

**RO0232 MEETING NOTES**  
**10700 MACARTHUR, OAKLAND**  
**DECEMBER 22, 2009**

**PARTICIPANTS:**

Jerry Wickham, ACEH  
Peter McIntyre, AEI Consultants  
Gowri Kowtha, Stratus,  
Scott Bittinger, Stratus  
Chuck Miller, Moller Investments

There was no formal agenda for the meeting. The topic of the meeting was the soil vapor sampling results and site-specific cleanup objectives: Stratus presented a "MEMO," to facilitate discussion of the site. The Memo (attached) contained three remedial approaches.

- 1) Jerry Wickham discussed comparing the soil vapor results for 4 feet bgs with a subslab screening level. As an example, the benzene concentration at 5 feet bgs, which would be the future subslab concentration, should be less than 140  $\mu\text{g}/\text{m}^3$  using an indoor air screening level of 0.14  $\mu\text{g}/\text{m}^3$  and an attenuation factor of 0.01 subslab to indoor air.
- 2) Excavation to 10 feet within area with elevated VOC concentrations in soil vapor was discussed. The group could not reach agreement on a method for establishing SSTLs. Jerry Wickham requested that excavation extend to greater depths in most contaminated areas and lesser depths in less contaminated areas.
- 3) Stratus and Moller believe that ESLs are too conservative and want to negotiate higher levels for SSTLs. Stratus will submit a spreadsheet listing the default parameters and suggested changes from default parameters.
- 4) Stratus expressed concern regarding liability for compaction of soil following excavation.
- 5) The use of max, mean, or 95% UCL was discussed. Jerry Wickham indicated max should be used since one sampling point would likely represent an office where someone would consistently be exposed.

**Action Items:**

- 1) Stratus will submit a spreadsheet with suggested input parameters for model to develop site specific SSTLs.

## MEMO

<b>Site Name:</b> Former USA Service Station No. 57
<b>Site Address:</b> 10700 MacArthur Boulevard, Oakland, California
<b>Prepared For:</b> December 22, 2009 Meeting at Alameda County Health Dept. Office
<b>Prepared By:</b> Gowri S. Kowtha, P.E., and Scott G. Bittinger, P.G.

Stratus Environmental, Inc. (Stratus) has prepared this memorandum in order to facilitate discussion regarding future management of the environmental case at the subject site. Stratus recently completed a soil gas survey at the property; results of this work indicated that elevated concentrations of petroleum hydrocarbons in shallow soil gas, most notably TPHG and benzene, are present in the vicinity of former USTs and dispensers. Based on the data collected, and our understanding of the site, active remedial efforts would likely be necessary in order to further reduce soil gas concentrations.

In a document entitled *Remedial Alternatives Evaluation and Proposed Site Specific Cleanup Objectives (August 2009)*, Stratus assessed the technical viability and cost effectiveness of several technologies that could be used to mitigate petroleum hydrocarbon impact. From this group, Stratus has selected 3 remedial approaches, (excavation and disposal of soil, combined SVE/AS, and combined DPE/AS, presented below), which we believe would be appropriate and cost effective methods for significantly reducing petroleum hydrocarbon concentrations in shallow soil gas. The August 2009 report presented more comprehensive remedial scenarios for mitigating site contaminants than those outlined below. This 2009 report estimated timeframes and costs for reducing both soil and groundwater concentrations to low-level cleanup objectives.

Based on recent discussions with Alameda County Health Department personnel, soil gas concentrations at the site will be considered as the primary exposure risk to the public. Therefore, reduction in soil gas concentrations has become the objective of future remedial efforts for the property. Although petroleum hydrocarbon concentrations in soil and groundwater are potential sources for contaminant accumulation in shallow soil gas, this memo attempts to re-focus remedial objectives towards reduction of near-surface soil gas concentrations.

Stratus believes that the three remedial approaches below would be effective in reducing shallow soil gas concentrations at the site. Each of the methods have advantages and disadvantages, and this memo attempts to objectively assess use of each remedial approach. We believe that each of these 3 remedial options would be cost effective ways to reduce shallow soil gas concentrations if a consensus to use the specified approach was agreed upon by all parties involved with the project.

