October 26, 2016

Alameda County Department of Environmental Health 1131 Harbor Bay Parkway, 2nd Floor Alameda, CA 94502

Attention: Mark Detterman

Subject:Long-Term Operation and Maintenance Plan3800 San Pablo Avenue, Emeryville, CaliforniaACDEH Fuel Leak Case: RO00002520; Global ID: T06019788682

Ladies and Gentlemen:

Attached please find a copy of the *Long-Term Operation and Maintenance Plan* prepared by Gribi Associates. I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

RECEIVED

By Alameda County Environmental Health 3:05 pm, Oct 26, 2016

Very truly yours,

William H. Bankip

William H. Banker, Jr. San Pablo Avenue Venture c/o William Banker 530 The Glade Orinda, CA 94563



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Ladies and Gentlemen:

Gribi Associates is pleased to submit this *Long-Term Operation and Maintenance Plan* (O&M Plan) on behalf of the site owners for the property located at 3800 San Pablo Avenue in Emeryville, California (Site) (see Figure 1 and Figure 2). This O&M Plan describes operation and maintenance activities to be conducted during the long-term operation of a sub-slab depressurization system (SSDS) at the Site. The SSDS has been approved by Alameda County Department of Environmental Health (ACEH) and is being implemented to mitigate potential future vapor intrusion of gasoline and methane vapors into the Site building.

1.0 INTRODUCTION

This O&M Plan has been developed as an independent component of the *Vapor Mitigation System Design and CQAP* (Gribi Associates, Carlin Environmental Consulting, May 6, 2016) prepared for the Site under the oversight of the ACEH. A copy of the *Vapor Mitigation System Design and CQAP* is included in Attachment A. This O&M Plan provides measures to be implemented both during and after SSDS installation to insure the integrity and long-term effectiveness of the SSDS.

2.0 OBJECTIVES

This O&M Plan sets forth the procedures for inspection, monitoring and operation of the subslab depressurization system (SSDS) at the Site. In general, O&M activities include the following:

Inspection of all visible components of the sub-slab depressurization system (SSDS), including vent pipe inside the Site building and the vent riser and wind turbine above the roof line.

■ Monitoring of HVOC vapor concentrations in sub-slab soils and at the vent riser.

O&M activities will be carried out by qualified personnel, as described in Section 5.0 of this report.

3.0 BACKGROUND

In April 2012, a 1,000-gallon UST was discovered in the West MacArthur Boulevard sidewalk on the south side of the Site ("MacArthur Boulevard UST") (see Figure 3). A date stamp in the overlying concrete sidewalk indicated that this UST may have pre-dated the mid-1930s. This UST was removed on August 9, 2012. The tank showed no evidence of leakage, and soils beneath the removed UST exhibited slight to occasionally moderate hydrocarbon odors. Laboratory analytical results from sidewall and pit bottom soil samples showed no significant hydrocarbon detections. The only hydrocarbon detection in any of the samples was 0.520 milligrams per kilogram (mg/kg) (detection level = 0.500 mg/kg) of Total Petroleum Hydrocarbons as Gasoline (TPH-G) in the north sidewall soil sample. Subsequent soil gas sampling in SG-4, located immediately north from the former UST, showed elevated concentrations of TPH-G and over 20 percent methane gas.

On September 25, 2015, AEI Consultants excavated soil immediately north of the MacArthur Boulevard UST, between the UST excavation cavity and the Site building. The goal of the soil removal activities was to attempt to mitigate continued generation of hydrocarbon and methane soil gas concentrations present in shallow soils in the vicinity of soil vapor well SG-4. The excavation extended south from the Site building footing to the former UST excavation cavity and measured approximately 15 feet by 6 feet by 9.5 feet in depth. Soils from the excavation generally consisted of dense brown to olive grey clays. Soils exhibited no unusual staining and no hydrocarbon odors. Pit bottom and sidewall soil samples showed no significant detections of gasoline or diesel range hydrocarbons.

