Mr. Jeremy Harris
1919 Crew LLC
Pier 54 Suite 202
San Francisco, CA 94158

Ms. Dilan Roe
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: 1919 Market Street – Acknowledgement Statement
Oakland, California 94805
ACEH Case# RO0003205
APNs 5-410-13-1, 5-410-14, 5-410-25

Dear Ms. Roe:

1919 Crew LLC has retained the environmental consultant referenced on the attached report for the project referenced above. The attached report is being submitted on behalf of 1919 Crew LLC.

I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH's FTP server and the State Water Resources Control Board's GeoTracker website.

Sincerely,

Jeremy Harris

September 22, 2017

Mr. Jeremy Harris
1919 Crew LLC
Pier 54 Suite 202
San Francisco, CA 94607

Re: **Revised Site Management Plan 2017**
1919 Market Street
Oakland, California 94607
ACEH Case# RO0003205
APNs 5-410-13-1, 5-410-14, 5-410-251919

Dear Mr. Harris:

On behalf of 1919 Crew LLC, PANGEA Environmental Services, Inc. (PANGEA) has prepared this *Revised Site Management Plan 2017* (SMP) for the subject site. This SMP was prepared in response to agency correspondence dated May 22, 2017 and September 12, 2017. The objective of the SMP is to provide Site management procedures, control measures and notification procedures during various environmental, geotechnical, demolition, construction and any future subgrade earthwork activities at the Site.

If you have any questions or comments, please call me at (510) 435-8664.

Sincerely,
PANGEA Environmental Services, Inc.

Bob Clark-Riddell, P.E.
Principal Engineer

Attachment: *Revised Site Management Plan*

cc: Ms. Dilan Roe, ACDEH (ACDEH FTP)
Mr. Robert Schultz, ACDEH (ACDEH FTP)
David Miles, Inspection Supervisor, City of Oakland Building and Planning Department
Geotracker

REVISED SITE MANAGEMENT PLAN

1919 Market Street
Oakland, CA
ACEH Case# RO0003205

September 22, 2017

Prepared for:

1919 Crew LLC
Pier 54, Suite 202
San Francisco, CA 94607

Prepared by:

PANGEA Environmental Services, Inc.
1710 Franklin Street, Suite 200
Oakland, California 94612

Written by:

Ron Scheele, P.G.
Principal Geologist

Bob Clark-Riddell, P.E.
Principal Engineer

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ATTACHMENTS

1.0 INTRODUCTION

On behalf of 1919 Crew LLC, PANGEA Environmental Services, Inc. (PANGEA) has prepared this *Revised Site Management Plan* (SMP) for the property at 1919 Market in Oakland, California (Site). This SMP was prepared in response to correspondence from Alameda County Department of Environmental Health (ACDEH) who is providing oversight of environmental issues at the Site via a Voluntary Remediation Action Agreement. Development plans for the Site involves the adaptive re-use and conversion of the existing warehouse into 102 live-work apartment units. The objective of the SMP is to provide Site management procedures, control measures and notification procedures during various environmental, geotechnical, demolition, construction and any future subgrade earthwork activities at the Site.

1.1 Agency Direction

In correspondence dated May 22, 2017 and September 12, 2017, ACDEH requested a comprehensive SMP to provide notification procedures and control measures during planned and possible future Site activities involving subgrade earthwork. Dust control during the Site activity is of a paramount concern to the project neighbors and local community.

1.2 Notification of Relevant Parties

Prior to any environmental/geotechnical activities involving subsurface work, any demolition/ construction activities with the potential to generate dust, or any future subgrade earthwork, the Site owner/developer or representative will notify all relevant parties, including ACDEH. Notification will be provided at least one week prior to the potential dust generating activities. If the planned scope of activities is not adequately covered by the SMP, or if there is likelihood for the proposed subsurface work to encounter contamination, then the notification to relevant parties will include a description of the nature of the potential for encountering contamination.

2.0 SITE BACKGROUND

The Site consists of three parcels of land comprising 1.457 acres located on the west side of Market Street and the east side of Myrtle Street within a mixed residential and commercial area of Alameda County, in Oakland, California (Figure 1). The Site's assessor parcel numbers (APN) are: 5-410-13-1, 5-410-14, and 5-410-25. The property is owned and being redeveloped by 1919 Crew LLC into live-work units. The Site is currently developed with one 70,000 square foot building constructed in 1923 that has been partially demolished. In addition to the structure, the Site is improved with asphalt-paved parking, perimeter fencing, and associated drainage features. The subject property is bound by residential housing to the north, Market Street to the east beyond which is residential housing, St. John Missionary Baptist Church and residential housing to the south, and Myrtle Street to the west beyond which is residential housing. An aerial Site map showing Site features and surrounding properties is included as Figure 2.

2.1 Regulatory Cases at Site

Regulatory oversight is currently provided by the Alameda County Department of Environmental Health (ACDEH) under case #RO0003205 for Site redevelopment at 1919 Market Street. A LUST case under the name Scott Company of California for 1919 Market Street was closed in January 1999 pertaining to two former USTs located directly west of the Site beneath the sidewalk along Myrtle Street (ACDEH case# RO0002439).

2.2 Current and Historic Site Use

The Site has historically housed both residential and commercial tenants. The Site was formerly occupied by Greyhound Bus Lines and a plumbing contractor warehouse, which included onsite operations such as auto motive repair and painting. The property was formerly equipped with two 10,000-gallon underground storage tanks (USTs), located within the sidewalk to the southwest side of the building along Myrtle Street. The USTs were reportedly used by Greyhound Bus Lines to store diesel prior to the 1960s. The Site was occupied by Scott Company starting as early as 1957, who reportedly used the southwest UST to store gasoline. A former fuel dispenser was reportedly located on the southwest portion of the property, near the corner of the subject property building. The USTs and dispenser were removed in the early 1980s at a time when Myrtle Street was being repaved. On January 22, 1999, the Site received closure via Letter of No Further Action from the ACDEH for the Leaking UST case. According to a Phase I environmental site assessment (AEI, 2014), solvents were stored near the southwest and southeast corners of the Site and refrigerant oil was stored in the northeast corner of the Site. Historical use areas are shown on Figure 2.

2.3 Development Plans

The planned redevelopment of the Site will involve conversion of the existing warehouse into 102 live-work units with communal courtyards. A Site map showing the planned Site development is included as Figure 3. The existing street side facades and portions of the building that are structurally adequate will remain, while rebuilding the middle portion of the building to current structural standards from the ground up. The entire building floor slab will be removed to allow for construction of new structural elements, infrastructure, and utilities, except within the planned stacked parking area in the northeast corner of the Site. A copy of the most recent Site development plans is included in Appendix A.

2.4 Site Geology and Hydrogeology

The Site is situated within the Coast Range physiographic province of the State of California. The Coast Ranges are northwest-trending mountain ranges and narrow valleys, extending approximately 600 miles from the Oregon Border to the Santa Ynez River near Santa Barbara, sub-parallel to the Pacific coast and San Andreas Fault. Structural features including faults and synclinal folds largely control topography in the province and reflect both previous and existing regional tectonic regimes. The Coast Ranges are comprised of Mesozoic and Cenozoic aged sedimentary strata, dominated by the Franciscan Complex within the subject property vicinity.

The Site is located within the East Bay Plain subbasin, which is part of the larger Santa Clara Valley Groundwater Basin. The East Bay Plain subbasin is a northwest trending alluvial plain bounded to the north by San Pablo Bay, to the east by the contact with Franciscan Basement rock, and to the south by the Niles Cone Groundwater basin. The basin extends beneath San Francisco Bay to the west. Groundwater is generally found very near the surface throughout the basin. The East Bay Plain subbasin aquifer system consists of unconsolidated sediments of Quaternary age. The Early Holocene Temescal Formation is the most recently deposited and consists of primarily silts and clays with some gravel layers.

The relatively flat Site lies at an elevation of approximately 20 feet above mean sea level to the east of San Francisco Bay and to the north of the Oakland Inner Harbor (Figure 1). According to previous boring logs, soil beneath the Site consists of silty sand fill underlain by silty sand, clayey sand, and sandy clay to a total depth of 25 feet below grade surface (ft bgs). Potential shallow fill material consisting of sand, gravelly sand and/or silty sand is found at approximately 0 to 4 ft bgs. The Merritt Sand formation present in West Oakland consists of silty sand, making it difficult to differentiate this potential shallow fill material from the native soil. The shallow material is underlain by silt from 4 to 10 ft bgs, silty sand or clay from 10 to 21 ft bgs, sand from 21 to 24 ft bgs and clay from 24 to 25 ft bgs. In the former loading area in the northwest corner of the building, along the perimeter of the Site, and underneath Myrtle Street, a silty sand was observed from 13 to 21 ft bgs. During previous drilling, groundwater was encountered at approximately 13 to 16 ft bgs and with water levels rising several feet after drilling. Groundwater appears to be under semi-confined conditions. Based on historical well monitoring data from the Site and Site vicinity, groundwater flows to the northwest.

2.5 Chemicals of Potential Concern

The chemicals of potential concern (COPC) at this Site primarily include the following chlorinated VOCs and petroleum hydrocarbons: tetrachloroethene (PCE), trichloroethene (TCE), carbon tetrachloride, chloroform, benzene, ethylbenzene, and total petroleum hydrocarbons as gasoline and diesel (TPHg and TPHd).

The following chemicals have been detected in Site media (soil, soil gas, subslab gas or groundwater) above conservative residential environmental screening levels (ESLs) established by the San Francisco Bay Region Water Quality Control Board (RWQCB): PCE, TCE, carbon tetrachloride, chloroform, benzene, ethylbenzene, and total petroleum hydrocarbons as gasoline and diesel (TPHg and TPHd). The following additional VOCs have been detected at the Site below ESLs: arsenic; 1,2-dichloroethane; naphthalene; 1,1,1-trichloroethane; toluene; xylenes; and TPH as motor oil (TPHmo).

No significant VOC impact has been detected in soil or groundwater based on data comparison to ESLs, with only limited benzene in groundwater above ESLs in the southeast corner (boring B-15). The primary impacted media of concern is soil gas and subslab gas.

Lead and asbestos are also considered COPC. Lead and asbestos are also considered a COPC at the Site due to the former presence of asbestos-containing material (ACM) and lead-based paint within the building, which was abated by a licensed hazardous material abatement contractor. Absent comment from the Bay

Area Air Quality Management District (BAAQMD) regarding the completed hazardous material abatement, ACDEH considers lead and asbestos as COPC since these compounds could be potentially present on top of the soil from aerial deposition during previous removal of building materials. In addition, lead was detected in soil at one location at 2 ft depth at 84 mg/kg (sample F-2), slightly above the residential ESL of 80 mg/kg. Due to the lack of serpentinite rock, asbestos is not considered a COPC due to subsurface soil conditions.

2.6 Previous Site Assessment

A summary of previous environmental activities at the Site is provided below. Investigation drilling and sampling locations are shown on Figure 4.

- **November 19, 2014, Phase I Environmental Site Assessment, AEI:** A Phase I ESA revealed that the Site was formerly occupied by Greyhound Bus Lines and a plumbing contractor warehouse, which included onsite operations such as motor repair and painting. The property was formerly equipped with two 10,000-gallon USTs, located within the sidewalk to the southwest side of the building along Myrtle Street.

- **March 28, 2016, Phase II Subsurface Investigation Report, Partner Engineering & Science (Partner):** Three subslab samples (SS-3, SS-4 and SS-5) were collected on March 11, 2016. One of the subslab samples (SS-4) contained a detectable concentration of benzene which exceeded the residential Environmental Screening Level (ESL) established by the San Francisco Bay Regional Water Quality Control Board. No other VOCs were detected in excess of applicable ESLs. Based on the results of this investigation, the report concluded that there has been a release of VOCs to the subsurface in the vicinity of the former painting area.

- **May 2, 2016, Additional Subsurface Investigation Report, Partner:** Five soil borings (B-1 through B-5) were advanced to a depth of 15 to 20 ft bgs inside the building. **S**oil, groundwater, and shallow soil gas at 5 ft bgs were sampled to identify potential concerns related to the aforementioned historical operations. No VOCs were detected in soil samples above the applicable laboratory reporting limits (RL). Tetrachloroethene (PCE) was detected in one groundwater sample (B5-GW) at a concentration less than the applicable ESL. No other VOCs were detected in groundwater exceeding laboratory RLs and/or residential ESLs. One soil gas sample (B3-SG-5) contained PCE and trichloroethene (TCE) concentrations exceeding applicable ESLs. Two soil gas samples (B2-SG-5 and B4-SG-5) contained chloroform concentrations exceeding the applicable ESL.

- **October 6, 2016, Site Assessment Report, PANGEA:** Nineteen subslab gas probes and three soil gas wells were installed and sampled to delineate VOCs beneath the building. Two soil borings were also drilled and grab groundwater samples collected to assess groundwater conditions. The extent of PCE, TCE, benzene, carbon tetrachloride and chloroform were delineated in subslab gas/soil gas beneath the building. The extent of PCE in groundwater was also delineated.

- **May 17, 2017, Preliminary Offsite Assessment Results – 2006 Myrtle Street, PANGEA:** Two soil gas probes were installed and sampled to assess potential vapor intrusion at the residence located at 2006 Myrtle Street. Additionally, an indoor air sample was collected from the basement of the residence. Soil gas samples did not detect any VOCs above residential Environmental Screening Levels (ESLs). However, two contaminants of concern, benzene and carbon tetrachloride, were detected in the indoor air sample above residential ESLs. This Perimeter/Offsite Assessment Report documents additional soil gas and indoor air testing that showed that VOC concentrations in indoor air resembled VOC concentrations in ambient air.
- **July 17, 2017, Preliminary/Offsite Assessment Report and Site Assessment Workplan, PANGEA:** Soil, groundwater, subslab gas, shallow soil gas and indoor air samples were collected to further delineate the perimeter and offsite extent of known subsurface VOCs and possible VOCs near historical Site operations/chemical use. Soil sampling results showed that the shallow fill/soil within the proposed courtyard/landscaped areas had only trace levels of hydrocarbons and no VOCs, SVOCs or PCBs. No significant COC impact was detected in soil or groundwater during perimeter/offsite sampling except in the southeast corner in B-15. No VOCs were detected in the perimeter/offsite soil gas wells above applicable ESLs or LTCP criteria, except for low *chloroform* concentrations in one offsite soil gas well (SG-10) just above the conservative ESL. Only low VOC concentrations were detected in the basement air at 2006 Myrtle Street and levels appeared to be representative of ambient air conditions.

3.0 DISTRIBUTION OF CHEMICALS OF POTENTIAL CONCERN

The following chemicals have been detected in Site media (soil, soil gas, subslab gas or groundwater) above conservative residential RWQCB environmental screening levels (ESLs) and are considered the primary chemicals of potential concern (COPCs): PCE, TCE, carbon tetrachloride, chloroform, benzene, ethylbenzene and total petroleum hydrocarbons as gasoline and diesel (TPHg and TPHd). Available information suggests several onsite releases from previous historical operations/storage areas are likely responsible for the VOCs and hydrocarbons discovered at the Site. The following subsections describe COPC distribution by media, by compound, and by location. The COPC distribution may change following implementation of interim remediation or final Site remedial action.

3.1 Chemical Distribution by Media

The chemical distribution in Site media (soil, groundwater, subslab gas/soil gas and indoor air) is summarized below. The COPC distribution in Site soil, groundwater, subslab gas/soil gas shown on Figures 5, 6, 7, 8, 9 and 10. No significant VOC impact has been detected in *soil* or *groundwater* based on data comparison to ESLs, with only limited benzene in groundwater above ESLs in the southeast corner (boring B-15). The primary impacted media of concern is soil gas and subslab gas.

3.1.1 Distribution of COPCs in Soil and Groundwater

Soil and groundwater analytical results are summarized on Figure 12 and Tables 1 and 2, respectively. These tables include a comparison to RWQCB ESLs for residential site use. Primary TPH impact in groundwater is present in the southeast historical solvent storage area (boring B-15) and also in the southwest former leaking UST area. No significant VOC impact has been detected in *soil* or *groundwater* based on data comparison to ESLs, with only limited benzene in groundwater above ESLs in the southeast corner (boring B-15). Since only petroleum hydrocarbons were detected in the southeast historical solvent storage area, a historic release of petroleum hydrocarbons likely occurred in this vicinity of the Site. Despite TPHg and TPHd in soil and groundwater being above residential ESLs, the hydrocarbon concentrations do not exceed the LTCP criteria shown on Tables 1 and 2. Lead in soil was also detected in one location (F-2) slightly above the residential ESL at a concentration of 84.4 mg/kg at a depth of 2 ft bgs. No groundwater monitoring wells exist at the Site.

3.1.2 Distribution of COPCs in Subslab Gas and Soil Gas

Subslab gas and soil gas analytical results are summarized on Figure 12 and Table 3. Table 3 also includes a comparison to soil vapor ESLs for residential site use. Subslab gas and shallow soil gas is impacted with concentrations of PCE, TCE, benzene, carbon tetrachloride and chloroform in excess respective residential ESLs for soil gas and/or subslab gas. The primary VOC impact above ESLs is present in soil gas about 5 ft below the concrete slab in the former loading dock and historical painting area within northwestern corner of the Site. The slab in the subgrade loading area (50 ft by 35 ft) is approximately 3.5 ft lower than the slab across the rest of the Site as shown on Figure 11. Some limited PCE (slightly below the ESL) was found in subslab gas in the northeast area.

Chloroform has been detected slightly above soil gas ESLs at three locations: northwest boring B-2, north central boring B-4 and offsite well SG-10 across Myrtle Street (Figure 9). These apparent isolated locations are near former or existing water service. Low chloroform concentrations are commonly detected in soil gas as a result of the chemical breakdown of chlorinated tap water.

While benzene was detected above the conservative ESL in select offsite soil gas wells, the benzene concentrations were well below the Low Threat UST Case Closure Policy (LTCP) criteria of 85,000 $\mu g/m^3$ for sites with a bioattentuation zone. The presence of oxygen above 4% for soil gas at 5 ft below building foundations and the lack of TPHg+TPHd concentrations greater than 100 mg/kg in shallow soil indicates the presence of a bioattenuation zone at the Site as based on the LTCP criteria.

3.1.3 Distribution of COPCs in Indoor Air

Indoor air analytical results from offsite sampling are summarized on Table 4. Table 4 also include a comparison to residential indoor air ESLs. Benzene and carbon tetrachloride were detected in indoor air basement samples slightly above the residential indoor air ESLs. No PCE or chloroform were detected in indoor air. A comparison of indoor air results to soil gas results yielded a poor correlation between the VOCs detected in the offsite basement air and underlying soil gas, suggesting that the VOCs detected in

the offsite basement air sample were sourcing from materials inside the basement and ambient air, rather than from the subsurface.

3.2 Chemical Distribution by Compound

As requested by ACDEH, the distribution of the following COPCs within all Site media are summarized on chemical-specific figures: PCE, TCE, carbon tetrachloride, chloroform, benzene, ethylbenzene and total petroleum hydrocarbons as gasoline and diesel (TPHg and TPHd). The chemical-specific figures are presented as Figures 5 through 10.

3.3 Chemical Distribution by Location

The COPC distribution by Site location associated with historical uses is described below and summarized on Figure 12.

3.3.1 VOC Impact in Northwest Loading Area

Site data suggests that the northwest loading area is the primary source area of VOCs in soil gas. The primary chemicals of concern in this area are PCE, TCE and benzene, due to soil gas concentrations above residential ESLs in select wells. Chloroform slightly exceeds the residential soil gas ESL in this area within boring B-2. Low chloroform concentrations are commonly detected in soil gas as a result of the chemical breakdown of chlorinated tap water. No significant VOCs were detected in soil or groundwater in this area of the Site.

3.3.2 Petroleum Hydrocarbons in Former UST Area in Southwest Corner

The primary chemicals of concern in this area are TPHg, TPHd, benzene and ethylbenzene. TPHg and/or TPHd have been historically detected above the soil ESL in borings/former wells IB-1, IB-7, IB-8, B-14, MW-1 and MW-2 at concentrations ranging up to 560 mg/kg TPHg and 1,200 mg/kg TPHd. TPHg and TPHd have also been detected above the groundwater ESL in recent boring B-14-GW at 461 µg/L and 1,170 µg/L respectively. Benzene has been detected above the soil gas ESL in soil gas wells SG-12, SG-13 and SG-15 at concentrations ranging from 120 to 430 µg/m^3. Historical levels of ethylbenzene have been detected above the soil ESL in boring IB-8 at 1,100 mg/kg and above the groundwater ESL in former well MW-4 at 110 µg/L. Benzene concentrations in soil gas were well below the Low Threat UST Case Closure Policy (LTCP) criteria of 85,000 µg/m^3 for sites with a bioattentuation zone. The presence of oxygen above 4% for soil gas at 5 ft below building foundations and the lack of TPHg+TPHd concentrations greater than 100 mg/kg in shallow soil (B-14) indicates the presence of a bioattenuation zone at the Site as based on the LTCP criteria.

3.3.3 Northeastern Storage Area

PCE is a primary chemical of concern in this area due to 190 µg/m3 detected in subslab gas probe SS-21. The other COPC in this area is TPHd due to its detection above the groundwater ESL of 219 µg/L in boring B-11.

3.3.4 Southeast Solvent Storage Area

Benzene is a primary chemical of concern in this area due to 20 µg/L detected in grab groundwater in boring B-15. The other COPCs in this area are TPHg/TPHd due to their detection above groundwater ESLs in borings B-10 and B-15 at concentrations up to 6,650 µg/L TPHg and 4,460 µg/L TPHd.

4.0 RESPONSIBILITIES FOR SMP IMPLEMENTATION

The firms and individuals responsible for implementation of this comprehensive SMP are listed below in Table A. The developer/owner will retain the involved firms. Preconstruction meetings will be held between the involved parties. The pre-construction meetings will serve to introduce all parties and establish the chain of command and lines of communications for the project. This and other meetings will include other trades that may be affected by the SMP implementation.

Table A – SMP Implementation Roles

Role	Firm	Contact Person
Developer/Owner – Project Manager	1919 Crew, LLC	Jeremy Harris, 510-560-4316 jeremy@thenegev.com
Site Maintenance Contractor	Top Form, Inc.	Dion Ross, 510-328-0710 topformusa@gmail.com
Security Contractor	Top Form, Inc.	Dion Ross, 510-328-0710 topformusa@gmail.com
General Contractor	To Be Determined	To Be Determined
Safety Health Officer	To Be Determined	To Be Determined
Project Site Safety Officer	To Be Determined	To Be Determined
Air/Dust Control Manager	PANGEA Environmental Services, Inc.	Bob Clark-Riddell, 510-435-8664 briddell@pangeaenv.com
Air/Dust Control Site Monitor	PANGEA Environmental Services, Inc.	Jake Wilson, 415-259-8860 jwilson@pangeaenv.com
Storm Water Consultant	Lea & Braze Engineering, Inc.	Raymond Barro, 916-966-1338 rbarro@leabraze.com
Environmental Consultant	PANGEA Environmental Services, Inc.	Bob Clark-Riddell, 510-435-8664 briddell@pangeaenv.com
Public Relations Contact	Peggy Moore	Peggy Moore, 510-599-8218 moore4oakland@gmail.com

These SMP implementation roles will be presented on the project website (www.1919market.org).

5.0 SCENARIOS COVERED BY SMP

This SMP provides control measures for the following Site development activities:

- Environmental and geotechnical assessment (drilling);
- Environmental remediation (soil excavation, soil stockpiling and loading);
- Building demolition activities; and
- Construction earthwork activities (including grading, trenching, soil stockpiling).

Environmental assessment is planned in the near future for implementation of the *Perimeter/Offsite Assessment Report and Revised Site Assessment Workplan* dated September 8, 2017. No further geotechnical drilling is planned at this time. Interim remedial soil excavation is planned shortly within the northwest corner of the Site for implementation of the *Interim Remedial Action Plan* dated September 8, 2017. Demolition activities and construction earthwork is scheduled for early 2018. A matrix of the various Site development activities with applicable control measures is provided below in Table B.

6.0 SITE CONTROL MEASURES

Site control measures will be conducted as necessary during the various phases of Site development and will consist of the following:

- Notification of relevant parties;
- Site maintenance and security;
- Air and dust monitoring and control;
- Management of contaminated soil;
- Management of unknown environmental features;
- Groundwater control;
- Storm water management and erosion control; and
- Traffic management.

A matrix of the applicable Site control measures for various environmental, geotechnical and demolition/construction activities during Site development is provided below in Table B.

TABLE B - Site Control Measures by Scenario

Site Control Measures	**Environmental & Geotechnical Assessment** (Drilling)	**Environmental Remediation** (Excavation, Soil Stockpiling & Loading)	**Building Demolition**	**Construction** (Grading)	**Construction** (Trenching, Aggregate/Soil Handling)
Notification of Relevant Parties	√	√	√	√	√
Site Maintenance and Security	√	√	√	√	√
Air and Dust Monitoring/Control (VOCs and PM_{10})	√	√	√	√	√
Air and Dust Monitoring/Control (lead and asbestos)	-	-	√	√	-
Management of Contaminated Soil	√	√	-	√	√
Management of Unknown Environmental Features	√	√	√	√	√
Groundwater Control	√	√	-	-	-
Storm Water Management and Erosion Control	√	√	√	√	√
Traffic Management	√	√	√	√	√

6.1 Notification of Relevant Parties

Prior to any environmental/geotechnical activities involving subsurface work, or any demolition/ construction activities with the potential to generate dust, the Site owner/developer or representative will notify all relevant parties including ACDEH. Notification will be provided at least one week prior to the potential dust generating activities. If the planned scope of activities is not adequately covered by the SMP, or if there is likelihood for the proposed subsurface work to encounter contamination, then the notification to relevant parties will include a description of the nature of the potential for encountering contamination. Contact information for notified parties is provided in Table A of Section 4.0.

6.2 Site Maintenance and Security

The property owner (1919 Crew LLC) will implement the following measures for Site maintenance and Security:

- Clean up debris within the Site interior and exterior;
- Board up interior of Site to restrict access to the upstairs regions; and
- Provide a security firm to watch the Site evenings/weekends.

6.3 Air and Dust Monitoring and Control for VOCs and PM_{10}

Dust control is a paramount concern of the project neighbors and local community. This air and dust monitoring program is designed to control and mitigate dust during any potential dust generation activity including drilling, excavation, trenching, grading, soil stockpiling, soil/aggregate handling, truck/equipment traffic, demolition, or any other type of earthwork. Prior to any Site work, owner/developer will communicate the following air and dust monitoring and control procedures to all contractors and project firms and notify relevant parties as described in Section 6.1.

6.3.1 Air/Dust Monitoring Personnel

Prior to implementing any activities, the owner/developer and the environmental consultant will identify key personnel responsible for air/dust monitoring and control. One senior manager will be designated as the "Air/Dust Control Manager" to oversee all air/dust monitoring and control efforts for the project. One Site-specific individual will be designated the "Air/Dust Control Monitor" responsible for all air/dust monitoring and control efforts at the Site. The Air/Dust Control Manager and Air/Dust Control Monitor are presented above on Table A of Section 4.0 and are subject to change. Individual contractors may choose to perform additional VOC monitoring in the breathing zone of the work area to provide for their workers' health and safety.

6.3.2 Air Monitoring for VOCs

A portable PID or equivalent will be used to measure VOC measurements directly around the work activities. The PID will be serviced and calibrated by manufacturer's representative prior to use, and additional field calibrations will be conducted as necessary by the Air/Dust Control Monitor during field activities. If significant odors or VOC concentrations are measured above 5 parts per million per volume (ppmv) within the work area during the handling of any contaminated soil, additional PID readings will be collected every half hour along the downwind perimeter of the Site. VOC monitoring results from the PID will be written manually a minimum of every hour during working hours (approximately 7AM to 5PM) on preformatted data field sheets.

The dominant downwind direction at the Site is towards the east based on previous Site observations. The downwind direction and speed will be estimated daily using a windsock mounted at the Site as shown below in Table C.

Table C – Wind Speed Estimation from Windsock

Sock Position	Approximate Wind Speed (miles per hour)
At Rest	0 – 4
At 45º	4 – 8
At 60º	8 – 14
Straight	14 – 18

A handheld digital anemometer will also be used to confirm the wind speed. A high wind condition will be defined as an 18 mph or greater wind sustained for at least 5 minutes in any 1-hour period.

6.3.3 Air and Odor Mitigation Measures

VOC emissions leaving the Site will be maintained below 5 parts per million per volume (ppmv) in accordance with the Short Term Exposure Limit (STEL) for benzene as established by the California Occupational Safety and Health Administration (Cal OSHA). Benzene has the lowest STEL of all COCs at the Site including PCE which has a STEL of 100 ppmv. Should the Air/Dust Control Monitor identify VOC concentrations exceeding 5 ppmv directly adjacent to the work area, the Air/Dust Control Monitor will immediately take steps to mitigate the vapor. Potential mitigation steps would include covering the area/stockpile with heavy duty plastic and/or applying water or a vapor/odor suppressant such as Simple Green™ onto the soil.

6.3.4 Dust Monitoring

Dust monitoring will be conducted daily at the Site during any drilling, soil stocking or loading, demolition, or construction earthwork activities by the Air/Dust Control Monitor using one perimeter dust meter/data logging station and one portable dust meter. Dust will be monitored for coarse particulate matter less than 10 microns (PM_{10}) which is commonly associated with road dust and construction activities. Perimeter dust monitoring for real-time PM_{10} concentrations will be conducted each work day (from approximately 7AM to 5PM) using a fixed tripod-mounted, battery-powered, TSI Dust Trak 8530 meter/data logger or equivalent. The dust meter/datalogger will be serviced and calibrated by manufacturer's representative prior to use and additional field calibrations will be conducted as necessary by the Air/Dust Control Monitor. Perimeter dust monitoring PM_{10} results will be recorded every minute with the datalogger from the tripod-mounted station set downwind of the work area along the perimeter of the Site.

The downwind of the work area is likely to be along the east of the Site based on the typical weather pattern for the Site. Since the Site is surrounded by existing concrete building walls, particularly along the west, north and east property boundaries, wind across the Site is likely to be muted. Wind direction and wind speed will be monitored periodically throughout the day using a handheld digital anemometer and a windsock mounted at the Site. Should the downwind direction change or fluctuate at the Site, the perimeter dust meter station will either be relocated to a more appropriate downwind perimeter location, or supplemental dust measurements will be collected on a half hour basis in the downwind direction using a portable dust meter. The dedicated Air/Dust Control Monitor will visit the monitoring station several times throughout the work day to ensure the meter is operating as designed. Additional onsite dust monitoring for real-time PM_{10} concentrations will also be measured directly around the work activities and at the upwind property boundary using a portable TSI AIM 510 meter or equivalent. The dust monitoring results from the portable dust meter will be recorded a minimum of every hour on preformatted data field sheets.

All manual entries will be made in a legible and orderly manner using permanent ink. Erasures will be avoided. If an error is made, it is to be crossed out with a single line and the correction immediately made. Cancellations or insertions should be initialed, dated, and explained (in the margin, if possible) by an appropriate notation. All operating details and conditions should be recorded. Each page will be signed and dated by the individual making the entry and performing the work. An example of the Air and Dust Monitoring Log for field work is provided in Appendix B.

6.3.5 Dust Mitigation Measures

Dust from the Site will be maintained below the California Ambient Air Quality Standard (CAAQS) PM_{10} concentration of 50 $\mu g/m^3$ in accordance with 17 California Code of Regulations [CCR] 70200. An CAAQS air exceedance is defined as a PM_{10} concentration of 50 $\mu g/m^3$ above the upwind baseline level for more than for 5 minutes along the perimeter, or for more than 15 minutes directly adjacent to the earthwork location. Should the dedicated Air/Dust Control Monitor observe any visible clouds of dust or at any time identify a PM_{10} reading exceeding 50 $\mu g/m^3$, the Air/Dust Control Monitor will immediately arrange for the soil to be wetted with water, or otherwise suitably contained to prevent nuisance from dust. A high wind condition is defined as 18 mph sustained for at least 5 minutes in any 1-hour period. For high wind days, the upwind/downwind subtraction will be used to calculate the dust contribution from the Site at the property boundary as well as the ten percent contribution above the federal National Ambient Air Quality Standard PM_{10} value of 150 $\mu g/m^3$. For example, the Site would be in compliance with agency requirements assuming the following:

- PM_{10} (upwind) = 200 $\mu g/m^3$
- PM_{10} (downwind) = 220 $\mu g/m^3$
- Contribution from the Site = 20 $\mu g/m^3$
- Total loading at ten percent of 220 $\mu g/m3$ = 22 $\mu g/m^3$

Dust control measures during any dust generating activity will consist of spraying the minimum amount of

water needed to suppress the dust onto the soil and work area, limiting the speed of traffic through the work area to 15 miles per hour, or sealing any demolition/construction areas with plastic, as appropriate. Equipment, materials and roadways on the Site shall be used in a manner or treated as to prevent excessive dust conditions. Any soil not off-hauled from the Site the same day will be stockpiled on plastic sheeting and covered with plastic.

6.3.6 Documentation and Record Keeping

Documentation of all air and dust monitoring will include copies of written air and dust monitoring logs, PM_{10} data captured during data logging, laboratory analytical reports for asbestos and lead, and all equipment maintenance and calibration records. Photos will be taken of the monitoring stations and various dust mitigation measures used at the Site.

6.4 Air and Dust Monitoring and Control for Lead and Asbestos

The air and dust monitoring program with respect to lead and asbestos is designed to control and mitigate dust during any potential dust generation activity associated with demolition or significant disturbance of surficial soil, particularly Site grading activity. For air and dust monitoring and control for lead and asbestos, refer to notification procedures in Section 6.1 and procedures for air and dust monitoring personnel, PM_{10} dust monitoring, and record keeping in Section 6.3.

6.4.1 Initial Asbestos and Lead Sampling

During building demolition and construction grading, lead and asbestos sampling will be conducted by the Air/Dust Control Monitor, concurrent with the downwind perimeter PM_{10} dust monitoring procedures. Lead and asbestos samples will be collected in laboratory-supplied cassettes attached to the top of the tripod and connected via tubing to a Sensidyne Gilian GilAir® air pump or equivalent. The air pump will be serviced by manufacturer's representative prior to use, and additional field maintenance will be conducted as necessary by the Air/Dust Control Monitor during field activities. Sampling equipment for lead and asbestos will be set to collect an 8-hour sample. The air flow rate will be measured at the beginning and end of the sampling period to help calculate the average air flow rate. The Air/Dust Control Monitor will visit each air monitoring station hourly to ensure that monitoring and sampling equipment is operating as designed. Sampling cassette/air pumps for lead and asbestos will be setup and taken down daily, concurrent with the dust monitors. At the end of each work day, the cassettes will be capped and transported under chain of custody protocol to a California-certified laboratory for analysis. Lead samples will be analyzed by Flame Atomic Adsorption (FLAA) using NIOSH Method 7802. Asbestos samples will be analyzed by Phase Contrast Microscopy (PCM) fiber counting procedures using NIOSH Method 7400. Lead and asbestos sampled will be submitted to the analytical laboratory the same day as collection for 24-hour turn-around-time analytical reporting.

6.4.2 Termination of Asbestos and Lead Sampling

During each phase of building demolition and construction grading, lead and asbestos laboratory testing will be conducted daily to monitor conditions and evaluate concentration trends for a minimum of one

week. If laboratory results indicate no significant levels of lead or asbestos-laden dust originating from the Site after the week of sampling, lead and asbestos sampling will be discontinued for the remainder of the project phase. In addition, if the Bay Area Air Quality Management District (BAAQMD) eventually confirms that the former hazardous materials abatement of building materials satisfied abatement requirements, lead and asbestos sampling will be discontinued.

6.4.3 Asbestos and Lead Mitigation Measures

Levels of airborne asbestos and lead will be maintained below regulatory actions levels. The action level for airborne lead will be 30 $\mu g/m^3$in air as an 8-hour time-weighted average, in accordance with the Title 8, Section 1532.1 of the California Code of Regulations. The action level for airborne asbestos will be 0.1 fiber per cubic centimeter (f/cc) in air as an 8-hour time-weighted average, in accordance with Title 8, Section 1529 of the California Code of Regulations.

Lead and asbestos analytical results will be immediately reviewed upon receipt of the laboratory analytical, expected approximately 24 hours after sample submittal. If the laboratory results indicate that either lead or asbestos-laden dust originating from the Site exceeds the action level of 0.15 $\mu g/m^3$ (lead in air) or 0.1 f/cc (asbestos in air), the Air/Dust Control Monitor will advise the contractor to suspend all grading/earthwork or demolition activities until the graded surfaces can be wetted with water or work areas suitably contained to prevent nuisance from dust.

6.5 Management of Contaminated Soil

This section documents procedures for managing Site fill and soil during Site grading and all subsurface work.

6.5.1 Soil Screening and Handling

Prior to commencement of any earthwork at the Site, the property owner or general contractor will notify PANGEA. A Site safety and health plan (SSHP) dealing with the presence of VOCs shall be in place prior to commencement of any drilling, excavation, trenching, or grading activities. A copy of a Site Health and Safety Plan is included in Appendix D. In accordance with the SSHP, a project Safety and Health Officer (SHO) or Air/Dust Control Manager will be assigned to respond to community queries regarding odors and other health concerns. Perimeter air monitoring will be performed as described above in Section 6.3.

General soil screening and handling procedures are as follows. If suspected soil contamination is encountered during Site redevelopment, the Site environmental consultant is to be contacted immediately. The Site environmental consultant will respond to the Site within 24 hours to ascertain the appropriate measures to be taken to assure worker safety and to assure that all contaminated materials encountered are properly managed.

Any soil containing VOC odors or staining will either be stockpiled for further characterization or characterized in place, prior to excavation. Any soil containing brick or other obvious fill material will be stockpiled for further characterization or characterized in place, prior to excavation. Where hydrocarbon or VOC impact is suspected, soil samples will be collected and analyzes for TPH and VOCs at a minimum. If

heavier TPH impact if reported by the laboratory, samples also be analyzed for SVOCs, PCBs and CAM17 metals. If fill material is suspected (e.g., brick and debris), soil samples will be analyzed for compounds specified by the DTSC Advisory for Clean Import Fill Material. Contingent delineation characterization and mitigation procedures are described below.

If contaminated material is excavated, it will be stockpiled on plastic sheeting and covered with plastic sheeting, or placed in appropriate containers (e.g., 55-gallon DOT-approved drums or roll-off bins. In accordance with agency requirements for minimizing potential odor concerns, excavated soil will not be 'aerated.' Debris (brick, rubble, etc.) encountered during excavation as well as concrete and/or asphalt cuttings will be separated from the excavated soil and disposed of separately.

In addition, during excavation for grade beams and utilities in the area of known VOC impact to soil gas, the environmental manager or his representative will be present onsite to screen for VOC impact using a photo-ionization device (PID).

In summary, an environmental professional shall be onsite at any time the potential is high for contamination to be encountered to document and verify the extent of removal and ensure that air/dust control measures are implemented.

6.5.2 Cleanup of Soil Tracked Offsite and Track Off Prevention

In addition to plans within the construction documents, the following methods will be used to prevent and cleanup up offsite tracking of soil:

- Contractor will avoid tracking dirt off site and will assign someone to visually inspect trucks exiting the Site.
- Contractor will limit construction access routes and stabilize designated access points.
- Hauling trucks will not carry soil extending above the walls or back of the truck bed. As necessary, trucks with loose material will be covered with tarpaulins or other material. Wetting of soil in truck prior to covering, if necessary.
- Contractor will manually brush off tires and trucks, or will install wheel washers to clean all trucks and equipment leaving the Site.
- Contractor will sweep streets (with water sweepers as necessary) at the end of each day if visible soil material is carried on the adjacent paved roads.

6.5.3 Criteria for Import of Backfill Material

For import of fill material from commercial sources or quarries, letters of certification will be provided by the quarry or commercial business providing the engineered fill, baserock or other material. If the certification information is deemed insufficient, additional soil characterization will be conducted to facilitate the use of imported fill.

For non-commercial facilities, documentation regarding the previous land use and any environmental site

assessments performed at the source of the fill will be provided to minimize the potential of introducing contaminated fill material onto the Site. If an environmental site assessment was performed at the fill source site, its findings will be provided.

If adequate documentation cannot be provided, the source fill material will be tested for potential impact to ensure that 'clean' fill is being brought onsite. Per ACDEH direction, the source fill material will be sampled and analyzed for TPH, VOCs, SVOCs, and CAM-17 metals, and results will be compared to RWQCB Tier 1 ESLs. Samples will be submitted under chain-of-custody to a California certified laboratory. PANGEA's standard field sampling procedures are include in Appendix C.

6.6 Management of Unknown Environmental Features

6.6.1 Regulated Feature

If the unknown environmental feature is a regulated feature, such as a UST, the appropriate regulatory agencies will be notified, permits will be obtained, and work plans will be provided for a removal action for the feature. If a UST is discovered, soil sampling will be conducted consistent with the April 2004 Tri-Regional Guidelines of the Regional Water Quality Control Board – Central Valley Region. Documentation of the work conducted to assess and remediate the regulated feature will be provided in a final report.

6.6.2 Chemical Impact or Unregulated Feature

If evidence of chemical impact or other unregulated feature is discovered during earthwork or subsurface activities, soil sampling will be performed to delineate the horizontal and vertical extent of the discovered soil impact. At least one vertical and two lateral soil samples will be collected near the soil impact. Soil samples will be submitted for laboratory analysis and tested for potential compounds of concern. If analytical data indicates chemical impact that represents a significant threat to human health, the owner or environmental consultant will notify ACDEH in advance of any soil excavation performed to mitigate the threat to human health. The soil excavation would be conducted in accordance with applicable laws and regulations. Following any required excavation, soil compliance sampling will be performed from the excavation sidewalls and floor.

6.7 Groundwater Control

No deep work is currently planned that is likely to encounter Site groundwater estimated at approximately 13 to 16 ft bgs. However, if groundwater contamination is encountered during Site redevelopment, the environmental consultant is to be contacted immediately. The Site environmental consultant will respond to the Site within 24 hours to ascertain the appropriate measures to be taken to assure worker safety and to assure that any contaminated materials encountered are properly managed.

6.8 Storm Water Management and Erosion Control

All activities at the Site shall not result in any material entering the storm drain system. These procedures supplement the procedures in the Storm Water Pollution Prevention Plan (SWPPP) approved for the Site grading and construction work, which include best management practices (BMP) implemented throughout

excavation activities. A copy of the SWPPP and Erosion Control Plan prepared by Lea & Braze Engineering, Inc. is provided in Appendix E.

In a January 30, 2017 email, the Oakland Building Department indicated that storm water and Site drainage will be processed by the City under permit B1600468. The Oakland Building Department required that all plans and submittals should be sent to the attention of Principal Inspection Supervisor, David Miles (dmiles@oaklandnet.com and (510) 238-6214).

6.8.1 General Erosion and Storm Water Control Plan

General erosion and storm water control plans are presented in the construction documents dated November 23, 2016 in Appendix E. These plans will apply to active Site grading and construction work. In addition to specifications in these construction documents, the following grading and erosion control and BMPs will be observed and implemented throughout site grading and earthwork activities:

- Delineate with field markers clearing limits, easements, setbacks, sensitive or critical areas, buffer zones, trees, and drainage courses.
- Stabilize all denuded areas and install and maintain all temporary erosion and sediment controls continuously between October 15th and April 15th.
- Perform clearing and earth moving activities only during dry weather (without significant rainfall).
- Provisions will be made for diverting on-site runoff around exposed areas and diverting off-site runoff around the site.
- Provisions for preventing erosion and trapping sediment onsite, storm drain inlet protection, covers for soil stock piles, and/or other measures.
- Store, handle, and dispose of construction materials and wastes properly, so as to prevent their contact with storm water.
- Control and prevent the discharge of all potential pollutants, including pavement cutting wastes, concrete, petroleum products, chemicals, wash water or sediments, and non-storm water discharges to storm drains and any nearby surface water.
- Avoid cleaning or maintaining vehicles onsite, except in a designated area where wash water is contained and treated.
- Protect adjacent properties and undisturbed areas from construction impacts.
- Train and provide instruction to all employees and subcontractors regarding the construction BMPs.

If any storm water catch basins are found in close proximity to excavation and grading, the contractor will implement the following procedures designed to ensure that grading and erosion control practices proposed for the above project comply with best management practices and standards.

- Any catch basin will be protected by silt fencing or other erosion sedimentation prevention devices at all times.
- Erosion control devices will not be moved or modified without approval of the project manager.
- All removable erosion protective devices shall be in place at the beginning and end of each working day at all times.
- All silt and debris shall be removed from streets and public right of way immediately.
- All immediate downstream inlets will be protected.

6.8.2 Ponded Water Sampling

If any significant ponded water develops onsite that requires removal prior to Site assessment or construction, samples of the ponded water will be collected to evaluate water quality and facilitate disposal. At a minimum, ponded water samples will be analyzed by a State-certified analytical laboratory for the following potential chemical of concern for the Site: VOCs by EPA Method 8260, total dissolved lead by Method 8010, and asbestos by Air Resources Method 435. Ponded water will be sampled by PANGEA using laboratory-supplied containers.

As required to facilitate Site assessment or construction, pond water samples will be collected from each major pond, from a retention sump area with sediment filter, or from water stored within a temporary aboveground storage tank, as detailed below. Ponded water disposal options will be based on analytical results and facility requirements.

In the event of sanitary sewer discharge, ponded water will be analyzed for following in accordance with EBMUD Wastewater Control Ordinance for a special discharge permit: metals, chlorinated hydrocarbons, oil and grease, pH, temperature, phenolic compounds, and full method VOCs by EPA Method 8260 due to VOC impact at the Site. EBMUD may be contacted via Chuck Wittorp (Charles.Wittorp@EBMUD.com). In the event of offsite disposal, different analyzes may be required by the accepting facility.

6.8.3 Ponded Water Disposal for Offsite Disposal (Sanitary Sewer or Offsite Facility)

Ponded water requiring removal from the Site will be discharged to the sanitary sewer or trucked off site to an appropriate facility following approved testing. If necessary, the ponded water will be contained within stored within aboveground water storage tank.

EBMUD indicated water can also be pumped from an underground retention area/sump with gravel filter to control sediment discharge to the sanitary sewer. These sumps with gravel filter may be constructed as an alternative to the aboveground storage tank.

If sanitary sewer disposal is not allowed or less timely or cost effective, ponded water may be disposed at an appropriately licensed offsite facility. For offsite disposal, licensed waste haulers would transport water via vacuum trucks to appropriate facilities after profiling water for acceptance at the facility. In this event,

water may be pumped directly from the existing ponds using the vacuum truck and limited sediment filtration.

6.8.4 Ponded Water Removal before Environmental Soil Gas Sampling

If ponded water is present near soil gas sampling locations, ponded water will be removed to facilitate soil gas sampling. Agency guidance specifies soil gas sampling should not occur within 5 days of significant rainfall or where ponded water is present.

Other than procedures described herein, no additional methods are planned to limit rainwater infiltration into the Site. While ACDEH has expressed concern about potential subsurface contaminant migration in groundwater and soil gas due to hydraulic mounding, no VOC impact has been found in groundwater above RWQCB ESLs and the estimated mass of VOCs in soil gas should not represent a significant leaching risk for groundwater.

6.8.5 Storm Water Retention Contingency

The following contingency was prepared to provide enhanced retention and management of any future ponded/storm water and sedimentation. The ponded/storm water contingency involves the limited grading and construction of a primary and secondary retention basins, with examples shown on Figure 13. The Site would be prepared, graded and/or with temporary drainage routes to be directed to the primary basin. The basin will ideally serve as a percolation and infiltration zone for the storm water.

This contingency could be implemented in the event of ongoing storm water events (persistent rainy season) and additional pond dewater events to facilitate environmental sampling. The retention basin areas were selected to allow water retention away from the known VOC soil gas impact, and coincides with the area of the largest existing pond area.

Initially, limited Site grading would be conducted to slope the Site surface toward the planned retention basins. The primary retention basin would be constructed of 6 inches of bio-retention planting soil. The secondary retention basin would be constructed of 6 inches of bio-retention planting soil, underlain by 12 inches of treatment soil (about 65% sand and 35% compost), underlain by 12 inches of drain rock wrapped in filter fabric. A sump will be installed to facilitate pumping as necessary to dewater the retention basin as necessary. As shown on Figure 13, straw fiber rolls or hay bales would surround the retention basin for added erosion control and turbidity control.

6.9 Traffic Management

All Site-specific traffic will be advised to enter the Site through the main entrance along Market Street, at the southeast corner of the Site. Traffic through the work area will be limited to a speed to 15 miles per hour to minimize dust. Any large trucks required for hauling away contaminated soil or building debris, or delivering aggregate will enter the Site through the Market Street main entrance and exit the Site through the Myrtle Street entrance to minimize travel across the Site. Trucks hauling contaminated soil will be advised to exit the Site and travel southeast on 18th Street for three blocks and then travel northeast on

Castro Street for one block, prior to accessing Interstate Highway 980. To prevent offsite tracking of soil, the procedures outlines above in Section 6.5.2 will be followed.

7.0 REPORTING

This plan will be provided to the general contractor and earthwork subcontractors working on this project. If environmental conditions are observed by the Site environmental manager or others that may represent an imminent threat to human health or the environmental, such conditions shall be reported to the City of Oakland Fire Department and ACDEH. Interim data will be provided to ACDEH as merited based on indication of VOC or other contaminant impact. At the completion of a soil management, soil profiling, or soil sampling program, a technical report(s) will be provided to ACDEH.

8.0 REFERENCES

The regulatory record for this Site can be found on the State of California GeoTracker Website at https://geotracker.waterboards.ca.gov/profile_report?global_id=T10000009433

AEI Consultants, 2014, *Phase I Environmental Site Assessment*, (AEI, 2014) 1919 Market Street, Oakland California, November 19.

CalEPA/DTSC, 2010, *Proven Technologies and Remedies Guidance, Remediation of Chlorinated Volatile Organic Compounds in Vadose Zone Soil*, April 2010.

CalEPA/DTSC, 2011. *Vapor Intrusion Mitigation Advisory (VIMA), Revision 1, Final.* October.

CalEPA/DTSC, 2015, *Advisory – Active Soil Gas Investigations*, July 2015.

Los Angeles Department of Building and Safety (LADBS). Methane Mitigation Standards.

PANGEA Environmental Services, Inc., 2016, *Site Assessment Report*, 1919 Market Street, Oakland California, October 6.

PANGEA Environmental Services, Inc., 2017, *Preliminary Offsite Assessment Results – 2006 Myrtle Street*, 1919 Market Street, Oakland California, May 17.

PANGEA Environmental Services, Inc., 2017, *Perimeter/Offsite Assessment Report and Site Assessment Workplan*, 1919 Market Street, Oakland California, July 17.

Partner Engineering & Science, Inc., 2016, *Phase II Subsurface Investigation Report*, 1919 Market Street, Oakland California, March 28.

Partner Engineering & Science, Inc, 2016, *Additional Subsurface Investigation Report*, 1919 Market Street, Oakland California, May 2.

SWRCB, 2012, Low-Threat Underground Storage Tank Case Closure Policy. August 17, 2012.

