
REVISED DUST MONITORING PLAN
Golden State Warriors Arena
Blocks 29 through 32, Mission Bay
San Francisco, California

Prepared For:

Golden State Warriors
San Francisco, California

Prepared By:

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21 July 2015
731617205

LANGAN TREADWELL ROLLO

21 July 2015

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**Subject: Revised Dust Monitoring Plan
Golden State Warriors Arena
Blocks 29 through 32 Mission Bay
San Francisco, California
Langan Project: 731617205**

Dear Ms.Weden:

On behalf of the Golden State Warriors, we are pleased to present this Revised Dust Monitoring Plan (DMP), to be implemented during construction of the proposed arena development at Blocks 29 through 32 Mission Bay in San Francisco, California. This Revised Dust Monitoring Plan was prepared to comply with Article 22B of the San Francisco Public Health Code and incorporate comments from your 17 June 2015 *Site Mitigation Plan Approval Letter*. If you have any questions or need any information clarified, please call Dustyne Sutherland at (415) 955-5283.

Sincerely yours,
Langan Treadwell Rollo



Dustyne Sutherland
Senior Project Scientist



Dorinda Shipman, PG, CHG
Principal

cc: Stephanie K.J. Cushing, CHMM, REHS, MSPH – San Francisco Department of Public Health

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REVISED DUST MONITORING PLAN
Blocks 29 through 32 Mission Bay
San Francisco, California

1.0 INTRODUCTION

This Revised Dust Monitoring Plan (DMP), prepared on behalf of the Golden State Warriors, presents the proposed dust monitoring procedures and general dust control measures to be implemented during the proposed construction activities at Blocks 29 through 32 Mission Bay in San Francisco, California (Figure 1). This DMP was prepared to comply with Article 22B of the San Francisco Public Health Code and incorporate comments from your 17 June 2015 *Site Mitigation Plan Approval Letter*.

2.0 BACKGROUND

2.1 Site Description

The site and surrounding area is located in the Mission Bay district of San Francisco. The site is bounded by South Street on the north, 16th Street on the south, Terry A. Francois Boulevard on the east and Third Street on the west. The site is rectangular with plan dimensions of approximately 600 feet by 800 feet and is currently occupied by an asphalt paved parking lot and open undeveloped land surrounded by a chain link fence.

2.2 Site Background

The project is within the Maher zone of San Francisco (bayward of the historic 1852 high tide line). Construction projects within the Maher zone that disturb more than 50 cubic yards of soil require that the site history (Phase I ESA) and soil quality be assessed (Phase II ESA) in accordance with Article 22A of the San Francisco Public Health Code (Maher Ordinance). A Phase I Environmental Site Assessment (ESA) was performed by Strata in 2010 with an updated Phase I ESA performed by Langan in 2014. Based on site history information obtained during the Phase I ESA, the site was originally below water in a shallow bay known as Mission Bay. Starting in the late 1860s, the bay was reclaimed by placing fill. Based on historic maps, it is our opinion that the majority of the site was reclaimed between 1869 and 1910 with fill, and then with building rubble and debris from the 1906 San Francisco earthquake and fire. The site was previously occupied by railyards and associated warehouses. The southern half of the site was used as a bulk oil storage and distribution facility. Other uses include a boiler house, steel

mill, well casing manufacturer, fruit cannery, junk yards, vehicle parking, vehicle maintenance and a ready-mix concrete facility.

Based on a review of regulatory files, site history, and site reconnaissance, the Phase I ESA and Phase I ESA update revealed evidence of one recognized environmental condition (REC) in connection with the site.

- Elevated concentrations of petroleum hydrocarbons and heavy metals have been detected in the shallow fill throughout the Mission Bay area. Several phases of soil, soil gas and groundwater investigations have been completed throughout Mission Bay. Based on these previous investigations, the soil likely contains elevated concentrations of heavy metals, total petroleum hydrocarbons (TPH), and semi-volatile organic compounds (SVOCs). Additionally, groundwater beneath the site may be impacted with TPH as diesel (TPHd) and TPH as motor oil (TPHmo).