On October 13, 2015, Gribi Associates sampled sub-slab vapor well SS-1 and soil gas well SG-4, both located adjacent to the September 25 excavation area. Vapor samples from SS-1 and SG-4 showed respective TPH-G concentrations of nondetect (RL=7,170 ug/m³) and 174,000 ug/m³ (Duplicate = 201,000 ug/m³), and respective methane concentrations of nondetect (RL=0.0005 %) and 1.3 % (Duplicate = 1.5 %). On November 18, 2015, Gribi Associates again sampled sub-slab vapor well SS-1 and soil gas well SG-4. Vapor samples from SS-1 and SG-4 showed respective TPH-G concentrations of nondetect (RL=7,170 ug/m³) and 576,000 ug/m³, and respective methane concentrations of 0.44 % and 0.34 %.



On March 11, 2016, GrafCon submitted to Alameda County Department of Environmental Health (ACDEH) the *Short-term Soil Management Plan, 3800 San Pablo Avenue, Emeryville, California.* This Soil Management Plan (SMP) provided a plan to address potential environmental conditions encountered during construction-related investigation and excavation for the planned Site redevelopment project. The SMP included a brief workplan to excavate soil in the immediate area of SG-4. The planned excavation area would measure approximately 12 feet by 6 feet and would extend to a depth of approximately 10 feet below surface grade. The SMP was approved by ACDEH on March 14, 2016.

In April 2016, an area measuring approximately 12 feet by 6 feet surrounding and including SG-4 was excavated to approximately 10 feet in depth. Soils encountered during excavation activities generally consisted of 1 to 2 feet of base rock and gravel, followed by dark grey to black clayey silt (Bay Mud) to 5 feet in depth, and then by olive grey to brown silt and silty clay to 10 feet, the total excavation depth. Very slight hydrocarbon odors were noted in soils from 8 to 10 feet in depth. Groundwater did not enter the excavation cavity. Laboratory analytical results for the six confirmation soil samples and one composite stockpile soil sample reported extremely low concentrations of TPH-G, ranging from nondetect to 63 mg/kg, with no detectable concentrations of BTEX constituents. The only VOC detection in any of the soil samples was 0.0057 mg/kg of Naphthalene in the composite stockpile soil sample. All constituents were well below Tier 1 ESLs.

4.0 SSDS DESIGN FEATURES

The goal of an SSDS is to create a negative pressure field beneath the slab, thereby reducing the potential for vapor migration through the overlying concrete slab. The SSDS will consist of a single horizontal perforated vent pipe placed within an excavated trench in the existing building foundation and a membrane barrier system above the venting pipe. The venting system will provide a route for gasoline/methane gas beneath the concrete slab floor in the southern area of the Site building to vent directly to the atmosphere. The engineered barrier system will provide a positive barrier to the migration of gasoline/methane gas into the existing buildings. The vertical venting pipe will be fitted with a wind-driven turbine fan above the roof. This turbine will rely on thermal and wind effects to draw gasoline/methane gas from beneath the building to be vented to the atmosphere. According to Western Regional Climate Center statistics for Bay Area measurement stations, average annual wind speeds in the Bay Area range from approximately 7.5 miles per hour (mph) to approximately 11 mph. Thus, the wind-driven turbine fan will likely provide fairly continuous sub-slab vapor removal, creating the desired sub-slab negative pressure field.



5.0 SYSTEM OPERATION AND MAINTENANCE

The inspection and monitoring measures described in the following sections will be performed in order to ensure that the SSDS is functioning as intended.

Following system installation, and prior to Site closure by ACEH, a six-week startup phase will be conducted to: (1) Evaluate system effectiveness; and (2) Allow for system modifications as necessary to meet system objectives. The startup phase will last for approximately six weeks and will include more frequent inspection and monitoring activities. Once the system has met project goals, and subject to ACEH approval, the site will be granted regulatory closure and long-term O&M Plan measures will be implemented. In consultation with ACEH, the frequency and requirements of long-term O&M activities may be reduced once the long-term performance of the SSDS is demonstrated.

