STATE WATER RESOURCES CONTROL BOARD

# GEOTRACKER ESI



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| Submittal Type: | GEO_REPORT |
| Report Title: | Offsite South-Central Horizontal Biosparge and Soil Vapor Extraction Well Installation Completion Report, SFPP Norwalk Pump Station |
| Report Type: | Well Installation Report |
| Report Date: | 6/26/2020 |
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| Facility Name: | DOD - NORWALK DFSP-KINDER MORGAN |
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| Organization Name: | CH2M HILL |
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June 26, 2020

Attention: Mr. Paul Cho
Regional Water Quality Control Board
Los Angeles Region
320 West 4th Street, Suite 200
Los Angeles, California 90013

**Subject: Offsite South-Central Horizontal Biosparge and Soil Vapor Extraction Well Installation Completion Report, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California**

Dear Mr. Cho,

On behalf of SFPP, LP, an indirect subsidiary of Kinder Morgan, Inc. (Kinder Morgan), Jacobs has prepared this report detailing the drilling and installation of offsite south-central horizontal biosparge well BS-03 and soil vapor extraction (SVE) well HSVE-01 at the SFPP Norwalk Pump Station located at 15306 Norwalk Boulevard, Norwalk, California. Figure 1 shows the location of the project site, Figure 2 depicts the remediation system layout, and Figure 3 displays the location of the new wells.

This work was performed by Jacobs in accordance with the *Work Plan for Drilling and Installation of a Stacked Horizontal Biosparge and Soil Vapor Extraction Remediation Well System in the Offsite South-Central Area of SFPP Norwalk Pump Station, Norwalk, California* (Jacobs, 2019). In the work plan, Kinder Morgan proposed to install one biosparge well (BS-03) and one SVE well (HSVE-01) in the offsite south-central area. This work follows the successful installation of southeastern biosparge well BS-02 in 2017, as detailed in the *Southeastern Horizontal Biosparge Well (BS-02) Completion Report, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California* (Jacobs, 2018) and successful operation of south-central horizontal biosparge well BS-01. Remediation wells BS-03 and HSVE-01 will remain inoperable pending connection to existing remediation equipment, likely to be completed in late-2020. System monitoring and data analysis will commence upon startup. After sufficient data have been collected, the data will be compiled into an evaluation report that will include tabulated summaries of biosparge and SVE system performance results (including a zone of influence [ZOI] evaluation), along with supporting groundwater data, soil vapor analytical data, and baseline natural source zone depletion (NSZD) rate evaluation data. The evaluation report will be submitted to the Regional Water Quality Control Board, Los Angeles Region (RWQCB) and Norwalk Tank Farm Restoration Advisory Board members for review.

# 1. Background Information

This section presents a summary of background information including site description, hydrogeologic conditions, and references to documents in the administrative record that describe the existing remediation systems, effectiveness of the existing remediation systems, and selection of biosparge as an alternate interim remedy to the existing remediation systems.

## 1.1 Site Description

Kinder Morgan operates three active fuel pipelines along an approximately 20-foot-wide easement that traverses the southern boundary of the site. The site is partitioned into a 36-acre parcel to the west owned by the Defense Logistics Agency (DLA) Energy (formerly Defense Energy Support Center), and a 15-acre parcel to the east that is now owned by the City of Norwalk. The 36-acre parcel was formerly occupied by 12 aboveground fuel storage tanks and associated piping and facilities. The facility was decommissioned in 2001 and is no longer used to handle fuel. The aboveground tanks and the main infrastructure were demolished in 2011; demolition of the subsurface piping was completed in 2012. The 15-acre parcel is a vacant lot that the City of Norwalk plans to redevelop into a park, similar to adjacent Holifield Park.

Due to historical site operations, subsurface environmental assessments have been performed at the site since 1986. Groundwater monitoring and remediation wells have been installed at the site for monitoring and as components of groundwater remediation systems (Figure 2). The environmental assessments have evaluated and defined subsurface soil and groundwater within the uppermost groundwater zone that has been impacted by fuel-related hydrocarbons from historical releases from SFPP pipelines at the site. Separate-phase floating product, or light nonaqueous phase liquid (LNAPL), as well as sorbed-phase and dissolved-phase fuel hydrocarbons have been delineated in areas beneath the site and at offsite properties to the south, west, and east. The screened interval of BS-03 and HSVE-01 was placed below and above the LNAPL zone in the offsite south-central area.

Site assessments indicate that the chemicals of potential concern are total petroleum hydrocarbons (TPH), including TPH quantified as gasoline (TPH-g), diesel (TPH-d), and jet propulsion fuel grades 4, 5, and 8 (JP-4, JP-5, and JP-8); benzene, toluene, ethylbenzene, and total xylenes (BTEX); 1,2-dichloroethane (1,2-DCA); methyl tertiary butyl ether (MTBE); and tertiary butyl alcohol (TBA). A groundwater Monitoring and Reporting Program has been in effect at the site since 1995, and the current program is described in the *Revised Groundwater Sampling and Analysis Plan* (CH2M[1], 2013a).

[1] Note: CH2M is now Jacobs. On December 15, 2017, CH2M HILL Companies Ltd., including CH2M HILL Engineers, Inc., became part of Jacobs. CH2M is now a wholly owned direct subsidiary of Jacobs.

### 1.2 Hydrogeologic Conditions

The site is underlain by the following hydrogeologic units (from shallow to deep):

- Semiperched groundwater zone between depths of approximately 20 and 50 feet below ground surface (bgs). Groundwater flow within this uppermost zone is generally north to northwestward with a horizontal gradient of approximately 0.001 foot per foot (ft/ft).
- Bellflower aquitard of the Lakewood Formation between depths of approximately 50 and 80 feet bgs beneath the site. The Bellflower aquitard consists predominantly of clay, silty clay, and sandy clay with some interbedded sand with silt.
- Exposition aquifer between depths of approximately 80 and 220 feet bgs. The potentiometric surface in the Exposition aquifer is approximately 20 feet lower than that in the semiperched uppermost groundwater zone. This relatively consistent difference in hydraulic heads between the semiperched upper groundwater zone and the Exposition aquifer indicates that the Bellflower aquitard inhibits the vertical movement of groundwater in the site area. The horizontal hydraulic gradient in the Exposition aquifer beneath the site area has a magnitude of approximately 0.001 ft/ft and a generally southeastward direction.

Additional information about subsurface conditions is available in the report titled *Conceptual Site Model and Proposed Alternate Interim Remedy for Soil, Groundwater, and LNAPL* (CH2M, 2013b).

### 1.3 Overview of Existing Remediation Systems and Biosparge Technology

The following documents in the administrative record provide a description of the process and effectiveness of the existing remediation systems, and selection of biosparge as an alternate interim remedy to the existing remediation systems:

- CH2M. 2013c. *Horizontal Biosparge System Construction and Pilot Test Work Plan, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California*. November 13.
- CH2M. 2017. *Evaluation Report for the South-Central Area Horizontal Biosparge Pilot Test, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California.* August 3.
- Jacobs. 2018. *Southeastern Horizontal Biosparge Well (BS-02) Completion Report SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California.* July 12.
- Jacobs. 2019. *Work Plan for Drilling and Installation of a Stacked Horizontal Biosparge and Soil Vapor Extraction Remediation Well System in the Offsite South-Central Area of SFPP Norwalk Pump Station, Norwalk, California.* November 4.
- Jacobs. 2020. *Fourth Quarter 2019 Remediation Progress Report, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California.* January 15.

## 2. Field Activities and Well Construction Summary

This section presents a synopsis of field activities and well construction details. Field activities were performed between November 2019 and January 2020.

### 2.1 Preparatory Activities

The following tasks were completed prior to initiating drilling:

- Updated the existing site-specific health and safety plan to incorporate the planned fieldwork.
- Demarcated the proposed bore path of the biosparge and SVE well along the ground surface.
- Notified Underground Service Alert (USA). As required by USA, the borings were called-in and marked-out in white paint prior to mobilizing. The Dig Alert ticket numbers were A193310362 and B193180656.
- Obtained the required well permit from the Los Angeles County Department of Public Health (Attachment A).
- Registered biosparge well BS-03 as an injection well with the U.S. Environmental Protection Agency (EPA) (Attachment A).
- Performed an underground utility check using a private utility-locating subcontractor. Jacobs and the subcontractor met with Kinder Morgan operations staff, marked-out the boring locations, and cleared the boring locations of potential underground utilities and other infrastructure.
- To supplement the underground utility clearance, potholing using a hand auger was performed down to 10 feet bgs every 3 feet from the borehole entry point to approximately 50 feet downrange, for a total of 17 locations. The purpose of potholing along the bore path was to reconfirm that no shallow subsurface obstructions were present.
- Coordinated with Kinder Morgan personnel to arrange for a project inspector to be present while advancing the boreholes beneath the active product pipeline that is perpendicular to the borehole.
- In accordance with Kinder Morgan's Liquids O&M Procedure, Construction Near Company Facilities, Directional Drilling, Section 3.14, Part D (Kinder Morgan, 2017), prior to initiating directional drilling, another drilling contractor (Cascade Environmental) performed air-knife/ hydro-knife excavation activities to expose buried Kinder Morgan assets and other buried utilities. In total, seven excavations were dug to the following dimensions:
  - **Excavation 1 – 3 feet by 3 feet by 6 feet deep.** Abandoned Kinder Morgan line, 10-inch diameter, 3.5 feet bgs (northernmost).
  - **Excavation 2 – 7 feet by 4 feet by 6 feet deep.** Abandoned Navy line, 10-inch diameter, 3.5 feet bgs.
  - **Excavation 3 – 2.5 feet by 2.5 feet by 4 feet deep.** Water line, 10-inch diameter, 2.5 feet bgs.
  - **Excavation 4 – 7 feet by 7 feet by 10 feet deep.** Kinder Morgan line, 24-inch diameter, 5.0 feet bgs; and Kinder Morgan line, 36-inch diameter, 4.0 feet bgs.
  - **Excavation 5 – 4 feet by 4 feet by 7 feet deep.** Possible Kinder Morgan line, 10-inch diameter, 3.75 feet bgs.

- **Excavation 6 – 3 feet by 3 feet by 7.5 feet deep.** Possible Kinder Morgan line, 16-inch diameter, 4.0 feet bgs.
- **Excavation 7 – 3 feet by 4 feet by 7 feet deep.** Kinder Morgan line, 16-inch diameter, 3.5 feet bgs (southernmost).

### 2.2 Drill Rig Mobilization

The directional drilling subcontractor, Ellingson-DTD, mobilized an American Augers DD210 drill rig rated for 210,000 pounds thrust and 210,000 pounds pullback force, with approximately 60,000 foot-pounds of torque, to the site.

While in operation, the drill rig was supplied with circulated drilling mud from a MudTechnology Inc., MCT-800 mud system, which mixes and distributes the drill mud. This mud system includes multiple mud tanks, mixing jets, scalper screens/shakers, desilting and de-sanding hydrocyclones, pumps, and associated fluid conveyance lines. Saturated drill cuttings from the shakers were accumulated in 20-yard roll-off containers positioned adjacent to the mud system. Photographs of the drill rig and mud system are provided in Attachment B (Photographs 1 and 2).

### 2.3 Borehole Navigation

Ellingson-DTD used a gyroscopic steering tool, supplied and operated by Sharewell, Inc. (Sharewell), to determine the precise location of the drill bit during borehole advancement. The navigation system, located just behind the drill-collar, allowed for real-time monitoring of the advancing drill-head without need for a wire surface grid. Continuous communication between the driller and the Sharewell technician enabled precise navigation within (+/-) 1 foot vertically and 3 feet horizontally. Sharewell survey results, including plan and profile views of the bore paths/wells and navigation data collected from each drill rod, are provided in Attachment C.

### 2.4 Drilling and Well Construction

The drill bit diameter used to advance boreholes at BS-03 and HSVE-01 was 10.25 inches. The borehole diameter ranged from 100 to 125 percent of the drill bit size, due to asymmetrical enlargement of the horizontal borehole by gravitational effects during drilling. A photograph of the drill bit is provided as Photograph 3 in Attachment B. Biodegradable guar-based drilling fluid (Baroid BioBore biodegradable biopolymer) was used to facilitate advancement of the drill bit and circulation of the drill cuttings from the borehole.

The entry points for BS-03 and HSVE-01 are located along the access road immediately southeast of the former truck fill stand. BS-03 was drilled to a distance of 769.54 lateral feet bgs with a surficial bore path extending 755.25 feet from the entry point and having a total depth of 45 feet bgs. HSVE-01 was drilled to a distance of 741.42 lateral feet bgs with a surficial bore path extending 755.08 feet from the entry point and having a total depth of 19 feet bgs. Both borings are blind holes, meaning single-entry completion. Soil cutting returns at the drilling rig mud system were logged by a Jacobs geologist for color, grain size, odor, and other pertinent soil characteristics. Soil also was screened in the field using a photoionization detector for the potential presence of volatile organic compounds. A copy of the boring logs are provided in Attachment D.

Once the borehole for BS-03 was completed, all rods were removed from the boring, the drill bit and navigation system housing (containing the gyroscopic steering tool) were removed, and the drill rods with an open "blunt nose" fitting at the distal end were returned to "chase" the boring and prepare for well installation. Drilling fluid was pumped continuously during this process to keep the borehole open and drill rods clear. Upon achieving the target distance, the drill rig mast/carrier was used to gradually push the polyvinyl chloride (PVC) well materials into place in 10-foot (flush-threaded) sections. A total of 270 feet of Schedule 80 PVC riser pipe (blank casing) were installed from the entry point to the beginning of the screened interval, with 500 feet of Schedule 80 PVC slotted pipe ("screen") from 270 to 770 feet. Photograph 4 in Attachment B shows project staff inspecting the well materials prior to installation. The screen has a maximum slot width of 0.010 inch, a slot length of 1.5 inches, and 4 rows at 20 slots per foot (4 rows x 5 slots per row; approximately 0.27 percent open area). A filter pack was not installed for this well because it is not necessary for a horizontal well of this configuration. The well construction diagram for BS-03 is included in Attachment E.

Similarly, once the borehole for HSVE-01 was completed, all rods and tooling were "tripped out" of the bore. However, immediately following drill rod removal, the 6-inch-diameter Schedule 10 stainless-steel casing was pushed downhole without the aid of the conductor casing/guide rod. A total of 241 feet of Schedule 10 stainless-steel riser pipe (blank casing) was installed from the entry point to the beginning of the screened interval, with 500 feet of 6-inch-diameter Schedule 10 stainless-steel casing (screen) from 241 to 741 feet. Photograph 5 in Attachment B shows project staff inspecting the well materials prior to installation. The screen has 1.5-inch-long slots, with a maximum width of 0.020 inch. The open area in well HSVE-01 increases with successive zones, starting at the proximal end of the screen. The first zone (Zone 1) spans the screen section from 0 to 150 feet from the proximal end of the screen and has an open area of 0.717 percent. Zone 2 spans the screen section from 150 to 350 feet, measured from the proximal end of the screen, and has an open area of 0.739 percent. Zone 3 extends to the distal end of the screen, spanning from 350 to 500 feet from the proximal end, and has an open area of 0.762 percent. Slot length and width were gauged and confirmed in the field by Jacobs field staff. A filter pack was not installed for this well because it is not necessary for a horizontal well of this configuration. The well construction diagram is included in Attachment E.

