DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CALIFORNIA 92132-5190

5090
Ser OPAE.TM/314
November 18, 2013

Ms. Beatrice Griffey
California Environmental Protection Agency
California Regional Water Quality Control Board
Mitigation & Cleanup Unit
2375 Northside Drive, Suite 100
San Diego, CA 92108

Mr. Tayseer Mahmoud
California Environmental Protection Agency
Department of Toxic Substances Control
Brownfields and Environmental Restoration Program
5796 Corporate Avenue
Cypress, CA 90630

Mr. Martin Hausladen
U. S. Environmental Protection Agency
Region IX, Code SFD-8-3
75 Hawthorne Street
San Francisco, CA 94105-3901

SUBJECT: MEETING MINUTES FOR THE 111th FEDERAL FACILITIES AGREEMENT (FFA) MEETING DATED SEPTEMBER 19th, 2013, MARINE CORPS BASE CAMP PENDLETON

Dear Ms. Griffey, Mr. Mahmoud, Mr. Hausladen:

Enclosed are the minutes to the Marine Corps Base, Camp Pendleton Federal Facilities Agreement (FFA) Meeting Number 111, held on September 19th, 2013. Should you have questions, please call Ms. Theresa Morley at (619) 532-1502.

Sincerely,

GASTON C. BORDENAVE, JR
By direction

Enclosures: (1) 111th FFA Meeting Minutes
(2) 111th FFA Meeting Agenda
(3) Sign in Sheet
(4) Deliverables/Fieldwork Spreadsheets
(5) FFA Schedule
(6) **IR Site 1119 Project Update**
(7) Chappo Subbasin Investigation Update
(8) New IR Sites 1120 and 1122
(9) NTCRA Progress Update for IR Site 1114

Copy to: CG, MCB Camp Pendleton (Attn: ACOS, Environmental Security - Mr. Joe Murtaugh)

PARSONS

Contract No. N62583-11-D-0515
Document Control No. BATL-0515-0006-0010
Parsons Project No. 748590

PROJECT NOTE NO. 61

SUBJECT: Marine Corps Base (MCB) Camp Pendleton Federal Facilities Agreement (FFA) Meeting (No. 111)

DATE HELD: September 19, 2013

Attendees**:**

Theresa Morley (Naval Facilities Engineering Command Southwest [NAVFAC SW]), Tracy Sahagun (MCB Camp Pendleton), Adam Hill (NAVFAC SW), Tayseer Mahmoud (California [Cal] EPA/Department of Toxic Substances Control [DTSC]), Bob Breglio (Trevet), Steve Griswold (Parsons), Lauri Roché (Parsons), and Josh Sacker (Parsons).

Attendees by teleconference: Joseph Murtaugh (MCB Camp Pendleton), Martin Hausladen (United States Environmental Protection Agency [USEPA or EPA]), and Beatrice Griffey (San Diego Regional Water Quality Control Board [RWQCB or Water Board]).

Introduction and Status of Deliverables and Fieldwork

A meeting was held in Parsons Pasadena office to update the FFA Team (Team) on program status. Refer to attached sign-in sheet and agenda (attached).

Following introductions, Ms. Morley discussed the deliverables spreadsheet, the FFA schedule, and the fieldwork spreadsheet (attached). The following items were specifically mentioned during the deliverables summary discussion:

- Agency comments have been received on the shaded items, and the items marked as final will be removed on the next version of the deliverables spreadsheet.
- Item #2, Department of the Navy (DON) and USEPA are discussing a remaining item on the 22/23 Area Groundwater Record of Decision (ROD) related to remedial goals for 1,4-dioxane and 1,2,3-trichloropropane(TCP). Mr. Hausladen said he will be hearing back from his manager, but he anticipates that the ROD is still on track to be signed.
- Item #9: DON is accelerating the remediation at Site 1115, and has received proposals for remedial options at the site. A proposed remedial option has been selected, and DON will inform the FFA Team of the selection once the contract is awarded.
- Item #10: Responses to agency comments will be issued next week.

- Item #12: This Work Plan will be delivered next week.
- Item #13: The DON technical reviewer determined that the site does not pose a risk that would justify remedial action. A soil vapor extraction (SVE) system was made available from another site on the Base and will be moved to this site.
- Items #14 and 16: The Team agreed that the due dates to the agencies for these two deliverables will be switched.
- An item will be added to the deliverables spreadsheet: Site Investigation (SI) Work Plan for Site 1122, which will be submitted to the agencies on October 30 (per the FFA schedule).