Based on the findings of the Phase I ESA, Langan performed a Phase II Environmental Site Assessment (Phase II ESA) in December 2014 and January 2015, to further evaluate the impacts of the above-mentioned REC. The Phase II ESA included drilling 33 soil borings to a maximum depth of 31 feet below ground surface (bgs) for soil sampling, chemical testing of soil and groundwater samples, and evaluating the results. Concentrations of chemical compounds and metals detected in soil were compared to State and Federal hazardous waste criteria to outline soil disposal options during construction. The results of the investigation indicated portions of the fill beneath the site contain elevated concentrations of TPHd and TPHmo, heavy metals (specifically lead, chromium, and nickel) exceeding State of California hazardous waste criteria, and low concentrations of volatile organic compounds (VOCs) and SVOCs. Detailed results of this investigation are summarized in Langan's Phase II ESA , *Golden State Warriors Arena, Blocks 29 through 32, Mission Bay, San Francisco, California* dated 3 June 2015.

2.3 Proposed Development

According to the design plans, and Basement Slab and Pile Cap Overview dated March 2015 provided by Manusson Klemencic Associates (MKA), the proposed development will consist of three main areas, as shown on Figure 2 and described below. Additionally, Terry A. Francois Boulevard will be re-aligned to run north to south on the east side of Blocks 30 and 32, in accordance with the Mission Bay master infrastructure plan, following arena construction.

- Arena – The arena structure will be approximately eight stories high. The arena has a total planned excavation depth of 12 feet bgs.
- Parking and Plaza – The parking and plaza will consist of restaurants, retail and office buildings up to 11 stories high. The parking and plaza areas have a total planned excavation depth of 24.5 feet bgs. Some portions of the plaza area will not include subgrade parking and have a total excavation depth to approximately 14 feet bgs.
- Practice Courts – The practice court has a total planned excavation depth of 18.5 feet bgs.

Design excavation depths are shown on Figure 2. The below grade structures will be designed to prevent groundwater infiltration and therefore long-term dewatering will not be required.

2.4 Sensitive Receptors

In accordance with Article 22B, projects that disturb more than 50 cubic yards of soil and are greater than one-half acre, must have “sensitive receptors” located within 1,000 feet of the site boundary. Sensitive receptors may include residential areas, day care centers, hospitals, and schools. The Bay Area Air Quality Management District (BAAQMD) defines sensitive receptors as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses (BAAQMD, 2012). Figure 3 shows the approximate 1,000 foot sensitive receptor zone around the site.

3.0 DUST MONITORING PLAN

3.1 General

Real-time dust monitoring will generally be conducted during potential dust generating activities. Please note that this DMP does not include worker health and safety monitoring, monitoring for volatiles or methane gas, or personal dust monitoring. These items will be addressed in the Health and Safety Plan (HASP) which will be prepared for and used by the contractor.

3.2 Dust Monitoring Equipment

The dust monitors used, such as the Thermo Electron Corporation MIE Model pDR-1200 or equivalent shall be capable of:

- Continuous, unattended, real-time monitoring, data-logging, and data transmission.
- Measurement of air-borne particulates 10 micrometers in size (PM-10) or less.
- Measurement of a 10-minute time-weighted average (TWA).
- A detection limit range of between 1 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and 400,000 $\mu\text{g}/\text{m}^3$.
- Triggering visual and/or remote alarms. The visual alarm will consist of a flashing light, audible alarm, or similar, to alert on-site monitoring and/or contractor personnel a reading has been recorded above the action level. If dust monitoring personnel are not available to monitor dust onsite, a remote alarm will be used. The remote alarm will consist of a text message, email, phone message, or similar, to alert off-site monitoring personnel a reading has been recorded above the action level.

3.3 Baseline Dust Conditions

Prior to commencement of site work, a dust monitor will be set up at an upwind location to collect continuous dust monitoring data for a period of two days, for at least eight hours each day. The dust monitoring data collected during this interval will be used to establish baseline dust conditions.

3.4 Sampling Frequency

Except in the case of heavy fog or precipitation events, the dust monitors will be set up on a daily basis, for the first week of each new, potential dust-generating activity conducted (e.g., one week of dust monitoring during demolition, one week of dust monitoring at the beginning of excavation). The dust monitors will be set up by dust monitoring personnel at the start of each work-day prior to the start of the dust generating activity, and taken down at the conclusion of each work-day. Additionally, dust monitoring personnel will be present on-site to

monitor field conditions and consult with contractor personnel on suitable dust suppression measures at:

- The start of each new dust-generating activity, and for one to two days thereafter depending on the observed site conditions.
- The day after a reading is collected that is above the daily average action level, if any (see Section 3.5).
- The day of and/or the day after a reading is collected that is above the 10-minute TWA action level, if any (see Section 3.5).
- The day of and/or the day after visual observation of fugitive dust crossing the project area boundary, if any (see Section 3.6).
- The day of and/or the day after complaints about dust are received, if any (see Section 5.2).