#### 2.4.1 Well Development

Well development was conducted to ensure effective communication between the wells and the surrounding geologic formation. A combination of flushing and jetting with a mixture of water and drill-fluid-breaking enzyme (added at approximately 2 pints per 2,000 gallons of water) was employed to clear the screened interval of both wells during development. The total development water discharged after flushing and jetting was approximately 7,880 gallons at BS-03 and 5,870 gallons at HSVE-01, with a total of six and eight jetting passes through the screened intervals of BS-03 and HSVE-01, respectively. Approximately 13,750 gallons of development fluid (development water and drilling mud) was discharged and containerized during the development event. Field water quality parameters (pH, temperature, conductivity, turbidity, sand and mud content) were collected during development activities and are included in the well development logs (Attachment F).

### 2.4.2 Well Grouting

Installation of well seals at BS-03 and HSVE-01 was completed following well development. A grout plug was emplaced in each well by pumping approximately 300 gallons of thick cement-bentonite through a tremie to approximate depths of 20 feet bgs (about 70 feet measured laterally) at BS-03 and 15 feet bgs (about 100 feet measured laterally) at HSVE-01. The grout plug settled for several hours followed by emplacement of approximately 250 gallons and 130 gallons of cement-bentonite grout at BS-03 and HSVE-01, respectively. Grouting was continued until grout material was visible at the borehole entry point. In total, 550 gallons and 430 gallons of cement-bentonite grout was emplaced at BS-03 and HSVE-01, respectively.

### 2.4.3 Wellhead Completion

A cleanout port was installed at the proximal end of wells BS-03 and HSVE-01 in a steel frame access manway (one manway for both wellheads), with dimensions of approximately 36 inches by 60 inches, with a spring-assist H-20 rated cover. The termination of the biosparge well includes one 4-inch-diameter Schedule 80 PVC "Y" pipe. The termination of the SVE well includes one 6-inch-diameter stainless steel "Y" pipe. For both biosparge and SVE wells, the straight end of the "Y" terminates inside the vault with a 4-inch and 6-inch National Pipe Tapered (NPT) thread plug (PVC and stainless steel, respectively). For each well, the 45-degree elbow of the "Y" connects to 3-inch and 6-inch high-density polyethylene (HDPE) transition fittings and HDPE conveyance pipe that stub outside of the vault at approximately 3 feet below grade, for future connection to remediation systems. The stubs are covered with slip caps (secured with duct tape) and the location is delineated at the surface. The manways are set in a concrete pad that measures approximately 18 inches wide on all sides of the vault and is 6 inches thick. Figure 4 provides a conceptual well completion diagram. Photographs of the well vaults are provided as Photographs 8 and 9 in Attachment B.

### 2.4.4 Site Restoration Activities

Following well installation activities, the seven excavations dug to expose buried pipelines and other utilities were restored to match pre-construction conditions. Excavations were backfilled to approximately 4 inches below grade using zero-sack slurry (i.e., flowable fill) and capped with approximately 4 inches of asphaltic concrete to match the surrounding grade. In total, approximately 12 cubic yards of zero-sack slurry and 4 tons of asphaltic concrete were emplaced to backfill and cap the excavations.

## 3. Waste Management

Waste generated during field activities included soil cuttings, drilling fluids, decontamination water, purged groundwater, disposable sampling supplies, disposable personal protective equipment, and general refuse, including construction debris. Soil cuttings and drilling fluids were containerized in eight 20-cubic-yard roll-off bins, with secondary containment. Rinse water and purged groundwater were containerized in two 6,000-gallon polyethylene holding tanks and one Adler tank, with secondary containment. Discarded personal protective equipment and general refuse were containerized in one 20-yard roll-off bin. Following analytical results for waste characterization,

drilling fluids were solidified in-place and roll-off bins holding solid waste (drill cuttings) and solidified mud were removed from the site by Kinder Morgan's waste hauling contractor (Patriot Environmental Services [Patriot]).

The following sections summarize liquid and solid waste removed from the site during the investigation.

### 3.1 Liquids

- Liquid waste (development and decontamination fluid) samples were collected for profiling purposes on February 11, 2020, by Patriot.
- Nonhazardous waste liquids (BS-03 and HSVE-01 decontamination water and well development water) were removed from the site on February 26, 2020, by Patriot and transported to Patriot Waste Water at 314 West Freedom Avenue, Orange, California.

### 3.2 Solids

- Solid waste (drill cuttings) and drill mud samples (prior to solidification) were collected for profiling purposes on December 11, 2019.
- Nonhazardous waste solids (drill cuttings from potholing, pipeline excavations, and borehole drilling) were removed from the site on February 06, 2020, by Patriot and transported to Soil Safe of California, Inc., at 12328 Hibiscus Avenue, Adelanto, California.
- Nonhazardous waste solids (solidified drill mud from BS-03 and HSVE-01) were removed by Patriot and transported to Patriot Waste Water at 314 West Freedom Avenue, Orange, California.
- General refuse, such as disposable sampling supplies and spent personal protective equipment, were containerized in a separate dumpster and hauled offsite by Patriot for disposal as municipal trash at the end of the project.

Copies of the waste manifests are provided in Attachment G.

## 4. System Startup Schedule

This section provides a high-level summary of the methods and processes that will be followed during system startup, short- and long-term monitoring, data evaluation, and reporting. A work plan addendum will be submitted prior to system startup that expands on this summary and provides a detailed description of the work that will occur prior to, during, and after startup.

### 4.1 System Startup

Biosparging at BS-03 will not be initiated until the capture zone study of HSVE-01 is completed to confirm sufficient management of potential vapor migration from BS-03 sparging activities. Following the capture zone study, BS-03 startup will be initiated at a flow rate of approximately 0.1 cubic foot per minute (cfm) per foot of screen interval (cfm/ft), and will be increased gradually in steps over a period of approximately 3 to 5 days to a target flow rate of 0.8 cfm/ft. The lateral extent of the ZOI in the saturated zone will be evaluated, and the SVE vacuum capture zone will be

reassessed, based on field measurements at nearby groundwater monitoring wells and soil vapor monitoring probes.

The baseline flow rate for HSVE-01 will be 1 cfm/ft or 500 cfm and will be increased gradually to a maximum of 1.8 cfm/ft, depending on vacuum and water table elevation measurements in surrounding soil vapor monitoring probes and groundwater monitoring wells.

Monitoring and evaluation of the new system will be conducted in three phases:

- Phase 1: Baseline Sampling
- Phase 2: Short-Term ZOI Evaluation and Soil Vapor Monitoring
- Phase 3: Long-Term Monitoring

#### 4.1.1 Phase 1: Baseline Sampling

Prior to BS-03 and HSVE-01 system startup, a baseline set of groundwater and soil vapor samples will be collected from selected wells during the normal operation of the total fluids extraction and SVE systems. Groundwater samples will be analyzed for volatile organic compounds (VOCs) including fuel oxygenates using EPA Method 8260B, TPH-g and TPH-d using EPA Method 8015M, and field water quality parameters (pH, dissolved oxygen, oxidation-reduction potential, temperature, and conductivity). Soil vapor samples will be analyzed for VOCs using EPA Method TO-15, TPH-g using EPA Method TO-3, and fixed gases (oxygen, carbon dioxide, and methane) using ASTM International (ASTM) D1946.

#### 4.1.2 Phase 2: Short-Term ZOI Evaluation and Soil Vapor Monitoring (Week 1)

The ZOI evaluation will be conducted after the 3-day startup period and will require approximately 2 days to complete. The lateral and vertical extent of the ZOI will be based on the following observations and/or field analytical data from nearby groundwater monitoring wells and/or soil vapor monitoring probes: (1) changes in dissolved oxygen concentrations; (2) vadose zone pressure; (3) changes in water level; and (4) changes in vadose zone VOCs, oxygen, and carbon dioxide vapor concentrations.

#### 4.1.3 Phase 3: Long-Term Monitoring

**Groundwater**

After the first week of operation, the groundwater wells will be monitored quarterly for a period of 1 year. After 1 year of quarterly sampling, these wells will be sampled on a semiannual basis under the routine groundwater Monitoring and Reporting Program for the site. Groundwater samples will be analyzed for VOCs including fuel oxygenates using EPA Method 8260B, and TPH-g and TPH-d using EPA Method 8015M. Additional wells may be added to this list in a work plan addendum.

**Soil Vapor**

After the first week of operation, the nested soil vapor monitoring probes will be monitored for VOCs, oxygen, and carbon dioxide with a 5-gas meter as follows: weekly during the first month, monthly for the next 6 months, and on a quarterly basis thereafter. Concurrently, vadose zone pressure will be measured using a digital manometer.

Soil vapor samples will be collected quarterly from the same set of soil vapor monitoring probes for a period of 1 year to evaluate subsurface soil vapor concentrations near the site boundary. After 1 year of quarterly sampling, these soil vapor monitoring probes will be sampled on a semiannual basis. Soil vapor samples will be analyzed for VOCs using EPA Method TO-15, TPH-g using EPA Method TO-3, and fixed gases (carbon dioxide, oxygen, and methane) using ASTM D1946. Additional probes may be added to this list in a work plan addendum.

## 5. References

CH2M HILL (CH2M). 2013a. *Revised Groundwater Sampling and Analysis Plan, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California.* May 30.

CH2M HILL (CH2M). 2013b. *Conceptual Site Model and Proposed Alternate Interim Remedy for Soil, Groundwater, and LNAPL, Defense Fuel Support Point, 15306 Norwalk Boulevard, Norwalk, California. S*eptember 3.

CH2M HILL (CH2M). 2013c. *Horizontal Biosparge System Construction and Pilot Test Work Plan, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California.* November 13.

CH2M HILL (CH2M). 2017. *Evaluation Report for the South-Central Area Horizontal Biosparge Pilot Test, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California.* August 3.

Kinder Morgan Energy Partners, LP (Kinder Morgan). 2017. Liquids O&M Procedure, Construction Near Company Facilities. Number L-O&M 204. Revised July 12, 2017.

Jacobs. 2018. *Southeastern Horizontal Biosparge Well (BS-02) Completion Report SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California.* July 12.

Jacobs. 2019. *Work Plan for Drilling and Installation of a Stacked Horizontal Biosparge and Soil Vapor Extraction Remediation Well System in the Offsite South-Central Area of SFPP Norwalk Pump Station, Norwalk, California.* November 4.

Jacobs. 2020. *Fourth Quarter 2019 Remediation Progress Report, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California.* January 15.

Jacobs

June 26, 2020
Subject: Offsite South-Central Horizontal Biosparge and Soil Vapor Extraction Well Installation Completion Report, SFPP Norwalk Pump Station, 15306 Norwalk Boulevard, Norwalk, California

If you have any questions regarding this investigation, please contact Eric Davis/Jacobs at (404) 323-1600, or Mr. Ryan Koch, Kinder Morgan's Remediation Project Manager, at (713) 420-6730.

Regards

**Eric Davis**
Senior Project Manager

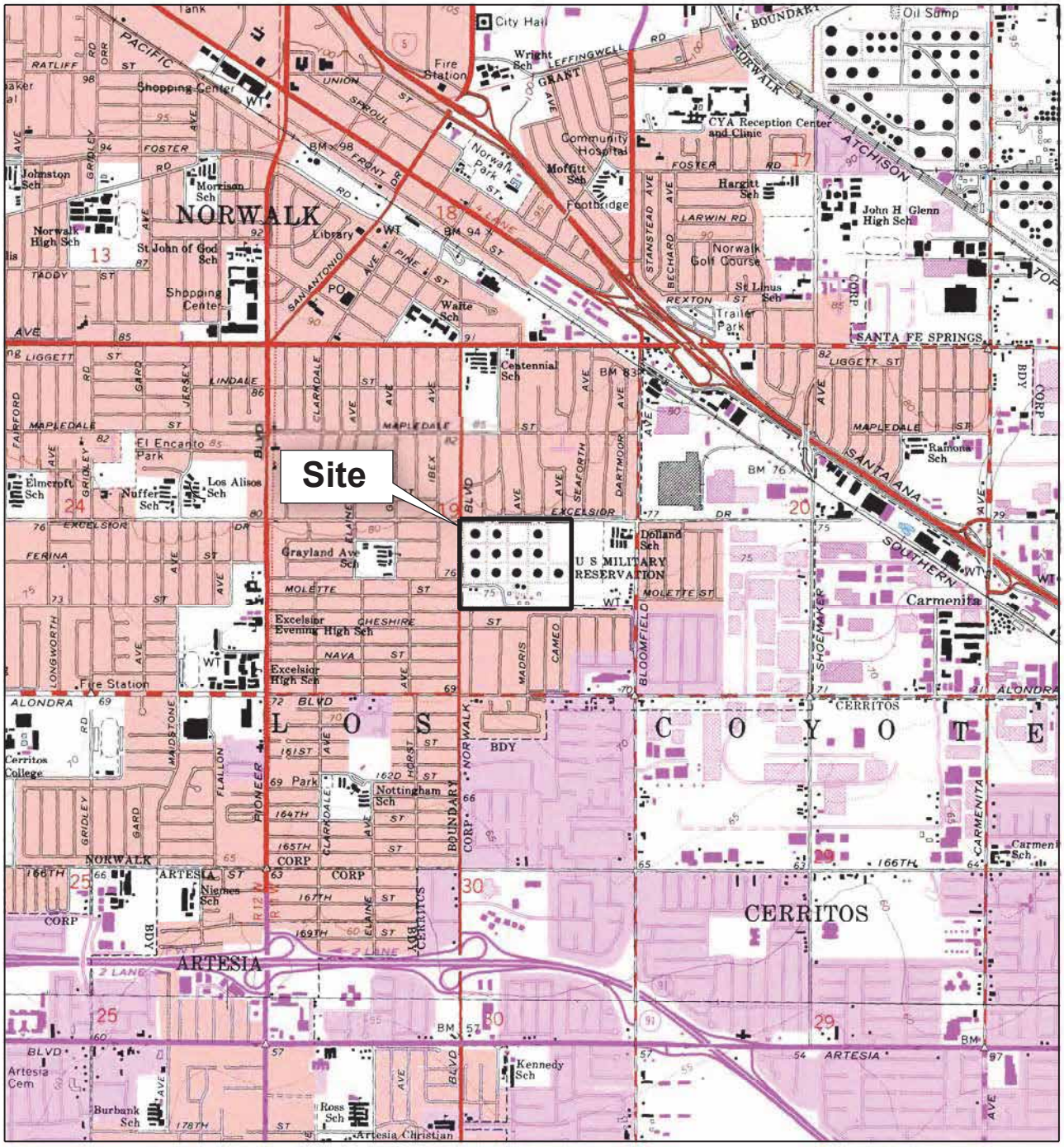
**Malcolm Thomas, M.Sc., P.G.**
Project Geologist
California Professional Geologist, No. 9825

Copies to: Ryan Koch, Kinder Morgan, Inc.
Norwalk Tank Farm Restoration Advisory Board
Reference Librarian, Norwalk Public Library

Attachments:

Figure 1 – Site Location Map
Figure 2 – Remediation System Layout
Figure 3 – Offsite South-Central Area Biosparge Well Location Map
Figure 4 – Conceptual Horizontal Biosparge Well Completion Diagram
Attachment A – Los Angeles County Department of Public Health Well Permit and EPA Injection Well Registration
Attachment B – Photographic Documentation
Attachment C – Ellingson-DTD Data Report
Attachment D – Well Boring Logs
Attachment E – Well Construction Diagrams
Attachment F – Well Development Logs
Attachment G – Waste Manifests

# Figures




North

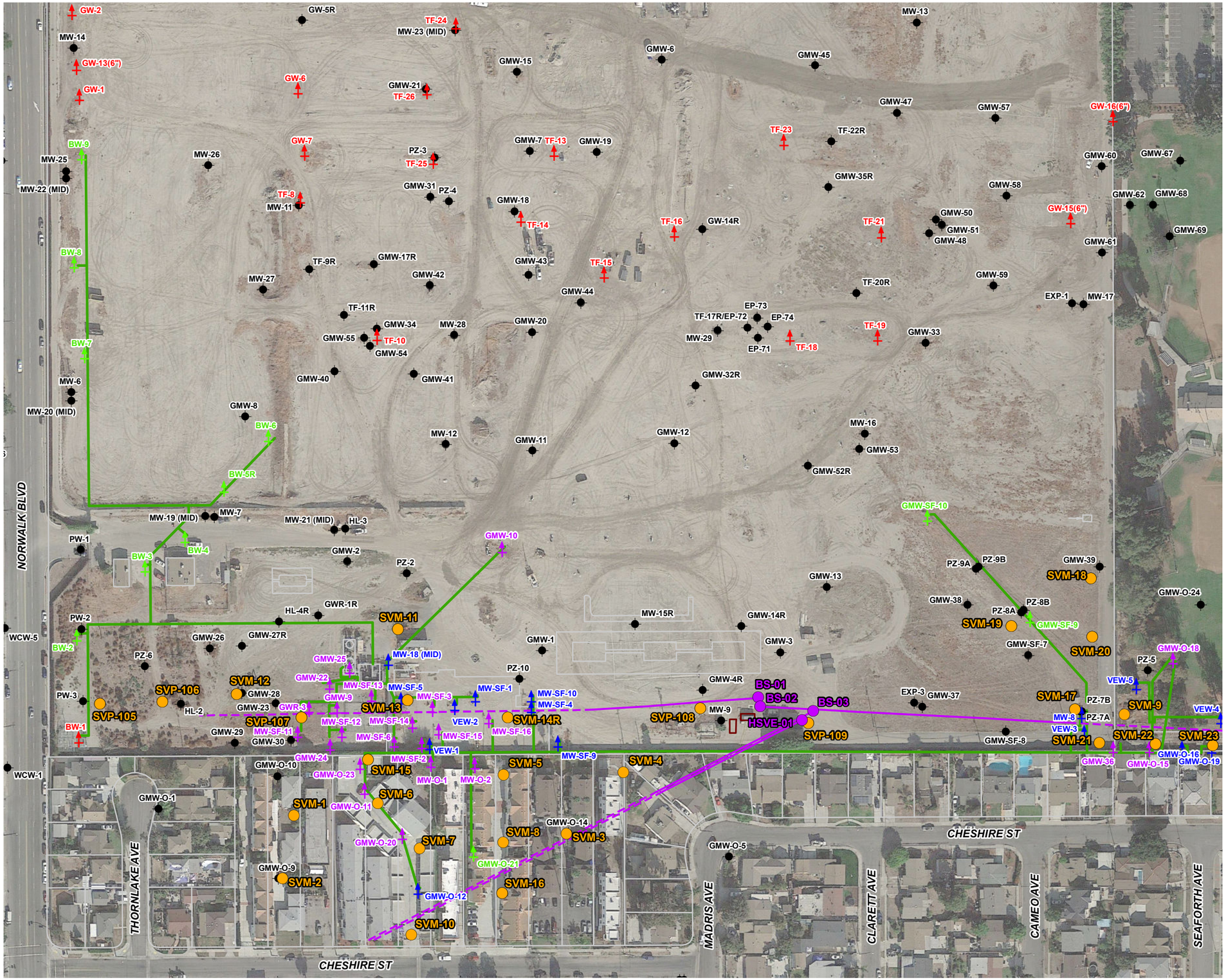
0 1200 2400

Approximate scale in feet

**Figure 1. Site Location Map**
SFPP Norwalk Pump Station
Norwalk, California

BASEMAP MODIFIED FROM U.S.G.S. 7.5 MINUTE QUADRANGLE MAP
LOS ALAMITOS 1964, CALIFORNIA. PHOTO-REVISED 1981.
WHITTIER 1965, CALIFORNIA. PHOTO-REVISED 1981.

Jacobs




**LEGEND**

- Soil Vapor Probe/Soil Vapor Monitoring Probe
- Horizontal Biosparge Well Entry Point
- Existing Groundwater Monitoring Well
- Existing Remediation Well
- Kinder Morgan Combined Soil Vapor and Total Fluids Extraction Wells
- Kinder Morgan Soil Vapor Extraction Wells
- Kinder Morgan Total Fluids and/or Groundwater Extraction Wells
- Kinder Morgan Remediation Piping Layout (Above Ground and Below Ground)
- Horizontal Biosparge Well (Dashed Line Depicts Approximate Lateral Extent of Well Screen)
- Air Compressor System

Imagery Source:
Google Earth December 3, 2017.

N

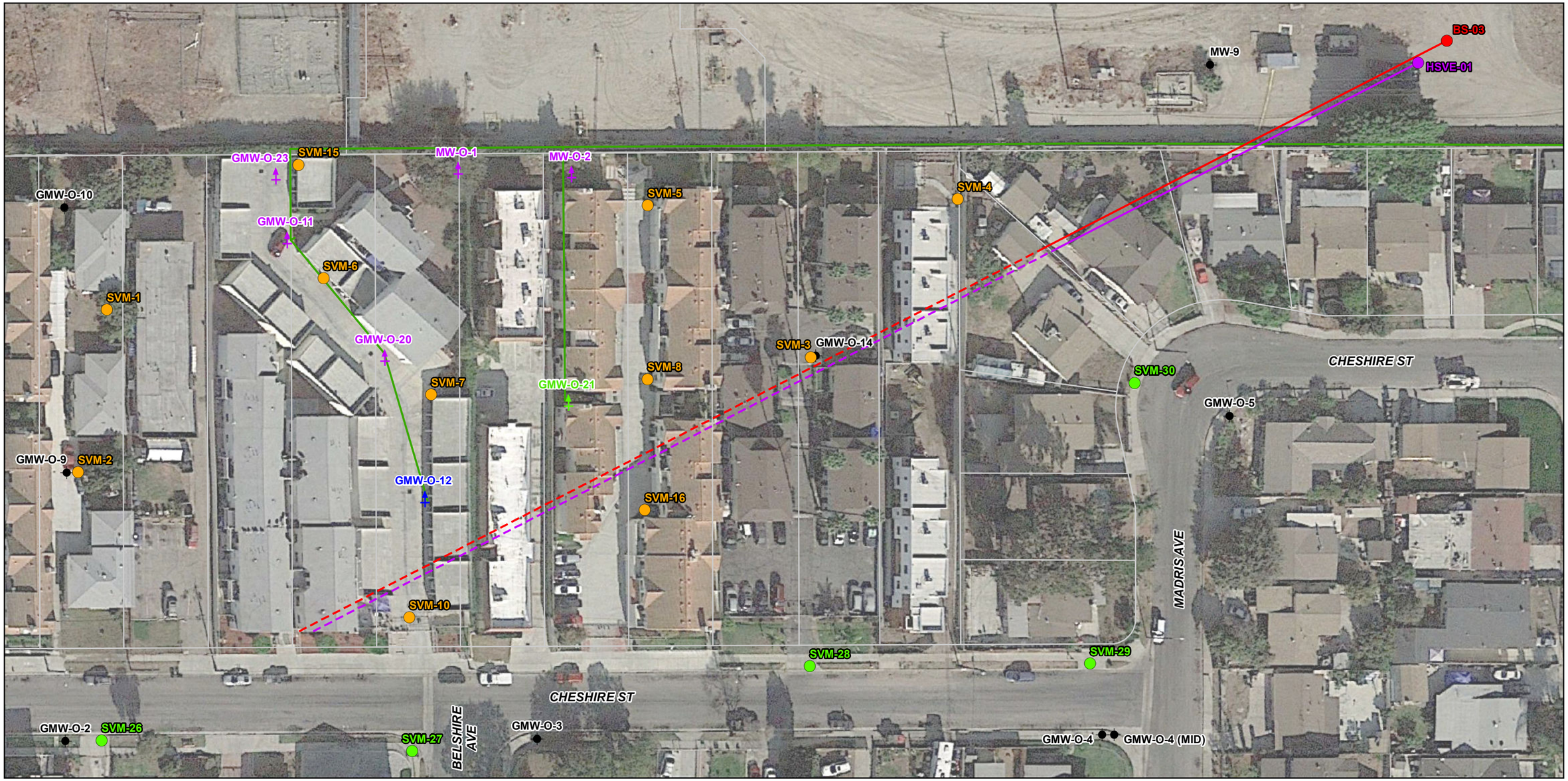
0 75 150 300
Feet

1 inch = 150 feet

**Figure 2. Remediation System Layout**
SFPP Norwalk Pump Station
Norwalk, California

Jacobs

\\DC1VS01\GISPROJ\K\KINDERMORGAN\NORWALK\MAPFILES\2020\FIGURE_2_REMEDIATION_SYSTEM_LAYOUT.MXD AESPEJO 6/18/2020




**LEGEND**

- Proposed Soil Vapor Monitoring Probe Location
- BS-03 (500-foot Screen, 270-foot Blank Casing)
- HSVE-01 (500-foot Screen, 241-foot Blank Casing)
- Soil Vapor Probe/Soil Vapor Monitoring Probe
- Existing Groundwater Monitoring Well
- Existing Kinder Morgan Combined Soil Vapor and Total Fluids Extraction Wells
- Existing Kinder Morgan Soil Vapor Extraction Wells
- Existing Kinder Morgan Total Fluids and/or Groundwater Extraction Wells
- Existing Kinder Morgan Remediation Piping Layout (Above Ground and Below Ground)
- New Remediation Well (BS-03)
- New Remediation Well (HSVE-01)

Imagery Source:
Google Earth December 3, 2017.

N

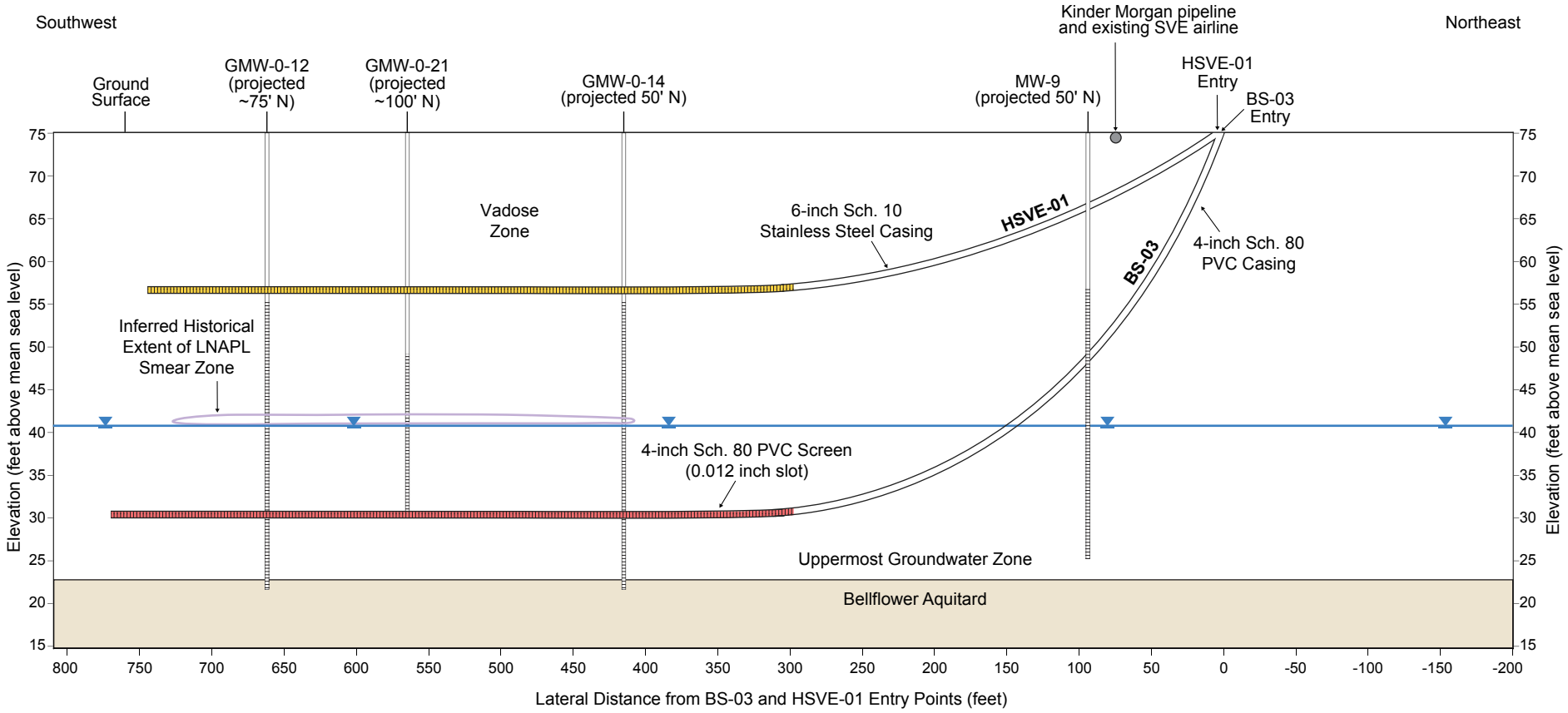
0 60 120
Feet

1 inch = 60 feet

\\DC1VS01\GISPROJ\K\KINDERMORGAN\NORWALK\MAPFILES\2020\FIGURE_3_OFFSITE_SC_AREA_BIOSPARGE_WELL.MXD 6/18/2020 6:09:05 PM

**Figure 3. Offsite South Central Area Biosparge Well Location Map**
SFPP Norwalk Pump Station
Norwalk, California

Jacobs




**LEGEND**

- Monitoring or TFE/SVE Well Screen
- Horizontal Biosparge Well Screen
- Horizontal Soil Vapor Extraction Well Screen
- Average 2Q19 GWE for GMW-O-12, GMW-O-14, GMW-O-21 and MW-9
- Kinder Morgan Pipeline and Existing Remediation System Piping

Note: HSV-01 boring path will reside approximately 10 feet north of the BS-03 boring path

**Figure 4.Conceptual Horizontal Biosparge and Soil Vapor Extraction Well Completion Diagram**
SFPP Norwalk Pump Station
Norwalk, California

Jacobs

# Attachment A
# Los Angeles County Department of Public Health Well Permit and EPA Injection Well Registration

# ENVIRONMENTAL HEALTH

## Drinking Water Program

5050 Commerce Drive, Baldwin Park, CA 91706
Telephone: (626) 430-5420 • Facsimile: (626) 813-3013 • Email: waterquality@ph.lacounty.gov
http://publichealth.lacounty.gov/eh/ep/dw/dw_main.htm