5.1 Personnel and Project Management

The Site owners will retain qualified specialists to ensuring that the mechanical components and sensor systems are maintained and calibrated on a schedule recommended by the manufacturer. Changes in designated personnel will be noticed to the ACEH in writing.

The Property Owner's Contact, responsible for site access and overall adherence to this plan is:

Name:	3800 San Pablo LLC
Address:	1201 Pine Street #151
	Oakland CA 94607

Telephone:510-547-2122Email:doris@hollidaydevelopment.com

The vapor mitigation Project Manager, responsible for all SSDS start up, monitoring, inspection, and reporting activities, is the following. The PM will also be responsible for developing and implementing a Health and Safety Plan (HASP) for the project:

Name:	Jim Gribi, P.G.
Address:	Gribi Associates
	1090 Adams Street, Suite K
	Benicia, CA 94510
Telephone:	707-748-7743
Email:	jgribi@gribiassociates.com



5.2 Health and Safety

Methane, the primary contaminant of concern, is a colorless, odorless gas. As a gas, it is nontoxic, but is flammable over a concentration range of 4.4 percent to 17 percent. Methane may also be an asphyxiant, as it can displace oxygen in confined spaces. All contractors and O&M personnel will conduct operations with adequate ventilation and in accordance with applicable regulatory guidelines and statutes.

5.3 Inspection and Monitoring

The program of inspection, monitoring, and reporting described in this section is designed to confirm the continued effectiveness of the SSDS in protecting tenants, customers, adjacent tenants and residents. At the conclusion of the six-week start-up testing period, a report will be submitted to ACEH providing system operation details and baseline laboratory testing results.

Weekly inspections of the SSDS will be conducted during the six-week startup phase. During long-term operation, annual inspections will be conducted for at least five years. These inspection frequencies may be modified upon consultation with ACEH. SSDS inspections will include the following activities:

- Visual inspection of all SSDS components, including both inside and outside roof components. Any cracking, wear, holes, or vandalism will be noted.
- Measurements of SSDS extraction air flow and vacuum pressure will be collected and recorded.
- To the extent possible, the concrete slab flooring in the methane-impacted area will be visually inspected for cracks.
- Bi-weekly during the startup phase and as directed by ACEH during long-term SSDS operation, effluent vapor sampling will be conducted. Vapor samples will be analyzed for TPH-G by TO-3, Methane by RSK 175, and Oxygen by ASTM Method D-1946.

5.4 Maintenance and Repair

If a component of the SSDS is damaged or otherwise requires repair or replacement, ACEH will be notified of the incident, and repairs will be undertaken in conformance with specifications developed by the Project Manager for the component that requires repair.



5.5 Data Collection, Documentation, and Reporting

Overall field inspection and monitoring activities will be documented in field logs that will be completed by the field technician. Field logs will document where, when, how, and from whom any vital project information was obtained. Project logs will be archived for a period of five years and will be made available for agency review upon request.

Entries in the field logs and/or inspection and monitoring forms will include, at a minimum, the following for each sample date:

- Site name and address.
- Recorder's name.
- Time of arrival and time of departure.
- Other project personnel on-site and a summary of any on-site meetings.
- Deviations from the O&M Plan or Health and Safety Plan.
- Identification information for any equipment used (i.e., instrument type and model number).
- Field measurements recorded at each monitoring point.
- Visual observations of site conditions and on-going activities that might impact the operation of the SSDS.

After the startup phase, annual reports will be submitted to ACEH for a minimum of five years. These reports will provide documentation of SSDS operation and results. Upon consultation with ACEH, the frequency of these progress reports may be altered based on ongoing results.

6.0 SYSTEM CLOSURE AND DECOMMISSIONING

Five-year review reports will be submitted to the ACEH for review and approval. ACEH and the Site owners will then review and re-evaluate the effectiveness of the SSDS. Based on this review, ACEH will notify the Site owners whether or not modifications to the SSDS or to the O&M program are required. System closure and decommissioning will also be assessed during each five-year review.