## **Option 1 – Excavation and Disposal of Soil, Up to 10 feet Below Ground Surface**

Excavation of shallow-impacted soil could be used to remove near surface petroleum hydrocarbon mass, and thus reduce soil gas concentrations in select portions of the site. Excavation can be implemented rapidly within 6 to 9 months, and is an effective way of removing contaminant mass from the site. For the purpose of this cost estimate, excavation will be completed no deeper than 10 feet bgs. Based on the current redevelopment plan, soil in the upper 5 feet would likely be removed anyway during grocery store construction, and thus these project costs would be incurred even if another remedial alternative is selected. Figures 1 and 2 illustrate the approximate area proposed for excavation.

### Anticipated Issues:

- Underground utility lines could impede excavation in some areas.
- Four wells would need to be destroyed to facilitate the excavation.
- A large portion of petroleum hydrocarbon mass would remain in place after the excavation, and thus would remain a source for ongoing volatilization of contaminant vapors.

### Assumptions for Excavation Option:

- A total of 1,587 tons of soil (1,307 cubic yards) would be removed. (Note: About 744 of the 1,307 cubic yards of soil are situated in the upper 5 feet of the subsurface, and would be encountered during re-grading and need to be disposed of at the time of construction).
- Clean soil from offsite would be used to backfill the excavation.
- Excavation cavity backfilled all the way to surface grade even though upper 5 feet of backfill could be removed at a later date.
- Six soil gas wells (permanent) will be installed and soil gas sampling will be conducted to verify the concentration levels upon completion of excavation.

## **Option 2 – Soil Vapor Extraction and Air Sparging**

Soil vapor extraction in conjunction with air sparging would likely be effective in mitigating the soil gas concentrations. Since the air flow rates during the previous interim DPE events were poor (due to fine grained soil in the vadose zone), Stratus proposes to air sparge in the vadose zone to facilitate air movement and enhance performance of the SVE system. We estimate the time needed to significantly reduce soil gas concentrations (two orders of magnitude) is approximately 6 months of continuous operation. The time required to implement (procure power and permits, and install temporary system on site) this remedial option is shorter (3 to 6 months) compared to other remedial alternatives.

### Anticipated Issues:

- Not effective in reducing soil gas concentrations that are contributed due to volatilization from groundwater.
- Time required to procure electrical power and natural gas, if not readily available.

### Assumptions for SVE:

- Three SVE (VW-1 through 3) and three additional AS wells (AS-3 through 5) are required to mitigate the soil gas petroleum hydrocarbon impact (see Figures 3 and 4 for potential locations).
- System will be built as a temporary system with above ground piping.
- Required electrical service is still available and there will not be any PG&E delays to provide the electrical service.
- SVE system with various locations permit will be used to expedite system installation.
- SVE wells screened from 5-15 ft bgs and AS wells screened from 10-15 ft bgs.
- Six soil gas wells (permanent) will be installed and soil gas sampling would be needed to verify the concentration levels upon completion of the operation of the SVE/AS system.