SFRWQCB, 2016. San Francisco Bay Regional Water Quality Control Board, *Environmental Screening Levels*, February 22, (Revision 3, May)

1919 Market Street
Oakland, California

PANGEA

Vicinity Map

Figure 2

1919 Market Street
Oakland, California

Site Map and Historical Use Areas

1919 Market Street
Oakland, California

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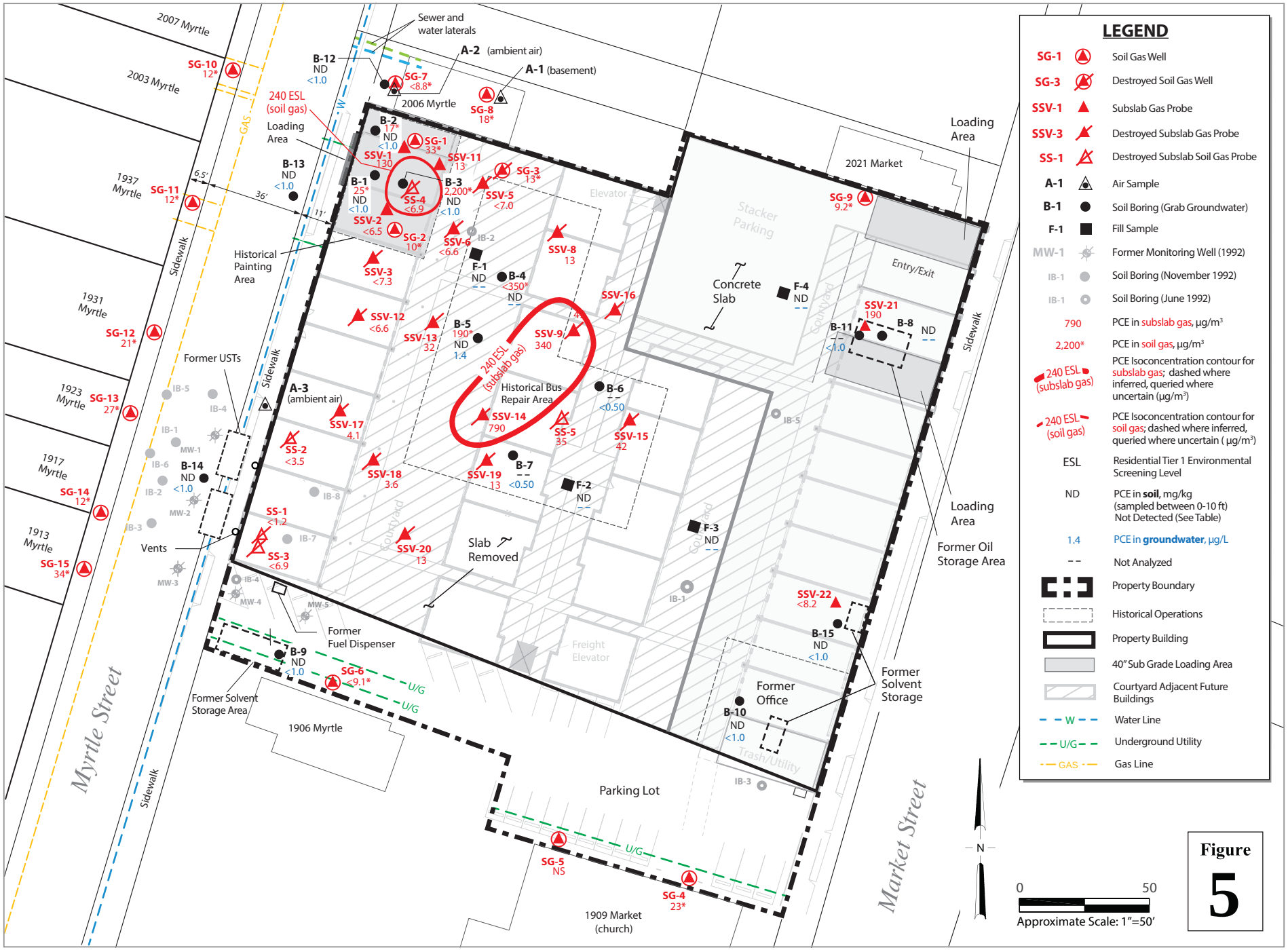
Site Map with
Planned Site Development

1919 Market Street
Oakland, California

PANGEA

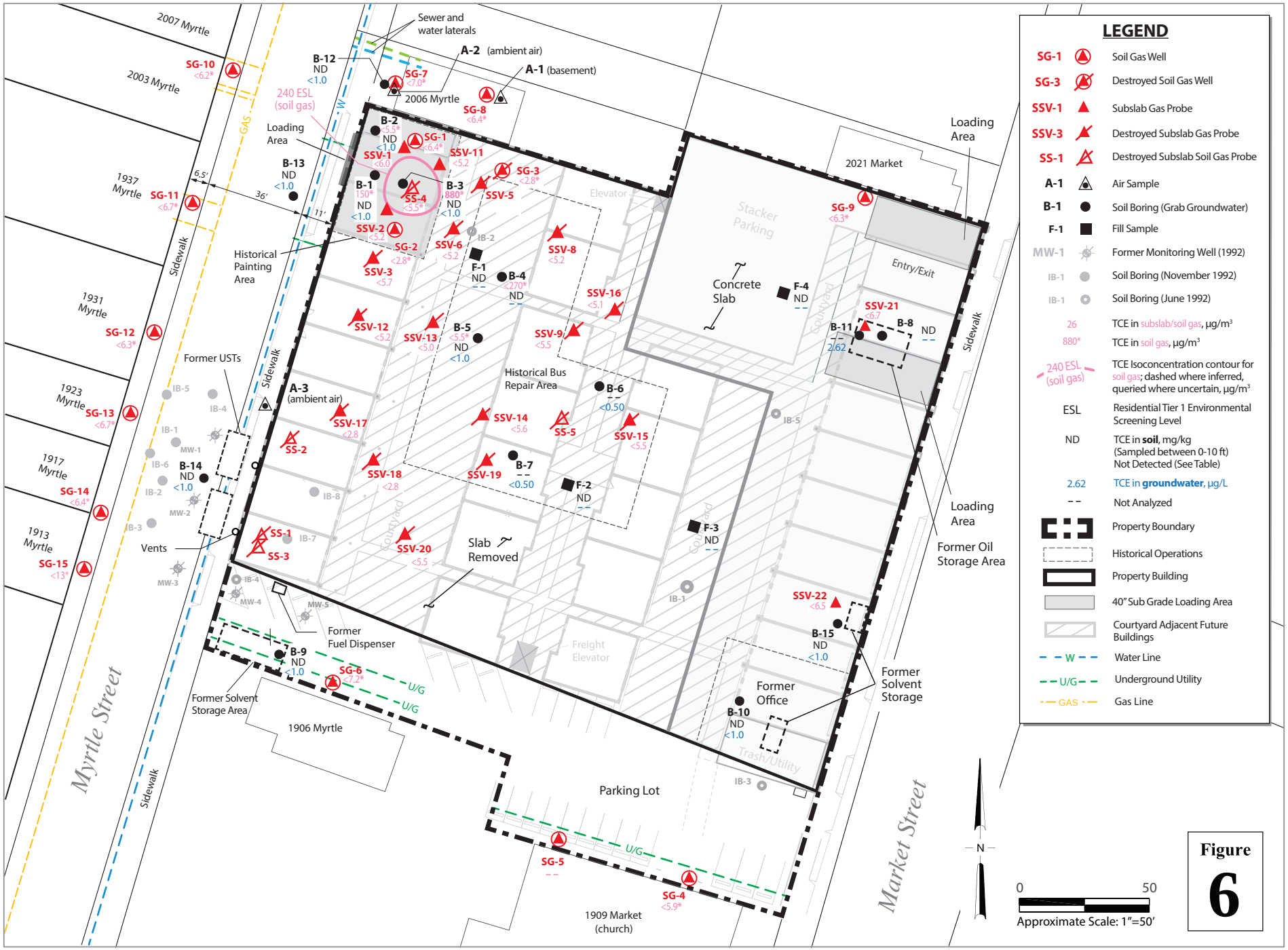
Site Map with Investigation Locations



1919 Market Street
Oakland, California

PANGEA

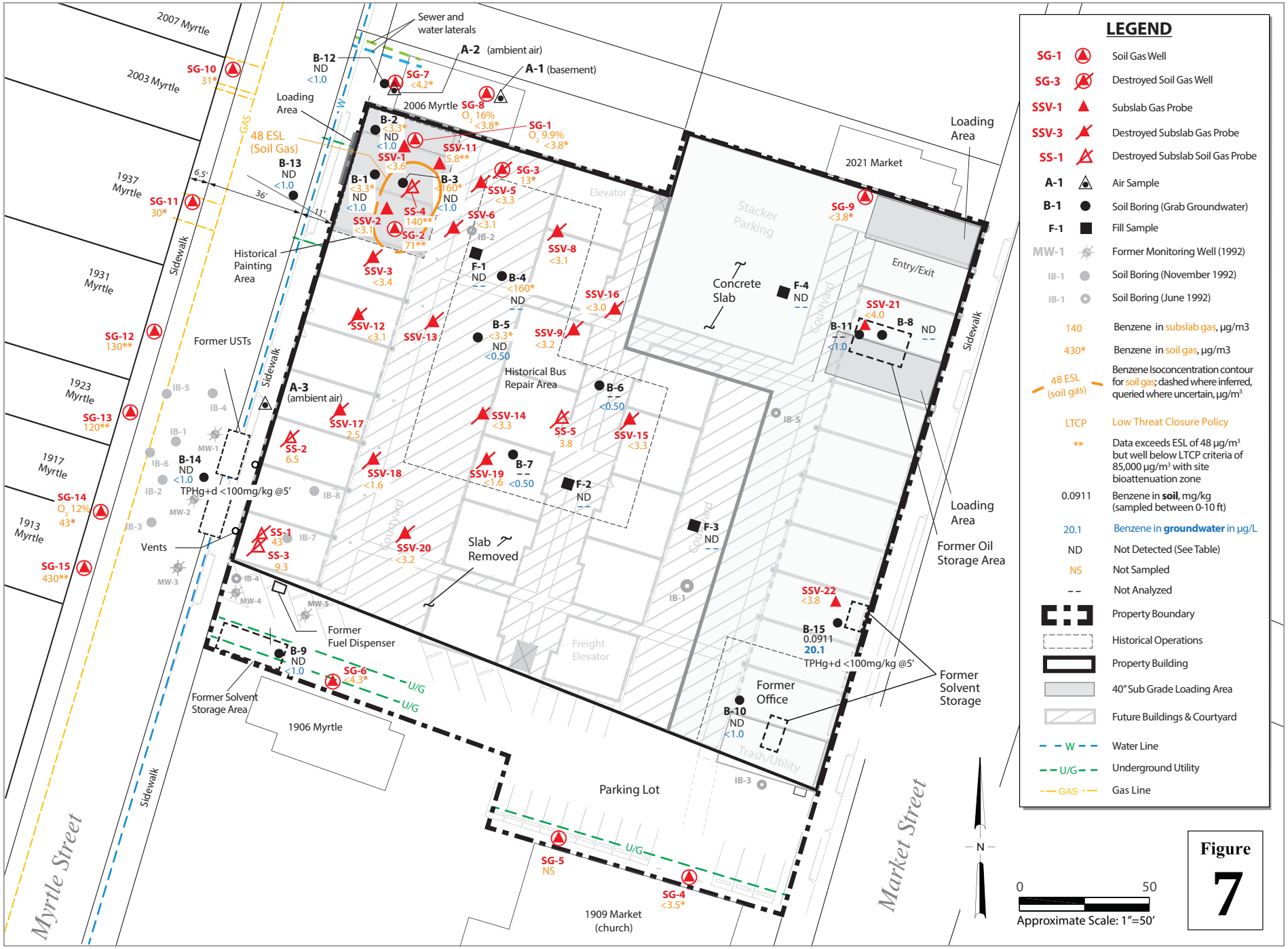
PCE in Soil, Groundwater and Subslab/Soil Gas



1919 Market Street
Oakland, California

PANGEA

TCE in Soil, Groundwater and Subslab/Soil Gas



LEGEND

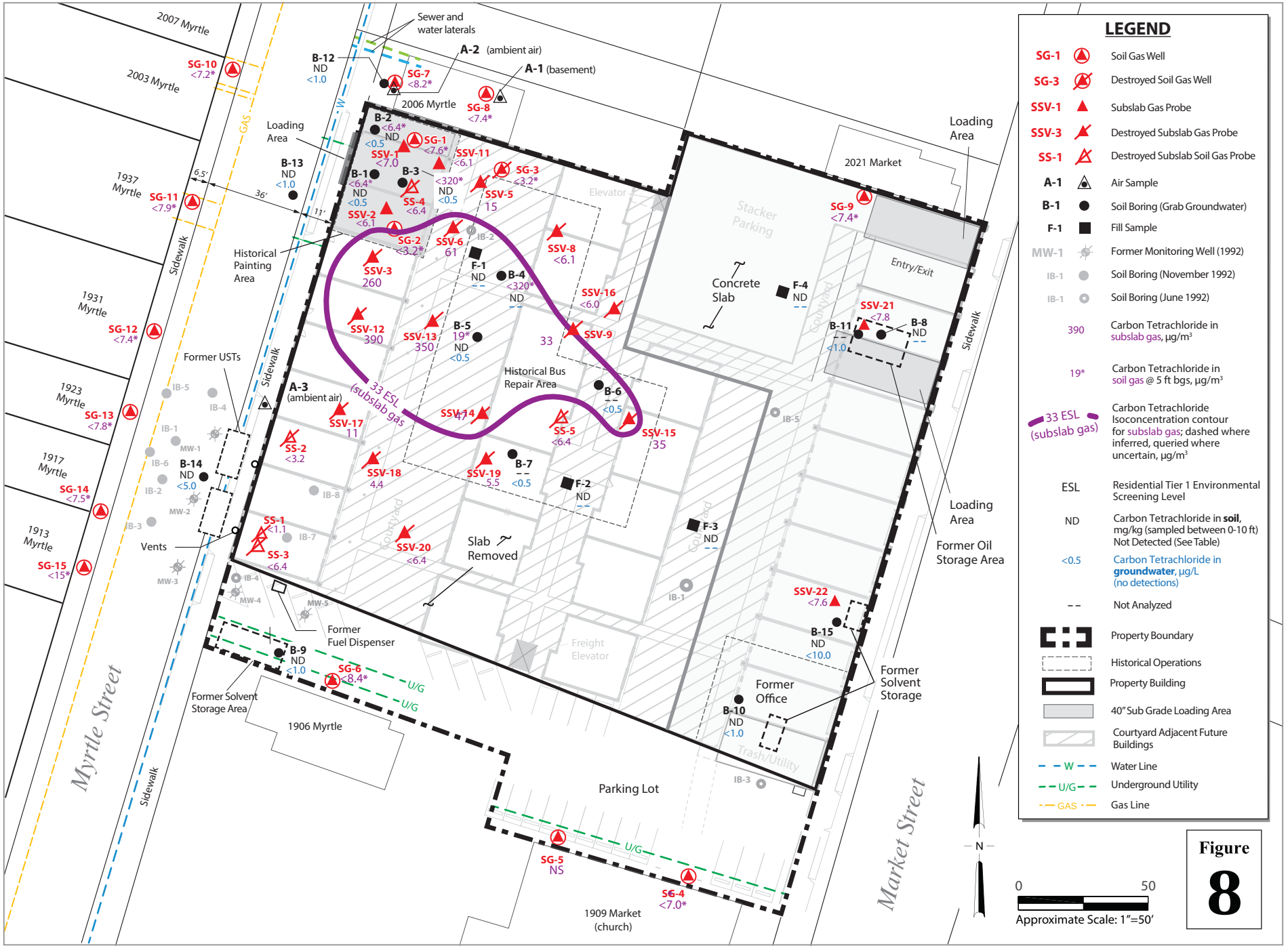
- SG-1 — Soil Gas Well
- SG-3 — Destroyed Soil Gas Well
- SSV-1 — Subslab Gas Probe
- SSV-3 — Destroyed Subslab Gas Probe
- SS-1 — Destroyed Subslab Soil Gas Probe
- A-1 — Air Sample
- B-1 — Soil Boring (Grab Groundwater)
- F-1 — Fill Sample
- MW-1 — Former Monitoring Well (1992)
- IB-1 — Soil Boring (November 1992)
- IB-1 — Soil Boring (June 1992)
- 140 — Benzene in subslab gas, µg/m3
- 430* — Benzene in soil gas, µg/m3
- 48 ESL (soil gas) — Benzene Isoconcentration contour for soil gas; dashed where inferred, queried where uncertain, µg/m³
- LTCP — Low Threat Closure Policy
- ** — Data exceeds ESL of 48 µg/m³ but well below LTCP criteria of 85,000 µg/m³ with site bioattenuation zone
- 0.0911 — Benzene in **soil**, mg/kg (sampled between 0-10 ft)
- 20.1 — Benzene in **groundwater** in µg/L
- ND — Not Detected (See Table)
- NS — Not Sampled
- -- — Not Analyzed
- Property Boundary
- Historical Operations
- Property Building
- 40" Sub Grade Loading Area
- Future Buildings & Courtyard
- W — Water Line
- U/G — Underground Utility
- GAS — Gas Line

Figure 7

1919 Market Street
Oakland, California

PANGEA

Benzene in Soil, Groundwater and Subslab/Soil Gas



LEGEND

- SG-1 — Soil Gas Well
- SG-3 — Destroyed Soil Gas Well
- SSV-1 — Subslab Gas Probe
- SSV-3 — Destroyed Subslab Gas Probe
- SS-1 — Destroyed Subslab Soil Gas Probe
- A-1 — Air Sample
- B-1 — Soil Boring (Grab Groundwater)
- F-1 — Fill Sample
- MW-1 — Former Monitoring Well (1992)
- IB-1 — Soil Boring (November 1992)
- IB-1 — Soil Boring (June 1992)
- 390 — Carbon Tetrachloride in subslab gas, µg/m³
- 19* — Carbon Tetrachloride in soil gas @ 5 ft bgs, µg/m³
- 33 ESL (subslab gas) — Carbon Tetrachloride Isoconcentration contour for subslab gas; dashed where inferred, queried where uncertain, µg/m³
- ESL — Residential Tier 1 Environmental Screening Level
- ND — Carbon Tetrachloride in **soil**, mg/kg (sampled between 0-10 ft) Not Detected (See Table)
- <0.5 — Carbon Tetrachloride in **groundwater**, µg/L (no detections)
- -- — Not Analyzed
- Property Boundary
- Historical Operations
- Property Building
- 40" Sub Grade Loading Area
- Courtyard Adjacent Future Buildings
- W — Water Line
- U/G — Underground Utility
- GAS — Gas Line

Figure 8

1919 Market Street
Oakland, California

PANGEA

Carbon Tetrachloride in Soil, Groundwater and Subslab/Soil Gas

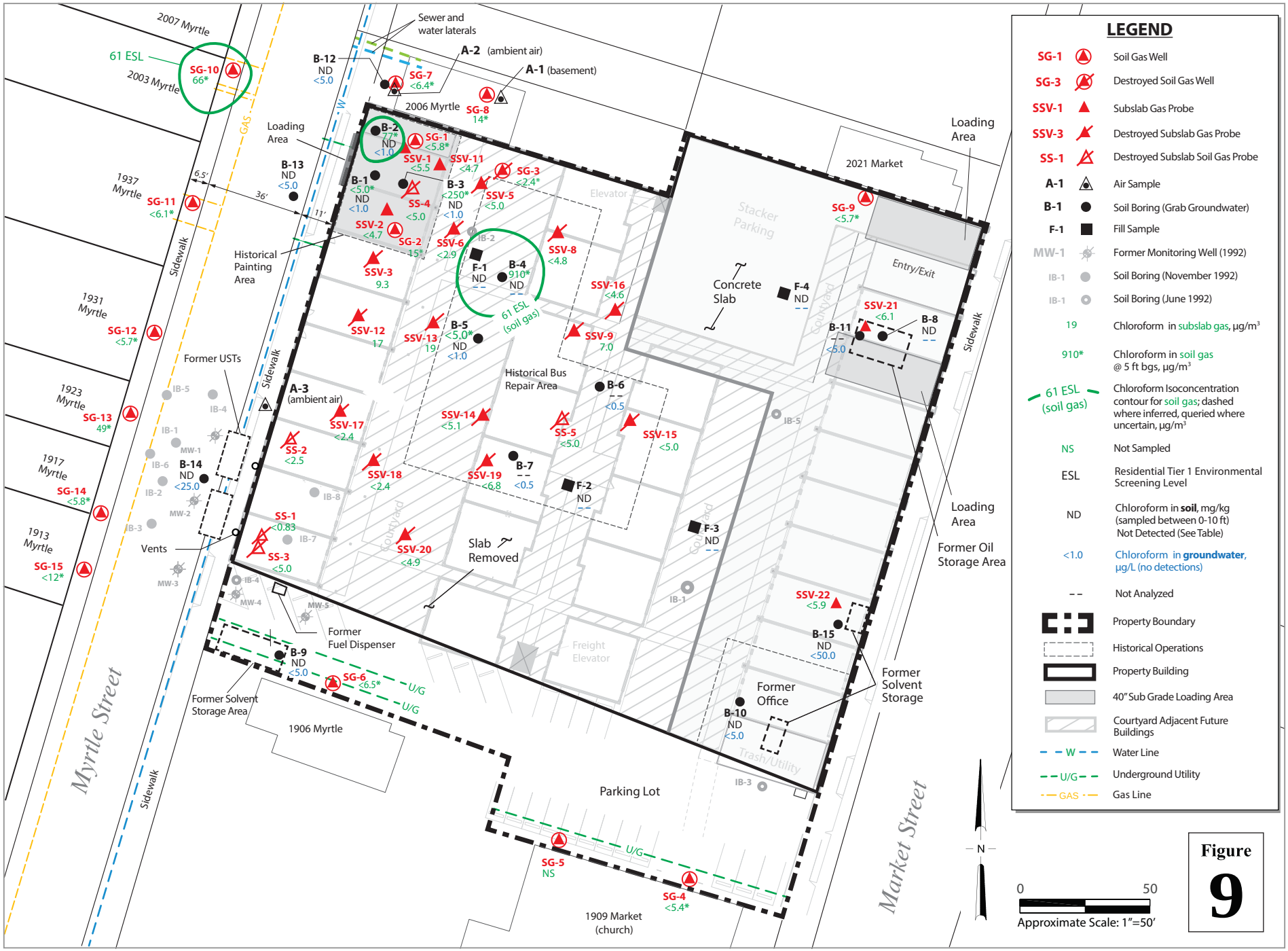


Figure 9

1919 Market Street
Oakland, California

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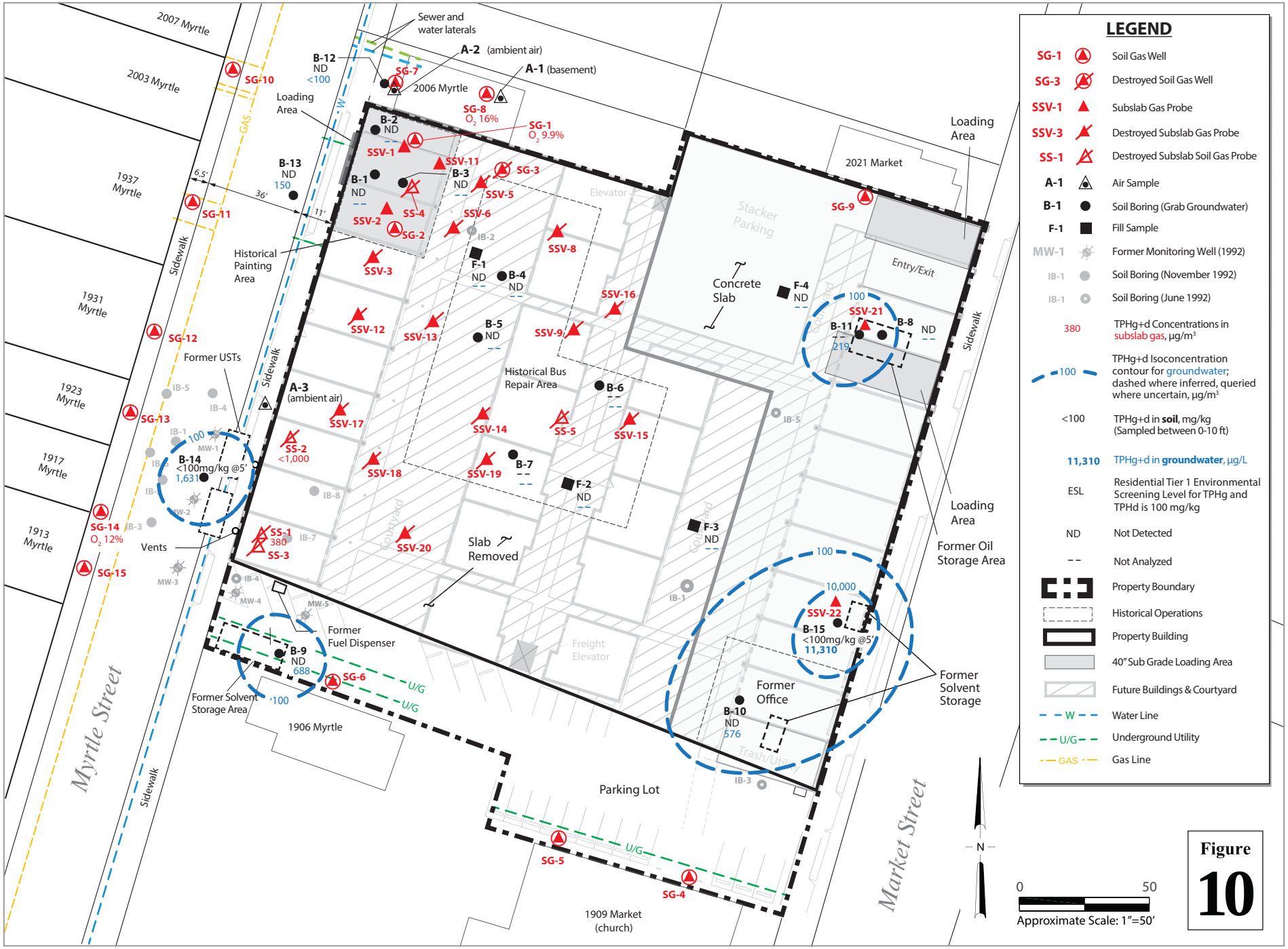
Chloroform in Soil, Groundwater and Subslab/Soil Gas



1919 Market Street
Oakland, California

PANGEA

TPH in Soil, Groundwater and Subslab/Soil Gas

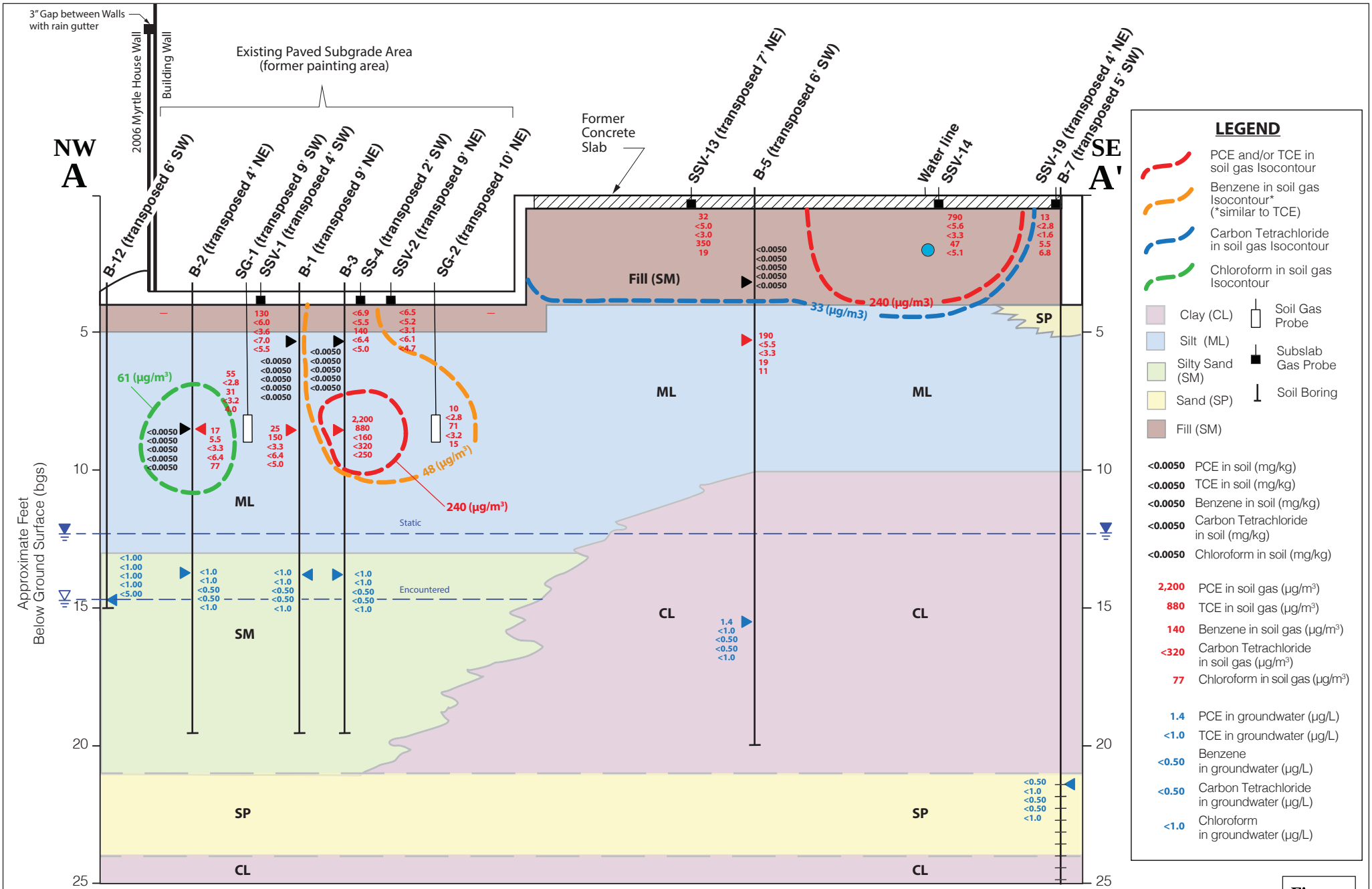
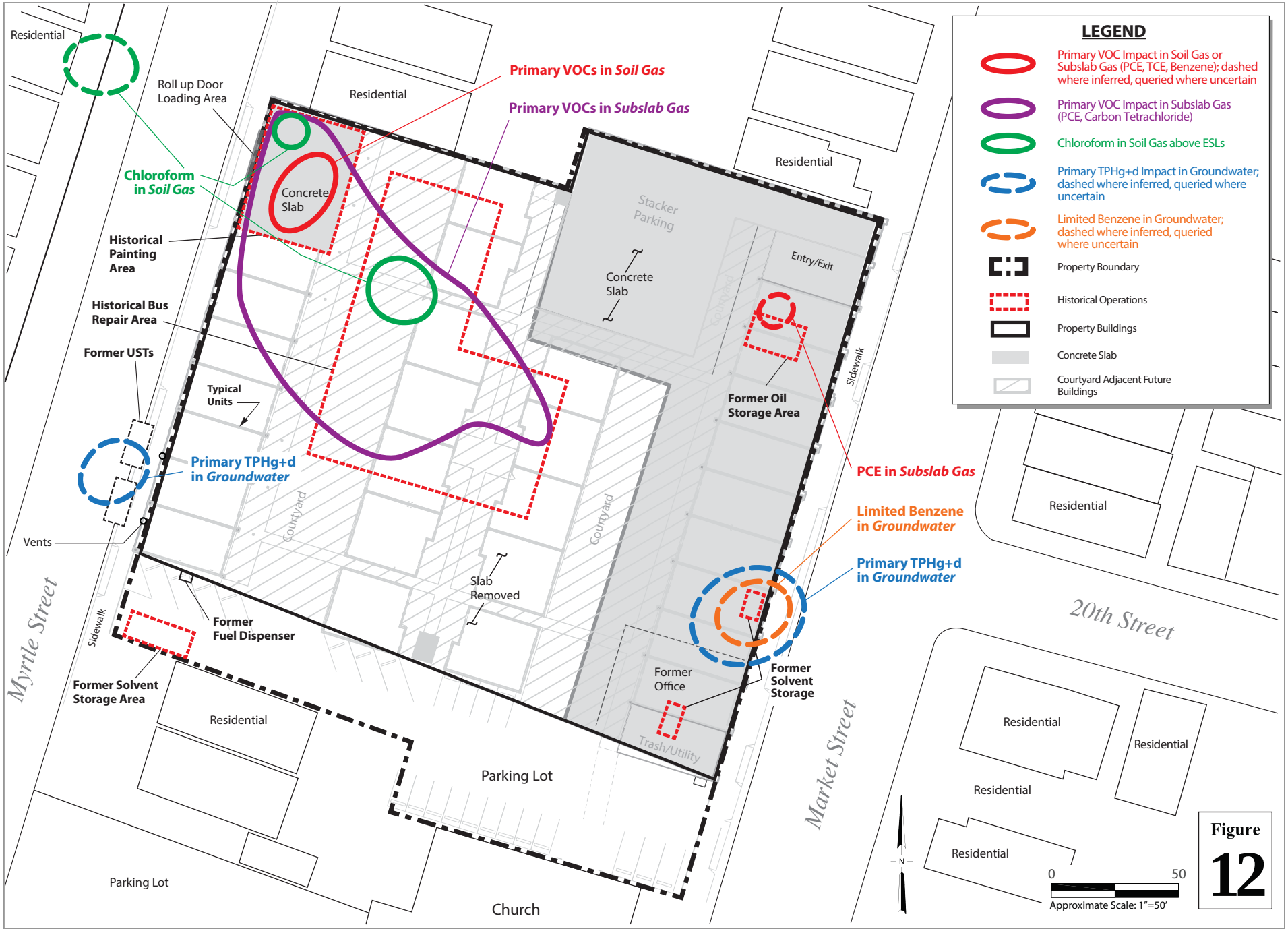


Figure 11

1919 Market Street
Oakland, California

PANGEA

Cross Section A-A'



1919 Market Street
Oakland, California

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VOC and TPH Impact Summary

Figure
13

1919 Market Street
Oakland, California

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Contingent Ponded/Storm Water Plan for Ongoing Management

Table 1. Soil Analytical Data - 1919 Market Street, Oakland, California

Boring / Sample ID	Date Sampled	Sample Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	1,2-DCA	PCE	TCE	1,1,1-TCA	Carbon Tetrachloride	Chloroform	SVOCs	PCBs	Metals	NOTES
			mg/kg																	
	Soil - Tier 1 ESL:		100	230	5,100	0.044	2.9	1.4	2.3	0.033	0.0045	0.42	0.46	7.8	0.048	0.068	Varies	0.25	Varies	
	Residential 0-5 ft - LTCP Criteria:		<100		NA	1.9	NA	21	NA	9.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	
2016-2017 Soil Sampling																				
B-1	04/15/2016	2.0[1]	--	--	--	<0.0050	<0.0050	<0.0050	<0.015	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	
B-2	04/15/2016	5.0[1]	--	--	--	<0.0050	<0.0050	<0.0050	<0.015	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	
B-3	04/15/2016	2.0[1]	--	--	--	<0.0050	<0.0050	<0.0050	<0.015	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	
B-4	04/15/2016	3.0	--	--	--	<0.0050	<0.0050	<0.0050	<0.015	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	
B-5	04/15/2016	3.0	--	--	--	<0.0050	<0.0050	<0.0050	<0.015	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	--	--	--	
B-8-5	11/14/2016	5.0	<0.15	<0.99	<5.0	<0.0038	<0.0038	<0.0038	<0.015	<0.0038	<0.0038	<0.0038	<0.0038	<0.0038	<0.0038	<0.0038	--	--	--	
B-9-5	5/26/2017	5.0	<0.116	<4.63	<4.63	<0.00116	<0.00578	<0.00116	<0.00347	<0.00578	<0.00116	<0.00116	<0.00116	<0.00116	<0.00116	<0.00578	--	--	--	
B-10-5	5/26/2017	5.0	<0.113	<4.52	<4.52	<0.00113	<0.00566	<0.00113	<0.00339	<0.00566	<0.00113	<0.00113	<0.00113	<0.00113	<0.00113	<0.00566	--	--	--	
B-12-5	5/26/2017	5.0	<0.116	<4.65	<4.65	<0.00116	<0.00581	<0.00116	<0.00349	<0.00581	<0.00116	<0.00116	<0.00116	<0.00116	<0.00116	<0.00581	--	--	--	
B-13-5	5/26/2017	5.0	<0.116	<232	**1,914**	<0.00116	<0.00580	<0.00116	<0.00348	<0.00580	<0.00116	<0.00116	<0.00116	<0.00116	<0.00116	<0.00580	--	--	--	
B-14-5	5/26/2017	5.0	**3.34**	**22.8**	<4.67	<0.00117	<0.00583	<0.00117	<0.00350	<0.00583	<0.00117	<0.00117	<0.00117	<0.00117	<0.00117	<0.00583	--	--	--	
B-14-10	5/26/2017	10.0	**65.1**	**252**	**16.2**	<0.0196	<0.0979	<0.0196	<0.0587	<0.0979	<0.0196	<0.0196	<0.0196	<0.0196	<0.0196	<0.0979	--	--	--	b
B-15-5	5/26/2017	5.0	**5.50**	<4.51	<4.51	<0.0194	<0.0972	<0.0194	<0.0583	<0.0972	<0.0194	<0.0194	<0.0194	<0.0194	<0.0194	<0.0972	--	--	--	
B-15-10	5/26/2017	10.0	**101**	<5.32	<5.32	**0.0911**	<0.110	<0.0220	<0.0659	<0.110	<0.0220	<0.0220	<0.0220	<0.0220	<0.0220	<0.110	--	--	--	b
F-1	11/14/2016	2.0	<0.14	**12**	**30**	<0.0034	<0.0034	<0.0034	<0.0068	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<1,700	<0.096	c	
F-2	11/14/2016	2.0	<0.14	<1.0	<5.0	<0.0033	<0.0033	<0.0033	<0.0066	<0.0033	<0.0033	<0.0033	<0.0033	<0.0033	<0.0033	<0.0033	<1,700	<0.096	c,d	d =lead detected at 84.4 mg/kg
F-3	11/14/2016	2.0	<0.15	<1.0	<5.0	<0.0039	<0.0039	<0.0039	<0.0078	<0.0039	<0.0039	<0.0039	<0.0039	<0.0039	<0.0039	<0.0039	<1,700	<0.096	c	
F-4	11/14/2016	2.0	<0.19	1.0	<5.0	<0.0048	<0.0048	<0.0048	<0.0096	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<1,700	<0.096	c	

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Boring / Sample ID	Date Sampled	Sample Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	1,2-DCA	PCE	TCE	1,1,1-TCA	Carbon Tetrachloride	Chloroform	SVOCs	PCBs	Metals	NOTES
			mg/kg																	
		Soil - Tier 1 ESL:	100	230	5,100	0.044	2.9	1.4	2.3	0.033	0.0045	0.42	0.46	7.8	0.048	0.068	Varies	0.25	Varies	
June 1992 Soil Sampling																				
IB-1	June 1992	5.0	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
		10.5	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
IB-2	June 1992	5.0	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
		10.5	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
IB-3	June 1992	5.0	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
		10.5	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
IB-4	June 1992	5.0	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
		10.5	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
		15.0	**2.5**	--	--	ND	**0.016**	**0.030**	**0.10**	--	--	--	--	--	--	--	--	--	--	
IB-5	June 1992	5.0	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
		10.5	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	
November 1992 Soil Sampling																				
IB-1	11/25/1992	6.0	**2.8**	<10	**<10 / 14[a]**	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
		11.0	**87**	**300**	<20	<0.005	<0.005	<0.005	0.030	--	--	--	--	--	--	--	--	--	--	
IB-2	11/25/1992	6.0	<0.50	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
		11.0	**23**	**<10 / 12[a]**	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
IB-3	11/25/1992	6.0	<0.5	<10	**13 / <10[a]**	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
		11.0	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
IB-4	11/25/1992	6.0	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
		11.5	**13**	**170**	**27**	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--	--	--	--	
IB-5	11/25/1992	7.0	<1	<1	<10	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--	--	--	--	--	--	--	--	
		11.5	<1	<1	<10	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--	--	--	--	--	--	--	--	
IB-6	11/25/1992	7.0	<1	<1	<10	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--	--	--	--	--	--	--	--	
		11.5	<1	<1	<10	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--	--	--	--	--	--	--	--	
IB-7	11/25/1992	5.0	<1	<1	<10	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--	--	--	--	--	--	--	--	
		10.0	**560**	**44**	<10	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--	--	--	--	--	--	--	--	
IB-8	11/25/1992	5.0	<1	<1	**11**	<0.0025	<0.0025	<0.0025	<0.0025	--	--	--	--	--	--	--	--	--	--	
		10.0	**160**	**76**	<10	<0.0025	<0.0025	**1,100**	<0.0025	--	--	--	--	--	--	--	--	--	--	

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Boring / Sample ID	Date Sampled	Sample Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	1,2-DCA	PCE	TCE	1,1,1-TCA	Carbon Tetrachloride	Chloroform	SVOCs	PCBs	Metals	NOTES
			← mg/kg →																	
		Soil - Tier 1 ESL:	100	230	5,100	0.044	2.9	1.4	2.3	0.033	0.0045	0.42	0.46	7.8	0.048	0.068	Varies	0.25	Varies	
MW-1	1992	5.0	**40**	**140**	<10	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--	--	--	--	
		10.5	**430**	**1,100**	**61**	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
		13.0	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
MW-2	1992	5.5	**120**	**180**	<10	<0.05	<0.05	<0.05	<0.05	--	--	--	--	--	--	--	--	--	--	
		10.5	**310**	**1,200**	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
		15.5	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
MW-3	1992	5.5	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
		10.5	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
		15.5	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005											
MW-4	1992	8.0	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
		12.5	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
MW-5	1992	8.0	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	
		14.5	<0.5	<10	<10	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--	--	--	--	

Legend:

TPHg,d,mo = Total Petroleum Hydrocarbons as gasoline (TPHg), diesel(TPHd), and motor oil(TPHmo) by EPA Method 8015C.

VOCs = Volatile Organic Compounds by EPA Method 8260B.

1,2-DCA = 1,2-Dichloroethane

PCE = Tetrachloroethene

TCE = Trichloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

SVOCs = Semi-Volatile Organic Compounds

mg/Kg = milligrams per kilogram

ft bgs = Depth below ground surface in feet.

ND = analyte(s) not detected, detection limit unkowwn

< n = Chemical not present at a concentration in excess of detection limit shown.

-- = Not analyzed, not applicable

ESL = Environmental Screening Level, from California Regional Water Quality Control Board - San Francisco Bay Region, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Revised February 2016 (Revision 3).

a = duplicate sample taken

b = sample analyzed outside of laboratory method hold time. See lab report for details

c = all metals detected below Tier 1 ESLs, except for arsenic which was detected above its Tier 1 ESL, but within background range for the area.

(1) = Grade elevation is 40" below rest of building so sample depth is approximately 3.3 ft lower than samples collected outside of Loading Area

Concentrations exceed environmental screening levels

Bold = contaminant detected above reporting limit

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Well ID	Date Sampled	Sample Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,2-DCA	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	Carbon Tetrachloride	Chloroform	NOTES
			µg/L																	
	Groundwater - Tier 1 ESL:		100	100	50,000	1.0	40	13	20.0	0.170	0.50	3.0	5.0	6.0	10	0.061	62	0.22	2.3	
	LTCP Criteria:		NA	NA	NA	3,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Grab Groundwater Data																				
B-1-GW	4/11/2016	16*	--	--	--	<0.50	<0.50	<0.50	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	
B-2-GW	4/11/2016	16*	--	--	--	<0.50	<0.50	<0.50	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	
B-3-GW	4/11/2016	16*	--	--	--	<0.50	<0.50	<0.50	<1.0	<1.0	<0.50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	
B-5-GW	4/11/2016	20	--	--	--	<0.50	<0.50	<0.50	<1.0	<1.0	<0.50	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<0.50	<1.0	
B-6-GW	9/1/2016	21	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
B-7-GW	9/1/2016	21	--	--	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
B-9-GW	5/26/2017	15	<100	**688**	**304**	<1.00	<1.00	<1.00	<3.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	
B-10-GW	5/26/2017	16	<100	**576**	**706**	<1.00	<1.00	<1.00	<3.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	
B-11-GW	5/26/2017	15	<100	**219**	**381**	<1.00	<1.00	<1.00	<3.00	<5.00	<1.00	<1.00	**2.62**	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	
B-12-GW	5/26/2017	15	<100	<100	<100	<1.00	<1.00	<1.00	<3.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	
B-13-GW	5/26/2017	14	<100	**150**	**315**	<1.00	<1.00	<1.00	<3.00	<5.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<5.00	
B-14-GW	5/26/2017	12.5	**461**	**1,170**	**938**	<5.00	<5.00	<5.00	<15.0	<25.0	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<25.0	
B-15-GW	5/26/2017	13	**6,650**	**4,660**	**3,830**	**20.1**	<10.0	<10.0	<30.0	<50.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<50.0	
Historical Monitoring Well Data																				
MW-1	8/7/1992	--	<0.050	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	12/3/1992	--	<0.050	<0.050	<0.050	<0.5	**14**	**1.8**	**2.5**	--	--	--	--	--	--	--	--	--	--	
	6/11/1993	--	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	1/28/1994	--	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	1/10/1995	--	<0.050	**0.06**	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	6/12/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	10/22/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	5/7/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	8/7/1992	--	<0.050	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	12/3/1992	--	<0.050	<0.050	<0.050	<0.5	**14**	**1.9**	**2.5**	--	--	--	--	--	--	--	--	--	--	
	6/11/1993	--	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	1/13/1994	--	<0.050	**0.11**	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	1/10/1995	--	<0.050	**0.06**	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	

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Well ID	Date Sampled	Sample Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,2-DCA	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	Carbon Tetrachloride	Chloroform	NOTES
			µg/L																	
	Groundwater - Tier 1 ESL:		100	100	50,000	1.0	40	13	20.0	0.170	0.50	3.0	5.0	6.0	10	0.061	62	0.22	2.3	
MW-2 cont.	6/12/1997	--	<0.050	<0.050	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	10/22/1997	--	<0.050	<0.050	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	5/7/1998	--	--	--	--	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
MW-3	8/7/1992	--	<0.050	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	12/3/1992	--	<0.050	<0.050	<0.050	<0.5	**16**	**2.4**	**3.5**	--	--	--	--	--	--	--	--	--	--	
	6/11/1993	--	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	1/13/1994	--	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	1/10/1995	--	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	6/12/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	10/22/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	5/7/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	8/7/1992	--	**2.8**	<0.050	<0.050	**20**	**150**	**7.5**	**340**	--	--	--	--	--	--	--	--	--	--	
	12/3/1992	--	**0.22**	<0.050	<0.050	**13**	**36**	**8.2**	**31**	--	--	--	--	--	--	--	--	--	--	
	6/11/1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	1/13/1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	1/10/1995	--	**3.0**	**0.75**	<0.5	**25**	**52**	**43**	**230**	--	--	--	--	--	--	--	--	--	--	
	6/12/1997	--	**5.4**	**0.39**	--	**5.2**	**5.2**	**30**	**130**	--	--	--	--	--	--	--	--	--	--	
	10/22/1997	--	**7.7**	<0.30	--	**17**	**18**	**110**	**300**	--	--	--	--	--	--	--	--	--	--	
	5/7/1998	--	**17**	<0.30	--	**8.8**	<0.5	**9.9**	**22**	--	--	--	--	--	--	--	--	--	--	
MW-5	8/7/1992	--	<0.050	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	12/3/1992	--	**0.072**	<0.050	<0.050	<0.5	**33**	**3.5**	**4.2**	--	--	--	--	--	--	--	--	--	--	
	6/11/1993	--	<0.050	**0.10**	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	1/13/1994	--	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	1/10/1995	--	<0.050	<0.050	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
	6/12/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	10/22/1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
	5/7/1998	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2. Groundwater Analytical Data - 1919 Market St, Oakland, CA

Well ID	Date Sampled	Sample Depth (ft bgs)	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	1,2-DCA	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	1,1,1-TCA	Carbon Tetrachloride	Chloroform	NOTES
			µg/L																	
Groundwater - Tier 1 ESL:			100	100	50,000	1.0	40	13	20.0	0.170	0.50	3.0	5.0	6.0	10	0.061	62	0.22	2.3	

Legend:

TPHg = Total Petroleum Hydrocarbons as gasoline by EPA Method 8015.

TPHd = Total Petroleum Hydrocarbons as diesel by EPA Method 8015. ESE Carbon Range of C12-C22.

TPHmo = Total Petroleum Hydrocarbons as motor oil by EPA Method 8015. ESE Carbon Range of C22-C32.

1,2-DCA = 1,2-Dichloroethane

PCE = Tetrachloroethene

TCE = Trichloroethene

1,1,1-TCA = 1,1,1-Trichloroethane

µg/L = Micrograms per Liter

ft bgs = feet below ground surface in feet

< n = Chemical not present at a concentration in excess of detection limit shown.

-- = Not analyzed

ESL = Environmental Screening Level, from California Regional Water Quality Control Board - San Francisco Bay Region, Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Revised February 2016 (Revision 3).