If a reading above any action levels as specified in Table 1 is recorded during the initial week of dust monitoring, dust monitoring will be extended for an additional week. Dust monitoring will continue until the appropriate dust suppression measures have been established for the given activity and an entire work-week with no readings above the dust action levels has occurred.

Dust monitoring will not be conducted when there is fog or a precipitation event since (1) a nuisance dust condition is not anticipated in the case of heavy fog or precipitation and (2) dust monitors are subject to damage or falsely elevated readings in the presence of excessive atmospheric moisture.

3.5 Sampling Locations

At a minimum, two dust monitors will be placed at the site perimeter. One dust monitor will be placed at an upwind location, and one dust monitor will be placed at a downwind location. Wind direction will be evaluated based on a wind sock or flag located at the site or per the nearest weather station (KCASANFR102 zip 94111) with live wind reporting. Weather forecasting and reporting can be found on a website such as <http://www.wunderground.com>. Dust monitor locations will be re-located throughout the day in the case of significant changes in the wind direction. The dust monitor locations will be recorded in dedicated field logs (see Section 5.1).

3.6 Action Levels and Corrective Actions

The California Air Resources Board (CARB) has developed an ambient air quality standard for PM-10 of 50 $\mu\text{g}/\text{m}^3$ averaged over a 24 hour period (CARB, 2012). If the daily average from perimeter monitoring exceeds 50 $\mu\text{g}/\text{m}^3$, or the baseline dust conditions, whichever is higher, additional dust control measures will be implemented per Table 1 and Section 4.0. The daily average will be calculated over a 24 hour period based on (1) the continuous dust monitoring data collected over the course of the work day and (2) the previously established baseline dust concentrations, extrapolated over the remainder of the 24 hour period.

Visual and/or remote alarms on the perimeter dust monitors will be set to trigger if the PM-10 level exceeds 250 $\mu\text{g}/\text{m}^3$ averaged over 10 minutes. If the visual and/or remote alarms are triggered, additional dust control measures will be implemented per Table 1 and Section 4.0.

Table 1
Action Levels and Required Actions

Dust Condition	Required Actions
PM-10 concentration exceeds daily average of 50 $\mu\text{g}/\text{m}^3$ or baseline dust conditions, whichever is higher	Review baseline dust conditions. Review work procedures. Implement additional dust control measures as needed to prevent future exceedances of the 50 $\mu\text{g}/\text{m}^3$ daily average and/or minimize dust concentrations over the baseline dust conditions. Example additional dust control measures provided in Section 4.0.
PM-10 concentration exceeds 10-minute TWA of 250 $\mu\text{g}/\text{m}^3$	Particulate monitor triggers an alarm. Temporarily stop work and apply more aggressive dust control measures, per Section 4.0 or similar, until the 10 minute average concentration drops below 250 $\mu\text{g}/\text{m}^3$.
Visible fugitive dust migrating off-site	Temporarily stop work and apply more aggressive dust control measures, per Section 4.0 or similar, until there are no visible dust clouds migrating off-site.
Neighbor complaints	Implement more aggressive dust control measures, per Section 4.0 or similar.

3.7 Fugitive Dust

Fugitive dust migration from the site will be visually assessed by dust monitoring personnel and/or contractor personnel. If, during the course of the work, fugitive dust is observed migrating from the site, additional dust control measures will be implemented per Table 1 and Section 4.0.

4.0 GENERAL DUST CONTROL METHODS

Dust suppression measures will be implemented by the contractor in accordance with Article 22B of the San Francisco Public Health Code (City and County of San Francisco, 2012), San Francisco Building Code Section 106A.3.2.6.3 (City and County of San Francisco, 2011), and in accordance with the SFDPH comment letter dated 17 June 2015. The goal of this DMP is no visible dust. Based on the air monitoring results, visual observations of fugitive dust, and/or complaints of excessive dust generation by off-site parties, additional dust suppression measures may need to be implemented. Dust suppression measures could include, but are not limited to, the following:

