URS

March 9, 2011

Mr. Jerry Wickham
Alameda County Health Agency
1131 Harbor Bay Parkway
Alameda, CA 94502

Uploaded to Alameda County Website

Re: Chevron Pipeline Company, Sunol, California Site, Investigation Workplan

Dear Mr. Wickham:

URS Corporation (URS) is pleased to submit, on behalf of Chevron Pipeline Company (CPL), a revised workplan for additional investigation and to start a groundwater bio-stimulation program at the Sunol, CA site for your review and comment. This additional investigation is proposed to fill data gaps identified in our recent Conceptual Site Model for the Sunol site and the bio-stimulation program to advance our remediation efforts toward site closure.

We are happy to meet with you to discuss the workplan content or the overall project. If you have any questions or wish to discuss the workplan, please call the undersigned at 510-874-3201.

Sincerely,

URS CORPORATION

Joe Morgan III
Senior Project Manager

Enclosure

cc: Mr. Stephen Gwin, CPL, Houston
Ms. Rachel Naccarati, URS, Oakland
Mr. Jacob Wilcox, URS Oakland

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Chevron

Global Gas

March 9, 2012

Mr. Jerry Wickham
Department of Environmental Health
Alameda County Health Agency
1131 Harbor Bay Parkway
Alameda, California 94502

Dear Mr. Wickham:

I declare, under penalty of perjury, that the information and/or recommendations contained in URS' report titled "**SLIC Case No. RO0002892, Chevron Sunol Pipeline, 2793 Calaveras Road, Sunol, CA – Investigation and Bio-stimulationWorkplan**" are true and correct to the best of my knowledge at the present time.

Submitted by:

Stephen Gwin
Chevron Pipe Line Company

URS

This Site Investigation and Bio-Stimulation Workplan was prepared under my direct supervision. The information presented in this report is based on our review of available data obtained during our Conceptual Site Model development and our previous subsurface investigation efforts. To the best of our knowledge, we have incorporated into our recommendations all relevant data pertaining to the Chevron Pipeline Company's Sunol Spill Site in Sunol, California.

The workplan discussed herein was developed in accordance with the standard of care used to develop this type of plan. The assumptions that were made and the recommendations for continued field activities were based on our professional experience and protocols reported in the literature for similar investigations.

URS Corporation
Approved by:

Joe Morgan III, Senior Project Manager

George Muehleck, P.G.

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Revised Workplan for the Sunol Site Data Gaps Investigation and Bio-Stimulation Remediation for the Chevron Pipeline Company Site in Sunol, California

URS Corporation (URS) is pleased to submit our revised 2012 Data Gaps and Remediation Workplan on behalf of Chevron Pipeline Company (CPL) for the Sunol Spill site (Site) in Sunol, California, to the Alameda County Environmental Health Department (ACEHD). This workplan is based on the following factors.

- The results of the URS conceptual site model (CSM) for the Site.
- Comments from the ACEHD on our earlier Sunol data gaps investigation workplan submittal and a personal communication with Jerry Wickham, the ACEHD case worker.
- The recommendations stemming from the URS evaluation of remediation options for the site, which concluded that bio-stimulation, was the best remedial option to pursue at this time.

BACKGROUND

On Sunday August 14, 2005, at 16:30 hours, CPL noted a pressure drop in their 8-inch-diameter gasoline pipeline, the Bay Area Pile Line (BAPL) that traverses the Sunol area of the San Francisco Bay Area. Upon investigation by CPL personnel, it was discovered that the lessee of a property that the pipeline traverses had hired a contractor to grade a dirt road on the property. The grading operation ruptured the pipeline, resulting in a gasoline release. The property is owned by the San Francisco Public Utilities Commission (SFPUC), and is managed as part of the nearby Calaveras Reservoir. Immediately across Calaveras Road and hydraulically downgradient from the release is Valley Crest Nursery, a commercial plant nursery that also leases property from the SFPUC. No spill-related injuries were reported.