### **Option 3 – Dual Phase Extraction, Soil Vapor Extraction and Air Sparging**

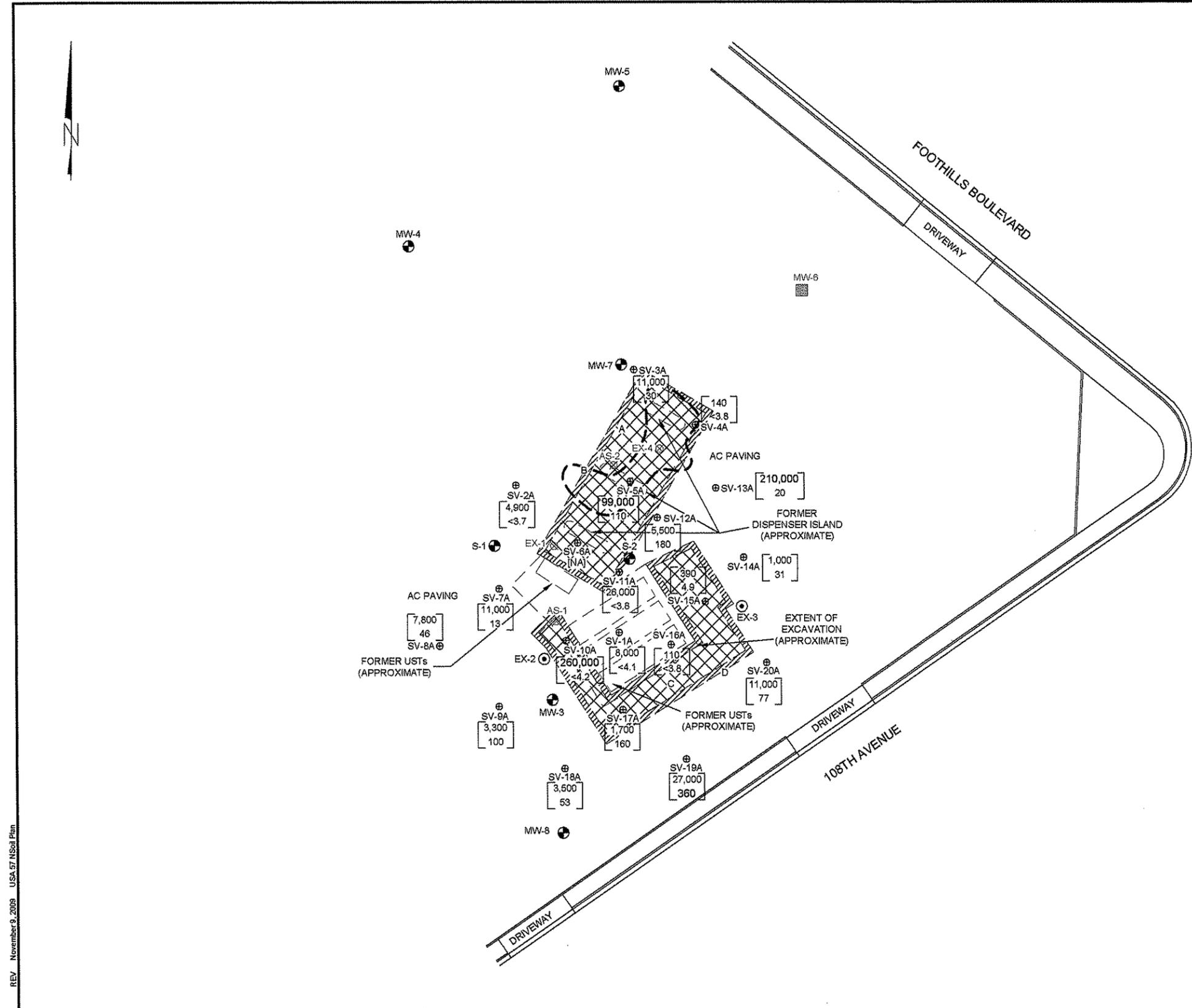
Dual phase extraction provides flexibility to focus either on vapor extraction (in areas where significant impact is in the unsaturated zone) or on groundwater extraction (in areas where both unsaturated and saturated zones are impacted with petroleum hydrocarbons). Since the air flow rates during the previous interim DPE events were poor, air sparging in the vadose zone will facilitate forced air movement in the subsurface and also enhance the desorption rates and biodegradation rates in soil. The time needed for significant reduction in soil gas concentrations is estimated to be approximately 6 months of continuous operation. The time required to construct/install the equipment need to implement this remedial option is estimated to be approximately 6 months.

#### Anticipated Issues:

- Air and groundwater extraction rates may be constrained due to fine grained soils.
- Time required to procure electrical power and natural gas, if not readily available.

#### Assumptions for DPE:

- Three SVE (VW-1 through VW-3) and three additional AS wells (AS-3 through 5) are required to mitigate the soil gas petroleum hydrocarbon impact. Existing and proposed wells will be utilized for mitigating the subsurface petroleum hydrocarbon impact. Two additional DPE wells (EX-5 and 6) will also be installed (see Figures 3 and 4 for potential locations).
- System will be built as a temporary system with above ground piping.
- Required electrical and natural gas services are still available and there will not be any PG&E delays to provide the utility services.
- Sewer discharge permit (similar to the one procured during previous DPE events) can be obtained from EBMUD.
- DPE system with various locations permit will be used to expedite system installation.
- SVE wells screened from 5-15 ft bgs, AS wells screened from 10-15 ft bgs, and DPE wells same as existing wells EX-1 through EX-4 (5-25 ft bgs).
- Six soil gas wells (permanent) will be installed and soil gas sampling would be needed to verify the concentration levels upon completion of the operation of the DPE/AS system.