* = Surface elevation approximately 3.3 ft below other borings

Concentrations exceed environmental screening levels

Bold = contaminant detected above reporting limit

Table 3. Subslab Gas and Soil Gas Analytical Data - 1919 Market Street, Oakland, California

Boring/ Sample ID	Date Sampled	Sample Depth (ft bgs)	TPHg	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	1,2-DCA	PCE	TCE	1,1,1-TCA	Carbon Tetrachloride	Chloroform	Other VOCs	Isopropyl Alcohol (Leak Check Compound)	Oxygen	Methane (1)	Carbon Dioxide	Notes
			ug/m^3														%	%	%	
Subslab Gas /Soil Gas - Residential ESL:			300,000	48	160,000	560	52,000	41	54	240	240	520,000	33	61	Varies	NA	NA	NA	NA	
Soil Gas @ 5 ft with Bio Zone - LTCP Criteria:			NA	<85,000	NA	<1,100,000	NA	<93,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Subslab Soil Gas Samples																				
SS-1	02/05/16	0.5	**380**	**43**	**27**	**1.3**	**9.0**	**1.9**	<0.70	<1.2	<0.93	**2.3**	<1.1	<0.83	*	**12**	**17**	<0.20	--	
SS-2	02/05/16	0.5	<1,000	**6.5**	**16**	<2.2	<6.6	**5.3**	<2.1	<3.5	<2.8	<2.8	<3.2	<2.5	--	**16**	**17**	<0.19	--	
SS-3[2]	03/11/16	0.5	--	**9.3**	**140**	**19**	**100**	--	<4.1	<6.9	<5.5	<5.6	<6.4	<5.0	--	--	--	--	--	
SS-4[2]	03/11/16	0.5	--	**140**	**35**	**6.9**	**46**	--	<4.1	<6.9	<5.5	<5.6	<6.4	<5.0	--	--	--	--	--	
SS-5	03/11/16	0.5	--	**3.8**	**19**	<4.4	**26**	--	<4.1	**35**	**26**	**67**	<6.4	<5.0	--	--	--	--	--	
SSV-1	08/01/16	0.5	--	<3.6	**8.2**	<4.9	**9.7**	<23	<4.5	**130**	<6.0	<6.1	<7.0	<5.5	*	**14**	--	--	--	
SSV-2	08/01/16	0.5	--	<3.1	**8.1**	<4.2	**6.3**	<20	<3.9	<6.5	<5.2	<5.3	<6.1	<4.7	--	--	--	--	--	
SSV-3	08/01/16	0.5	--	<3.4	**4.2**	<4.6	**5.6**	<22	<4.3	<7.3	<5.7	**10**	**260**	**9.3**	--	**38**	--	--	--	
SSV-5	08/01/16	0.5	--	<3.3	**5.9**	<4.5	**7.5**	<21	<4.1	<7.0	<5.5	<5.6	**15**	<5.0	--	**21**	--	--	--	
SSV-6	08/01/16	0.5	--	<3.1	**4.5**	<4.2	**6.2**	<20	<3.9	<6.6	<5.2	**18**	**61**	<4.8	*	**13**	--	--	--	
SSV-8	08/01/16	0.5	--	<3.1	<3.7	<4.2	<8.4	<20	<3.9	**13**	<5.2	**80**	<6.1	<4.8	*	--	--	--	--	
SSV-9	08/01/16	0.5	--	<3.2	<3.8	<4.4	<8.4	<21	<4.1	**340**	<5.5	**220**	**33**	**7.0**	*	--	--	--	--	
SSV-10	--	--	----------probe destroyed before sampling could occur----------																	
SSV-11	08/17/16	0.5	--	**5.8**	**34**	<4.2	**15.3**	<20	<3.9	**13**	<5.2	<5.3	<6.1	<4.7	--	**10**	--	--	--	
SSV-12	08/17/16	0.5	--	<3.1	<3.7	**17**	**168**	<20	<3.9	<6.6	<5.2	**17**	**390**	**17**	--	**21**	--	--	--	
SSV-13	08/17/16	0.5	--	<3.0	<3.5	<4.0	<8.0	<19	<3.7	**32**	<5.0	**79**	**350**	**19**	--	<9.1	--	--	--	

Table 3. Subslab Gas and Soil Gas Analytical Data - 1919 Market Street, Oakland, California

Boring/ Sample ID	Date Sampled	Sample Depth (ft bgs)	TPHg	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	1,2-DCA	PCE	TCE	1,1,1-TCA	Carbon Tetrachloride	Chloroform	Other VOCs	Isopropyl Alcohol (Leak Check Compound)	Oxygen	Methane [1]	Carbon Dioxide	Notes
			ug/m^3														%	%	%	
Subslab Gas /Soil Gas - Residential ESL:			300,000	48	160,000	560	52,000	41	54	240	240	520,000	33	61	Varies	NA	NA	NA	NA	
SSV-14	08/17/16	0.5	--	<3.3	<3.9	<4.5	<9.0	<22	<4.2	**790**	<5.6	**240**	**47**	<5.1	--	**13**	--	--	--	
SSV-15	08/17/16	0.5	--	<3.3	<3.9	<4.5	<9.0	<22	<4.2	**42**	<5.5	**260**	**35**	<5.0	--	**15**	--	--	--	
SSV-16	08/17/16	0.5	--	<3.0	<3.6	<4.1	<8.2	<20	<3.8	**47**	<5.1	**52**	<6.0	<4.6	--	**20**	--	--	--	
SSV-17	09/01/16	0.5	--	**2.5**	**5.9**	<2.2	<6.6	<5.3	<2.0	**4.1**	<2.8	**5.3**	**11**	<2.4	*	**320**	--	--	--	
SSV-18	09/01/16	0.5	--	<1.6	**4.5**	<2.2	<6.6	<5.3	<.20	**3.6**	<2.8	**12**	**4.4**	<2.4	*	**150**	--	--	--	
SSV-19	09/01/16	0.5	--	<1.6	**3.1**	<2.2	<6.6	<5.3	**11**	**13**	<2.8	**160**	**5.5**	**6.8**	*	**110**	--	--	--	
SSV-20	09/01/16	0.5	--	<3.2	**6.4**	<4.4	<13	**13**	<4.1	**13**	<5.5	**13**	<6.4	<4.9	*	<100	--	--	--	
SSV-21	05/31/17	0.5		<4.0	<4.7	<5.4	<10.8	<13	<5.0	**190**	<6.7	<6.8	<7.8	<6.1	--	**14**	--	--	--	
SSV-22	05/31/17	0.5	--	<3.8	<4.5	<5.2	<10.4	<13	<4.9	<8.2	<6.5	<6.6	<7.6	<5.9	--	<12	--	--	--	
Soil Gas Samples																				
B-1[2]	04/29/16	5.0[3]	--	<3.3	<3.8	<4.4	<8.8	--	<4.1	**25**	**150**	<5.6	<6.4	<5.0	--	--	--	--	--	
B-2[2]	04/29/16	5.0[3]	--	<3.3	<3.8	**66**	**400**	--	<4.1	**17**	**5.5**	<5.6	<6.4	**77**	--	--	--	--	--	
B-3[2]	04/29/16	5.0[3]	--	<160	<190	<220	<220	--	<210	**2,200**	**880**	<280	<320	<250	--	--	--	--	--	
B-4[2]	04/29/16	5.0	--	<160	<190	<220	<220	--	<210	<350	<270	<280	<320	**910**	--	--	--	--	--	
B-5[2]	04/29/16	5.0	--	<3.3	<3.8	<4.4	<8.8	--	<4.1	**190**	<5.5	**46**	**19**	**11**	--	--	--	--	--	
SG-1	09/06/16	5.0[3]	--	**31**	**24**	**2.6**	**14**	<5.3	<2.0	**55**	<2.8	<2.8	<3.2	**4.0**	*	<50	--	--	--	
	05/24/17	5.0[3]	--	<3.8	<4.5	<5.2	<10.4	<12	<4.8	**33**	<6.4	<6.5	<7.6	<5.8	--	<12	**9.9**	<0.00032	**2.3**	
SG-2	09/06/16	5.0[3]	--	**71**	**120**	**17**	**80**	<5.3	<2.0	**10**	<2.8	<2.8	<3.2	**15**	*	<50	--	--	--	

Table 3. Subslab Gas and Soil Gas Analytical Data - 1919 Market Street, Oakland, California

Boring/ Sample ID	Date Sampled	Sample Depth (ft bgs)	TPHg	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	1,2-DCA	PCE	TCE	1,1,1-TCA	Carbon Tetrachloride	Chloroform	Other VOCs	Isopropyl Alcohol (Leak Check Compound)	Oxygen	Methane [1]	Carbon Dioxide	Notes
			ug/m^3														%	%	%	
Subslab Gas /Soil Gas - Residential ESL:			300,000	48	160,000	560	52,000	41	54	240	240	520,000	33	61	Varies	NA	NA	NA	NA	
SG-3	09/06/16	5.0	--	**13**	**38**	**8.3**	**53**	<5.3	<2.0	**13**	<2.8	**3.4**	<3.2	<2.4	*	<50	--	--	--	
SG-4	05/23/17	5.0	--	<3.5	<4.2	<4.8	<9.6	<12	<4.5	**23**	<5.9	<6.0	<7.0	<5.4	--	**760**	--	--	--	
SG-5	05/23/17	5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	not sampled, water in well
SG-6	05/24/17	5.0	--	<4.3	<5.0	<5.8	<11.6	<14	<5.4	<9.1	<7.2	<7.3	<8.4	<6.5	--	<13	--	--	--	
SG-7	04/14/17	5.0	--	<4.0	<4.7	<5.4	<10.8	<26	<5.1	**16**	<6.7	<6.8	<7.9	<6.1	*	**68**	--	--	--	
	05/24/17	5.0	--	<4.2	<4.9	<5.7	<11.4	<14	<5.3	<8.8	<7.0	<7.1	<8.2	<6.4	--	<13	--	--	--	
SG-8	04/14/17	5.0	--	**11**	**27**	<6.5	**15**	<31	<6.0	**22**	<8.0	<8.1	<9.4	**9.5**	*	**15**	--	--	--	
	05/24/17	5.0	--	<3.8	<4.4	<5.1	<10.2	<12	<4.8	**18**	<6.3	<6.4	<7.4	14	--	<12	**16**	<0.00024	**1.6**	
	05/24/17	5.0	--	<3.8	<4.5	<5.1	<10.2	<12	<4.8	**20**	<6.4	<6.5	<7.4	14	--	<12	--	--	--	duplicate sample
SG-9	05/24/17	8.0	--	<3.8	<4.4	<5.1	<10.2	<12	<4.8	**9.2**	<6.3	<6.4	<7.4	<5.7	--	<12	--	--	--	
SG-10	05/31/17	8.0	--	**31**	**44**	**5.1**	**22**	<12	<4.6	**12**	<6.2	<6.3	<7.2	**66**	--	<11	--	--	--	
SG-11	05/31/17	5.0	--	**30**	**42**	**5.9**	**16**	<13	<5.0	**12**	<6.7	<6.8	<7.9	<6.1	--	**12**	--	--	--	
SG-12	05/31/17	5.0	--	**130**	**110**	**10**	**46**	<12	<4.7	**21**	<6.3	<6.4	<7.4	<5.7	--	<12	--	--	--	
SG-13	05/31/17	5.0	--	**120**	**150**	**18**	**79**	<13	<5.0	**27**	<6.7	<6.8	<7.8	**49**	--	**21**	--	--	--	
SG-14	05/31/17	5.0	--	**43**	**100**	**28**	**109**	<12	<4.8	**12**	<6.4	<6.5	<7.5	<5.8	--	<12	**12**	<0.00024	**3.0**	
SG-15	05/31/17	5.0	--	**430**	**1,600**	**300**	**1,140**	<25	<9.8	**34**	<13	<13	<15	<12	--	<24	--	--	--	
Shroud Samples																				
Shroud (SG-8)	04/14/17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**110,000**	--	--	--	
Shroud (SG-1)	05/24/17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**180,000**	--	--	--	
Shroud (SG-1)	05/31/17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**180,000**	--	--	--	

Table 3. Subslab Gas and Soil Gas Analytical Data - 1919 Market Street, Oakland, California

Boring/ Sample ID	Date Sampled	Sample Depth (ft bgs)	TPHg	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene	1,2-DCA	PCE	TCE	1,1,1-TCA	Carbon Tetrachloride	Chloroform	Other VOCs	Isopropyl Alcohol (Leak Check Compound)	Oxygen	Methane (1)	Carbon Dioxide	Notes
			ug/m^3														%	%	%	
Subslab Gas /Soil Gas - Residential ESL:			300,000	48	160,000	560	52,000	41	54	240	240	520,000	33	61	Varies	NA	NA	NA	NA	

Legend:

VOC = Volatile Organic Compounds

TPHg = Total Petroleum Hydrocarbons as gasoline

1,2-DCA = 1,2-dichloroethane

PCE = Tetrachloroethene

TCE = Trichloroethene

1,1,1-TCA = 1,1,1-trichloroethane

VOCs analyzed by EPA Method TO-15

ug/m^3 = Micrograms per cubic meter of air.

ft bgs = Depth interval below ground surface in feet.

< n = Chemical not present at a concentration in excess of detection limit shown.

-- = not analyzed

NA = not applicable

* = trace levels of other VOCs detected well below screening level thresholds. See lab report for details.

ESL = Environmental Screening Level for Shallow Soil Gas for Evaluation of Potential Vapor Intrusion (Table E-2). Established by the SFBRWQCB, Interim Final - November 2007 (Revised February 2016).

(1) = The lower explosion limit for methane is 4.4 to 5%.

(2) = Samples collected by Partner Engineering and Science, Inc. as part of seperate investigation

(3) = Grade elevation is 40 inces below rest of building so sample depth is at approximately 8.3 ft relative to samples collected outside of Loading Area

Concentrations exceed environmental screening levels

Bold = contaminant detected above reporting limit

Table 4. Indoor Air Analytical Data - 1919 Market Street, Oakland, CA

Sample Location / ID	Sample Date	Benzene	Toluene	Ethylbenzene	Total Xylenes	Napthalene	1,2-DCA	PCE	TCE	1,1,1-TCA	Carbon Tetrachloride	Chloroform	Notes
		µg/m^3											
Indoor Air ESL, Commercial Land Use:		0.42	1,300	4.9	440	0.36	0.47	2.1	3.0	4,400	0.29	0.53	
Indoor Air ESL, Residential Land Use:		0.097	310	1.1	100	0.083	0.11	0.48	0.48	1,000	0.067	0.12	
2006 Myrtle Street													
A-1 (Basement Air)	4/8/2017	**0.60**	**0.82**	<0.21	**0.98**	--	<0.20	<0.33	<0.26	<0.27	**0.36**	<0.24	
	5/24/2017	<0.25	**0.66**	**0.14**	**0.61**	<0.41	<0.13	<0.21	<0.17	<0.17	**0.66**	**0.15**	
A-2 (Ambient Air)	5/24/2017	<0.26	**0.56**	<0.14	**0.53**	<0.43	<0.13	<0.22	<0.18	<0.18	**0.97**	<0.16	
1919 Market Street													
A-3 (Ambient Air)	5/24/2017	**0.30**	**1.4**	**0.34**	**1.14**	<0.42	<0.13	<0.22	<0.17	<0.17	**0.81**	<0.16	

Notes:

Samples analyzed for VOCs by USEPA Method TO-15 SIM.

DCA = Dichloroethane

PCE = Tetrachloroethene

TCE = Trichloroethene

TCA = Trichloroethane

µg/m3 = micrograms per cubic meter

San Francisco Bay Region.

< n = Compound not detected at or above the laboratory method detection limit of n

Concentrations exceed shown environmental screening levels

Bold = contaminant detected above reporting limit

APPENDIX A

Site Development Plans

1 SITE PLAN
1" = 30'-0"

SHEET NOTES

1. ACCESSIBLE PATHS OF TRAVEL SHALL MEET REQUIREMENTS OF CBC 11B-302, SHALL HAVE A CONTINUOUS COMMON SURFACE, NOT INTERRUPTED BY STEPS OR BY ABRUPT CHANGES IN LEVEL EXCEEDING ½ INCH AND SHALL BE A MINIMUM OF 48 INCHES IN WIDTH. SURFACE CROSS SLOPES SHALL NOT EXCEED ¼ INCH PER FOOT. WHEN THE SLOPE IN DIRECTION OF TRAVEL OF ANY WALK EXCEEDS ONE UNIT VERTICAL TO 20 UNITS HORIZONTAL, IT SHALL COMPLY WITH PROVISIONS OF CBC 11B-405 FOR RAMPS.

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1919 MARKET

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1919 MARKET STREET, OAKLAND, CA

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STAMP

LICENSED ARCHITECT KENNETH A. LOWNEY C 29402 EXP: 8/30/17 STATE OF CALIFORNIA

NOT FOR CONSTRUCTION

#	DATE	ISSUES & REVISIONS	BY
2	07/25/2017	SCHEMATIC DESIGN	WW
3	09/06/2017	PLANNING APPLICATION	WW
4	09/13/2017	DESIGN DEVELOPMENT	WW

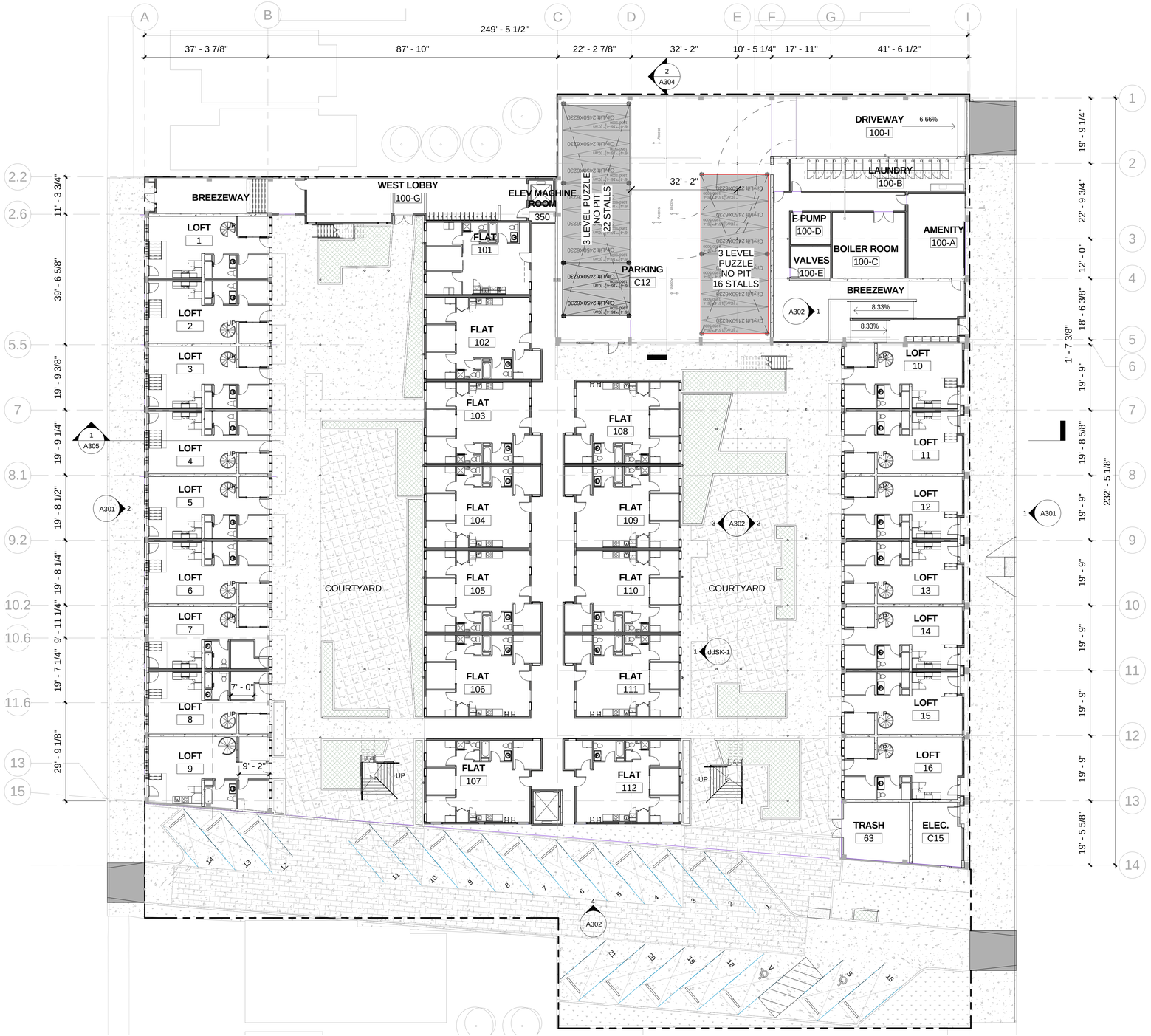
N PROJECT NORTH
N TRUE NORTH

DRAWN BY: Author
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 04/19/17
SHEET TITLE:

SITE PLAN

SHEET NUMBER
A004

9/6/2017 4:32:48 PM



1 FLOOR PLAN - LEVEL 1
1/16" = 1'-0"

Graphic Scale: 1 inch = 16 feet

0 16' 32' 48'

9/6/2017 4:33:07 PM

SHEET NOTES

1. PROVIDE ALL NECESSARY BLOCKING AND BACKING FOR WALL MOUNTED EQUIPMENT AND FIXTURES.

2. REFER TO G003 FOR MOUNTING HEIGHTS AND ACCESSIBILITY STANDARDS.

3. REFER TO DRAWING G501 FOR SIGNAGE.

4. REFER TO CIVIL, STRUCTURAL, MECHANICAL, PLUMBING, FIRE PROTECTION, AND ELECTRICAL DRAWINGS FOR NEW WORK.

5. REFER TO DRAWINGS A400-A404 FOR ENLARGED UNIT PLANS AND RCPS.

6. FIRE EXTINGUISHERS SHALL BE 2A-10BC MULTI-PURPOSE DRY CHEMICAL TYPE FIRE EXTINGUISHER WITH VALID CERTIFICATION TAG ATTACHED

7. REFER TO SHEET A408 FOR LEVEL 1.5 - EQUIPMENT MEZZANINE

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LICENSED ARCHITECT KENNETH A. LOWNEY C 29482 EXP: 5/30/17 STATE OF CALIFORNIA

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#	DATE	ISSUES & REVISIONS	BY
1	03/09/2017	CONCEPTUAL DESIGN	WW
2	07/25/2017	SCHEMATIC DESIGN	WW
3	09/06/2017	PLANNING APPLICATION	WW
4	09/13/2017	DESIGN DEVELOPMENT	WW

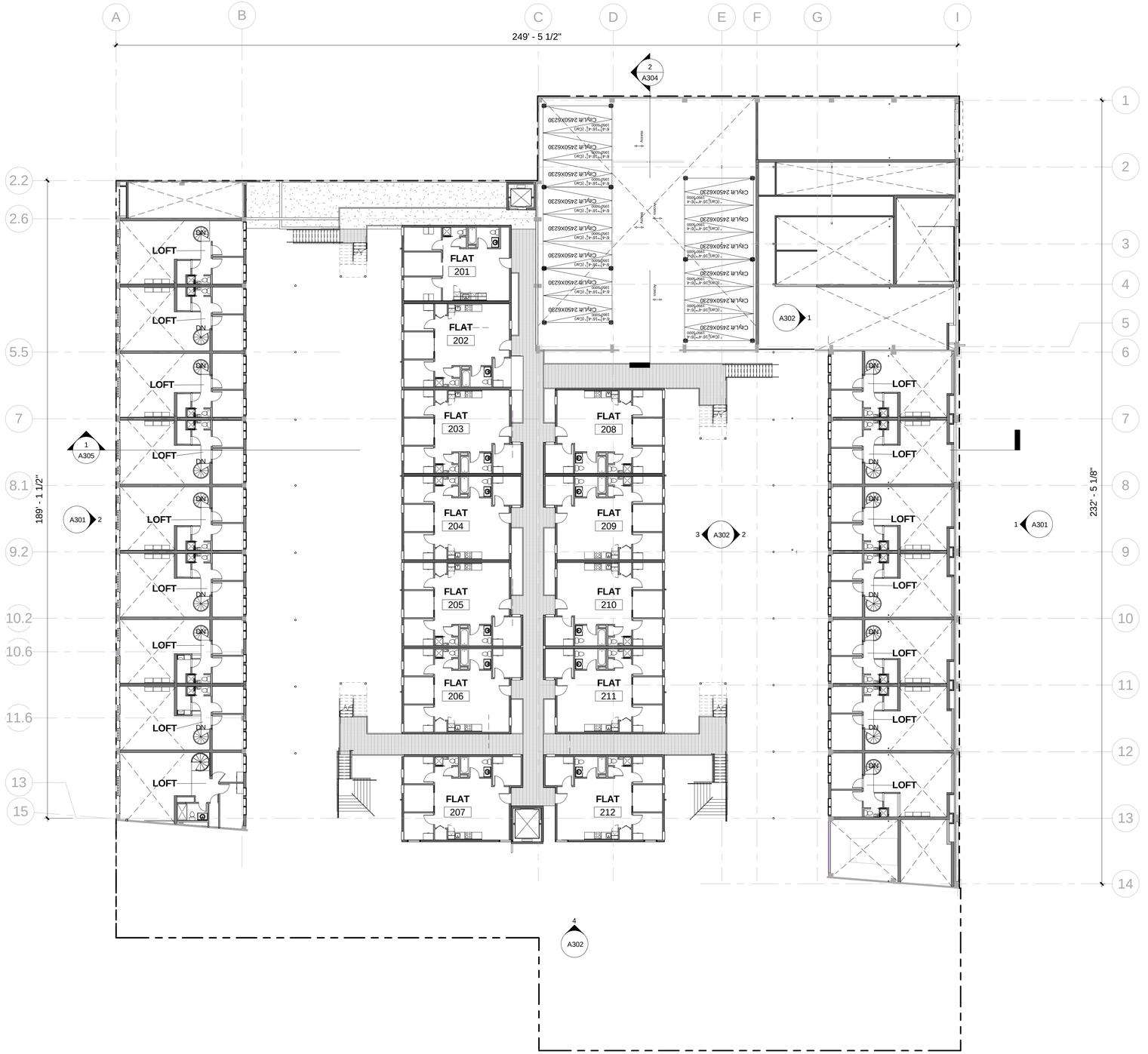
N PROJECT NORTH
N TRUE NORTH

DRAWN BY: Author
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 03/07/17
SHEET TITLE:

FLOOR PLAN - LEVEL 1

SHEET NUMBER

A201



1 FLOOR PLAN - LEVEL 2
1/16" = 1'-0"

Graphic Scale: 1 inch = 16 feet

0 16' 32' 48'

9/6/2017 4:33:16 PM

SHEET NOTES

1. PROVIDE ALL NECESSARY BLOCKING AND BACKING FOR WALL MOUNTED EQUIPMENT AND FIXTURES.

2. REFER TO G003 FOR MOUNTING HEIGHTS AND ACCESSIBILITY STANDARDS.

3. REFER TO DRAWING G501 FOR SIGNAGE.

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LICENSED ARCHITECT KENNETH A. LOWNEY C 29402 EXP: 8/30/17 STATE OF CALIFORNIA

WET SEAL CONSTRUCTION

#	DATE	ISSUES & REVISIONS	BY
1	03/09/2017	CONCEPTUAL DESIGN	WW
2	07/25/2017	SCHEMATIC DESIGN	WW
3	09/06/2017	PLANNING APPLICATION	WW
4	09/13/2017	DESIGN DEVELOPMENT	WW

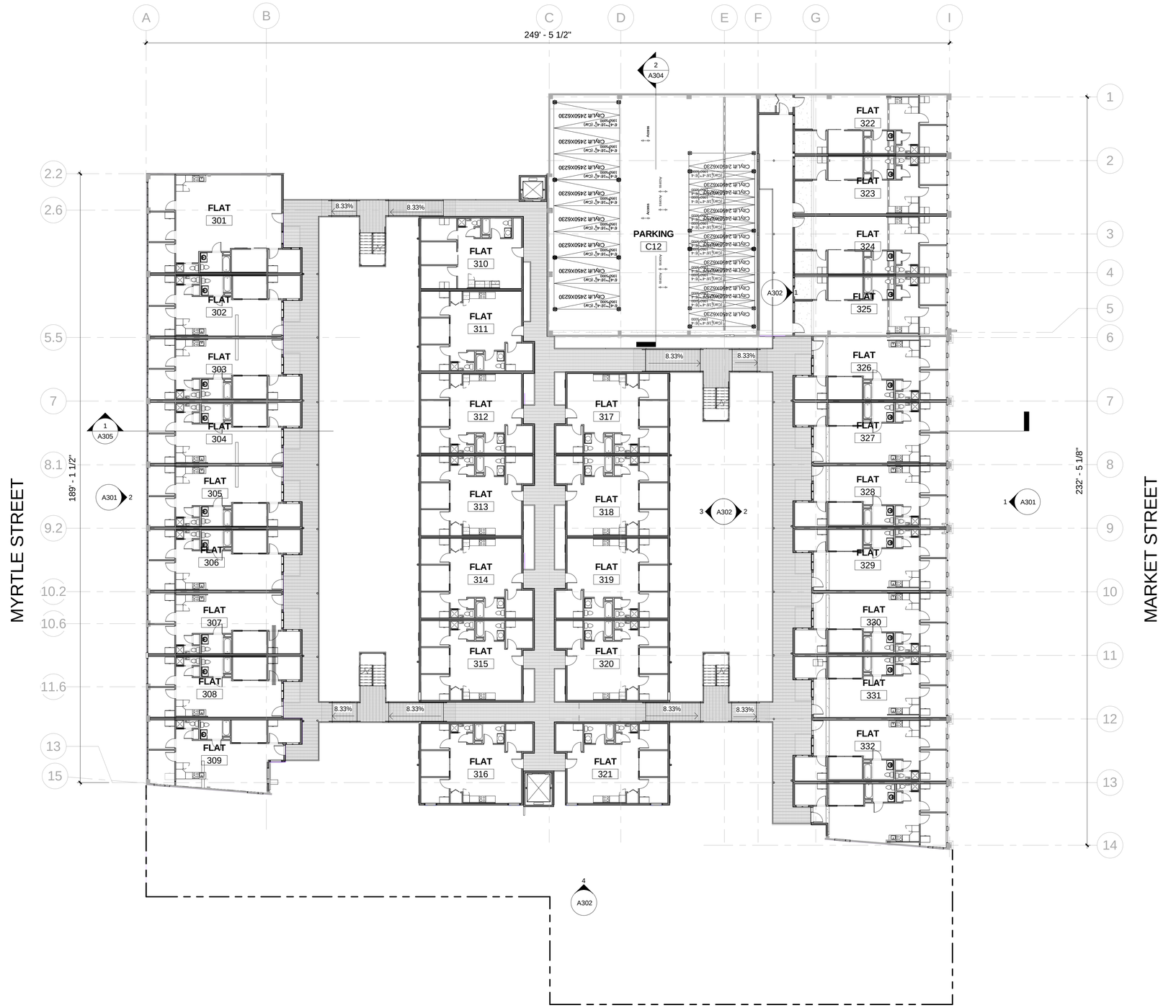
N PROJECT NORTH
N TRUE NORTH

DRAWN BY: Author
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 03/07/17
SHEET TITLE:

FLOOR PLAN - LEVEL 2

SHEET NUMBER

A202



1 FLOOR PLAN - LEVEL 3
1/16" = 1'-0"

Graphic Scale: 1 inch = 16 feet
0 16' 32' 48'

9/6/2017 4:33:32 PM

SHEET NOTES

1. PROVIDE ALL NECESSARY BLOCKING AND BACKING FOR WALL MOUNTED EQUIPMENT AND FIXTURES.

2. REFER TO G003 FOR MOUNTING HEIGHTS AND ACCESSIBILITY STANDARDS.

3. REFER TO DRAWING G501 FOR SIGNAGE.

4. REFER TO CIVIL, STRUCTURAL, MECHANICAL, PLUMBING, FIRE PROTECTION, AND ELECTRICAL DRAWINGS FOR NEW WORK.

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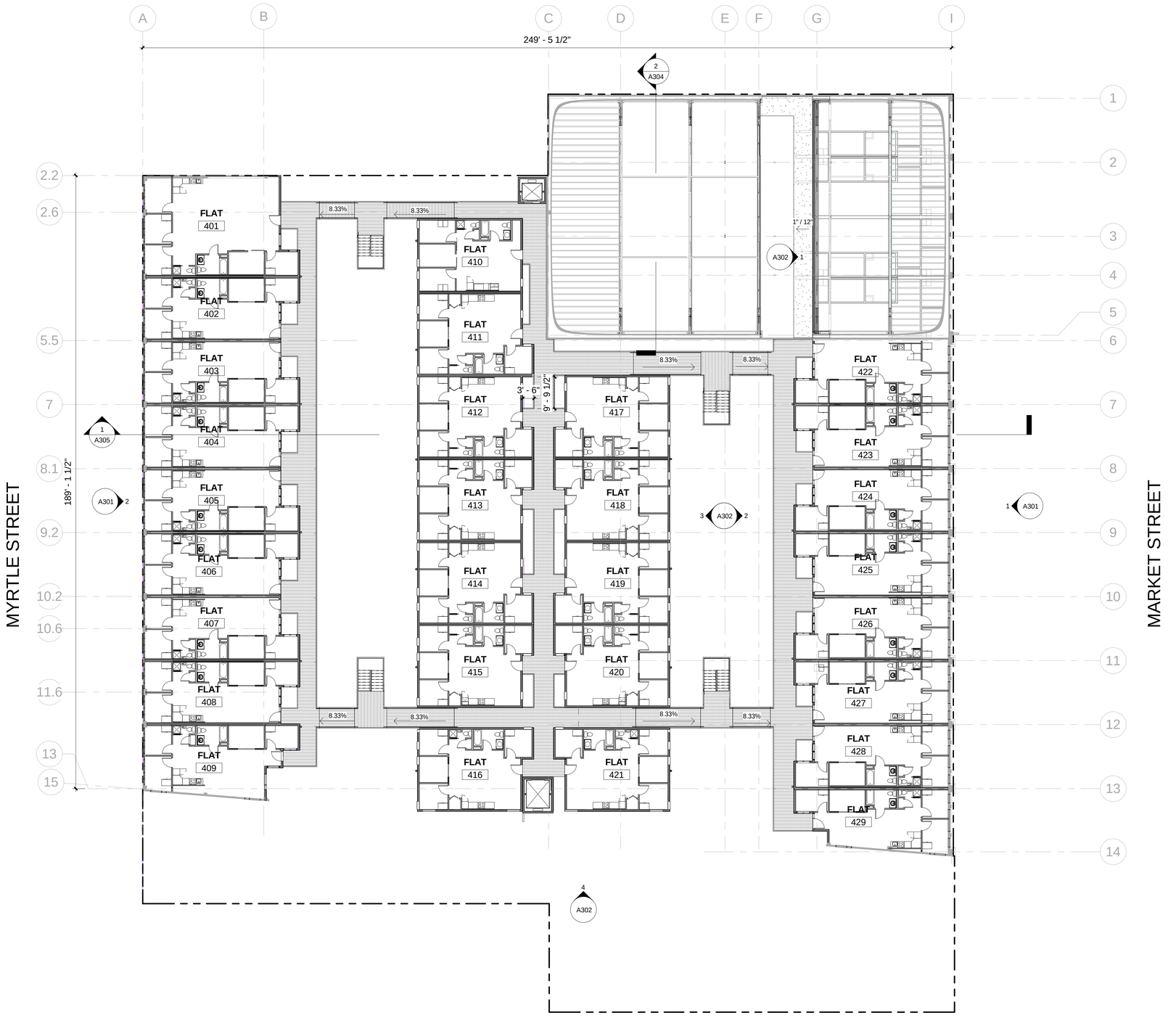
3	09/06/2017	PLANNING APPLICATION	WW
4	09/13/2017	DESIGN DEVELOPMENT	WW

N PROJECT NORTH
N TRUE NORTH

DRAWN BY: Author
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 03/09/17
SHEET TITLE:

FLOOR PLAN - LEVEL 3

SHEET NUMBER
A203



1 FLOOR PLAN - LEVEL 4
1/16" = 1'-0"

Graphic Scale: 1 inch = 16 feet

0 16' 32' 48'

9/6/2017 4:33:45 PM

SHEET NOTES

1. PROVIDE ALL NECESSARY BLOCKING AND BACKING FOR WALL MOUNTED EQUIPMENT AND FIXTURES.

2. REFER TO G003 FOR MOUNTING HEIGHTS AND ACCESSIBILITY STANDARDS.

3. REFER TO DRAWING G501 FOR SIGNAGE.

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LICENSED ARCHITECT KENNETH A. LOWNEY C 29462 EXP: 8/30/17 STATE OF CALIFORNIA

WITH CONSTRUCTION

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2	07/25/2017	SCHEMATIC DESIGN	WW
3	09/06/2017	PLANNING APPLICATION	WW
4	09/13/2017	DESIGN DEVELOPMENT	WW

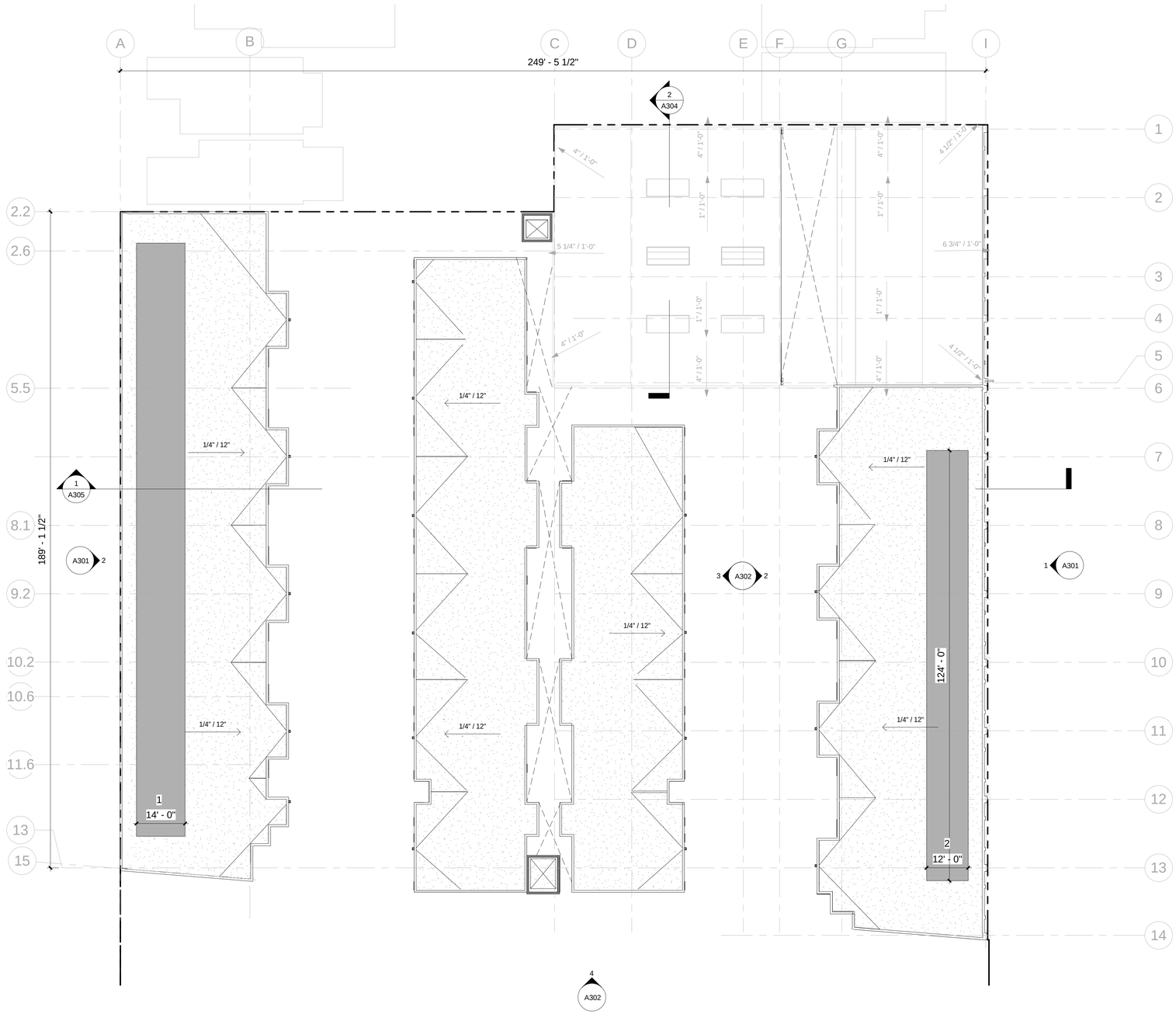
N PROJECT NORTH
N TRUE NORTH

DRAWN BY: Author
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 03/07/17
SHEET TITLE:

FLOOR PLAN - LEVEL 4

SHEET NUMBER

A204



1 ROOF PLAN Working
1/16" = 1'-0"

Graphic Scale: 1 inch = 16 feet

0 16' 32' 48'

SHEET NOTES

1. ROOF SHALL BE FIRE RESISTIVE.

2. MINIMUM ROOF COVERING CLASSIFICATION SHALL BE CLASS A PER CBC 1505.1.

3. REFER TO MECHANICAL, PLUMBING, FIRE PROTECTION, AND ELEVTRICAL DRAWINGS FOR ROOFTOP EQUIPMENT.

4. ALL PENETRATIONS SHALL BE FLASHES. SEE ROOF DETAILS.

5. ALL PIPES AND CONDUITS ON ROOF SHALL BE SUPPORTED. SEE ROOF DETAILS.

6. PROVIDE CRICKETS TO CREATE POSITIVE DRAINAGE TO ROOF DRAINS, 1/4" PER FOOT MINIMUM CRICKET SLOPE.

7. ROOF SURFACES SHALL BE SRI COMPLIANT. SEE SPECIFICATIONS.

KEY NOTES

1 KEY NOTE 1

LEGEND

DESIGNATED SOLAR READY ZONE

MIN. 80 SF PER AREA WHEN TOTAL ROOF AREA IS LESS THAN OR EQUAL 10,000 SF

MIN. 160 SF PER AREA WHEN TOTAL ROOF AREA IS GREATER THAN 10,000 SF

1 DESIGNATED AREA FOR FUTURE SOLAR (160 SF MIN)

SOLAR READY ZONE CALCULATION

TOTAL ROOF AREA= 25,809 SF
SOLAR READY ZONE = 25,809 SF x 15%
= 3,871 SF

SOLAR READY AREAS

AREA 1 = 2,394 SF
AREA 2 = 1,488 SF
TOTAL = 3,882 SF

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4	09/13/2017	DESIGN DEVELOPMENT	WW

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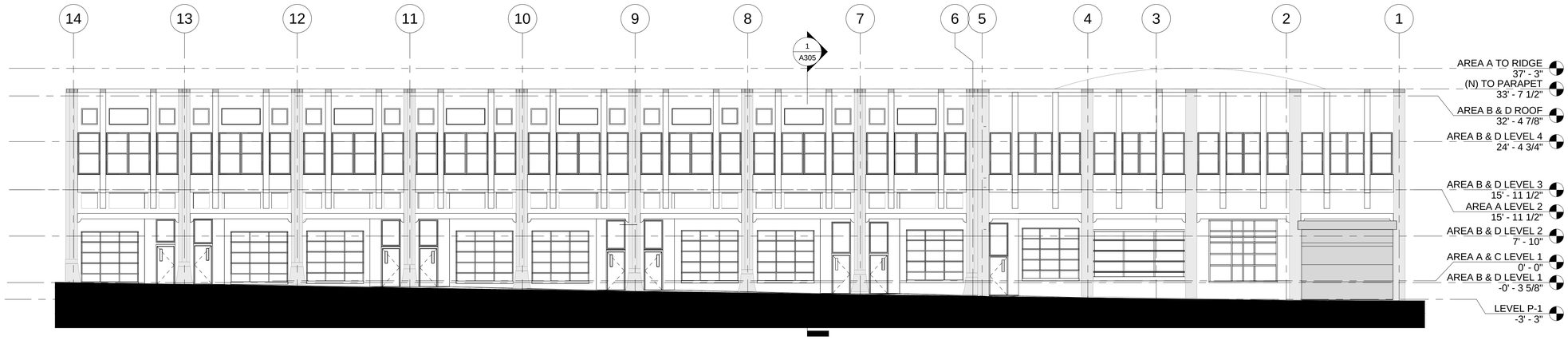
DRAWN BY: Author
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 01/01/13
SHEET TITLE:

ROOF PLAN

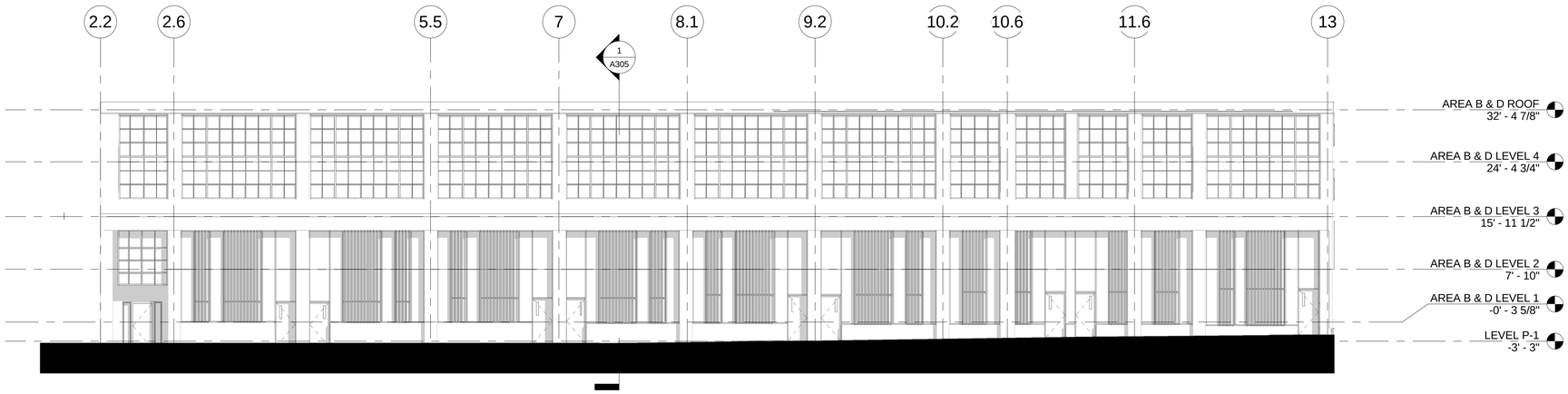
SHEET NUMBER

A205

9/6/2017 4:33:55 PM



1 EAST ELEVATION - MARKET STREET
1" = 10'-0"



2 WEST ELEVATION - MYRTLE STREET
1" = 10'-0"

9/6/2017 4:34:15 PM

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MEP CONSTRUCTION

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4	09/13/2017	DESIGN DEVELOPMENT	WW

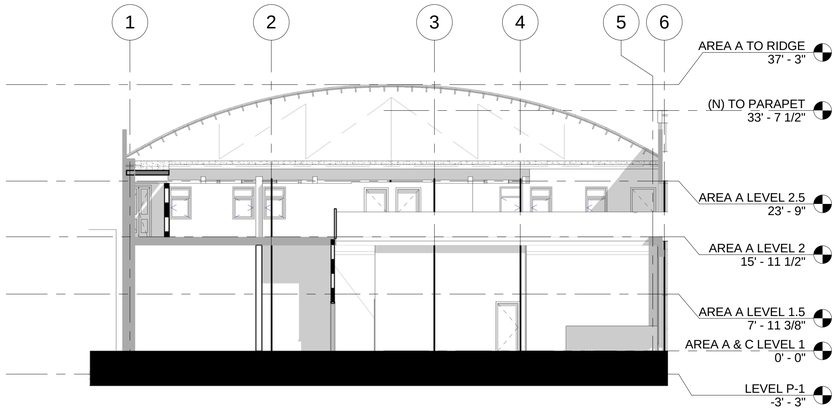
N PROJECT NORTH
N TRUE NORTH

DRAWN BY: Author
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 01/01/13
SHEET TITLE:

EXTERIOR ELEVATIONS

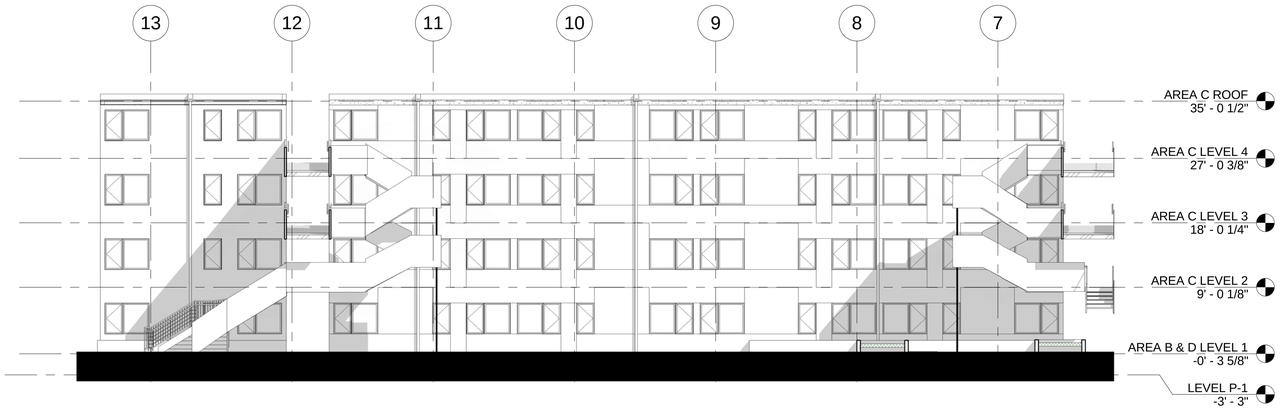
SHEET NUMBER

A301

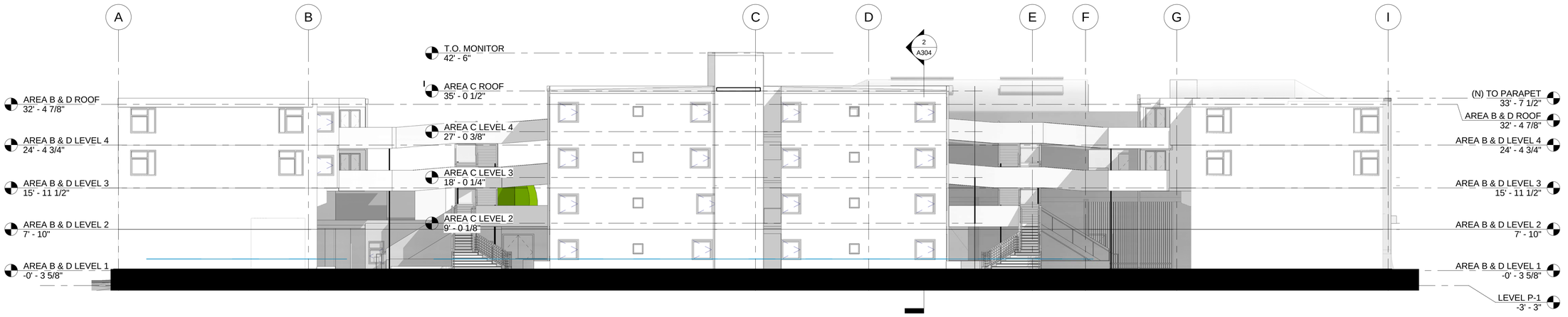


1 WEST ELEVATION - AREA A
1" = 10'-0"

2 ELEVATION - TYPICAL AREA B & D
1" = 10'-0"



3 EAST ELEVATION - TYPICAL AREA C COURTYARD
1" = 10'-0"



4 SOUTH ELEVATION
1" = 10'-0"

9/6/2017 4:35:22 PM

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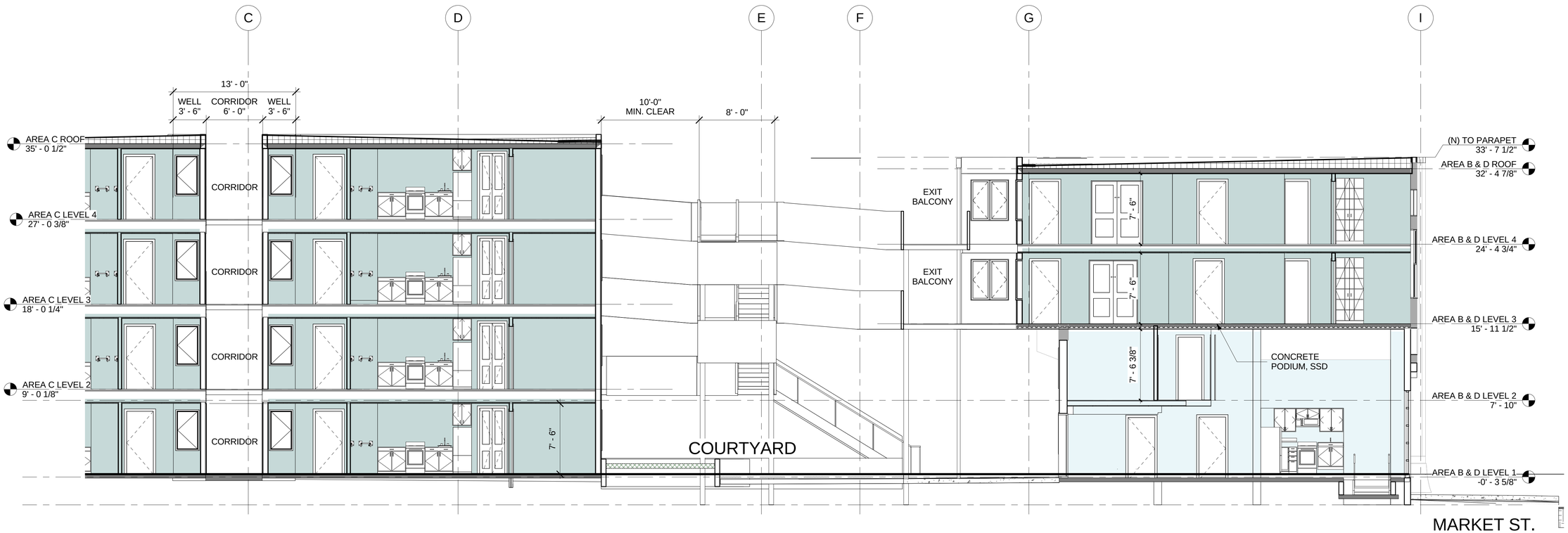
4	09/13/2017	DESIGN DEVELOPMENT	WW

DRAWN BY: Author
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 01/01/13
SHEET TITLE:

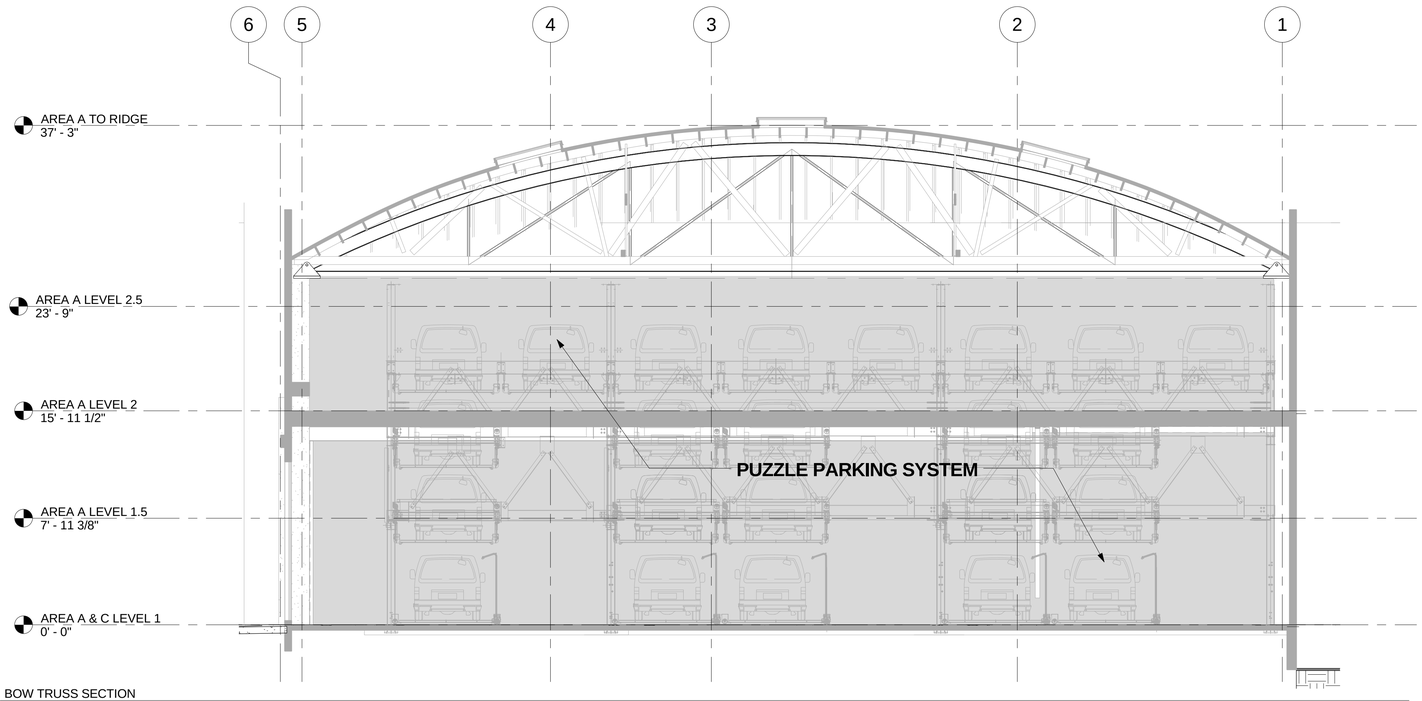
EXTERIOR ELEVATIONS

SHEET NUMBER

A302



1 PARTIAL SECTION THROUGH COURTS
3/16" = 1'-0"



2 BOW TRUSS SECTION
3/16" = 1'-0"

9/6/2017 4:35:32 PM

SHEET NOTES

1. VERTICAL DIMENSIONS ARE FROM THE TOP OF THE FLOOR SLAB DATUM LINE, ESTABLISHED BY THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE OWNER OR ARCHITECT, UNLESS OTHERWISE NOTED.