URS prepared a CSM for the Site and submitted it to the ACEHD on October 28, 2010. The ACEHD provides regulatory oversight for the Site under delegated authority from the San Francisco Bay Regional Water Quality Control Board (RWQCB). During the preparation of the CSM, URS identified several data gaps and recommended that the data gaps be filled before resuming soil vapor extraction (SVE) remediation activities as requested by the ACEHD.

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The Site's groundwater is anaerobic, based on the very low dissolved oxygen concentrations and other geochemical data collected during the URS groundwater monitoring and reporting program that has been under way from 2005 until the present. Anaerobic biological degradation of groundwater contaminants is occurring, as shown by the decreasing sulfate concentrations in the groundwater. Anaerobic degradation is slow compared to aerobic degradation of groundwater contaminants. Groundwater concentrations of gasoline compounds are gradually decreasing in all wells except MW-8, based on the ongoing semi-annual groundwater sample collection and analytical program conducted by URS. In MW-8, which is located at the bottom of the hillside where the release occurred, dissolved-phase gasoline compound concentrations are gradually increasing.

REMEDIAL TECHNOLOGY OPTIONS REVIEW

URS reviewed three remedial options for the Sunol Site. The three options evaluated, in order of increasing cost, were (1) SVE, (2) bio-stimulation with the addition of hydrogen peroxide to the groundwater, and (3) in-situ chemical oxidation (ISCO) with Fenton's reagent. Based on the three options evaluated, URS came to the following conclusions.

- SVE – URS concluded that while a fourth round of SVE is technically feasible, the expected recovery rates of gasoline compounds are not cost-effective. Installation of new and/or deeper SVE wells in the hillside is problematic due to the Site's steep slope. The recovery rates for the existing individual SVE wells at the conclusion of the third SVE operation by well number are as follows.

  1D–0.034 pound/day
  2S–0.015 pound/day
  3S–0.22 pound/day
  4D–0.02 pound/day
  5–0.29 pound/day
  6–0.97 pound/day
  7–4.24 pounds/day
  8–0.19 pound/day
  9–1.10 pounds/day

The cumulative recovery rate from all the wells was 7.07 pounds/day when the SVE system was shut down on August 23, 2009. URS believes that this low-level recovery rate justifies moving to a more groundwater-focused remediation technology. SVE was the least expensive remedial option evaluated for the Sunol Site, based on another 3-month operation period.

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Bio-stimulation – URS concluded that bio-stimulation would address the increasing gasoline compound concentrations in MW-8, the only well on site with increasing concentrations, by fostering faster aerobic degradation of the gasoline compounds. This will also be used to treat the other wells on site with long-term low gasoline compound concentrations—MW-1 and MW-9. Furthermore, by installing a new injection well on the road above the release location and by using SVE-8 in the middle of the hillside as an injection point, bio-stimulation would also treat the groundwater flowing through the area where the release impacts from soil to the groundwater via infiltration were the greatest.

- ISCO – URS concluded that ISCO would be an intensive and effective method to treat groundwater contamination, but due to the limited extent and low-level gasoline compound concentrations at the Site, URS determined that ISCO was probably not needed at this time. URS also concluded that if the bio-stimulation program was not effective as planned, ISCO would be a viable backup remediation technique.

In summary, URS determined that further utilization use of SVE technology is no longer cost-effective at the Site. URS also determined that bio-stimulation at the wells with long-term low concentration of gasoline compounds (MW-8, SVE-8, and at a new injection well) would be a more productive way to address site-specific groundwater impacts.

REGULATORY REQUIREMENTS and ISSUES

In a letter dated December 13, 2011, Jerry Wickham of the ACEHD requested that the CPL reinstall and resume the operation of an SVE system at the Site. He also requested that the CPL conduct an additional soil and groundwater investigation of the spill area on the Site's steep slope, and concurred that additional soil sampling should be conducted and monitoring wells installed near monitoring well MW-8, as identified in the CSM.

The California Environmental Protection Agency's Water Quality Control Board's environmental screening levels (ESLs) for total petroleum hydrocarbons (TPH) and benzene in groundwater that is a potential drinking water source for shallow and deep soil sites are as follows.

- TPH – as gasoline 100 micrograms/Liter (µg/L).
- Benzene – 1.0 µg/L.

