stress.

There are three kinds of major heat-related disorders—heat cramps, heat exhaustion and heat stroke. You need to know how to recognize each one and what first aid treatment is necessary.

OSHA Heat Stress Fact Sheet:
www.osha.gov/OshDoc/data_Hurricane_Facts/heat_stress.pdf

OSHA Heat Stress Quick Card:
www.osha.gov/Publications/osha3154.pdf

Lyme Disease/Tick-Borne Diseases

These illnesses (i.e., Rocky Mountain spotted fever) are transmitted to people by bacteria from bites of infected deer (blacklegged) ticks. In the case of Lyme disease, most, but not all, victims will develop a "bulls-eye" rash. Other signs and symptoms may be non-specific and similar to flu-like symptoms such as fever, lymph node swelling, neck stiffness, generalized fatigue, headaches, migrating joint aches, or muscle aches. You are at increased risk if your work outdoors involves construction, landscaping, forestry, brush clearing, land surveying, farming, railroads, oil fields, utility lines, or park and wildlife management. Protect yourself with these precautions:

- Wear light-colored clothes to see ticks more easily.

- Wear long sleeves; tuck pant legs into socks or boots.
- Wear high boots or closed shoes that cover your feet completely.
- Wear a hat.
- Use tick repellants, but not on your face.
- Shower after work. Wash and dry your work clothes at high temperature.
- Examine your body for ticks after work. Remove any attached ticks promptly and carefully with fine-tipped tweezers by gripping the tick. Do not use petroleum jelly, a hot match, or nail polish to remove the tick.

OSHA Lyme Disease Fact Sheet: www.osha.gov/OshDoc/data_LymeFacts/lymefac.pdf

West Nile Virus

West Nile virus is transmitted by the bite of an infected mosquito. Mild symptoms include fever, headache, and body aches, occasionally with a skin rash on the trunk of the body and swollen lymph glands. Symptoms of severe infection include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. You can protect yourself from mosquito bites in these ways:

- Apply Picaridin or insect repellent with DEET to exposed skin.
- Spray clothing with repellents containing DEET or permethrin. (Note: Do not spray permethrin directly onto exposed skin.)
- Wear long sleeves, long pants, and socks.
- Be extra vigilant at dusk and dawn when mosquitoes are most active.
- Get rid of sources of standing water (used tires, buckets) to reduce or eliminate mosquito breeding areas.

OSHA West Nile Virus Fact Sheet: www.osha.gov/OshDoc/data_Hurricane_Facts/west_nile_virus.pdf

OSHA Safety and Health Information Bulletin: "Workplace Precautions Against West Nile Virus"

http://www.osha.gov/dts/shib/shib082903b.pdf

Poison Ivy-Related Plants

Poison ivy, poison oak and poison sumac have poisonous sap (urushiol) in their roots, stems, leaves and fruits. The urushiol may be deposited on the skin by direct contact with the plant or by contact with contaminated objects, such as clothing, shoes, tools, and animals.

Approximately 85 percent of the general population will develop an allergy if exposed to poison ivy, oak or sumac. Forestry workers and firefighters who battle forest fires have developed rashes or lung irritations from inhaling the smoke of burning plants.

- Wear long-sleeved shirts and long pants, tucked into boots. Wear cloth or leather gloves.
- Apply barrier creams to exposed skin.
- Educate workers on the identification of poison ivy, oak, and sumac plants.
- Educate workers on signs and symptoms of contact with poisonous ivy, oak, and sumac.
- Keep rubbing alcohol accessible. It removes the oily resin up to 30 minutes after exposure.

OSHA Web Page—Poisonous Plants: www.osha.gov/SLTC/etools/sawmills/poison.html

* Apply Hazard Mitigators for motor vehicles when utilizing heavy equipment (where applicable).

* Remember, heavy equipment has the right-of-way over regular vehicles. Yield to heavy equipment.

* Listen for warning signals on heavy equipment.

* Perform a visual inspection and walk around parked heavy equipment before moving to assure that equipment is in good condition and that there are no personnel on the ground that could be injured or objects that could be damaged by vehicle movement.

* Use hand rails and footholds when mounting and dismounting equipment,

* Follow appropriate equipment startup procedures. Brakes, steering, clutches and controls shall be tested.

* Pay attention to workers on the ground that may be in the path and provide warning prior to moving the equipment.

* Permit no one to ride on, or in, heavy equipment. This includes any portion of a backhoe, bulldozer, forklift or the back of a pickup truck, except in locations specifically designed for passenger use and approved by the SSO.

* Locate and flag underground utilities and buried cables, whenever possible, prior to intrusive activities (such as excavation and drilling).

* Keep haulage vehicles under positive control at all times while operating. Vehicles shall be kept in gear when descending grades.

* Do not use heavy equipment on slopes with steepness exceeding 3H:1V unless operations are consistent with manufacturer's recommendations (if the Owner's Manual is not with the equipment or does not specify slope operating procedures, see the SSO).

* Operate equipment with booms, blades, buckets, beds, etc., lowered or in a stable position while on slopes. Safety cables tethered to appropriate anchors shall be used for equipment working on steep slopes, where appropriate. The use of cables and anchors must be approved by the SSO.

* Use rollover protection and seat belts.

* Lower hydraulic systems (e.g., blades, rippers, etc.) to the ground, set brakes, and shut down equipment if malfunction occurs which impairs the ability to control a piece of equipment.

* Suspend in slings or support by hoists or jacks heavy equipment in need of repair. The equipment must also be blocked or cribbed before workers are permitted to work underneath. Working under heavy equipment can pose a crushing hazard.

* Shut off motors, do not allow smoking, and use proper dispensing equipment when refueling gasoline-operated equipment to prevent fire hazards.

* Wear hearing protection if required.

* Maintain eye contact with the heavy equipment operator when working near equipment.

* Be aware of changes in sound of equipment that may indicate a change in direction or activity.

* Know and practice proper lifting techniques.
* Limit continuous lifting of weights to 50 pounds or less. Lifts of heavier weights are permitted on an interim basis. Help shall be obtained for lifting of loads greater than 50 pounds. Mechanical equipment should be used on heavy materials when possible. If mechanical assistance is not available, adequate manpower to maintain the 50-pound limit per employee will be required.
* Do not lift more weight than can be handled comfortably, regardless of load weight. If necessary, help should be requested to lift a load so that the lifting is comfortable.
* Use drum dollies when moving drums or barrels.
* Inspect objects for grease or slippery substances before they are lifted to ensure that the object will not slip.
* Do not carry long, bulky or heavy objects without first verifying that the way is clear and that vision is unobstructed. This ensures that other persons or objects will not be struck by the load.
* Do not carry loads that cannot be seen over or around.
* Make sure workers are physically suited for the job before assigning jobs requiring heavy and/or frequent lifting. A person's lifting ability is not necessarily indicated by his height or weight.
* Before lifting an object, consideration should be given to how the object will be set down without pinching or crushing hands or fingers. For example, to place an object on a bench or table, the object should be set on the edge and pushed far enough onto the support so it will not fall. The object can then be released gradually as it is set down, and pushed in place with the hands and body from in front of the object.
* When two or more persons are handling the same object, one should "call the signals". All the persons on the lift should know who this person is and should warn him if anyone in the crew is about to relax his grip.
* Proper lifting includes:
  - *Feet* - Feet should be parted, with one foot alongside the object being lifted and one behind. Feet should be comfortably spread to give greater stability. The rear foot should be in position for the upward thrust of the lift.
  - *Back* - Use the sit-down position and keep the back straight, but remember that "straight" does not mean "vertical". A straight back keeps the spine, back muscles, and organs of the body in correct alignment. It minimizes the compression of the abdomen that can cause a hernia.
  - *Arms and Elbows* - The load should be drawn close, and the arms and elbows should be tucked into the side of the body. When the arms are held away from the body, they lose much of their strength and power. Keeping the arms tucked in also helps keep body

weight centered.