2. ALL DIM. SHOWN TO STRUCTURE U.O.N.

3. FOR TYP. ROOF DETAILS, SEE SHEETS A910 & A911

4. FOR WALL TYPE ASSEMBLY INFORMATION, SEE SHEETS A10.3

5. FOR WINDOW & STOREFRONT SCHEDULE, SEE SHEET A830

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DRAWN BY: WW,EP
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 03/07/17
SHEET TITLE:

SECTIONS

SHEET NUMBER

A304

SHEET NOTES

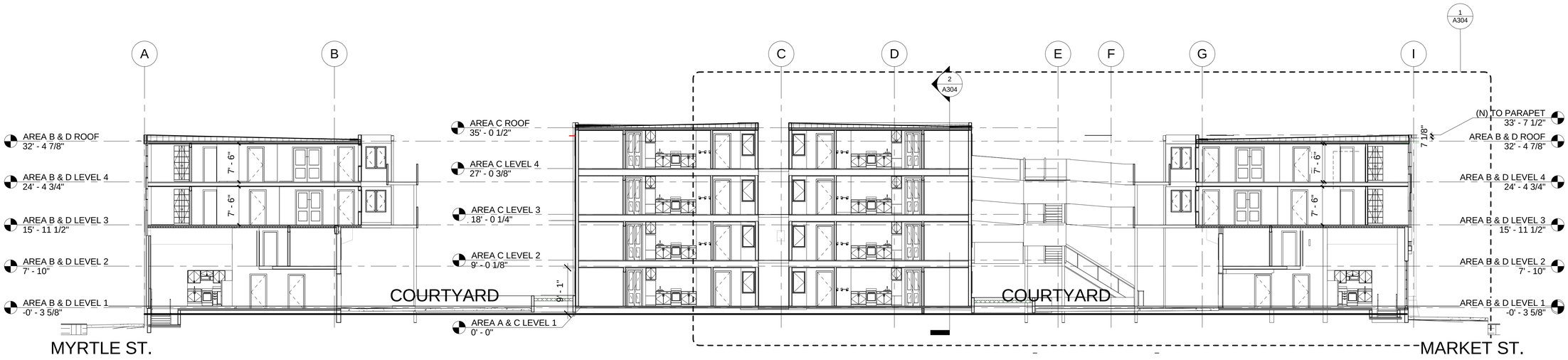
1. VERTICAL DIMENSIONS ARE FROM THE TOP OF THE FLOOR SLAB DATUM LINE, ESTABLISHED BY THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE OWNER OR ARCHITECT, UNLESS OTHERWISE NOTED.

2. ALL DIM. SHOWN TO STRUCTURE U.O.N.

3. FOR TYP. ROOF DETAILS, SEE SHEETS A910 & A911

4. FOR WALL TYPE ASSEMBLY INFORMATION, SEE SHEETS A10.3

5. FOR WINDOW & STOREFRONT SCHEDULE, SEE SHEET A830



1 FULL SECTION THROUGH COURTS
1" = 10'-0"

9/6/2017 4:35:36 PM

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KENNETH A. LOWNEY
C 29402
EXP: 8/30/17
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MEP CONSTRUCTION

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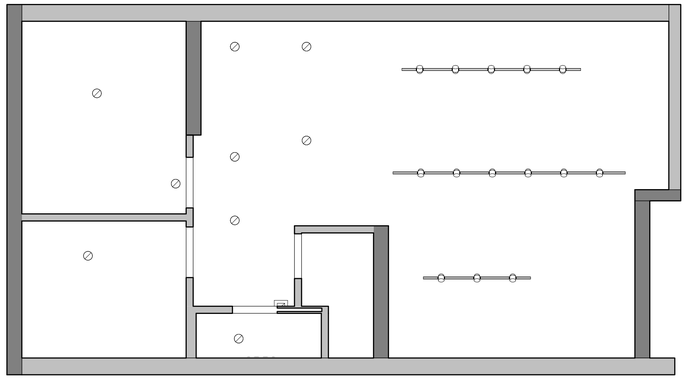
DRAWN BY: WW, FP
PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 03/14/17
SHEET TITLE:

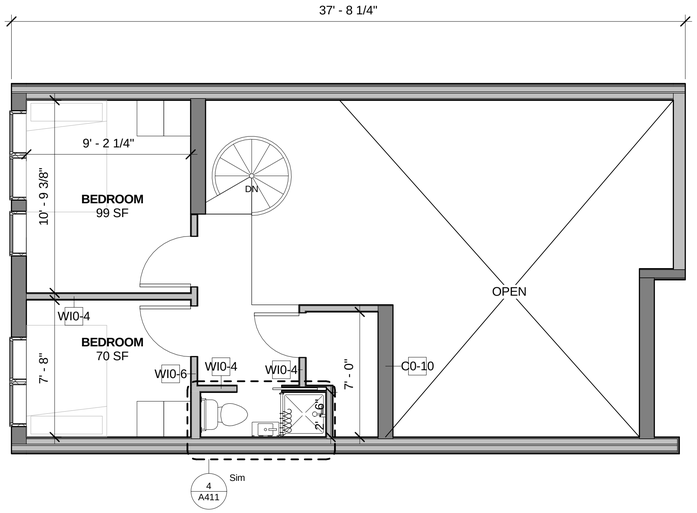
SECTIONS

SHEET NUMBER

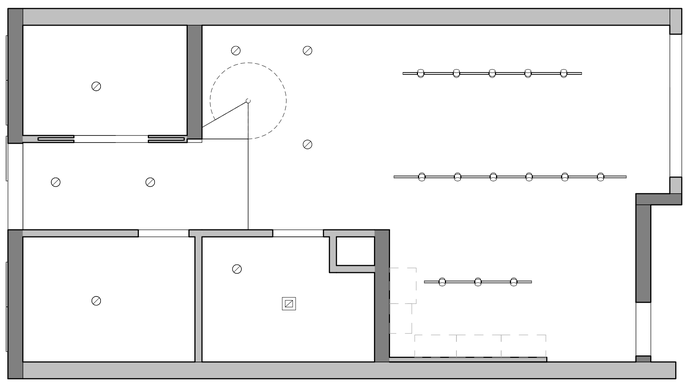
A305



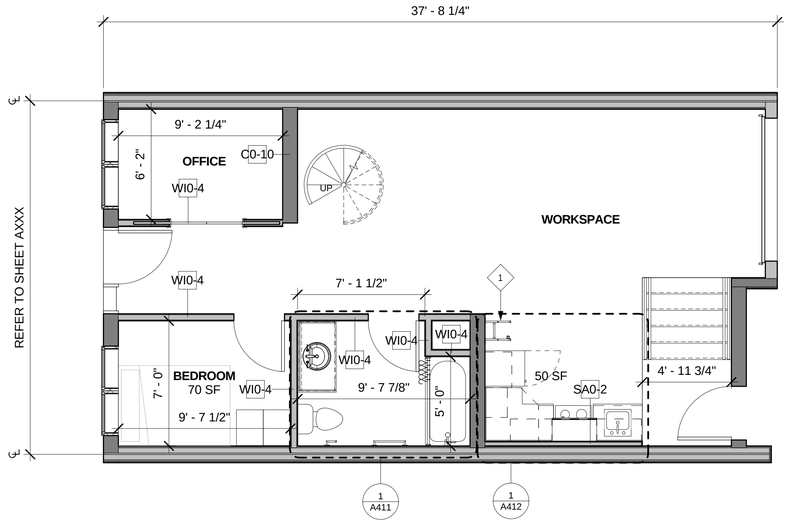
4 LOFT - SECOND FLOOR REFLECTED CEILING PLAN
1/4" = 1'-0"



2 LOFT - SECOND FLOOR
1/4" = 1'-0"



3 LOFT - GROUND FLOOR REFLECTED CEILING PLAN
1/4" = 1'-0"



1 LOFT - GROUND FLOOR
1/4" = 1'-0"

9/6/2017 4:45:45 PM

SHEET NOTES

1. FOR WALL TYPES

   - SEE ENLARGED PLANS (A400 SHEET SERIES) FOR INTERIOR WALLS AT UNITS

   - SEE FLOOR PLANS (A200 SHEET SERIES) FOR EXTERIOR WALLS AND PARTY WALLS

2. BIKE RACKS ARE PROVIDED FOR EACH UNIT; TWO(2) FOR GROUND FLOOR UNITS AND ONE(1) FOR UNITS IN LEVELS 2-4

SHEET KEYNOTE - UNITS

1 BIKE RACKS, PROVIDED

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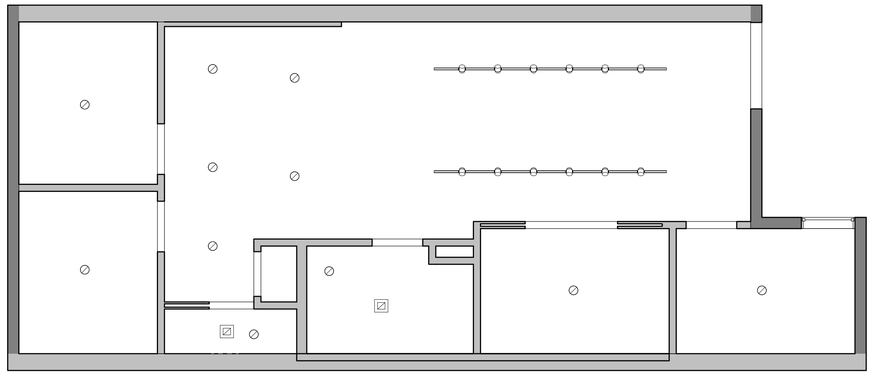
4	09/13/2017	DESIGN DEVELOPMENT	WW

DRAWN BY: Author
PROJECT NUMBER: 00-000
SHEET ISSUE DATE: 01/01/13
SHEET TITLE:

ENLARGED UNIT PLAN -LOFT TYPE 1

SHEET NUMBER

A401



2 UNIT TYPE 2 - REFLECTED CEILING PLAN
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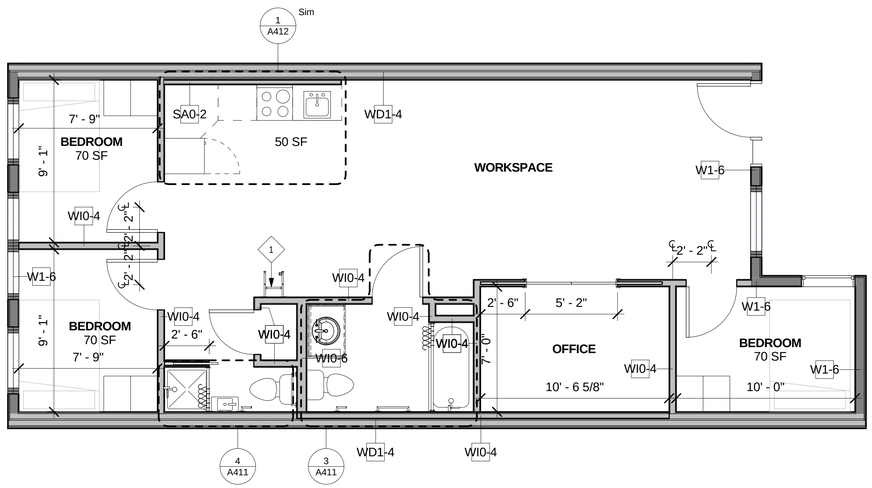

1 UNIT TYPE 2
1/4" = 1'-0"

9/6/2017 4:45:46 PM

SHEET NOTES

1. FOR WALL TYPES

   - SEE ENLARGED PLANS (A400 SHEET SERIES) FOR INTERIOR WALLS AT UNITS

   - SEE FLOOR PLANS (A200 SHEET SERIES) FOR EXTERIOR WALLS AND PARTY WALLS

2. BIKE RACKS ARE PROVIDED FOR EACH UNIT; TWO(2) FOR GROUND FLOOR UNITS AND ONE(1) FOR UNITS IN LEVELS 2-4

SHEET KEYNOTE - UNITS

1 BIKE RACKS, PROVIDED

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3	09/06/2017	PLANNING APPLICATION	WW

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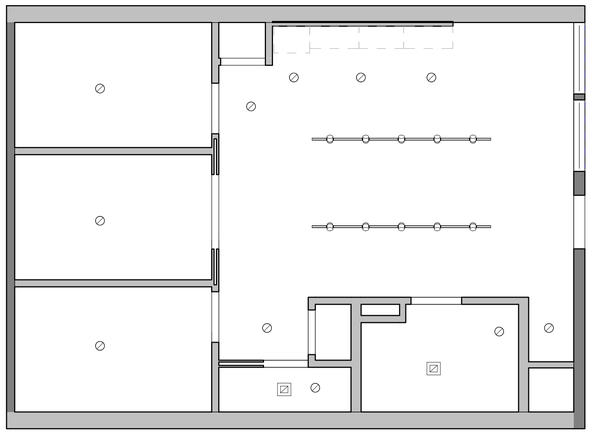
TRUE NORTH

DRAWN BY: Author
PROJECT NUMBER: 00-000
SHEET ISSUE DATE: 08/16/17
SHEET TITLE:

ENLARGED UNIT PLAN - TYPE 2

SHEET NUMBER

A402



4 UNIT TYPE 3 END - REFLECTED CEILING PLAN
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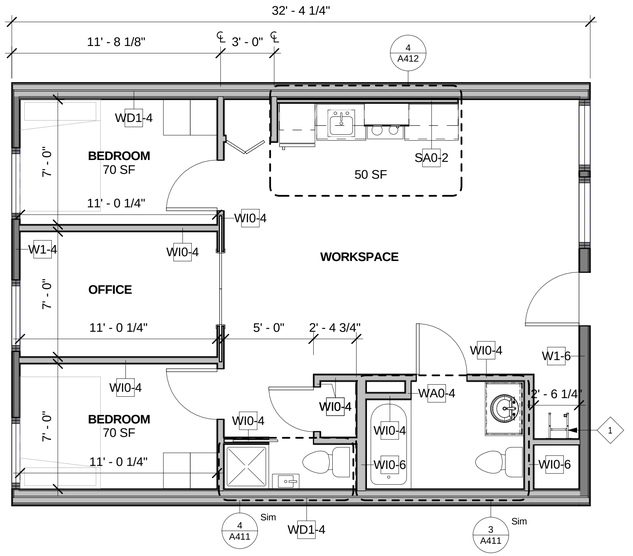
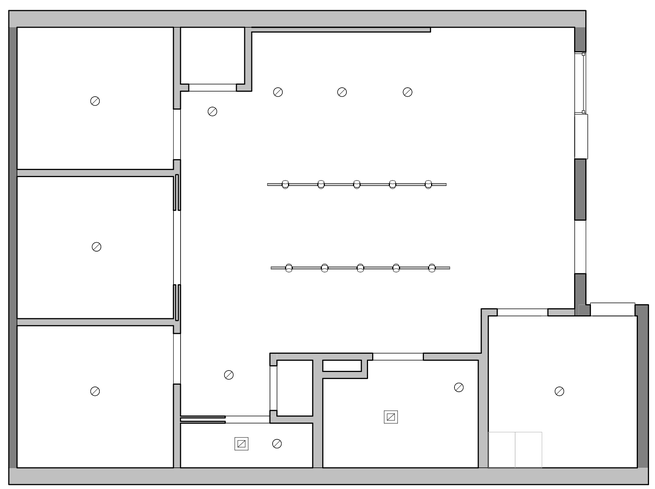


2 UNIT TYPE 3 - END
1/4" = 1'-0"



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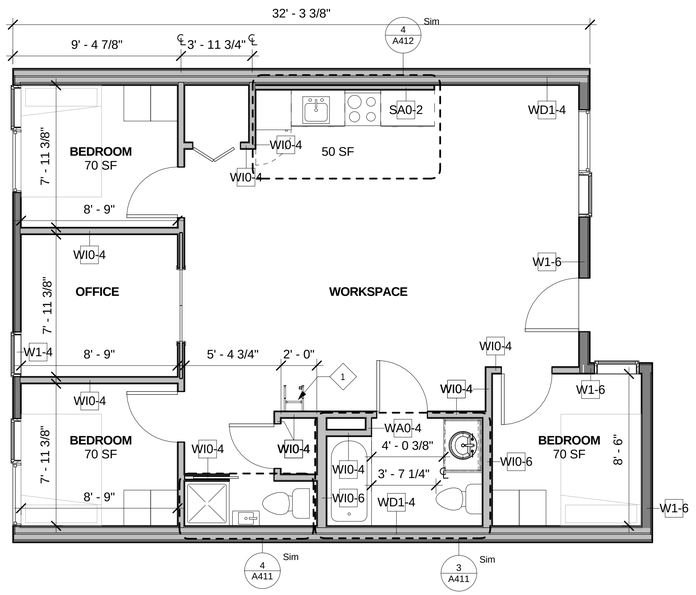

1 UNIT TYPE 3
1/4" = 1'-0"

SHEET NOTES

1. FOR WALL TYPES

   - SEE ENLARGED PLANS (A400 SHEET SERIES) FOR INTERIOR WALLS AT UNITS

   - SEE FLOOR PLANS (A200 SHEET SERIES) FOR EXTERIOR WALLS AND PARTY WALLS

2. BIKE RACKS ARE PROVIDED FOR EACH UNIT; TWO(2) FOR GROUND FLOOR UNITS AND ONE(1) FOR UNITS IN LEVELS 2-4

SHEET KEYNOTE - UNITS

1 BIKE RACKS, PROVIDED

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PROJECT NUMBER: 00-000
SHEET ISSUE DATE: 08/16/17
SHEET TITLE:

ENLARGED UNIT PLAN - TYPE 3

SHEET NUMBER

A403

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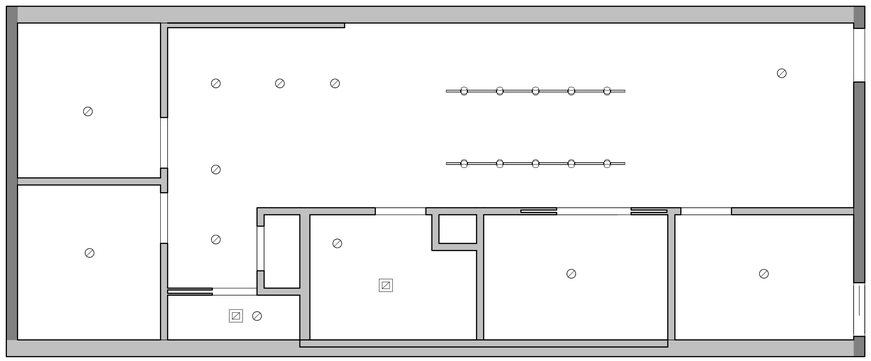
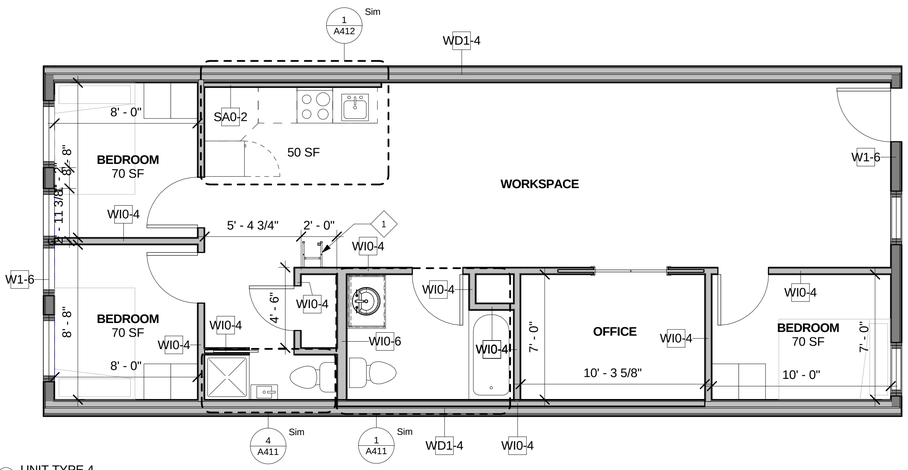


2 UNIT TYPE 4 - REFLECTED CEILING PLAN
1/4" = 1'-0"



1 UNIT TYPE 4
1/4" = 1'-0"

SHEET NOTES

1. FOR WALL TYPES

   - SEE ENLARGED PLANS (A400 SHEET SERIES) FOR INTERIOR WALLS AT UNITS

   - SEE FLOOR PLANS (A200 SHEET SERIES) FOR EXTERIOR WALLS AND PARTY WALLS

2. BIKE RACKS ARE PROVIDED FOR EACH UNIT; TWO(2) FOR GROUND FLOOR UNITS AND ONE(1) FOR UNITS IN LEVELS 2-4

SHEET KEYNOTE - UNITS

1 BIKE RACKS, PROVIDED

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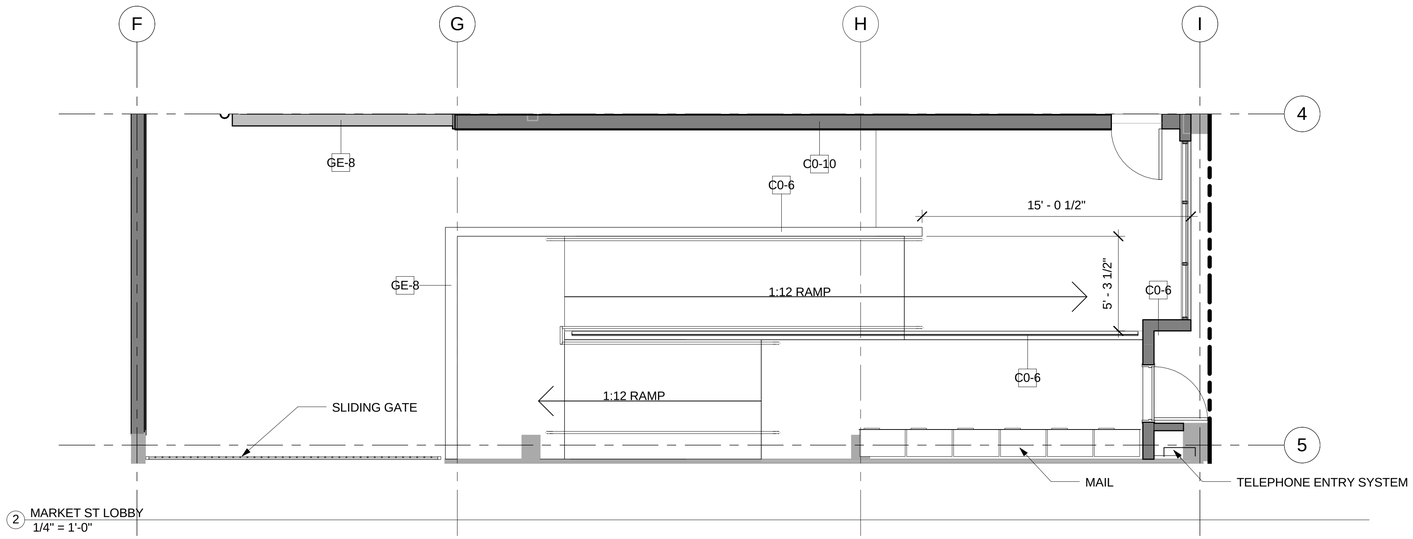
SHEET ISSUE DATE: 08/16/17
SHEET TITLE:

ENLARGED UNIT PLAN - TYPE 4

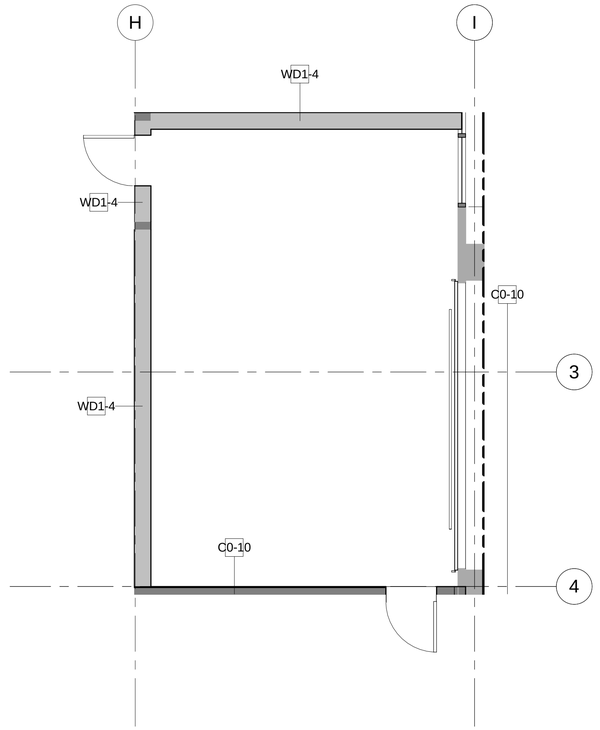
SHEET NUMBER

A404

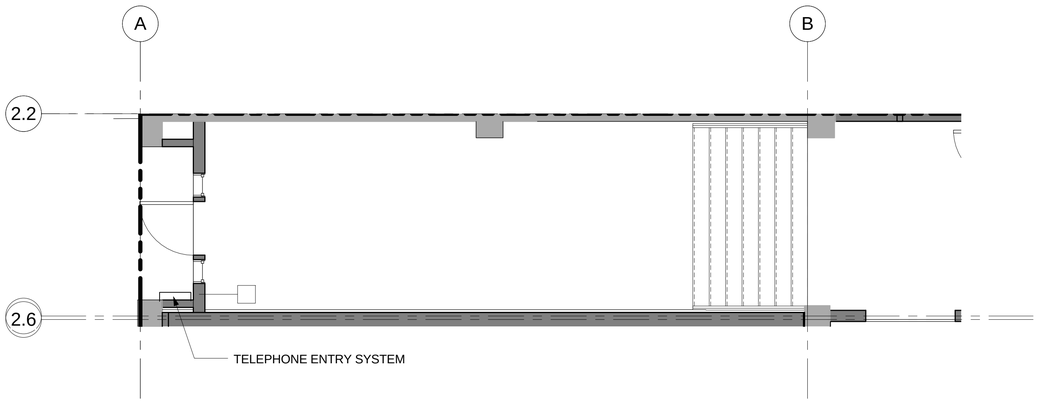
9/6/2017 4:45:48 PM



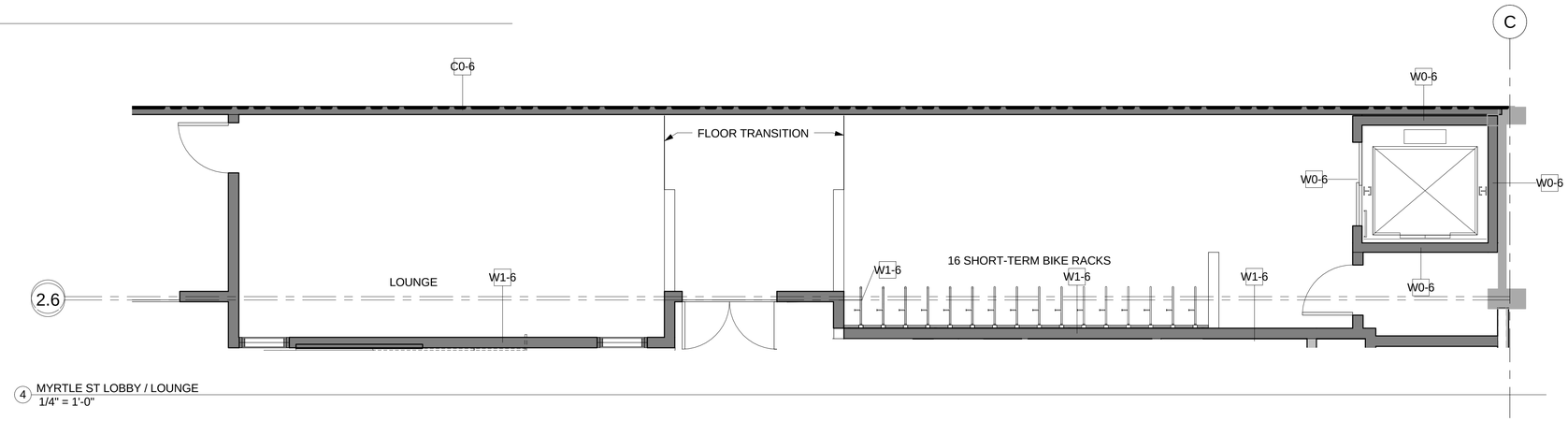
2 MARKET ST LOBBY
1/4" = 1'-0"



3 AMENITY RM PLAN
1/4" = 1'-0"



1 MYRTLE ST PASSAGE
1/4" = 1'-0"



4 MYRTLE ST LOBBY / LOUNGE
1/4" = 1'-0"

9/6/2017 4:35:38 PM

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PROJECT NUMBER: 17-009
SHEET ISSUE DATE: 08/03/17
SHEET TITLE:

ENLARGED PLANS - COMMON AREA FLOOR PLANS

SHEET NUMBER

A405

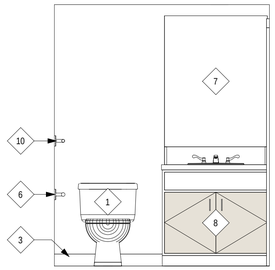
SHEET NOTES

1. REFER TO FINISH SCHEDULE ON A6.0 AND FINISH PLAN ON A6.1 FOR ADDITIONAL MATERIAL INFORMATION.

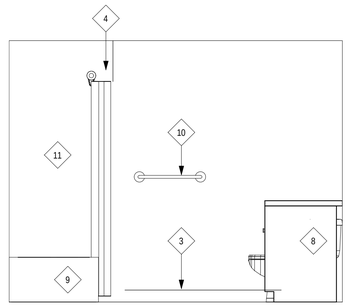
3. PROVIDE BLOCKING BEHIND WALL WHERE REQ'D FOR FIXTURE & ACCESSORIES.

SHEET KEYNOTE -...

1	TOILET
2	WALL MOUNTED SINK
3	BASE BOARD
4	SHOWER CURTAIN ROD
5	SHOWER RECEPTOR
6	TOILET PAPER HOLDER
7	SQUARE CUT MIRROR
8	SINK/CABINET
9	TUB/SHOWER
10	TOWEL ROD
11	TUB/SHOWER WALL PANEL



16 BATH TYPE 3
1/2" = 1'-0"



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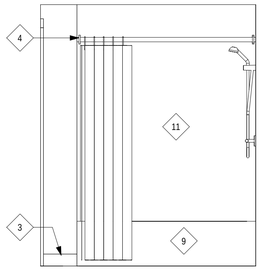

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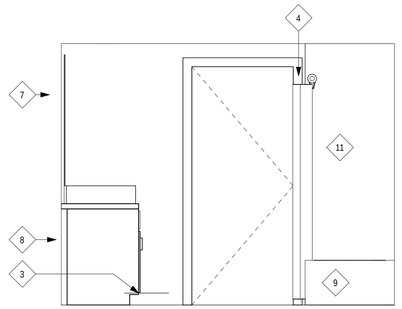
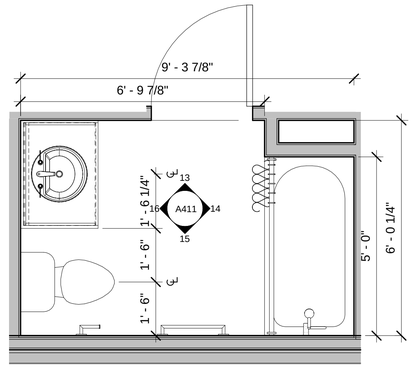
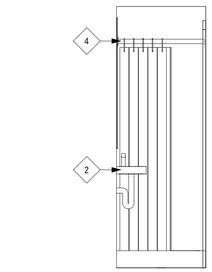
1/2" = 1'-0"



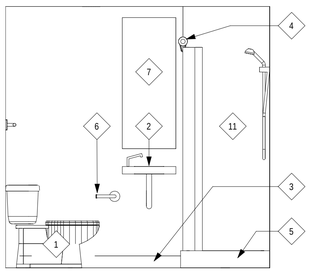
13 BATH TYPE 3
1/2" = 1'-0"



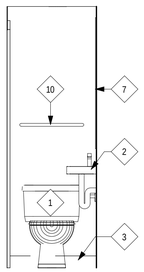
3 TYPICAL BATH - TYPE 3
1/2" = 1'-0"



19 BATH TYPE 4
1/2" = 1'-0"



18 BATH TYPE 2
1/2" = 1'-0"



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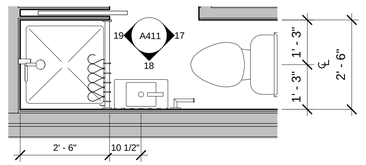
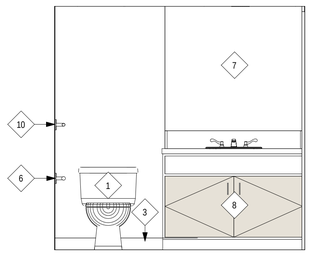
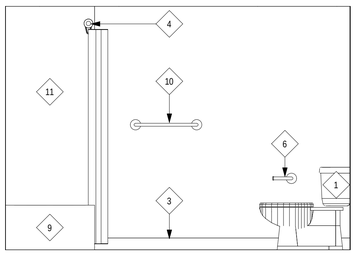


4 TYPICAL BATH - TYPE 2
1/2" = 1'-0"



8 BATH TYPE 1
1/2" = 1'-0"



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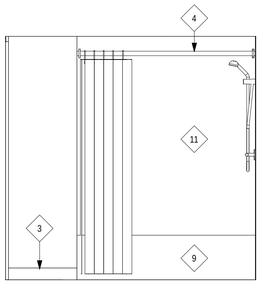
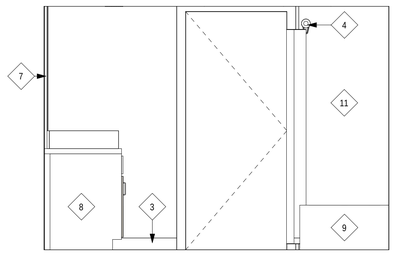
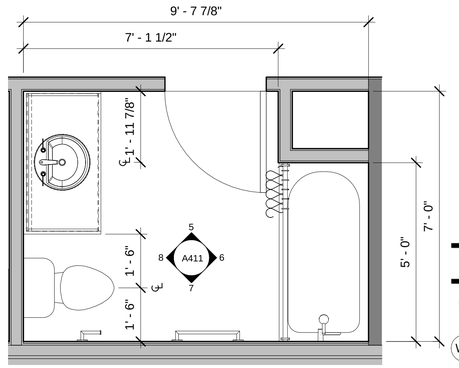
1/2" = 1'-0"



6 BATH TYPE 1
1/2" = 1'-0"



5 BATH TYPE 1
1/2" = 1'-0"



1 TYPICAL BATH - TYPE 1
1/2" = 1'-0"

LEGEND

BX	BASE FINISH
WX PX	WALL FINISH/PAINT COLOR
M1	MILLWORK FINISH

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DRAWN BY: Author
PROJECT NUMBER: 00-000
SHEET ISSUE DATE: 08/16/17
SHEET TITLE:

INTERIOR ELEVATIONS - BATHROOM

SHEET NUMBER

A411

9/6/2017 4:45:53 PM

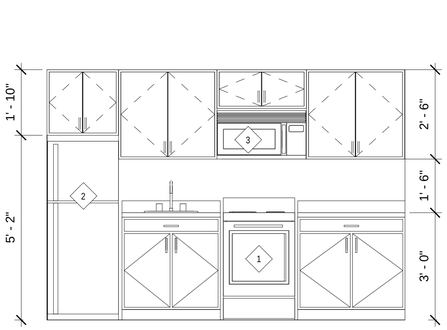
SHEET NOTES

1. REFER TO FINISH SCHEDULE ON A6.0 AND FINISH PLAN ON A6.1 FOR ADDITIONAL MATERIAL INFORMATION.

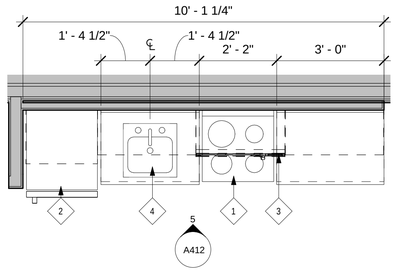
3. PROVIDE BLOCKING BEHIND WALL WHERE REQ'D FOR FIXTURE & ACCESSORIES.

SHEET KEYNOTE -...

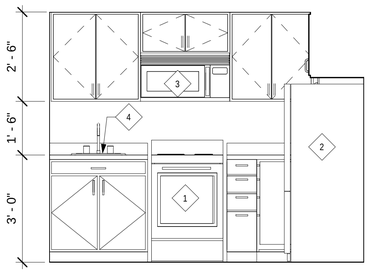
1 RANGE/CONVECTION OVEN
2 FRIDGE
3 MICROWAVE/HOOD VENT
4 SINGLE BOWL SINK
5 BASE BOARD



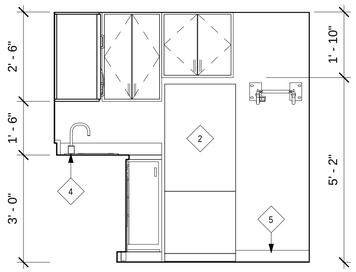
5 TYPICAL KITCHEN TYPE 2
1/2" = 1'-0"



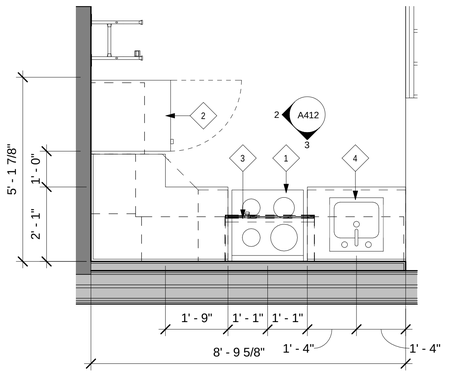
4 TYPICAL KITCHEN - TYPE 2
1/2" = 1'-0"



3 TYPICAL KITCHEN TYPE 1
1/2" = 1'-0"



2 TYPICAL KITCHEN TYPE 1
1/2" = 1'-0"



1 KITCHEN TYPE 1
1/2" = 1'-0"

LEGEND

BX BASE FINISH

WX PX WALL FINISH/PAINT COLOR

M1 MILLWORK FINISH

9/6/2017 4:45:57 PM

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DRAWN BY: Author
PROJECT NUMBER: 00-000
SHEET ISSUE DATE: 01/01/13
SHEET TITLE:

INTERIOR ELEVATIONS - KITCHEN

SHEET NUMBER

A412

APPENDIX B

Air and Dust Monitoring Log

AIR AND DUST MONITORING LOG

Site:	**Recorded By:**
Station ID:	**Date:**
Perimeter Dust Monitor Model:	
Perimeter Dust Monitor Serial Number:	
Portable Dust Monitor Model:	
Portable Dust Monitor Serial Number:	
PID Meter Model:	
PID Meter Serial Number:	

Time	Wind Direction	Wind Speed (mph)	PM_{10} Concentration (ug/m^3)			VOC Reading (ppmv)		Notes (exceedances, control measures)
			Upwind, Work Area	Downwind, Work Area	Downwind, Perimeter	Downwind, Work Area	Downwind, Perimeter	

APPENDIX C

Standard Operating Procedures

STANDARD FIELD PROCEDURES FOR SOIL BORINGS

This document describes Pangea Environmental Services' standard field methods for drilling and sampling soil borings. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality, and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the Unified Soil Classification System by a trained geologist, scientist or engineer working under the supervision of a California Registered Engineer, California Registered Geologist (RG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel)
- Approximate percentage of each grain size category,
- Color,
- Approximate water or product saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or hydraulic-push technologies. At least one and one half ft of the soil column is collected for every five ft of drilled depth. Additional soil samples are collected near the water table and at lithologic changes. With hollow-stem drilling, samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the borehole. With hydraulic-push drilling, samples are typically collected using acetate liners. The vertical location of each soil sample is determined by measuring the distance from the middle of the soil sample tube to the end of the drive rod used to advance the split barrel sampler or the acetate tube. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Storage, Handling and Transport

Sampling tubes or cut acetate liners chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

Soil samples collected during drilling will be analyzed in the field for ionizable organic compounds using a photo-ionization detector (PID) with a 10.2 eV lamp. The screening procedure will involve placing an undisturbed soil sample in a sealed container (either a zip-lock bag, glass jar, or a capped soil tube). The container will be set aside, preferably in the sun or warm location. After approximately fifteen minutes, the head space within the container will be tested for total organic vapor, measured in parts per million on a volume to volume basis (ppmv) by the PID. The PID instrument will be calibrated prior to boring using hexane or isobutylene. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Water samples collected from borings are either collected from the open borehole, from within screened PVC inserted into the borehole, or from a driven Hydropunch-type sampler. Groundwater is typically extracted using a bailer, check valve and/or a peristaltic pump. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory.

Pangea often performs electrical conductivity (EC) logging and/or continuous coring to identify potential water-bearing zones. Hydropunch-type sampling is then performed to provide discrete-depth grab groundwater sampling within potential water-bearing zones for vertical contaminant delineation. Hydropunch-type sampling typically involves driving a cylindrical sheath of hardened steel with an expendable drive point to the desired depth within undisturbed soil. The sheath is retracted to expose a stainless steel or PVC screen that is sealed inside the sheath with Neoprene O-rings to prevent infiltration of formation fluids until the desired depth is attained. The groundwater is extracted using tubing inserted down the center of the rods into the screened sampler.

Duplicates and Blanks

Blind duplicate water samples are collected usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory QA/QC blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite on top of and covered by plastic sheeting. At least four individual soil samples are collected from the stockpiles for later compositing at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Ground water removed during sampling and/or rinsate generated during decontamination procedures are stored onsite in sealed 55 gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Disposal of the water is based on the analytic results for the well samples. The water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.

STANDARD FIELD PROCEDURES FOR EXCAVATION SAMPLING

During remedial excavation activities compliance sampling is typically required to assess the extent of the contamination remaining in site soil. Pangea has developed standard field procedures for compliance sampling and excavation to provide sample collection, handling and documentation in compliance with State and local regulatory agency regulations.

Soil Sampling

Soil samples are typically collected from the bottom and sidewalls of the excavation. If water is present in the excavation, soil samples are typically collected from the soil/water interface. The soil samples are collected in steam-cleaned brass or steel tubes from either a driven split-spoon type sampler or the bucket of a backhoe or excavator. When a backhoe or excavator is used, approximately three inches of soil are scraped from the surface and the tube is driven into the exposed soil. The location and number of samples is determined by the environmental professional and/or regulatory agency representatives overseeing the excavation.

When required or requested before sample collection, Pangea field staff screen soil with a portable photo-ionization detector (PID) to qualitatively assess the presence or absence of volatile contaminants. Excavated soil is typically segregated based on contaminant concentration and stockpiled on site on plastic sheeting. When field observations and/or PID measurements indicate that the contaminant-bearing soil has been satisfactorily removed, Pangea collects soil samples from excavation sidewalls and floor for confirmatory analysis at a State-certified analytic laboratory.

Stockpile Soil Sampling

To facilitate soil disposal at approved offsite facilities, Pangea typically collects one four-point composite soil samples for 200 cubic yards or less of stockpiled soil. If the soil stockpile volume is between 200 and 1,000 cubic yards, two four-point composite samples are typically collected. If soil is segregated based on field observations, at least one four-point composite soil sample is collected for each segregated stockpile. To generate a composite sample, Pangea collects four individual soil samples in steam-cleaned brass or steel tubes by hand, or from either a driven split-spoon type sampler or the bucket of a backhoe or excavator. The sample locations and depths are selected to obtain composite soil sample representative of the stockpile. The four individual soil tubes are composited by the state-certified laboratory. When hand sampling or backhoe/excavator is used, approximately three inches of soil are scraped from the surface and the tube is driven into the exposed soil. Additional stockpile sampling procedures may be required to facilitate reuse of soil onsite in accordance with regulatory oversight.

Grab Ground Water Sampling

If groundwater enters the excavation, grab ground water samples are typically collected from the open excavation. Grab groundwater sample can be collected from excavator equipment, disposable Tygon® tubing placed into the excavation, or other appropriate sampling equipment placed into the water. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory.

Sample Storage, Handling and Transport

Upon removal from the sampler or the backhoe, soil samples are trimmed flush, capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Groundwater samples in appropriate containers are labeled, placed in protective bags, and stored on crushed ice at or below 4° C. All samples are transported under chain-of-custody to a State-certified analytic laboratory.

Duplicates and Blanks

Duplicate or blind duplicate samples can be collected, if requested. For water sampling, laboratory-supplied trip blanks can accompany samples to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory quality assurance/quality control (QA/QC) blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

STANDARD FIELD PROCEDURES FOR MONITORING WELLS

This document describes Pangea Environmental Services' standard field methods for drilling, installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Well Construction and Surveying

Groundwater monitoring wells are installed in soil borings to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 feet below and 5 feet above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three feet thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two feet thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I, II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security. The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. Wells may be surged prior to installation of the well seal to ensure that there are no voids in the sand pack. Development occurs 48 to 72 hours after seal installation to ensure that the Portland cement has set up correctly. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 72 hours after they are developed.

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

APPENDIX D

Site Health and Safety Plan

SITE HEALTH AND SAFETY PLAN

Date: September 21, 2017 Project: 1919 Market Street, Oakland

SITE DESCRIPTION

Client: Danny Haber
Client contact name/phone number: Danny Haber (631) 931-7522; Jeremy Harris (858) 449-5270

Site Address: 1919 Market Street, Oakland
Site Use/Conditions: Development Site
Area Land Use: [X] Residential [ ] Commercial [ ] Industrial [ ] Agricultural [ ] Other
Topography: [X] Flat [ ] Hilly [ ] Open Excavation [X] Paved [X] Unpaved [ ] Other

Weather Conditions (see Heat Stress Monitoring): Highs ranging from 58 to 74 degrees on average throughout the year. Rainy season is from October to May.

SCOPE OF WORK:

Site development activities include: environmental and geotechnical drilling; environmental remediation including soil excavation, soil stockpiling, and soil loading; building demolition activities; and construction earthwork activities including site grading, trenching, and soil stockpiling.

SITE CONTROL:

[X] A safe perimeter around the work zone has been established defined by:
[ ] Caution Tape and/or [ ] Cones [ ] Fencing [X] Other: work site is walled off.

The Contamination Reduction Zone is designated as:
Outside, on the east side of the building, or wherever the field vehicles are located.

The Support Zone is designated as: Field Vehicle
[ ] Offsite traffic control is required and plan is attached.
[ ] Traffic control contractor is required.

CHEMICAL HAZARD EVALUATION

Suspected or known concentrations of the compounds shown below are expected at the site. In general, the compounds are present in soil gas near the northwest corner of the building. The presence of compounds in air will be indicated by hydrocarbon odors. Since the hydrocarbon compounds are highly volatile, the compounds will dissipate in air. If site workers notice hydrocarbon odor, ambient air will be monitored with a PID or wear level C personal protective equipment. As a general safety precaution, keep all potential ignition sources away from work area

Compound	Soil Gas Conc. (ug/m^3)	Max Soil Conc. (mg/kg)	Water Conc. (µg/L)	STEL (ppm)	PEL (use for 8-hr TWA)	IDLH (ppm)
Tetrachloroethene	2,200	ND	1.4	100	25	150
Trichloroethene	880	ND	ND	100	25	1000
Chloroform	910	ND	ND	n/a	2	500
Carbon Tetrachloride	260	ND	ND	10	2	200
TPHg	380	560	6,650	500	300	n/a
TPHd	n/a	1,200	4,660	n/a	n/a	n/a
Benzene	140	ND	ND	5	1	500
Ethylbenzene	300	1,100	110	30	5	800

Ambient Air Action Level: 5 ppm (to be monitored by a PID)

A note on IDLH: Limits are based on a 30 minute exposure. HOWEVER, the 30 minute work period was not meant to imply that workers should stay in the work environment any longer than necessary; in fact, EVERY EFFORT SHOULD BE MADE TO EXIT IMMEDIATELY! (Ref. NIOSH Pocket guide to Chemical Hazards, 2003).

[X] Applicable material safety data sheets (MSDS) or equivalents are attached.
[ ] Vapor-phase concentrations may exceed 10% of the lower explosive limit (LEL).
[X] Vapor-phase concentrations may exceed Cal-OSHA PEL (8-hr time-weighted average) for the following compounds:
Tetrachloroethylene, Trichloroethylene, Chloroform, Carbon Tetrachloride, gasoline, benzene, ethylbenzene and other PCE daughter products.

PHYSICAL HAZARD EVALUATION

[ ] For borings or other excavations, the Subsurface Clearance Checklist has been completed and outstanding issued are resolved.
[X] Personnel are aware of the safety hazards associated with lifting heavy objects, moving machinery and equipment, slipping, falling and operating or working near electrical equipment.
[ ] Confined space entry is [ ], is not [X] required. Standard Pangea training prohibits staff from performing work in confined space.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Required respiratory protection level: [ ] A [ ] B [ ] C [X] D
Specific respiratory protection equipment required: Respirators if ambient air concentrations exceed action level for over 15 minutes or if concentrations are sustained above PEL for any compounds.
Cartridge type: Volatile hydrocarbon and particulate filters.
This cartridge is expected to provide protection for 8 hrs
Protective clothing required: Cover alls, safety vests, steel toed boots, hard hat, nitrile gloves, safety glasses, ear protection.
[X] All site personnel are currently certified in the use of specified PPE.

AIR QUALITY MONITORING

Instrument		Monitoring Intervals
[X]	PID	As needed or every 30 minutes.
[ ]	FID	
[ ]	LEL Meter	
[ ]	Colorimetric tubes	

DECONTAMINATION PROCEDURES

Personnel and equipment shall be decontaminated as follows:
[X] Wash and rinse all exposed skin and equipment.
[ ] Other:

HEAT STRESS MONITORING

The anticipated air temperature is 58 to 74 degrees F.
Adjusted air temperature [$T_{adj} = T_{air}$ (F^o) + (13 5 % Sunshine)] is not expected to exceed 84 degrees F.

[X] Workers are trained to recognize and treat heat stress symptoms. The site safety officer will monitor pulse and temperature of workers showing signs of heat stress. No person shall work with a temperature exceeding 100 degrees F without specific approval of a Safety Committee representative.

[X] Drinking water is available at: Field Vehicle

EMERGENCY PROCEDURES

Injury: The Site Safety Officer and On-site Project Manager should evaluate the injury and contact an ambulance and/or the designated medical facility as needed. Conduct First Aid and CPR if necessary and only if qualified, but not in lieu of getting professional medical attention. See **Incident Reporting** instructions below.

Fire/Explosion: All personnel must immediately move to a safe location away from threat of fire and/or explosion. Sound alarm if available and safely accessible. Call fire department.

Emergency escape route and meeting place: Exit out front door on east side of building, or whichever door is closest to the field vehicle and/or furthest from the contaminated area. Meet at field vehicle at safe distance from contaminated site.

For hitting a utility line during subsurface investigation/construction work:

1. Stop operations and clear people from the area (Do not touch equipment if an electrical line has been hit)
2. If possible turn off the affected utility
3. Inform the facility manager
4. Call 911 for natural gas, electrical, or product lines (Otherwise call affected utility)
5. Call the project manager, your supervisor and Pangea Safety Officer
6. Notify the client
7. Document the circumstances of the incident in your daily field report, take photographs (if safe to do so) and fill out an incident report w/in 24 hours

EMERGENCY MEDICAL FACILITIES

Hospital name/location: Alta Bates Summit Medical Center, 357 34th Street, Oakland, CA 94609
Hospital phone number: (510) 869-6600
Urgent Care name/location: Concentra Urgent Care, 384 Embarcadero West, Oakland, CA 94607
Urgent Care phone number: (510) 465-9565
A map to the hospital and urgent care center are attached.
A first aid kit is located in the Site Safety Officer's vehicle.
Police Number: 911 **Fire Number: 911**
Office No.: (510) 435-8664

EMERGENCY CONTACTS

Contact Name: Bob Clark-Riddell
Client No: (631) 931-7522
C**ontact Name***:* Danny Haber
CA Dept of Health Services: (800) 554-0349
US EPA Emergency Spills: (415) 974-8131
Federal OSHA: (800) 648-1003
Underground Service Alert: (800) 227-2600
Emergency medical treatment due to chemical exposure to compounds anticipated to be at the site is presented on the attached MSDS (or equivalent) forms.

INCIDENT REPORTING

1. Report any injury to Bob Clark-Riddell and to Pangea Safety Officer (SO) within 8 hours.
2. All incidents including “near misses” to be reported to assigned safety officer.

Any injured sub-contractor or sub-contractor employee will be covered under their employer's policy.

SIGNATURES

All site workers have read the plan and are familiar with and will abide by its provisions.

Name	Signature	Date	Employer

SIGNATURES

All site workers have read the plan and are familiar with and will abide by its provisions.