The most recent groundwater monitoring data from the wells with gasoline compounds in the groundwater are provided below.

Monitoring Well Number	TPH-g Concentrations as of 3rd Quarter 2011 in µg/L	Benzene Concentration as of 3rd Quarter of 2011in µg/L
MW-1 at Valley Crest Nursery	960	<0.5
MW-8 at the hillside base	76,000	1,200
MW-9 at Valley Crest Nursery	7,900	<0.5

SCOPE of WORK

Under this workplan, URS will perform the following tasks, which are based on the results of the CSM.

- Update the Job Site Safety Plan (JSSP).
- Conduct the biological survey identified in the CSM as a data gap.
- Conduct soil investigation and groundwater well installation along Calaveras Road. This will include up to four borings and new groundwater monitoring wells, based on field conditions.
- Install a new injection well on the hillside above the main contaminated soil mass, as identified by the Gore™ passive soil gas survey conducted in 2009.
- Implement a 12-month-long program to inject hydrogen peroxide into specified Site wells (MW-8, MW-1, MW-9, SVE-8, and a new injection well) to provide oxygen to the indigenous aerobic bacteria in the groundwater to promote aerobic bio-degradation of gasoline compounds. The injection program would be matched with a monitoring and reporting program to track the injection program's progress.
- Develop separate investigation and remediation reports for the tasks in this workplan.
- Dispose of investigation-derived waste water and soil.
- Fulfill GeoTracker investigation reporting requirements.
- Participate in meetings with CPL and ACEHD staff.

The workplan tasks are described in more detail below.

Task 1–Job Site Safety Plan Update

Before field activities begin, the existing JSSP and Job Safety Analyses (JSAs) will be reviewed and updated. A site-specific health-and-safety orientation will be conducted for all onsite personnel. The JSSP will include the following topics:

- Stop work authority.
- Hazard identification tool.

- Site health and safety personnel names and alternates responsible for site health and safety.
- Site hazards, as identified in the JSSP and JSAs, for example biological, chemicals of concern, traffic, slip, trip, and fall, and tool (cutting) hazards.
- Journey management plan, including road hazards along Calaveras Road.
- Personal protective equipment (PPE).
- Fire prevention.
- Heat stress symptoms and control measures that will be employed.
- Applicable CPL Health, Safety, and Environment (HES) Guidelines and URS Safety Management Standards (SMSs).
- Safe work practices, including those discussed in the JSSP, the JSAs, the CPL's HES Guidelines, and the URS SMSs.
- Personnel and equipment decontamination procedures.
- Air monitoring.
- Emergency procedures.
- Other applicable topics.
- At the end of the briefing, attendees will be informally quizzed to assess their understanding of the health and safety requirements.

In addition to the initial site-specific health-and-safety briefing, daily health-and-safety meetings will be conducted to address health-and-safety concerns. These meetings will be documented using the On-Site Health and Safety Tailgate Meeting Record Form included in the JSSP. The JSAs will also be reviewed daily during the safety tailgate meeting. CPL work permitting requirements will be conducted on site on the first day of field activities by CPL representatives.

Task 2–Biological Survey

One data gap identified during the preparation of the CSM was that an update to the initial December 2005 biological survey was needed. Although no significant Site changes have occurred since the initial survey, URS recommends that another survey be conducted to confirm that no new ecological receptors (e.g., burrowing animals) are present at the Site. Results of the biological survey will be included in the soil and groundwater investigation report. The biological survey will be conducted during a monthly groundwater gauging or semi-annual groundwater-monitoring event.

Task 3–Soil Investigation and Well Installation

A data gap identified during the preparation of the CSM was that more current analytical results for Site soils were needed. Furthermore, the GORE™ module passive soil gas survey conducted in 2009 provided a snapshot of the hillside soil source and provided evidence that groundwater

impacts were likely compounded by surface water infiltration through the hillside source area soils.