- *Palm* - The palm grip is one of the most important elements of lifting. The fingers and the hand are extended around the object to be lifted. Use the full palm; fingers alone have very little power.
- *Chin* - Tuck in the chin so the neck and head continue the straight back line. Keep the spine straight and firm.
- *Body Weight* - Position the body so its weight is centered over the feet. This provides a more powerful line of thrust and assures better balance. Start the lift with a thrust of the rear foot. Shift hand positions so the object can be boosted after knees are bent. Straighten knees as object is lifted or shifted to the shoulders. To change direction, lift the object to a carrying position, and turn the entire body, including the feet. Do not twist your body. In repetitive work, both the person and the material should be positioned so that the worker will not have to twist his body when moving the material. If the object is too heavy to be handled by one person, get help.

* Know the effects of noise, including:
  - Workers being startled, annoyed, or distracted.
  - Physical damage to the ear, pain, and temporary and/or permanent hearing loss.
  - Communication interference that may increase potential hazards due to the inability to warn of danger and proper safety precautions to be taken.
* Utilize feasible administrative or engineering controls if workers are subjected to noise exceeding an 8-hour, time-weighted average (TWA) sound level of 90 dBA (decibels on the A-weighted scale).
* Implement the company Hearing Conservation Program when noise exposures equal or exceed an 8-hour, TWA sound level of 85 dBA.
* Wear hearing protection where applicable.

* Route cords, hoses, and cables supplying power to portable power tools to prevent tripping hazards or contact with equipment or machinery.
* Avoid abusing the power supply lines of portable equipment. Excessive scraping, kicking, stretching, and exposure to grease and oils will damage lines or cause them to fail prematurely, and possibly injure the operator or fellow workers.
* Inspect cords, hoses, and cables for wear or deterioration prior to each use. Defective power supply lines shall not be used.
* Do not use electrically powered tools near flammable materials or explosive atmosphere, unless they are of the explosion-proof type meeting the National Electrical Code for explosive area. Employees operating the equipment should be aware of sparks and or metal fragments when using this equipment.
* Ground-check portable electric power tools with metal cases initially and quarterly. At no time will electrical power equipment be operated without proper grounding. All electrical cords and cables, including extension cords, shall include a third wire ground.
* Prohibit operations of electric tools in wet or damp areas except in unusual emergency circumstances. When operation is required in wet or damp conditions, extreme care will be exercised to ensure effective grounding of equipment and proper use of protective gear.
* Size cords adequately for length and the electrical demand of the tool. Otherwise, they may cause a fire hazard.
* Limit use of tools to the purpose for which the tool is intended (e.g., wrenches will not be used as hammers). Defective tools (e.g., with mushroomed heads or split or defective handles) shall not be used.
* Protect tools from corrosion damage.
* Keep tools free of accumulated dirt and unnecessary oil or grease. Moving and adjustable parts shall be lubricated frequently to prevent wear and misalignment.
* Replace or repair damaged or worn tools promptly. Temporary or makeshift repairs are prohibited. At the discretion of the supervisor, discard all tools that cannot be repaired safely. Supervisors shall decide when to discard a tool.
* Store tools in suitable boxes or containers. Loose tools shall not be stored on ledges or where they might fall. Tools shall be picked up when a job is completed and not be allowed to accumulate in the work area. Store all tools in a safe place.
* Do not use conducting (i.e., metal) tools around electrical facilities. Insulated tools, approved for electrical work, shall be tested frequently for proper insulation.

* Select the correct size and type of wrench for each job. Wrench handles shall not be extended with a pipe or cheater because the jaws will spread.
* Repair mushroomed punch, drift and chisel heads. Mushroomed heads represent crystallized metal that will break and fly off when struck.
* Wear eye protection at all times.

* Wear the proper footwear for the task at hand.
* Pay attention to the environment and use caution when moving about on site.
* Follow the easiest and safest path to the destination.
* Follow good housekeeping procedures.
* Remove objects that pose tripping hazards where practicable.
* Prevent water accumulation where practicable.

The following sections address the major workplace fire hazards and the procedures for controlling the hazards.

A. Electrical Fire Hazards

Electrical system failures and the misuse of electrical equipment are leading causes of workplace fires. Fires can result from loose ground connections, wiring with frayed insulation, or overloaded fuses, circuits, motors, or outlets.

To prevent electrical fires, employees shall:

1. Make sure that worn wires are replaced.
2. Use only appropriately rated fuses.
3. Never use extension cords as substitutes for wiring improvements.
4. Use only approved extension cords [i.e., those with the Underwriters Laboratory (UL) or Factory Mutual (FM) label].
5. Check wiring in hazardous locations where the risk of fire is especially high.
6. Check electrical equipment to ensure that it is either properly grounded or double insulated.
7. Ensure adequate spacing while performing maintenance.

B. Portable Heaters

All portable heaters shall be approved by **SSO**. Portable electric heaters shall have tip-over protection that automatically shuts off the unit when it is tipped over. There shall be adequate clearance between the heater and combustible furnishings or other materials at all times.

C. Office Fire Hazards

Fire risks are not limited to industrial facilities. Fires in offices have become more likely because of the increased use of electrical equipment, such as computers and fax machines. To prevent office fires, employees shall:

1. Avoid overloading circuits with office equipment.
2. Turn off nonessential electrical equipment at the end of each workday.
3. Keep storage areas clear of rubbish.
4. Ensure that extension cords are not placed under carpets.
5. Ensure that trash and paper set aside for recycling is not allowed to accumulate.

D. Cutting, Welding, and Open Flame Work

The **SSO**will ensure the following:

1. All necessary hot work permits have been obtained prior to work beginning.
2. Cutting and welding are done by authorized personnel in designated cutting and welding areas whenever possible.

3. Adequate ventilation is provided.
4. Torches, regulators, pressure-reducing valves, and manifolds are UL listed or FM approved.
5. Oxygen-fuel gas systems are equipped with listed and/or approved backflow valves and pressure-relief devices.
6. Cutters, welders, and helpers are wearing eye protection and protective clothing as appropriate.
7. Cutting or welding is prohibited in sprinklered areas while sprinkler protection is out of service.
8. Cutting or welding is prohibited in areas where explosive atmospheres of gases, vapors, or dusts could develop from residues or accumulations in confined spaces.
9. Cutting or welding is prohibited on metal walls, ceilings, or roofs built of combustible sandwich-type panel construction or having combustible covering.
10. Confined spaces such as tanks are tested to ensure that the atmosphere is not over ten percent of the lower flammable limit before cutting or welding in or on the tank.
11. Small tanks, piping, or containers that cannot be entered are cleaned, purged, and tested before cutting or welding on them begins.
12. Fire watch has been established.

E. Flammable and Combustible Materials

The **SSO** shall regularly evaluate the presence of combustible materials at.

Certain types of substances can ignite at relatively low temperatures or pose a risk of catastrophic explosion if ignited. Such substances obviously require special care and handling.

1. Class A combustibles.

These include common combustible materials (wood, paper, cloth, rubber, and plastics) that can act as fuel and are found in non-specialized areas such as offices.

To handle Class A combustibles safely:

a. Dispose of waste daily.
b. Keep trash in metal-lined receptacles with tight-fitting covers (metal wastebaskets that are emptied every day do not need to be covered).
c. Keep work areas clean and free of fuel paths that could allow a fire to spread.
d. Keep combustibles away from accidental ignition sources, such as hot plates, soldering irons, or other heat- or spark-producing devices.
e. Store paper stock in metal cabinets.
f. Store rags in metal bins with self-closing lids.
g. Do not order excessive amounts of combustibles.
h. Make frequent inspections to anticipate fires before they start.