Name	Signature	Date	Employer

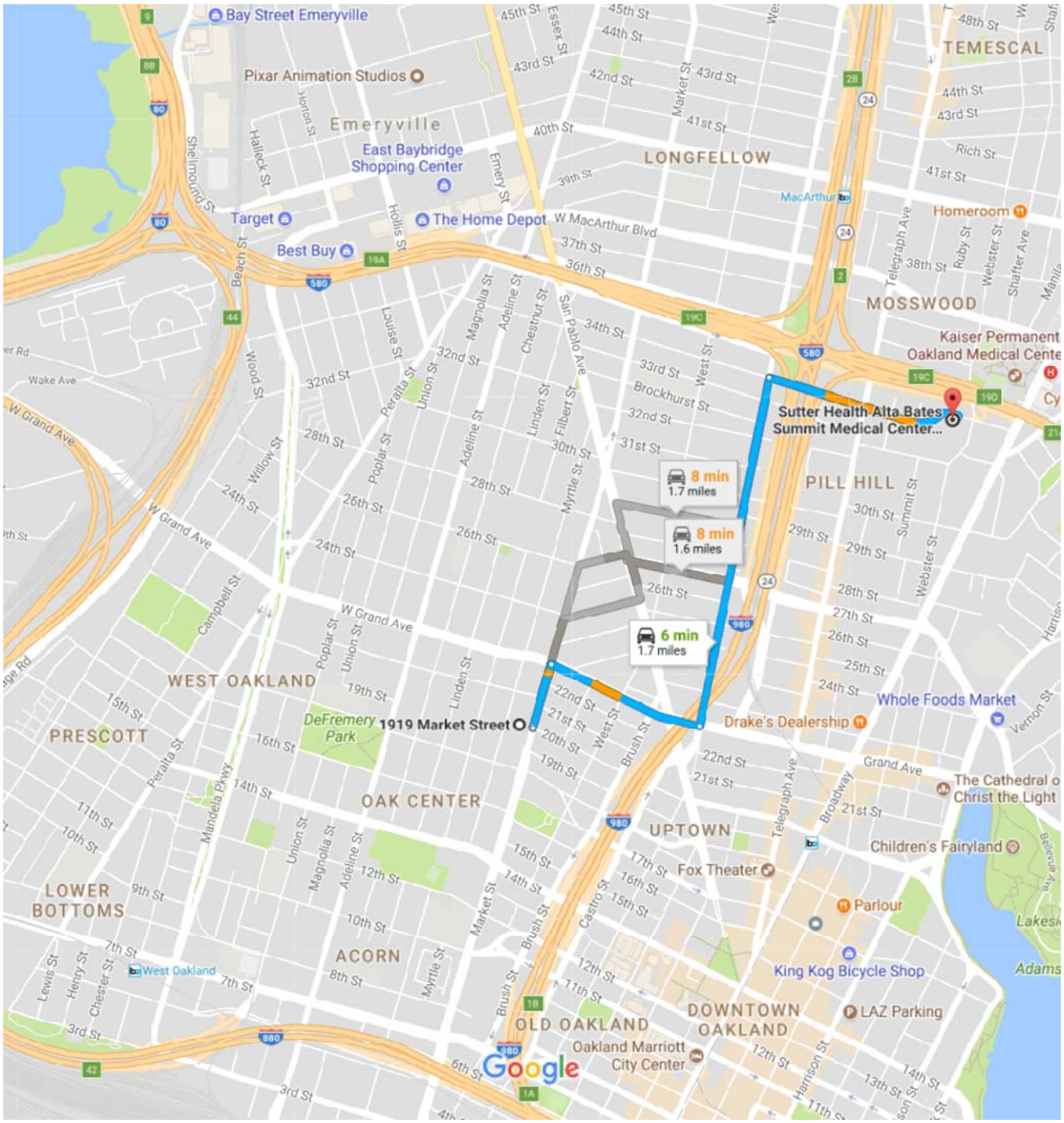
ATTACHMENT A

HOSPITAL DIRECTIONS

Google Maps

1919 Market St, Oakland, CA 94607 to Sutter Health Alta Bates Summit Medical Center: Emergency Room

Drive 1.7 miles, 6 min



1919 Market St
Oakland, CA 94607

1. Head north on Market St toward 21st St

0.1 mi

2. Turn right onto W Grand Ave

0.3 mi

3. Turn left onto Martin Luther King Jr Way

0.8 mi

4. Turn right onto 34th St

Destination will be on the right

0.4 mi

Sutter Health Alta Bates Summit Medical Center: Emergency Room

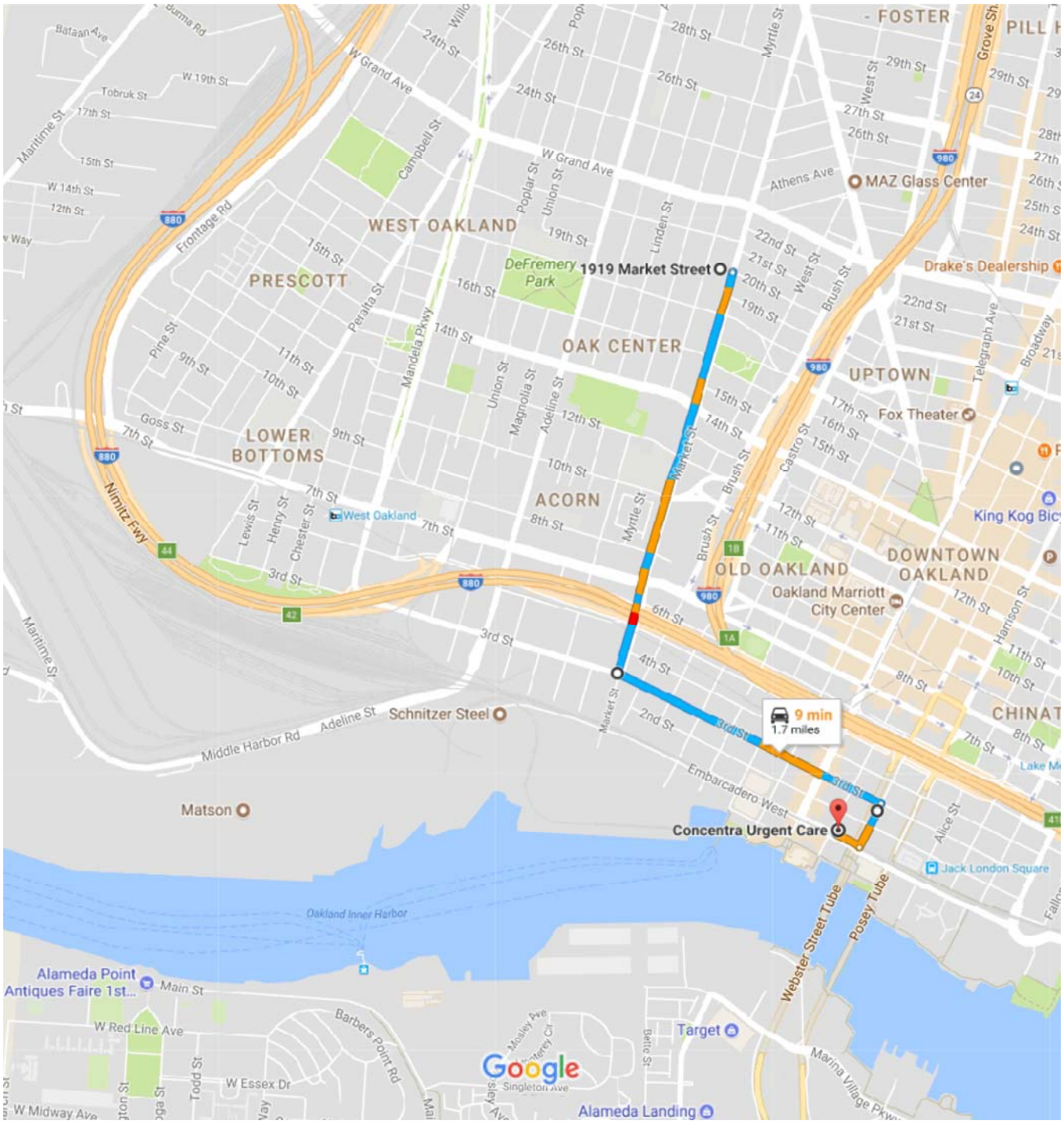
357 34th St, Oakland, CA 94609

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Google Maps

1919 Market St, Oakland, CA 94607 to Concentra Urgent Care

Drive 1.7 miles, 9 min



1919 Market St

Oakland, CA 94607

Google Maps

1919 Market St, Oakland, CA 94607 to Concentra Urgent Care

Drive 1.7 miles, 9 min

1919 Market St
Oakland, CA 94607

1. Head south on Market St toward 19th St

0.9 mi

2. Turn left onto 4th St

0.6 mi

3. Turn right onto Webster St

0.2 mi

4. Turn right onto Embarcadero West
   Destination will be on the right

302 ft

Concentra Urgent Care
384 Embarcadero West, Oakland, CA 94607

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

ATTACHMENT B

MATERIAL SAFETY DATA SHEETS

ALDRICH CHEMICAL CO -- TETRACHLOROETHYLENE, 99.9+%, HPLC GRADE, 27 -- 6810-00N038043

========== Product Identification ==========

Product ID:TETRACHLOROETHYLENE, 99.9+%, HPLC GRADE, 27
MSDS Date:10/09/1991
FSC:6810
NIIN:00N038043
MSDS Number: BQVNG
=== Responsible Party ===
Company Name:ALDRICH CHEMICAL CO
Box:355
City:MILWAUKEE
State:WI
ZIP:53201
Country:US
Info Phone Num:414-273-3850
Emergency Phone Num:414-273-3850
CAGE:60928
=== Contractor Identification ===
Company Name:ALDRICH CHEMICAL CO INC
Address:1001 WEST ST PAUL AVE
Box:355
City:MILWAUKEE
State:WI
ZIP:53233
Country:US
Phone:414-273-3850
CAGE:60928

========== Composition/Information on Ingredients ==========

Ingred Name:ETHYLENE, TETRACHLORO-; (TETRACHLOROETHYLENE, HPLC GRADE)
CAS:127-18-4
RTECS #:KX3850000
Fraction by Wt: 99.9%
OSHA PEL:100 PPM
ACGIH TLV:25PPM/100,A3 STEL;94
EPA Rpt Qty:100 LBS
DOT Rpt Qty:100 LBS

========== Hazards Identification ==========

LD50 LC50 Mixture:LD50:(ORAL RAT) 2629 MG/KG
Routes of Entry: Inhalation:YES Skin:YES Ingestion:YES
Reports of Carcinogenicity:NTP:YES IARC:YES OSHA:NO
Health Hazards Acute and Chronic:ACUTE: HARMFUL IF SWALLOWED, INHALED
OR ABSORBED THROUGH SKIN. VAPOR/MIST IS IRRITATING TO EYES, MUCOUS
MEMBRANES & UPPER RESPIRATORY TRACT. CAUSES SKIN IRRITATION.
EXPOSURE CAN CAUSE: NAUSEA, DIZZINE SS & HEADACHE; NARCOTIC EFFECT.
CHRONIC: DAMAGE TO LIVER & KIDNEYS. CARCINOGEN. MAY ALTER GENETIC
(EFTS OF OVEREXP)
Explanation of Carcinogenicity:TETRACHLOROETHYLENE: ANTICIP TO BE A
CARCIN (NTP), NTP 6TH ANN RPT ON CARCINS (SUM) 1991: GRP 2B
(IARC)...(SUPDAT)
Effects of Overexposure:HLTH HAZ:MATERIAL. TARGET ORGANS: NERVES,
HEART, LIVER & KIDNEYS. CHLOROBARBON/CHLOROFLUOROCARBON (CFC)
MATERIALS HAVE PRODUCED SENSITIZATION OF THE MYOCARDIUM TO

EPINEPHRINE IN LAB ANIMALS AND COULD HAVE A SIMILAR EFFECT IN HUMANS. ADREMOMIMETICS (E.G. EPINEPHRINE) MAY BE CONTRA-INDICATED EXCEPT FOR LIFE-...(SUPDAT)
Medical Cond Aggravated by Exposure:NONE SPECIFIED BY MANUFACTURER.

========== First Aid Measures ==========

First Aid:EYES/SKIN:IMMED FLUSH W/COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINS WHILE REMOVING CONTAMD CLOTHING/SHOES. ASSURE ADEQUATE FLUSHING OF EYES BY SEPARATING EYELIDS W/FINGERS. REMOVE & WASH CONTAMD CLO THING PROMPTLY. INHAL:REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. INGEST:WASH OUT MOUTH W/WATER PROVIDED PERSON IS CONSCIOUS. CALL MD.

========== Fire Fighting Measures ==========

Flash Point:NONE
Extinguishing Media:NONCOMBUSTIBLE. USE EXTINGUISHING MEDIA APPROPRIATE TO SURROUNDING FIRE CONDITIONS.
Fire Fighting Procedures:WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT . PREVENT CONTACT W/SKIN & EYES.
Unusual Fire/Explosion Hazard:EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

========== Accidental Release Measures ==========

Spill Release Procedures:EVACUATE AREA. WEAR NIOSH/MSHA APPROVED SCBA, RUBBER BOOTS & HEAVY RUBBER GLOVES. ABSORB ON SAND OR VERMICULITE & PLACE IN CLOSED CONTAINERS FOR DISPOSAL. VENTILATE AREA & WASH SPILL SITE AFTER MATERI AL PICKUP IS COMPLETE.
Neutralizing Agent:NONE SPECIFIED BY MANUFACTURER.

========== Handling and Storage ==========

Handling and Storage Precautions:STORE IN A COOL/DRY PLACE. IRRITANT. HARMFUL LIQ & FUMES. MUTAGEN. KEEP TIGHTLY CLSD. DO NOT BREATHE VAPOR. DO NOT GET IN EYES, ON SKIN OR ON CLTHG.
Other Precautions:EXPOSURE TO &/OR CONSUMPTION OF ALCOHOL MAY INCREASE TOXIC EFFECTS.

========== Exposure Controls/Personal Protection ==========

Respiratory Protection:WEAR APPROPRIATE NIOSH/MSHA APPROVED RESPIRATOR.
Ventilation:USE ONLY IN A CHEMICAL FUME HOOD.
Protective Gloves:CHEMICAL-RESISTANT GLOVES.
Eye Protection:CHEMICAL WORKERS GOGGLES .
Other Protective Equipment:PROTECTIVE CLOTHING, SAFETY SHOWER & EYE BATH.
Work Hygienic Practices:WASH THOROUGHLY AFTER HANDLING.
Supplemental Safety and Health
VP:13 @ 20C; 19 @ 25C. HEALTH HAZARD: IARC MONOGRAPH, VOL SUPPL 7, P. 355, 1987. SIGNS/SYMPTOMS OVEREXPOSURE: ...SUSTAINING USES IN HUMANS ACUTELY OR CHRONICALLY EXPOSED TO CHLOROCARBONS OR CFCS.

========== Physical/Chemical Properties ==========

Boiling Pt:B.P. Text:250F,121C
Melt/Freeze Pt:M.P/F.P Text:-8F,-22C
Vapor Pres:SUPP DATA
Vapor Density:5.83

Spec Gravity:1.623
Appearance and Odor:COLORLESS LIQUID.

========== Stability and Reactivity Data ==========

Stability Indicator/Materials to Avoid:YES
STRONG BASES.
Stability Condition to Avoid:NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomposition Products:TOXIC FUMES OF PHOSGENE GAS, HYDROGEN CHLORIDE GAS, CARBON MONOXIDE & CARBON DIOXIDE.

========== Disposal Considerations ==========

Waste Disposal Methods:DISSOLVE OR MIX THE MATERIAL W/A COMBUSTIBLE SOLVENT & BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER. OBSERVE ALL FEDERAL, STATE & LOCAL ENVIRONMENTAL REGULATIONS.

Material Safety Data Sheets

Division of Facilities Services

DOD Hazardous Material Information (ANSI Format)
For Cornell University Convenience Only

TRICHLOROETHYLENE

Section 1 - Product and Company Identification
TRICHLOROETHYLENE

Product Identification: TRICHLOROETHYLENE
Date of MSDS: 01/01/1987 **Technical Review Date:** 03/22/1993
FSC: 6810 **NIIN:** 00-924-7107
Submitter: D DG
Status Code: C
MFN: 01

Article: N
Kit Part: N

Manufacturer's Information

Manufacturer's Name: PHIPPS PRODUCTS CORP (COMPANY OUT OF BUSINESS)
Manufacturer's Address1: 186 LINCOLN ST SUITE 502
Manufacturer's Address2: BOSTON, MA 02111-2403
Manufacturer's Country: US
General Information Telephone: COMPANY OUT OF BUSINESS
Emergency Telephone: COMPANY OUT OF BUSINESS
Emergency Telephone: COMPANY OUT OF BUSINESS
MSDS Preparer's Name: DEFENSE GEN SUPPLY CTR
Proprietary: N
Reviewed: Y
Published: Y
CAGE: 86511
Special Project Code: N

Item Description

Item Name: TRICHLOROETHYLENE,TECHNICAL
Item Manager: S9G
Specification Number: O-T-634
Type/Grade/Class: TYPE I
Unit of Issue: GL
Unit of Issue Quantity: 6
Type of Container: CAN,METAL

Preparer Information

Preparer's Name: PHIPPS PRODUCTS CORP
Preparer's Address1: 186 LINCOLN ST SUITE 502
Preparer's Address2: BOSTON, MA 02111-2403
Preparer's CAGE: 86511
Assigned Individual: N

Contractor Information

Contractor's Name: PHIPPS PRODUCTS CORP
Contractor's Address1: 186 LINCOLN ST SUITE 502
Contractor's Address2: BOSTON, MA 02111-2403
Contractor's Telephone: OUT OF BUSINESS
Contractor's CAGE: 86511

Section 2 - Compositon/Information on Ingredients
TRICHLOROETHYLENE

Ingredient Name: TRICHLOROETHYLENE (SARA III)
Ingredient CAS Number: 79-01-6 **Ingredient CAS Code:** M
RTECS Number: KX4550000 **RTECS Code:** M
=WT: =WT Code:
=Volume: =Volume Code:
>WT: >WT Code:
>Volume: >Volume Code:
<WT: <WT Code:
<Volume: <Volume Code:
% Low WT: % Low WT Code:
% High WT: % High WT Code:
% Low Volume: % Low Volume Code:
% High Volume: % High Volume Code:
% Text: 100.0
% Enviromental Weight:
Other REC Limits: NOT ESTABLISHED
OSHA PEL: 100 PPM/100 STEL **OSHA PEL Code:** M
OSHA STEL: OSHA STEL Code:
ACGIH TLV: 50 PPM/100,A5STEL;93 **ACGIH TLV Code:** M
ACGIH STEL: N/P **ACGIH STEL Code:**
EPA Reporting Quantity: 100 LBS
DOT Reporting Quantity: 100 LBS
Ozone Depleting Chemical: N

Section 3 - Hazards Identification, Including Emergency Overview
TRICHLOROETHYLENE

Health Hazards Acute & Chronic: ACUTE: IRRITATION OF EYES, SKIN, RESPIRATORY OR G.I. TRACT. SEVERE PAIN, REDNESS OF EYES; DRYNESS OF SKIN; CNS EFFECTS LIKE, VISUAL DISTURBANCES AND MENTAL CONFUSION, HEADACHE, NAUSEA, DIZZINESS, VOMI TING, DIZZINESS. CHRONIC: LIVER AND KIDNEY DAMAGE, CNS EFFECTS.

Signs & Symptoms of Overexposure:
EYES/SKIN: IRRITATION, PAIN, REDNESS, DRYNESS. INHALATION: RESPIRATORY TRACT IRRITATION, HEADACHE, NAUSEA, VOMITING, DIZZINESS, VISUAL DISTURBANCES, MENTAL CONUFUSION. INGESTION: SAME SYMPTOMS AS INHA LATION.

Medical Conditions Aggravated by Exposure:
PRE-EXISTING EYE, SKIN, RESPIRATORY, KIDNEY OR LIVER CONDITIONS MAY BE AGGRAVATED BY EXPOSURE.

LD50 LC50 Mixture: ORAL RAT LD50: 4920 MG/KG

Route of Entry Indicators:
Inhalation: YES
Skin: YES
Ingestion: NO

Carcenogenicity Indicators

NTP: NO
IARC: YES
OSHA: NO

Carcinogenicity Explanation: SUSPECTED ANIMALS CARCINOGEN.

Section 4 - First Aid Measures
TRICHLOROETHYLENE

First Aid:
INHALATION: REMOVE TO FRESH AIR. USE CPR/OXYGEN IF NECESSARY. CONSULT A PHYSICIAN. INGESTION: IF CONSCIOUS, GIVE TWO GLASSES OF WATER. CONSULT A PHYSICIAN IMMEDIATELY. SKIN AND EYES: FLUSH WITH PLENTY OF WATER FOR ABOUT 15-20 MINUTES, CALLA PHYSICIAN IMMEDIATELY.

Section 5 - Fire Fighting Measures
TRICHLOROETHYLENE

Fire Fighting Procedures:
FULL PROTECTIVE CLOTHING AND NIOSH/MSHA APPROVED SCBA IN AN ENCLOSED AREA.
Unusual Fire or Explosion Hazard:
A STRONG IGNITION SOURCE CAN PRODUCE IGNITION.
Extinguishing Media:
WATER SPRAY, CARBON DIOXIDE, DRY CHEMICAL, FOAM.
Flash Point: Flash Point Text: NONE

Autoignition Temperature:

Autoignition Temperature Text: N/A
Lower Limit(s): 12.5
Upper Limit(s): 90

Section 6 - Accidental Release Measures
TRICHLOROETHYLENE

Spill Release Procedures:
USE PROPER PERSONAL PROTECTION. CONTAIN FREE LIQUID IF POSSIBLE. REMOVE ALL IGNITION SOURCES. USE SUITABLE INERT ABSORBENT MATERIAL AND RECOVER FOR PROPER DISPOSAL.

Section 7 - Handling and Storage
TRICHLOROETHYLENE

Handling and Storage Precautions:

Other Precautions:

Section 8 - Exposure Controls & Personal Protection
TRICHLOROETHYLENE

Repiratory Protection:
USE NIOSH/MSHA APPROVED RESPIRATOR FOR ORGANIC VAPORS/MIST IF ABOVE PEL/TLV OR SCBA IN AN ENCLOSED AREA.
Ventilation:
LOCAL EXHAUSTED/GENERAL TO MAINTAIN PEL/TLV.
Protective Gloves:
IMPERVIOUS
Eye Protection: CHEMICAL SAFETY GOGGLES.
Other Protective Equipment: IMPERVIOUS APRON. EYE-WASH FACILITIES.
Work Hygenic Practices: AVOID CONTACT WITH EYES AND SKIN;DO NOT BREATHE VAPORS/MIST;WASH THOROUGHLY AFTER EACH USE.
Supplemental Health & Safety Information: MSDS PREPARED BY DGSC-SSH/HMIS FOR COMPANY OUT-OF-BUSINESS.

Section 9 - Physical & Chemical Properties
TRICHLOROETHYLENE

HCC: T4
NRC/State License Number: N/R
Net Property Weight for Ammo: N/R
Boiling Point: Boiling Point Text: 188.F/87C
Melting/Freezing Point: Melting/Freezing Text: -99.4F/-73C
Decomposition Point: Decomposition Text: N/K
Vapor Pressure: 57.8 **Vapor Density:** 4.5;AIR=1
Percent Volatile Organic Content:
Specific Gravity: 1.45
Volatile Organic Content Pounds per Gallon:
pH: N/K
Volatile Organic Content Grams per Liter:
Viscosity: N/P
Evaporation Weight and Reference: N/K
Solubility in Water: NEGLIIBLE
Appearance and Odor: CLEAR,COLORLESS LIQUID,CHLOROFORM-LIKE.
Percent Volatiles by Volume: N/K
Corrosion Rate: UNKNOWN

Section 10 - Stability & Reactivity Data
TRICHLOROETHYLENE

Stability Indicator: YES
Materials to Avoid:
ALKALI HYDROXIDES, POWDERED METALS, LIQUID OXYGEN.
Stability Condition to Avoid:
EXTREME HEAT, FLAMES, LIGHT, UV LIGHT.
Hazardous Decomposition Products:
CARBON MONOXIDE, PHOSGENE AND HYDROCHLORIC ACIDS VAPORS.

Hazardous Polymerization Indicator: NO
Conditions to Avoid Polymerization:
NOT APPLICABLE

Section 11 - Toxicological Information
TRICHLOROETHYLENE

Toxicological Information:
N/P

Section 12 - Ecological Information
TRICHLOROETHYLENE

Ecological Information:
N/P

Section 13 - Disposal Considerations
TRICHLOROETHYLENE

Waste Disposal Methods:
CONSULT LOCAL AUTHORITIES. DISPOSAL MUST BE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. WASTE MATERIAL WILL BE A LAND-BANNED HAZARDOUS WASTE.

Section 14 - MSDS Transport Information
TRICHLOROETHYLENE

Transport Information:
N/P

Section 15 - Regulatory Information
TRICHLOROETHYLENE

SARA Title III Information:
N/P
Federal Regulatory Information:
N/P
State Regulatory Information:
N/P

Section 16 - Other Information
TRICHLOROETHYLENE

Other Information:
N/P

HMIS Transportation Information

Product Identification: TRICHLOROETHYLENE
Transporation ID Number: 92066
Responsible Party CAGE: 86511

Date MSDS Prepared: 01/01/1987
Date MSDS Reviewed: 03/22/1993
MFN: 03/22/1993
Submitter: D DG
Status Code: C

Container Information
Unit of Issue: GL
Container Quantity: 6
Type of Container: CAN,METAL
Net Unit Weight: 73 POUNDS

Article without MSDS: N
Technical Entry NOS Shipping Number: TRICHLOROETHYLENE
Radioactivity:
Form:
Net Explosive Weight:
Coast Guard Ammunition Code:
Magnetism: N/P
AF MMAC Code:
DOD Exemption Number:
Limited Quantity Indicator:
Multiple Kit Number: 0
Kit Indicator: N
Kit Part Indicator: N
Review Indicator: Y
Additional Data:

Department of Transportation Information
DOT Proper Shipping Name: TRICHLOROETHYLENE
DOT PSN Code: OQK
Symbols:
DOT PSN Modifier:
Hazard Class: 6.1
UN ID Number: UN1710
DOT Packaging Group: III
Label: KEEP AWAY FROM FOOD
Special Provision(s): N36,T1
Packaging Exception: 153
Non Bulk Packaging: 203
Bulk Packaging: 241
Maximimum Quanity in Passenger Area: 60 L
Maximimum Quanity in Cargo Area: 220 L
Stow in Vessel Requirements: A
Requirements Water/Sp/Other: 40

IMO Detail Information
IMO Proper Shipping Name: TRICHLOROETHYLENE
IMO PSN Code: OVL

IMO PSN Modifier: P
IMDG Page Number: 6273
UN Number: 1710
UN Hazard Class: 6.1
IMO Packaging Group: III
Subsidiary Risk Label: -
EMS Number: 6.1-02
Medical First Aid Guide Number: 340

IATA Detail Information

IATA Proper Shipping Name: TRICHLOROETHYLENE
IATA PSN Code: YMD
IATA PSN Modifier:
IATA UN Id Number: 1710
IATA UN Class: 6.1
Subsidiary Risk Class:
UN Packaging Group: III
IATA Label: TOXIC
Packaging Note for Passengers: 605
Maximum Quantity for Passengers: 60L
Packaging Note for Cargo: 612
Maximum Quantity for Cargo: 220L
Exceptions:

AFI Detail Information

AFI Proper Shipping Name: TRICHLOROETHYLENE
AFI Symbols:
AFI PSN Code: YMD
AFI PSN Modifier:
AFI UN Id Number: UN1710
AFI Hazard Class: 6.1
AFI Packing Group: III
AFI Label:
Special Provisions: P5, N36
Back Pack Reference: A10.5

HAZCOM Label Information

Product Identification: TRICHLOROETHYLENE
CAGE: 86511
Assigned Individual: N
Company Name: PHIPPS PRODUCTS CORP
Company PO Box:
Company Street Address1: 186 LINCOLN ST SUITE 502
Company Street Address2: BOSTON, MA 02111-2403 US
Health Emergency Telephone: COMPANY OUT OF BUSINESS
Label Required Indicator: Y
Date Label Reviewed: 03/22/1993
Status Code: C
Manufacturer's Label Number: N/K
Date of Label: 03/22/1993
Year Procured: 1983
Organization Code: G

Chronic Hazard Indicator: Y
Eye Protection Indicator: YES
Skin Protection Indicator: YES
Respiratory Protection Indicator: YES
Signal Word: WARNING
Health Hazard: Moderate
Contact Hazard: Slight
Fire Hazard: None
Reactivity Hazard: None

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Material Safety Data Sheet

Chloroform

1 . Product and company identification

Product name : Chloroform

Product code : CX1050

Supplier : EMD Chemicals Inc.
480 S. Democrat Rd.
Gibbstown, NJ 08027
856-423-6300 Technical Service
Monday-Friday: 8:00 -5:00 PM

Synonym : Trichloromethane

Material uses : Other non-specified industry: Analytical reagent.

Validation date : 4/2/2009.

In case of emergency : 800-424-9300 CHEMTREC (USA)
613-996-6666 CANUTEC (Canada)
24 Hours/Day: 7 Days/Week

2 . Hazards identification

Emergency overview : WARNING!

HARMFUL IF INHALED OR SWALLOWED.
CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
SUSPECT CANCER HAZARD - MAY CAUSE CANCER.
MAY CAUSE DAMAGE TO THE FOLLOWING ORGANS: KIDNEYS, LIVER, HEART, SKIN, EYES, CENTRAL NERVOUS SYSTEM.

WARNING: This product contains a chemical known to the State of California to cause cancer.

Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Physical state : Liquid. [Colorless.]

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Toxic by inhalation. Irritating to respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : Toxic if swallowed. Aspiration hazard if swallowed. Can enter lungs and cause damage.

Skin : Irritating to skin.

Eyes : Irritating to eyes.

Potential chronic health effects

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Target organs : May cause damage to the following organs: kidneys, liver, heart, skin, eyes, central nervous system (CNS).

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

Continued on next page

3 . Composition/information on ingredients

Name	CAS number	% by weight
Chloroform	67-66-3	100

4 . First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

5 . Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
carbonyl halides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards : Emits very toxic fumes when heated to decomposition.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container.

Continued on next page

7 . Handling and storage

Handling : Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container, protected from direct sunlight. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Chloroform	**ACGIH (United States, 1996).** TWA: 49 mg/m³ **OSHA (United States, 1989).** TWA: 9.78 mg/m³ **ACGIH TLV (United States, 1/2008).** TWA: 10 ppm 8 hour(s). TWA: 49 mg/m³ 8 hour(s). **OSHA PEL 1989 (United States, 3/1989).** TWA: 2 ppm 8 hour(s). TWA: 9.78 mg/m³ 8 hour(s). **NIOSH REL (United States, 6/2008).** STEL: 2 ppm 60 minute(s). STEL: 9.78 mg/m³ 60 minute(s). **OSHA PEL (United States, 11/2006).** CEIL: 50 ppm CEIL: 240 mg/m³

Consult local authorities for acceptable exposure limits.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: Viton

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Recommended: splash goggles

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Recommended: lab coat

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Continued on next page

9 . Physical and chemical properties

Physical state	:	Liquid. [Colorless.]
Color	:	Colorless.
Odor	:	Pleasant. Ethereal.
Molecular weight	:	119.37 g/mole
Molecular formula	:	CHCl3
pH	:	Not available.
Boiling/condensation point	:	60.5°C (140.9°F)
Melting/freezing point	:	-63°C (-81.4°F)
Critical temperature	:	263.3°C (505.9°F)
Relative density	:	1.49
Vapor pressure	:	22.3 kPa (167 mm Hg)
Vapor density	:	4.1 [Air = 1]
Volatility	:	100% (v/v)
Odor threshold	:	205 ppm
Evaporation rate	:	10.2 (Butyl acetate. = 1)
VOC	:	100 (%)
Solubility	:	Partially soluble in the following materials: water

10 . Stability and reactivity

Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous polymerization	:	Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	:	Avoid exposure - obtain special instructions before use. Do not swallow.
Materials to avoid	:	Reactive or incompatible with the following materials: oxidizing materials, metals and alkalis.
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Conditions of reactivity	:	Emits very toxic fumes when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Test	Route	Species	Result
Chloroform	LD50	Intraperitoneal	Rat	894 mg/kg
	LD50	Oral	Rat	695 mg/kg
	LD50	Oral	Rat	300 mg/kg
	LD50	Oral	Mouse	36 mg/kg
	LD50	Dermal	Rabbit	>20 g/kg
	LD50	Oral	Rat	1250 mg/kg
	LDLo	Oral	Man	2514 mg/kg
	LDLo	Oral	Rabbit	500 mg/kg
	TDLo	Oral	Rat	0.5 mL/kg
	TDLo	Oral	Rat	14.9 mg/kg
	TDLo	Oral	Rat	119.37 mg/kg
	TDLo	Intraperitoneal	Rat	0.5 mL/kg
	TDLo	Intraperitoneal	Rat	180 mg/kg
	LC50	Inhalation Vapor	Rat	6000 mg/m3
	LC50	Inhalation	Rat	47702 mg/m3

Continued on next page

11 . Toxicological information

	Vapor		
LC50 Inhalation Vapor	Rat		47702 mg/m³

Carcinogenicity

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Chloroform	A3	2B	-	+	Possible	-

May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity

No known significant effects or critical hazards.

Teratogenicity

No known significant effects or critical hazards.

12 . Ecological information

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Chloroform	Acute EC50 950 mg/L	Algae	48 hours
	Acute EC50 560 mg/L	Algae	48 hours
	Acute LC50 81.5 to 106 mg/L Marine water	Crustaceans - Northern pink shrimp - Penaeus duorarum - 35 to 50 mm	48 hours
	Acute LC50 65.7 mg/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Acute LC50 17.1 mg/L	Fish	96 hours
	Acute LC50 16.2 mg/L	Fish	96 hours
	Acute LC50 15.1 mg/L	Fish	96 hours
	Acute LC50 13.3 mg/L	Fish	96 hours
	Acute LC50 17.1 ppm Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute LC50 16.2 ppm Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours
	Acute LC50 15.1 ppm Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
	Acute LC50 13.3 ppm Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours
	Acute LC50 13300 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus - 17.1 cm - 126.4 g	96 hours
	Acute LC50 758000 to 850000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Young - <=24 hours	48 hours
	Acute LC50 353000 to 512000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate - <12 hours	48 hours
	Acute LC50 290000 to 512000 ug/L Fresh water	Daphnia - Water flea - Ceriodaphnia dubia - Neonate - <12 hours	48 hours
	Acute LC50 66800 to 71900 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate	48 hours
	Acute LC50 66500 to 78500 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - Neonate	48 hours
	Acute LC50 16200 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus - 16.9 cm - 129.9 g	96 hours
	Acute LC50 63800 to	Daphnia - Water flea -	48 hours

Continued on next page

12 . Ecological information

78000 ug/L Fresh water	Daphnia magna - Neonate	
Acute LC50 15100 to 22100 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
Acute LC50 29000 to 47000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - <24 hours	48 hours
Acute LC50 15100 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling) - 11.5 cm - 16.8 g	96 hours
Acute LC50 17100 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss - Juvenile (Fledgling, Hatchling, Weanling) - 8.8 cm - 7.6 g	96 hours
Acute LC50 13300 to 20800 ug/L Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours

Environmental effects : No known significant effects or critical hazards.

Other adverse effects : No known significant effects or critical hazards.

13 . Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	UN1888	CHLOROFORM	6.1	III		**Reportable quantity** 10 lbs. (4.54 kg)

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Toxic material
Irritating material
Carcinogen
Target organ effects

U.S. Federal regulations : **United States inventory (TSCA 8b):** This material is listed or exempted.
TSCA 8(d) H and S data reporting: Chloroform : 1987

TSCA (Toxic Substance Control Act): This product is listed on the TSCA Inventory.

SARA 302/304/311/312 extremely hazardous substances: Chloroform
SARA 302/304 emergency planning and notification: Chloroform
SARA 302/304/311/312 hazardous chemicals: Chloroform
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Chloroform : Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: Chloroform

Clean Water Act (CWA) 311: Chloroform

Continued on next page

15 . Regulatory information

Clean Air Act (CAA) 112 accidental release prevention: Chloroform

Clean Air Act (CAA) 112 regulated flammable substances: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: Chloroform

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements :	Chloroform	67-66-3	100
Supplier notification :	Chloroform	67-66-3	100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

Massachusetts Substances : This material is listed.

New Jersey Hazardous Substances : This material is listed.

New York Acutely Hazardous Substances : This material is listed.

Pennsylvania RTK Hazardous Substances : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Chloroform	Yes.	No.	20 µg/day (ingestion) 40 µg/day (inhalation)	No.

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists : **CEPA Toxic substances:** This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

CEPA DSL / CEPA NDSL : This material is listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

EU regulations

Hazard symbol or symbols :

Risk phrases : R40- Limited evidence of a carcinogenic effect.
R22- Harmful if swallowed.
R48/20/22- Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R38- Irritating to skin.

Continued on next page

15 . Regulatory information

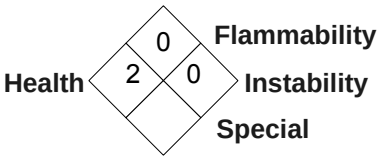
Safety phrases : S2- Keep out of the reach of children.
S36/37- Wear suitable protective clothing and gloves.

International regulations

International lists : **Australia inventory (AICS):** This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory (ENCS): This material is listed or exempted.
Japan inventory (ISHL): Not determined.
Korea inventory (KECI): This material is listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.

16 . Other information

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



Other special considerations : Contains stabilizer. (<1% wt/wt)

Notice to reader

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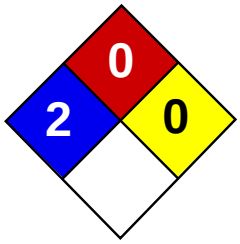

Material Safety Data Sheet
Carbon tetrachloride MSDS

Section 1: Chemical Product and Company Identification

Product Name: Carbon tetrachloride

Catalog Codes:

CAS#: 56-23-5

RTECS: FG4900000

TSCA: TSCA 8(b) inventory: Carbon tetrachloride

CI#: Not available.

Synonym: Tetrachloromethane

Chemical Formula: CCl4

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
Carbon tetrachloride	56-23-5	100

Toxicological Data on Ingredients: Carbon tetrachloride: ORAL (LD50): Acute: 2350 mg/kg [Rat]. 8263 mg/kg [Mouse]. 6380 mg/kg [Rabbit]. DERMAL (LD50): Acute: 15000 mg/kg [Rabbit]. 5070 mg/kg [Rat]. VAPOR (LC50): Acute: 8000 ppm 4 hour(s) [Rat]. 13471.8 ppm 4 hour(s) [Mouse].

Section 3: Hazards Identification

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

Potential Chronic Health Effects:
Very hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. 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, the nervous system, liver, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged inhalation of vapors may lead to chronic respiratory irritation.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Do not use an eye ointment. Seek medical attention.

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:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

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. Seek medical attention.

Ingestion:
Do not induce vomiting. 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: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

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: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. 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 Do not ingest. Do not breathe gas/fumes/ vapour/spray. 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. Avoid contact with skin and eyes

Storage:
Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor 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: 10 CEIL: 20 (ppm) TWA: 65 CEIL: 130 (mg/m3)Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 153.82 g/mole

Color: Not available.

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

Boiling Point: 76.54°C (169.8°F)

Melting Point: -23°C (-9.4°F)

Critical Temperature: Not available.

Specific Gravity: 1.594 (Water = 1)

Vapor Pressure: 91.3 mm of Hg (@ 20°C)

Vapor Density: 5.3 (Air = 1)

Volatility: Not available.

Odor Threshold: 50 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold 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: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 2350 mg/kg [Rat]. Acute dermal toxicity (LD50): 5070 mg/kg [Rat]. Acute toxicity of the vapor (LC50): 8000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified 2B (Possible for human.) by IARC. Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. The substance is toxic to kidneys, lungs, the nervous system, liver, mucous membranes.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Embryotoxic and/or foetotoxic in animal. Detected in maternal milk in human.

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 more toxic.

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: : Carbon Tetrachloride : UN1846 PG: II

Special Provisions for Transport: Marine Pollutant

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: Carbon tetrachloride 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: Carbon tetrachloride Pennsylvania RTK: Carbon tetrachloride Massachusetts RTK: Carbon tetrachloride TSCA 8(b) inventory: Carbon tetrachloride CERCLA: Hazardous substances.: Carbon tetrachloride

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):
R36/38- Irritating to eyes and skin. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

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

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:36 PM

Last Updated: 05/21/2013 12:00 PM

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CITGO Gasolines, All Grades Unleaded

Material Safety Data Sheet

CITGO Petroleum Corporation
P.O. Box 3758
Tulsa, OK 74102-3758

MSDS No. UNLEAD

Revision Date 07/06/2001

IMPORTANT: Read this MSDS before handling or disposing of this product and pass this information on to employees, customers and users of this product.

Hazard Rankings

		HMIS	NFPA
Health Hazard	*	2	1
Fire Hazard		3	3
Reactivity		0	0

* = Chronic Health Hazard

Protective Equipment

Minimum Requirements
See Section 8 for Details

Emergency Overview

Physical State	Liquid.		
Color	Transparent, clear to amber or red.	Odor	Pungent, characteristic gasoline.

DANGER:
Extremely flammable liquid; vapor may cause flash fire or explosion.
Use Only as a Motor Fuel. Do Not Siphon by Mouth.
Harmful or fatal if swallowed - Can enter lungs and cause damage.
High concentrations of vapor reduce oxygen available for breathing and may cause suffocation.
May be harmful if inhaled or absorbed through the skin.
Mist or vapor may irritate the eyes, mucous membranes, and respiratory tract.
Liquid contact may cause mild to moderate eye and/or mild to severe skin irritation.
May be harmful if inhaled or absorbed through the skin.
Overexposures may cause central nervous system (CNS) depression and target organ effects (See Section 3).
Inhalation overexposure can increase the heart's susceptibility to arrhythmias (irregular beats).
Contains Benzene - Cancer Hazard.
Long term exposure to gasoline vapor has caused cancer in laboratory animals.
Spills may create a slipping hazard.

SECTION 1: IDENTIFICATION

Trade Name	CITGO Gasolines, All Grades Unleaded	Technical Contact	(918) 495-5940 or (918) 495-5933
Product Number	UNLEAD	Medical Emergency	(918) 495-4700
CAS Number	Mixture.	CHEMTREC Emergency (United States Only)	(800) 424-9300
Product Family	Motor fuels.		
Synonyms	Unleaded Gasolines; Motor Gasolines; Petrol; Automobile Motor Fuels; Finished Gasolines; Gasoline, Regular Unleaded; Gasoline, Mid-grade Unleaded; Gasoline, Premium Unleaded; Reformulated Gasolines (RFG); Reformulated Motor Fuels; Oxygenated Motor Spirits; Gasoline, Regular Reformulated; Gasoline, Mid-grade Reformulated; Gasoline, Premium Reformulated.		

SECTION 2: COMPOSITION

Component Name(s)	CAS Registry No.	Concentration (%)
1) Methyl tertiary-Butyl Ether (MTBE)	1634-04-4	0 - 15
2) tertiary-Amyl Methyl Ether (TAME)	994-05-8	0 - 15
3) Ethyl tertiary-butyl ether (ETBE)	637-92-3	0 - 15
4) tertiary-Amyl Ethyl Ether (TAEE)	919-94-8	0 - 15
5) Di-isopropyl Ether (DIPE)	108-20-3	0 - 15
6) Ethanol	64-17-5	0 - 10
7) Pentane, all isomers	Mixture.	5 - 20
8) Octane, all isomers	Mixture.	5 - 20
9) Toluene	108-88-3	1 - 20
10) Xylene, all isomers	1330-20-7	1 - 18
11) Hexane, other isomers	Mixture.	5 - 15
12) Heptane, all isomers	Mixture.	5 - 15
13) Nonane, all isomers	Mixture.	0 - 10
14) Isopentane	78-78-4	0 - 10
15) n-Butane	106-97-8	0 - 10
16) n-Hexane	110-54-3	1 - 8
17) Methylcyclohexane	108-87-2	1 - 5
18) Trimethylbenzene, all isomers	25551-13-7	1 - 5
19) Benzene	71-43-2	0 - 4.9
20) Cumene	98-82-8	0.5 - 4
21) Ethylbenzene	100-41-4	0.2 - 4
22) Hexene, all isomers	Mixture.	1 - 3
23) Methylcyclopentane	96-37-7	1 - 3
24) Cyclohexane	110-82-7	1 - 3
25) Ethylmethylbenzenes (Ethyltoluenes)	25550-14-5	1 - 3
26) Cyclopentane	287-92-3	1 - 2
27) Naphthalene	91-20-3	0.1 - 2
28) Indene	95-13-6	0.5 - 1.5
29) n-Propylbenzene	103-65-1	0.5 - 1.5
30) Styrene	100-42-5	0 - 1

SECTION 3: HAZARDS IDENTIFICATION

Also see Emergency Overview and Hazard Ratings on the top of Page 1 of this MSDS.

Major Route(s) of Entry Skin contact. Eye Contact. Skin Absorption. Inhalation.

Signs and Symptoms of Acute Exposure

Inhalation

Overexposure to gasoline vapor can cause upper respiratory tract irritation, headache, nausea, vomiting and/or central nervous system (CNS) depression. Also, effects of components of this mixture can include euphoria, excitation, giddiness, abdominal pain, loss of appetite, fatigue, muscular weakness and staggered gait. CNS effects include dizziness, drowsiness, disorientation, vertigo, memory loss, visual disturbances, difficulty breathing, convulsions, unconsciousness, paralysis, coma and death. High vapor concentrations (such as in confined spaces) can displace the amount of oxygen in air available to breathe below that level necessary to sustain life. Gasoline vapor concentrations in the range of 20,000 ppm (2% by volume) in air can be fatal to humans in five minutes. In addition, exposures by susceptible individuals to concentrations as low as 5,000 ppm can result in death by cardiac arrest (heart attack).

Eye Contact

This material can cause mild to moderate eye irritation as a result of short-term contact with liquid, mist or vapor. Symptoms can include stinging, watering, redness or swelling (conjunctivitis). In severe cases, permanent eye damage can result.

Skin Contact

This material can cause mild to severe skin irritation with short-term exposure. The degree of irritation will depend on the amount of material that is applied to the skin and the speed and thoroughness that it is removed. Signs and symptoms can include pain, sensation of heat, discoloration, swelling or blistering. Repeated or prolonged skin contact can produce moderate irritation or dermatitis. Signs and symptoms can include drying, swelling, scaling, blistering, cracking or other skin changes. Certain components of this material can be absorbed through the skin and produce target organ effects. If the skin is damaged, the potential for absorption increases.

Ingestion

If swallowed, this material may irritate the mucous membranes of the mouth, throat, and esophagus. It can be readily absorbed by the stomach and intestinal tract. Symptoms include a burning sensation of the mouth and esophagus, nausea, vomiting, dizziness, staggering gait, drowsiness, loss of consciousness and delirium, as well as additional central nervous system (CNS) effects (see "Inhalation" above).

Due to its light viscosity, there is a danger of aspiration into the lungs during swallowing and subsequent vomiting. Aspiration can result in severe lung damage or death. Cardiovascular effects include shallow rapid pulse and pallor followed by flushing. Also, progressive CNS depression, respiratory insufficiency and ventricular fibrillation may result in death.

Chronic Health Effects Summary

Intentional misuse by deliberately concentrating and inhaling gasoline can be harmful or fatal. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage ("Petrol Sniffers Encephalopathy"), delirium, fetal development effects, seizures and sudden death are associated with gasoline abuse. Chronic effects of ingestion and subsequent aspiration of gasoline into the lungs has been associated with the formation of lung cavities (pneumatoceles) and chronic lung dysfunction. Gasoline has been associated with cancer in experimental animals, however, the data are generally not considered relevant to humans.

Prolonged or repeated overexposure to n-hexane, a component of gasoline, may cause damage to the peripheral nervous system that is characterized by numbness, tingling or pain in the extremities. These effects can progressively worsen to neuromuscular motor coordination difficulty or partial paralysis. Prolonged or repeated overexposure to benzene, a potential component of gasoline, has been associated with depletion of red blood cells (anemia), damage to white blood cells (leukopenia) and bone marrow (aplastic anemia). In addition, long term overexposure to benzene has been associated with a cancer of the blood forming tissues (acute myelogenous leukemia or AML). Prolonged or repeated overexposure to toluene, a component of gasoline, has been associated with reproductive effects in experimental animals and in long-term chemical abuse situations. Long-term overexposures to toluene and xylene have been associated with hearing damage.

This material and/or its components have been associated with developmental toxicity, reproductive toxicity, genotoxicity, immunotoxicity and carcinogenicity. Refer to Section 11 of this MSDS for additional health-related information.

Conditions Aggravated by Exposure

Personnel with pre-existing central nervous system (CNS) disease, chronic respiratory diseases, skin disorders, blood disorders, impaired cardiovascular systems, liver or kidney function should avoid exposure.

Exposure to high concentrations of this material may increase the sensitivity of the heart to epinepherine (adrenalin) and catecholamine-like drugs. Personnel with pre-existing cardiac disorders may be more susceptible to this effect (see Section 4, "Note to Physicians").

Target Organs

This material causes damage to the following organs: kidneys, lungs, heart, cardiovascular system, eyes, central nervous system (CNS).
This material may cause damage to the following organs: blood, the reproductive system, liver, mucous membranes, peripheral nervous system, upper respiratory tract, skin, bone marrow.

Carcinogenic Potential

This material may contain benzene, ethylbenzene or styrene at concentrations above 0.1%. Benzene is considered to be a known human carcinogen by OSHA, IARC and NTP. IARC has identified ethylbenzene, styrene, gasoline and gasoline engine exhaust as possibly carcinogenic to humans (Group 2B) based on laboratory animal studies.

OSHA Hazard Classification is indicated by an "X" in the box adjacent to the hazard title. If no "X" is present, the product does not exhibit the hazard as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).

OSHA Health Hazard Classification				OSHA Physical Hazard Classification					
Irritant	X	Toxic		Combustible		Explosive		Pyrophoric	
Sensitizer		Highly Toxic		Flammable	X	Oxidizer		Water-reactive	
Corrosive		Carcinogenic	X	Compressed Gas		Organic Peroxide		Unstable	

SECTION 4: FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

Inhalation	Immediately move victim to fresh air. If victim is not breathing, immediately begin rescue breathing. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). If breathing is difficult, 100 percent humidified oxygen should be administered by a qualified individual. Seek medical attention immediately. If exposed to benzene in an emergency situation, a medical evaluation should be completed at the end of the work-shift in accordance with OSHA requirements.
Eye Contact	Check for and remove contact lenses. If irritation or redness develops, flush eyes with cool, clean, low-pressure water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye and eyelid tissue. Do not use eye ointment. Seek medical attention immediately.
Skin Contact	Remove contaminated shoes and clothing. Flush affected area with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. Do not use ointments. If skin surface is not damaged, clean affected area thoroughly with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists.
Ingestion	Do not induce vomiting. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Never give anything by mouth to a person who is not fully conscious. Do not leave victim unattended. Seek medical attention immediately.
Notes to Physician	Inhalation overexposure can produce toxic effects. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis. Vigorous anti-inflammatory or steroid treatment may be required at first evidence of upper airway or pulmonary edema. Administer 100 percent humidified supplemental oxygen with assisted ventilation, as required. If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Accordingly, induction of emesis is not recommended. Consider administration of an aqueous slurry of activated charcoal followed by a cathartic such as magnesium citrate or sorbitol. Also, treatment may involve careful gastric lavage if performed soon after ingestion or in patients who are comatose or at risk of convulsing. Protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position. Obtain chest X-ray and liver function tests. Monitor for cardiac function, respiratory distress and arterial blood gases in severe exposure cases. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of this material (e.g., in enclosed spaces or with deliberate abuse). If used, monitor heart action closely. Consider use of other drugs with less arrhythmogenic potential.

SECTION 5: FIRE FIGHTING MEASURES

NFPA Flammability Classification	NFPA Class-IB flammable liquid. Extremely flammable.		
Flash Point Method	CLOSED CUP: -43°C (-45.4°F). (Tagliabue [ASTM D-56])		
Lower Flammable Limit	AP 1.4 %	**Upper Flammable Limit**	AP 7.6 %
Autoignition Temperature	280°C (536°F)		
Hazardous Combustion Products	Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons, aldehydes and other products of incomplete combustion.		
Special Properties	Flammable Liquid! This material releases vapors at or below ambient temperatures. When mixed with air in certain proportions and exposed to an ignition source, its vapor can cause a flash fire. Use only with adequate ventilation. Vapors are heavier than air and may travel long distances along the ground to an ignition source and flash back. A vapor and air mixture can create an explosion hazard in confined spaces such as sewers. If container is not properly cooled, it can rupture in the heat of a fire.		

Extinguishing Media

SMALL FIRE: Use dry chemicals, carbon dioxide, foam, water fog, or inert gas (nitrogen).
LARGE FIRE: Use foam, water fog, or water spray. Water fog and spray are effective in cooling containers and adjacent structures. However, water can cause frothing and/or may not extinguish the fire. Water can be used to cool the external walls of vessels to prevent excessive pressure, autoignition or explosion. DO NOT use a solid stream of water directly on the fire as the water may spread the fire to a larger area.

Fire Fighting Protective Clothing

Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies. Evacuate area and fight the fire from a maximum distance or use unmanned hose holders or monitor nozzles. Cover pooling liquid with foam. Containers can build pressure if exposed to radiant heat; cool adjacent containers with flooding quantities of water until well after the fire is out. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines. Be aware that burning liquid will float on water. Notify appropriate authorities if liquid enter sewers or waterways.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

Flammable Liquid! Release causes an immediate fire or explosion hazard. Evacuate all non-essential personnel from immediate area and establish a "regulated zone" with site control and security. A vapor-suppressing foam may be used to reduce vapors. Eliminate all ignition sources. All equipment used when handling this material must be grounded. Stop the leak if it can done without risk. Do not touch or walk through spilled material. Remove spillage immediately from hard, smooth walking areas. Prevent its entry into waterways, sewers, basements, or confined areas. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to appropriate waste containers. Use clean, non-sparking tools to collect absorbed material.

For large spills, secure the area and control access. Dike far ahead of a liquid spill to ensure complete collection. Water mist or spray may be used to reduce or disperse vapors; but, it may not prevent ignition in closed spaces. This material will float on water and its run-off may create an explosion or fire hazard. Verify that responders are properly HAZWOPER-trained and wearing appropriate respiratory equipment and fire-resistant protective clothing during cleanup operations. In an urban area, cleanup spill as soon as possible; in natural environments, cleanup on advice from specialists. Pick up free liquid for recycle and/or disposal if it can be accomplished safely with explosion-proof equipment. Collect any excess material with absorbant pads, sand, or other inert non-combustible absorbent materials. Place into appropriate waste containers for later disposal. Comply with all laws and regulations.