- Wetting down soil improvement operations, visibly dry disturbed soil surface areas, and visibly dry disturbed unpaved driveways, parking areas, and staging areas to minimize or prevent dust from becoming airborne.
- Construction areas and roads will receive watering every two hours and at a minimum three times per eight hour shift during active operations or sufficiently often to keep the area adequately moisture conditioned. Moisture conditioning may be increased during above average temperatures, when dust generating activities intensify, or wind speeds increase.
- Covering stockpiles of excavated materials, backfill material, import material, gravel, sand, road base, and soil with polyethylene plastic sheeting, tarp, or other equivalent cover. Active stockpiles will be thoroughly wetted and excess material will be removed and/or consolidated regularly to limit the size and extent of the stockpile. The frequency of such activity will be adjusted based on weather and site conditions.
- If necessary, apply chemical dust suppressants consistent with manufacturer's directions and facilitate reapplication for non-active stockpiles.
- Using dust enclosures, dust curtains, plastic tarps, windbreaks, and dust collectors as necessary to control dust.
- Utilizing alternate work methods.
- Construction traffic on paved and unpaved roads, parking lots and staging areas will adhere to a maximum vehicle speed limit of ten (10) miles per hour (mph).

- Maintain a gravel or asphalt cover with a silt content that is less than five percent to a depth of three inches on the surfaces being used for travel.
- Paved roads within a construction site will be swept twice daily with a wet street sweeper during dust-generating activities.
- At least the first 500 feet of any public roadway exiting from the construction site will be swept twice daily during dust generating activities.
- Implementation of erosion control best management activities (BMPs) to control dust emissions from public roadways, parking areas, and any above grade unpaved staging areas or roadways.
- Construction workers will park on paved or graveled areas to reduce dust emissions.
- To the extent possible, heavy equipment will be left on the construction site and not staged outside the construction site to minimize potential for tracking soil off-site.
- Reduce vehicle trips via efficient trucking and equipment usage. Whenever possible, minimize equipment mobilization and demobilization.
- Utilize a rumble strip at all exits around the project area.
- Minimize drop heights while loading transportation vehicles.
- Use tarpaulins or other effective covers for trucks transporting soils.
- Wet sweeping or vacuuming paved streets, sidewalks, paths, and intersections where work is in progress.
- Sweeping the surrounding streets and sidewalks at least once per day during demolition, excavation, and construction so that dust is not allowed to leave the construction area.
- Installing wheel washers to clean all trucks and equipment leaving the site. In the case where wheel washers cannot be installed, brushing tires or tracks and spoil trucks off before they re-enter City streets to minimize deposition of dust-causing materials.

- Additional wetting will be required for weekends and end of workdays, should dust issues and complaints arise.
- Use of reclaimed water for dust control where applicable per San Francisco Health Code, Article 22B, Section 1242 (c)(11) and (14). Because construction dewatering discharge is anticipated to be authorized under the San Francisco Regional Water Quality Control's (Water Board) Order Number R2-2012-0012: Volatile Organic Compounds (VOCs) and Fuel General Permit, Langan will discuss the approval to use of reclaimed water with Randy Lee, the Water Board case worker.
- To reduce dust, dirt, or concrete fines from causing eye injuries during high winds, employees and onsite visitors will have proper eye protection and access to eye wash stations. The Cal/OSHA requirements for personal protection and safety will be established throughout the site.

5.0 WIND MONITORING AND REQUIREMENTS

Per the *SFDPH SMP Approval Letter* dated 17 June 2015 additional wind monitoring will be conducted on site and dust control requirements will be enforced by the contractor in the event of increasing wind speeds.

5.1 Wind Monitoring

Wind speeds will be documented using an on-site weather station. Wind speed data will be gathered by the on-site weather station and presented as daily or half-day average wind speeds. The data shall be collected every 10 minutes, and an audible signal set to alarm if 20 mph winds or greater are detected. A written description and reference table will accompany the weekly reports documenting the implementation of dust control activities when 15, 20, and 25 mph wind speeds are recorded.

5.2 Wind Requirements

When wind speeds reach 20 miles per hour or greater over a ten minute time-weighted average; the contractor will increase dust control measures for 30 minutes to mitigate fugitive dust. Increased dust control measures will be documented in the field log and will be made available to the SFDPH upon request. If the increased dust control measures fail, that specific

activity contributing to the dust generation shall cease. Work shall not commence, until the contractor can demonstrate adequate dust control activities at the site are effective due to changed conditions, or are no longer necessary.