Water, multi-purpose dry chemical (ABC), and halon 1211 are approved fire extinguishing agents for Class A combustibles.

2. Class B combustibles.

These include flammable and combustible liquids (oils, greases, tars, oil-based paints, and lacquers), flammable gases, and flammable aerosols.

To handle Class B combustibles safely:

a. Use only approved pumps, taking suction from the top, to dispense liquids from tanks, drums, barrels, or similar containers (or use approved self-closing valves or faucets).
b. Do not dispense Class B flammable liquids into containers unless the nozzle and container are electrically interconnected by contact or by a bonding wire. Either the tank or container must be grounded.
c. Store, handle, and use Class B combustibles only in approved locations where vapors are prevented from reaching ignition sources such as heating or electric equipment, open flames, or mechanical or electric sparks.
d. Do not use a flammable liquid as a cleaning agent inside a building (the only exception is in a closed machine approved for cleaning with flammable liquids).
e. Do not use, handle, or store Class B combustibles near exits, stairs, or any other areas normally used as exits.
f. Do not weld, cut, grind, or use unsafe electrical appliances or equipment near Class B combustibles.
g. Do not generate heat, allow an open flame, or smoke near Class B combustibles.
h. Know the location of and how to use the nearest portable fire extinguisher rated for Class B fire.

Water should not be used to extinguish Class B fires caused by flammable liquids. Water can cause the burning liquid to spread, making the fire worse. To extinguish a fire caused by flammable liquids, exclude the air around the burning liquid. The following fire-extinguishing agents are approved for Class B combustibles: carbon dioxide, multi-purpose dry chemical (ABC), halon 1301, and halon 1211. (**NOTE:** Halon has been determined to be an ozone-depleting substance and is no longer being manufactured. Existing systems using halon can be kept in place.)

F. Smoking

Smoking is prohibited at the facility.

–

- Be aware of chemicals of concern that can directly injure the skin or that can be absorbed into the bloodstream and subsequently transported to other organs.
- Know that skin absorption is enhanced by abrasions, cuts, heat, and moisture.
- Do not wear contact lenses in contaminated atmospheres (since they may trap chemicals against the eye surface). The eye is particularly vulnerable because airborne chemicals can dissolve in its moist surface and be carried to the rest of the body through the bloodstream (capillaries are very close to the surface of the eye).
- Keep hands away from face.
- Minimize contact with liquid and solid chemicals.

Wear protective clothing (e.g., suits and gloves) as required by the Health and Safety Plan

– .

* Adhere to the 0.05 mg/m^3 action level for dust

* Be aware that the lungs are extremely vulnerable to chemical agents. Even substances that do not directly affect the lungs may pass through lung tissue into the bloodstream, where they are transported to other vulnerable areas of the body.

* Know the odor and odor threshold of the chemicals of concern. Some toxic chemicals present in the atmosphere may not be detected by human senses (i.e., they may be odorless and colorless, and their toxic effects may not produce any immediate symptoms).

* Use engineering controls to reduce vapor concentrations (e.g., ventilation) or dusty atmospheres (e.g., dust suppression techniques).

* Wear respiratory protection as indicated by air monitoring results and/or as required by the Health and Safety Plan.

* Conduct work zone air monitoring as required by the Health and Safety Plan.

Appendix E

Personal Protective Equipment Per Task

Applies to Task: ☒ **1.Excavation, soil sampling, well installation, GW sampling and capping**

☒ *Modified Level D**		☐ *Level C**		☐ *Level B**	
Equipment	***Material/ Type***	***Equipment***	***Material/Type***	***Equipment***	***Material/Type***
☒ Protective clothing	Long sleeve shirt and long pants, Tyvek coveralls	☐ Full-face air-purifying respirator	Cartridge Type:	☐ SCBA (pressure demand)	
☒ Outer gloves	Nitrile	☐ Half-mask air-purifying respirator	Cartridge Type:	☐ Air-line System (pressure demand)	
☐ Outer boots		☐ Protective clothing		☐ Protective clothing	
☒ Hard hat		☐ Outer gloves		☐ Outer gloves	
☒ Safety glasses May include full-face shield		☐ Inner gloves		☐ Inner gloves	
☒ Hard-toed boots		☐ Outer boots		☐ Outer boots	
☒ Hearing protection		☐ Hard hat**		☐ Hard hat**	
☐ Other:		☐ Safety glasses**		☐ Hard-toed boots**	
		☐ Hard-toed boots**		☐ Hearing protection**	
		☐ Hearing protection**		☐ Escape respirator**	
		☐ Other:		☐ Safety “tag” rope**	
				☐ Other:	

* If checked, indicates initial level of PPE. Other completed columns indicate information to upgrade/downgrade.

** Optional as applicable

Appendix F

Contractor and Outside Company HASP Consent Agreement

I have reviewed the health and safety plan prepared by EarthCon Inc., dated _____, for the _____ site fieldwork. I understand the purpose of the plan, and I consent to adhere to its policies, procedures, and guidelines.

Employee signature / Print	Firm	Date
Employee signature / Print	Firm	Date
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Appendix G

OSHA Onsite Training Documentation Form

After completion of the OSHA 40-hour training class, 29 CFR 1910.120 states that 3 days of onsite experience under the direct supervision of a trained, experienced supervisor are required to complete the OSHA HAZWOPER training requirements. This form is to be used to document this requirement, and shall be completed by a qualified supervisor (i.e., someone who has completed the 8-hour supervisory training class). Upon completion of this form, please submit it to the EarthCon project manager.

EMPLOYEE INFORMATION

Name: _____

Signature: _____

40-Hour Training Completion Date: _____

Dates of Onsite Training: _____

Name of Site: _____

Type of Site: _____

SUPERVISOR CERTIFICATION

Supervisor: _____

Signature: _____

Appendix H –

Health & Safety Inspection Checklist

Project: _____ Date: _____

Inspected by: _____

Category	***Observations/Corrective Actions (N/A, if Not Applicable)***
Pre-field activity briefing records are current	
Tailgate meeting records are current	
Training/medical surveillance/respiratory protection records are current	
Site map is posted	
Buddy system is implemented	
Work zones are identified	
Site access is controlled	
Visitors are escorted	
On-site/off-site communications are in working order	
Safe work practices are implemented	
Any additional hazards incurred?	
Air monitoring equipment is in working condition	
Air monitoring records are being recorded in field logbook	
Air monitoring calibration records are recorded in field logbook	
PPE storage area is neat and organized	
Standard operating procedures are implemented	
Housekeeping at decontamination zone is appropriate	
Decontamination procedures are implemented	
Emergency response equipment is in working condition	
Route to hospital is posted	
Confined space entry program is implemented	
Spill containment equipment is available	
Chemical inventory is up to date	
Safety data sheets are available	
Primary and secondary containers are properly labeled	
Housekeeping at the chemical storage area is appropriate	

APPENDIX B

GEOTECHNICAL PROFESSIONALS INC.

GEOTECHNICAL INVESTIGATION
PROPOSED PAVEMENT PROJECT
CLOW VALVE FACILITY
1375 MAGNOLIA AVENUE
CORONA, CALIFORNIA

Prepared for:
Earthcon Consultants CA, Inc.
1500 S. Sunkist Street, Suite D
Anaheim, California 92806

Prepared by:
Geotechnical Professionals Inc.
5736 Corporate Avenue Cypress,
California 90630
(714) 220-2211

Project No. 2945.I

July 8, 2019

GEOTECHNICAL PROFESSIONALS INC.