SECTION 7: HANDLING AND STORAGE

Handling

A static electrical charge can accumulate when this material is flowing through pipes, nozzles or filters and when it is agitated. A static spark discharge can ignite accumulated vapors particularly during dry weather conditions. Always bond receiving containers to the fill pipe before and during loading. Always keep nozzle in contact with the container throughout the loading process. Do not fill any portable container in or on a vehicle. Special precautions, such as reduced loading rates and increased monitoring, must be observed during "switch loading" operations (i.e., loading this material in tanks or shipping compartments that previously contained middle distillates or similar products).

A spill or leak can cause an immediate fire or explosion hazard. Keep containers closed and do not handle or store near heat, sparks, or any other potential ignition sources. Do not contact with oxidizable materials. Do not breathe vapor. Use only with adequate ventilation and personal protection. Never siphon by mouth. Avoid contact with eyes, skin, and clothing. Prevent contact with food and tobacco products. Do not take internally.

When performing repairs and maintenance on contaminated equipment, keep unnecessary persons away from the area. Eliminate all potential ignition sources. Drain and purge equipment, as necessary, to remove material residues. Use gloves constructed of impervious materials and protective clothing if direct contact is anticipated. Provide ventilation to maintain exposure potential below applicable exposure limits. Promptly remove contaminated clothing. Wash exposed skin thoroughly with soap and water after handling.

Empty containers may contain material residues which can ignite with explosive force. Misuse of empty containers can be dangerous if used to store toxic, flammable, or reactive materials. Cutting or welding of empty containers can cause fire, explosion, or release of toxic fumes from residues. Do not pressurize or expose empty containers to open flame, sparks, or heat. Keep container closed and drum bungs in place. All label warnings and precautions must be observed. Return empty drums to a qualified reconditioner. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling, or disposing of empty containers and/or waste residues of this material.

Storage

Store and transport in accordance with all applicable laws. Keep containers tightly closed. Store in a cool, dry, well-ventilated place. Clearly label all containers. Do not allow containers to be kept in enclosed vehicles. Keep away from all ignition sources. Ground all equipment containing this material. Containers must be able to withstand pressures that are created from changes in product temperature. Product samples and other small containers of this flammable liquid should be stored in a separate safety cabinet or room. All electrical equipment in areas where this material is stored or handled should be installed and operated in accordance with applicable regulatory requirements and the National Electrical Code.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below the applicable workplace exposure limits indicated below. All electrical equipment should comply with the National Electric Code. An emergency eye wash station and safety shower should be located near the work-station.

Personal Protective Equipment

Personal protective equipment should be selected based upon the conditions under which this material is used. A hazard assessment of the work area for PPE requirements should be conducted by a qualified professional pursuant to OSHA regulations. The following pictograms represent the minimum requirements for personal protective equipment. For certain operations, additional PPE may be required.

Eye Protection

Safety glasses with side shields are recommended as a minimum protection. During transfer operations or when there is a likelihood of misting, splashing, or spraying, chemical goggles should be worn. Suitable eye wash water should be readily available.

Hand Protection

Avoid skin contact. Use gloves (e.g., disposable PVC, neoprene, nitrile, vinyl, or PVC/NBR). Wash hands with plenty of mild soap and water before eating, drinking, smoking, use of toilet facilities or leaving work. DO NOT use this material as a skin cleaner.

Body Protection

Avoid skin contact. Wear long-sleeved fire-retardant garments (e.g., Nomex®) while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, boots and additional facial protection. If product comes in contact with clothing, immediately remove soaked clothing and shower. Promptly remove and discarded contaminated leather goods.

Respiratory Protection

For unknown vapor concentrations use a positive-pressure, pressure-demand, self-contained breathing apparatus (SCBA). Due to the fire and explosion hazard, do not enter atmosphere containing concentrations greater than 20% of the lower flammable limit under any circumstances. For known vapor concentrations above the occupational exposure guidelines (see below), use a NIOSH-approved organic vapor respirator if adequate protection is provided. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134).

General Comments

Warning! Use of this material in spaces without adequate ventilation may result in generation of hazardous levels of combustion products and/or inadequate oxygen levels for breathing. Odor is an inadequate warning for hazardous conditions.

Occupational Exposure Guidelines

Substance	Applicable Workplace Exposure Levels

1) Gasoline	TWA: 300 (ppm) STEL: 500 (ppm) from ACGIH (TLV)
2) Petroleum Distillates (Naphtha)	TWA: 500 (ppm) from OSHA (PEL)
3) Methyl tert-Butyl Ether (MTBE)	TWA: 40 (ppm) from ACGIH (TLV)
4) Ethanol	TWA: 1000 (ppm) from ACGIH (TLV) TWA: 1000 (ppm) from OSHA (PEL)
5) Butane	TWA: 800 (ppm) from ACGIH (TLV)
6) Pentane, all isomers	TWA: 600 (ppm) from ACGIH (TLV) TWA: 1000 (ppm) from OSHA (PEL)
7) Cyclopentane	TWA: 600 (ppm) from ACGIH (TLV)
8) Hexane Isomers	TWA: 500 (ppm) STEL: 1000 (ppm) from ACGIH (TLV)
9) 1-Hexene	TWA: 30 (ppm) from ACGIH (TLV)
10) Hexane (n-Hexane)	TWA: 50 (ppm) from ACGIH (TLV) - SKIN TWA: 500 (ppm) from OSHA (PEL)
11) Cyclohexane	TWA: 300 (ppm) from ACGIH (TLV) TWA: 300 (ppm) from OSHA (PEL)
12) Heptane (n-Heptane)	TWA: 400 (ppm) STEL: 500 (ppm) from ACGIH (TLV) TWA: 500 (ppm) from OSHA (PEL)
13) Methylcyclohexane	TWA: 400 (ppm) from ACGIH (TLV) TWA: 500 (ppm) from OSHA (PEL)
14) Benzene	TWA: 0.5 (ppm) STEL: 2.5 (ppm) from ACGIH (TLV) - SKIN TWA: 1 (ppm) STEL: 5 AL: 0.5 (ppm) from OSHA (PEL) - SKIN (See Table Z-2 in 29 CFR 1910.1028 for exclusions to PEL.)
15) Toluene	TWA: 50 (ppm) from ACGIH (TLV) - SKIN TWA: 200 (ppm) CEIL: 300 (ppm) 500* (ppm) from OSHA (PEL) (*10-min peak per 8 hour shift)
16) Octane, all isomers	TWA: 300 (ppm) from ACGIH (TLV) TWA: 500 (ppm) from OSHA (PEL)
17) Xylene, all isomers	TWA: 100 (ppm) STEL: 150 (ppm) from ACGIH (TLV) TWA: 100 (ppm) from OSHA (PEL)
18) Ethylbenzene	TWA: 100 (ppm) STEL: 125 (ppm) from ACGIH (TLV) TWA: 100 (ppm) from OSHA (PEL)
19) Nonane, all isomers	TWA: 200 (ppm) from ACGIH (TLV)
20) Cumene	TWA: 50 (ppm) from ACGIH (TLV) TWA: 50 (ppm) from OSHA (PEL) - SKIN
21) Trimethylbenzene (mixed isomers)	TWA: 25 (ppm) from ACGIH (TLV)
22) Indene	TWA: 10 (ppm) from ACGIH (TLV)
23) Naphthalene	TWA: 10 (ppm) STEL: 15 (ppm) from ACGIH (TLV) - SKIN TWA: 10 (ppm) from OSHA (PEL)
24) Styrene	TWA: 20 (ppm) STEL: 40 (ppm) from ACGIH (TLV) - BEI TWA: 100 (ppm) STEL C 200; 600* from OSHA (PEL) (*5-minute peak in any three hours)

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid.	**Color**	Transparent, clear to amber or red.	**Odor**	Pungent, characteristic gasoline.
Specific Gravity	0.72 - 0.77 (Water = 1)	**pH**	Not Applicable.	**Vapor Density**	3 to 4 (Air = 1)
Boiling Point/Range	38° to 204°C (100° to 400°F) (ASTM D-86)			**Melting/Freezing Point**	Not available.
Vapor Pressure	220 to 450 mm Hg at 20°C (68°F) or 6 to 15 Reid-psia at 37.8°C (100°F).			**Viscosity (cSt @ 40°C)**	0.35 to 1.0 [ASTM D-445]
Solubility in Water	Ethanol is readily soluble in water. Other oxygenate components are moderately soluble and the hydrocarbon components are slightly soluble in water.			**Volatile Characteristics**	720 - 770 g/l VOC's W/V.
Additional Properties	Average Density at 60°F = 6.2 lbs./gal. (ASTM D-2161)				

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability	Stable.	**Hazardous Polymerization**	Not expected to occur.
Conditions to Avoid	Keep away from extreme heat, sparks, open flame, and strongly oxidizing conditions.		
Materials Incompatibility	Strong acids, alkalies and oxidizers such as liquid chlorine, other halogens, hydrogen peroxide and oxygen.		
Hazardous Decomposition Products	No additional hazardous decomposition products were identified other than the combustion products identified in Section 5 of this MSDS.		

SECTION 11: TOXICOLOGICAL INFORMATION

For other health-related information, refer to the Emergency Overview on Page 1 and the Hazards Identification in Section 3 of this MSDS.

Toxicity Data

Gasoline:
Unleaded Gasoline:
VAPOR (TELo) Acute: 140 ppm (Human) (8 hours) - Mild eye irritant.
VAPOR (TELo) Acute: 500 ppm (Human) (1 hour) - Moderate eye irritant.
INHALATION (TCLo) Acute: 900 ppm (Human) (1 hour) - CNS and pulmonary effects.
DERMAL (TDLo) Acute: 53 mg/kg (Human) - Skin allergy effects.
INHALATION (LC50) Acute: 101,200 ppm (Rat, Mouse, & Guinea Pig) (5 minutes).

Unleaded Gasoline Containing 15% MTBE:
ORAL (LD50) Acute: >5,000 mg/kg (Rat screen level).
DERMAL (LD50) Acute: >2,000 mg/kg (Rabbit screen level).
INHALATION (LC50) Acute: >5,200 ppm (Rat screen level) (8 hours).
DRAIZE EYE Acute: Mild eye irritant. (Rabbit).
DRAIZE DERMAL Acute: Moderate skin irritant. (Rabbit).
BUEHLER DERMAL Acute: Non-sensitizing. (Guinea Pig).
28-Day DERMAL Sub-Chronic: Severe skin irritant. (Rabbit).

A major epidemiological study concluded that there was no increased risk of kidney cancer associated with gasoline exposures for petroleum refinery employees or neighboring residents. Another study identified a slight trend in kidney cancers among service station employees following a 30-year latency period. Two-year inhalation toxicity studies with fully vaporized unleaded gasoline (at concentrations of 67, 292 and 2,056 ppm in air) produced kidney damage and kidney tumors in male rats, but not in female rats or mice of either sex. Results from subsequent scientific studies suggest that the kidney damage, and probably the kidney tumor response, is limited to the male rat. The kidney tumors apparently were the result of the formation of alpha-2u-globulin, a protein unique to male rats. This finding is not considered relevant to human exposure. Under conditions of the study, there was no evidence that exposure to unleaded gasoline vapor is associated with developmental toxicity. Experimental studies with laboratory animals did suggest that overexposure to gasoline may adversely effect male reproductive performance. Also, in laboratory studies with rats, the maternal and developmental "no observable adverse effect level" (NOAEL) was determined to be 9,000 ppm (75% of the LEL value). Female mice developed a slightly higher incidence of liver tumors compared to controls at the highest concentration. IARC has listed gasoline as possibly carcinogenic to humans (Group 2B).

Methyl tertiary-Butyl Ether (MTBE):
Acute symptoms associated with human exposure to MTBE appear to be mild and transient. In laboratory studies, rodents exposed to high doses of MTBE exhibited blood chemistry changes and liver and kidney abnormalities. In laboratory studies, MTBE vapor exposure at the high dose concentration was associated with an increased incidence of liver tumors in female mice. Also, at high dose concentration exposures, MTBE was associated with an increased incidence of kidney and testicular (Leydig cell) tumors in male rats. Additional oncogenicity studies on rats resulted in testicular tumors following administration by ingestion. These data are not generally considered relevant to humans. In the Ninth edition (2000) of its Report on Carcinogens, NTP has not identified MTBE as either a known carcinogen or reasonably anticipated to be carcinogenic to humans. In animal studies, developmental and reproductive toxicity related to MTBE inhalation exposures was observed only at concentrations that were maternally toxic. MTBE was shown to be maternal toxic at 4,000 and 8,000 ppm levels when

mice were exposed for six hours per day during their pregnancy. Also, a decrease in the number of successful pregnancies and a reduction in birth weights were observed at these exposure levels. Birth defects (cleft palate) were observed at the high dose level. These data suggest that the risk of developmental and reproductive toxicity in humans is negligible as a result of anticipated exposures to MTBE.

Tertiary-Amyl Methyl Ether (TAME):
TAME was found to be negative for the induction of structural chromosome aberrations (both S9-activated and non-activated) in Chinese hamster ovary (CHO) cells. Inhalation of TAME vapors at concentrations above 250 ppm produced reversible CNS depression in rats and mice. In a four week inhalation study, increases in liver weights with no tissue injury were observed in rats exposed to a TAME concentration of 500 ppm. Birth defects in mice and fetotoxicity in both rats and mice were observed after inhalation exposures to maternally toxic concentrations of TAME.

Diisopropyl Ether (DIPE):
Increased kidney and liver weights were observed in rats and mice in subchronic and chronic inhalation studies of DIPE. Also, evidence of microscopic changes (hyaline droplets) were reported in liver tissue and kidney tubules of rabbits and male rats exposed to DIPE at concentrations of 7,100 ppm. These findings were similar those found in gasoline studies. Overexposure by inhalation of pregnant rats to DIPE at concentrations of 3,095 and 6,745 ppm increased the frequency of rudimentary 14th ribs in the offspring. This effect was not observed at exposure concentrations of 430 ppm. The significance of these findings to human exposure is unclear.

Ethanol:
Inhalation exposure to ethanol vapor at concentrations above applicable workplace exposure levels is expected to produce eye and mucus membrane irritation. Human exposure at concentrations from 1,000 to 5,000 ppm produced symptoms of narcosis, stupor and morbid drowsiness. Subjects exposed to ethanol vapor in concentrations between 500 and 10,000 ppm experienced coughing and smarting of the eyes and nose. At 15,000 ppm there was continuous lacrimation and coughing. While extensive acute and chronic effects can be expected with ethanol consumption, ingestion is not expected to be a significant route of exposure to this product.

Pentanes, all isomers:
n-Pentane was associated with cardiac sensitization in rabbits at a concentration of 100,000 ppm in air within four hours of exposure. Pentane can act as an aesthetic by inhalation. Mice exhibited signs of respiratory irritation and mild central nervous system effects at concentrations of 32,000 to 69,000 ppm for five minutes.

Toluene:
Deliberate long-term inhalation of toluene at high concentrations (e.g., glue sniffing) has been associated with reversible liver effects, permanent kidney damage, CNS depression, brain damage and cardiac sensitization. In addition, intentional abuse behavior increases the risk for reproductive effects including pre-term delivery, prenatal death and growth retardation. Also, case studies of persons abusing toluene have revealed isolated incidences of birth defects. Long-term inhalation studies with toluene produced kidney damage, enlargement of the liver and thymus, heart palpitations, brain damage, general weakness and impaired reaction time in laboratory animals. Also, in long-term laboratory studies, rats exposed to high concentrations of toluene exhibited high-frequency hearing loss. Case studies have reported hearing damage in humans exposed elevated concentrations of toluene and other mixed solvents.

Xylene, all isomers:
Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, CNS damage and narcosis. Effects may be increased by the use of alcoholic beverages. Also, ototoxicity has been associated with chronic overexposure to xylene. An inhalation study with laboratory rats indicated an association between elevated exposures to mixed xylenes and hearing loss. Animal studies have associated embryo and feto-toxicity with maternally toxic dose exposures of mixed xylene isomers and ethylbenzene. Lung inflammation and liver damage were identified as health effects in chronic studies using guinea pigs. The significance of these animal study results to humans is not known.

Heptane, all isomers:
n-Heptane was not mutagenic in the Salmonella/microsome (Ames) assay and is not considered to be carcinogenic.

n-Butane:
An n-butane exposure of 5,000 ppm in air has been shown to affect the heart in dogs, causing lower contractile force and other effects. Also, butane may decrease the myocardial threshold to

epinephrine-induced arrhythimias.

n-Hexane:
Intentional abuse of products containing n-hexane have been associated with permanent brain and nervous system damage. Adverse effects include numbness, tingling, pain, and loss of muscle control in the extremities, disorientation, impaired vision and reflexes, decline in motor function and even paralysis. These neurological effects are pronounced in combination with lack of oxygen supply, especially among women. Chronic repeated or prolonged overexposure to n-hexane, either by inhalation or skin absorption, has been associated with peripheral neuropathy in both human workers and rodents. The neurotoxic properties of n-hexane may increase with concurrent exposure to methyl ethyl ketone, methyl isobutyl ketone or toluene. n-Hexane has been associated with testicular degeneration and epididymal lesions in rats. Also, n-hexane produced fetal toxicity and reduced fetal weight in mice at maternally toxic doses.

Methylcyclohexane:
Rats inhaling methylcyclohexane at an airborne concentration of 15,250 ppm for one hour displayed tremors, loss of coordination, anesthesia and convulsions. Experimental animals exposed to 10,050 ppm for six hours per day for 14 days exhibited weight loss or decreased weight gain and changes in the structure of their salivary glands. In experimental studies with rabbits, the LD50 for methylcyclohexane was estimated to be between 3,300 ppm and 7,300 ppm. Death was preceded by conjunctival congestion with mucoid secretion and lacrimation, salivation, coughing, sneezing, labored breathing and diarrhea. Lethal oral dosing of rabbits caused lethargy, severe diarrhea and circulatory collapse. Vascular and degenerative lesions were observed in the kidneys and liver.

Trimethylbenzenes, all isomers:
The TCLo for humans is 10 ppm, with somnolence and respiratory tract irritation noted. In inhalation studies with rats, four of ten animals died after exposures of 2400 ppm for 24 hours. An oral dose of 5 mL/kg resulted in death in one of ten rats. Minimum lethal intraperitoneal doses were 1.5 to 2.0 mL/kg in rats and 1.13 to 12 mL/kg in guinea pigs. Levels of total hydrocarbon vapors present in the breathing atmosphere of these workers ranged from 10 to 60 ppm. Mesitylene (1, 3, 5 Trimethylbenzene) inhalation at concentrations of 1.5, 3.0, and 6.0 mg/L for six hours was associated with dose-related changes in white blood cell counts in rats. No significant effects on the complete blood count were noted with six hours per day exposure for five weeks, but elevations of alkaline phosphatase and SGOT were observed. Central nervous system depression and ataxia were noted in rats exposed to 5,100 to 9,180 ppm for two hours.

Benzene:
Prolonged and repeated exposure to high concentrations of benzene is associated with injury to blood forming organs and anemia. It is linked to the development of acute myelogenous leukemia (AML) in humans. Studies of workers exposed to high levels of benzene have identified humoral and cellular immunity impairment and a decrease in levels of circulating leukocytes. NTP, IARC and OSHA list benzene as carcinogenic to humans. Consumption of alcohol may increase the blood system changes related to benzene exposure. Animal studies have shown testicular effects and alterations in reproductive cycles, but teratogenic effects have not been reported even at maternally toxic doses. Also, animal studies show some evidence of fetotoxic and developmental effects.

Ethylbenzene:
NTP completed a 2-year inhalation bioassay of ethylbenzene in rodents. The study was conducted in rats and mice at exposure concentrations of 0, 75, 200 and 750 ppm. No significant effects were observed at the 75 and 200 ppm levels. However, compared to chamber controls, the severity of nephropathy was increased in rats at the 750 ppm level; and male rats had higher incidences of renal tubule carcinomas. Step section analyses of the kidneys found a significant increase hyperplasia and renal tubule adenomas in both male and female rats. Also at this 750 ppm level, male mice had a higher incidence of alveolar/bronchiolar adenomas and carcinomas and female mice had increased hepatocellular adenomas and carcinomas when compared to chamber controls. Also, hyperplasia was observed in the thyroid gland of both sexes of mice and in the pituitary gland of female mice. The relevance of these findings to human health is unclear. However, based upon this data, the IARC has designated ethylbenzene as possibly carcinogenic to humans (Group 2B).

Cyclohexane:
Cyclohexane can cause eye, skin and mucous membrane irritation, CNS depressant and narcosis at elevated concentrations. In experimental animals exposed to lethal concentrations by inhalation or oral route, there was generalized vascular damage and severe degenerative changes in the heart, lungs, liver, kidneys and brain. Cyclohexane does not act as a promotor for tumors on mice when exposed to dimethylbenzanthracene. Further, it did not induce unscheduled DNA synthesis in cultured human lymphocytes. It is not mutagenic in the Salmonella/microsome (Ames) or the mouse lymphoma L5178Y assays, with or without metabolic activation. However, it did increase the number of chromosomal

aberrations in bone marrow cells of rats exposed to between 100 and 300 ppm for six hours/day for five days. These chromosomal aberrations did not appear to be dose-related.

Naphthalene:
Naphthalene is a potential irritant to eyes, skin and lungs. Ingestion of naphthalene has been associated with severe red blood cell and liver damage leading to death. Following prolonged or repeated exposures, naphthalene has been shown to cause cataracts, optical neuritis, hemolytic and aplastic anemia, jaundice and possibly neurotoxicity. In animal studies, naphthalene caused fetal effects and decreased spleen weights in pregnant female mice. In an NTP sponsored study, naphthalene produced a dose related increase in tumors at the 30 and 60 ppm exposure level in both male and female rats. Higher incidences of respiratory epithelial adenomas, olfactory epithelial neuroblastomas, and non-neoplastic lesions of the nose were observed as compared to controls. Cytogenic studies with Chinese hamster ovary cells have demonstrated sister chromatid exchanges and chromosomal aberrations. The relevance of these studies to human health is unclear.

Indene:
Indene and ethylmethylbenzenes are primary skin irritants. Overexposure has been associated with kidney damage and increased blood cholinesterase levels. In inhalation developmental studies, indene and other C9 aromatic hydrocarbons have been associated with decreased fetal and newborne pup weights.

Styrene:
Neurological injury associated with chronic styrene exposure include distal hypesthesia, decreased nerve conduction velocity, and altered psychomotor performance. These effects did not occur with exposures to airborne concentrations that were less than 100 ppm. Increased deaths from degenerative neurological disorders were found in a comprehensive epidemiological study of Danish reinforced plastics workers. These workers were reported to have a 2.5-fold increased risk for myeloid leukemia with clonal chromosome aberrations. Also, there are several studies that suggest potential reproductive effects in humans and experimental animals from overexposure to styrene. Styrene was not mutagenic in the standard (liquid phase) Ames Salmonella/microsome assay, but was weakly positive when tested in the vapor phase. IARC has listed styrene as possibly carcinogenic to humans (Group 2B).

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicity

Unleaded gasoline is potentially toxic to freshwater and saltwater ecosystems. Various grades of gasoline exhibited range of lethal toxicity (LC100) from 40 PPM to 100 PPM in ambient stream water with Rainbow Trout (Salmo irideus). A 24-hour TLm (Median Toxic Limit) was calculated to be 90 PPM with juvenile American Shad (Squalius cephalus). Using Bluegill Sunfish (Lepomis macrochirus), Grey Mullet (Chelon labrosus) and Gulf Menhaden (Brevoortia patronus), gasoline exhibited a 96-hour LC50 of 8 PPM, 2 PPM, and 2 PPM, respectively.

Methyl tertiary-Butyl Ether (MTBE) has a relatively low level of aquatic ecotoxicity. Using the crustacean Harpacticoid Copepods (Nitrocra spinipes), MTBE exhibited a 96-hour LC50 of from 1,000 PPM to 10,000 PPM depending upon various water temperatures. MTBE exhibited a 24-hour LC50 of 1,700 PPM and a 96-hour LC50 of 1,000 PPM using Bleak Fish (Alburnus alburnus) at 10° C. Using Golden Orfe Fish (Leuciscus idus melanotus), MTBE exhibited a 48-hour LC0 of 1,000 PPM and an LC100 of 2,000 PPM.

Environmental Fate

Gasoline contains components that are potentially toxic to freshwater and saltwater ecosystems. It will normally float on water. The lighter components of gasoline will evaporate rapidly. In stagnant or slow-flowing waterways, a hydrocarbon layer can cover a large surface area. As a result, this covering layer might limit or eliminate natural atmospheric oxygen transport into the water. With time, if not removed, oxygen depletion in the waterway might be enough to cause a fish kill or create an anaerobic environment. This coating action can also be harmful or fatal to plankton, algae, aquatic life, and water birds.

This material can be hazardous to human health or the environment. If spilled, this material will normally evaporate rapidly. Hydrocarbon components may contribute to atmospheric smog. The atmospheric half-life of the butane components under photochemical smog conditions are estimated to be between three and seven days. Isopentane, n-pentane, hexane isomers, n-heptane, heptane isomers and iso-octane have estimated half-lives of between two and five days in air when photochemical hydroxyl or nitrate radicals are present. Toluene has a half-life of from three hours to approximately one day. Cyclohexane has a half-life of from six hours to over four days when hydroxyl radicals are present.

SECTION 13: DISPOSAL CONSIDERATIONS

Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

Maximize material recovery for reuse or recycling. If spilled material is introduced into a wastewater treatment system, chemical and biological oxygen demand (COD and BOD) will likely increase. This material is biodegradable if gradually exposed to microorganisms, preferably in an aerobic environment. In sewage-seeded wastewater, at or below concentrations of 0.2 vol.% of this material, there is little or no effect on bio-oxidation and/or digestion. However, at 1 vol.%, it doubles the required digestion period. Higher concentrations interfere with floc formation and sludge settling and also plug filters or exchange beds. Vapor emissions from a bio-oxidation process contaminated with this material can be a health hazard.

Recovered non-usable material may be regulated by US EPA as a hazardous waste due to its ignitibility (D001) and/or its toxic (D018) characteristics. In addition, conditions of use may cause this material to become a hazardous waste, as defined by Federal or State regulations. It is the responsibility of the user to determine if the material is a hazardous waste at the time of disposal. Transportation, treatment, storage, and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR Parts 260 through 271). State and/or local regulations might be even more restrictive. Contact the RCRA/Superfund Hotline at (800) 424-9346 or your regional US EPA office for guidance concerning case specific disposal issues.

SECTION 14: TRANSPORT INFORMATION

DOT Status A U.S. Department of Transportation regulated material.

Proper Shipping Name Gasoline

Hazard Class Class 3: Flammable liquid.

Packing Group(s) II

UN/NA ID UN1203

Reportable Quantity A Reportable Quantity (RQ) has not been established for this material.

Placards

Emergency Response Guide No. 128

HAZMAT STCC No. 4908177

MARPOL III Status Not a DOT "Marine Pollutant" per 49 CFR 171.8.

SECTION 15: REGULATORY INFORMATION

TSCA Inventory This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.

SARA 302/304 The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified.

SARA 311/312 The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories:

Fire, Acute (Immediate) Health Hazard, Chronic (Delayed) Health Hazard

SARA 313

This product contains the following components in concentrations above de minimis levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA:
Methyl tertiary-Butyl Ether (MTBE) [CAS No.: 1634-04-4] Concentration: 0 - 15%
Toluene [CAS No.: 108-88-3] Concentration: 1 - 20%
Xylene, all isomers [CAS No.: 1330-20-7] Concentration: 1 - 18%
n-Hexane [CAS No.: 110-54-3] Concentration: 1 - 8%
1, 2, 4 Trimethylbenzene [CAS No.: 95-63-6] Concentration: 1 - 3%
Benzene [CAS No.: 71-43-2] Concentration: 0 - 4.9%
Ethylbenzene [CAS No.: 100-41-4] Concentration: 0.2 - 4%
Cumene [CAS No.: 98-82-8] Concentration: 0.5 - 4%
Styrene [CAS No.: 100-42-5] Concentration: 0 - 1%
Cyclohexane [CAS No.: 110-82-7] Concentration: 1 - 3%
Naphthalene [CAS No.: 91-20-3] Concentration: 0.1 - 2%

CERCLA

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are:
Methyl tertiary-Butyl Ether (MTBE) [CAS No.: 1634-04-4] RQ = 1000 lbs. (453.6 kg) Concentration: 0 - 15%
Toluene [CAS No.: 108-88-3] RQ = 1000 lbs. (453.6 kg) Concentration: 1 - 20%
Xylene, all isomers [CAS No.: 1330-20-7] RQ = 100 lbs. (45.36 kg) Concentration: 1 - 18%
n-Hexane [CAS No.: 110-54-3] RQ = 5000 lbs. (2268 kg) Concentration: 1 - 8%
2,2,4-Trimethylpentane [CAS No.: 540-84-1] RQ = 1000 lbs. (453.6 kg) Concentration: 1 - 5%
Benzene [CAS No.: 71-43-2] RQ = 10 lbs. (4.536 kg) Concentration: 0 - 4.9%
Ethylbenzene [CAS No.: 100-41-4] RQ = 1000 lbs. (453.6 kg) Concentration: 0.2 - 4%
Cumene [CAS No.: 98-82-8] RQ = 5000 lbs. (2268 kg) Concentration: 0.5 - 4%
Cyclohexane [CAS No.: 110-82-7] RQ = 1000 lbs. (453.6 kg) Concentration: 1 - 3%
Naphthalene [CAS No.: 91-20-3] RQ = 100 lbs. (45.36 kg) Concentration: 0.1 - 2%
Styrene [CAS No.: 100-42-5] RQ = 1000 lbs. (453.6 kg) Concentration: 0 - 1%

CWA

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

California Proposition 65

This material contains the following components which are known to the State of California to cause cancer, birth defects or other reproductive harm; and therefore, it may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5): Gasoline (Wholly Vaporized and Engine Exhaust), Benzene [CAS No. 71-43-3] and Toluene [CAS No. 108-88-3]

New Jersey Right-to-Know Label

Gasoline [NJDEP CAS No. 8006-61-9]

Additional Regulatory Remarks

As minimum requirements, CITGO recommends that the following advisory information be displayed on equipment used to dispense gasoline in motor vehicles. Additional warnings specified by various regulatory authorities may be required: "DANGER: Extremely Flammable. Use as a Motor Fuel Only. No Smoking. Stop Engine. Turn Off All Electronic Equipment including Cellular Telephones. Do Not Overfill Tank. Keep Away from Heat and Flames. Do Not leave nozzle unattended during refueling. **Static Sparks Can Cause a Fire, especially when filling portable containers.** Containers must be metal or other material approved for storing gasoline. PLACE CONTAINER ON GROUND. DO NOT FILL ANY PORTABLE CONTAINER IN OR ON A VEHICLE. Keep nozzle spout in contact with the container during the entire filling operation. **Harmful or Fatal if Swallowed. Long-Exposure Has Caused Cancer in Laboratory Animals.** Avoid prolonged breathing of vapors. Keep face away from nozzle and gas tank. Never siphon by mouth."

Section 12(b) of Toxic Substances Control Act: This material may contain detectable concentrations of **Methyl tertiary-Butyl Ether (MTBE) [CAS No. 1634-04-4], tertiary-Amyl Methyl Ether (TAME) [CAS No. 994-05-8], Methylcyclopentane [CAS No. 96-37-7], Cyclohexane [CAS No. 110-82-7], n-Hexane [CAS No. 110-54-3] and 1,3,5-Trimethylbenzene (Mesitylene) [CAS No. 108-67-8].** Accordingly, this product may be subject to US EPA's one-time only per country export notification requirements.

SECTION 16: OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

REVISION INFORMATION

Version Number	6.0
Revision Date	07/06/2001
Print Date	Printed on 07/06/2001.

ABBREVIATIONS

AP = Approximately Established EQ = Equal > = Greater Than < = Less Than NA = Not Applicable ND = No Data NE = Not

ACGIH = American Conference of Governmental Industrial Hygienists

AIHA = American Industrial Hygiene Association

IARC = International Agency for Research on Cancer

NTP = National Toxicology Program

NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

NPCA = National Paint and Coating Manufacturers Association

HMIS = Hazardous Materials Information System

NFPA = National Fire Protection Association

EPA = Environmental Protection Agency

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SAFETY DATA SHEET

CITGO No. 2 Diesel Fuel, Low Sulfur, All Grades

Section 1. Identification

GHS product identifier : CITGO No. 2 Diesel Fuel, Low Sulfur, All Grades

Chemical name : Fuels, diesel, No 2

Synonyms : No. 2-D Grade Diesel Fuel Oil (defined by ASTM D-975); Treated or Refined Diesel Fuel No. 2; Grade 2 Distillate Fuel; Hydrodesulfurized Middle Distillate; C9-C16 Petroleum Hydrocarbons

Code : Various

MSDS # : AG2DF

Supplier's details : CITGO Petroleum Corporation
P.O. Box 4689
Houston, TX 77210
sdsvend@citgo.com

Emergency telephone number : Technical Contact: (832) 486-4000
Medical Emergency: (832) 486-4700
CHEMTREC Emergency: (800) 424-9300
(United States Only)

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 3
ACUTE TOXICITY: INHALATION - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B
CARCINOGENICITY - Category 2
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) [central nervous system (CNS)] - Category 2
ASPIRATION HAZARD - Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Flammable liquid and vapor.
Harmful if inhaled.
Causes skin and eye irritation.
Suspected of causing cancer.
May be fatal if swallowed and enters airways.
May cause damage to organs through prolonged or repeated exposure. (central nervous system (CNS))

Precautionary statements

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Wash hands thoroughly after handling.

Section 2. Hazards identification

Response : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF SWALLOWED: Immediately call a POISON CENTER or physician. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up. Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Fuels, diesel, No 2

Other means of identification : No. 2-D Grade Diesel Fuel Oil (defined by ASTM D-975); Treated or Refined Diesel Fuel No. 2; Grade 2 Distillate Fuel; Hydrodesulfurized Middle Distillate; C9-C16 Petroleum Hydrocarbons

CAS number/other identifiers

CAS number : 68476-34-6

Ingredient name	%	CAS number
Ethyltoluene	<3	25550-14-5
Trimethylbenzene, all isomers	<2	25551-13-7
Naphthalene	<2	91-20-3
Biphenyl	<2	92-52-4
Cumene	<1	98-82-8
Xylenes, mixed isomers	<1	1330-20-7
Ethylbenzene	<1	100-41-4

* = Various ** = Mixture *** = Proprietary

Any concentration shown as a range is to protect confidentiality or is due to process variation.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that gas or vapor is still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Wash contaminated skin with soap and water. Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Section 4. First aid measures

Ingestion : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. Aspiration hazard if swallowed. Can enter lungs and cause damage. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute

Potential acute health effects

Eye contact : Causes eye irritation.

Inhalation : Harmful if inhaled. Long-term exposure to diesel engine exhaust may cause cancer.

Skin contact : Causes skin irritation.

Ingestion : May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : Adverse symptoms may include the following:
nausea or vomiting

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended. Consider activated charcoal and/or gastric lavage. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.

Specific treatments : Treat symptomatically and supportively.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that gas or vapor is still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Specific hazards arising from the chemical : Flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

Suitable extinguishing media : Use dry chemical, carbon dioxide (CO_2,) water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Section 5. Fire-fighting measures

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
Diesel engine exhaust

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not swallow. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container. Non equilibrium conditions may increase the fire hazard associated with this product. Always bond receiving containers to the fill pipe before and during loading. Always confirm that receiving container is properly grounded. Bonding and grounding alone

Section 7. Handling and storage

may be inadequate to eliminate fire and explosion hazards. Carefully review operations that may increase the risks such as tank and container filling, tank cleaning, sampling, gauging, loading, filtering, mixing, agitation, etc. In addition to bonding and grounding, efforts to mitigate the hazards may include, but are not limited to, ventilation, inerting and/or reduction of transfer velocities.
Always keep nozzle in contact with the container throughout the loading process. Do NOT fill any portable container in or on a vehicle.

Special precautions, such as reduced loading rates and increased monitoring, must be observed during "switch loading" operations (i.e., loading this material in tanks or shipping compartments that previously contained a dissimilar product).

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Bulk Storage Conditions: Maintain all storage tanks in accordance with applicable regulations. Use necessary controls to monitor tank inventories. Inspect all storage tanks on a periodic basis. Test tanks and associated piping for tightness. Maintain the automatic leak detection devices to assure proper working condition.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Trimethylbenzene, all isomers	**ACGIH TLV (United States, 4/2014).** TWA: 25 ppm 8 hours. TWA: 123 mg/m³ 8 hours.
Naphthalene	**ACGIH (United States). Absorbed through skin.** TWA: 10 ppm 8 hours. STEL: 15 ppm 15 minutes. **OSHA (United States).** TWA: 10 ppm 8 hours. **ACGIH TLV (United States, 4/2014). Absorbed through skin.** TWA: 10 ppm 8 hours. TWA: 52 mg/m³ 8 hours. **OSHA PEL (United States, 2/2013).** TWA: 10 ppm 8 hours. TWA: 50 mg/m³ 8 hours.
Biphenyl	**OSHA PEL Z2 (United States).** TWA: 0.2 ppm 8 hours. **ACGIH TLV (United States, 4/2014).** TWA: 0.2 ppm 8 hours. TWA: 1.3 mg/m³ 8 hours. **OSHA PEL (United States, 2/2013).** TWA: 0.2 ppm 8 hours. TWA: 1 mg/m³ 8 hours.
Cumene	**ACGIH TLV (United States, 4/2014).** TWA: 50 ppm 8 hours. **OSHA PEL (United States, 2/2013). Absorbed through**

Section 8. Exposure controls/personal protection

	skin. TWA: 50 ppm 8 hours. TWA: 245 mg/m³ 8 hours.
Xylenes, mixed isomers	**ACGIH TLV (United States, 4/2014).** TWA: 100 ppm 8 hours. TWA: 434 mg/m³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m³ 15 minutes. **OSHA PEL (United States, 2/2013).** TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.
Ethylbenzene	**ACGIH TLV (United States, 4/2014).** TWA: 20 ppm 8 hours. **OSHA PEL (United States, 2/2013).** TWA: 100 ppm 8 hours. TWA: 435 mg/m³ 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, vapor controls, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: Splash goggles. Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. chemical splash goggles. If inhalation hazards exist, a full-face respirator may be required instead.

Skin protection

Hand protection : Chemical-resistant gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or supplied-air respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Physical state	:	Liquid.
Color	:	Colorless to light yellow or red.
Odor	:	Characteristic.
pH	:	Not available.
Melting point	:	-30 to -18°C (-22 to -0.4°F)
Boiling point/boiling range	:	282 to 338°C (539.6 to 640.4°F)
Flash point	:	Closed cup: 52°C (125.6°F) [Pensky-Martens.]
Evaporation rate	:	<1 (butyl acetate = 1)
Lower and upper explosive (flammable) limits	:	Lower: 0.6% Upper: 6.5%
Vapor pressure	:	0.27 kPa (2 mm Hg) [room temperature]
Vapor density	:	5 [Air = 1]
Relative density	:	0.84
Density lbs/gal	:	Estimated 7 lbs/gal
Gravity, °API	:	Estimated 37 @ 60 F
Solubility	:	Very slightly soluble in the following materials: cold water.
Solubility in water	:	0.005 g/l
Partition coefficient: n-octanol/water	:	>3.3
Auto-ignition temperature	:	254 to 285°C (489.2 to 545°F)
Viscosity	:	Kinematic (room temperature): 0.03 cm^2/s (3 cSt)

Section 10. Stability and reactivity

Reactivity	:	Not expected to be Explosive, Self-Reactive, Self-Heating, or an Organic Peroxide under US GHS Definition(s).
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
Incompatible materials	:	Reactive or incompatible with the following materials: oxidizing materials
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Section 11. Toxicological information

Product/ingredient name	Result	Species	Dose	Exposure
Trimethylbenzene, all isomers	LD50 Oral	Rat	8970 mg/kg	-
Naphthalene	LD50 Oral	Rat	490 mg/kg	-
Biphenyl	LD50 Dermal	Rabbit	>5010 mg/kg	-
	LD50 Oral	Rat	2140 mg/kg	-
Cumene	LC50 Inhalation Vapor	Mouse	10 g/m³	7 hours
	LD50 Dermal	Rabbit	12300 uL/kg	-
	LD50 Oral	Rat	2.9 g/kg	-
	LD50 Oral	Rat	4000 mg/kg	-
Xylenes, mixed isomers	LC50 Inhalation Gas.	Cat	9500 ppm	2 hours
	LC50 Inhalation Gas.	Rat	5000 ppm	4 hours
	LC50 Inhalation Gas.	Rat	6700 ppm	4 hours
	LC50 Inhalation Gas.	Rat	6670 ppm	4 hours
	LD50 Oral	Mouse	2119 mg/kg	-
	LD50 Oral	Rat	4300 mg/kg	-
	LD50 Oral	Rat	4300 mg/kg	-
Ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-

Conclusion/Summary : No additional information.

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Trimethylbenzene, all isomers	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
Naphthalene	Skin - Mild irritant	Rabbit	-	495 milligrams	-
Biphenyl	Eyes - Mild irritant	Rabbit	-	100 milligrams	-
	Skin - Severe irritant	Rabbit	-	24 hours 500 microliters	-
Cumene	Eyes - Mild irritant	Rabbit	-	86 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 10 milligrams	-
Xylenes, mixed isomers	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Moderate irritant	Rabbit	-	100 Percent	-
Ethylbenzene	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-

Skin : No additional information.

Eyes : No additional information.

Respiratory : No additional information.

Sensitization

Skin : No additional information.

Respiratory : No additional information.

Mutagenicity

Conclusion/Summary : No additional information.

Carcinogenicity

Conclusion/Summary :

Section 11. Toxicological information

Diesel exhaust particulate: Lung tumor and lymphomas were identified in rats and mice exposed to unflitered diesel fuel exhaust in chronic inhalation studies. Further, epidemiological studies have identified increase incidences of lung cancer in US railroad workers and bladder cancer in bus and truck drivers possibly associated with exposure to diesel engine exhaust. NTP has determined that exposure to diesel exhaust particulates, a complex mixture of combustion products of diesel fuel, is reasonably anticipated to be a human carcinogen. In addition, NIOSH has identified complete diesel exhaust as a potential carcinogen.

Classification

Product/ingredient name	OSHA	IARC	NTP
Fuels, diesel, No 2	-	3	-
Diesel exhaust particulate	-	1	Reasonably anticipated to be a human carcinogen.
Naphthalene	-	2B	Reasonably anticipated to be a human carcinogen.
Cumene	-	2B	Reasonably anticipated to be a human carcinogen.
Xylenes, mixed isomers	-	3	-
Ethylbenzene	-	2B	-

Reproductive toxicity

Conclusion/Summary : No additional information.

Teratogenicity

Conclusion/Summary : No additional information.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
Trimethylbenzene, all isomers	Category 3	Not applicable.	Respiratory tract irritation and Narcotic effects
Biphenyl	Category 3	Not applicable.	Respiratory tract irritation
Cumene	Category 3	Not applicable.	Respiratory tract irritation
Ethylbenzene	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
Fuels, diesel, No 2	Category 2	Not determined	central nervous system (CNS)
Trimethylbenzene, all isomers	Category 2	Not determined	central nervous system (CNS)
Xylenes, mixed isomers	Category 2	Not determined	ears

Aspiration hazard

Name	Result
Trimethylbenzene, all isomers	ASPIRATION HAZARD - Category 1
Cumene	ASPIRATION HAZARD - Category 1
Ethylbenzene	ASPIRATION HAZARD - Category 1
propylbenzene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Routes of entry anticipated: Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes eye irritation.

Inhalation : Harmful if inhaled. Long-term exposure to diesel engine exhaust may cause cancer.

Skin contact : Causes skin irritation.

Section 11. Toxicological information

Ingestion : May be fatal if swallowed and enters airways. Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : Adverse symptoms may include the following:
nausea or vomiting

Potential chronic health effects

General : May cause damage to organs through prolonged or repeated exposure.

Carcinogenicity : Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Trimethylbenzene, all isomers	Acute LC50 5600 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
Naphthalene	Acute EC50 1600 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 2350 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 213 µg/l Fresh water	Fish - Melanotaenia fluviatilis - Larvae	96 hours
	Chronic NOEC 0.67 ppm Fresh water	Fish - Oncorhynchus kisutch	40 days
Biphenyl	Acute LC50 360 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 1450 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Chronic NOEC 0.17 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	21 days
	Chronic NOEC 0.229 mg/l Fresh water	Fish - Oncorhynchus mykiss	87 days
Cumene	Acute EC50 2600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 7400 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute EC50 10600 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 2700 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
Xylenes, mixed isomers	Acute EC50 90 mg/l Fresh water	Crustaceans - Cypris subglobosa	48 hours
	Acute LC50 8.5 ppm Marine water	Crustaceans - Palaemonetes pugio - Adult	48 hours
	Acute LC50 8500 µg/l Marine water	Crustaceans - Palaemonetes pugio	48 hours
	Acute LC50 15700 µg/l Fresh water	Fish - Lepomis macrochirus -	96 hours

Section 12. Ecological information

		Juvenile (Fledgling, Hatchling, Weanling)	
	Acute LC50 19000 µg/l Fresh water	Fish - Lepomis macrochirus	96 hours
	Acute LC50 13400 µg/l Fresh water	Fish - Pimephales promelas	96 hours
	Acute LC50 16940 µg/l Fresh water	Fish - Carassius auratus	96 hours
Ethylbenzene	Acute EC50 4600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 3600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 2930 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 5200 µg/l Marine water	Crustaceans - Americamysis bahia	48 hours
	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
	Chronic NOEC 1000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours

Conclusion/Summary : Not available.

Persistence and degradability

Not available.

Conclusion/Summary : Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Fuels, diesel, No 2	>3.3	-	low
Trimethylbenzene, all isomers	3.4 to 3.8	-	low
Naphthalene	3.4	36.5 to 168	low
Biphenyl	4.008	1900	high
Cumene	3.55	94.69	low
Xylenes, mixed isomers	3.12	8.1 to 25.9	low
Ethylbenzene	3.6	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

RCRA classification : D001, D018

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	NA1993	UN 1202	UN 1202
UN proper shipping name	NA 1993, Diesel Fuel, 3, PG III	UN 1202, Diesel Fuel, 3, PG III	UN 1202, Diesel Fuel, 3, PG III
Transport hazard class(es)	3 	3 	3 
Packing group	III	III	III
Environmental hazards	No.	Yes.	No.
Additional information	**Packaging instruction** **Passenger aircraft** Quantity limitation: 60 L Packaging instructions: Y309 **Cargo aircraft** Quantity limitation: 220 L Packaging instructions: 310 **Remarks** 49 CFR 173.150 (f)(1) states that a flammable liquid with a flash point at or above 38ºC (100ºF) that does not meet the definition of any other hazard class may be reclassed as a combustible liquid. This provision does not apply to transportation by vessel or aircraft except where other means of transportaion is impracticable.	-	**Cargo Aircraft Only**Quantity limitation: 220 L Packaging instructions: 310 **Limited Quantities - Passenger Aircraft**Quantity limitation: 60 L Packaging instructions: 309Y

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b)**: All components are listed or exempted.

Clean Water Act (CWA) 307: Ethylbenzene; Naphthalene; Toluene; Benzene

Clean Water Act (CWA) 311: Ethylbenzene; Xylenes, mixed isomers; Naphthalene; Toluene; Benzene

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

Section 15. Regulatory information

SARA 302/304

Composition/information on ingredients

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

Name	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Fuels, diesel, No 2	Yes.	No.	No.	Yes.	Yes.
Trimethylbenzene, all isomers	Yes.	No.	No.	Yes.	Yes.
Naphthalene	Yes.	No.	No.	Yes.	Yes.
Biphenyl	No.	No.	No.	Yes.	No.
Cumene	Yes.	No.	No.	Yes.	Yes.
Xylenes, mixed isomers	Yes.	No.	No.	Yes.	Yes.
Ethylbenzene	Yes.	No.	No.	Yes.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	Naphthalene Ethylbenzene	91-20-3 100-41-4	<1 <1
Supplier notification	Naphthalene Ethylbenzene	91-20-3 100-41-4	<1 <1

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : The following components are listed: Trimethylbenzene, all isomers; Ethyltoluene

New York : The following components are listed: Ethylbenzene; Cumene; Benzene, 1-methylethyl-; Naphthalene

New Jersey : The following components are listed: Ethylbenzene; Cumene; NAPHTHALENE; TRIMETHYL BENZENE (mixed isomers); BENZENE, TRIMETHYL-; ETHYLTOLUENES; BENZENE, ETHYLMETHYL-

Pennsylvania : The following components are listed: Ethylbenzene; Cumene; NAPHTHALENE; Trimethylbenzene, all isomers; Ethyltoluene

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.
WARNING: This product contains less than 1% of a chemical known to the State of California to cause birth defects or other reproductive harm.

Ingredient name	%	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Naphthalene	<1	Yes.	No.	Yes.	No.
Cumene	<1	Yes.	No.	No.	No.
Ethylbenzene	<1	Yes.	No.	41 µg/day (ingestion) 54 µg/day (inhalation)	No.
Diesel exhaust particulate	<1	Yes.	No.	No.	No.
Toluene	<0.1	No.	Yes.	No.	7000 µg/day (ingestion)
Benzene	<0.1	Yes.	Yes.	6.4 µg/day (ingestion)	24 µg/day (ingestion) 49 µg/day

Section 15. Regulatory information

				13 µg/day (inhalation)	(inhalation)

International regulations

International lists : **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.

Canada inventory : All components are listed or exempted.

EU Inventory : All components are listed or exempted.

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).

Section 16. Other information

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

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of issue/Date of revision : 7/29/2015.

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Notice to reader

THE INFORMATION IN THIS SAFETY DATA SHEET (SDS) WAS OBTAINED FROM SOURCES WHICH WE BELIEVE ARE RELIABLE. HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESSED OR IMPLIED REGARDING ITS CORRECTNESS OR ACCURACY. SOME INFORMATION PRESENTED AND CONCLUSIONS DRAWN HEREIN ARE FROM SOURCES OTHER THAN DIRECT TEST DATA ON THE SUBSTANCE ITSELF. THIS SDS WAS PREPARED AND IS TO BE USED ONLY FOR THIS PRODUCT. IF THE PRODUCT IS USED AS A COMPONENT IN ANOTHER PRODUCT, THIS SDS INFORMATION MAY NOT BE APPLICABLE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION OR PRODUCTS FOR THEIR PARTICULAR PURPOSE OR APPLICATION.

Section 16. Other information

THE CONDITIONS OR METHODS OF HANDLING, STORAGE, USE, AND/OR DISPOSAL OF THE PRODUCT ARE BEYOND OUR CONTROL AND MAY BE BEYOND OUR KNOWLEDGE. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR ANY LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.

Blood-forming organs.
Immune system.
Possible risk of irreversible (genetic) effects. May cause cancer. May cause leukaemia (AML - acute myelogenous leukaemia).

Signs and Symptoms : Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. The onset of respiratory symptoms may be delayed for several hours after exposure. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death. Damage to blood-forming organs may be evidenced by: a) fatigue and anaemia (RBC), b) decreased resistance to infection, and/or excessive bruising and bleeding (platelet effect). Heart damage may be evidenced by shortness of breath and, in severe cases, by collapse (cardiac arrest).

Environmental Hazards : Toxic to aquatic organisms.

4. FIRST AID MEASURES

General Information : Keep victim calm. Obtain medical treatment immediately.

Inhalation : DO NOT DELAY. Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.

Skin Contact : Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

Eye Contact : Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. Transport to the nearest medical facility for additional treatment.

Ingestion : If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.

Advice to Physician : Potential for chemical pneumonitis. Consider: gastric lavage with protected airway, administration of activated charcoal. Potential for cardiac sensitisation, particularly in abuse situations. Hypoxia or negative inotropes may enhance these effects. Consider: oxygen therapy.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point : -11 °C / 12 °F (Abel)

Explosion / Flammability : 1.4 - 7.1 %(V)

limits in air		
Auto ignition temperature	:	562 °C / 1,044 °F
Specific Hazards	:	The vapour is heavier than air, spreads along the ground and distant ignition is possible. Will float and can be reignited on surface water. Carbon monoxide may be evolved if incomplete combustion occurs.
Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Additional Advice	:	Keep adjacent containers cool by spraying with water.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Observe all relevant local and international regulations.

Protective measures	:	Isolate hazard area and deny entry to unnecessary or unprotected personnel. Stay upwind and keep out of low areas. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Ventilate contaminated area thoroughly.
Clean Up Methods	:	For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
Additional Advice	:	Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. The vapour is heavier than air, spreads along the ground and distant ignition is possible. Vapour may form an explosive mixture with air. U.S. regulations may require reporting releases of this material to the environment which exceed the reportable quantity (refer to Chapter 15) to the National

Response Centre at (800) 424-8802.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing of or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Avoid inhaling vapour and/or mists. Avoid contact with skin, eyes, and clothing. Avoid exposure. Obtain special instructions before use. Extinguish any naked flames. Do Not smoke. Remove ignition sources. Avoid sparks. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations.

Storage : Vapours from tanks should not be released to atmosphere. Breathing losses during storage should be controlled by a suitable vapour treatment system. Bulk storage tanks should be diked (bunded). The vapour is heavier than air. Beware of accumulation in pits and confined spaces.

Product Transfer : Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<= 1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations.