Obtaining soil data from below the hillside source, at the base of the hillside below the source area, will enable a more comprehensive evaluation of the hillside soil contaminant migration since the initial release. URS believes the hillside soil source contaminant migration to be very slow. Data from the soil investigation and subsequent groundwater-monitoring well installation proposed below will improve understanding of the migration pathways and potential impacts on the north and south along the base of the hillside in the vicinity of the Calaveras fault.

Prior to the proposed soil investigation/well installation, an encroachment permit from County of Alameda Public Works will be obtained to work in the shoulder along Calaveras Road and to close one lane of Calaveras Road. Soil boring and monitoring well installation permits will also be obtained from Alameda County Flood Control and Water Conservation District (Zone 7) before the investigation starts.

URS will notify Underground Service Alert 48 hours before initiating field activities. In additional URS will hire a private utility locator to clear all proposed boring locations for the presence of underground utilities.

To minimize potential fire hazards, URS will thoroughly wet the work area with water before any field work is conducted (e.g., soil boring). At the beginning of the work day and as needed thereafter, the water will be sprayed from a water buffalo equipped with a hose and nozzle. This procedure is based on a site inspection with the drilling contractor on January 13, 2012, which revealed that the area is extremely dry due to the low amounts of rainfall received this winter. URS has confirmed that the water can be obtained from the Valley Crest Nursery, located across Calaveras Road.

The soil investigation includes advancing up to four soil borings along Calaveras Road to bedrock, which is approximately 25 feet below ground surface (bgs), and converting the soil borings to 4-inch-diameter groundwater monitoring wells. The first two borings will be advanced and the wells installed along Calaveras Road, one 50 feet north and one 50 feet south of the existing well MW-8. If the analytical results for both new wells show that the groundwater is uncontaminated, no additional borings will be advanced. If both of the first wells have contaminated groundwater, a second set of two borings/wells will be drilled, one 100 feet north and one 100 feet south of MW-8. If one boring/well has contaminated groundwater and the other boring/well is clean, one additional boring will be advanced and a well will be installed 50 feet beyond the contaminated well, in line with MW-8 and the newly installed contaminated well. For example, if the boring/well that is 50 feet north of well MW-8 has contaminated groundwater, an

additional boring will be advanced 50 feet north of that boring/well, and a well will be installed at the location of the new boring.

Four-inch-diameter wells will be installed as part of this program to provide greater flexibility for the future, (i.e., so that the wells may be used for extraction or injection, if needed). During the boring advancement, URS will use photo-ionization detection (PID) to evaluate the soil borings for the presence of gasoline compounds and to evaluate the need to advance the second two borings. Also, groundwater samples from the first two wells will be sent to the analytical laboratory for a 24-hour rush turnaround to provide additional information for the determination of whether the additional two borings/wells are needed. The final decision as to the number of well installations will be made in the field by the URS site field geologist, based on the groundwater conditions at the Site. If the PID readings indicate that gasoline compounds are present or if laboratory results for the groundwater samples indicate that gasoline compounds are above the ESLs for deep groundwater that is a potential source of drinking water, the well(s) at the 100-foot distance from MW-8 will be installed. A figure showing the locations of the proposed wells is attached.

URS assumes that the screened interval of the new wells will closely resemble the water-bearing zone monitored by nearby well MW-8, which is at a depth of 14.5 feet to 24.5 feet bgs. The wells will be installed with a sand pack and sealed with a bentonite cement mix and neat cement. The wells will be developed by the drilling contractor and will be equipped with locking tops and traffic-rated boxes. URS will survey the wells.

URS will subcontract with a traffic safety firm to conduct the traffic control while working along Calaveras Road.

Each soil boring location will be cleared to a depth of 5 feet bgs, using a hand auger to ensure that subsurface utilities are not present. This task's field work is anticipated to take 2 days. Well development will take an additional 2 days.

Soil borings will be advanced to bedrock (approximately 25 feet bgs) using a tracked hollow stem auger drill rig. A URS field geologist will continuously log soil borings per the Unified Soil Classification System (USCS). Soil samples will be collected continuously from 5 feet bgs to 25 feet bgs (or bedrock) and monitored with a PID.