We appreciate this opportunity to provide this Operation and Maintenance Plan for your review. Please contact us if there are questions or if additional information is required.

Very truly yours,

James E. Gribi Professional Geologist California No. 5843

Enclosure

c: Bill Banker Tom Graf





FIGURES







ATTACHMENT A

CARLIN ENVIRONMENTAL CONSULTING VMS DESIGN ELEMENTS



THE INTERSECTION COMMERCIAL SHELL 3800 SAN PABLO AVENUE EMERYVILLE, CALIFORNIA



Site Maps:



SHEET TITLES	
SHT, 1	COVER SHEET
SHT, 2	SITE LAYDUT
SHT, 3	PIPE DETAILS

<u>Carlin environmental consul</u>ting NDTES:

2522 Chambers Road # 100, Tustin, California 92780

To: Holliday Development / 3800 San Pablo LLC

Subject: Summary of Proposed Methane Mitigation System for 3800 San Pablo Avenue, Emeryville, California.

Introduction

Assessment of methane soil vapors in soil gas at the Site is currently being conducted under the oversight of the State Water Resources Control Board (SWRCB) and the Alameda County Environmental Health department (ACEH). The presence of methane in soil, in the form of soil vapor, creates a potential risk of vapor intrusion of methane-affected soil vapor into the existing buildings at the Site.

As reported in a letter on December 17th, 2015, the ACEH staff has determined that the eastern portion of the Site appears to meet the closure criteria specified in the Low Threat Closure Policy. ACEH has determined that the western portion of the site, which is predominately overlain with the existing building, fails the Nuisance General Criteria due to the presence of potentially explosive concentrations of methane in the subsurface. These methane concentrations, as delineated by soil gas tests conducted by Gribi Associates, the consultants for the Site owners, have highlighted the southwestern area of the building to be the area principally associated with elevated methane concentrations, adjacent to a former heating oil underground storage tank (UST). Gribi Associates have conducted numerous testing of soil, soil gas, and groundwater throughout the Site that further support the presence of methane to be concentrated in the southwest corner of the Site.

ACEH has requested that a Vapor Mitigation System (VMS) be designed and implemented into the western portion of the Site to minimize the risk to occupants of accumulating methane gas concentrations. In addition to the VMS design, ACEH has requested a VMS Basis of Design report, including system construction plans and specifications, Construction Quality Assurance Plan (CQAP) for installation of the system, and an Operations and Maintenance Plan.

Carlin Environmental Consulting, Inc. has been contracted by Holliday Development, the project owner to prepare the Methane Gas Mitigation Measures design, the CQAP, and the Operations and Maintenance Plan to meet the requirements of the ACEH. These drawings represent CEC's recommendations to address the issue. It is our opinion that if the methane mitigations measures depicted on these drawings are implemented, future site inhabitants will be properly protected.

Site Layout:

VMS Design

The proposed methane gas mitigation system will consist of a single perforated vent pipe placed within an excavated trench in the existing building foundation and a membrane barrier system above the venting pipe. The venting system will provide a route for methane gas in the southwest area of the Site to vent directly to the atmosphere and reduce the possibility of methane concentrations building up in the aboveground structures. The engineered barrier system will provide a positive barrier to the migration of methane gas into the existing buildings. Passive venting rely on thermal and wind effects to draw methane gas from beneath the building to be vented to the atmosphere.