# SR0204789
# 15306 Norwalk Boulevard, Norwalk, CA 90650
# Work Plan Approval

| WORK SITE ADDRESS | CITY | ZIP | EMAIL ADDRESS FOR WELL PERMIT APPROVAL |
|---|---|---|---|
| 15306 Norwalk Boulevard | Norwalk | 90650 | eric.davis@jacobs.com |

**NOTICE:**

- WORK PLAN APPROVALS ARE VALID FOR 180 DAYS. 30 DAY EXTENSIONS OF WORK PLAN APPROVALS ARE CONSIDERED ON AN INDIVIDUAL (CASE-BY-CASE) BASIS AND MAY BE SUBJECT TO ADDITIONAL PLAN REVIEW FEES (HOURLY RATE AS APPLICABLE).
- WORK PLAN MODIFICATIONS MAY BE REQUIRED IF WELL AND GEOLOGIC CONDITIONS ENCOUNTERED AT THE SITE INSPECTION ARE FOUND TO DIFFER FROM THE SCOPE OF WORK PRESENTED TO THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.
- WORK PLAN APPROVALS ARE LIMITED TO COMPLIANCE WITH THE CALIFORNIA WELL STANDARDS AND THE LOS ANGELES COUNTY CODE AND DOES NOT GRANT ANY RIGHTS TO CONSTRUCT, RENOVATE, OR DECOMMISSION ANY WELL. THE APPLICANT IS RESPONSIBLE FOR SECURING ALL OTHER NECESSARY PERMITS SUCH AS WATER RIGHTS, PROPERTY RIGHTS, COASTAL COMMISSION APPROVALS, USE COVENANTS, ENCROACHMENT PERMISSIONS, UTILITY LINE SETBACKS, CITY/COUNTY PUBLIC WORKS RIGHTS OF WAY, ETC.
- THIS PERMIT IS NOT COMPLETE UNTIL ALL OF THE FOLLOWING REQUIREMENTS ARE SIGNED BY THE DEPUTY HEALTH OFFICER. WORK SHALL NOT BE INITIATED WITHOUT A WORK PLAN APPROVAL STAMPED BY THE DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM.
- ***ONCE APPROVED NOTIFY INSPECTOR AT ytaye@ph.lacounty.gov PREFERABLY 3 BUSINESS DAYS BEFORE WORK IS SCHEDULED TO BEGIN.***

**TO BE COMPLETED BY DEPARTMENT OF PUBLIC HEALTH—DRINKING WATER PROGRAM:**

**WORK PLAN APPROVED (1 Air Sparge well construction)** **DATE: November 22, 2019**

**ADDITIONAL APPROVAL CONDITIONS:**

- Work plan approval is issued for scope of work submitted to the Drinking Water Program. Any modifications to the scope of work will require additional work plan review.
- Ensure to backfill using a tremie pipe or equivalent, proceeding upward from the bottom of the boring.
- The construction of wells must comply with all applicable requirements published in the California Well Standards (Bulletins 74-81 and 74-90), Los Angeles County Code and all other applicable laws.
- Submit well completion report/log to ***ytaye@ph.lacounty.gov*** within 30 days from the date its construction is completed.
- Drillers shall submit their well completion reports to the Department of Water Resources through the Online System of Well Completion Reports (OSWCR) at https://civicnet.resources.ca.gov/DWR_WELLS.

REHS NO: 7115

*Yonas Taye,* REHS

☑ ANNULAR SEAL FINAL INSPECTION REQUIRED

| DATE ACCEPTED: | REHS signature |
|---|---|
| | |

☑ WELL COMPLETION LOG REQUIRED

| DATE ACCEPTED: | REHS signature |
|---|---|
| | |

□ WATER QUALITY—BACTERIOLOGICAL STANDARDS REQUIRED

| DATE ACCEPTED: | REHS signature |
|---|---|
| | |

□ WATER QUALITY—CHEMICAL STANDARDS REQUIRED

| DATE ACCEPTED: | REHS signature |
|---|---|
| | |

□ WATER SUPPLY YIELD REQUIRED

| DATE ACCEPTED: | REHS signature |
|---|---|
| | |

□ OTHER REQUIREMENT

| DATE ACCEPTED: | REHS signature |
|---|---|
| | |

# Underground Injection Well Registration for the Pacific Southwest (Region 9)

Underground Injection Control in Region 9

General inquiries or send email to R9iWells@epa.gov
*Be sure to include your e-mail address if you'd like a response.*

Register any class of injection well using the inventory form below.

**How to Register Injection Wells**

**Common Questions**

## Injection Well Inventory Form

Transaction Type (choose one): (•) First time entry ( ) Change

---------- Facility Information ----------

Facility Name: (Required)
SFPP Norwalk Pump Station

This is a private residence ( ) true (•) false

Street: 15306 Norwalk Boulevard

Street 2:

City: (Required) Norwalk

State: (Required) CA

Zip: (Required) 90650

Facility Phone: 714-560-4802

---------- Facility Location ----------

County CA-Los Angeles

Land ID:
RCRA ID, APN, or TMK or leave blank

8082-013-905

Indicate the land ownership of the property: (Required)

- ○ Private
- ○ Government-local, state
- ◉ Government-federal
- ○ Government-tribal
- ○ Non-Profit

If Tribal select Tribe name: - None -

NAICS Code
Numbers only, please. For industry/business, find NAICS code at www.census.gov

486910

Latitude
Latitudes in American Samoa should be entered as *negative* numbers. Free lat/long finder is latlong.net

33.8915804 °N

Longitude
Enter positive numbers for degrees longitude east or negative numbers for longitude west, in this field.

-118.0692023

Longitude (W or E)
Specify "W" for longitudes in the U.S., or "E" for longitudes in Guam & the Northern Mariana Islands.

W

---- Legal Contact Information: Owner or Other Responsible Party ----

Owner Contact Name: Alan Van Antwerp

Email: (Required) Alan_Vanantwerp@kindermorgan.com

Organization: (Required)
Kinder Morgan Energy Partners, L.P.
Street: 9950 San Diego Mission Road
Street 2:
City: (Required) San Diego
State: CA
Zip: (Required) 92108

---------- Well Details ----------

Total number of injection wells at this site: (Required)
If you would like to report other types of wells at this site, please submit this form, then use the back button to modify this entry or start over.
3
Number of identical wells reported below (Required)
1
Well Operating Status of your well(s):
- ( ) Planned/under construction
- (•) Active
- ( ) Inactive/not plugged
- ( ) Plugged and approved by regulator
- ( ) Plugged and abandoned without approval

Plugged & Abandoned?
If well(s) have been plugged and abandoned enter the *numerical* year only.

Injection Well Depth
(# of feet below ground surface)
- (•) < 50
- ( ) 50 - 500
- ( ) > 500

Injection Purpose
- ( ) Disposal
- ( ) Energy production
- ( ) Hydraulic barrier
- ( ) Oil or mineral recovery
- (•) Remediation
- ( ) Recharge
- ( ) Water supply storage and withdrawal

Injectate
Select the primary constituent of injected fluids.
- ( ) Storm drainage

- ( ) Irrigation runoff
- ( ) Non-contact cooling water
- ( ) Brine
- ( ) Combined industrial/sanitary
- ( ) Disinfected Tertiary Effluent (CA Title 22)
- ( ) Geothermal fluids
- ( ) Industrial Non-hazardous (describe in comments)
- ( ) Mine lixiviant
- ( ) Potable water
- (•) Remedial fluids/air
- ( ) Septic tank effluent
- ( ) Untreated sewage

Dispersal Direction

Select the predominant plumbing orientation of the injection well(s): horizontal such as a leachfield; vertical such as a drywell or seepage pit

- (•) horizontal
- ( ) vertical

Injectate Sources

Please select one.

- (•) From this site only
- ( ) This site and others

Comments

Please list any local or state permits that authorize, monitor, or otherwise affect the reported injection well(s). If this site is subject to any relevant local or state permits, or if you have any operational considerations for the injection well(s) that you would like to note, please list them here.

Pending well permit from the LA County of Public Health. Operation of BS-03 is under regulatory oversight of the Regional Water Quality Control Board, Los Angeles Region. Paul Cho is the case manager. BS-03 will be used to inject air into the groundwater at the southeast area of the site for LNAPL removal and remediation of dissolved petroleum hydrocarbons

Your Name

If you are NOT the owner listed above, please enter your name here.

Malcolm Thomas

Your Email (Required)

malcolm.thomas@jacobs.com

Your Organization

Your organization if other than the contact above.

Jacobs Engineering Group, Inc.

**Submit Registration**

## Davis, Eric/LAC

**From:** drupal_admin@epa.gov on behalf of US EPA: Injection Well Registration <no-reply@epa.gov>
**Sent:** Friday, November 15, 2019 7:25 AM
**To:** Thomas, Malcolm/SCO
**Subject:** [EXTERNAL] Injection Wells Registration: Confirming your submission

Thank you for using the online injection well registration form. Below is a copy of the preliminary data you submitted. This is the first step in registering your well. When this information is evaluated and entered into the EPA database you will receive a second notice for confirmation of well(s) registration.

Warning: Please print or save this email for your records. It may take up to
2 weeks for EPA to process your inventory data and respond. If you do not hear from us within two weeks, please contact Leslie Greenberg
(greenberg.leslie@epa.gov)

Submitted on Friday, November 15, 2019 - 10:25

Your submitted information:

Transaction Type (choose one): First time entry
==---------- Facility Information ----------==
Facility Name: SFPP Norwalk Pump Station
This is a private residence: false
Street: 15306 Norwalk Boulevard
Street 2:
City: Norwalk
State: CA
Zip: 90650
Facility Phone: 714-560-4802

==---------- Facility Location ----------==
County: CA-Los Angeles
Land ID: 8082-013-905
Indicate the land ownership of the property: Government-federal
If Tribal select Tribe name:
NAICS Code: 486,910
Latitude: 33.891580°N
Longitude: -118.069202
Longitude (W or E): W

==---- Legal Contact Information: Owner or Other Responsible Party ----==
Owner Contact Name: Alan Van Antwerp
Email: Alan_Vanantwerp@kindermorgan.com
Organization: Kinder Morgan Energy Partners, L.P.
Street: 9950 San Diego Mission Road
Street 2:

City: San Diego
State: CA
Zip: 92108

==---------- Well Details ----------==
Total number of injection wells at this site: 3
Number of identical wells reported below: 1
Well Operating Status of your well(s): Active
Plugged & Abandoned?
Injection Well Depth: < 50
Injection Purpose: Remediation
Injectate: Remedial fluids/air
Dispersal Direction: horizontal
Injectate Sources: From this site only

Comments: Pending well permit from the LA County of Public Health. Operation of BS-03 is under regulatory oversight of the Regional Water Quality Control Board, Los Angeles Region. Paul Cho is the case manager. BS-03 will be used to inject air into the groundwater at the southeast area of the site for LNAPL removal and remediation of dissolved petroleum hydrocarbons Your Name: Malcolm Thomas Your Email: malcolm.thomas@jacobs.com Your Organization: Jacobs Engineering Group, Inc.

==========
Best regards,
U.S. EPA, Pacific Southwest Region
Leslie Greenberg (greenberg.leslie@epa.gov)

# Attachment B
# Photographic Documentation

# Attachment B. Photographic Documentation, Horizontal Biosparge and Soil Vapor Extraction Well Installation

Photograph 1: View of drill rig (American Augers DD210), looking east.

Photograph 2: View of mud system (MCT800), looking south.

Photograph 3: View of 10-¼-inch cobble bit.

Photograph 4: View of BS-03 well casing, looking southwest.

Photograph 5: View of HSVE-01 well casing, looking north.

Photograph 6: View of daylit Kinder Morgan pipelines, looking south.

Photograph 7: View of HSVE-01 boring progression, looking east/northeast.

Photograph 8: View of BS-03 well vault installation and stub-out, looking west.

Photograph 9: View of HSVE-01 well vault installation and stub-out, looking west.

Photograph 10: View of HSVE-01 and BS-03 vault completions, looking east.

*Photograph 1: View of drill rig (American Augers DD210), looking east.*


*Photograph 2: View of mud system (MCT800), looking south.*

*Photograph 3: View of 10-¼-inch cobble bit.*

*Photograph 4: View of 4-inch-diameter PVC well screen and blank casing for BS-03, looking southwest.*


*Photograph 5: View of 6-inch-diameter blank and slotted stainless-steel casing for HSVE-01, looking north.*

*Photograph 6: Daylit, southernmost, active 16-inch Kinder Morgan pipeline (top in blue) and unknown line (bottom in yellow). Coating of 16-inch pipeline repaired (blue). Top of active pipeline 3.5 feet below ground surface. Depicted excavation extends 7 feet deep and 4 feet by 4 feet in length, looking south.*


*Photograph 7: View of HSVE-01 boring progression, looking east/northeast.*

*Photograph 8: View of BS-03 well vault installation and stub-out, looking west.*

*Photograph 9: View of HSVE-01 well vault installation and stub-out, looking west.*

*Photograph 10: View of HSVE-01 (front) and BS-03 (back) vault completions, looking east.*

