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To: David Kelly, Golden State Warriors

From: Dorinda Shipman, PG, CHG

Date: 8 December 2015

Re: Response to Soil Treatment Questions
Golden State Warriors Mission Bay Arena and Entertainment Complex
San Francisco, California
Langan Project No.: 731617205

This memorandum documents our response to recent questions regarding the proposed treatment of soil with total and soluble metals concentrations exceeding California hazardous waste criteria that will be excavated during construction of the Golden State Warriors Mission Bay Arena and Entertainment Complex. Langan prepared a Site Mitigation Plan (SMP) to support the construction project titled *Site Mitigation Plan, Golden State Warriors Arena, Blocks 29-32, Mission Bay, San Francisco, California* dated June 2015. The SMP was approved by the San Francisco Department of Public Health (SFDPH) on June 17, 2015. The site 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, soil, groundwater, and soil gas quality of the material that will be encountered during construction be assessed in accordance with Article 22A of the Maher Ordinance.

Previous investigations of properties within the Maher zone in Mission Bay have found fill material containing elevated levels of certain metals and petroleum hydrocarbons associated with 1906 earthquake and resulting fire. Langan's *Phase II Environmental Site Assessment, Golden State Warriors Arena, Mission Bay, San Francisco, California* (Phase II ESA) dated 2 June 2015, documented that heavy metals (chromium, nickel, and lead) were detected in soil above State of California hazardous waste thresholds. Therefore, site mitigation and health

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and safety procedures are required during construction to minimize worker and public exposure to the hazardous materials. These procedures are outlined in the SMP. The SMP presents the measures recommended to mitigate potential risks to the environment and to protect construction workers, nearby residents, workers and/or pedestrians from potential exposure to hazardous substances and underground structures that may be encountered during soil excavation and grading activities. The SMP includes contingency procedures for hazardous materials including underground storage tanks, sumps and/or vaults, and soil with petroleum hydrocarbon odors and/or stains may be encountered during excavation activities. As required by the SMP, further details will be provided in Health and Safety Plans (HASPs) prepared and implemented during construction. The Maher Ordinance requires that the SMP include measures that "assure that the intended use will not result in public health or safety hazards in excess of the acceptable public health risk levels established by the Department of Toxic Substances Control or the Regional Water Quality Control Board, or other applicable regulatory standards and, therefore will mitigate the significant health and safety risks caused by or likely to be caused by the presence of hazardous substances in the soil and/or groundwater given the intended use." (Maher Ordinance, San Francisco Health Code Article 22A.10.)

Regulatory Framework

Mission Bay is under Regional Water Quality Control Board (Water Board) oversight and development activities must be conducted according to a Risk Management Plan (RMP) prepared for the Mission Bay project area (Environ, 1999). The RMP presents the decision framework and the specific protocols for managing chemicals in the soil and groundwater in a manner that is protective of human health and the ecological environment, consistent with the existing and planned future land uses, and compatible with long-term phased development. The RMP delineates the specific risk management measures that must be implemented prior to, during, and after development of each parcel within the Mission Bay area.

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In February 2000, the City and County of San Francisco submitted the Covenant and Environmental Restriction for the entire Mission Bay development site. This covenant states that the site must be developed in accordance with the 1999 Mission Bay RMP. On 26 May 1999, the Water Board provided a Certificate of Completion for the RMP prepared by Environ. The letter stated that no further investigation or response action will be required within Mission Bay other than the requirements of the RMP, and Covenant and Environmental Restrictions.

As outlined in the RMP, fill material in Mission Bay contains heavy metals and petroleum hydrocarbons. Development projects must comply with the RMP and Article 22A under oversight by the San Francisco Department of Public Health (SFPDH). Hazardous and non-hazardous fill material can remain at sites within the Mission Bay RMP area following development if covered by hard scape (building foundations, sidewalks, roads) or clean soil and landscaping.

Planned Soil Removal and Treatment

The Golden State Warriors plan to excavate fill material that contains elevated concentrations of chromium, lead, and nickel, petroleum hydrocarbons, and low concentrations of volatile and semi-volatile organic compounds that will need to be disposed off-site at regulated landfills. The areas of fill material containing soluble lead, chromium and/or nickel concentrations exceeding the State of California hazardous waste criteria (Class I California hazardous waste) have been delineated as documented in Langan's Phase II ESA. The remaining excavated fill material will be disposed of as Class II non-hazardous waste. The native material underlying the fill layer will be removed as Class III and/or unrestricted waste.