For the Fieldwork Spreadsheet, the items with blue shading will be removed on the next version. For Item #11, the DON had to change the laboratory in order to perform TO-17 analyses.

FFA Schedule

Refer to the attached FFA Schedule. The following items were noted during discussion of this schedule:

- For Site 6 (22/23 Groundwater), the Land Use Control Remedial Design/Remedial Action Work Plan (LUC RD/RAWP) is currently scheduled for January 11, 2014, but this date is contingent on finalizing the ROD soon. Mr. Mahmoud asked that the Chappo Subbasin Well Siting Technical Memorandum be added to the deliverables schedule.
- For Site 1115, pilot studies have been added to the schedule. Responses to comments on the Remedial Investigation/Feasibility Study (RI/FS) will be provided next week.
- For Site 1122, the Work Plan will be added to the FFA schedule.
- The Five Year Review for Sites 6 and 7 will be completed in-house by DON.

Ms. Morley noted that due to sequestration, the agencies may experience budgetary impacts.

Site 1119 Data and Preliminary FS Alternatives

Mr. Griswold provided an overview of progress to date for Site 1119, including site history, results, and potential cleanup alternatives (refer to attached slides). The site was originally discovered after two wells were drilled by the Base for future use as drinking water production wells (wells 26016 and 26018). When these wells were found to have trichloroethene (TCE) contamination, Site 1119 was created to determine the source of contamination in the aquifer and how to address it.

Two phases of field investigation were conducted. In the last half of 2011, 17 existing wells were sampled and 26 new wells were installed to better define the presence of volatile organic compound (VOC) contaminants in the groundwater subbasin (called the

Upper Ysidora subbasin). The first phase found that much of the subbasin is not contaminated, and that the TCE contamination is present only along the southeastern edge of the subbasin. The data pointed to a potential source in the area of buildings between Vandegrift Boulevard and Santa Margarita River Road; sometimes referred to as the Museum District (Building 2612 is the Mechanized Museum).

The second phase of field investigation was conducted in April through July 2013, and included a 41-point soil gas survey and installation of additional wells in the suspected source area in three locations (10 separate well casings). This second phase indicated that the source is in the vicinity of Building 2611, with a possible secondary source around Building 2622. In addition, aquifer thickness and vertical delineation of TCE contamination was better defined, with the highest detected concentration of 530 µg/L of TCE downgradient of the source.

Although the source area has been narrowed-down to an area approximately 400 feet long by 300 feet wide, additional refinement of the source area will be performed as part of the remedial design. The data gathered to date will be discussed in the RI/FS Report, and remedial options will also be evaluated in that document. Preliminary remedial options were presented during the meeting. The possible remedial options include the general categories of land use controls, long-term monitoring, in situ treatment, containment, phytoremediation, and excavation. In general, the selected remedy for the site will likely include land use controls and long-term monitoring, and may also have in situ treatment of the source area and/or containment measure such as a permeable reactive barrier. Each of the possible alternatives were discussed, including potential pros and cons of each. Mr. Mahmoud asked if pump-and-treat will be considered, and Ms. Morley said that Navy policy is to not use pump-and-treat under most circumstances, and that the FS will discuss this policy and whether it is applicable to the site.

Chappo Subbasin Results and Planned Test Well

Mr. Griswold summarized status of the Chappo subbasin investigation, which is focused on finding a suitable location for a replacement supply well. The presentation (attached) provided results of monitoring well sampling, geologic interpretation, and planned next steps. Four test locations in the Chappo subbasin were selected in consultation with NAVFAC SW, Camp Pendleton Environmental Security, Office of Water Resources, Facilities Maintenance Division, and Stetson Engineers (refer to figures in presentation). As part of the investigation, well screens were installed at five depths throughout the aquifer at each location, geophysical logging was conducted (gamma and resistivity), and geologic conditions and depths to bedrock were determined.