# Attachment C
# Ellingson-DTD Data Report

# TrueGyde Steer : Directional Data Report

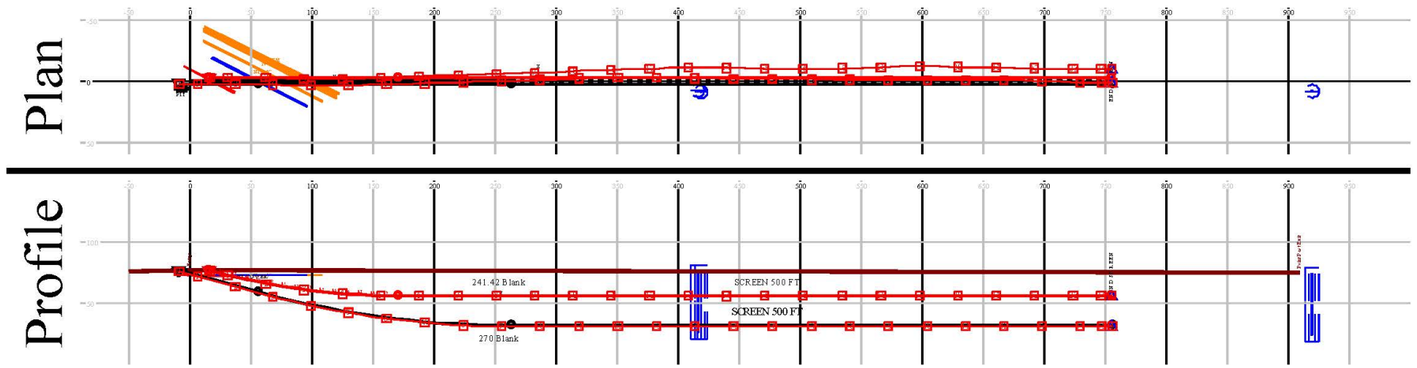
| | | | |
|---|---|---|---|
| **Job Name** | 19-404 B | **Line Az** | 242.8° |
| **Service Company** | SHAREWELL HDD | **Customer** | Ellingson DTD |
| **Location** | Norwalk, CA | **Description** | |
| **Product Size/Type** | 6" Stainless | **Probe S/N** | |

| Survey | MD | CL | Away | Lateral | Elev | Incl | Raw Az | Plg Az | Pilot Rad | Reamed Rad | DLS | Min Annu | Max Annu | DS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tie-In | 0.00 | N/A | 15.74 | -2.85 | 76.70 | 75.00 | 242.60 | 242.60 | N/A | N/A | N/A | 0.0 | 0.0 | TI |
| 1 | 15.20 | 15.20 | 30.45 | -2.93 | 72.88 | 75.90 | 242.60 | 242.40 | N/A | N/A | N/A | N/A | N/A | KB |
| 2 | 47.15 | 31.95 | 61.63 | -2.66 | 65.94 | 79.00 | 242.60 | 244.20 | N/A | N/A | N/A | N/A | N/A | KB |
| 3 | 78.85 | 31.70 | 92.93 | -1.84 | 61.04 | 83.20 | 242.60 | 244.43 | 551 | 658 | 10.40 | N/A | N/A | KB |
| 4 | 110.85 | 32.00 | 124.77 | -1.79 | 57.88 | 85.48 | 242.80 | 241.35 | 572 | 646 | 10.02 | N/A | N/A | KB |
| 5 | 142.15 | 31.30 | 156.02 | -2.56 | 56.30 | 88.74 | 241.30 | 241.48 | 559 | 630 | 10.25 | N/A | N/A | KB |
| 6 | 173.39 | 31.24 | 187.23 | -3.78 | 56.09 | 90.50 | 241.48 | 239.66 | 742 | 875 | 7.72 | N/A | N/A | KB |
| 7 | 205.29 | 31.90 | 219.10 | -5.15 | 56.23 | 89.97 | 241.30 | 241.01 | 1205 | 1602 | 4.75 | N/A | N/A | KB |
| 8 | 236.69 | 31.40 | 250.49 | -5.93 | 56.29 | 90.26 | 241.30 | 241.76 | 3564 | 13247 | 1.61 | N/A | N/A | KB |
| 9 | 267.99 | 31.30 | 281.78 | -6.64 | 56.31 | 89.82 | 241.76 | 241.29 | 7971 | INF | 0.72 | N/A | N/A | KB |
| 10 | 299.29 | 31.30 | 313.05 | -7.93 | 56.23 | 89.88 | 241.29 | 239.61 | INF | INF | 0.10 | N/A | N/A | KB |
| 11 | 330.59 | 31.30 | 344.33 | -9.11 | 56.21 | 90.07 | 241.30 | 241.67 | 28316 | INF | 0.20 | N/A | N/A | KB |
| 12 | 362.54 | 31.95 | 376.26 | -10.18 | 56.18 | 89.80 | 241.30 | 240.12 | INF | INF | 0.02 | N/A | N/A | KB |
| 13 | 394.24 | 31.70 | 407.95 | -10.84 | 55.95 | 89.36 | 242.50 | 243.09 | 10462 | INF | 0.55 | N/A | N/A | KB |
| 14 | 425.42 | 31.18 | 439.13 | -10.53 | 55.88 | 90.38 | 243.00 | 243.68 | 17527 | INF | 0.33 | N/A | N/A | KB |
| 15 | 456.88 | 31.46 | 470.58 | -10.00 | 56.03 | 90.20 | 243.00 | 243.88 | 13513 | INF | 0.42 | N/A | N/A | KB |
| 16 | 488.28 | 31.40 | 501.98 | -9.85 | 56.06 | 89.90 | 243.00 | 242.30 | 9978 | INF | 0.57 | N/A | N/A | KB |
| 17 | 520.23 | 31.95 | 533.92 | -10.43 | 56.07 | 90.12 | 242.80 | 241.22 | 20893 | INF | 0.27 | N/A | N/A | KB |
| 18 | 552.19 | 31.96 | 565.87 | -11.30 | 56.02 | 89.70 | 242.80 | 241.30 | 10922 | INF | 0.52 | N/A | N/A | KB |
| 19 | 583.71 | 31.52 | 597.39 | -11.80 | 56.03 | 90.36 | 242.80 | 242.50 | 11886 | INF | 0.48 | N/A | N/A | KB |
| 20 | 615.36 | 31.65 | 629.04 | -11.50 | 56.04 | 89.66 | 242.80 | 244.18 | 11849 | INF | 0.48 | N/A | N/A | KB |
| 21 | 646.60 | 31.24 | 660.27 | -10.88 | 56.01 | 90.24 | 242.80 | 243.73 | 10017 | INF | 0.57 | N/A | N/A | KB |
| 22 | 677.85 | 31.25 | 691.52 | -10.51 | 56.02 | 89.80 | 242.80 | 243.23 | 9632 | INF | 0.59 | N/A | N/A | KB |
| 23 | 709.42 | 31.57 | 723.09 | -10.27 | 55.92 | 89.83 | 242.80 | 243.28 | 31701 | INF | 0.18 | N/A | N/A | KB |
| 24 | 732.42 | 23.00 | 746.08 | -9.82 | 55.89 | 90.04 | 242.80 | 244.56 | 24586 | INF | 0.23 | N/A | N/A | KB |
| Bit | 741.42 | 9.00 | 755.08 | -9.55 | 55.90 | 90.04 | 242.80 | 244.56 | N/A | N/A | N/A | N/A | N/A | PR |

# TrueGyde Steer : Directional Data Report

| | | | |
|---|---|---|---|
| **Job Name** | 19-404 | **Line Az** | 242.8° |
| **Service Company** | Sharewell HDD | **Customer** | Ellingson DTD |
| **Location** | Norwalk, CA | **Description** | |
| **Product Size/Type** | 4" | **Probe S/N** | |

| Survey | MD | CL | Away | Lateral | Elev | Incl | Raw Az | Plg Az | Pilot Rad | Reamed Rad | DLS | Min Annu | Max Annu | DS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tie-In | 0.00 | N/A | -9.30 | 2.24 | 76.39 | 74.60 | 242.50 | 242.50 | N/A | N/A | N/A | 0.0 | 0.0 | TI |
| 1 | 15.75 | 15.75 | 5.87 | 2.20 | 72.17 | 74.32 | 242.80 | 242.84 | N/A | N/A | N/A | N/A | N/A | KB |
| 2 | 47.70 | 31.95 | 36.67 | 2.31 | 63.65 | 74.73 | 243.00 | 243.16 | N/A | N/A | N/A | N/A | N/A | KB |
| 3 | 79.40 | 31.70 | 67.30 | 3.00 | 55.52 | 75.56 | 243.16 | 245.04 | 4739 | INF | 1.21 | N/A | N/A | KB |
| 4 | 111.40 | 32.00 | 98.44 | 3.62 | 48.20 | 78.01 | 244.00 | 242.89 | 1485 | 2500 | 3.86 | N/A | N/A | KB |
| 5 | 142.90 | 31.50 | 129.36 | 3.31 | 42.24 | 80.16 | 241.90 | 241.60 | 1005 | 1390 | 5.70 | N/A | N/A | KB |
| 6 | 174.40 | 31.50 | 160.50 | 2.66 | 37.55 | 82.72 | 241.60 | 241.60 | 760 | 963 | 7.54 | N/A | N/A | KB |
| 7 | 205.90 | 31.50 | 191.81 | 1.89 | 34.13 | 84.81 | 241.50 | 241.21 | 796 | 1025 | 7.20 | N/A | N/A | KB |
| 8 | 237.40 | 31.50 | 223.21 | 1.02 | 31.92 | 87.16 | 241.50 | 241.23 | 773 | 987 | 7.41 | N/A | N/A | KB |
| 9 | 268.80 | 31.40 | 254.59 | 0.03 | 31.21 | 90.24 | 241.23 | 240.79 | 719 | 901 | 7.97 | N/A | N/A | KB |
| 10 | 300.10 | 31.30 | 285.87 | -1.11 | 31.34 | 90.23 | 241.20 | 240.64 | 996 | 1384 | 5.75 | N/A | N/A | KB |
| 11 | 332.25 | 32.15 | 318.00 | -2.16 | 31.40 | 90.00 | 241.30 | 241.26 | 1914 | 4087 | 2.99 | N/A | N/A | KB |
| 12 | 364.40 | 32.15 | 350.15 | -2.57 | 31.28 | 89.55 | 242.50 | 242.90 | 7938 | INF | 0.72 | N/A | N/A | KB |
| 13 | 395.87 | 31.47 | 381.61 | -2.42 | 31.15 | 90.00 | 242.80 | 243.26 | 23857 | INF | 0.24 | N/A | N/A | KB |
| 14 | 427.29 | 31.42 | 413.03 | -2.22 | 31.20 | 90.17 | 243.26 | 243.08 | 32032 | INF | 0.18 | N/A | N/A | KB |
| 15 | 459.27 | 31.98 | 445.01 | -1.95 | 31.21 | 89.86 | 243.80 | 243.50 | 17534 | INF | 0.33 | N/A | N/A | KB |
| 16 | 491.25 | 31.98 | 476.99 | -1.52 | 31.19 | 90.06 | 243.80 | 243.67 | INF | INF | 0.06 | N/A | N/A | KB |
| 17 | 523.19 | 31.94 | 508.93 | -1.30 | 31.18 | 89.92 | 243.80 | 242.75 | 21979 | INF | 0.26 | N/A | N/A | KB |
| 18 | 554.49 | 31.30 | 540.23 | -1.13 | 31.21 | 90.20 | 243.80 | 243.47 | 16046 | INF | 0.36 | N/A | N/A | KB |
| 19 | 585.75 | 31.26 | 571.49 | -0.79 | 31.29 | 90.09 | 244.80 | 243.40 | INF | INF | 0.03 | N/A | N/A | KB |
| 20 | 617.66 | 31.91 | 603.40 | -0.67 | 31.25 | 89.76 | 243.30 | 242.66 | 33830 | INF | 0.17 | N/A | N/A | KB |
| 21 | 649.06 | 31.40 | 634.80 | -0.69 | 31.23 | 90.15 | 243.30 | 242.88 | INF | INF | 0.05 | N/A | N/A | KB |
| 22 | 680.37 | 31.31 | 666.10 | -0.47 | 31.25 | 89.92 | 243.00 | 243.55 | 31890 | INF | 0.18 | N/A | N/A | KB |
| 23 | 711.67 | 31.30 | 697.39 | 0.33 | 31.21 | 89.95 | 242.80 | 245.00 | 28349 | INF | 0.20 | N/A | N/A | KB |
| 24 | 743.39 | 31.72 | 729.10 | 1.26 | 31.23 | 90.11 | 242.80 | 243.97 | INF | INF | 0.04 | N/A | N/A | KB |
| 25 | 760.69 | 17.30 | 746.40 | 1.46 | 31.23 | 89.93 | 242.80 | 243.00 | INF | INF | 0.01 | N/A | N/A | KB |
| Bit | 769.54 | 8.85 | 755.25 | 1.49 | 31.22 | 89.93 | 242.80 | 243.00 | N/A | N/A | N/A | N/A | N/A | PR |




**Proposed bore - Modified**
Bore Plan
MD of proposed bore = 770.0 ft
Away of proposed bore = 765.3 ft
Line Az of proposed bore = 0.0°

**As-drilled bore - 19-404**
Bore started on Dec 05, 2019
Bore completed on Dec 12, 2019
Directional data ☐ Tracking data △

**Proposed bore - 19 Ft Depth Stainless**
Bore Plan
MD of proposed bore = 741.9 ft
Away of proposed bore = 740.1 ft
Line Az of proposed bore = 0.0°

**As-drilled bore - 19-404 B**
Bore started on Dec 13, 2019
Bore completed on Dec 17, 2019
Directional data ☐ Tracking data △

South Central Area Biosparge Well
SFPP Norwalk Punp Station
Jacobs

THIS DRAWING PROVIDED BY : SHAREWELL HDD
OPERATOR(S) FOR THIS JOB : RENO MAYNARD
THIS DRAWING IS BASED ON INFORMATION PROVIDED BY : Directed Technologies Drilling

# Attachment D
# Well Boring Logs

# JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | BS-03 | SHEET 1 OF 7 |

## *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/9/2019
END : 12/12/2019
LOGGER : M. Thomas

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| | | | | | | **SM (SM)** brown (7.5YR 5/4), fine to coarse (40% fine - 40% medium - 20% coarse), subangular, micaceous, with quartz and pyrite | | cement-bentonite seal |
| 10 | | | | | | | | |
| | | | | 2.7 | | | | |
| | 4.05 | -15.68 | | | | **SM (SM)** brown (7.5YR 5/4), same as above | | |
| 20 | | | | | | | | |
| 30 | | | | | | | | |
| 40 | | | | | | | | |
| | | | | 3.2 | | | | |
| | 12.57 | -15.27 | | | | **SM (SM)** brown (7.5YR 5/4), same as above | | blank 4-inch Sch 80 PVC |
| 50 | | | | | | | | |
| 60 | | | | | | | | |
| 70 | | | | | | | | |
| | | | | 4.7 | | | | |
| 80 | 20.7 | -14.44 | | | | **SM (SM)** brown (7.5YR 5/4), fine to medium (50% fine - 50% medium), subangular, micaceous, with quartz and trace pyrite | | |
| 90 | | | | | | | | |
| 100 | | | | | | | | |
| | | | | 2.6 | | | | |
| 110 | 28.02 | -11.99 | | | | **SM (SM)** brown (7.5YR 5/4), fine to coarse (50% fine - 40% medium - 10% coarse), subangular, micaceous, with quartz and pyrite | | |
| 120 | | | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

# JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | BS-03 | SHEET 2 OF 7 |

## *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/9/2019
END : 12/12/2019
LOGGER : M. Thomas

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION<br>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS<br>DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 130 | | | | | | **SM (SM)**<br>brown (7.5YR 5/4), fine to coarse (50% fine - 40% medium - 10% coarse), subangular, micaceous, with quartz and pyrite*(continued from previous page)* | | |
| 140 | 33.98 | -9.84 | | 3.3 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to coarse (50% fine - 40% medium - 10% coarse), subangular, micaceous, with quartz and trace pyrite | sheen, color change | |
| 150 | | | | | | | | native material |
| 160 | | | | | | | | |
| 170 | 38.67 | -7.28 | | 2.5 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above, fine to medium (50% fine - 50% medium) | sheen | |
| 180 | | | | | | | | |
| 190 | | | | | | | | |
| 200 | 42.09 | -5.19 | | 2.6 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium (50% fine - 50% medium), subangular, micaceous with quartz | sheen | |
| 210 | | | | | | | | |
| 220 | | | | | | | | |
| 230 | | | | 2.6 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above | sheen | |
| 240 | 44.3 | -2.84 | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

# JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | BS-03 | SHEET 3 OF 7 |

## *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/9/2019
END : 12/12/2019
LOGGER : M. Thomas

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 250 | | | | | | **SM (SM)** dark brown (10YR 3/3), same as above*(continued from previous page)* | | |
| | | | | 4.7 | | **SM (SM)** dark brown (10YR 3/3), fine to coarse (50% fine - 45% medium - 5% coarse), subangular, micaceous,with quartz | | |
| 260 | | | | | | | | |
| 270 | 45.01 | 0.24 | | | | | | 4-inch SCH 80 PVC, slotted 0.010-inch, 4 rows, 1.5-inch spacing |
| 280 | | | | | | | | |
| | | | | 3.9 | | **SM (SM)** dark brown (10YR 3/3), same as above | | |
| 290 | | | | | | | | |
| 300 | 44.88 | 0.23 | | | | | | |
| 310 | | | | | | | | |
| | | | | 5.3 | | **SM (SM)** dark brown (10YR 3/3), fine to medium (60% fine - 40% medium), subangular, micaceous, with quartz | | |
| 320 | | | | | | | | |
| 330 | 44.82 | 0 | | | | | | |
| 340 | | | | | | | | |
| 350 | | | | 3.4 | | **SM (SM)** dark brown (10YR 3/3), same as above | sheen | |
| 360 | | | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