Soil samples will be collected in clean acrylic tubes from the sampler or in jars provided by the analytical laboratory. Soil samples that are collected for analysis will be typically collected at 5-foot intervals, starting at 5 to 5.5 feet bgs. If high PID readings are found along the continuous cores, samples from those depths will be substituted for the next planned sampling interval.

The acrylic soil tubes for the soil samples will be cut to length; the ends will be covered with Teflon sheets and capped. Sample containers will be labeled with project-specific unique labels, placed on ice, and shipped to the analytical laboratory under URS chain of custody. Samples will be analyzed for total petroleum hydrocarbons as gasoline (TPH-g) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8260B.

A new injection well will be installed on the hillside above the spill area to allow injection of hydrogen peroxide into the groundwater migrating down through the spill area's highest gasoline concentrations, based on the 2009 Gore Sorber Survey. This work is anticipated to take 1 day with an additional day for well development. The depth of the well screen will be determined in the field, and it will be based on the depth of the local water-bearing zone, which is estimated to be at approximately 50 to 60 feet bgs. The well construction details and soil sampling procedures will be the same as those of the wells to be installed along Calaveras Road, as described above. The proposed injection well location is shown on the attached figure.

Soil cuttings, decontamination water, and monitoring well development water will be drummed, sampled, and analyzed for offsite disposal in accordance with applicable regulations.

URS will submit a written report of findings from the soil and groundwater investigation from the well drilling activities to the ACDEH via the ACDEH file transfer website.

Task 4–Bio-Stimulation Program Implementation and Monitoring

URS will implement a bio-stimulation program with hydrogen peroxide injection after the new wells are developed, sampled, and analyzed, and after the groundwater data are evaluated. The objective of this program is to change the groundwater from its current anaerobic condition to an aerobic condition. This change will facilitate aerobic biological degradation of the gasoline compounds in the groundwater, as it is much faster than anaerobic degradation. URS will implement this program and monitor its progress over a 1-year timeframe.

Environmental, Health, & Safety for the Remediation Program

- The existing site health-and-safety plan will be amended to include these new activities and URS will add hydrogen peroxide safety precautions to the plan.
- A new job safety analysis will be developed for the injection activities.
- Additional PPE (i.e., face shields) will be added to the required Site PPE during the injection program.
- Traffic control on Calaveras Road will be needed for the pre-injection monitoring activities and the hydrogen peroxide injection into MW-8.
- A CPL permit to work will be obtained before the start of each monitoring/injection round.
- A tailgate safety meeting as described in Task 1 above will be conducted before each round of pre-injection monitoring and injection activities.
- The subcontractor will purchase pre-mixed 7% hydrogen peroxide solution. No chemical mixing will be conducted on or off site by the URS subcontractor.
- The subcontractor will provide Material Safety Data sheets for all chemicals brought on site.
- The subcontractor will provide secondary containment for generators, gasoline, and other chemicals brought on site.
- The subcontractor's vehicles will have fire extinguishers, spill kits, and first aid kits.

A complete round of groundwater monitoring of all of the Sunol Site and the proposed groundwater monitoring and the injection wells will be conducted before each round of peroxide injection to evaluate the status of the groundwater from the previous injection for both gasoline compound concentrations and geochemical parameters. The sampling will be conducted by low-flow sampling methods until the groundwater parameters (temperature, pH, conductivity, turbidity, dissolved oxygen, and oxidation/reduction potential [ORP]) stabilize. The normal site analyte list of gasoline-related compounds and geo-chemical parameters will be analyzed. These analytes are as follows: total petroleum hydrocarbons as gasoline (TPH-g) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8260B, and the following geo-chemical analytes: methane, manganese, iron, nitrate nitrogen, sulfate, alkalinity to pH 4.5 and 8.3, total dissolved solids, and ferrous iron.

The groundwater samples will be analyzed on a regular laboratory turnaround basis. The injection program is not dependent on receipt of the most recent groundwater monitoring data; in other words, the injection round will be conducted after the wells are sampled and before the analytical data are received. Wells will not be sampled and/or injected with hydrogen peroxide where well-specific groundwater level elevations fall below the bedrock contact or when post-purge recharge is minimal.