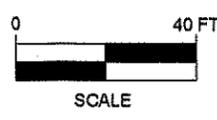
**LEGEND**

- MW-3 MONITORING WELL LOCATION
- ⊙ EX-1 EXTRACTION WELL LOCATION
- MW-6 ABANDONED MONITORING WELL LOCATION
- ⊗ AS-1 AIR SPARGE WELL LOCATION
- ⊕ SV-1A SOIL GAS SAMPLING BORING LOCATION
- ⊗ EX-1 WELL TO BE ABANDONED BEFORE EXCAVATION
- ▨ PROPOSED EXCAVATION AREA
- ▩ PROPOSED EXCAVATION AREA BENCH
- [ 8,000 ] TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (TPHG) IN  $\mu\text{g}/\text{m}^3$
- [ <math><4.1</math> ] BENZENE CONCENTRATION IN  $\mu\text{g}/\text{m}^3$
- [ 210,000 ] TPHG CONCENTRATIONS ABOVE COMMERCIAL ESL FOR TPHG (29,000  $\mu\text{g}/\text{m}^3$ )
- [ 360 ] BENZENE CONCENTRATIONS ABOVE COMMERCIAL ESL FOR BENZENE (280  $\mu\text{g}/\text{m}^3$ )
- OUTER LIMITS OF TPHG IN SOIL (0-7' bgs)
- [NA] = INSUFFICIENT AIR FLOW THROUGH SUBSURFACE STRATA TO ENABLE COLLECTION OF SAMPLE

NOTE: SOIL GAS COLLECTED ON OCTOBER 12, 21, & 22, 2009  
CONCENTRATIONS REPORTED IN MICROGRAMS PER CUBIC METER ( $\mu\text{g}/\text{m}^3$ )

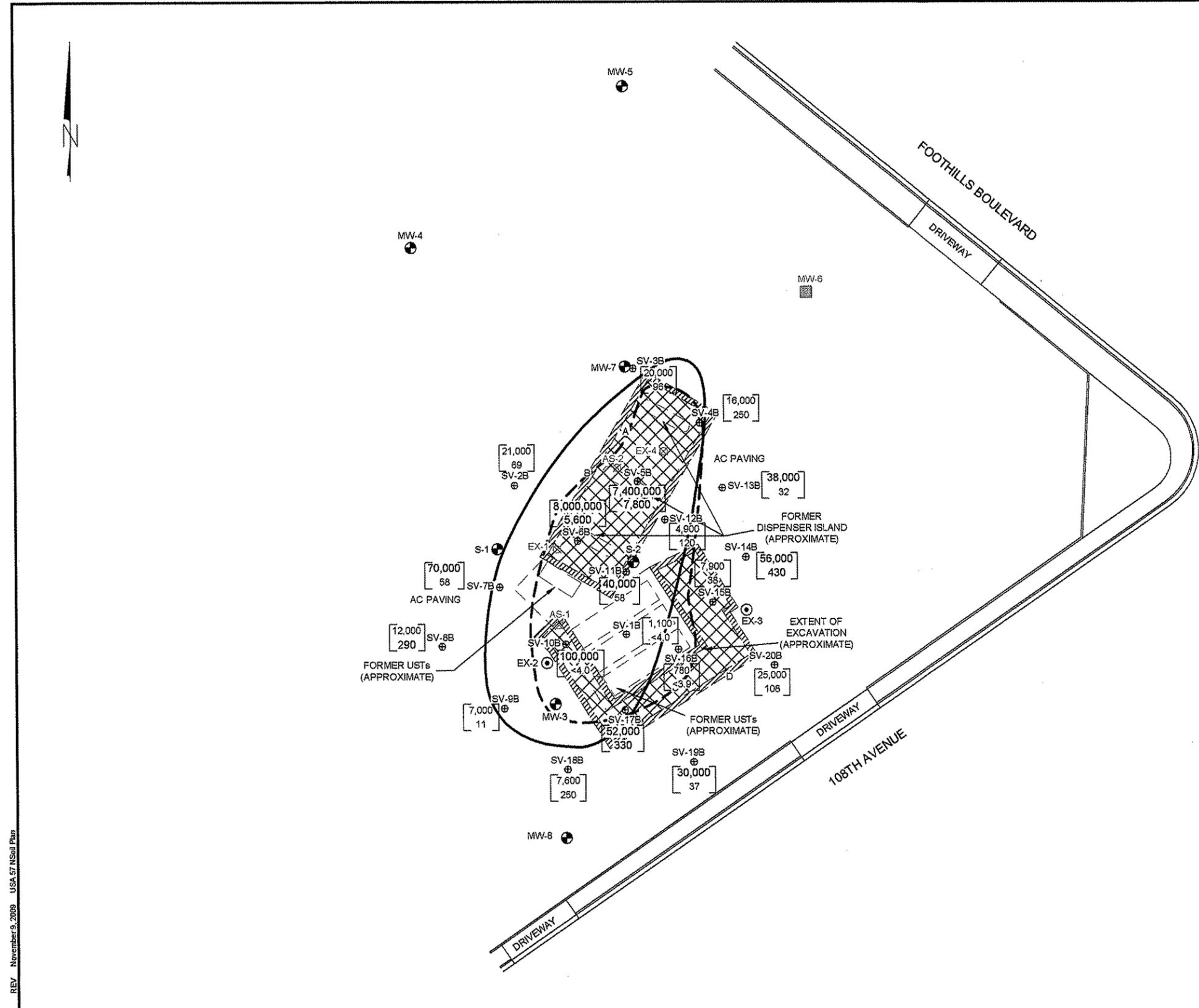
AREA OF A: 1,800.74 FT<sup>2</sup>  
 AREA OF B: 402.47 FT<sup>2</sup>  
 AREA OF C: 1,269.10 FT<sup>2</sup>  
 AREA OF D: 572.43 FT<sup>2</sup>