Laboratory results indicated that there were no detections of VOCs above Federal or State Maximum Contaminant Levels (MCLs) or State Notification Levels, although chloroform and 1,2,3-TCP were detected above their USEPA Tapwater Regional Screening Levels (RSLs). Regarding general chemistry, chloride, sulfate, and total dissolved solids (TDS) measurements exceeded their secondary MCLs, particularly at the deepest interval of CSB-MW1. The CSB-MW2 location has the thickest intervals of permeable material (sands and gravel), indicating the highest likely well yield at this

location. CSB-MW1 has the second highest amount of permeable material, but also has high TDS readings near the bottom of the aquifer.

Ms. Morley said that a meeting will be held with the Air Station to determine the best path forward, since there may be logistical issues associated with installing a supply well at the Air Station.

Brief on New IR Sites 1120 and 1122

Mr. Hill provided the status of the new IR Sites 1120 and 1122 (refer to attached slides). Site 1120 is the Stuart Mesa Pesticide Maintenance Area. At Site 1120, there are several subsites that are being addressed. A portion of the Site 1120 is adjacent to the Marine Corps Tactical Systems Support Activity (MCTSSA). The MCTSSA expansion will be able to proceed as planned following excavation of contaminated soils being carried out in accordance with the Work Plan of September 2013. The RI Work Plan for Site 1120, planned for January 2014, will include information from the MCTSSA excavation closure report, and the other subsites will be investigated as outlined in the upcoming Work Plan.

Site 1122 is the Shot Fall Zone, which overlaps the Base land and is leased to the San Clemente Skeet and Trap Club. Previous field work conducted by the Base and documented in the Field Sampling Report of September 2012 indicates the presence of metals or PAHs exceeding EPA BTAG values. The SI Work Plan is in progress and will be submitted to the FFA Team for review in October. In response to a question, Mr. Hill noted that the site does not have large mounds of clay pigeons like some other sites, but instead the pigeons are more sparsely distributed around the site.

The site work will include sampling of surface water after a storm event, and samples will be sieved in the field for the presence of lead shot. Field work will be carried out in January to avoid the breeding season. Mr. Hausladen noted that at a site on the central coast the lead contamination did not go where it was expected to go, and large amount of soil needed to be excavated.

IR Site 1114 Fieldwork

Mr. Breglio provided a progress update for Site 1114 (refer to attached slides). A Non-Time Critical Removal Action was conducted to address tetrachloroethene (PCE) in groundwater. The field work began in August 2013, and involved trenching and well installations, and groundwater extraction from the trenches will begin in mid-September. Refer to the attached slides for figures and photographs of the site work conducted to date. The three trenches are each 40 feet long and 15 feet wide. As part of the cleanup, a groundwater extraction and treatment system will be installed and operated at the site.

The attached photographs show the processes used for trenching, shoring, backfilling of permeable rock, stockpile management, well installations, and the onsite treatment system. The water is being treated to undetectable concentrations to comply with the

Offsite Rule. Following groundwater extraction, bioaugmentation substrates will be emplaced in the trenches.

Site 33 Update

Ms. Morley provided an update on the remedial activities at Site 33 to the Team. Five groundwater monitoring wells were installed at the site following the large excavation project at the site. Two of the new wells were installed in the former excavation area, two were installed upgradient, and one downgradient. Results of the two wells installed in the excavation area show nearly non-detect concentrations, whereas an upgradient well has concentrations of PCE of approximately 500 µg/L, and the downgradient well has concentrations of approximately 380 µg/L. There will be three more quarterly monitoring events conducted at the site, and the Navy will keep the Team informed of the results as they become available.

Schedule for Next FFA Meeting

The next FFA Meeting is scheduled to be held in San Francisco on January 23, 2014. [Note: January 16, 2014 was originally the date set during the meeting, but it was subsequently changed to January 23 via email communication with the FFA Team.]