URS will add 7% hydrogen peroxide solution to the following Site wells.

- New injection well – INJW -1on the hillside road.
- SVE – 8, on the hillside, this well is screened in a shallow perched groundwater zone.
- MW – 8 at the base of the hillside.
- MW – 1 in the nursery across Calaveras Road.
- MW – 9 in the nursery across Calaveras Road.

The 7% hydrogen peroxide will be added to these wells on a biweekly basis for 3 months (six events). Twenty gallons of hydrogen peroxide solution will be added to each of the listed wells above during each injection event. The 20 gallons of hydrogen peroxide will be followed by up to 100 gallons of deionized water per well. The total volume of water will depend on each well's capacity to infiltrate the water into the surrounding groundwater. The deionized water will provide a hydraulic head to move the hydrogen peroxide solution into the groundwater. Note that SVE 8 is a shallow 1-inch diameter SVE well that was installed with a hard auger, due to the steep terrain in that area. URS anticipates that SVE 8 will take limited amounts of hydrogen peroxide solution and the follow-up deionized water. URS will start each injection round with SVE-8 to allow the maximum infiltration at this location.

Oxidant addition to the groundwater will change the groundwater's ORP supporting growth of aerobic bacteria to reduce the gasoline compound concentrations in the groundwater. The measure of success of these treatments is the gasoline compound reductions. The ORP will take additional time to return to its natural equilibrium. This workplan does not include groundwater monitoring beyond the 12 months monitoring/injection period described above.

A brief data transmittal report will be generated for each monitoring/injection event. The analytical data will be added to a set of cumulative data tables to monitor the progress of the remedial effort over time.

Task 5 –Subsequent Monitoring and Injection

After the initial three months of biweekly pre-injection monitoring and injection, URS will implement three quarterly events of additional pre-injection monitoring and hydrogen peroxide injection in the wells, as described above (three events). This will allow URS and CPL to monitor the impact of the treatment. If the groundwater concentrations are reduced to acceptable levels, CPL/URS will terminate the injection program and request Site closure at that point.

Task 6 - Reporting

At the conclusion of the bio-stimulation effort, a summary report will be generated evaluating the overall success of the program and incorporating recommendations, as needed. Data tables submitted for the semiannual groundwater reporting will also include the results from the work conducted under this SOW. The report will provide a detailed description of the field activities and an analytical data review by a URS staff person trained in data Quality Assurance/Quality control (QA/QC). The tabulated data will include QA/QC qualifiers for the intended data use. The report and associated attachments will be peer reviewed by senior URS representatives, and then the report will be submitted to the ACDEH via the ACDEH file transfer website; analytical data sheets will provided electronically in the final report only.

Task 7 – Investigation Derived Waste Disposal and Coordination

All investigation-derived waste will be stored in 55-gallon drums. URS will coordinate with a certified waste disposal contractor to pick up and transport liquid and soil waste generated during investigation activities to a Chevron-approved waste facility. Groundwater generated during the soil and groundwater investigation will be stored in 55-gallon drums at the Site, pending removal and disposal.