July 8, 2019

Earthcon Consultants CA, Inc.
1500 S. Sunkist Street, Suite D
Anaheim, California 92806

Attention: Ms. Fabiola Hatley

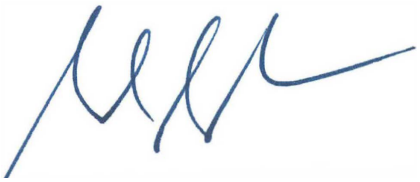
Subject: Report of Geotechnical Investigation
Proposed Pavement Project – Clow Valve Facility
1375 Magnolia Avenue
Corona, California
GPI Project No. 2945.I

Ms. Hatley:

Transmitted herewith is an electronic copy of our report of geotechnical investigation for the subject project. The report presents the results of our evaluation of the subsurface conditions at the site and recommendations for design and construction. Hard copies can be provided as needed.

We appreciate the opportunity of offering our services on this project and look forward to seeing the project through its successful completion. Feel free to call us if you have any questions regarding our report or need further assistance.

Very truly yours,
Geotechnical Professionals Inc.



Paul R. Schade, G.E.
Principal

cc: Jenn McHenny & Jeff Bennett, Earthcon Consultants CA

5736 Corporate Avenue • Cypress, CA 90630 • (714) 220-2211 , FAX (714) 220-2122

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1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of a geotechnical investigation performed by Geotechnical Professionals Inc. (GPI) for the proposed pavement project at the Clow Valve Facility in Corona, California. The site location is shown on the Site Location Map, Figure 1.

1.2 PROJECT DESCRIPTION

The project covered by this report is the construction of a new paved storage area to supplement the existing surface parking and storage areas at the site. The new paved storage area will be located in a currently vacant lot adjacent to El Camino Avenue and the railroad tracks, and in between the two existing structures to the north and south. The storage area will predominately house large, rollaway bins supported on steel wheels and forklift and truck traffic. The limits of the proposed project are shown on the Site Plan, Figure 2. Proposed grades are not anticipated to change significantly from the existing grade.

We understand that there is also an environmental component to the project as well as the above stated purpose to support storage containers and equipment traffic. Because of environmental concerns regarding the soils at the site, it is required to provide a surface cap to prevent or minimize human exposure, infiltration of water, and erosion.

Our recommendations are based upon the above assumed site usage and finish grade information. We should be notified if the site usage or actual grades differ or change during the project design to either confirm or modify our recommendations. Also, when the project plans become available, we should be provided with a copy for review and comment.

1.3 PURPOSE OF INVESTIGATION

The primary purpose of this investigation and report is to provide an evaluation of the existing geotechnical conditions at the site as they relate to the design and construction of the proposed improvements.

2.0 SCOPE OF WORK

Our scope of work included a field investigation, laboratory testing, geotechnical analyses, and preparation of this report.

Our field investigation consisted of six exploratory test pit excavations. The test pits were excavated to depths of 3.5 to 5.5 feet below the existing grade. A description of field procedures and logs of the explorations are presented in Appendix A.

Our laboratory testing program included evaluations of in-place moisture content, fines content, maximum dry density and optimum moisture content, and R-value. Laboratory test procedures and results are presented in Appendix B.

R-value testing and pavement consultation was performed by LaBelle Marvin, Pavement Engineers, under subcontract to GPI. Their results are presented in Appendix C.

Engineering evaluations were performed to provide earthwork criteria, and pavement design parameters. We consulted with LaBelle Marvin regarding recommendations for pavements presented herein. The results of our evaluations are presented in the remainder of the report.

3.0 SITE CONDITIONS

3.1 SURFACE CONDITIONS

The proposed storage area will be located in a currently vacant lot at the western edge of the property between the two existing structures. The Clow Valve site is bounded by El Camino Avenue to the west, the Temescal Wash to the northeast, and Magnolia avenue to the southeast. The vacant lot is currently undeveloped and covered with vegetation and debris. Based on a review of historical aerial photographs (www.historicaerials.com) and discussions with Earthcon the site appears to have remained largely undeveloped.

The topography across the site is relatively flat, with ground surface elevations ranging from approximately +642 feet in the northeast to +645 feet in the southeast.

3.2 SUBSURFACE SOIL CONDITIONS

Our field investigation disclosed a subsurface profile consisting of shallow undocumented fill soils over natural soils. Detailed descriptions of the conditions encountered are shown on the Log of Test Pits in Appendix A.

Undocumented fill soils, up to 4.5 feet in depth, were encountered in the test pits. The fill soils at the exploration locations consisted primarily of dry to slightly moist sand and sand with silt, with gravel, cobbles, and debris (metal, wood, glass, and brick). The debris varied in size from approximately ¼ to 12-inch in diameter, and was not uniformly spread across the site.

The underlying natural materials consisted predominantly of slightly moist to moist sand with gravel to the depths explored.

3.3 GROUNDWATER AND CAVING

Groundwater was not encountered in our explorations within the maximum depth explored (5.5 feet).

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 OVERVIEW

Based on the results of our investigation, it is our opinion that from a geotechnical viewpoint it is feasible to develop the site as proposed. The most significant geotechnical issues that will affect the design and construction of the proposed improvements are as follows:

- The undocumented fills are not considered to be suitable for uniform support of the new pavements in their current condition. We recommend one of the two options below:

    - The undocumented fill soils and debris be removed and replaced as properly compacted fill.

    - The upper foot of the fill soils be excavated, the bottom of the excavation compacted using a large vibratory roller, and the soils replaced as properly compacted fill. As an added measure to aid in "bridging" over the undocumented fill soils left in-place, a layer of geogrid could be placed after subgrade compaction and before replacement of the upper fill soils.

- The existing soils are generally considered to be suitable for reuse as properly compacted fill with the exception of the debris. Details are presented in the "Earthwork" section of this report.

- We found the moisture content of the upper soils to be generally dry to slightly moist, with moistures near or below the optimum moisture content. Moisture conditioning (wetting) will likely be required prior to reusing the on-site soils as properly compacted fill. Earthwork subcontractors should review the moisture conditions when planning the work.

- Because of the intended use of the planned pavement (i.e. roll-off bins and forklifts), portland cement concrete (PCC) is anticipated to perform better than asphalt concrete (AC) in resisting wear and distress. However, because of the higher initial cost of PCC, we are providing recommendations for both PCC and AC pavements.

Our recommendations related to the geotechnical aspects of the development of the site are presented in the subsequent sections of this report.

4.2 EARTHWORK

The earthwork at the project site is anticipated to consist of excavations, subgrade preparation, and the placement and compaction of fill.

4.2.1 Clearing and Grubbing

Prior to grading, performing excavations or constructing the proposed improvements, the areas to be developed should be stripped of vegetation and cleared of existing near surface structures, debris, railroad lines, and pavements. Buried obstructions, such as

footings, abandoned utilities, and tree roots should be removed from areas to be developed. Deleterious material generated during the clearing operation, including organic topsoil, should be removed from the site. If approved by the owner and regulatory agency, inert demolition debris, such as concrete and asphalt, may be reused in engineered fills and in a stabilization layer in accordance with the criteria presented in the "Materials for Fill" section of this report.

Although not anticipated, if cesspools or septic systems are encountered during grading, they should be removed in their entirety. The resulting excavation should be backfilled as recommended in the "Subgrade Preparation" and "Placement and Compaction of Fill" sections of this report. As an alternative, cesspools can be backfilled with lean sand-cement slurry. At the conclusion of the clearing operations, a representative of GPI should observe and accept the site prior to further grading.

4.2.2 Excavations

Excavations at this site are anticipated to include removals of undocumented fills and soils disturbed during demolition.

Prior to placing fills or construction of the pavement, one of the following two options should be performed:

- Undocumented fills and loose fills disturbed during demolition should be removed and replaced as properly compacted fill. Undocumented fill soils encountered in our test pits ranged from 1.5 to 4.5 feet below the existing ground surface. The actual depths of removals should be determined in the field during grading by a representative of GPI.