MCB Camp Pendleton
111th FFA Meeting Agenda
100 West Walnut Street
Pasadena, CA 91124

September 19th, 2013

0900 – 0915	**Welcome and Introductions (Navy)**
0915 – 0945	**Project Deliverables, FFA Schedule Update and Planned/In Progress Field Work Status (Navy)**
0945 – 1045	**Break**
1045 – 1130	**Site 1119 Data and Preliminary FS Alternatives (Parsons)**
1130 – 1215	**Lunch**
1215 – 1245	**Chappo Subbasin Results and Planned Test Well (Parsons)**
1245 – 1315	**Brief on New IR Sites 1120 and 1122 (Navy)**
1315 – 1345	**Presentation on IR Site 1114 Fieldwork (Trevet)**
1345 – 1400	**Meeting Conclusion and Action Items (Navy)**

PARSONS

CLIENT Navy NAVFAC JOB NO. SHEET 1 OF 6
SUBJECT ITI FFA Meeting Sign-In BY DATE 9/19
CKD. REVISION

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MCB Camp Pendleton Deliverables Spreadsheet

Date: 9/19/13

				Date Due	Agency Comments	Response Received From:		
Item	**Document**	**Contractor**	**Status**	**to Agencies**	**Due By**	**EPA**	**DTSC**	**RWQCB**
1	ROD for NFA at Site 1111	SDV	FINAL	12/22/11	2/20/12	**28-Mar**	**15-Feb**	**17-Feb**
2	ROD for 22/23 Area Groundwater	Parsons	Signature page in transit	5/8/12	7/9/12	**25-Jun**	**27-Jun**	**9-Jul**
3	RI Work Plan - Site 1121 - 1D Groundwater	SDV	FINAL	10/10/12	12/10/12	**NC**	**10-Dec**	**10-Dec**
4	Annual Post Closure Maintenance Report (for CY12) - Site 7	Trevet	FINAL	2/14/13	4/15/13	**NC**	**4-Apr**	**17-Apr**
5	Work Plan to Install Wells & Monitor Groundwater - Site 33	Trevet	FINAL	3/15/13	5/14/13	**NC**	**30-Apr**	**8-May**
6	Removal Action Work Plan - Site 1116 14 Area Groundwater (incl ESI Report as an appendix)	ECM	FINAL	3/23/13	5/24/13	**NC**	**8-May**	**5-Jun**
7	RAWP for Site 1114 - 41 Area Arroyo	Trevet	FINAL	4/1/13	5/31/13	**NC**	**30-May**	**10-Jun**
8	RI Work Plan for Site 150 - 21 Area Boat Basin	Trevet	Finalizing	4/22/13	6/21/13	**NC**	**19-Jun**	**22-May**
9	RI/FS for Site 1115 - FSSG Lot * due date 21 July (RWQCB request)	Noreas/Parsons	Responding to agency comments	4/30/13	7/1/13	**NC**	**27-Jun**	**7-Aug**
10	RI Work Plan for Site 1117 - 16/17 Area Groundwater	Trevet	Responding to agency comments	5/6/13	7/5/13	**NC**	**2-Jul**	**12-Aug**
11	Annual Groundwater Monitoring Report - Site 7 Box Canyon	Trevet	Responding to agency comments	6/11/13	8/12/13	**NC**	**NC**	
12	Work Plan to Install Wells & Monitor Groundwater - 22/23 Area GW	Tidewater	With agencies	8/30/13	10/29/13			
13	EE/CA and AM for 12 Area Site 13	SDVJV	Document rescinded					
14	Plume Removal Action Completion Report - Site 33 (52 Area Armory)	Shaw	Navy review	9/27/13				
15	Work Plan for Additional Investigation - Site 11116 (14 Area GW)	TriEco	Navy review	10/13/13				
16	Work Plan for Performance Monitoring - Site 1114 (41 Area Arroyo)	TriEco	Navy review	10/25/13				
17	Source Removal Action Work Plan - Site 33 (52 Area Armory)	ECM	Navy review	11/30/13				
18	Extended Site Inspection Report - Site 1118 (21, 26, 52 Area GW)	ECM	Preparing pre-draft	12/16/13				
19	Remedial Investigation/Feasibility Study Report - Site 1119	Parsons	Preparing pre-draft	12/19/13				
20	Extended Site Inspection Report - Site 62 (Asphalt Batch Plant)	SDVJV	Once field work is complete	12/20/13				
21	Land Use Control Implementation Plan (LUCIP) - 22/23 Area GW	Tidewater	Preparing pre-draft	1/11/14				
			Agencies have commented					