USA57SCM REV November 9, 2009 USA 57 NSoil Plan JMP



FORMER USA SERVICE STATION NO. 57  
 10700 MACARTHUR BOULEVARD  
 OAKLAND, CALIFORNIA  
 TPHG AND BENZENE IN SOIL GAS  
 CONCENTRATIONS, 4ft bgs

FIGURE  
**1**  
 PROJECT NO.  
 2007-0057-01



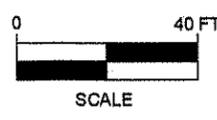
LEGEND

- MW-3 MONITORING WELL LOCATION
- ⊙ EX-1 EXTRACTION WELL LOCATION
- MW-6 ABANDONED MONITORING WELL LOCATION
- ⊕ AS-1 AIR SPARGE WELL LOCATION
- ⊕ SV-1A SOIL GAS SAMPLING BORING LOCATION
- ⊗ EX-1 WELL TO BE ABANDONED BEFORE EXCAVATION
- ▨ PROPOSED EXCAVATION AREA
- ▩ PROPOSED EXCAVATION AREA BENCH
- [ 780 ] TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (TPHG) IN  $\mu\text{g}/\text{m}^3$
- [ <3.9 ] BENZENE CONCENTRATION IN  $\mu\text{g}/\text{m}^3$
- [100,000] TPHG CONCENTRATIONS ABOVE COMMERCIAL ESL FOR TPHG (29,000  $\mu\text{g}/\text{m}^3$ )
- [430] BENZENE CONCENTRATIONS ABOVE COMMERCIAL ESL FOR BENZENE (280  $\mu\text{g}/\text{m}^3$ )
- OUTER LIMITS OF TPHG IN SOIL (7' - 12' bgs)
- APPROXIMATE LIMITS OF GROUNDWATER IMPACT

NOTE: SOIL GAS COLLECTED ON OCTOBER 12, 21, & 22, 2009  
CONCENTRATIONS REPORTED IN MICROGRAMS PER CUBIC METER ( $\mu\text{g}/\text{m}^3$ )