- Undocumented fills and loose soils disturbed within the upper foot of the finished subgrade should be removed. The exposed subgrade should be moisture conditioned and compacted in-place with a heavy pad-foot vibrator roller, and the upper soils replaced as properly compacted fills.

The first option (remove all of the undocumented fill material) will provide the better level of support for the pavement with less uncertainty than leaving a portion of the fill in-place. However, this option will also expose more debris that will need to be removed prior to replacing the fill as properly compacted fill. The second option (partial removal of the undocumented fill) should provide adequate support for the pavement but does include some potential for localized future settlement related to leaving some of the fill

in-place. As an added option, after the partial removal is performed, a layer of geogrid (Tensar BX1200 or equivalent) could be placed to reduce the potential for adverse impacts in leaving fill soils in-place. We recommend that the option selected be outlined on the project grading plans for clarity in bidding and performing the work.

In general, the site soils are not considered to be susceptible to caving in shallow excavations. Temporary construction excavations may be made vertically without shoring to a depth of 4 feet below the adjacent grade. Although not anticipated, for

deeper cuts up to 8 feet, the slopes should be properly shored or sloped back to at least 1:1 (horizontal:vertical) or flatter. Some raveling of localized sandy deposits should be anticipated at the slope inclinations recommended. If raveling cannot be tolerated, flatter slope inclinations should be considered. The exposed slope face should be kept moist (but not saturated) during construction to reduce local sloughing.

Surcharge loads should not be permitted within a horizontal distance equal to the height of cut from the top of the excavation or 5 feet from the top of the slopes, whichever is greater, unless the cut is properly shored. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of the adjacent existing site facilities should be properly shored to maintain support of adjacent elements. Excavations and shoring systems should meet the minimum requirements given in Article 6 of the State of California Occupational Safety and Health Standards.

In general, the excavation can be accomplished by conventional soil excavation equipment such as backhoes, loaders, or dozers.

4.2.3 Subgrade Preparation

If the removals will expose the undisturbed natural soils (option is selected to remove all of the undocumented fill material), the exposed subgrade should be scarified to a depth of 8 inches, moisture conditioned, and compacted to at least 90 percent of the maximum dry density (ASTM D1557).

If the option of removing only the upper foot of undocumented fills is chosen, after the recommended removals and prior to placing fills, the subgrade soils should be moisture-conditioned and compacted using a large pad-foot vibratory roller (minimum 40,000 pound dynamic force) to at least 90 percent of the maximum dry density, determined in accordance with ASTM D1557. We suggest a minimum of six passes with the vibratory roller.

Based on laboratory testing, the near-surface subgrade soils exhibit moisture contents near or below the optimum moisture content. The earthwork subcontractors should review the moisture content information presented on the test pit logs.

4.2.4 Material for Fill

Soils available from on-site excavations, less debris or organic matter, will be suitable for re-use in fills. Although not encountered in our explorations, clayey soils should not be placed within 1-foot of finished subgrade in concrete hardscape areas. Moisture conditioning (wetting) will likely be required prior to re-using the in-place soils.

mported fill material should be predominately granular (containing no more than 40 percent fines - portion passing No. 200 sieve) and non-expansive (E.I. of 20 or less). Import or on-site materials used in compacted fills should not contain particles larger than 8 inches in diameter (3 inches in diameter within the upper 1 foot of the finished subgrade). GPI should be provided with a sample (at least 50 pounds) and notified of

the location of soils proposed for import at least 72 hours in advance of importing. Each proposed import source should be sampled, tested and accepted for use prior to delivery of the soils to the site. Soils imported prior to acceptance by GPI may be rejected if not suitable.

4.2.5 Placement and Compaction of Fills

Fill soils should be placed in horizontal lifts, moisture-conditioned, and mechanically compacted to densities equal to at least 90 percent of the maximum dry density, determined in accordance with ASTM D1557. The soils within 12 inches of finished subgrade in pavement areas should be compacted to at least 95 percent. The optimum lift thickness will depend on the compaction equipment used and can best be determined in the field. The following uncompacted lift thickness can be used as preliminary guidelines.

Plate compactors	4-6 inches
Small vibratory or static rollers (5-ton±) or track equipment	6-8 inches
Scrapers, heavy loaders, or heavy vibratory rollers	8-12 inches

The maximum lift thickness should not be greater than 12 inches and each lift should be thoroughly compacted and accepted prior to subsequent lifts.

Fills should be placed at a moisture content of 0 to 2 percent over the optimum moisture content. The moisture content of the soils encountered in the explorations was generally near or below optimum. As such, some wetting will be required prior to replacing the soils as properly compacted fill. The on-site soils should not be allowed to dry out prior to covering or additional processing and moisture conditioning will be required.

During backfill of excavations, the fill should be properly benched into the construction slopes as it is placed in lifts.

4.2.6 Shrinkage and Subsidence

Shrinkage and subsidence are not anticipated to be significant factors in the construction of the improvements because of the limited earthwork anticipated. Shrinkage is the loss of soil volume caused by compaction of fills to a higher density than before grading. Subsidence is the settlement of in-place subgrade soils caused by loads generated by large earthmoving equipment. For earthwork volume estimating purposes, an average shrinkage value of 10 to 15 percent may be assumed for the surficial soils. Subsidence is not anticipated to be significant. These values are estimates only and exclude losses due to removal of vegetation or debris. Actual shrinkage and subsidence will depend on the types of earthmoving equipment used and should be verified during grading.

4.2.7 Trench/Wall Backfill

Utility trench and wall backfill, consisting of the on-site materials or imported sand, should be mechanically compacted in lifts. Lift thickness should not exceed those values given in the "Compacted Fill" section of this report. Moisture conditioning of the on-site soils will be required prior to re-use as backfill. Jetting or flooding of backfill materials should not be permitted. A GPI representative should observe and test trench and wall backfill as they are placed.

In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, sand-cement slurry may be substituted for compacted backfill. The slurry should contain one sack of cement per cubic yard and have a maximum slump of 5 inches. When set, such a mix typically has the consistency of compacted soil. Within foundation areas, concrete with the same compressive strength of the foundation should be used.

4.2.8 Observation and Testing

A representative of GPI should observe excavations, subgrade preparation, and fill placement activities. Sufficient in-place field density tests should be performed during fill placement and in-place compaction to evaluate the overall compaction of the soils. Soils that do not meet minimum compaction requirements should be reworked and tested prior to placement of additional fill.

4.3 CONCRETE SLABS

Concrete hardscape should be supported on non-expansive, compacted soils as discussed in the "Placement and Compaction of Fill" section. Although not tested, the upper on-site sands are anticipated to have a low expansion potential. The on-site soils should not be allowed to dry out or additional processing and moisture conditioning will be required.

4.4 PAVED AREAS

R-value testing and pavement consultation was provided by LaBelle Marvin, Pavement Engineers, under subcontract to GPI. Their findings are presented in Appendix C and summarized below. Testing of the on-site upper soils resulted in an R-value of 75. Pavement design has been based on an R-value of 50.

For the area investigated that will be supporting storage containers and forklift/truck traffic, we understand that the minimum pavement section, either asphalt or portland cement concrete, is 6 inches. We recommend the section to support the planned storage containers and traffic consist of either:

- 6 inches of asphalt concrete (AC) over 4 inches of aggregate base (AB), or
- 6.5 inches of portland cement concrete (PCC) over 4 inches of AB.

Although paving the area with PCC anticipated to have higher installation costs than AC pavement, PCC will perform better than AC in resisting long-term wear and distress under the relativity concentrated loads of the roll-off storage bins and forklifts. This issue is more pronounced in the site vicinity where high temperatures can soften AC, leading to potential divots and rutting under high point loads. The relatively wide daily temperature fluctuations in the site vicinity can also lead AC pavement to experience a higher amount of long-term thermal cracking resulting from shink-swell movement as compared to PCC.

