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

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> 2 October 2015 731617205

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2 October 2015

Martita A. Lee M. Weden Senior Environmental Health Inspector San Francisco Department of Public Health 1390 Market Street, Suite 210 San Francisco, CA 94102

Subject: 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 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 and 15 September 2015 *Site Mitigation Plan Approval Letters*. 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.

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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 30-minute time-weighted average (TWA).
- A detection limit range of between 1 microgram per cubic meter (μg/m3) and 400,000 μg/m3.
- 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 secure upwind location inside the site fence to collect continuous dust monitoring data for a period of four days, for 24 hours each day. The baseline dust monitoring results will be discussed with SFDPH prior to

removing the dust monitor. The dust monitoring data collected during this interval will be used to establish baseline dust conditions.

3.4 Sampling Frequency

The dust monitors will be set up 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 run continuously five days a week 24-hours a day to assess dust conditions during work and non-work hours. If after one week the dust monitoring data collected during non-work hours are below the action level, monitoring will then monitor only during active dust generating activities. Dust monitoring personnel will check the monitoring equipment at the start of each work-day and at the conclusion of each work-day to ensure dust monitoring equipment is recording data accurately. Before the dust generating activities are shut down prior to the weekend a dust monitoring personnel will check that all stockpiles are covered and excavations are managed in accordance with dust control measures outlined in Section 4.0. Additionally, during times of dust generating activities, dust monitoring personnel will be present on-site for visual monitoring of field conditions and fugitive dust, to be available to manage complaints from the public, and consult with contractor personnel on suitable dust suppression measures. Dust monitoring personnel may check the site on weekends to assure that no fugitive dust is migrating from the site.

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 week with no readings above the dust action levels has occurred.

When dust monitoring is conducted during fog or precipitation the monitors will be covered to protect the equipment from damage. Given that fog or precipitation can falsely elevate readings, daily field reports will document weather conditions on site and weekly monitoring reports will summarize weather conditions that could have resulted in false readings.

3.5 Sampling Locations

Four dust monitors will be placed at the site perimeter. Two dust monitors will be placed at upwind locations, and two dust monitors will be placed at downwind locations. Wind direction will be evaluated based on an onsite windsock or flag. Dust monitor locations will remain constant throughout project's dust generating activities. 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 µg/m³ averaged over a 24 hour period (CARB, 2012). In response to the SFDPH's *Dust Monitoring Plan Conditional Approval Letter* dated 15 September, 2015, a daily average will not be calculated. Instead an average over 30 minutes from perimeter monitoring equipment will be calculated. If the 30 minute TWA average exceeds 50 µg/m³, or the baseline dust condition, whichever is higher, additional dust control measures will be implemented per Table 1 and Section 4.0. The 30 minute TWA will be calculated 24 hours a day during active dust generating activities. Visual and/or remote alarms on the perimeter dust monitors will be set to trigger if the PM-10 level is exceeds 50 µg/m³. The action level of 50 µg/m³ may be negotiated with the SFDPH if the background dust monitoring results indicate a higher site background level. If the visual and/or remote alarms are triggered above the approved action level, 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	Particulate monitor triggers alarm. Review baseline dust
exceeds 30 minute TWA	conditions. Review work procedures. Implement additional
of 50 µg/m³ (or to action	dust control measures as needed to prevent future
level approved by	exceedances of the 50 μg/m³ daily average and/or minimize
SFDPH) or baseline dust	dust concentrations over the baseline dust conditions.
conditions, whichever is	Example additional dust control measures provided in Section
higher	4.0.
Visible fugitive dust	Temporarily stop work and apply more aggressive dust
migrating off-site	control measures, per Section 4.0 or similar, until there are no
Inigrating on Site	visible dust clouds migrating off-site.
Neighbor complaints	Implement more aggressive dust control measures, per
rveighber complaints	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 non-toxic 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 and the surrounding streets and sidewalks will be swept, via wet sweeping techniques, 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.

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- 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.
- Wet 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 greeter 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 TWA; 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 wet street sweeping per this DMP.
10 mph	Increase frequency of moisture conditioning and wet street sweeping.
15 mph	Reduce vehicular traffic, cover stockpiles, and further increase moisture conditioning and wet street sweeping. At two consecutive intervals of an average wind speed of 15 mph over a 10 minute period, the foreman will walk the site to observe if visible dust is being generated. If visible dust is observed, more rigorous dust measures will be implemented per section 4.0.
20 mph	Temporarily cease dust generating activity to assess wind direction and speeds, and moisture condition area to be worked prior to resuming potential dust generating activities. At two consecutive intervals of an average wind speed of 20 mph over a 10 minute period, the foreman will implement more rigorous dust control measures. If additional dust suppression and mitigation measures are not sufficient to control visible dust, the dust generating activity will be discontinued until visible dust is adequately suppressed.
25 mph	At two consecutive intervals of an average wind speed of 25 mph over a 10 minute period, the dust generating activity will stop until wind speeds are sustained under an average of 25 mph for two consecutive 10 minute periods.

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.
- Minimum 30-minute TWA and maximum 30-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 the neighboring area. The signage shall include pertinent contact information of the project proponents and be clearly seen at a distance of 25 feet from the perimeter fence line.

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, 30

minute TWAs, minimum daily 30-minute TWAs, maximum daily 30-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.

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

FIGURES