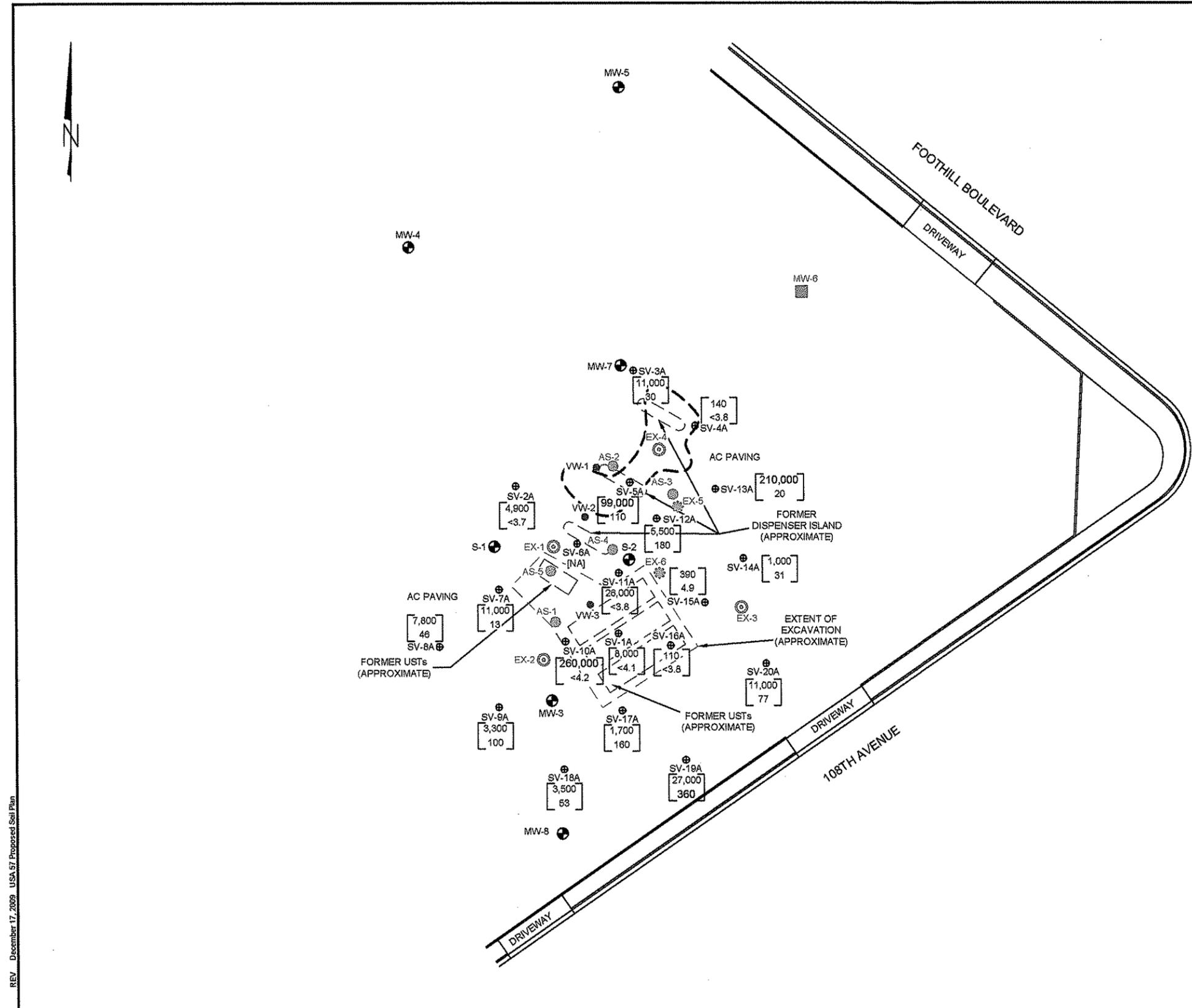
AREA OF A: 1,800.74 FT<sup>2</sup>  
 AREA OF B: 402.47 FT<sup>2</sup>  
 AREA OF C: 1,269.10 FT<sup>2</sup>  
 AREA OF D: 572.43 FT<sup>2</sup>

USA57NSM JMP REV November 9, 2009 USA 57 NSoil Plan



FORMER USA SERVICE STATION NO. 57  
 10700 MACARTHUR BOULEVARD  
 OAKLAND, CALIFORNIA  
 TPHG AND BENZENE IN SOIL GAS  
 CONCENTRATIONS, 9ft bgs