Recommended Materials : For containers, or container linings use mild steel, stainless steel.

Unsuitable Materials : Natural, butyl, neoprene or nitrile rubbers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Benzene	ACGIH	TWA	0.5 ppm		
	ACGIH	STEL	2.5 ppm		
	ACGIH	SKIN			Can be absorbed through the skin
	OSHA	TWA	1 ppm		
	OSHA	STEL	5 ppm		
	OSHA	ACTION	0.5 ppm		

	OSHA Z1A	TWA	1 ppm		
	OSHA Z1A	STEL	5 ppm		

Additional Information : Skin notation means that significant exposure can also occur by absorption of liquid through the skin and of vapour through the eyes or mucous membranes. Shell has adopted as Interim Standards, the OSHA PELs that were established in 1989 and later rescinded.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Adequate explosion-proof ventilation to control airborne concentrations. Firewater monitors and deluge systems are recommended. Eye washes and showers for emergency use.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)]. Where respiratory protective equipment is required, use a full-face mask. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1920.134.

Hand Protection : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: Longer term protection: Viton. Incidental contact/Splash protection: Nitrile rubber. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.

Eye Protection : Chemical splash goggles (chemical monogoggles).

Protective Clothing : Chemical resistant gloves/gauntlets, boots, and apron. Where risk of splashing or in spillage clean up, use chemical resistant one-piece overall with integral hood.

Environmental Exposure Controls : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Colourless Liquid
Odour	:	Aromatic
Odour threshold	:	2.7 ppm
Boiling point	:	80.1 °C / 176.2 °F
Freezing Point	:	5.6 °C / 42.0 °F
Flash point	:	-11 °C / 12 °F (Abel)
Explosion / Flammability limits in air	:	1.4 - 7.1 %(V)
Auto-ignition temperature	:	562 °C / 1,044 °F
Vapour pressure	:	10 kPa at 20 °C / 68 °F
Specific gravity	:	0.8787 at 20 °C / 68 °F
Density	:	885 kg/m3 at 15 °C / 59 °F
Water solubility	:	0.1 g/l Negligible. 1.8 kg/m3 at 25 °C / 77 °F
n-octanol/water partition coefficient (log Pow)	:	1.95 - 2.13
Kinematic viscosity	:	0.65 mm2/s at 20 °C / 68 °F
Vapour density (air=1)	:	2.7 at 15 °C / 59 °F
Electrical conductivity	:	< 50 pS/m at 20 °C / 68 °F
Saturated Vapour concentration (in air)	:	99000 PPM_M at 20 °C / 68 °F
Evaporation rate (nBuAc=1)	:	2.8
Surface tension	:	0.03 N/m
Molecular weight	:	78 g/mol

10. STABILITY AND REACTIVITY

Stability	:	Stable under normal conditions of use. Reacts violently with strong oxidising agents.
Conditions to Avoid	:	Avoid heat, sparks, open flames and other ignition sources. Prevent vapour accumulation.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on product testing.
Acute Oral Toxicity	:	Low toxicity: LD50 >2000 mg/kg , Rat (Benzene) Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.
Acute Dermal Toxicity	:	Low toxicity: LD50 >2000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Low toxicity: LC50>5000 ppm / 1 hours, Rat High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea;

		continued inhalation may result in unconsciousness and/or death.
Skin Irritation	:	Irritating to skin.
Eye Irritation	:	Irritating to eyes.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation to the respiratory system.
Sensitisation	:	Not expected to be a skin sensitiser.
Repeated Dose Toxicity	:	Blood-forming organs: repeated exposure affects the bone marrow. Blood: may cause haemolysis of red blood cells and/or anaemia. Cardiovascular system: chronic abuse of similar materials has been associated with irregular heart rhythms and cardiac arrest. Immune System: animal studies on this material or its components have demonstrated immunotoxicity.
Mutagenicity	:	Mutagenic; positive in in-vivo and in-vitro assays.
Carcinogenicity	:	Known human carcinogen. May cause leukaemia (AML - acute myelogenous leukaemia).

Material	:	**Carcinogenicity Classification**
Benzene	:	ACGIH Group A1: Confirmed human carcinogen.
Benzene	:	NTP: Known carcinogen.
Benzene	:	IARC 1: Human carcinogen.
Benzene	:	OSHASP: Cancer hazard.

Reproductive and Developmental Toxicity	:	Causes foetotoxicity in animals at doses which are maternally toxic. Does not impair fertility.

12. ECOLOGICAL INFORMATION

Acute Toxicity	:	
Fish	:	Toxic: 1 < LC/EC/IC50 <= 10 mg/l
Aquatic Invertebrates	:	Harmful: 10 < LC/EC/IC50 <= 100 mg/l
Algae	:	Harmful: 10 < LC/EC/IC50 <= 100 mg/l
Microorganisms	:	Harmful: 10 < LC/EC/IC50 <= 100 mg/l
Mobility	:	Floats on water. If product enters soil, it will be highly mobile and may contaminate groundwater.
Persistence/degradability	:	Readily biodegradable meeting the 10 day window criterion.
Bioaccumulation	:	Does not bioaccumulate significantly.
Other Adverse Effects	:	In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with

applicable regulations.

Local Legislation : Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)

Identification number	UN 1114
Proper shipping name	Benzene
Class / Division	3
Packing group	II
Hazardous subst./material RQ:	BENZENE/10.00 LB
Emergency Response Guide .	130

IMDG

Identification number	UN 1114
Proper shipping name	BENZENE
Class / Division	3
Packing group	II
Marine pollutant:	No

IATA (Country variations may apply)

Identification number	UN 1114
Proper shipping name	Benzene
Class / Division	3
Packing group	II

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material

Federal Regulatory Status

Notification Status

AICS	Listed.	
DSL	Listed.	
INV (CN)	Listed.	
ENCS (JP)	Listed.	(3)-1
TSCA	Listed.	
EINECS	Listed.	200-753-7
KECI (KR)	Listed.	97-1-99
KECI (KR)	Listed.	KE-02150
PICCS (PH)	Listed.	

Comprehensive Environmental Release, Compensation & Liability Act (CERCLA)

Benzene (71-43-2)	Reportable quantity: 10 lbs
Benzene (71-43-2)	Reportable quantity: 10 lbs

Clean Water Act (CWA) Section 311

Benzene (71-43-2)	Reportable quantity: 10 lbs
Benzene (71-43-2)	Reportable quantity: 10 lbs

SARA Hazard Categories (311/312)

Immediate (Acute) Health Hazard. Delayed (Chronic) Health Hazard. Fire Hazard.

SARA Toxic Release Inventory (TRI) (313)

Benzene (71-43-2)	100.00%

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

Known to the State of California to cause birth defects or other reproductive harm.
Known to the state of California to cause cancer

Benzene (71-43-2)	100.00%	Carcinogenic. Developmental toxin. Male reproductive toxin.

New Jersey Right-To-Know Chemical List

Benzene (71-43-2)	100.00%

Pennsylvannia Right-To-Know Chemical List

Benzene (71-43-2)	100.00%	Special hazard. Environmental hazards Listed.

16. OTHER INFORMATION

HMIS Rating (Health, Fire, Reactivity)	:	2, 3, 0
NFPA Rating (Health, Fire, Reactivity)	:	2, 3, 0
MSDS Version Number	:	23
MSDS Effective Date	:	06/30/2003
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.

MSDS Regulation	:	The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
Uses and Restrictions	:	Raw material for use in the chemical industry.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product
Disclaimer	:	The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

ATOFINA
ATOFINA Petrochemicals, Inc.

Material Safety Data Sheet

Section 1. Chemical Product and Company Identification

Trade name	**Ethylbenzene**
Supplier	ATOFINA Petrochemicals, Inc. P O Box 674411 Houston,Tx. 77267-4411
Synonym	Ethylbenzene, Phenylethane, EB
MSDS Name	Ethylbenzene
Chemical Family	Aromatic.
CAS Registry Number	100-41-4
Threshold Limit Value	TWA: 100 ppm from OSHA (PEL) TWA: 100 STEL: 125 ppm from ACGIH (TLV) TWA: 435 STEL: 545 mg/m^3 from NIOSH TWA: 100 STEL: 125 ppm from NIOSH Immediately Dangerous to Life and Health: 800 ppm from NIOSH
Manufacturer	ATOFINA Styrene Joint Venture P.O. Box 98 Carville, LA 70721

Code	ETHYLBENZENE
MSDS#	P81
Validation Date	**8/2/2002**
Print Date	8/2/2002
Responsible for Preparation	**Paul Bradley**

In Case of Emergency	**Chemtrec:** (800) 424-9300 **ATOFINA Petrochemicals:** (800) 322-FINA
Technical Information	Carville: 225-642-4300

Section 2. Composition and Information on Ingredients

Name	CAS #	% by Weight	Exposure Limits
1) Ethylbenzene	100-41-4	99-99.9	TWA: 100 ppm from OSHA (PEL) TWA: 100 STEL: 125 ppm from ACGIH (TLV) TWA: 435 STEL: 545 mg/m^3 from NIOSH TWA: 100 STEL: 125 ppm from NIOSH Immediately Dangerous to Life and Health: 800 ppm from NIOSH
2) Benzene	71-43-2	0.1-1	TWA: 1.6 STEL: 5 (mg/m^3) from ACGIH (TLV) TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) SKIN TWA: 1.6 STEL: 8 (mg/m^3) from ACGIH TWA: 1 STEL: 5 (ppm) from OSHA

Section 3. Hazards Identification

Physical State and Appearance	Liquid. (Liquid)
Emergency Overview	HIGHLY FLAMMABLE LIQUID AND VAPOR, VAPOR MAY CAUSE FLASH FIRE. BIRTH DEFECT HAZARD CONTAINS MATERIAL WHICH CAN CAUSE BIRTH DEFECT CONTAINS MATERIAL WHICH CAN CAUSE SPECIFIC ORGAN OR SYSTEM DAMAGE: (blood, kidneys, lungs, the nervous system, liver, upper respiratory tract, skin, eyes). MAY CAUSE EYE IRRITATION. MAY CAUSE ALLERGIC RESPIRATORY REACTION. MAY CAUSE RESPIRATORY TRACT IRRITATION
Routes of Entry	Eye contact. Ingestion. Inhalation. Skin contact.
Potential Acute Health Effects	
Eyes	Hazardous in case of eye contact (severe irritant).
Skin	Hazardous in case of skin contact (irritant). Severe over-exposure can result in death. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.
Inhalation	Very hazardous in case of inhalation. Hazardous in case of inhalation (lung irritant and sensitizer). May be fatal if inhaled.
Ingestion	Very hazardous in case of ingestion. May be fatal if swallowed. Possible pneumonia if vomited.
Potential Chronic Health Effects	**CARCINOGENIC EFFECTS**: NTP: Yes. Classified 2b (Possibly carcinogenic to humans) by IARC, NONE by OSHA [Ethylbenzene]. This material may contain small amounts of benzene, which is known human carcinogen. **MUTAGENIC EFFECTS**Not available. **TERATOGENIC EFFECTS** Not available.
Medical Conditions Aggravated by Overexposure	Not available.

Continued on Next Page

Overexposure /Signs/Symptoms	Headaches, dizziness, fatigue, eye, nose and throat irritation. Target organs: Eyes, upper respiratory system, skin, CNS, lung, liver, kidney, skin (dermatitis), eye (conjuntivitis and other eye injuries), upper respiratory system disorders, and central nervous system disorders.
See Toxicological Information (Section 11)	

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Seek medical attention.
Skin Contact	If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. Wash thoroughly with soap and water. Launder contaminated clothes.
Inhalation	Allow the victim to rest in a well ventilated area. Seek immediate medical attention. If the victim is not breathing, perform mouth-to-mouth resuscitation.
Ingestion	DO NOT induce vomiting or give liquids. 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.
Notes to Physician	Ingestion: cautious gastric lavage followed by administration of activated charcoal may be of benefit if the patient is seen soon after the exposure. Inhalation: if bronchospasm and wheezing occur, consider treatment with inhaled sympathomimetic agents. If pulmonary edema (noncardiogenic) occurs, then maintain ventilation and oxygenation with close arterial blood gas monitoring. Early use of PEEP and mechanical ventilation may be needed to maintain pO2 greater than 50 mmHG with FIO2 less than 60%.

Section 5. Fire Fighting Measures

Flammability of the Product	Flammable.
Auto-ignition Temperature	432°C (809.6°F)
Flash Points	CLOSED CUP: 12.8°C (55°F). (Tagliabue.). OPEN CUP: 21°C (69.8°F).
Flammable Limits	LOWER: 1.3% UPPER: 7.1%
Products of Combustion	These products are carbon oxides (CO, CO2).
Fire Hazards in Presence of Various Substances	Extremely flammable in presence of open flames and sparks, or heat.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not expected. Risks of explosion of the product in presence of static discharge: Expected.
Fire Fighting Media and Instructions	Flammable liquid. SMALL FIRE: Use DRY chemicals, CO2, alcohol foam, water spray, or halon. LARGE FIRE: Use alcohol foam, water spray or fog.
Protective Clothing (Fire)	Wear MSHA/NIOSH approved self-contained breathing apparatus or equivalent and full protective gear.
Special Remarks on Fire Hazards	Flammable.
Special Remarks on Explosion Hazards	No additional remark.

Section 6. Accidental Release Measures

Small Spill and Leak	Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill and Leak	Flammable liquid, insoluble in water. Contain spill and safely stop the flow. Warn personnel to move away. Eliminate all sources of ignition. Ventilate. Absorb with DRY earth, sand or other non-combustible material.

Section 7. Handling and Storage

Handling	Keep locked up. DO NOT ingest. Do not breathe gas, fumes, vapor or spray. 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. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.
Storage	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.

Continued on Next Page

Section 8. Exposure Controls/Personal Protection

Engineering Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection

Eyes Splash goggles. Safety glasses.

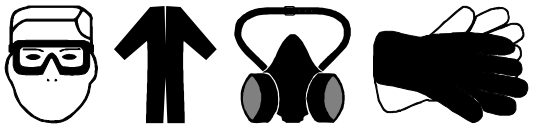
Body Flame retardant clothing covering the entire body.

Respiratory At high concentrations be sure to use a MSHA/NIOSH approved respirator or equivalent.

Hands Gloves (impervious).

Feet Non-slip safety shoes in areas where spills or leaks can occur.

Protective Clothing (Pictograms)



Personal Protection in Case of a Large Spill

Splash goggles. Full suit. Vapor and 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.

Product Name	Exposure Limits
1) Ethylbenzene, Phenylethane, EB	TWA: 100 ppm from OSHA (PEL) TWA: 100 STEL: 125 ppm from ACGIH (TLV) TWA: 435 STEL: 545 mg/m³ from NIOSH TWA: 100 STEL: 125 ppm from NIOSH Immediately Dangerous to Life and Health: 800 ppm from NIOSH
2) Benzene	TWA: 1.6 STEL: 5 (mg/m³) from ACGIH (TLV) TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) SKIN TWA: 1.6 STEL: 8 (mg/m³) from ACGIH TWA: 1 STEL: 5 (ppm) from OSHA

Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Liquid. (Liquid)
Molecular Weight	Not applicable.
Molecular Formula	C6H5-CH2-CH3

Odor	Sweet (aromatic) odor.
Taste	Not available.
Color	Colorless liquid with distinctive aromatic odor

pH (1% Soln/Water)	Not applicable.
Boiling/Condensation Point	136.11°C (277°F)
Melting/Freezing Point	-95°C (-139°F)
Critical Temperature	343.89°C (651°F)
Specific Gravity	0.864 (Water = 1)
Vapor Pressure	10 mm of Hg (@ 25.6°C)
Vapor Density	3.66 (Air = 1)
Volatility	100% (v/v).
Odor Threshold	Not available.
Evaporation Rate	94 times slower compared to Ethylether
VOC	100 (%)
Viscosity	Not available.
$LogK_{ow}$	The product is more soluble in oil; log(oil/water) = 3.1
Ionicity (in Water)	Not available.
Dispersion Properties	Not available.
Solubility in Water	Negligible.
Physical Chemical Comments	No additional remark.

Continued on Next Page

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Avoid heat, sparks, & static electricity.
Incompatibility with Various Substances	Reactive with oxidizing agents.
Hazardous Decomposition Products	Carbon monoxide & carbon dioxide.
Hazardous Polymerization	No.

Section 11. Toxicological Information

Toxicity to Animals	Acute oral toxicity (LD50): 5.46 g/kg [Rat]. Skin toxicity (LD50): 17.8 g/kg [Rabbit].
Chronic Effects on Humans	**CARCINOGENIC EFFECTS**: NTP: Yes. Classified 2b (Possibly carcinogenic to humans) by IARC, NONE by OSHA [Ethylbenzene]. This material may contain small amounts of benzene, which is known human carcinogen. **MUTAGENIC EFFECTS**Not available. **DEVELOPMENTAL TOXICITY**: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [PROVEN] [Benzene]. This substance is toxic to blood, kidneys, lungs, the nervous system, liver, brain, upper respiratory tract, skin, eyes.
Other Toxic Effects on Humans	Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (permeator), of eye contact (irritant). Slightly hazardous in case of skin contact (irritant). Aspiration of even a small amt of ethylbenzene may cause severe injury, since its low viscosity and surface tension will cause it to spread over a large surface of pulmonary tissue.
Special Remarks on Toxicity to Animals	NTP has concluded that kidney tumors in rats exposed in chronic inhalation studies indicate clear evidence of carcinogenic activity.
Special Remarks on Chronic Effects on Humans	No additional remark.
Special Remarks on Other Toxic Effects on Humans	Possible cardiac and dermal sensitizer (benzene).

Section 12. Ecological Information

Ecotoxicity	ECOTOXICITY VALUES (HSDB, 1996; CHRIS, 1996): LC50, Lepomis macrochirus, 32 mg/L/96 hr; LC50, Carassius auratus, 94.44 mg/L/96 hr; LC50, Lebistes reticulatus, 97.10 mg/L/96 hr; LC50, Mysidopsis bahia (shrimp), 87.6 mg/L/96 hr; LC50, Cyprinodon variegatus (sheepshead minnow), 275 mg/L/96 hr; LC50, Pimephales promelas (fathead minnow), 42.3 (hard water) to 48.5 (soft water) mg/L/96 hr; LC50, Poecilla reticulata (guppy), 97.1 mg/L/96 hr; LC50, Palemonetes pugio (grass shrimp, adult), 14,400 mcg/L/24 hr;LC50, Palaemonetes pugio (grass shrimp, larva), 10,200 mcg/L/24 hr; LC50, fathead minnows, 12.1 mg/L/96 hr.
BOD5 and COD	Not available.
Biodegradable/OECD	Biodegradation of ethylbenzene is fairly rapid in sewage or activated sludge inoculua. It is totally degraded in groundwater in 8 days and seawater in 10 days.
Mobility	In the atmosphere, it exists primarily in the vapor phase based on its vapor pressure. It photochemically degrades by reaction with hydroxyl radicals (half-life 0.5 to 2 days) and partially returns to the earth in rain. Degradation occurs faster under smog conditions. Photooxidation products include ethylphenol, benzaldehyde, acetophenone and m- and p-ethylnitrobenzene. In water, ethylbenzene's concentration decreases by evaporation and biodegradation. The rate of decrease is dependent on the season. Half-lives in water range from several days to 2 weeks. Some ethylbenzene is absorbed by sediment, but bioconcentration in fish is not expected to be significant. Ethylbenzene is adsorbed moderately by soil. It does not significantly hydrolyze in either water or soil. 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	No additional remark.

Continued on Next Page

Section 13. Disposal Considerations

Waste Information	Recover free liquid. Transfer to a safe disposal area in accordance with federal, state, and local regulations.
Waste Stream	Recover free liquid. Transfer to a safe disposal area in accordance with federal, state, and local regulations.

Consult your local or regional authorities.

Section 14. Transport Information

DOT Classification	DOT CLASS 3: Flammable liquid.
DOT Proper Shipping Name	Ethylbenzene, 3, UN1175, PGII RQ
UN Number	UN1175
Packing Group	II
USCG Proper Shipping Name	Ethylbenzene
Marine Pollutant	Not listed in Appendix B to 49 CFR 172.101.
Hazardous Substances Reportable Quantity	454 Kg
Special Provisions for Transport	No additional remark.
TDG Classification	Not available.
ADR/RID Classification	Not available.
IMO/IMDG Classification	Not available.
ICAO/IATA Classification	Not available.

Section 15. Regulatory Information

HCS Classification	HCS CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F). HCS CLASS: Target organ effects. HCS CLASS: Reproductive toxins.
U.S. Federal Regulations	TSCA inventory: **All components are listed on TSCA inventory.** TSCA 8(a) PAIR: **Ethylbenzene** SARA 313 toxic chemical notification and release reporting: **Ethylbenzene** 1% Clean water act (CWA) 307: No products were found. Clean water act (CWA) 311: No products were found. Clean air act (CAA) 112 accidental release prevention: No products were found. Clean air act (CAA) 112 regulated flammable substances: No products were found. Clean air act (CAA) 112 regulated toxic substances: No products were found.
International Regulations	
WHMIS (Canada)	WHMIS CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). WHMIS CLASS D-2A: Material causing other toxic effects (VERY TOXIC).
	CEPA DSL: Ethylbenzene Canadian NPRI: Ethylbenzene
EINECS	Not available.
DSCL (EEC)	R11- Highly flammable. R18- In use, may form flammable/explosive vapor-air mixture. R48- Danger of serious damage to health by prolonged exposure.
International Lists	No products were found.
State Regulations	

Continued on Next Page

Pennsylvania RTK: **Ethylbenzene**
Florida: **Ethylbenzene**
Minnesota: **Ethylbenzene**
Michigan critical material: **Benzene**
Massachusetts RTK: **Ethylbenzene**
New Jersey: **Ethylbenzene**

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: **Benzene**

Section 16. Other Information

Label requirements

HIGHLY FLAMMABLE LIQUID AND VAPOR, VAPOR MAY CAUSE FLASH FIRE.
BIRTH DEFECT HAZARD
CONTAINS MATERIAL WHICH CAN CAUSE BIRTH DEFECT
CONTAINS MATERIAL WHICH CAN CAUSE SPECIFIC ORGAN OR SYSTEM DAMAGE: (blood, kidneys, lungs, the nervous system, liver, upper respiratory tract, skin, eyes).
MAY CAUSE EYE IRRITATION.
MAY CAUSE ALLERGIC RESPIRATORY REACTION.
MAY CAUSE RESPIRATORY TRACT IRRITATION

Hazardous Material Information System (U.S.A.)

Health	*	2
Fire Hazard		3
Reactivity		0
Personal Protection		

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

References

- NIOSH Pocket Guide
-HSDB - Hazardous Substances Data Bank
-RTECS - Registry of Toxic Effects of Chemicals Substances

Other Special Considerations

No additional remark.

Validated by Paul Bradley on 8/2/2002.

Verified by Paul Bradley.

Printed 8/2/2002.

Chemtrec:
(800) 424-9300
ATOFINA Petrochemicals:
(800) 322-FINA

Notice to Reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards th

APPENDIX E

Construction Documents with Erosion and Storm Water Control

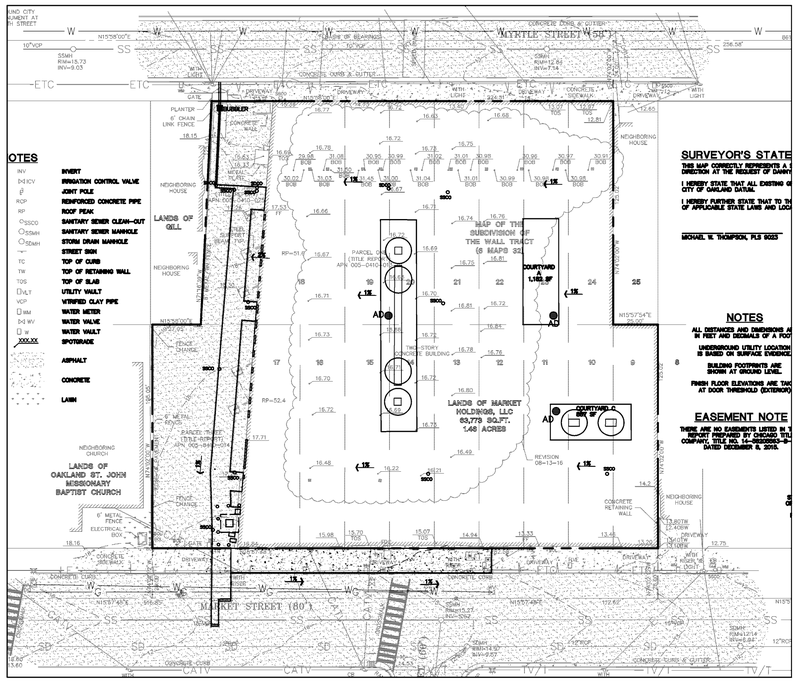
1919 MARKET STREET
OAKLAND, CALIFORNIA

LEGEND

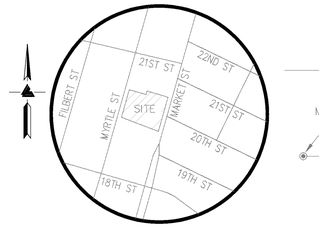
EXISTING	PROPOSED	DESCRIPTION
		BOUNDARY
		PROPERTY LINE
		RETAINING WALL
		LANDSCAPE RETAINING WALL
	RW RW	RAINWATER TIGHTLINE
	SUB	SUBDRAIN LINE
	TL	TIGHTLINE
SD	SD	STORM DRAIN LINE
SS	SS	SANITARY SEWER LINE
W	W	WATER LINE
G	G	GAS LINE
P	P	PRESSURE LINE
JT	JT	JOINT TRENCH
		SET BACK LINE
		CONCRETE VALLEY GUTTER
		EARTHEN SWALE
CB	CB	CATCH BASIN
JB	JB	JUNCTION BOX
AD	AD	AREA DRAIN
SDMH	SDMH	STORM DRAIN MANHOLE
SSMH	SSMH	FIRE HYDRANT
222.57 INV	222.57 INV	SANITARY SEWER MANHOLE
		STREET SIGN
		SPOT ELEVATION
		FLOW DIRECTION
	D	DEMOLISH/REMOVE
		BENCHMARK
200	200	CONTOURS
XX" TREE	XX" TREE	TREE TO BE REMOVED

ABBREVIATIONS

AB	AGGREGATE BASE	LF	LINEAR FEET
AC	ASPHALT CONCRETE	MAX	MAXIMUM
ACC	ACCESSIBLE	MH	MANHOLE
AD	AREA DRAIN	MIN	MINIMUM
BC	BEGINNING OF CURVE	MON.	MONUMENT
B & D	BEARING & DISTANCE	(N)	NEW
BM	BENCHMARK	NO.	NUMBER
BW/FG	BOTTOM OF WALL/FINISH	NTS	NOT TO SCALE
GRADE		O.C.	ON CENTER
CB	CATCH BASIN	O/	OVER
C & G	CURB AND GUTTER	(PA)	PLANTING AREA
℄	CENTER LINE	PED	PEDESTRIAN
CPP	CORRUGATED PLASTIC PIPE (SMOOTH INTERIOR)	PIV	POST INDICATOR VALVE
		PSS	PUBLIC SERVICES EASEMENT
CO	CLEANOUT	ℙ	PROPERTY LINE
COTG	CLEANOUT TO GRADE	PP	POWER POLE
CONC	CONCRETE	PUE	PUBLIC UTILITY EASEMENT
CONST	CONSTRUCT or –TION	PVC	POLYVINYL CHLORIDE
CONC COR	CONCRETE CORNER	R	RADIUS
CY	CUBIC YARD	RCP	REINFORCED CONCRETE PIPE
D	DIAMETER	RIM	RIM ELEVATION
DI	DROP INLET	RW	RAINWATER
DIP	DUCTILE IRON PIPE	R/W	RIGHT OF WAY
EA	EACH	S	SLOPE
EC	END OF CURVE	S.A.D.	SEE ARCHITECTURAL DRAWINGS
EG	EXISTING GRADE	SAN	SANITARY
EL	ELEVATIONS	SD	STORM DRAIN
EP	EDGE OF PAVEMENT	SDMH	STORM DRAIN MANHOLE
EQ	EQUIPMENT	SHT	SHEET
EW	EACH WAY	S.L.D.	SEE LANDSCAPE DRAWINGS
(E)	EXISTING	SPEC	SPECIFICATION
FC	FACE OF CURB	SS	SANITARY SEWER
FF	FINISHED FLOOR	SSCO	SANITARY SEWER CLEANOUT
FG	FINISHED GRADE	SSMH	SANITARY SEWER MANHOLE
FH	FIRE HYDRANT	ST.	STREET
FL	FLOW LINE	STA	STATION
FS	FINISHED SURFACE	STD	STANDARD
G	GAS	STRUCT	STRUCTURAL
GA	GAGE OR GAUGE	T	TELEPHONE
GB	GRADE BREAK	TC	TOP OF CURB
HDPE	HIGH DENSITY CORRUGATED POLYETHYLENE PIPE	TEMP	TEMPORARY
		TP	TOP OF PAVEMENT
HORIZ	HORIZONTAL	TW/FG	TOP OF WALL/FINISH GRADE
HI PT	HIGH POINT	TYP	TYPICAL
H&T	HUB & TACK	VC	VERTICAL CURVE
ID	INSIDE DIAMETER	VCP	VITRIFIED CLAY PIPE
INV	INVERT ELEVATION	VERT	VERTICAL
JB	JUNCTION BOX	W/	WITH
JT	JOINT TRENCH	W, WL	WATER LINE
JP	JOINT UTILITY POLE	WM	WATER METER
L	LENGTH	WWF	WELDED WIRE FABRIC
LNDG	LANDING		



KEY MAP
1" = 40'



VICINITY MAP
NO SCALE

OWNER'S INFORMATION
OWNER:
DANNY HABER
PIER 54, SUITE 202
SAN FRANCISCO, CA

APN: 005–0410–013–0,–014,&–025

REFERENCES
THIS UTILITY PLAN IS SUPPLEMENTAL TO:
1. TOPOGRAPHIC SURVEY BY LEA & BRAZE ENGINEERING, INC. ENTITLED;
"THREE PARCELS"
1919 MARKET STREET
OAKLAND, CA
DATED: 2–11–16
JOB# 2151061

2. SITE PLAN BY LEA & BRAZE ENGINEERING, INC. ENTITLED:
"THREE PARCELS"
1919 MARKET STREET
OAKLAND, CA

THE CONTRACTOR SHALL REFER TO THE ABOVE NOTED SURVEY AND PLAN, AND SHALL VERIFY BOTH EXISTING AND PROPOSED ITEMS ACCORDING TO THEM.

ESTIMATED EARTHWORK QUANTITIES

CUBIC YARDS	WITHIN BUILDING FOOTPRINT	OUTSIDE BUILDING FOOTPRINT	TOTAL CUBIC YARDS
CUT	170	40	210
FILL	0	0	0
EXPORT			210

NOTE:
GRADING QUANTITIES REPRESENT BANK YARDAGE. IT DOES NOT INCLUDE ANY SWELLING OR SHRINKAGE FACTORS AND IS INTENDED TO REPRESENT IN–SITU CONDITIONS. QUANTITIES DO NOT INCLUDE OVER–EXCAVATION, TRENCHING, STRUCTURAL FOUNDATIONS OR PIERS, OR POOL EXCAVATION (IF ANY). NOTE ADDITIONAL EARTHWORKS, SUCH AS KEYWAYS OR BENCHING MAY BE REQUIRED BY THE GEOTECHNICAL ENGINEER IN THE FIELD AT TIME OF CONSTRUCTION. CONTRACTOR TO VERIFY QUANTITIES.

SHEET INDEX

ENGINEER'S STATEMENT–GEOTECHNICAL DESIGN

INITIAL STATEMENT OF THE ENGINEER (DIVIDED RESPONSIBILITY)

I HAVE BEEN RETAINED BY TO BE
IN RESPONSIBLE CHARGE OF THE PORTIONS OF GRADING WORK ENUMERATED BELOW. I WILL ASSUME FULL RESPONSIBILITY AS RESPONSIBILITY IS DEFINED IN SECTION 2–6.075 OF THE OAKLAND MUNICIPAL CODE FOR CARRYING OUT THE FOLLOWING TO THE BEST OF MY KNOWLEDGE AND ABILITY:

(A) ASSURING THAT TESTING AND INSPECTION REQUIRED FOR THE WORK IN PROGRESS AND THE COMPLETED WORK SHALL BE ACCOMPLISHED IN A PROFESSIONAL MANNER TO DETERMINE WHETHER ALL THE WORK IS BEING/WAS DONE IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR OF PUBLIC WORKS.

(B) NOTIFYING THE APPLICANT, VERBALLY AND IN WRITING (WITH A COPY TO THE DIRECTOR OF PUBLIC WORKS), OF ANY WORK NOT BEING PERFORMED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.

(C) NOTIFYING THE APPLICANT, VERBALLY AND IN WRITING (WITH A COPY TO THE DIRECTOR OF PUBLIC WORKS), OF ANY WORK NOT MEETING THE REQUIREMENTS OF THE APPROVED PLANS AND SPECIFICATIONS.

(D) NOTIFYING THE APPLICANT, VERBALLY AND IN WRITING, OF THE MODIFICATION(S) REQUIRED IN HIS PERFORMANCE AND THE NECESSARY CORRECTIVE MEASURES TO BE TAKEN TO CURE ALL DEFICIENCIES.

(E) (BY PROJECT CIVIL ENGINEER)

(F) (BY PROJECT CIVIL ENGINEER)

(G) (BY PROJECT CIVIL ENGINEER)

(H) (BY PROJECT CIVIL ENGINEER)

IF MY SERVICES ON THE JOB ARE TERMINATED, I WILL, AT SAID TIME OF TERMINATION, SUBMIT TO THE DIRECTOR OF PUBLIC WORKS, A STATEMENT OF PARTIAL COMPLETION ADDRESSING THE PROGRESS AND CONDITIONS OF ALL OF THE APPLICABLE ITEMS ABOVE AND ATTACH THERETO THE RESULTS OF SUCH INSPECTIONS AND TESTS WHICH HAVE BEEN COMPLETED.

SIGNED: _____
REGISTERED CIVIL ENGINEER NO. _____ (EXP. _____)

(TO BE STAMPED AND SIGNED BY PROJECT GEOTECHNICAL CONSULTANT)

ENGINEER'S STATEMENT – CIVIL DESIGN

INITIAL STATEMENT OF THE ENGINEER (DIVIDED RESPONSIBILITY)

I HAVE BEEN RETAINED BY TO BE
IN RESPONSIBLE CHARGE OF THE PORTIONS OF GRADING WORK ENUMERATED BELOW. I WILL ASSUME FULL RESPONSIBILITY AS RESPONSIBILITY IS DEFINED IN SECTION 2–6.075 OF THE OAKLAND MUNICIPAL CODE FOR CARRYING OUT THE FOLLOWING TO THE BEST OF MY KNOWLEDGE AND ABILITY:

(A) (BY PROJECT GEOTECHNICAL CONSULTANT)

(B) (BY PROJECT GEOTECHNICAL CONSULTANT)

(C) (BY PROJECT GEOTECHNICAL CONSULTANT)

(D) (BY PROJECT GEOTECHNICAL CONSULTANT)

(E) SUBMITTING AN AMENDED GRADING PLAN (THROUGH THE APPLICANT) TO THE CITY ENGINEER FOR HIS REVIEW AND APPROVAL FOR ANY SIGNIFICANT CHANGES CAUSED BY UNFORESEEN CONDITIONS, ALONG WITH A REPORT SETTING FORTH THE REASONS FOR THESE CHANGES AND THE RECOMMENDED CHANGES TO THE IMPROVEMENT PLANS ENGENDERED AS A RESULT OF THE AMENDED GRADING PLAN.

(F) NOTIFYING THE APPLICANT, VERBALLY AND IN WRITING (WITH A COPY TO THE CITY ENGINEER), OF ANY PORTION OF THE GRADING WORK AFFECTED BY THE AMENDED PLANS AND SHALL RECOMMEND WHETHER OR NOT THE APPLICANT SHOULD PROCEED WITH THE WORK BEFORE THE AMENDED PLANS ARE APPROVED BY THE CITY ENGINEER.

(G) SUBMITTING UPON THE APPLICANT'S SATISFACTORY COMPLETION OF WORK UNDER THE PERMIT, A STATEMENT OF COMPLETION PURSUANT TO SECTION 2–6.111 OF THE OAKLAND MUNICIPAL CODE WITH THE RESULTS OF ALL TESTS AND INSPECTIONS ATTACHED THERETO.

(H) STATING IN WRITING, ALONG WITH THE STATEMENT OF COMPLETION, THAT THE INTERIM EROSION CONTROL AND SEDIMENT CONTROL MEASURES APPEAR TO BE ADEQUATE IF PROPERLY MAINTAINED UNTIL THE PERMANENT EROSION CONTROL MEASURES ARE FULLY ESTABLISHED, IF ANY ARE REQUIRED.

IF MY SERVICES ON THE JOB ARE TERMINATED, I WILL, AT SAID TIME OF TERMINATION, SUBMIT TO THE CITY ENGINEER, A STATEMENT OF PARTIAL COMPLETION ADDRESSING THE PROGRESS AND CONDITIONS OF ALL OF THE APPLICABLE ITEMS ABOVE AND ATTACH THERETO THE RESULTS OF SUCH INSPECTIONS AND TESTS WHICH HAVE BEEN COMPLETED.

SIGNED: RAYMOND BARRO
REGISTERED CIVIL ENGINEER NO. C68283 (EXP. 09–30–17)

*** BUILDING PAD NOTE:**
ADJUST PAD LEVEL AS REQUIRED. REFER TO STRUCTURAL PLANS FOR SLAB SECTION OR CRAWL SPACE DEPTH TO ESTABLISH PAD LEVEL.

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT GREG BRAZE AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116. aabaya@leabraze.com

1–800–227–2600 CALL BEFORE YOU DIG USA UNDERGROUND SERVICE ALERT

REGISTERED PROFESSIONAL ENGINEER PETER CARLINO No. C79555 CIVIL STATE OF CALIFORNIA ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS
BAY AREA REGION
2495 INDUSTRIAL PKWY WEST
HAYWARD, CALIFORNIA 94545
(P) (510) 887–4086
(F) (510) 887–7676

SACRAMENTO REGION
3017 DOUGLAS BLVD, # 300
ROSEVILLE, CA 95661
(P) (916) 966–1338
(F) (916) 797–7363
WWW.LEABRAZE.COM

THREE PARCELS
1919 MARKET STREET
OAKLAND, CALIFORNIA
APN: 005–0410–013–0,–014,&–025
ALAMEDA COUNTY

TITLE SHEET

REVISIONS	BY
–	–
–	–
–	–
–	–
–	–

JOB NO: 2160934
DATE: 09–22–16
SCALE: AS NOTED
DESIGN BY: VL
DRAWN BY: RP
SHEET NO:

C–1.0
01 OF 8 SHEETS

CONSTRUCTION DOCUMENT 11-23-16

GENERAL NOTES

ALL GENERAL NOTES, SHEET NOTES, AND LEGEND NOTES FOUND IN THESE DOCUMENTS SHALL APPLY TYPICALLY THROUGHOUT. IF INCONSISTENCIES ARE FOUND IN THE VARIOUS NOTATIONS, NOTIFY THE ENGINEER IMMEDIATELY IN WRITING REQUESTING CLARIFICATION.

THESE DRAWINGS AND THEIR CONTENT ARE AND SHALL REMAIN THE PROPERTY OF LEA AND BRAZE ENGINEERING, INC. WHETHER THE PROJECT FOR WHICH THEY ARE PREPARED IS EXECUTED OR NOT. THEY ARE NOT TO BE USED BY ANY PERSONS ON OTHER PROJECTS OR EXTENSIONS OF THE PROJECT EXCEPT BY AGREEMENT IN WRITING AND WITH APPROPRIATE COMPENSATION TO THE ENGINEER.

ALL WORK SHALL COMPLY WITH APPLICABLE CODES AND TRADE STANDARDS WHICH GOVERN EACH PHASE OF WORK INCLUDING, BUT NOT LIMITED TO, CALIFORNIA MECHANICAL CODE, CALIFORNIA PLUMBING CODE, CALIFORNIA ELECTRICAL CODE, CALIFORNIA FIRE CODE, CALTRANS STANDARDS AND SPECIFICATIONS, AND ALL APPLICABLE STATE AND/OR LOCAL CODES AND/OR LEGISLATION.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND ALL SUBCONTRACTORS TO CHECK AND VERIFY ALL CONDITIONS, DIMENSIONS, LINES AND LEVELS INDICATED. PROPER FIT AND ATTACHMENT OF ALL PARTS IS REQUIRED. SHOULD THERE BE ANY DISCREPANCIES, IMMEDIATELY NOTIFY THE ENGINEER FOR CORRECTION OR ADJUSTMENT THE EVENT OF FAILURE TO DO SO, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CORRECTION OF ANY ERROR.

ALL DIMENSIONS AND CONDITIONS SHALL BE CHECKED AND VERIFIED ON THE JOB BY EACH SUBCONTRACTOR BEFORE HE/SHE BEGINS HIS/HER WORK. ANY ERRORS, OMISSION, OR DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER/CONTRACTOR BEFORE CONSTRUCTION BEGINS.

COMMENCEMENT OF WORK BY THE CONTRACTOR AND/OR ANY SUBCONTRACTOR SHALL INDICATE KNOWLEDGE AND ACCEPTANCE OF ALL CONDITIONS DESCRIBED IN THESE CONSTRUCTION DOCUMENTS, OR EXISTING ON SITE, WHICH COULD AFFECT THEIR WORK.

WORK SEQUENCE

IN THE EVENT ANY SPECIAL SEQUENCING OF THE WORK IS REQUIRED BY THE OWNER OR THE CONTRACTOR, THE CONTRACTOR SHALL ARRANGE A CONFERENCE BEFORE ANY SUCH WORK IS BEGUN.

SITE EXAMINATION: THE CONTRACTOR AND ALL SUBCONTRACTORS SHALL THOROUGHLY EXAMINE THE SITE AND FAMILIARIZE HIM/HERSELF WITH THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. THE CONTRACTOR SHALL VERIFY AT THE SITE ALL MEASUREMENTS AFFECTING HIS/HER WORK AND SHALL BE RESPONSIBLE FOR THE CORRECTIONS OF THE SAME. NO EXTRA COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR EXPENSES DUE TO HIS/HER NEGLECT TO EXAMINE, OR FAILURE TO DISCOVER, CONDITIONS WHICH AFFECT HIS/HER WORK.

LEA AND BRAZE ENGINEERING, INC. EXPRESSLY RESERVES ITS COMMON LAW COPYRIGHT AND OTHER PROPERTY RIGHTS IN THESE PLANS. THESE PLANS ARE NOT TO BE REPRODUCED, CHANGED OR COPIED IN ANY FORM OR MANNER WHATSOEVER, NOR ARE THEY TO BE ASSIGNED TO A THIRD PARTY WITHOUT FIRST OBTAINING THE WRITTEN PERMISSION AND CONSENT OF LEA AND BRAZE ENGINEERING, INC. IN THE EVENT OF UNAUTHORIZED REUSE OF THESE PLANS BY A THIRD PARTY, THE THIRD PARTY SHALL HOLD HARMLESS LEA AND BRAZE ENGINEERING, INC.

CONSTRUCTION IS ALWAYS LESS THAN PERFECT SINCE PROJECTS REQUIRE THE COORDINATION AND INSTALLATION OF MANY INDIVIDUAL COMPONENTS BY VARIOUS CONSTRUCTION INDUSTRY TRADES. THESE DOCUMENTS CANNOT PORTRAY ALL COMPONENTS OR ASSEMBLIES EXACTLY. IT IS THE INTENTION OF THESE ENGINEERING DOCUMENTS THAT THEY REPRESENT A REASONABLE STANDARD OF CARE IN THEIR CONTENT. IT IS ALSO PRESUMED BY THESE DOCUMENTS THAT CONSTRUCTION REVIEW SERVICES WILL BE PROVIDED BY THE ENGINEER. SHOULD THE OWNER NOT RETAIN THE ENGINEER TO PROVIDE SUCH SERVICES, OR SHOULD HE/SHE RETAIN THE ENGINEER TO PROVIDE ONLY PARTIAL OR LIMITED SERVICES, THEN IT SHALL BE THE OWNER'S AND CONTRACTOR'S RESPONSIBILITY TO FULLY RECOGNIZE AND PROVIDE THAT STANDARD OF CARE.

IF THE OWNER OR CONTRACTOR OBSERVES OR OTHERWISE BECOMES AWARE OF ANY FAULT OR DEFECT IN THE PROJECT OR NONCONFORMANCE WITH THE CONTRACT DOCUMENTS, PROMPT WRITTEN NOTICE THEREOF SHALL BE GIVEN BY THE OWNER AND/OR CONTRACTOR TO THE ENGINEER.

THE ENGINEER SHALL NOT HAVE CONTROL OF OR CHARGE OF AND SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES, OR FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTORS, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

SITE PROTECTION

PROTECT ALL LANDSCAPING THAT IS TO REMAIN. ANY DAMAGE OR LOSS RESULTING FROM EXCAVATION, GRADING, OR CONSTRUCTION WORK SHALL BE CORRECTED OR REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION OF ALL EXISTING SITE UTILITIES AND SHALL COORDINATE THEIR REMOVAL OR MODIFICATIONS (IF ANY) TO AVOID ANY INTERRUPTION OF SERVICE TO ADJACENT AREAS. THE GENERAL CONTRACTOR SHALL INFORM HIM/HERSELF OF MUNICIPAL REGULATIONS AND CARRY OUT HIS/HER WORK IN COMPLIANCE WITH ALL FEDERAL AND STATE REQUIREMENTS TO REDUCE FIRE HAZARDS AND INJURIES TO THE PUBLIC.

STORMWATER POLLUTION PREVENTION NOTES

1) STORE, HANDLE, AND DISPOSE OF CONSTRUCTION MATERIALS AND WASTES PROPERLY, SO AS TO PREVENT THEIR CONTACT WITH STORMWATER.

2) CONTROL AND PREVENT THE DISCHARGE OF ALL POTENTIAL POLLUTANTS, INCLUDING SOLID WASTES, PAINTS, CONCRETE, PETROLEUM PRODUCTS, CHEMICALS, WASH WATER OR SEDIMENT, AND NON-STORMWATER DISCHARGES TO STORM DRAINS AND WATER COURSES.

3) USE SEDIMENT CONTROL OR FILTRATION TO REMOVE SEDIMENT FROM DEWATERING EFFLUENT.

4) AVOID CLEANING, FUELING, OR MAINTAINING VEHICLES ON SITE, EXCEPT IN A DESIGNATED AREA IN WHICH RUNOFF IS CONTAINED AND TREATED.

5) DELINEATE CLEARING LIMITS, EASEMENTS, SETBACKS, SENSITIVE OR CRITICAL AREAS, BUFFER ZONES, TREES AND DISCHARGE COURSE WITH FIELD MARKERS.

6) PROTECT ADJACENT PROPERTIES AND UNDISTURBED AREAS FROM CONSTRUCTION IMPACTS USING VEGETATIVE BUFFER STRIPS, SEDIMENT BARRIERS OF FILTERS, DIKES, MULCHING, OR OTHER MEASURES AS APPROPRIATE.

7) PERFORM CLEARING AND EARTH MOVING ACTIVITIES DURING DRY WEATHER TO THE MAXIMUM EXTENT PRACTICAL.

8) LIMIT AND TIME APPLICATIONS OF PESTICIDES AND FERTILIZERS TO PREVENT POLLUTED RUNOFF.

9) LIMIT CONSTRUCTION ACCESS ROUTES AND STABILIZE DESIGNATED ACCESS POINTS.

10) AVOID TRACKING DIRT OR MATERIALS OFF-SITE; CLEAN OFF-SITE PAVED AREAS AND SIDEWALKS USING DRY SWEEPING METHODS TO THE MAXIMUM EXTENT PRACTICAL.

SUPPLEMENTAL MEASURES

A. THE PHRASE "NO DUMPING – DRAINS TO BAY" OR EQUALLY EFFECTIVE PHRASE MUST BE LABELED ON STORM DRAIN INLETS (BY STENCILING, BRANDING, OR PLAQUES) TO ALERT THE PUBLIC TO THE DESTINATION OF STORM WATER AND TO PREVENT DIRECT DISCHARGE OF POLLUTANTS INTO THE STORM DRAIN.

B. USING FILTRATION MATERIALS ON STORM DRAIN COVERS TO REMOVE SEDIMENT FROM DEWATERING EFFLUENT.

C. STABILIZING ALL DENUDED AREAS AND MAINTAINING EROSION CONTROL MEASURES CONTINUOUSLY FROM OCTOBER 15 AND APRIL 15.

D. REMOVING SPOILS PROMPTLY, AND AVOID STOCKPILING OF FILL MATERIALS, WHEN RAIN IS FORECAST. IF RAIN THREATENS, STOCKPILED SOILS AND OTHER MATERIALS SHALL BE COVERED WITH A TARP OR OTHER WATERPROOF MATERIAL.

E. STORING, HANDLING, AND DISPOSING OF CONSTRUCTION MATERIALS AND WASTES SO AS TO AVOID THEIR ENTRY TO THE STORM DRAIN SYSTEMS OR WATER BODY.

F. AVOIDING CLEANING, FUELING, OR MAINTAINING VEHICLES ON-SITE, EXCEPT IN AN AREA DESIGNATED TO CONTAIN AND TREAT RUNOFF.

GRADING & DRAINAGE NOTES:

1. SCOPE OF WORK

THESE SPECIFICATIONS AND APPLICABLE PLANS PERTAIN TO AND INCLUDE ALL SITE GRADING AND EARTHWORK ASSOCIATED WITH THE PROJECT INCLUDING, BUT NOT LIMITED TO THE FURNISHING OF ALL LABOR, TOOLS AND EQUIPMENT NECESSARY FOR SITE CLEARING AND GRUBBING, SITE PREPARATION, DISPOSAL OF EXCESS OR UNSUITABLE MATERIAL, STRIPPING, KEYING, EXCAVATION, OVER EXCAVATION, RECOMPACTION PREPARATION FOR SOIL RECEIVING FILL, PAVEMENT, FOUNDATION OF SLABS, EXCAVATION, IMPORTATION OF ANY REQUIRED FILL MATERIAL, PROCESSING, PLACEMENT AND COMPACTION OF FILL AND SUBSIDIARY WORK NECESSARY TO COMPLETE THE GRADING TO CONFORM TO THE LINES, GRADING AND SLOPE SHOWN ON THE PROJECT GRADING PLANS.

2. GENERAL

A. ALL SITE GRADING AND EARTHWORK SHALL CONFORM TO THE RECOMMENDATIONS OF THESE SPECIFICATIONS.

B. ALL FILL MATERIALS SHALL BE DENSIFIED SO AS TO PRODUCE A DENSITY NOT LESS THAN 90% RELATIVE COMPACTION BASED UPON ASTM TEST DESIGNATION D1557. FIELD DENSITY TEST WILL BE PERFORMED IN ACCORDANCE WITH ASTM TEST DESIGNATION 2922 AND 3017. THE LOCATION AND FREQUENCY OF THE FIELD DENSITY TEST WILL BE AS DETERMINED BY THE SOIL ENGINEER. THE RESULTS OF THESE TEST AND COMPLIANCE WITH THE SPECIFICATIONS WILL BE THE BASIS UPON WHICH SATISFACTORY COMPLETION OF THE WORK WILL BE JUDGED BY THE SOIL ENGINEER. ALL CUT AND FILL SLOPES SHALL BE CONSTRUCTED AS SHOWN ON PLANS, BUT NO STEEPER THAN TWO (2) HORIZONTAL TO ONE (1) VERTICAL.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SATISFACTORY COMPLETION OF ALL THE EARTHWORK IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS. NO DEVIATION FROM THESE SPECIFICATIONS SHALL BE MADE EXCEPT UPON WRITTEN APPROVAL BY THE SOILS ENGINEER. BOTH CUT AND FILL AREAS SHALL BE SURFACE COMPLETED TO THE SATISFACTION OF THE SOILS ENGINEER AT THE CONCLUSION OF ALL GRADING OPERATIONS AND PRIOR TO FINAL ACCEPTANCE. THE CONTRACTOR SHALL NOTIFY THE SOILS ENGINEER AT LEAST TWO (2) WORKING DAYS PRIOR TO DOING ANY SITE GRADING AND EARTHWORK INCLUDING CLEARING.

3. CLEARING AND GRUBBING

A. THE CONTRACTOR SHALL ACCEPT THE SITE IN ITS PRESENT CONDITION. ALL EXISTING PUBLIC IMPROVEMENTS SHALL BE PROTECTED. ANY IMPROVEMENTS DAMAGED SHALL BE REPLACED BY THE CONTRACTOR AS DIRECTED BY THE LOCAL JURISDICTION WITH NO EXTRA COMPENSATION.

B. ALL ABANDONED BUILDINGS AND FOUNDATIONS, TREE (EXCEPT THOSE SPECIFIED TO REMAIN FOR LANDSCAPING PURPOSES), FENCES, VEGETATION AND ANY SURFACE DEBRIS SHALL BE REMOVED AND DISPOSED OF OFF THE SITE BY THE CONTRACTOR.