However, if it is decided to use AC pavement for the subject area, there are actions that can be taken to improve the long-term performance. Heavy loads can be kept off the pavement for a period of at least 3 months after installation to allow the AC surface to oxidize and harden. AC should not be sealed for a period of 5 years after installation, but should be sealed every 3 years thereafter. The AC material used, which is specified in a following paragraph, should not be a recycled product, which can have a higher potential for thermal cracking than a non-recycled AC material.

The following recommendations are for standard AC and PCC pavements in other areas of the site, if required:

ASPHALT CONCRETE

PAVEMENT AREA	TRAFFIC INDEX	SECTION THICKNESS (inches)	
		PAVEMENT (AC)	AGGREGATE BASE COURSE
Auto Parking	4.0	3.0	4.0
Auto Drives	5.0	3.0	5.0
Truck Drives	6.0	4.0	5.0
Heavy Truck Drives	7.0	5.0	6.0

PORTLAND CEMENT CONCRETE

PAVEMENT AREA	TRAFFIC INDEX	SECTION THICKNESS (inches)	
		PAVEMENT (PCC)	AGGREGATE BASE COURSE
Auto Parking	4.0	6.0	4.0
Auto Drives	5.0	6.0	4.0
Truck Drives	6.0	7.0	4.0
Heavy Truck Drives	7.0	7.5	4.0

The asphalt concrete material used for automotive drives and parking areas (TI = 4.0 and 5.0) should be a Type III C3 PG 64-10 material per Section 203-6.5 of the most current Standard Specifications for Public Works Construction (SSPWC or Greenbook). The asphalt concrete material used for the subject storage area and truck and heavy truck drives (TI = 6.0 and 7.0) should be a Type III B3 PG 64-10 material per Section 203-6.5 of the most current SSPWC. In areas other than the subject storage area, the material used may be a recycled material but should be changed to a Type III B3 PG 64-10-R0 where placed in truck traffic areas that will be immediately opened for use. Non-recycled asphalt concrete material is recommended for the storage area to reduce the potential for thermal cracking.

PCC material should be a 525 psi Flexural Strength (equivalent to about 3,500 psi compressive strength) with a maximum slump of 4 inches at the time of placement. Water should not be added to the PCC at the project site before placement. The PCC should have 1.5 pounds of Buckeye Ultra 500 fibermesh additive per cubic yard of material. Dowelling is required at 18 inches on center adjoining to existing PCC walls, foundations, slabs, and construction joints. Dowels should be #4 rebar. PCC expansion joints should be placed at a lateral distance from each other of no more than 20 times the thickness of the pavement in both direction of orientation and resulting panels should be approximately square. Construction joints should be spaced with a 3/8-inch expansion material and recessed a minimum of ½ inch and filled with an elastomeric backfill material.

The pavement base course should be compacted to at least 95 percent of the maximum dry density (ASTM D 1557). Aggregate base should conform to the requirements of Section 26 of the California Department of Transportation Standard Specifications for Class 2 aggregate base (three-quarter inch maximum) or Section 200-2 of the SSPWC for untreated base materials (except processed miscellaneous base).

4.5 DRAINAGE

Positive surface gradients should be provided adjacent to structures so as to direct surface water run-off and roof drainage away from foundations and slabs toward suitable discharge facilities. Long-term ponding of surface water should not be allowed on pavements or adjacent to buildings.

5.0 LIMITATIONS

This report, exploration logs, and other materials resulting from GPI's efforts were prepared exclusively for use by Earthcon Consultants CA and their consultants in designing the proposed development. The report is not intended to be suitable for reuse on extensions or modifications of the project or for use on project other than the currently proposed development as it may not contain sufficient or appropriate information for such uses.

Soil deposits may vary in type, strength, and many other important properties between points of exploration due to non-uniformity of the geologic formations or to man-made cut and fill operations. While we cannot evaluate the consistency of the properties of materials in areas not explored, the conclusions drawn in this report are based on the assumption that the data obtained in the field and laboratory are reasonably representative of field conditions and are conducive to interpolation and extrapolation.

Furthermore, our recommendations were developed with the assumption that a proper level of field observation and construction review will be provided by GPI during grading, excavation, and foundation construction. If construction phase services are performed by others they must accept full responsibility for the geotechnical aspects of the project, including this report.

Our investigation and evaluations were performed using generally accepted engineering approaches and principles available at this time and the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical engineers practicing in this area. No other representation, either expressed or implied, is included or intended in our report.

Respectfully submitted,
Geotechnical Professionals Inc.

Patrick McGervey
Staff Engineer

Paul R. Schade, G.E.
Principal

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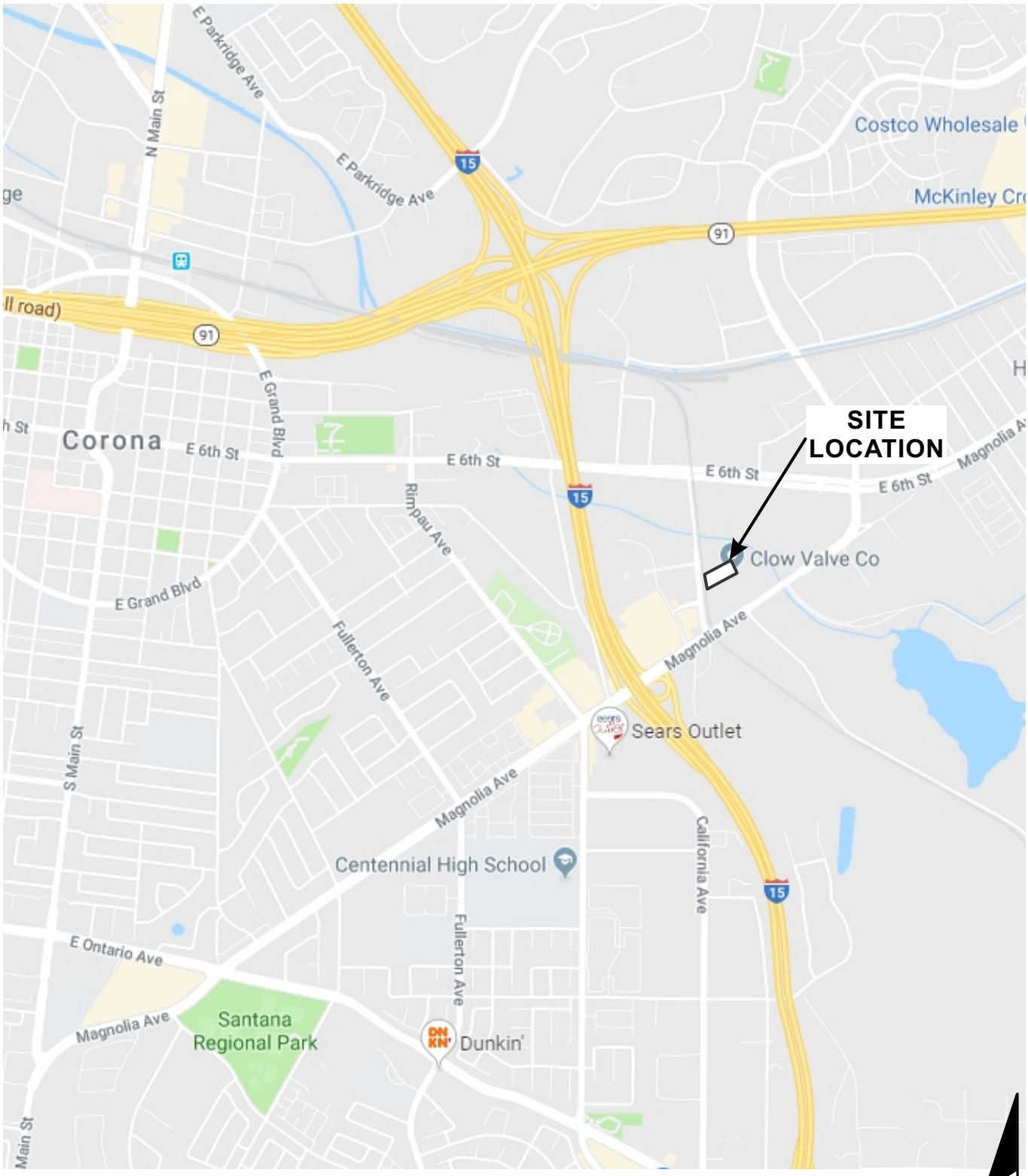

0 2000 4000 FEET

BASE MAP REPRODUCED FROM GOOGLE EARTH © 2019

GPI GEOTECHNICAL PROFESSIONALS, INC.