JACOBS

| PROJECT NUMBER: | BORING NUMBER: |
|---|---|
| D3270300.A.CS.EV.01.01L | BS-03 SHEET 4 OF 7 |

# *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/9/2019
END : 12/12/2019
LOGGER : M. Thomas

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION<br>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS<br>DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| | 44.94 | -0.45 | | | | **SM (SM)**<br>dark brown (10YR 3/3), same as above*(continued from previous page)* | | |
| 370 | | | | | | | | |
| 380 | | | | 3.6 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium (60% fine - 40% medium), subangular, micaceous with quartz grains | | |
| 390 | | | | | | | | |
| | 45.07 | 0 | | | | | | |
| 400 | | | | | | | | |
| 410 | | | | 1.3 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above | sheen | |
| 420 | | | | | | | | |
| | 45.02 | 0.17 | | | | | | |
| 430 | | | | | | | | |
| 440 | | | | | | | | |
| 450 | | | | 5.0 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium (50% fine - 50% medium), subangular, micaceous with quartz grains | sheen | |
| | 45.01 | -0.14 | | | | | | |
| 460 | | | | | | | | |
| 470 | | | | | | | | |
| 480 | | | | 2.4 | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

JACOBS

| PROJECT NUMBER: | BORING NUMBER: |
|---|---|
| D3270300.A.CS.EV.01.01L | BS-03 SHEET 5 OF 7 |

# *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/9/2019
END : 12/12/2019
LOGGER : M. Thomas

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 490 | 45.03 | 0.06 | | | | **SM (SM)** dark brown (10YR 3/3), same as above*(continued from previous page)* | | |
| 500 | | | | | | | | |
| 510 | | | | 2.1 | | **SM (SM)** dark brown (10YR 3/3), same as above | | |
| 520 | | | | | | | | |
| 530 | 45.04 | -0.08 | | | | | | |
| 540 | | | | 2.2 | | **SM (SM)** dark brown (10YR 3/3), fine to medium (60% fine - 40% medium) | | |
| 550 | | | | | | | | |
| 560 | 45.01 | 0.2 | | | | | | |
| 570 | | | | 3.7 | | **SM (SM)** dark brown (10YR 3/3), same as above | | |
| 580 | | | | | | | | |
| 590 | 44.93 | 0.09 | | | | | | |
| 600 | | | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | BS-03 | SHEET 6 OF 7 |

# *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/9/2019
END : 12/12/2019
LOGGER : M. Thomas

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION<br>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS<br>DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 610 | | | | 1.7 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium (50% fine - 50% medium), subangular, micaceous with quartz grains | | |
| 620 | 44.97 | -0.24 | | | | | | |
| 630 | | | | | | | | |
| 640 | | | | 4.3 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above | | |
| 650 | 44.99 | 0.15 | | | | | | |
| 660 | | | | 11.7 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above | sheen | |
| 670 | | | | | | | | |
| 680 | 44.97 | -0.08 | | | | | | |
| 690 | | | | | | | | |
| 700 | | | | 6.5 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above | sheen | |
| 710 | 45.01 | -0.05 | | | | | | |
| 720 | | | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

# JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | BS-03 | SHEET 7 OF 7 |

## *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/9/2019
END : 12/12/2019
LOGGER : M. Thomas

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION<br>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS<br>DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 730 | | | | 4.7 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above*(continued from previous page)*<br><br>**SM (SM)**<br>dark brown (10YR 3/3), same as above | sheen | |
| 740 | | | | | | | | |
| | 44.99 | 0.11 | | | | | | |
| 750 | | | | | | | | |
| | | | | 13.4 | | | sheen | |
| 760 | | | | | | | | |
| | 44.99 | -0.07 | | | | | | |
| 770 | | | | | | | | |
| | 45 | -0.07 | | | | Subsurface Boring Length: 769.54 ft.<br>End Depth: 45.00 ft bgs.<br>Maximum Depth: 45.07 ft bgs. | | |
| 780 | | | | | | | | |
| 790 | | | | | | | | |
| 800 | | | | | | | | |
| 810 | | | | | | | | |
| 820 | | | | | | | | |
| 830 | | | | | | | | |
| 840 | | | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | HSVE-01 | SHEET 1 OF 7 |

# *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/14/2019
END : 12/17/2019
LOGGER : M. Thomas/N. Orliczky

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | **SM (SM)** brown (7.5YR 5/4), fine to coarse (40% fine - 40% medium - 20% coarse), subangular, micaceous, with quartz and trace pyrite | | |
| 10 | | | | | | | | |
| | 2.02 | -14.1 | | | | **SM (SM)** brown (7.5YR 5/4), same as above | | |
| 20 | | | | | | | | |
| 30 | | | | | | **SM (SM)** brown (7.5YR 5/4), same as above | | |
| 40 | | | | | | | | |
| | 8.96 | -11 | | | | | | blank 6-inch Sch 10 stainless-steel |
| 50 | | | | | | | | |
| 60 | | | | 4.3 | | **SM (SM)** brown (7.5YR 5/4), same as above | | |
| 70 | | | | | | | | |
| 80 | 13.86 | -6.8 | | | | | | |
| 90 | | | | 2.1 | | **SM (SM)** brown (7.5YR 5/4), fine to coarse (40% fine - 40% medium - 20% coarse), subangular, micaceous, with quartz and trace pyrite | | |
| 100 | | | | | | | | |
| 110 | 17.02 | -4.52 | | | | | | |
| 120 | | | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

# JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | HSVE-01 | SHEET 2 OF 7 |

## *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/14/2019
END : 12/17/2019
LOGGER : M. Thomas/N. Orliczky

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION<br>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS<br>DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 130 | | | | 2.6 | | **SM (SM)**<br>brown (7.5YR 5/4), fine to medium (50% fine - 50% medium), subangular, micaceous, with quartz and trace pyrite | | |
| 140 | 18.6 | -1.26 | | | | | | |
| 150 | | | | | | | | native material |
| 160 | | | | 5.4 | | **SM (SM)**<br>brown (7.5YR 5/4), same as above | Sheen | |
| 170 | | | | | | | | |
| 180 | 18.81 | 0.5 | | | | | | |
| 190 | | | | 31.0 | | **SM (SM)**<br>brown (7.5YR 5/4), fine to medium (60% fine - 40% medium), subangular, micaceous, with quartz and pyrite | Sheen and odor | |
| 200 | | | | | | | | |
| 210 | 18.67 | -0.03 | | | | | | |
| 220 | | | | 15.1 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above | Sheen and odor | |
| 230 | | | | | | | | |
| 240 | 18.61 | 0.26 | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | HSVE-01 | SHEET 3 OF 7 |

# *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/14/2019
END : 12/17/2019
LOGGER : M. Thomas/N. Orliczky

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 250 | | | | | | **SM (SM)**<br>dark brown (10YR 3/3), same as above*(continued from previous page)* | | |
| | | | | 6.1 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above | | |
| 260 | | | | | | | | 6-inch SCH 10 stainless-steel, slotted 0.020-inch, 1.5-inch long slots |
| 270 | 18.59 | -0.18 | | | | | | |
| 280 | | | | 9.4 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above | Sheen | |
| 290 | | | | | | | | |
| 300 | 18.67 | -0.12 | | | | | | |
| 310 | | | | | | | | |
| | | | | 14.0 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium (60% fine - 40% medium), subangular, micaceous, with quartz and pyrite | Sheen | |
| 320 | | | | | | | | |
| 330 | 18.69 | 0.07 | | | | | | |
| 340 | | | | | | | | |
| | | | | 7.7 | | **SM (SM)**<br>dark brown (10YR 3/3), same as above | | |
| 350 | | | | | | | | |
| 360 | | | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

# JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | HSVE-01 | SHEET 4 OF 7 |

## *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/14/2019
END : 12/17/2019
LOGGER : M. Thomas/N. Orliczky

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| | 18.72 | -0.2 | | | | **SM (SM)** dark brown (10YR 3/3), same as above*(continued from previous page)* | | |
| 370 | | | | | | | | |
| | | | | 7.7 | | **SM (SM)** dark brown (10YR 3/3), same as above | | |
| 380 | | | | | | | | |
| 390 | | | | | | | | |
| | 18.95 | -0.64 | | | | | | |
| 400 | | | | | | | | |
| | | | | 9.8 | | **SM (SM)** dark brown (10YR 3/3), same as above | Sheen | |
| 410 | | | | | | | | |
| 420 | | | | | | | | |
| | 19.02 | 0.38 | | | | | | |
| 430 | | | | | | | | |
| 440 | | | | 4.6 | | **SM (SM)** dark brown (10YR 3/3), fine to medium (60% fine - 40% medium), subangular, micaceous, with quartz and trace pyrite | Sheen | |
| 450 | | | | | | | | |
| | 18.87 | 0.2 | | | | | | |
| 460 | | | | | | | | |
| 470 | | | | 0.7 | | **SM (SM)** dark brown (10YR 3/3), fine to medium | | |
| 480 | | | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

# JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | HSVE-01 | SHEET 5 OF 7 |

## *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/14/2019
END : 12/17/2019
LOGGER : M. Thomas/N. Orliczky

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION<br>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS<br>DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 490 | 18.84 | -0.1 | | | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium*(continued from previous page)* | | |
| 500 | | | | 2.5 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium | | |
| 510 | | | | | | | | |
| 520 | 18.83 | 0.12 | | | | | | |
| 530 | | | | | | | | |
| 540 | | | | 5.0 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium | | |
| 550 | | | | | | | | |
| 560 | 18.88 | -0.3 | | | | | | |
| 570 | | | | 1.0 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium | | |
| 580 | | | | | | | | |
| 590 | 18.87 | 0.36 | | | | | | |
| 600 | | | | 2.2 | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | HSVE-01 | SHEET 6 OF 7 |

# *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/14/2019
END : 12/17/2019
LOGGER : M. Thomas/N. Orliczky

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS: DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| 610 | | | | | | **SM (SM)** dark brown (10YR 3/3), fine to medium*(continued from previous page)* | | |
| | 18.86 | -0.34 | | | | | | |
| 620 | | | | | | | | |
| 630 | | | | 0.9 | | **SM (SM)** dark brown (10YR 3/3), fine to medium | | |
| 640 | | | | | | | | |
| | 18.89 | 0.24 | | | | | | |
| 650 | | | | | | | | |
| 660 | | | | 0.5 | | **SM (SM)** dark brown (10YR 3/3), fine to medium | | |
| 670 | | | | | | | | |
| 680 | 18.88 | -0.2 | | | | | | |
| 690 | | | | 0.1 | | **SM (SM)** dark brown (10YR 3/3), fine to medium | | |
| 700 | | | | | | | | |
| 710 | 18.98 | -0.17 | | | | | | |
| 720 | | | | | | | | |

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

# JACOBS

| PROJECT NUMBER: | BORING NUMBER: | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | HSVE-01 | SHEET 7 OF 7 |

## *Directional Borehole Log*

PROJECT : SFPP Norwalk Horizontal Well Installations, Norwalk, CA
LOCATION : 15306 Norwalk Blvd, Norwalk, CA

ELEVATION : *NA*
DRILLING CONTRACTOR AND RIG : Ellingson-DTD, American Augers DD210

COORDINATES :
DRILLING METHOD AND EQUIPMENT : Horizontal Drilling, 10-1/4" bit

STEERING CONTRACTOR: Ellingson-DTD
STEERING METHOD AND EQUIPMENT: Gyroscopic Steering Tool

WATER LEVEL : NA
START : 12/14/2019
END : 12/17/2019
LOGGER : M. Thomas/N. Orliczky

| BOREHOLE LENGTH (ft) | STEERING DATA: DEPTH BELOW GROUND (ft) | STEERING DATA: BOREHOLE INCLINATION (DEGREES) | DRILLING PIPE | ENVIRONMENTAL DATA (PID = ppm) | GRAPHIC LOG | SOIL DESCRIPTION<br>SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY | COMMENTS<br>DEPTH OF CASING, DRILLING RATE, DETAILS, AND INSTRUMENTATION | WELL DETAILS |
|---|---|---|---|---|---|---|---|---|
| | | | | 1.3 | | **SM (SM)**<br>dark brown (10YR 3/3), fine to medium | Sheen | |
| | 19.01 | 0.04 | | | | | | |
| | 19 | 0.04 | | | | Subsurface Boring Length: 741.42 ft.<br>End Depth: 19.00 ft bgs.<br>Maximum Depth: 19.02 ft bgs. | | |

730
740
750
760
770
780
790
800
810
820
830
840

Boreholes logged from drill cuttings. Group names and USCS descriptions are based entirely on visual-manual procedures.

# Attachment E
# Well Construction Diagrams

| PROJECT NUMBER | WELL NUMBER | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | BS-03 | SHEET 1 OF 1 |

# WELL COMPLETION DIAGRAM

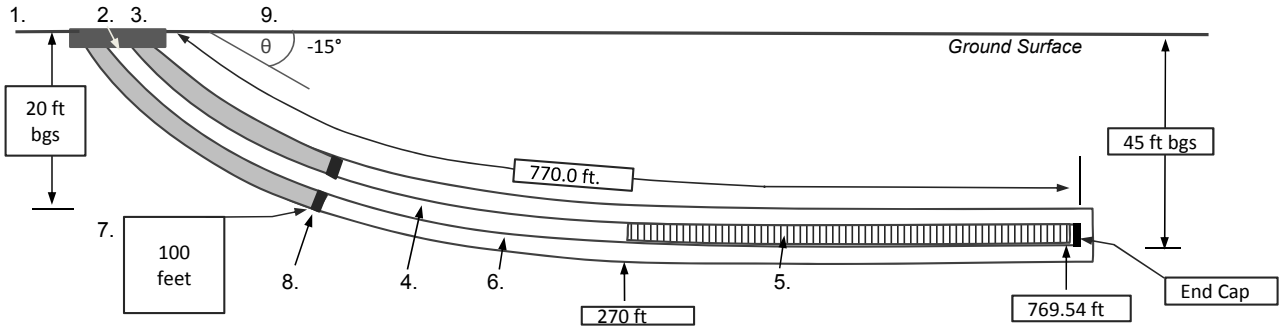
PROJECT : KMEP Norwalk Biosparge Well Installation LOCATION : 15306 Norwalk Blvd, Norwalk, CA

DRILLING CONTRACTOR : Ellingson DTD and Sharewell HDD

DRILLING METHOD AND EQUIPMENT USED : Directional Mud Drilling. American Augers DD210 drill. 10 ¼-inch cobble bit

STEERING METHOD AND EQUIPMENT USED : Sharewell gyroscopic steering tool

WATER LEVELS : Refer to Site Data for Water Levels START : 12/9/2019 END: 12/13/2019 LOGGER : M. Thomas




Screen from 270 - 769.54 feet. *Not to Scale*

1- Ground elevation at well 76.22 ft msl

2- Top of casing elevation 75.97 ft msl

3- Wellhead protection cover typ H20 spring-assist vault box 5'x3'x2'
a) concrete pad dimensions 6.5'x4.5'x0.5' concrete pad

4- Dia./type of well casing Threaded 4-inch SCH 80 PVC

5- Type/slot/aperture of screen 4-inch SCH 80 slotted PVC
0.010" nominal slots, cut in 4 rows quadra-symmetrical
Slot Length/Spacing 1.5 inch slots
Field Measured? Yes / No Yes

6- Type screen filter Natural Filter Pack from Borehole
a) Quantity used N/A

7- Type of seal Portland-Cement Bentonite Grout
a) Quantity used 66 (95 lb.) bags of Portland with 5% Bentonite

8- Grout stop seal Cement-bentonite grout plug to 67 feet down range

9- Angle at Point of Entry -15°
a) Boring angle at screen 0.24° to 0.07°

Drilling Fluid employed Baroid Bio-Bore biodegradable bioploymer drilling fluid.