MCB Camp Pendleton Fieldwork Spreadsheet **Date: 9/19/13**

Item	Field Work	Planned Start Date	Planned Completion Date
1	Field Work for 22/23 Area Groundwater ZVZ Pilot Study	2/6 - 2/8: Well Installations 2/13 - 2/15: Well Develop/Survey 2/20 - 2/24: Baseline GW Event April - Install PRB	on hold
2	Field Work for Site 1118 ESI	remobilize for phase II 8 May	complete
3	EISB Pilot Study - 22/23 Area GW	9/30 - begin injections	18-Oct-13
4	Well Siting Study - 22/23 Area Groundwater	depends on well location	
5	RI Field Work - Site 1119	4/30 - 5/3 - install SG probes 5/8 - purge test 5/21 - 5/27 - sample probes 6/17 install/develop/sample wells	complete
6	Field Work for Site 33 Wells	8-19 Jul - Install and Develop Wells 22-26 Sample Wells	complete
7	Removal Action Site 1114	8/5 mobilize	mid Sep - excavation water treatment, bio, reveg end of Oct
8	Removal Action Site 1116	8/27 abandon wells 9/17 mobilize 12/2 install wells	12/2 demob
9	Complete Site 62	end of Sep	
10	RI Field Work - Site 1D	early Nov	
11	Remedial Investigation - Site 150	early Nov	
12	Remedial Investigation - Site 1117	early Dec	

Date: 9/19/13

Item	Document	Contractor	RTCs to agencies	RTC Approved		
				EPA	DTSC	RWQCB
1	RI/FS for Site 1115 - FSSG Lot	Parsons		N/A		
2	RI Work Plan for Site 1117 - 16/17 Area Groundwater	Trevet		N/A		
3	Annual Groundwater Monitoring Report - Site 7 Box Canyon	Trevet		N/A		

FFA Schedule for Draft Documents – September 19, 2013

Original schedule was agreed to by all FFA signatories at the May 17, 2011 FFA meeting. Updates are made every four months, prior to the FFA meetings. Dates marked with an asterisk are tentative, based on funding and subject to change. Once funding becomes available for a site, the date will be updated and the asterisk removed. Items in italics represent field work and are not enforceable.

Site 6 (Site number is for funding purposes only) – 22/23 Area Groundwater

This site consists of VOC plumes in the groundwater under the 22 and 23 Areas. Various industrial activities have historically taken place in the 22 and 23 Areas. An RI/FS was completed in January 2011. The Proposed Plan outlined the various alternatives from the FS and proposed the preferred alternative which is a combination of alternatives 2, 3 and 4. Alternative 2 includes Land Use Controls and Long-Term Monitoring, Alternative 3 involves an Alternate Water Supply and Alternative 4 is Source Area Treatment via In-Situ Technologies. A public comment period and public meeting for the Proposed Plan were held in July/August 2011. A Record of Decision is being routed for signature by the agencies. To evaluate the effectiveness of the remedies proposed for Alternative 4, two pilot studies are in progress: a Zero Valent Zinc (ZVZ) Permeable Reactive Barrier is planned for the TCP plume; and, Enhanced InSitu Bioremediation (EISB) is planned for the TCE plume. The DoN has finalized work plans for both pilot studies and to test locations to cite the replacement production well.

- Proposed Plan — complete
- Geotechnical and Design Information for ZVZ PRB Pilot Study — complete
- *Implementation of ZVZ PRB Pilot Study* — *in progress*
- **Record of Decision** — **5/8/2012**
- **Well Siting Study Sampling and Analysis Plan** — **complete**
- *Field Work for Well Siting Study* — *in progress*
- Work Plan for Enhanced InSitu Bioremediation (EISB) — complete
- *Field Work for EISB Pilot Study* — *in progress*
- Work Plan to Install Wells and Conduct Groundwater Monitoring — 8/30/2013
- Land Use Control Implementation Plan — 1/11/2014

Extension for Record of Decision requested to incorporate multiple Navy and Marine Corps comments and for Sampling and Analysis Plan to accommodate changes in Navy Quality Assurance Officer

****POST ROD Site 7 – Box Canyon Landfill**

This site is a CAMU situated above an old municipal landfill. This site is post-ROD. The selected remedy was an EvapoTranspiration (ET) cap with land use controls. The site must be fenced and signed. Annual inspections are made in relation to the monitoring systems, cover maintenance, drainage/erosion control, cracks, settlement and movement and vegetation growth. Additionally, groundwater monitoring wells are sampled every year and gas probes are sampled according to the percent of methane in the probe. The groundwater monitoring results and the annual maintenance activities are summarized in annual reports. The

methane results are emailed to the FFA team monthly. A Gas Collection and Control System (GCCS) was recently installed and has reduced methane concentrations to below compliance standards.