SITE LOCATION MAP

CLOW VALVE EARTHCON

GPI PROJECT NO.: 2945.I | SCALE: 1" = 2000'

FIGURE 1

EXPLANATION

TP-6 APPROXIMATE LOCATION AND NUMBER OF EXPLORATORY TEST PIT

N

0 80 160 FEET

BASE MAP PRODUCED FROM GOOGLE EARTH © 2019

GPI GEOTECHNICAL PROFESSIONALS, INC.

CLOW VALVE EARTHCON

GPI PROJECT NO.: 2945.I | SCALE: 1" = 80'

SITE PLAN

FIGURE 2

APPENDIX A

APPENDIX A

EXPLORATORY TEST PITS

The subsurface conditions at the site were investigated by excavating and sampling six exploratory test pits. The excavations were advanced to depths of 3.5 to 5.5 feet below the existing ground surface. The locations of the explorations are shown on the Site Plan, Figure 2.

The test pits were excavated using a mini-excavator with a bucket. Disturbed samples were collected in the field at selected locations and placed in bulk bags.

The field exploration for the investigation was performed under the continuous technical supervision of GPI's representative, who visually inspected the site, maintained detailed logs of the borings, classified the soils encountered, and obtained disturbed samples for examination and laboratory testing. The soils encountered in the boring were classified in the field and through further examination in the laboratory in accordance with the Unified Soils Classification System. Detailed logs of the explorations are presented in Figures A-1 to A-6 in this appendix.

The test pit locations were laid out in the field by measuring from existing site features. Ground surface elevations at the exploration locations were estimated from Google Earth and should be considered approximate.

PROBE (IN)	MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
						This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
	2.0			B	0	Fill: **SAND with SILT (SP-SM)** light grey brown, dry, with gravel	
	5.0			B		**SAND (SP)** brown and rust, slighty moist, with debris (metal, gravel, wood) up to 4-Inch diameter	
						Natural: **SAND (SP)** grey brown, moist, medium grained, with gravel	
						Total Depth 4 feet	640

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 5-14-19
EQUIPMENT USED: Mini Excavator
GROUNDWATER LEVEL (ft): Not Encountered

PROJECT NO.: 2945.I
CLOW VALVE

LOG OF TEST PIT TP-1

FIGURE A-1

PROBE (IN)	MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					0	Fill: **SILTY SAND (SM)** light grey brown, dry, with gravel	
	0.2			B		**SAND (SP)** light brown, dry, heavily cemented, with debris (wood, metal and concrete)	
	2.7			B		**SILTY SAND (SM)** grey brown, dry to slightly moist, with gravel and debris (metal, glass, and wood)	
	2.5			B		Natural: **SAND (SP)** grey, moist, with gravel	640
					5	Total Depth 5.5 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 5-14-19
EQUIPMENT USED: Mini Excavator
GROUNDWATER LEVEL (ft): Not Encountered

PROJECT NO.: 2945.I
CLOW VALVE

LOG OF TEST PIT TP-2

FIGURE A-2

PROBE (IN)	MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
						Fill: **SILTY SAND (SM)** grey, dry, with gravel and debris (metal, brick and asphalt)	
	0.5			B		**SAND (SP)** light brown, dry to slighlty moist, heavily cemented, with debris (wood, metal and concrete)	
	2.9			B		**SILTY SAND (SM)** brown with rust, dry, with gravel and debris (metal, asphalt) up to 2-inch diameter	640
						Natural: **SAND (SP)** grey brown, moist with gravel	
						Total Depth 4.2 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 5-14-19
EQUIPMENT USED: Mini Excavator
GROUNDWATER LEVEL (ft): Not Encountered

PROJECT NO.: 2945.I
CLOW VALVE

LOG OF TEST PIT TP-3

FIGURE A-3

PROBE (IN)	MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS	ELEVATION (FEET)
					0	6-Inch ASPHALT	
	7.7			B		Fill: **SILTY SAND (SM)** grey brown and rust, moist, with gravel and metal fragments to 4-Inch diameter	
	1.9			B		Natural: **SAND (SP)** light grey brown, slighlty moist, with gravel	640
						Total Depth 4 feet Large concrete block/anchor approximately 3 x 3 x 3 feet encountered on the edge of the excavation.	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 5-14-19
EQUIPMENT USED: Mini Excavator
GROUNDWATER LEVEL (ft): Not Encountered

PROJECT NO.: 2945.I
CLOW VALVE

LOG OF TEST PIT TP-4

FIGURE A-4

PROBE (IN)	MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					0	This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	
						Fill: **SILTY SAND (SM)** light grey brown, with gravel	
	3.0			B		**GRAVEL (GP)** rust brown, hard, with sand, silt, and debris (metal) up to 6-Inch diameter	
	3.9			B		**SILTY SAND (SM)** grey with rust streaks, moist, with gravel up to 4-inch diameter	640
	9.0			B		Natural: **SAND (SP)** grey brown, dry, with gravel up to 1/2-inch diameter	
						Total Depth 5 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 5-14-19
EQUIPMENT USED: Mini Excavator
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2945.I
CLOW VALVE

LOG OF TEST PIT TP-5

FIGURE A-5

PROBE (IN)	MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	*DESCRIPTION OF SUBSURFACE MATERIALS*	ELEVATION (FEET)
					0		645
						Fill:**SILTY SAND (SM)** grey brown, dry, with gravel	
						4-Inch ASPHALT	
	1.3			B		**SILTY SAND (SM)** grey brown with rust, moist, with gravel and debris (metal slag, asphalt, concrete, and wood) up to 4-Inch diameter	
						Natural: **SAND (SP)** grey brown, with rust, moist, with gravel up to 1/2-Inch diameter	
						Total Depth 3.5 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 5-14-19
EQUIPMENT USED: Mini Excavator
GROUNDWATER LEVEL (ft): Not Encountered

GPI

PROJECT NO.: 2945.I
CLOW VALVE

LOG OF TEST PIT TP-6

FIGURE A-6

APPENDIX B

APPENDIX B

LABORATORY TESTS

INTRODUCTION

Representative bulk samples were carefully packaged in the field and sealed to prevent moisture loss. The samples were then transported to a soil laboratory for examination and testing assignments. Laboratory tests were performed on selected representative samples as an aid in classifying the soils and to evaluate the physical properties of the soils affecting foundation design and construction procedures. Detailed descriptions of the laboratory tests are presented below under the appropriate test headings. Test results are presented in the figures that follow.

MOISTURE CONTENT

Moisture content was determined from a number of the samples. The samples were dried in accordance with ASTM D 2216. After drying, the weight of each sample was measured, and moisture content and dry density were calculated. Moisture content values are presented on the boring logs in Appendix A.