The contractor will be responsible for implementing BMPs prior to winds reaching 20 mph. If wind speeds of 20 mph or greater are sustained for 30 minutes or longer dust generating activities will be ceased. Dust generating activities include, but are not limited to, excavation, grading, vehicular traffic, drilling, and equipment mobilization. The contractor will notify all subcontractors contributing to fugitive dust and instruct them to stop activity until wind speeds are below 20 mph for 30 minutes.

The contractor will adhere to the required actions described in Table 2 below depending on the wind speed recorded at the on-site weather station.

Table 2
Wind Speeds and Required Actions

Wind Speed	Required Actions
5 mph	Continue moisture conditioning of soil and street sweeping per this DMP.
10 mph	Increase frequency of moisture conditioning and street sweeping.
15 mph	Reduce vehicular traffic, cover stockpiles, and further increase moisture conditioning and street sweeping.
20 mph	Temporarily cease dust generating activity until wind speeds are recorded below 20 mph for 30 minutes or greater.

6.0 RECORDKEEPING AND REPORTING

6.1 Record Keeping

Observations and monitoring results shall be recorded in dedicated field logs for each day dust monitoring is conducted. Information to be recorded in the dedicated field logs will, at a minimum, include:

- Dust monitoring personnel on-site, and location and type of dust monitoring equipment.

- Contractor personnel and equipment on-site.
- Weather conditions, including temperature, precipitation conditions, and wind direction and speed.
- Dust generating activities conducted.
- Dust suppression measures implemented.
- Daily average, minimum 10-minute TWA, and maximum 10-minute TWA.
- Exceedances of action levels or visible fugitive dust, if any, and additional dust suppression measures implemented.
- Conditions in which dust generating activities are conducted, but dust monitoring is not (i.e. equipment malfunction, heavy fog or precipitation, etc.).
- Site maps and photographs to illustrate site activities that generated dust.

6.2 Project Signage

Signage will be posted at the site that will include the appropriate contractor contact information (i.e., telephone number) for interested parties to contact in case of complaints, such as excessive dust generation. Signage will be posted at a location that is visible from the public right-of-way. Onsite signage shall be in English, Spanish and the predominate language of construction workers on site. The signage shall include pertinent contact information of the project proponents and be clearly seen at a distance of 25 feet.

6.3 Weekly Reporting and Exceedance Notifications

A weekly summary report will be prepared and submitted to the SFDPH for each week that dust monitoring is conducted. At a minimum, the weekly summary report will include information on the dust generating activities, photographs and site plans illustrating dust generating activities, dust suppression measures implemented, dust monitoring activities, daily averages, minimum daily 10-minute TWAs, maximum daily 10-minute TWAs, and action level exceedances, if any.

6.4 Closure Report

A summary of the dust monitoring activities will be prepared and included in the regulatory Closure Report to be prepared for the site, once soil handling activities are completed as outlined in the Site Mitigation Plan (SMP). At a minimum, information on the dust generating activities, dust suppression measures implemented, dust monitoring activities, and exceedances, if any, will be included. Dust monitoring data logs will be included as an appendix to the report.

REFERENCES

City and County of San Francisco. *City and County of San Francisco Building Industry Commission (BIC) Codes, Building, Electrical, Housing, Mechanical and Plumbing Codes, Section 106A.3.2.6.3., Construction Dust Control*. Ordinances approved through 30 November 2011 and Administrative Bulletins approved through 1 January 2011.

Bay Area Air Quality Management District, 2012. *California Environmental Quality Act Air Quality Guidelines* May.

California Air Resources Board (CARB), *Ambient Air Quality Standards*, 2012, 2012. <http://www.arb.ca.gov/research/aags/aags2.pdf>. 7 June.

City and County of San Francisco. *San Francisco Health Code, Article 22B, Construction Dust Control Requirements*. Last amended by [Ordinance 229-12](#), File No. 120815, approved 14 November 2012, effective 14 December 2012.

Langan Treadwell Rollo, 2015. *Phase II Environmental Site Assessment Golden State Warriors Arena, Mission Bay Blocks 29-32, San Francisco, California*. 3 June .

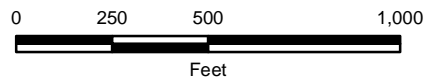


Legend

- Blocks
- Project Site

Notes:

1. Aerial orthophoto mosaic is courtesy of the City and County of San Francisco and is from April 2012.
2. Map displayed in California State Plane Coordinate System, Zone III, North American Datum of 1983 (NAD83), US Survey Feet.