Fluid degrader CETCO LEB-CD Liquid Enzyme Breaker

Development method Water Flushing and Jetting

Development time ~6.0 hours

Final Development Parameters
Temp: 23.95° C
pH: 6.31
Conductivity: 1.9 ms/cm
Turbidity: 69.9 NTU
Sand Content: <1.0 ml/L
Mud Content: <1.0 ml/L
Total Water Volume Discharged: ~8,950 gallons

Comments
Drill bit has a 10.25" diameter; however, horizontal borehole diameters vary slightly (likely 100% to 125% of drill bit size) due to gravitational effects.

| PROJECT NUMBER | WELL NUMBER | |
|---|---|---|
| D3270300.A.CS.EV.01.01L | HSVE-01 | SHEET 1 OF 1 |

# WELL COMPLETION DIAGRAM

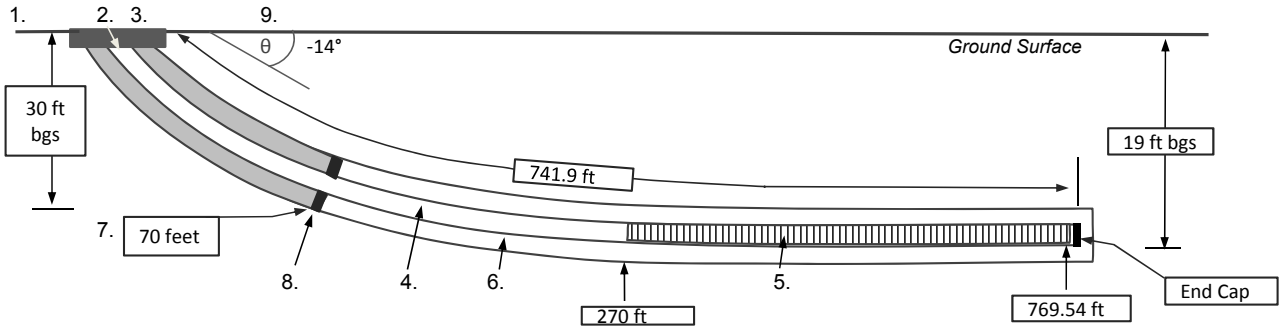
PROJECT : KMEP Norwalk Biosparge Well Installation LOCATION : 15306 Norwalk Blvd, Norwalk, CA

DRILLING CONTRACTOR : Ellingson DTD and Sharewell HDD

DRILLING METHOD AND EQUIPMENT USED : Directional Mud Drilling. American Augers DD210 drill. 10 ¼-inch cobble bit

STEERING METHOD AND EQUIPMENT USED : Sharewell gyroscopic steering tool

WATER LEVELS : Refer to Site Data for Water Levels START : 12/13/2019 END: 12/17/2019 LOGGER : M. Thomas




Screen from 270 - 769.54 feet. *Not to Scale*

1- Ground elevation at well 74.9 ft msl

2- Top of casing elevation 74.65 ft msl

3- Wellhead protection cover typ H20 spring-assist vault box 5'x3'x2'
a) concrete pad dimensions 6.5'x4.5'x0.5' concrete pad

4- Dia./type of well casing Threaded 4-inch SCH 80 PVC

5- Type/slot/aperture of screen 4-inch SCH 80 slotted PVC
0.010" nominal slots, cut in 4 rows quadra-symmetrical
Slot Length/Spacing 1.5 inch slots
Field Measured? Yes / No Yes

6- Type screen filter Natural Filter Pack from Borehole
a) Quantity used N/A

7- Type of seal Portland-Cement Bentonite Grout
a) Quantity used 66 (95 lb.) bags of Portland with 5% Bentonite

8- Grout stop seal Cement-bentonite grout plug to 67 feet down range

9- Angle at Point of Entry -15°
a) Boring angle at screen 0.24° to 0.07°

Drilling Fluid employed Baroid Bio-Bore biodegradable bioploymer drilling fluid.

Fluid degrader CETCO LEB-CD Liquid Enzyme Breaker

Development method Water Flushing and Jetting

Development time ~6.0 hours

Final Development Parameters
Temp: 23.95° C
pH: 6.31
Conductivity: 1.9 ms/cm
Turbidity: 69.9 NTU
Sand Content: <1.0 ml/L
Mud Content: <1.0 ml/L
Total Water Volume Discharged: ~8,950 gallons

Comments
Drill bit has a 10.25" diameter; however, horizontal borehole diameters vary slightly (likely 100% to 125% of drill bit size) due to gravitational effects.

# Attachment F
# Well Development Logs

Jacobs

| PROJECT NUMBER | WELL ID | |
|---|---|---|
| D3289100.A.CS.EV.02.01L | BS-03 | Sheet 1 of 1 |

# WELL DEVELOPMENT LOG

PROJECT : KMEP Norwalk Biosparge and Soil Vapor Extraction Well Installation LOCATION : 15306 Norwalk Blvd, Norwalk, CA

DEVELOPMENT CONTRACTOR : Ellingson DTD

DEVELOPMENT METHOD AND EQUIPMENT USED : Flush and Jet, Vactor 1200 Jet/Vacuum Unit

START WATER LEVELS : Not monitored START : 12/19/2019 END : 1/8/2020 LOGGER : M. Thomas

MAXIMUM DRAWDOWN DURING PUMPING: Not determined (ND)

RANGE AND AVERAGE DISCHARGE RATE: 10 - 40 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 7,880 gallons

DISPOSITION OF DISCHARGE WATER: Discharge water held in rolloff bin and poly tanks for profiling and disposal.

MONITORING EQUIPMENT USED: Horiba U-52 cal'd to 7.0 pH, cond. -4.49 mS/cm, and turbidity 0.0 NTU

| Date/Time | Water Volume Discharged (gal) | Water Level (ft BTOC) | Temp. (°C) | pH | Conductivity (µmhos/cm) | Turbidity (NTU) | Sand (ml/L) | Mud (ml/L) | Remarks (color, odor, sheen, sediment, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| 12/19/19 13:30 | -- | -- | -- | -- | -- | -- | -- | -- | Initial flush of well of drilling mud with 2 pints of liquid enzyme breaker to approx. 2,000-gallons |
| 15:00 | 4,800 | -- | -- | -- | -- | -- | -- | -- | end of flush. |
| 1/8/2020 | -- | -- | -- | -- | -- | -- | -- | -- | development via jetting |
| 10:15 | 5,000 | -- | 19.79 | 7.95 | 0.864 | 271 | <1 | <1 | light tan, transluscent |
| 10:25 | 5,400 | -- | 20.12 | 4.41 | 2.49 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 10:35 | 5,800 | -- | 20.91 | 4.31 | 2.610 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 10:45 | 6,000 | -- | 20.86 | 4.51 | 2.500 | >1,000 | >50 | >100 | 5 min of down time. Dark brown with mud + sand |
| 10:55 | 6,400 | -- | 20.88 | 4.43 | 2.270 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 11:05 | 6,800 | -- | 20.99 | 4.41 | 2.520 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 11:30 | 7,080 | -- | 20.26 | 4.43 | 2.420 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 11:40 | 7,480 | -- | 20.70 | 4.40 | 2.49 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 12:20 | 7,880 | -- | 22.02 | 4.28 | 2.54 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 12:21 | -- | -- | -- | -- | -- | -- | -- | -- | terminated jetting/flushing with a total of 6 screen passes. Approx 3.5 hours of development |
| End of development | -- | -- | -- | -- | -- | -- | -- | -- | -- |

Jacobs

**PROJECT NUMBER** D3289100.A.CS.EV.02.01L

**WELL ID** HSVE-01



# WELL DEVELOPMENT LOG

PROJECT : KMEP Norwalk Biosparge and Soil Vapor Extraction Well Installation LOCATION : 15306 Norwalk Blvd, Norwalk, CA

DEVELOPMENT CONTRACTOR : Ellingson DTD

DEVELOPMENT METHOD AND EQUIPMENT USED : Flush and Jet, Vactor 1200 Jet/Vacuum Unit

START WATER LEVELS : Not monitored START : 12/20/2019 END : 1/8/2020 LOGGER : M. Thomas

MAXIMUM DRAWDOWN DURING PUMPING: Not determined (ND)

RANGE AND AVERAGE DISCHARGE RATE: 5 - 40 gpm

TOTAL QUANTITY OF WATER DISCHARGED: 5,870 gallons

DISPOSITION OF DISCHARGE WATER: Discharge water held in rolloff bin and poly tanks for profiling and disposal.

MONITORING EQUIPMENT USED: Horiba U-52 cal'd to 7.0 pH, cond. -4.49 mS/cm, and turbidity 0.0 NTU

| Date/Time | Water Volume Discharged (gal) | Water Level (ft BTOC) | Temp. (°C) | pH | Conductivity (µmhos/cm) | Turbidity (NTU) | Sand (ml/L) | Mud (ml/L) | Remarks (color, odor, sheen, sediment, etc.) |
|---|---|---|---|---|---|---|---|---|---|
| 12/20/19 07:30 | -- | -- | -- | -- | -- | -- | -- | -- | Intial flush well of drilling mud with 2 pints of liquid enzyme breaker to approx. 2,000-gallons of water |
| 9:00 | 3,000 | -- | -- | -- | -- | -- | -- | -- | end of flush. |
| 1/7/2020 | -- | -- | -- | -- | -- | -- | -- | -- | development via jetting |
| 15:10 | 3,400 | -- | 23.97 | 5.77 | 0.67 | 65.9 | 20 | <1 | light brown, transluscent |
| 15:20 | 3,800 | -- | 24.81 | 5.81 | 2.18 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 15:40 | 4,600 | | 24.70 | 5.82 | 3.020 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 15:45 | -- | -- | -- | 5.91 | 2.89 | >1,000 | >50 | >100 | dark brown with mud and sand |
| 1/8/2020 | -- | -- | -- | -- | -- | -- | -- | -- | End of jetting. 8 screen passes completed. |
| 8:30 | 4,800 | -- | 19.35 | 6.10 | 2.790 | >1,000 | >45 | 70.0 | light brown, cloudy, opaque, increasing clarity |
| 1/14/2020 | | | | | | | | -- | Development via submersible pump set between 185 to 225 feet down casing. Pump rate between 5 and 10 gallons per minute |
| 8:00 | 4,810 | | 17.02 | 4.45 | 2.43 | >1,000 | 2.0 | -- | cloudy, odor |
| 8:15 | 5,050 | | 19.69 | 4.53 | 2.45 | 960 | 0.0 | -- | cloudy, odor |
| 8:25 | 5,150 | | 19.92 | 4.88 | 2.47 | 760 | 0.0 | -- | cloudy, odor |
| 8:35 | 5,250 | -- | 20.57 | 4.83 | 2.45 | >1,000 | 0 | -- | cloudy, odor |
| 8:40 | -- | -- | -- | -- | -- | -- | -- | -- | pump stopped to allow for recharge |
| 9:07 | -- | -- | -- | -- | -- | -- | -- | -- | pumping resumed |
| 9:08 | 5,350 | | 19.83 | 4.71 | 2.4 | >1,000 | 0.0 | -- | cloudy, odor |
| 9:15 | -- | -- | -- | -- | -- | -- | -- | -- | pump stopped to allow for recharge |
| 9:42 | -- | -- | -- | -- | -- | -- | -- | -- | pumping resumed |
| 9:44 | 5,420 | | 18.10 | 4.80 | 2.47 | >1,000 | 0.0 | -- | cloudy, odor |
| 10:00 | 5,450 | | 21.28 | 4.79 | 2.57 | >1,000 | 0.0 | -- | cloudy, odor |
| 10:10 | 5,500 | | 22.56 | 5.5 | 2.31 | 680 | 0 | -- | cloudy, odor |
| 10:20 | 5,550 | | 23.5 | 5.72 | 2.15 | 405 | 0 | -- | cloudy, odor |
| 10:30 | 5,600 | | 23.51 | 5.81 | 2.11 | 330 | 0 | -- | slightly cloudy, slight odor |
| 10:40 | 5,650 | | 23.62 | 5.99 | 2.03 | 228 | 0 | -- | slightly cloudy, slight odor |
| 10:50 | 5,700 | | 23.64 | 6.09 | 1.99 | 179 | 0 | -- | slightly cloudy, slight odor |
| 11:10 | 5,800 | | 23.56 | 6.2 | 1.94 | 113 | 0 | -- | clear, slight odor |
| 11:22 | 5,860 | | 23.95 | 6.31 | 1.90 | 69.9 | 0 | -- | clear, slight odor |
| 11:24 | 5,870 | -- | -- | -- | -- | -- | -- | -- | pumping ceased |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# Attachment G
# Waste Manifests

Please print or type

| NON-HAZARDOUS WASTE MANIFEST | 1. Generator ID Number | 2. Page 1 of | 3. Emergency Response Phone | 4. Waste Tracking Number |
|---|---|---|---|---|
| | CAT080033962 | 1 | 800-624-9136 | NH 0229000 |

**GENERATOR**

5. Generator's Name and Mailing Address
SFPP, L.P. Norwalk Station
1001 Louisiana Street EHS 8th Floor
Houston TX 77002
Att: Nataniel Grace
Generator's Phone: 713 420-5610

Generator's Site Address (if different than mailing address)
SFPP, L.P. (Norwalk Station)
15306 Norwalk Blvd.
Norwalk CA 90651

6. Transporter 1 Company Name: Patriot Environmental Services — U.S. EPA ID Number: CAD053866794

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address
Patriot WasteWater
314 W. Freedom Ave
Orange CA 92865
Facility's Phone: 714 921-4545
U.S. EPA ID Number: Not Required

| | 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. |
|---|---|---|---|---|---|
| 1. | Non Hazardous Waste, Liquid (Drilling Mud) | 001 | TT | 4,800 | G |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |

13. Special Handling Instructions and Additional Information
P.W.W. ORANGE PROFILE NO.: SOC-20-0002 - DRILLING MUD
PATRIOT ENV. SVS. JOB NO.: 01-19-01233

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: JAMES DYE — Signature — Month 02 Day 4 Year 20