FIGURE  
**2**  
 PROJECT NO.  
 2007-0057-01



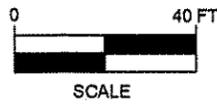
**LEGEND**

- MW-3 MONITORING WELL LOCATION
- ⊙ EX-1 EXTRACTION WELL LOCATION
- MW-6 ABANDONED MONITORING WELL LOCATION
- ⊙ AS-1 AIR SPARGE WELL LOCATION
- ⊙ SV-1A SOIL GAS SAMPLING BORING LOCATION
- ⊙ AS-3 PROPOSED AIR SPARGE WELL LOCATION
- ⊙ EX-5 PROPOSED EXTRACTION WELL LOCATION
- ⊙ VW-1 PROPOSED VAPOR EXTRACTION WELL LOCATION
- [8,000] TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (TPHG) IN  $\mu\text{g}/\text{m}^3$
- [<math><4.1</math>] BENZENE CONCENTRATION IN  $\mu\text{g}/\text{m}^3$
- [210,000] TPHG CONCENTRATIONS ABOVE COMMERCIAL ESL FOR TPHG (29,000  $\mu\text{g}/\text{m}^3$ )
- [360] BENZENE CONCENTRATIONS ABOVE COMMERCIAL ESL FOR BENZENE (280  $\mu\text{g}/\text{m}^3$ )
- OUTER LIMITS OF TPHG IN SOIL (0-7 bgs)
- [NA] = INSUFFICIENT AIR FLOW THROUGH SUBSURFACE STRATA TO ENABLE COLLECTION OF SAMPLE

NOTE: SOIL GAS COLLECTED ON OCTOBER 12, 21, & 22, 2009  
CONCENTRATIONS REPORTED IN MICROGRAMS PER CUBIC METER ( $\mu\text{g}/\text{m}^3$ )

USA57523M JMP REV December 17, 2009 USA 57 Proposed Soil Plan

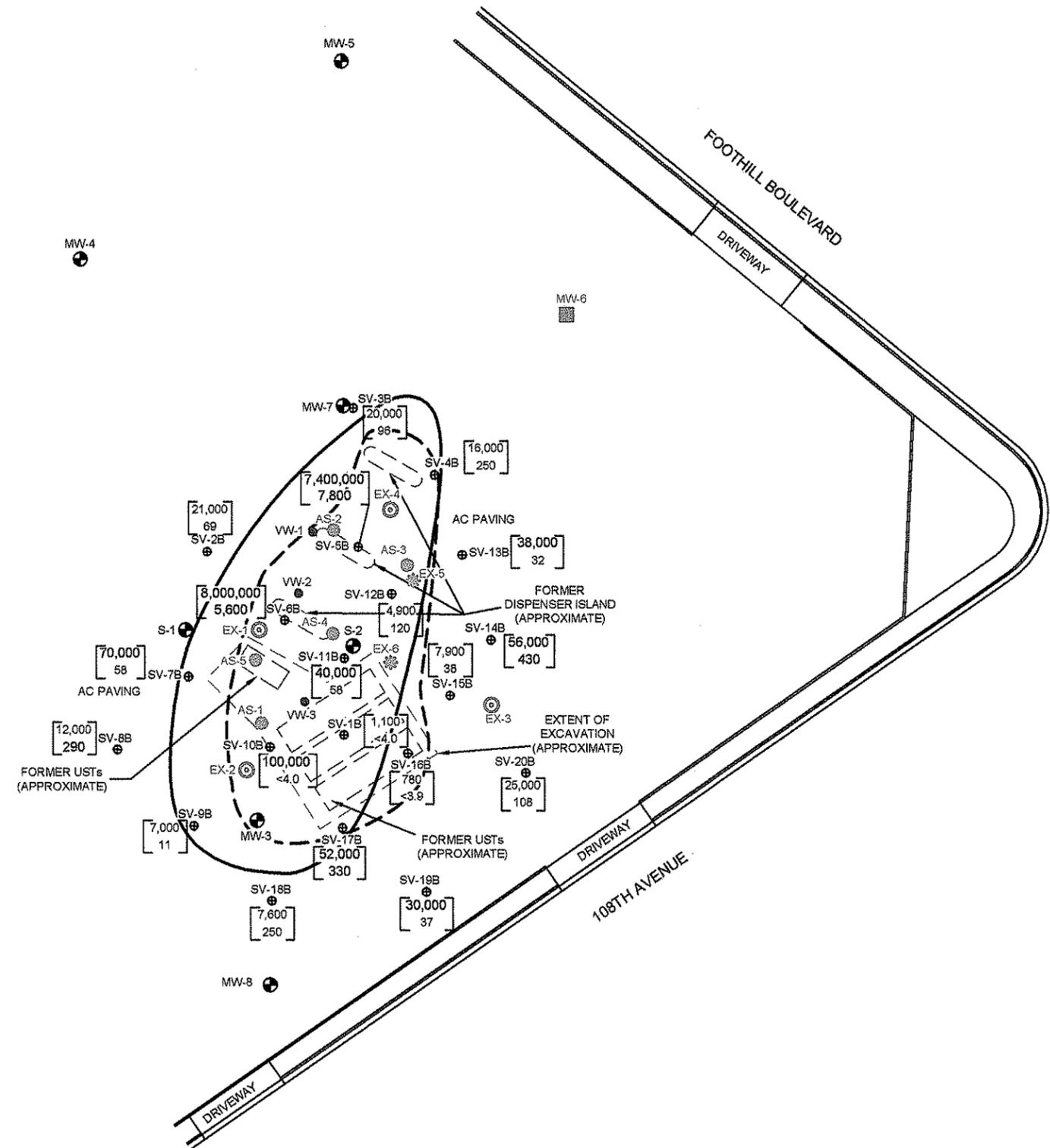
**STRATUS**  
ENVIRONMENTAL, INC.