PERCENT PASSING NO. 200 SIEVE

Soil samples were dried, weighed, soaked in water until individual soil particles were separated, and then washed on the No. 200 sieve. That portion of the material retained on the No. 200 sieve was oven-dried and weighed to determine the percentage of the material passing the No. 200 sieve. The percentages passing the No. 200 sieve are tabulated below.

Test Pit NO.	DEPTH (ft)	SOIL DESCRIPTION	PERCENT PASSING No. 200 SIEVE
TP-1	0	Sand (SP-SM) with Silt and Gravel	9
TP-1	1	Sand (SP)	1
TP-2	0.5	Sand (SP)	1
TP-3	1.5	Sand (SP)	0
TP-4	2	Sand (SP) with Gravel	3
TP-5	1	Gravel (GP) with Sand	3

COMPACTION TEST

A maximum dry density/optimum moisture test was performed in accordance with ASTM D1557 on a representative bulk sample of the surficial soils. The test results are as follows.

Test Pits NO.	DEPTH (ft)	SOIL DESCRIPTION	OPTIMUM MOISTURE (%)	MAXIMUM DRY DENSITY (pcf)
Composite	1 - 2	Sand with Silt (SP-SM)	8	126
Composite	1 - 2	Sand (SP-SM) with Silt and Gravel	7	133

APPENDIX C

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

APR 2 3 2019

Mr. Mark Willett
Vice Principal/General Manager
Clow Valve Company
1375 Magnolia Avenue
Corona, California 92879

Re: USEPA Conditional Approval of PCB Cleanup Plan for Clow Valve Company at 1375 Magnolia Avenue in Corona, California

Dear Mr. Willett:

Thank you for working with the U.S. Environmental Protection Agency, Region 9 ("USEPA") to address the disposal of polychlorinated biphenyls ("PCBs") found at Clow Valve Company ("Clow") located at 1375 Magnolia Avenue in Corona, California (the "Site"). USEPA has received and reviewed the *Risk-Based Approval Application* (the "Application") submitted by EarthCon Consultants CA, Inc. ("EarthCon") on behalf of Clow dated April 9, 2019, which outlines Clow's plan for leaving soils containing PCBs in place, in some cases under existing concrete caps.

The Site houses an active industrial facility that manufactures water pipes, valves, fire hydrants and fittings. The original building dates to the 1950s, with subsequent buildings from the 1960s. There are no plans for Clow to vacate the Site. The Application includes preparation of a land-use covenant ("LUC"), an operations and maintenance plan for the caps, and a soil management plan.

The Application describes disposal of PCB-impacted soils in place at the Site, consistent with Toxic Substances Control Act ("TSCA") standards. There are three areas of concern ("AOCs") to be remediated for PCBs, known as AOC-3, AOC-6, and AOC-7. At AOCs 6 and 7 the soil will be capped under existing concrete with a maximum PCB concentration of 1.1 mg/kg (ppm). The soil concentrations at AOC-3 are well below USEPA's risk-based threshold for industrial workers, and the soils will be left in place without a cap.

AOC-3 is the location of a former water pressure testing area. This AOC has a maximum concentration of PCBs in soils of 5.55 ppm, which is lower than USEPA's risk-based threshold for industrial workers of 15 ppm. USEPA therefore considers it appropriate to leave these soils in place.

AOC-6 is the location of a former asphalt dip tank. The maximum concentration in soils is 48 ppm. The 95% upper confidence limit of the mean is 13 ppm, which is below USEPA's risk-based threshold for industrial workers. There is currently concrete covering the contaminated soil at AOC-6, with a maximum concentration of PCBs in concrete of approximately 1.1 ppm. The concrete at AOC-6 acts as a cap, adding a layer of protection to workers.

AOC-7 is a fenced area currently containing two transformers. The maximum concentration in soils is 2,220 ppm at three feet below ground surface ("bgs"). The source of PCBs at AOC-7 was a leak of PCB oils from a former transformer in 1994, after which contaminated soil and concrete were removed from the surface until the area appeared clean. Groundwater depth on-Site is approximately 40 feet below ground surface ("bgs"),

with perched layers reported near the Site starting at approximately 23 feet bgs. To address a possible groundwater pathway, PCBs were delineated to a depth of 6.5 feet bgs, a depth at which the sampling equipment hit refusal. The result at 6.5 feet bgs was 16 ppm, which is just above USEPA's industrial risk-based threshold of 15 ppm. Given that there are no cosolvents at AOC-7 that could mobilize PCBs into groundwater, USEPA considers the proposed remedy of capping in-place to be appropriate for AOC-7. The highest level in concrete at AOC-7 is 0.133 ppm.

USEPA is approving Clow's Application with conditions pursuant to 40 C.F.R. § 761.61(c) (i.e., risk-based disposal standards of TSCA). Clow shall implement the Application as modified by the conditions listed below:

USEPA Conditions of Approval and Additional Comments:

1. **Deed Restriction:** A land use control in the form of a deed restriction shall be implemented to prohibit residential use. In addition, certain commercial uses defined as "sensitive uses" shall also be prohibited; sensitive uses include (a) a hospital for humans, (b) a public or private school for persons less than 15 years of age, (c) a day care center for children, and (d) any permanently occupied habitation other than those used for industrial purposes. The deed restriction shall also note the areas covered by concrete caps. A figure showing the known PCB levels left in place shall be included with the deed restriction. The deed restriction shall state that if the cap at AOC-6 is removed in the future, then the 48 ppm PCB hot spot shall be removed. The deed restriction shall be recorded within 60 days of submittal of the cleanup completion report.

2. **Operations and Maintenance Plan:** Clow shall submit an operations and maintenance plan to USEPA within 90 days of submittal of the cleanup completion report.

3. **Soil Management Plan:** Clow shall submit a soil management plan to USEPA within 90 days of submittal of the cleanup completion report.

4. **PCB Cleanup Report:** Clow shall submit a PCB cleanup report to USEPA, to include all relevant data and justification demonstrating that the work completed is consistent with this approval. Clow must address at a minimum all the reporting requirements listed in 40 C.F.R. § 761.61(a)(9) and 40 C.F.R. § 761.125(c)(5). Clow shall also include figures, surveys, or GPS coordinates depicting the location and results for all Site characterization samples and any PCBs left under a cap.

5. **Future Proposed Modifications to Cleanup Plan:** Clow shall request any changes to the approved cleanup plan via email to USEPA, and USEPA will provide any response to the request via email.

This approval does not relieve Clow from complying with all other applicable federal, state, and local regulations and permits. Departure from the conditions of the approval without prior written permission from USEPA may result in the commencement of proceedings to revoke this approval and/or an enforcement action. Nothing in this approval bars USEPA from imposing penalties for violations of this approval or for violations of other applicable TSCA PCB requirements or for activities not covered under this approval.

This approval only applies to the Site. USEPA reserves the right to require additional characterization and/or cleanup of PCBs at the Site if new information during additional Site characterization, cleanup verification, and/or during future post-cleanup activities (e.g. redevelopment or post-redevelopment) at the property shows that PCBs remain at the Site above the PCB cleanup level of 15 ppm total PCBs. In addition, USEPA may require cleanup of areas immediately adjacent to the Site if those areas are found to be impacted by PCBs from the Site.

USEPA appreciates the opportunity to assist Clow with this PCB cleanup. If you have any questions regarding this approval, please contact Sara Ziff at (415) 972-3536 or ziff.sara@epa.gov. Thank you for your cooperation.

Sincerely,

Jeff Scott, Director
Land Division

cc (electronic): Larry Bowers, Clow
Tiffany Smith, Clow
Jeff Bennett, EarthCon
Becky Sundilson, EarthCon
Irena Edwards, DTSC
Maryam Tasnif-Abbasi, DTSC