**INT'L**

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

**TRANSPORTER**

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: PAUL QUINTANA — Signature — Month 2 Day 4 Year 20

Transporter 2 Printed/Typed Name — Signature — Month 2 Day 4 Year

**DESIGNATED FACILITY**

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month Day Year

Please print or type

| NON-HAZARDOUS WASTE MANIFEST | 1. Generator ID Number | 2. Page 1 of | 3. Emergency Response Phone | 4. Waste Tracking Number |
|---|---|---|---|---|
| | CAT080033962 | 1 | 800-624-9136 | NH 0228998 |

**GENERATOR**

5. Generator's Name and Mailing Address
SFPP, L.P. Norwalk Station
1001 Louisiana Street EHS 8th Floor
Houston TX 77002
Att: Nataniel Grace
Generator's Phone: 713 420-5610

Generator's Site Address (if different than mailing address)
SFPP, L.P. (Norwalk Station)
15306 Norwalk Blvd.
Norwalk CA 90651
U.S. EPA ID Number

6. Transporter 1 Company Name
Patriot Environmental Services
U.S. EPA ID Number
CAD053866794

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Patriot WasteWater
314 W. Freedom Ave
Orange CA 92865
Facility's Phone: 714 921-4545
U.S. EPA ID Number
Not Required

| | 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| 1. | Non Hazardous Waste, Liquid (Drilling Mud) | 001 | TT | 4,800 | G | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |

13. Special Handling Instructions and Additional Information
P.W.W. ORANGE PROFILE NO.: SOC-20-0002 - DRILLING MUD
PATRIOT ENV. SVS. JOB NO.: 01-19-01233

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.
ALWAYS wear appropriate PPE when handling waste. JOB#

Generator's/Offeror's Printed/Typed Name: JAMES DYE
Signature:
Month: 2 Day: 4 Year: 20

**INT'L**

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

**TRANSPORTER**

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: x PAUL QUINTANA
Signature: x Paul Quintana
Month: 2 Day: 4 Year: 20

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

**DESIGNATED FACILITY**

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name:
Signature:
Month: Day: Year:

Please print or type

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: CAT080033962
2. Page 1 of: 1
3. Emergency Response Phone: 800-624-9136
4. Waste Tracking Number: NH 0228997

5. Generator's Name and Mailing Address
SFPP, L.P. Norwalk Station
1001 Louisiana Street EHS 8th Floor
Houston TX 77002
Att: Nataniel Grace
Generator's Phone: 713 420-5610

Generator's Site Address (if different than mailing address)
SFPP, L.P. (Norwalk Station)
15306 Norwalk Blvd.
Norwalk CA 90651

6. Transporter 1 Company Name: Patriot Environmental Services
U.S. EPA ID Number: CAD053866794

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Patriot WasteWater
314 W. Freedom Ave
Orange CA 92865
Facility's Phone: 714 921-4545
U.S. EPA ID Number: Not Required

GENERATOR

| | 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| 1. | Non Hazardous Waste, Liquid (Drilling Mud) | 001 | TT | 4,800 | G | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |

13. Special Handling Instructions and Additional Information
P.W.W. ORANGE PROFILE NO.: SOC-20-0002 - DRILLING MUD
PATRIOT ENV. SVS. JOB NO.: 01-19-01233

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: X SCOTT Gardner
Signature: X
Month 2 Day 5 Year 20

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: X PAUL QUINTANA
Signature: X
Month 2 Day 5 Year 20
Transporter 2 Printed/Typed Name
Signature
Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month Day Year

GC Labels • Printed in the USA 1-800-997-6966

DESIGNATED FACILITY TO GENERATOR

Reorder Part# MANIFEST-C6NHWC 913-897-6966

Please print or type

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: CAT080033962 | 2. Page 1 of 1 | 3. Emergency Response Phone: 800-624-9136 | 4. Waste Tracking Number: NH 0228995

5. Generator's Name and Mailing Address
SFPP, L.P. Norwalk Station
1001 Louisiana Street EHS 8th Floor
Houston TX 77002
Att: Nataniel Grace
Generator's Phone: 713 420 5610

Generator's Site Address (if different than mailing address)
SFPP, L.P. (Norwalk Station)
15306 Norwalk Blvd.
Norwalk CA 90651
U.S. EPA ID Number: CAD053866794

6. Transporter 1 Company Name
Patriot Environmental Services
U.S. EPA ID Number:

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Patriot WasteWater
314 W Freedom Ave
Orange CA 92865
Facility's Phone: 714 921-4545
U.S. EPA ID Number: Not Required

| | 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| 1. | Non Hazardous Waste, Liquid (Drilling Mud) | 001 | TT | 4,800 | G | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |

13. Special Handling Instructions and Additional Information
E.W. ORANGE PROFILE NO.: SOC-20-0002 - DRILLING MUD
PATRIOT ENV. SVS. JOB NO.: 01-19-01233

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: x Scott Gardner
Signature: x Scott Gardner
Month 12 Day 5 Year 20

INT'L
15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER
16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: x PAUL QUINTANA
Signature: x Paul Quintana
Month 12 Day 5 Year 20
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY
17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Brian Kuc
Signature:
Month 1 Day 6 Year 2

GC Labels • Printed in the USA 1-800-997-6966

TRANSPORTER #1

Reorder Part# MANIFEST-C6NRWC 913-897-6966

Please print or type

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: CAT080033962
2. Page 1 of: 1
3. Emergency Response Phone: 800-624-9136
4. Waste Tracking Number: NH 0228999

5. Generator's Name and Mailing Address
SFPP, L.P. Norwalk Station
1001 Louisiana Street EHS 8th Floor
Houston, TX 77002
Att: Nataniel Grace
Generator's Phone: 713 420 5610

Generator's Site Address (if different than mailing address)
SFPP, L.P. (Norwalk Station)
15306 Norwalk Blvd
Norwalk, CA 90651

6. Transporter 1 Company Name: Patriot Environmental Services
U.S. EPA ID Number: CAD053868794

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Patriot WasteWater
314 W. Freedom Ave
Orange, CA 92865
Facility's Phone: 714 921-4545
U.S. EPA ID Number: Not Required

| 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. |
|---|---|---|---|---|
| 1. Non Hazardous Waste, Liquid (Drilling Mud) | 001 | TT | 4,900 | G |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |

13. Special Handling Instructions and Additional Information
P.O. #: ORANGE PROFILE NO.: SCE-20-0001 - DRILLING MUD
PATRIOT ENV. SVS. JOB NO.: 01-19-01233

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: JAMES DYE
Signature:
Month: 2 Day: 4 Year: 20

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: PAUL QUINTANA
Signature: Paul Quintana
Month: 2 Day: 4 Year: 20

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name:
Signature:
Month: 2 Day: 4 Year: 20

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

GC Labels • Printed in the USA
1-800-997-6966

TRANSPORTER #1

Reorder Part# MANIFEST-C6NHWC
913-897-6966

# Manifest

## SOIL SAFE OF CA – TPST
Non-Hazardous Soils

↓ Manifest # ↓

| Date of Shipment: | Responsible for Payment: | Transport Truck #: | Facility #: | Approval Number: | Load # |
|---|---|---|---|---|---|
| 3-12-20 | Transporter | TRK994 RL126 | | A5-1385 | 3 |

**Generator and/or Consultant**

Generator's Name and Billing Address:
SFPP, LP
153 Norwalk Boulevard
Norwalk, Ca 90651

Generator's Phone #: 7145604987
Person to Contact: Nathaniel Grace
FAX#:
Customer Account Number: 7SFPPNorwalk

Consultant's Name and Billing Address:
PATRIOT ENVIRONMENTAL
Nancy Clements / Dan Nguyen
PO BOX 62920
Irvine, CA 92606

Consultant's Phone #: 5624362614
Person to Contact: Patriotenvironmental@avidbill
FAX#:
Customer Account Number: 7PATPOB

Generation Site (Transport from): *(name & address)*
SFPP, LP
Norwalk Station
153 Norwalk Boulevard
Norwalk, Ca 90651

Site Phone #: 7149709196
Person to Contact: Neil Frumkin
FAX#:

Designated Facility (Transport to): *(name & address)*
SOIL SAFE OF CALIFORNIA, INC
12328 HIBISCUS AVE
ADELANTO, CA 92301

Facility Phone #: (760) 246-8001
Person to Contact: JOE PROVANSAL
FAX#: (760) 246-8004

Transporter Name and Mailing Address:
Patriot Environmental Services
PO BOX 62920
Nancy Clements / Dan Nguyen
Irvine, CA 92606

Transporter's Phone #: 5624362614
Person to Contact: Patriotenvironmental@avid
FAX#: 7PATRIOT

Bin# R299149L
JOB# 01-19-01233
Customer Account Number

| Description of Soil | Moisture Content | Contaminated by: | Approx. Qty: | Description of Delivery | Gross Weight | Tare Weight | Net Weight |
|---|---|---|---|---|---|---|---|
| Sand ☐ Organic ☐ Clay ☑ Other ☐ | 0 - 10% ☑ 10 - 20% ☐ 20% - over ☐ | Gas ☐ Diesel ☐ Other ☐ | 01 | 20 yard Bin | | | |
| Sand ☐ Organic ☐ Clay ☐ Other ☐ | 0 - 10% ☐ 10 - 20% ☐ 20% - over ☐ | Gas ☐ Diesel ☐ Other ☐ | | | | | |

List any exception to items listed above: Scale Ticket #

*Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils descried in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.*

Print or Type Name: Generator ☒ Consultant ☐ JAMES D'E | Signature and date: | Month 3 | Day 12 | Year 20

**Transporter**

*Transporter's certification: I/We acknowledge receipt of the soil referenced above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that the soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.*

Print or Type Name: PAUL BENNETT | Signature and date: | Month 03 | Day 12 | Year 20

**Recycling Facility**

Discrepancies:

*Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:*

Print or Type Name: JOE PROVANSAL/BILL BISHOP/BARRY MEEK | Signature and date:

Please print or type.

FACILITY COPY

Please print or type

**NON-HAZARDOUS WASTE MANIFEST**

| 1. Generator ID Number | 2. Page 1 of | 3. Emergency Response Phone | 4. Waste Tracking Number |
|---|---|---|---|
| CAT080033962 | 1 | 800-624-9136 | NH 0234094 |

**GENERATOR**

5. Generator's Name and Mailing Address
SFPP, L.P. Norwalk Station
1001 Louisiana Street EHS 8th Floor
Houston TX 77002
Attn: Nataniel Grace
Generator's Phone: 713 420-5610

Generator's Site Address (if different than mailing address)
SFPP, L.P. (Norwalk Station)
15306 Norwalk Blvd.
Norwalk CA 90651

6. Transporter 1 Company Name: Patriot Environmental Services — U.S. EPA ID Number: CAD053866794

7. Transporter 2 Company Name — U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Patriot Wastewater
314 W. Freedom Ave
Orange CA 92865
Facility's Phone: 714 921-4545
U.S. EPA ID Number: Not Required

| | 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| 1. | Non Hazardous Waste, Liquid (Drilling Mud) | 001 | TT | 4,800 | G | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |

13. Special Handling Instructions and Additional Information
P.W.W. ORANGE PROFILE NO.: SOC-20-0002 - DRILLING MUD
PATRIOT ENV. SVS. JOB NO.: 01-19-01233

Always wear appropriate PPE when handling waste. JOB#

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: JAMES DYE — Signature — Month 02 Day 25 Year 20

**INT'L**

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: Date leaving U.S.:
Transporter Signature (for exports only):

**TRANSPORTER**

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: x Paul Quintana — Signature: x Paul Quintana — Month 9 Day 26 Year 20

Transporter 2 Printed/Typed Name — Signature — Month Day Year

**DESIGNATED FACILITY**

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month Day Year



DESIGNATED FACILITY TO GENERATOR

Please print or type

**NON-HAZARDOUS WASTE MANIFEST**

| 1. Generator ID Number | 2. Page 1 of | 3. Emergency Response Phone | 4. Waste Tracking Number |
|---|---|---|---|
| CAT080033962 | 1 | 800-624-9136 | NH 0234095 |

**GENERATOR**

5. Generator's Name and Mailing Address
SFPP, L.P. Norwalk Station
1001 Louisiana Street EHS 8th Floor
Houston TX 77002
Att: Nathaniel Grace
Generator's Phone: 713 420-5610

Generator's Site Address (if different than mailing address)
SFPP, L.P. (Norwalk Station)
15306 Norwalk Blvd.
Norwalk CA 90651

6. Transporter 1 Company Name
Patriot Environmental Services
U.S. EPA ID Number
CAD053866794

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Patriot WasteWater
314 W. Freedom Ave
Orange CA 92865
Facility's Phone: 714 921-4545
U.S. EPA ID Number
Not Required

| | 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| 1. | Non Hazardous Waste, Liquid (Drilling Mud) | 001 | TT | 4000 | G | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |

13. Special Handling Instructions and Additional Information
P.W.W. ORANGE PROFILE NO.: SOC-20-0002 - DRILLING MUD
PATRIOT ENV. SVS. JOB NO.: 01-19-01233

Always wear appropriate PPE when handling waste. LOPA

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: JAMES DYE
Signature
Month 2 Day 25 Year 20

**INT'L**

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

**TRANSPORTER**

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: PAUL QUINTANA
Signature: Paul Quintana
Month 9 Day 26 Year 20

Transporter 2 Printed/Typed Name
Signature
Month Day Year

**DESIGNATED FACILITY**

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name
Signature
Month Day Year



DESIGNATED FACILITY TO GENERATOR

Please print or type

| NON-HAZARDOUS WASTE MANIFEST | 1. Generator ID Number | 2. Page 1 of | 3. Emergency Response Phone | 4. Waste Tracking Number |
|---|---|---|---|---|
| | C A T 0 8 0 0 3 3 9 6 2 | 1 | 800-624-9136 | NH 0234022 |

**GENERATOR**

5. Generator's Name and Mailing Address
SFPP, L.P. Norwalk Station
Att: Nathaniel Grace
1001 Louisiana Street EHS 8th Floor
Houston TX 77002
Generator's Phone: 713 420-5810

Generator's Site Address (if different than mailing address)
SFPP, L.P. (Norwalk Station)
153 Norwalk Blvd.
Norwalk CA 90651

6. Transporter 1 Company Name
Patnot Environmental Services
U.S. EPA ID Number
C A D 0 5 3 8 6 6 7 9 4

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Soil Safe of California, Inc.
12328 Hibiscus Ave.
Adelanto CA 92301
Facility's Phone: 800 862-8001
U.S. EPA ID Number
Not Required

| | 9. Waste Shipping Name and Description | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| 1. | Non Hazardous Waste, Solid (Drilling Bulk Solids) | | CM | 20 | Y | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |

13. Special Handling Instructions and Additional Information
1) Profile # AS-1384 - Drilling Bulk Solids

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.
Always wear appropriate PPE when handling waste. JOB#
Generator's/Offeror's Printed/Typed Name: JAMES DYE
Signature
Month 2 Day 6 Year 20

**INT'L**

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

**TRANSPORTER**

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: X JACUAL FLORES
Signature: X
Month 2 Day 7 Year 20
Transporter 2 Printed/Typed Name
Signature
Month Day Year

**DESIGNATED FACILITY**

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month Day Year



DESIGNATED FACILITY TO GENERATOR