FORMER USA SERVICE STATION NO. 57  
10700 MACARTHUR BOULEVARD  
OAKLAND, CALIFORNIA  
TPHG AND BENZENE IN SOIL GAS  
CONCENTRATIONS, 4ft bgs

FIGURE  
**3**  
PROJECT NO.  
2007-0057-01

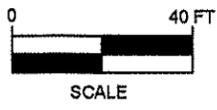
USA 57 USCM JMF REV December 17, 2009 USA 57 Proposed Soil Plan



**LEGEND**

- MW-3 MONITORING WELL LOCATION
- ⊙ EX-1 EXTRACTION WELL LOCATION
- MW-6 ABANDONED MONITORING WELL LOCATION
- ⊙ AS-1 AIR SPARGE WELL LOCATION
- ⊙ SV-1A SOIL GAS SAMPLING BORING LOCATION
- ⊙ AS-3 PROPOSED AIR SPARGE WELL LOCATION
- ⊙ EX-5 PROPOSED EXTRACTION WELL LOCATION
- VV-1 PROPOSED VAPOR EXTRACTION WELL LOCATION
- [ 780 ] TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (TPHG) IN  $\mu\text{g}/\text{m}^3$
- [ <3.9 ] BENZENE CONCENTRATION IN  $\mu\text{g}/\text{m}^3$
- [ 100,000 ] TPHG CONCENTRATIONS ABOVE COMMERCIAL ESL FOR TPHG (29,000  $\mu\text{g}/\text{m}^3$ )
- [ 430 ] BENZENE CONCENTRATIONS ABOVE COMMERCIAL ESL FOR BENZENE (280  $\mu\text{g}/\text{m}^3$ )
- OUTER LIMITS OF TPHG IN SOIL (7' - 12' bgs)
- APPROXIMATE LIMITS OF GROUNDWATER IMPACT

NOTE: SOIL GAS COLLECTED ON OCTOBER 12, 21, & 22, 2009  
CONCENTRATIONS REPORTED IN MICROGRAMS PER CUBIC METER ( $\mu\text{g}/\text{m}^3$ )



FORMER USA SERVICE STATION NO. 57  
10700 MACARTHUR BOULEVARD  
OAKLAND, CALIFORNIA  
TPHG AND BENZENE IN SOIL GAS  
CONCENTRATIONS, 9ft bgs

FIGURE  
**4**  
PROJECT NO.  
2007-0057-01