The Golden State Warriors plan to treat soil that exceeds the State of California hazardous waste criteria to non-hazardous levels before loading this soil into trucks for eventual disposal at an appropriately regulated landfill. The treatment process will take place on the

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site and the soil will be tested during bench scale procedures to ensure the treatment process is successful in stabilizing metals by reducing the potential for leaching as demonstrated by soluble metals testing. The treatment process will include mixing a concrete additive to the excavated hazardous soil via a pug mill or mixing the concrete additive in situ with rototilling type machinery. The concrete additive has the effect of reducing the solubility of the metals thereby treating the soil from a Class I California hazardous waste to a Class II non-hazardous waste. Once this process is complete, the treated soil will be loaded into trucks and hauled to a Class II non-hazardous regulated landfill. Treating the Class I California waste to Class II levels, will result in only non-hazardous soil being transported from the site for disposal.

Earth moving activities will be conducted under a SFDPH approved Dust Monitoring Plan (Langan, 2015c) and Bay Area Air Quality Management District approved Asbestos Dust Mitigation Plan (Langan, 2015d).

Soil Treatment Questions

We understand Tony Kelly has posed the following questions to the Golden State Warriors. We also provide our responses to Mr. Kelly's questions.

- Will petroleum impacted soils clog up the pug mill and affect the treatment of Cal Hazardous soil? We know that on some portions of the site near and below the water table residual petroleum hydrocarbons are present.

The levels of petroleum found in site soil during the Phase II ESA should not affect the metals treatment. Soil with much higher petroleum levels have been treated in the past without any issues. The Pier 64 remediation project removed over 100,000 tons of petroleum-impacted soil from the site. For this reason, the volume of petroleum-impacted soil remaining at the site is limited. In addition, post-bench-scale treatment testing will be performed to confirm that the pug mill treatment mixture is effective in producing Class II non-hazardous waste.

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- A rigorous pre-treatment and post-treatment confirmation testing program is needed to assure soils are less hazardous. Could you please provide us with number of samples you would propose to analyze per CY?

The Phase II ESA data provides the pre-treatment analytical information. Based on this data, the contractor will develop a treatment mixture and perform a large bench-scale testing program to confirm the mixture is correct. The contractor will excavate material from all areas, collecting a sample every 750 cubic yards. Following initial treatment, samples will be collected for soluble metals analyses. If results are below California hazardous waste criteria, then remaining soil will be treated and off hauled. Some soil with lead greater than 1,000 milligram per kilogram (mg/kg) will require direct off haul to a landfill that accepts Class I California waste. The bench-scale testing per volume can be adjusted for soil with higher total petroleum hydrocarbon concentrations (>1,000 mg/kg) to demonstrate effective treatment.

- Do you test stockpiles prior to treatment to calculate the volume of lime/cement media needed for treatment?

The initial lime/cement media used for the bench scale testing will be based on the existing data collected pre-treatment. Following initial bench-scale treatment the soil will be tested and if results are not below California hazardous waste criteria then the treatment mixture will be adjusted, the material retreated and retested until the results are below California hazardous waste criteria.

- When you have operated the pug mill at past jobs does the BAAQMD perform site inspections during operation? If so do you have any records of that?

The contractors are permitted to operate by and to notify the Bay Area Air Quality Management District (BAAQMD) for every project performed. We are not aware of

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BAAQMD inspections; however, the Golden State Warriors endeavor to hire contractors that have never been issued any permit violations for any jobs performed. The contractors conduct this work under permits from the California Environmental Protection Agency's Department of Toxic Substances Control.

References

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Environ, 2004. *Phase I Environmental Site Assessment, Mission Bay Development Parcels 29, 30, 31, and 32, San Francisco, California*, 27 September

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Langan, 2015c. *Dust Monitoring Plan, Golden State Warriors Arena, Blocks 29 through 32, Mission Bay, San Francisco, California*. October 2015.

Langan, 2015d. *Asbestos Dust Monitoring Plan, Golden State Warriors Arena, Blocks 29 through 32, Mission Bay, San Francisco, California*. November 2015.