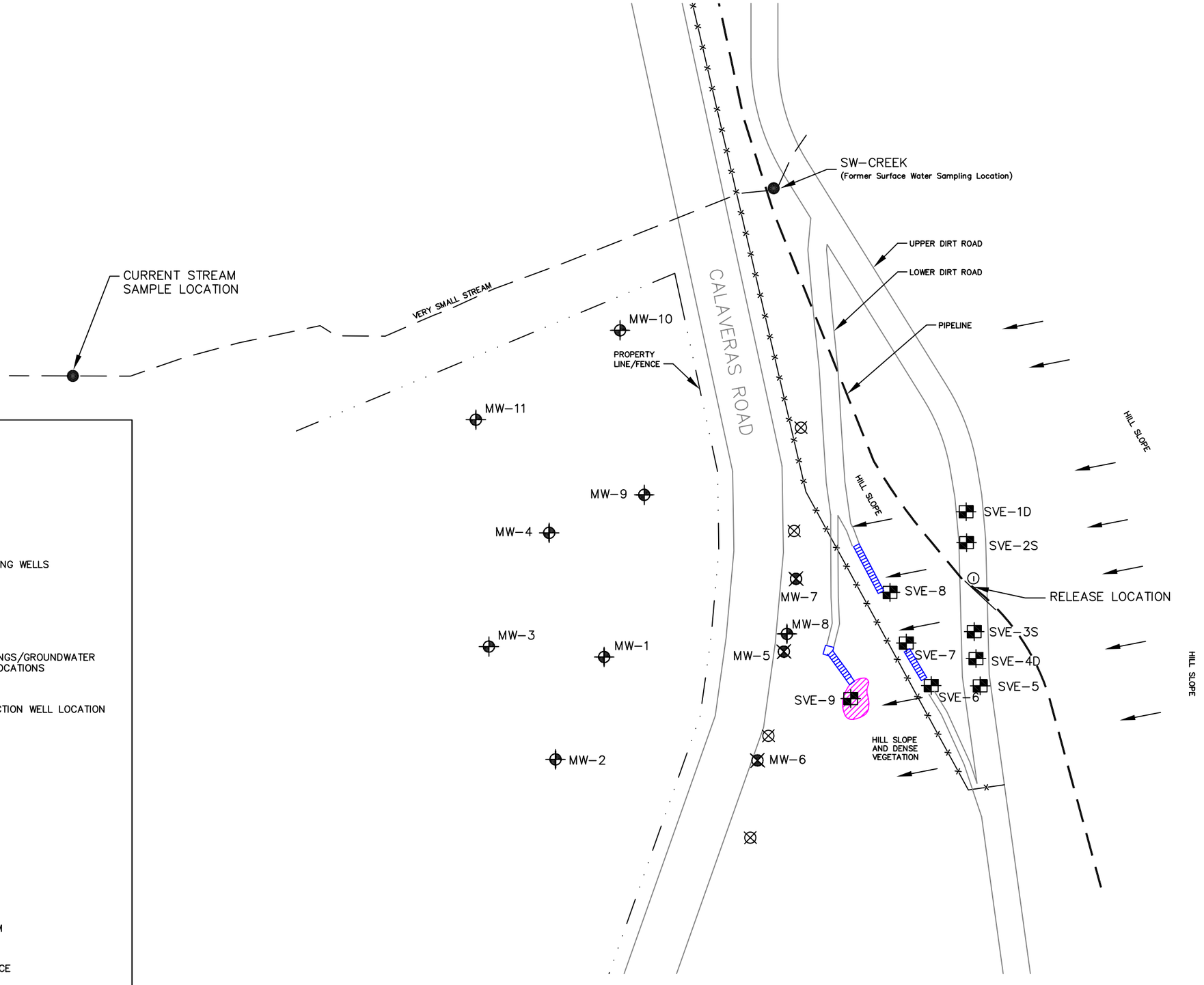
SCHEDULE

Once the ACEHD approves this workplan, URS will submit a budget to the CPL. URS will begin field activities within 2 to 3 weeks of the budget approval, based on our subcontractors' availability. The work detailed in this SOW is anticipated to start in approximately mid-May 2012 and to end one year later in mid-2013.

NORTH

0 50 100

SCALE IN FEET



LEGEND:

- SURFACE WATER SAMPLE LOCATIONS
- MONITORING WELL
- ABANDONED MONITORING WELLS
- SVE WELL
- PROPOSED NEW BORINGS/GROUNDWATER MONITORING WELLS LOCATIONS
- PROPOSED NEW INJECTION WELL LOCATION
- SHELF
- STAIRS
- FENCE
- PIPELINE
- VERY SMALL STREAM
- PROPERTY LINE/FENCE
- HILL SLOPE 80–90% GRADE

URS	CHEVRON PIPELINE COMPANY Project No. 26818071.00200	SVE AND GROUNDWATER MONITORING WELL LOCATIONS CHEVRON SUNOL PIPELINE	Figure 1

Mar 06, 2012 – 3:27pm
X:\x_env_waste\Chevron Pipeline Company\Sunol Spill – Current\Site Figures\Current CADD\FIGURE 1.dwg