GOLDEN STATE WARRIORS ARENA
San Francisco, California

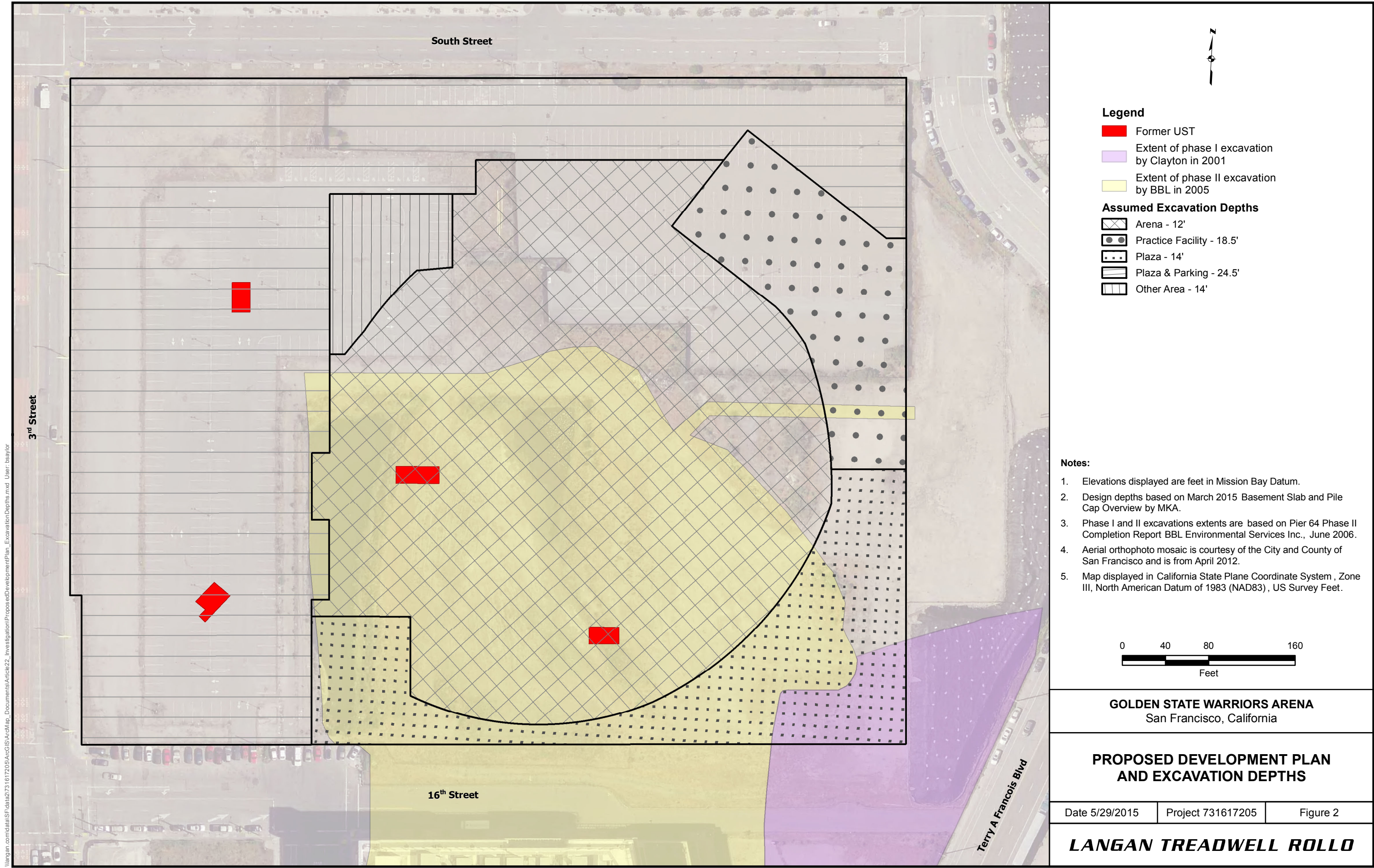
SITE LOCATION

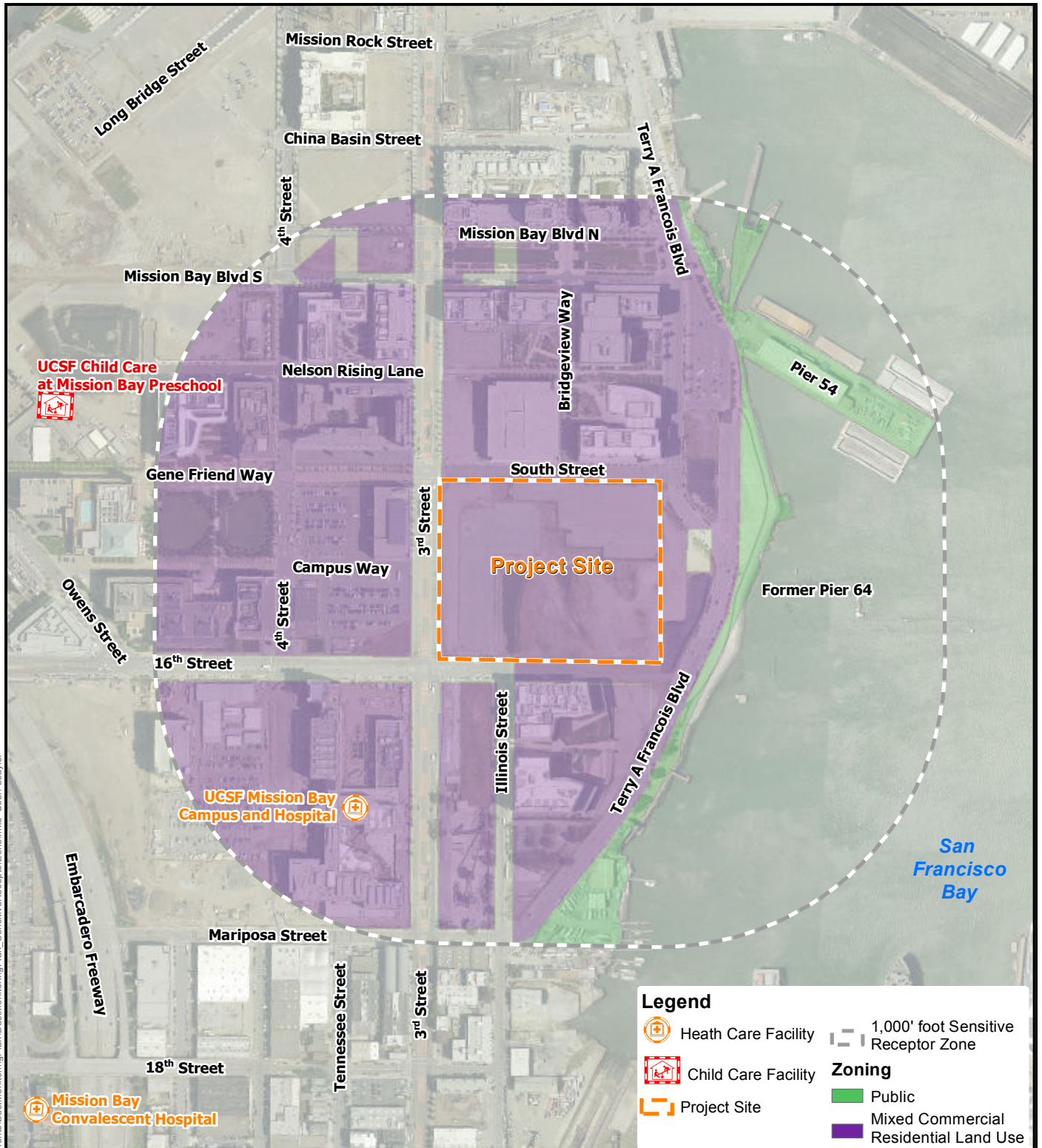
LANGAN TREADWELL ROLLO

Date 11/21/2014

Project 731617205

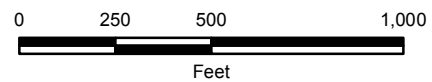
Figure 1





Notes:

1. Aerial orthophoto mosaic is courtesy of the City and County of San Francisco and is from April 2012.
2. Sensitive sites and zoning data provided by the County of San Francisco (datasf.org)
3. Map displayed in California State Plane Coordinate System, Zone III, North American Datum of 1983 (NAD83), US Survey Feet.



GOLDEN STATE WARRIORS ARENA
San Francisco, California

**DUST MONITORING PLAN
SENSITIVE RECEPTOR ZONE**

LANGAN TREADWELL ROLLO

Date 6/3/2015

Project 731617205

Figure 3

FIGURES