The purpose of the Methane Gas Mitigation System is to redirect and prohibit the intrusion of methane gas from the subsurface into the existing building at the Site at concentrations that may pose a risk to human health. To provide a redundant system, two elements will be included:

- Sub-slab venting system The venting system includes a permeable layer constructed beneath the building using a gravel bed and will include soil vapor collection pipe(s) that will route soil vapor to the vent riser(s). Vent riser(s) will convey the collected soil vapor to the roof of the new building to allow venting to the atmosphere. A low permeability wrap will be used to encase the contents of the trench (gravel backfill and 4" perforated pipe) to preclude the mixture of native soil into the gravel layer.
- Vapor barrier system The barrier system includes a very low permeability layer constructed between the venting system and the building floor slabs and foundations and sealing around each penetration. In this case CEC recommends that a double thickness of polyethylene sheeting be place at the top of the trench just beneath the concrete floor. The intention of the design is to cause any methane pressure accumulation to be collected in the trench and perforated vent piping where it will flow due to pressure differentiation out the vent riser. The sheeting is placed as a resistant, relatively impermeable layer that will cause the gas to migrate into the venting system instead of through the floor of the building.

The design of the vapor mitigation system plans have been prepared by a State of California licensed Professional Engineer with the appropriate experience and knowledge in the design of vapor mitigation systems. The sub-slab venting system will be designed to be passive.

Construction Quality Assurance Plan

The CQAP program will consist of utilizing a contractor that is experienced with materials and methods described on the design plans. Idealy they should be have installed similar systems in the past. Inspection of the installation of the designed system should be by qualified personnel whom are familiar with the design plans and construction of similar systems. This includes verifying that the appropriate material are utilized and that they are properly placed and in accordance with the approved design mitigation plans. It is proposed that staff members of CEC inspect the components of the system as they are installed and certifying, in writing, that the measures were installed in strict accordance with the approved drawings. CEC inspectors have been through the City of Los Angeles Deputy Inspector Certification Program and have experience inspecting similar installations. A letter will be prepared at the completion indicating that all components were per the plans and installed per recommendations.

Operations and Maintenance Plan

The Operation and Maintenance Plan (OMP) will consist of maintenance and monitoring of the components of the VMS that was installed. Properly maintaining the sub-slab components of the system does not require any activities other than preventing future cutting and/or penetrations beneath the slab. CEC recommends that this component should be identified and be acknowledged as condition of the certificate of occupancy of the building. The vent pipe will be vented through the roof and exposed to the atmosphere. Therefore, the vents should be annually inspected to be free of any foreign objects that might restrict the flow of methane from the subsurface into the atmosphere. These annual inspections should be properly documented by building occupants, owners, property managers.

Installation

The installation of the VMS system is detailed on the design drawings and briefly summarized below for convenience.

Step-by-Step Instructions:

- a) Saw cut out a section of the existing slab, approximately 2 feet wide for approximately 70 feet in length from east to west.
- b) Excavate a trench 3 feet deep by 2 feet wide the length of the excavation
- c) Drape geo-fabric (Mirafi 140-N or equivalent) type sheeting along the length of the excavation trench so that it is flush against the bottom of the trench and comes up along each sidewall with 1.5 feet excess for overlap.
- d) Fill the trench with approximately 1 foot 8 inches to 1 foot 10 inches of gravel the length of the excavation. Leaving approximately 1 foot 2 inches to 1 foot 4 inches of space below the top of the existing slab.
- e) Place 4 inch perforated pipe the length of the trench. There should be a connection on the west end for a vent riser. Each connection of the pipe should be firmly sealed.
- f) Place approximately 4 inches to 6 inches of gravel the length of the trench covering the sides and top of the perforated pipe with approximately 2 inches of gravel.
- g) Wrap the geo-fabric type sheeting to overlap with the opposite side. There should be a minimum of 6 inches of overlap that should be sealed with polyethylene compatible tape the length of the trench.
- h) Place 2 inches of gravel and level the gravel to leave approximately 6 inches of space below the top of the existing slab.
- i) Place a double layer of 10-mil thick polyethylene sheeting (barrier) covering the width and length of the trench. Edges of the barrier should be "tucked" into the gravel and underneath the existing slab (minimum 2" under lap).
- j) The vent riser and double layer of 10-mil polyethylene sheeting intersection should be properly sealed with heavy-duty polyethylene compatible tape.
- k) Clear the Polyethylene sheeting of any excess gravel or debris for placement of concrete flush to existing slab.

Phone: 714-508-1111









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