C. ALL ABANDONED SEPTIC TANKS AND ANY OTHER SUBSURFACE STRUCTURES EXISTING IN PROPOSED DEVELOPMENT AREAS SHALL BE REMOVED PRIOR TO ANY GRADING OR FILL OPERATION. ALL APPURTENANT DRAIN FIELDS AND OTHER CONNECTING LINES MUST ALSO BE TOTALLY REMOVED.

D. ALL ABANDONED UNDERGROUND IRRIGATION OR UTILITY LINES SHALL BE REMOVED OR DEMOLISHED. THE APPROPRIATE FINAL DISPOSITION OF SUCH LINES DEPEND UPON THEIR DEPTH AND LOCATION AND THE METHOD OF REMOVAL OR DEMOLITION SHALL BE DETERMINED BY THE SOILS ENGINEER. ONE OF THE FOLLOWING METHODS WILL BE USED:

   (1) EXCAVATE AND TOTALLY REMOVE THE UTILITY LINE FROM THE TRENCH.

   (2) EXCAVATE AND CRUSH THE UTILITY LINE IN THE TRENCH.

   (3) CAP THE ENDS OF THE UTILITY LINE WITH CONCRETE TO PREVENT THE ENTRANCE OF WATER. THE LOCATIONS AT WHICH THE UTILITY LINE WILL BE CAPPED WILL BE DETERMINED BY THE UTILITY DISTRICT ENGINEER. THE LENGTH OF THE CAP SHALL NOT BE LESS THAN FIVE FEET, AND THE CONCRETED MIX EMPLOYED SHALL HAVE MINIMUM SHRINKAGE.

4. SITE PREPARATION AND STRIPPING

A. ALL SURFACE ORGANICS SHALL BE STRIPPED AND REMOVED FROM BUILDING PADS, AREAS TO RECEIVE COMPACTED FILL AND PAVEMENT AREAS.

B. UPON THE COMPLETION OF THE ORGANIC STRIPPING OPERATION, THE GROUND SURFACE (NATIVE SOIL SUBGRADE) OVER THE ENTIRE AREA OF ALL BUILDING PADS, STREET AND PAVEMENT AREAS AND ALL AREAS TO RECEIVE COMPACTED FILL SHALL BE PLOWED OR SCARIFIED UNTIL THE SURFACE IS FREE OF RUTS, HUMMOCKS OR OTHER UNEVEN FEATURES WHICH MAY INHIBIT UNIFORM SOIL COMPACTION. THE GROUND SURFACE SHALL THEN BE DISCED OR BLADED TO A DEPTH OF AT LEAST 6 INCHES. UPON ENGINEER'S SATISFACTION, THE NEW SURFACE SHALL BE WATER CONDITIONED AND RECOMPACTED PER REQUIREMENTS FOR COMPACTING FILL MATERIAL.

5. EXCAVATION

A. UPON COMPLETION OF THE CLEARING AND GRUBBING, SITE PREPARATION AND STRIPPING, THE CONTRACTOR SHALL MAKE EXCAVATIONS TO LINES AND GRADES NOTED ON THE PLAN. WHERE REQUIRED BY THE SOILS ENGINEER, UNACCEPTABLE NATIVE SOILS OR UNENGINEERED FILL SHALL BE OVER EXCAVATED BELOW THE DESIGN GRADE. SEE PROJECT SOILS REPORT FOR DISCUSSION OF OVER EXCAVATION OF THE UNACCEPTABLE MATERIAL. RESULTING GROUND LINE SHALL BE SCARIFIED, MOISTURE-CONDITIONED AND RECOMPACTED AS SPECIFIED IN SECTION 4 OF THESE SPECIFICATIONS. COMPACTED FILL MATERIAL SHALL BE PLACED TO BRING GROUND LEVEL BACK TO DESIGN GRADE.

B. EXCAVATED MATERIALS SUITABLE FOR COMPACTED FILL MATERIAL SHALL BE UTILIZED IN MAKING THE REQUIRED COMPACTED FILLS. THOSE NATIVE MATERIALS CONSIDERED UNSUITABLE BY THE SOILS ENGINEER SHALL BE DISPOSED OF OFF THE SITE BY THE CONTRACTOR.

6. PLACING, SPREADING AND COMPACTING FILL MATERIAL

A. FILL MATERIALS

THE MATERIALS PROPOSED FOR USE AS COMPACTED FILL SHALL BE APPROVED BY THE SOILS ENGINEER BEFORE COMMENCEMENT OF GRADING OPERATIONS. THE NATIVE MATERIAL IS CONSIDERED SUITABLE FOR FILL; HOWEVER, ANY NATIVE MATERIAL DESIGNATED UNSUITABLE BY THE SOILS ENGINEER SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR. ANY IMPORTED MATERIAL SHALL BE APPROVED FOR USE BY THE SOILS ENGINEER, IN WRITING, BEFORE BEING IMPORTED TO THE SITE AND SHALL POSSESS SUFFICIENT FINES TO PROVIDE A COMPETENT SOIL MATRIX AND SHALL BE FREE OF VEGETATIVE AND ORGANIC MATTER AND OTHER DELETERIOUS MATERIALS. ALL FILL VOIDS SHALL BE FILLED AND PROPERLY COMPACTED. NO ROCKS LARGER THAN THREE INCHES IN DIAMETER SHALL BE PERMITTED.

B. FILL CONSTRUCTION

THE SOILS ENGINEER SHALL APPROVE THE NATIVE SOIL SUBGRADE BEFORE PLACEMENT OF ANY COMPACTED FILL MATERIAL. UNACCEPTABLE NATIVE SOIL SHALL BE REMOVED AS DIRECTED BY THE SOILS ENGINEER. THE RESULTING GROUND LINE SHALL BE SCARIFIED MOISTURE CONDITIONED AND RECOMPACTED AS SPECIFIED IN SECTION 4 OF THESE SPECIFICATIONS. COMPACTED FILL MATERIAL SHALL BE PLACED TO BRING GROUND LEVEL BACK TO DESIGN GRADE. GROUND PREPARATION SHALL BE FOLLOWED CLOSELY BY FILL PLACEMENT TO PREVENT DRYING OUT OF THE SUBSOIL BEFORE PLACEMENT OF THE FILL.

THE APPROVED FILL MATERIALS SHALL BE PLACED IN UNIFORM HORIZONTAL LAYERS NO THICKER THAN 8" IN LOOSE THICKNESS. LAYERS SHALL BE SPREAD EVENLY AND SHALL BE THOROUGHLY BLADE MIXED DURING THE SPREADING TO ENSURE UNIFORMITY OF MATERIAL IN EACH LAYER. THE SCARIFIED SUBGRADE AND FILL MATERIAL SHALL BE MOISTURE CONDITIONED TO AT LEAST OPTIMUM MOISTURE. WHEN THE MOISTURE CONTENT OF THE FILL IS BELOW THAT SPECIFIED, WATER SHALL BE ADDED UNTIL THE MOISTURE DURING THE COMPACTION PROCESS. WHEN THE MOISTURE CONTENT OF THE FILL IS ABOVE THAT SPECIFIED, THE FILL MATERIAL SHALL BE AERATED BY BLADING OR OTHER SATISFACTORY METHODS UNTIL THE MOISTURE CONTENT IS AS SPECIFIED.

AFTER EACH LAYER HAS BEEN PLACED, MIXED, SPREAD EVENLY AND MOISTURE CONDITIONED, IT SHALL BE COMPACTED TO AT LEAST THE SPECIFIED DENSITY.

THE FILL OPERATION SHALL BE CONTINUED IN COMPACTED LAYERS AS SPECIFIED ABOVE UNTIL THE FILL HAS BEEN BROUGHT TO THE FINISHED SLOPES AND GRADES AS SHOWN ON THE PLANS. NO LAYER SHALL BE ALLOWED TO DRY OUT BEFORE SUBSEQUENT LAYERS ARE PLACED.

COMPACTION EQUIPMENT SHALL BE OF SUCH DESIGN THAT IT WILL BE ABLE TO COMPACT THE FILL TO THE SPECIFIED MINIMUM COMPACTION WITHIN THE SPECIFIED MOISTURE CONTENT RANGE. COMPACTION OF EACH LAYER SHALL BE CONTINUOUS OVER ITS ENTIRE AREA UNTIL THE REQUIRED MINIMUM DENSITY HAS BEEN OBTAINED.

7. CUT OR FILL SLOPES

ALL CONSTRUCTED SLOPES, BOTH CUT AND FILL, SHALL BE NO STEEPER THAN 2 TO 1 (HORIZONTAL TO VERTICAL). DURING THE GRADING OPERATION, COMPACTED FILL SLOPES SHALL BE OVERFILLED BY AT LEAST ONE FOOT HORIZONTALLY AT THE COMPLETION OF THE GRADING OPERATIONS, THE EXCESS FILL EXISTING ON THE SLOPES SHALL BE BLADED OFF TO CREATE THE FINISHED SLOPE EMBANKMENT. ALL CUT AND FILL SLOPES SHALL BE TRACK WALKED AFTER BEING BROUGHT TO FINISH GRADE AND THEN BE PLANTED WITH EROSION CONTROL SLOPE PLANTING. THE SOILS ENGINEER SHALL REVIEW ALL CUT SLOPES TO DETERMINE IF ANY ADVERSE GEOLOGIC CONDITIONS ARE EXPOSED. IF SUCH CONDITIONS DO OCCUR, THE SOILS ENGINEER SHALL RECOMMEND THE APPROPRIATE MITIGATION MEASURES AT THE TIME OF THEIR DETECTION.

8. SEASONAL LIMITS AND DRAINAGE CONTROL

FILL MATERIALS SHALL NOT BE PLACED, SPREAD OR COMPACTED WHILE IT IS AT AN UNSUITABLY HIGH MOISTURE CONTENT OR DURING OTHERWISE UNFAVORABLE CONDITIONS. WHEN THE WORK IS INTERRUPTED FOR ANY REASON THE FILL OPERATIONS SHALL NOT BE RESUMED UNTIL FIELD TEST PERFORMED BY THE SOILS ENGINEER INDICATE THAT THE MOISTURE CONDITIONS IN AREAS TO BE FILLED ARE AS PREVIOUSLY SPECIFIED. ALL EARTH MOVING AND WORKING OPERATIONS SHALL BE CONTROLLED TO PREVENT WATER FROM RUNNING INTO EXCAVATED AREAS. ALL EXCESS WATER SHALL BE PROMPTLY REMOVED AND THE SITE KEPT DRY.

9. DUST CONTROL

THE CONTRACTOR SHALL TAKE ALL STEPS NECESSARY FOR THE ALLEVIATION OR PREVENTION OF ANY DUST NUISANCE ON OR ABOUT THE SITE CAUSED BY THE CONTRACTOR'S OPERATION EITHER DURING THE PERFORMANCE OF THE GRADING OR RESULTING FROM THE CONDITION IN WHICH THE CONTRACTOR LEAVES THE SITE. THE CONTRACTOR SHALL ASSUME ALL LIABILITY INCLUDING COURT COST OF CO-DEFENDANTS FOR ALL CLAIMS RELATED TO DUST OR WIND-BLOWN MATERIALS ATTRIBUTABLE TO HIS WORK. COST FOR THIS ITEM OF WORK IS TO BE INCLUDED IN THE EXCAVATION ITEM AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED.

10. INDEMNITY

THE CONTRACTOR WILL HOLD HARMLESS, INDEMNIFY AND DEFEND THE ENGINEER, THE OWNER AND HIS CONSULTANTS AND EACH OF THEIR OFFICERS AND EMPLOYEES AND AGENTS, FROM ANY AND ALL LIABILITY CLAIMS, LOSSES OR DAMAGE ARISING OR ALLEGED TO HEREIN, BUT NOT INCLUDING THE SOLE NEGLIGENCE OF THE OWNER, THE ARCHITECT, THE ENGINEER AND HIS CONSULTANTS AND EACH OF THEIR OFFICERS AND EMPLOYEES AND AGENTS.

11. SAFETY

IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR WILL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE. INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF THE WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

THE DUTY OF THE ENGINEERS TO CONDUCT CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES, IN, ON OR NEAR THE CONSTRUCTION SITE.

12. GUARANTEE

NEITHER THE FINAL PAYMENT, NOR THE PROVISIONS IN THE CONTRACT, NOR PARTIAL, NOR ENTIRE USE OR OCCUPANCY OF THE PREMISES BY THE OWNER SHALL CONSTITUTE AN ACCEPTANCE OF THE WORK NOT DONE IN ACCORDANCE WITH THE CONTRACT OR RELIEVES THE CONTRACTOR OF LIABILITY IN RESPECT TO ANY EXPRESS WARRANTIES OR RESPONSIBILITY FOR FAULTY MATERIAL OR WORKMANSHIP.

THE CONTRACTOR SHALL REMEDY ANY DEFECTS IN WORK AND PAY FOR ANY DAMAGE TO OTHER WORK RESULTING THERE FROM WHICH SHALL APPEAR WITHIN A PERIOD OF ONE (1) CALENDAR YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK.

13. TRENCH BACKFILL

EITHER THE ON-SITE INORGANIC SOIL OR APPROVED IMPORTED SOIL MAY BE USED AS TRENCH BACKFILL. THE BACKFILL MATERIAL SHALL BE MOISTURE CONDITIONED PER THESE SPECIFICATIONS AND SHALL BE PLACED IN LIFTS OF NOT MORE THAN SIX INCHES IN HORIZONTAL UNCOMPACTED LAYERS AND BE COMPACTED BY MECHANICAL MEANS TO A MINIMUM OF 90% RELATIVE COMPACTION. IMPORTED SAND MAY BE USED FOR TRENCH BACKFILL MATERIAL PROVIDED IT IS COMPACTED TO AT LEAST 90% RELATIVE COMPACTION. WATER JETTING ASSOCIATED WITH COMPACTION USING VIBRATORY EQUIPMENT WILL BE PERMITTED ONLY WITH IMPORTED SAND BACKFILL WITH THE APPROVAL OF THE SOILS ENGINEER. ALL PIPES SHALL BE BEDDED WITH SAND EXTENDING FROM THE TRENCH BOTTOM TO TWELVE INCHES ABOVE THE PIPE. SAND BEDDING IS TO BE COMPACTED AS SPECIFIED ABOVE FOR SAND BACKFILL.

14. EROSION CONTROL

A. ALL GRADING, EROSION AND SEDIMENT CONTROL AND RELATED WORK UNDERTAKEN ON THIS SITE IS SUBJECT TO ALL TERMS AND CONDITIONS OF THE COUNTY GRADING ORDINANCE AND MADE A PART HEREOF BY REFERENCE.

B. THE CONTRACTOR WILL BE LIABLE FOR ANY AND ALL DAMAGES TO ANY PUBLICLY OWNED AND MAINTAINED ROAD CAUSED BY THE AFORESAID CONTRACTOR'S GRADING ACTIVITIES, AND SHALL BE RESPONSIBLE FOR THE CLEANUP OF ANY MATERIAL SPILLED ON ANY PUBLIC ROAD ON THE HAUL ROUTE.

C. THE EROSION CONTROL MEASURES ARE TO BE OPERABLE DURING THE RAINY SEASON, GENERALLY FROM OCTOBER FIRST TO APRIL FIFTEENTH. EROSION CONTROL PLANTING IS TO BE COMPLETED BY OCTOBER FIRST. NO GRADING OR UTILITY TRENCHING SHALL OCCUR BETWEEN OCTOBER FIRST AND APRIL FIFTEENTH UNLESS AUTHORIZED BY THE LOCAL JURISDICTION.

D. ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL DISTURBED AREAS ARE STABILIZED AND CHANGES TO THIS EROSION AND SEDIMENT CONTROL PLAN SHALL BE MADE TO MEET FIELD CONDITIONS ONLY WITH THE APPROVAL OF OR AT THE DIRECTION OF THE SOILS ENGINEER.

E. DURING THE RAINY SEASON, ALL PAVED AREAS SHALL BE KEPT CLEAR OF EARTH MATERIAL AND DEBRIS. THE SITE SHALL BE MAINTAINED SO AS TO MINIMIZE SEDIMENT-LADEN RUNOFF TO ANY STORM DRAINAGE SYSTEM.

F. ALL EROSION CONTROL FACILITIES MUST BE INSPECTED AND REPAIRED AT THE END OF EACH WORKING DAY DURING THE RAINY SEASON.

G. WHEN NO LONGER NECESSARY AND PRIOR TO FINAL ACCEPTANCE OF DEVELOPMENT, SEDIMENT BASINS SHALL BE REMOVED OR OTHERWISE DEACTIVATED AS REQUIRED BY THE LOCAL JURISDICTION.

H. A CONSTRUCTION ENTRANCE SHALL BE PROVIDED AT ANY POINT OF EGRESS FROM THE SITE TO ROADWAY. A CONSTRUCTION ENTRANCE SHOULD BE COMPOSED OF COARSE DRAIN ROCK (2" TO 3") MINIMUM DIAMETER) AT LEAST EIGHT INCHES THICK BY FIFTY (50) FEET LONG BY TWENTY (20) FEET WIDE UNLESS SHOWN OTHERWISE ON PLAN AND SHALL BE MAINTAINED UNTIL THE SITE IS PAVED.

I. ALL AREAS SPECIFIED FOR HYDROSEEDING SHALL BE NOZZLE PLANTED WITH STABILIZATION MATERIAL CONSISTING OF FIBER, SEED, FERTILIZER AND WATER, MIXED AND APPLIED IN THE FOLLOWING PROPORTIONS:

   FIBER, 2000 LBS/ACRE
   SEED, 200 LBS/ACRE (SEE NOTE J, BELOW)
   FERTILIZER (11-8-4), 500 LBS/ACRE
   WATER, AS REQUIRED FOR APPLICATION

J. SEED MIX SHALL BE PER CALTRANS STANDARDS.

K. WATER UTILIZED IN THE STABILIZATION MATERIAL SHALL BE OF SUCH QUALITY THAT IT WILL PROMOTE GERMINATION AND STIMULATE GROWTH OF PLANTS. IT SHALL BE FREE OF POLLUTANT MATERIALS AND WEED SEED.

L. HYDROSEEDING SHALL CONFORM TO THE PROVISIONS OF SECTION 20, EROSION CONTROL AND HIGHWAY PLANTING", OF THE STANDARD SPECIFICATIONS OF THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION, AS LAST REVISED.

M. A DISPERSING AGENT MAY BE ADDED TO THE HYDROSEEDING MATERIAL, PROVIDED THAT THE CONTRACTOR FURNISHES SUITABLE EVIDENCE THAT THE ADDITIVE WILL NOT ADVERSELY AFFECT THE PERFORMANCE OF THE SEEDING MIXTURE.

N. STABILIZATION MATERIALS SHALL BE APPLIED AS SOON AS PRACTICABLE AFTER COMPLETION OF GRADING OPERATIONS AND PRIOR TO THE ONSET OF WINTER RAINS, OR AT SUCH OTHER TIME AS DIRECTED BY THE COUNTY ENGINEER. THE MATERIAL SHALL BE APPLIED BEFORE INSTALLATION OF OTHER LANDSCAPING MATERIALS SUCH AS TREES, SHRUBS AND GROUND COVERS.

O. THE STABILIZATION MATERIAL SHALL BE APPLIED WITHIN 4-HOURS AFTER MIXING. MIXED MATERIAL NOT USED WITHIN 4-HOURS SHALL BE REMOVED FROM THE SITE.

P. THE CONTRACTOR SHALL MAINTAIN THE SOIL STABILIZATION MATERIAL AFTER PLACEMENT. THE COUNTY ENGINEER MAY REQUIRE SPRAY APPLICATION OF WATER OR OTHER MAINTENANCE ACTIVITIES TO ASSURE THE EFFECTIVENESS OF THE STABILIZATION PROCESS. APPLICATION OF WATER SHALL BE ACCOMPLISHED USING NOZZLES THAT PRODUCE A SPRAY THAT DOES NOT CONCENTRATE OR WASH AWAY THE STABILIZATION MATERIALS.

15. CLEANUP

THE CONTRACTOR MUST MAINTAIN THE SITE CLEAN, SAFE AND IN USABLE CONDITION. ANY SPILLS OF SOIL, ROCK OR CONSTRUCTION MATERIAL MUST BE REMOVED FROM THE SITE BY THE CONTRACTOR DURING CONSTRUCTION AND UPON COMPLETION OF THE PROJECT. COST FOR THIS ITEM OF WORK SHALL BE INCLUDED IN THE EXCAVATION AND COMPACTION ITEM AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED.

NOTE:
THESE NOTES ARE INTENDED TO BE USED AS A GENERAL GUIDELINE. THE REFERENCED SOILS REPORT FOR THE PROJECT AND GOVERNING AGENCY GRADING ORDINANCE SHALL SUPERSEDE THESE NOTES. THE SOILS ENGINEER MAY MAKE ON-SITE RECOMMENDATIONS DURING GRADING OPERATIONS.

REGISTERED PROFESSIONAL ENGINEER
PETER CARLINO
No. C79555
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

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THREE PARCELS
1919 MARKET STREET
OAKLAND, CALIFORNIA
ALAMEDA COUNTY
APN: 005-0410-013-0,-014,&-025

GRADING
SPECIFICATIONS

REVISIONS	BY
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JOB NO: 2160934
DATE: 09-22-16
SCALE: NO SCALE
DESIGN BY: VL
DRAWN BY: RP
SHEET NO:

C-4.0

04 OF 8 SHEETS

CONSTRUCTION DOCUMENT 11-23-16

PURPOSE:

THE PURPOSE OF THIS PLAN IS TO STABILIZE THE SITE TO PREVENT EROSION OF GRADED AREAS AND TO PREVENT SEDIMENTATION FROM LEAVING THE CONSTRUCTION AREA AND AFFECTING NEIGHBORING SITES, NATURAL AREAS, PUBLIC FACILITIES OR ANY OTHER AREA THAT MIGHT BE AFFECTED BY SEDIMENTATION. ALL MEASURES SHOWN ON THIS PLAN SHOULD BE CONSIDERED THE MINIMUM REQUIREMENTS NECESSARY. SHOULD FIELD CONDITIONS DICTATE ADDITIONAL MEASURES, SUCH MEASURES SHALL BE PER CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD'S FIELD MANUAL FOR EROSION AND SEDIMENTATION CONTROL AND THE CALIFORNIA STORM WATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICES HANDBOOK FOR CONSTRUCTION. LEA & BRAZE ENGINEERING SHOULD BE NOTIFIED IMMEDIATELY SHOULD CONDITIONS CHANGE.

EROSION CONTROL NOTES:

1. IT SHALL BE THE OWNER'S/CONTRACTOR'S RESPONSIBILITY TO MAINTAIN CONTROL OF THE ENTIRE CONSTRUCTION OPERATION AND TO KEEP THE ENTIRE SITE IN COMPLIANCE WITH THIS EROSION CONTROL PLAN.
2. THE INTENTION OF THIS PLAN IS FOR INTERIM EROSION AND SEDIMENT CONTROL ONLY. ALL EROSION CONTROL MEASURES SHALL CONFORM TO CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD'S FIELD MANUAL FOR EROSION AND SEDIMENTATION CONTROL, THE CALIFORNIA STORM WATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICES HANDBOOK FOR CONSTRUCTION, AND THE LOCAL GOVERNING AGENCY FOR THIS PROJECT.
3. OWNER/CONTRACTOR SHALL BE RESPONSIBLE FOR MONITORING EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO, DURING, AND AFTER STORM EVENTS. PERSON IN CHARGE OF MAINTAINING EROSION CONTROL MEASURES SHOULD WATCH LOCAL WEATHER REPORTS AND ACT APPROPRIATELY TO MAKE SURE ALL NECESSARY MEASURES ARE IN PLACE.
4. SANITARY FACILITIES SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.
5. DURING THE RAINY SEASON, ALL PAVED AREAS SHALL BE KEPT CLEAR OF EARTH MATERIAL AND DEBRIS. THE SITE SHALL BE MAINTAINED SO AS TO MINIMIZE SEDIMENT–LADEN RUNOFF TO ANY STORM DRAINAGE SYSTEM, INCLUDING EXISTING DRAINAGE SWALES AND WATERCOURSES.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION WILL BE MINIMIZED. COMPLIANCE WITH FEDERAL, STATE AND LOCAL LAWS CONCERNING POLLUTION SHALL BE MAINTAINED AT ALL TIMES.
7. CONTRACTOR SHALL PROVIDE DUST CONTROL AS REQUIRED BY THE APPROPRIATE FEDERAL, STATE AND LOCAL AGENCY REQUIREMENTS.
8. ALL MATERIALS NECESSARY FOR THE APPROVED EROSION CONTROL MEASURES SHALL BE IN PLACE BY OCTOBER 15TH.
9. EROSION CONTROL SYSTEMS SHALL BE INSTALLED AND MAINTAINED THROUGHOUT THE RAINY SEASON, OR FROM OCTOBER 15TH THROUGH APRIL 15TH, WHICHEVER IS LONGER.
10. IN THE EVENT OF RAIN, ALL GRADING WORK IS TO CEASE IMMEDIATELY AND THE SITE IS TO BE SEALED IN ACCORDANCE WITH THE APPROVAL EROSION CONTROL MEASURES AND APPROVED EROSION CONTROL PLAN.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND REPAIRING EROSION CONTROL SYSTEMS AFTER EACH STORM.
12. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED BY LOCAL JURISDICTION'S ENGINEERING DEPARTMENT OR BUILDING OFFICIALS.
13. MEASURES SHALL BE TAKEN TO COLLECT OR CLEAN ANY ACCUMULATION OR DEPOSIT OF DIRT, MUD, SAND, ROCKS, GRAVEL OR DEBRIS ON THE SURFACE OF ANY STREET, ALLEY OR PUBLIC PLACE OR IN ANY PUBLIC STORM DRAIN SYSTEMS. THE REMOVAL OF AFORESAID SHALL BE DONE BY STREET SWEEPING OR HAND SWEEPING. WATER SHALL NOT BE USED TO WASH SEDIMENTS INTO PUBLIC OR PRIVATE DRAINAGE FACILITIES.
14. EROSION CONTROL MEASURES SHALL BE ON–SITE FROM SEPTEMBER 15TH THRU APRIL 15TH.
15. ALL EROSION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED THROUGHOUT THE RAINY SEASON OR FROM OCTOBER 15 THRU APRIL 1, WHICHEVER IS GREATER.
16. PLANS SHALL BE DESIGNED TO MEET C3 REQUIREMENTS OF THE MUNICIPAL STORMWATER REGIONAL PERMIT("MRP") NPDES PERMIT CAS 612008.
17. THE CONTRACTOR TO NPDES (NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM) BEST MANAGEMENT PRACTICES (BMP) FOR SEDIMENTATION PREVENTION AND EROSION CONTROL TO PREVENT DELETERIOUS MATERIALS OR POLLUTANTS FROM ENTERING THE TOWN OR COUNTY STORM DRAIN SYSTEMS.
18. THE CONTRACTOR MUST INSTALL ALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO THE INCEPTION OF ANY WORK ONSITE AND MAINTAIN THE MEASURES UNTIL THE COMPLETION OF ALL LANDSCAPING.
19. THE CONTRACTOR SHALL MAINTAIN ADJACENT STREETS IN A NEAT, CLEAN DUST FREE AND SANITARY CONDITION AT ALL TIMES AND TO THE SATISFACTION OF THE TOWN INSPECTOR. THE ADJACENT STREET SHALL AT ALL TIMES BE KEPT CLEAN OF DEBRIS, WITH DUST AND OTHER NUISANCE BEING CONTROLLED AT ALL TIMES. THE CONTRACTOR BE RESPONSIBLE FOR ANY CLEAN UP ON ADJACENT STREETS AFFECTED BY THE BY THEIR CONSTRUCTION, METHOD OF STREET CLEANING SHALL BE BY DRY SWEEPING OF ALL PAVED AREAS. NO STOCKPILING OF BUILDING MATERIALS WITHIN THE TOWN RIGHT–OF–WAY.
20. SEDIMENTS AND OTHER MATERIALS SHALL NOT BE TRACKED FROM THE SITE BY VEHICLE TRAFFIC. THE CONTRACTOR SHALL INSTALL A STABILIZED CONSTRUCTION ENTRANCE PRIOR TO THE INSPECTION OF ANY WORK ONSITE AND MAINTAIN IT FOR THE DURATION OF THE CONSTRUCTION PROCESS SO AS TO NOT INHIBIT SEDIMENTS FROM BEING DEPOSITED INTO THE PUBLIC RIGHT–OF–WAY UNTIL THE COMPLETION OF ALL LANDSCAPING.
21. THE CONTRACTOR SHALL PROTECT DOWN SLOPE DRAINAGE COURSES, STREAMS AND STORM DRAINS WITH ROCK FILLED SAND BAGS, TEMPORARY SWALES, SILT FENCES, AND EARTH PERMS IN CONJUNCTION OF ALL LANDSCAPING.
22. STOCKPILED MATERIALS SHALL BE COVERED WITH VISQUEEN OR A TARPAULIN UNTIL THE MATERIAL IS REMOVED FROM THE SITE. ANY REMAINING BARE SOIL THAT EXISTS AFTER THE STOCKPILE HAS BEEN REMOVED SHALL BE COVERED UNTIL A NATURAL GROUND COVER IS ESTABLISHED OR IT IS SEEDED OR PLANTED TO PROVIDE GROUND COVER PRIOR TO THE FALL RAINY SEASON.
23. EXCESS OR WASTE CONCRETE MUST NOT BE WASHED INTO THE PUBLIC RIGHT–OF–WAYOR ANY OTHER DRAINAGE SYSTEM. PROVISIONS SHALL BE MADE TO RETAIN CONCRETE WASTES ON SITE UNTIL THEY CAN BE DISPOSED OF AS SOLID WASTE.
24. TRASH AND CONSTRUCTION RELATED SOLID WASTES MUST BE DEPOSITED INTO A COVERED RECEPTACLE TO PREVENT CONTAMINATION AND DISPERSAL BY WIND

EROSION CONTROL NOTES CONTINUED:

24. FUELS, OILS, SOLVENTS AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MUST BE CLEANED UP IMMEDIATELY AND DISPOSED OF IN A PROPER MANNER. SPILLS MUST NOT BE WASHED INTO THE DRAINAGE SYSTEM,
25. DUST CONTROL SHALL BE DONE BY WATERING AND AS OFTEN AS REQUIRED BY THE TOWN INSPECTOR.
26. SILT FENCE(S) AND/OR FIBER ROLL(S) SHALL BE INSTALLED PRIOR TO SEPTEMBER 15TH AND SHALL REMAIN IN PLACE UNTIL THE LANDSCAPING GROUND COVER IS INSTALLED. CONTRACTOR SHALL CONTINUOUSLY MONITOR THESE MEASURES, FOLLOWING AND DURING ALL RAIN EVENTS,TO PUBLIC OWNED FACILITIES.

EROSION CONTROL MEASURES:

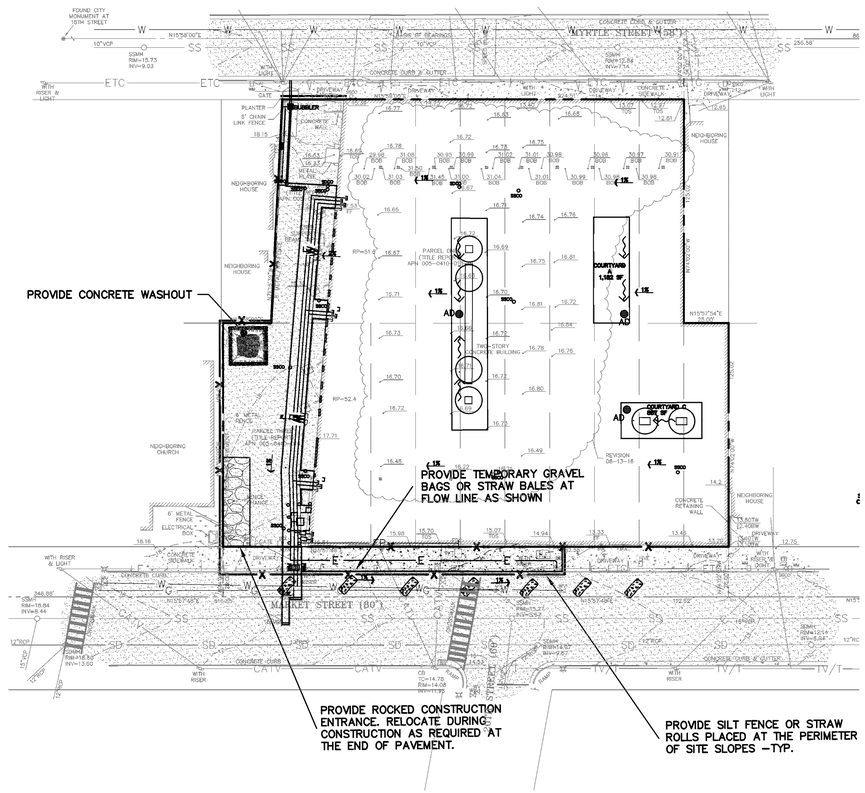
1. THE FACILITIES SHOWN ON THIS PLAN ARE DESIGNED TO CONTROL EROSION AND SEDIMENT DURING THE RAINY SEASON, OCTOBER 15TH TO APRIL 15. EROSION CONTROL FACILITIES SHALL BE IN PLACE PRIOR TO OCTOBER 15TH OF ANY YEAR. GRADING OPERATIONS DURING THE RAINY SEASON WHICH LEAVE DENUDED SLOPES SHALL BE PROTECTED WITH EROSION CONTROL MEASURES IMMEDIATELY FOLLOWING GRADING ON THE SLOPES.
2. SITE CONDITIONS AT TIME OF PLACEMENT OF EROSION CONTROL MEASURES WILL VARY. APPROPRIATE ACTION INCLUDING TEMPORARY SWALES, INLETS, HYDROSEEDING, STRAW BALES, ROCK SACKS, ETC. SHALL BE TAKEN TO PREVENT EROSION AND SEDIMENTATION FROM LEAVING SITE. EROSION CONTROL MEASURES SHALL BE ADJUSTED AS THE CONDITIONS CHANGE AND THE NEED OF CONSTRUCTION SHIFT.
3. CONSTRUCTION ENTRANCES SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF GRADING. ALL CONSTRUCTION TRAFFIC ENTERING ONTO THE PAVED ROADS MUST CROSS THE STABILIZED CONSTRUCTION ENTRANCES. CONTRACTOR SHALL MAINTAIN STABILIZED ENTRANCE AT EACH VEHICLE ACCESS POINT TO EXISTING PAVED STREETS. ANY MUD OR DEBRIS TRACKED ONTO PUBLIC STREETS SHALL BE REMOVED DAILY AND AS REQUIRED BY THE GOVERNING AGENCY.
4. ALL EXPOSED SLOPES THAT ARE NOT VEGETATED SHALL BE HYDROSEEDED. IF HYDROSEEDING IS NOT USED OR IS NOT EFFECTIVE BY OCTOBER 15, THEN OTHER IMMEDIATE METHODS SHALL BE IMPLEMENTED, SUCH AS EROSION CONTROL BLANKETS, OR A THREE–STEP APPLICATION OF 1) SEED, MULCH, FERTILIZER 2) BLOWN STRAW 3) TACKIFIER AND MULCH. HYDROSEEDING SHALL BE IN ACCORDANCE WITH THE PROVISIONS OF SECTION 20" EROSION CONTROL AND HIGHWAY PLANTING" OF THE STANDARD SPECIFICATION OF THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION, AS LAST REVISED. REFER TO THE EROSION CONTROL SECTION OF THE GRADING SPECIFICATIONS THAT ARE A PART OF THIS PLAN SET FOR FURTHER INFORMATION.
5. INLET PROTECTION SHALL BE INSTALLED AT OPEN INLETS TO PREVENT SEDIMENT FROM ENTERING THE STORM DRAIN SYSTEM. INLETS NOT USED IN CONJUNCTION WITH EROSION CONTROL ARE TO BE BLOCKED TO PREVENT ENTRY OF SEDIMENT. MINIMUM INLET PROTECTION SHALL CONSIST OF A ROCK SACKS OR AS SHOWN ON THIS PLAN
6. THIS EROSION AND SEDIMENT CONTROL PLAN MAY NOT COVER ALL THE SITUATIONS THAT MAY ARISE DURING CONSTRUCTION DUE TO UNANTICIPATED FIELD CONDITIONS. VARIATIONS AND ADDITIONS MAY BE MADE TO THIS PLAN IN THE FIELD. A REPRESENTATIVE OF LEA & BRAZE ENGINEERING SHALL PERFORM A FIELD REVIEW AND MAKE RECOMMENDATIONS AS NEEDED. CONTRACTOR IS RESPONSIBLE TO NOTIFY LEA & BRAZE ENGINEERING AND THE GOVERNING AGENCY OF ANY CHANGES.
7. THE EROSION CONTROL MEASURES SHALL CONFORM TO THE LOCAL JURISDICTION'S STANDARDS AND THE APPROVAL OF THE LOCAL JURISDICTION'S ENGINEERING DEPARTMENT.
8. STRAW ROLLS SHALL BE PLACED AT THE TOE OF SLOPES AND ALONG THE DOWN SLOPE PERIMETER OF THE PROJECT. THEY SHALL BE PLACED AT 25 FOOT INTERVALS ON GRADED SLOPES. PLACEMENT SHALL RUN WITH THE CONTOURS AND ROLLS SHALL BE TIGHTLY END BUTTED. CONTRACTOR SHALL REFER TO MANUFACTURES SPECIFICATIONS FOR PLACEMENT AND INSTALLATION INSTRUCTIONS.

REFERENCES:

1. CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD'S FIELD MANUAL FOR EROSION AND SEDIMENTATION CONTROL
2. CALIFORNIA STORM WATER QUALITY ASSOCIATION BEST MANAGEMENT PRACTICES HANDBOOK FOR CONSTRUCTION

PERIODIC MAINTENANCE:

1. MAINTENANCE IS TO BE PERFORMED AS FOLLOWS:
   - A. DAMAGES CAUSED BY SOIL EROSION OR CONSTRUCTION SHALL BE REPAIRED AT THE END OF EACH WORKING DAY.
   - B. SWALES SHALL BE INSPECTED PERIODICALLY AND MAINTAINED AS NEEDED.
   - C. SEDIMENT TRAPS, BERMS, AND SWALES ARE TO BE INSPECTED AFTER EACH STORM AND REPAIRS MADE AS NEEDED.
   - D. SEDIMENT SHALL BE REMOVED AND SEDIMENT TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO A DEPTH OF 1' FOOT.
   - E. SEDIMENT REMOVED FROM TRAP SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
   - F. RILLS AND GULLIES MUST BE REPAIRED.
2. GRAVEL BAG INLET PROTECTION SHALL BE CLEANED OUT WHENEVER SEDIMENT DEPTH IS ONE HALF THE HEIGHT OF ONE GRAVEL BAG.
3. STRAW ROLLS SHALL BE PERIODICALLY CHECKED TO ASSURE PROPER FUNCTION AND CLEANED OUT WHENEVER THE SEDIMENT DEPTH REACHED HALF THE HEIGHT OF THE ROLL.
4. SILT FENCE SHALL BE PERIODICALLY CHECKED TO ASSURE PROPER FUNCTION AND CLEANED OUT WHENEVER THE SEDIMENT DEPTH REACHES ONE FOOT IN HEIGHT.
5. CONSTRUCTION ENTRANCE SHALL BE REGRAVELED AS NECESSARY FOLLOWING SILT/SOIL BUILDUP.
6. ANY OTHER EROSION CONTROL MEASURES SHOULD BE CHECKED AT REGULAR INTERVALS TO ASSURE PROPER FUNCTION



EROSION CONTROL LEGEND

- GRAVEL BAG
- SEDIMENTATION BASIN
- INLET PROTECTION
- STRAW ROLL
- SILT FENCE
- CONCRETE WASHOUT
- CONSTRUCTION ENTRANCE
- TREE PROTECTION
- EROSION CONTROL BLANKET / MATTING

NOTE:
SEAL ALL OTHER INLETS NOT INTENDED TO ACCEPT STORM WATER AND DIRECT FLOWS TEMPORARILY TO FUNCTIONAL SEDIMENTATION BASIN INLETS. –TYP

0 20 40 80

SCALE: 1" = 40'

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EROSION CONTROL PLAN

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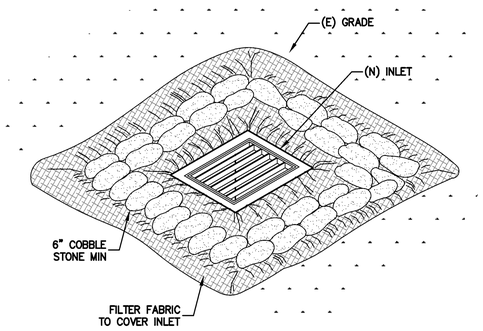
REVISIONS	BY
JOB NO:	2160934
DATE:	09–22–16
SCALE:	AS NOTED
DESIGN BY:	VL
DRAWN BY:	RP
SHEET NO:	

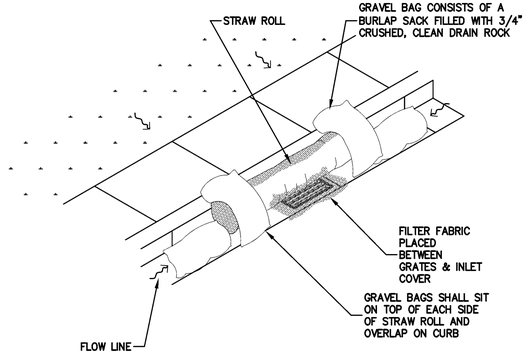
ER-1

06 OF 8 SHEETS

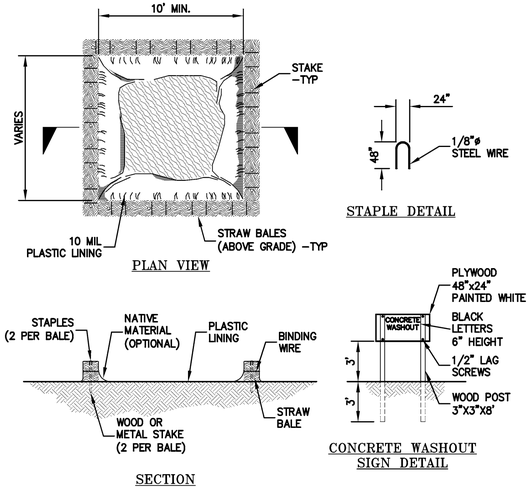
CONSTRUCTION DOCUMENT 11-23-16



1 ER-2 **INLET PROTECTION**
NTS



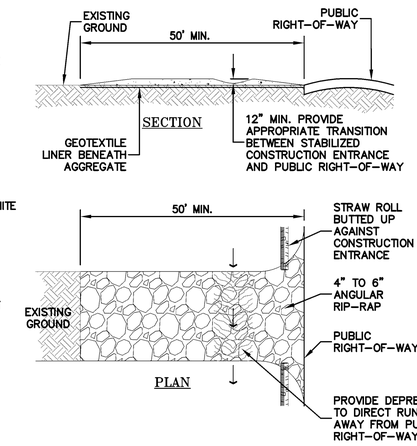
2 ER-2 **STREET INLET PROTECTION**
NTS



NOTES:
ACTUAL LAYOUT DETERMINED IN FIELD.

THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 10' OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

3 ER-2 **CONCRETE WASHOUT**
NTS



4 ER-2 **CONSTRUCTION ENTRANCE**
NTS

NOTES:

STABILIZED CONSTRUCTION SITE ACCESS SHALL BE CONSTRUCTED OF 3" TO 4" WASHED, FRACTURED STONE AGGREGATE.

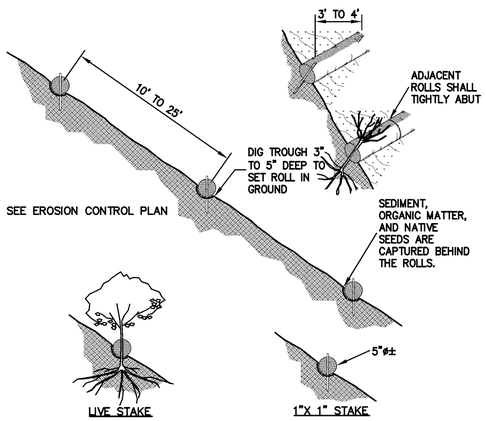
MATERIAL SHALL BE PLACED TO A MINIMUM THICKNESS OF 12". LENGTH OF ENTRANCE SHALL BE A MINIMUM OF 50'.

WIDTH SHALL BE A MIN. OF 15' OR GREATER IF NECESSARY TO COVER ALL VEHICULAR INGRESS AND EGRESS. PROVIDE AMPLE TURNING RADII.

THE ENTRANCE SHALL BE KEPT IN GOOD CONDITION BY OCCASIONAL TOP DRESSING WITH MATERIAL AS SPECIFIED IN ABOVE NOTE.

ACCESSES SHALL BE INSPECTED WEEKLY DURING PERIODS OF HEAVY USAGE, MONTHLY DURING NORMAL USAGE, AND AFTER EACH RAINFALL WITH MAINTENANCE PROVIDED AS NECESSARY.

PERIODIC TOP DRESSING SHALL BE DONE AS NEEDED.



NOTE:
1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3" TO 5" DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.
2. CONTRACTOR IS RESPONSIBLE FOR REGULAR MAINTENANCE AND INSPECTION. THE SILT SHALL BE CLEANED OUT WHEN IT REACHES HALF THE HEIGHT OF THE ROLL.

5 ER-2 **STRAW ROLLS**
NTS

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THREE PARCELS
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APN: 005-0410-013-0,-014,&-025
ALAMEDA COUNTY

EROSION CONTROL DETAILS

REVISIONS	BY
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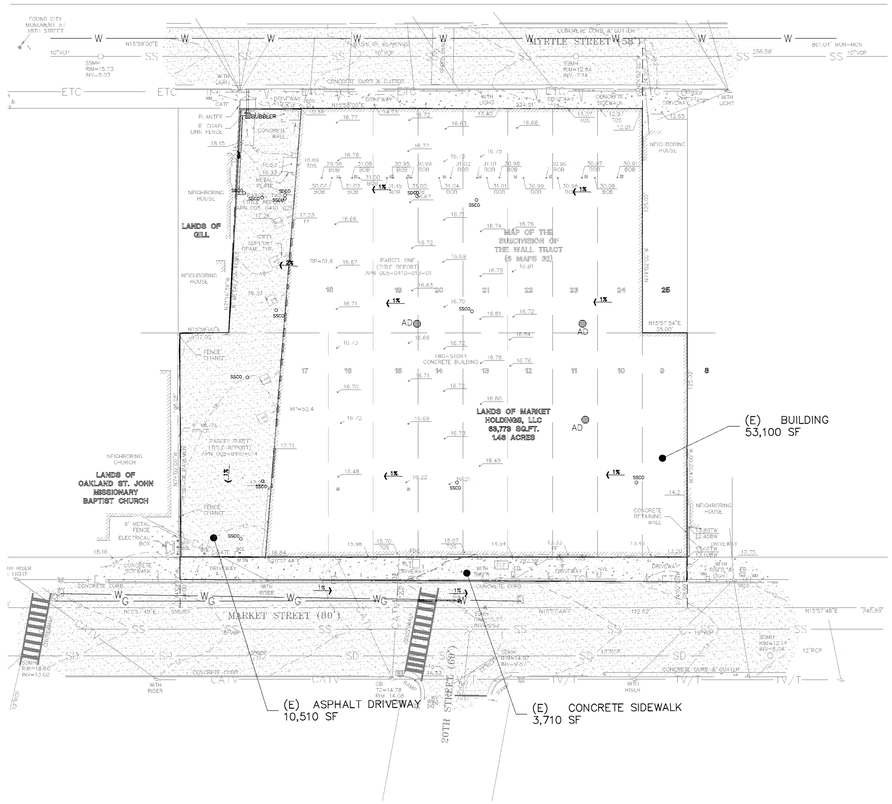
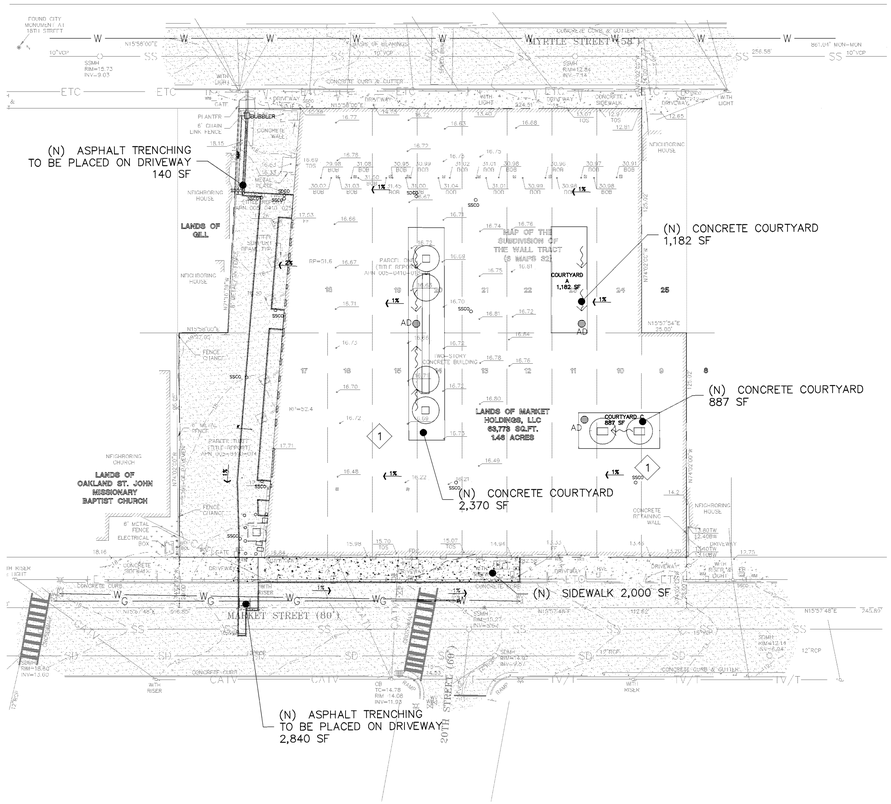
JOB NO: 2160934
DATE: 09-22-16
SCALE: AS NOTED
DESIGN BY: VL
DRAWN BY: RP
SHEET NO:
ER-2
07 OF 8 SHEETS

CONSTRUCTION DOCUMENT 11-23-16



EXISTING SITE



PROPOSED SITE

DEVELOPMENT AREA SUMMARY (IMPERVIOUS)

Total Site Area	Total Land Area Disturbed[1]	Total Existing/Pre-Project Impervious Surface[2]	Replaced Impervious Surface[3]	New Impervious Surface[4]	Total Post-Project Impervious Surface[5]
63,610	9,430	63,610	9,430	0	63,610

Impervious Surface = Any surface that cannot be effectively (easily) penetrated by water. Permeable paving (such as permeable concrete and interlocking pavers) underlain with permeable soil or permeable storage material, and green roofs with a minimum of three inches of planting media, are not considered impervious surfaces.

[1] Land Area Disturbed = Surface area of construction activities, including grading, construction, staging, and storage areas.
[2] Existing/Pre-Project Impervious Surface = Total amount of impervious surface on-site prior to the project.
[3] Replaced Impervious Surface = Project impervious surface that replaces existing/pre-project impervious surface.
[4] New Impervious Surface = Project impervious surface that replaces existing/pre-project permeable surface.
[5] Post-Project Impervious Surface = Total amount of impervious surface on-site after completion of the project.

0 20 40 80

SCALE: 1" = 40'

GENERAL PLAN NOTES:

A. THIS PROPOSED SITE IS AN UN-REGULATED PROJECT UNDER THE MUNICIPAL REGIONAL PERMIT (MRP) PROVISION C3.

B. THE PROJECT WILL CREATE AND REPLACE 9,370 SQUARE FEET OR MORE OF IMPERVIOUS AREA.

SITE DESIGN MEASURES

THIS PROPOSED SITE PLANS TO:

A. MINIMIZE IMPERVIOUS SURFACES

B. MINIMIZE DISTURBANCES TO NATURAL DRAINAGES

C. DIRECT RUNOFF FROM SIDEWALKS, AND/OR PATIOS ONTO VEGETATED AREAS.

D. DIRECT RUNOFF FROM DRIVEWAYS/UNCOVERED PARKING LOTS ONTO VEGETATED AREAS.

NOTE:

1 (N) STORM DRAIN OVERFLOW SYSTEM FOR (N) LANDSCAPE COURTYARDS.

SOURCE CONTROL MEASURES

THE PROPOSED SITE PLANS TO:

A. INCORPORATE SUSTAINABLE LANDSCAPING PRACTICES, SUCH AS MINIMIZING IRRIGATION AND RUNOFF, PROMOTING SURFACE INFILTRATION, MINIMIZING THE USE OF PESTICIDES AND FERTILIZERS, AND OTHER PRACTICES OF BAY FRIENDLY LANDSCAPING

B. USE EFFICIENT IRRIGATION SYSTEMS (E.G., WEATHER-BASED CONTROLLERS WITH RAIN SENSORS)

C. INSTALL STENCILING AT STORM DRAIN INLETS, SUCH AS "NO DUMPING - DRAINS TO BAY."

LEGEND:

PROPOSED FLOW DIRECTION

EXISTING FLOW DIRECTION

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APN: 005-0410-013-0,-014,&-025

ALAMEDA COUNTY

STORM WATER MANAGEMENT PLAN

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REVISIONS	BY
JOB NO:	2160934
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8 OF 8 SHEETS

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