- Memo to File for Site 7 (pv panels) complete
- *Field Work for Non Methane Organic Compounds* *complete*
- Memo To File complete
- Report for Non Methane Organic Compounds complete
- Annual Post Closure Maintenance Report (for CY12) complete
- Annual Groundwater Monitoring Report 7/3/2013

12 Area Site 13 – Former Building 1280 and 1283

This site is the site of a former UST and has some low level concentrations of VOCs in groundwater. An RI/FS has been completed. Due to an impending construction project through the site, contaminated soil and groundwater were removed from the area to be impacted by construction. A year of groundwater monitoring has been completed and a Project Completion Report is complete. The report recommends further action for the site. An interim action is planned to install a Soil Vapour Extraction system and monitor groundwater for a year.

- Groundwater Monitoring Report complete
- **Project Completion Report for Soil and Groundwater** **complete**
- Post SVE Groundwater Monitoring Report 2014*
- Proposed Plan 2015*
- Record of Decision 2016*

Dates changed as a result of the May 10, 2012 FFA Meeting

Site 21 – 14 Area Surface Area Impoundment

This site was a former oxidation pond near a maintenance facility which has some low levels of VOCs in groundwater. A Remedial Investigation has been completed for the site, but not a Feasibility Study. Currently a pilot study to evaluate the effectiveness of in-situ bioremediation of chlorinated solvents at low concentrations in groundwater is complete. A Technical Memorandum reporting on the effectiveness of the first year of the pilot study was finalized, as was the Pilot Study Addendum for the second phase of work, currently underway.

- Pilot Study Tech Memo complete
- Site 21 Pilot Study Work Plan Addendum complete
- *Second Phase of Pilot Study Field Work* *in progress*
- **Feasibility Study** **5/26/2014**
- **Proposed Plan** **11/15/2014***
- **Record of Decision** **11/15/2015***

Dates were changed as a result of the September 15, 2011 FFA meeting

Site 33 – 52 Area Armory

Gun cleaning in the armory contributed to a PCE plume downgradient of the armory. A Remedial Investigation and Feasibility Study have been completed for this site. An Engineering Evaluation/Cost Analysis and Non-Time Critical Action Memorandum have also been completed. The selected remedy was excavation of the source material, and treatment of groundwater from the site. An interim Removal Action was completed, concentrating on the worst part of the plume. An additional Removal Action is planned for the source area.

- Removal Action Work Plan for plume — complete
- *Plume Removal Action (geophysical work started 15 Nov 11)* — *complete*
- Plume Removal Action Completion Report — 9/27/2013
- Removal Action Work Plan for source — 11/30/2013
- *Source Removal Action* — *5/7/2014**
- Source Removal Action Completion Report — 2014*
- Proposed Plan — 2015*
- Record of Decision — 2016*

Site 150 – 21 Area, Location 1

This site became an IR site after a discovery investigation conducted based on information gained from a former Marine stationed at Camp Pendleton. During the discovery investigation, one location had vinyl chloride in soil gas that exceeded risk screening criteria. Field work for the Site Inspection has located groundwater contamination. This site is in the Remedial Investigation phase.

- *Site Inspection Field Work* — *complete*
- Site Inspection Report — complete
- **Remedial Investigation Work Plan** — **4/21/2013**
- ***Field Work for Remedial Investigation*** — ***11/5/2013***
- **Remedial Investigation Report** — **2014***
- Proposed Plan — 2015*
- Record of Decision — 2016*

Dates changed (RI added) as a result of the SI field work

SITE CLOSED Site 1003 (Site number is for funding purposes only) – Site 1D Groundwater

This site was a former burn ash site and has undergone a Remedial Investigation and Feasibility Study for soil only. A ROD was signed documenting the selected remedy consisting of excavation and off-base disposal of contaminated soil. During the remedial action a cell with 90 drums and drum fragments containing liquid and solid chemicals was discovered. The drums were removed but the material in the drums had reached groundwater. A Remedial Action Closure Report (RACR) was completed to close out the soil portion of the site, but the groundwater contamination remains to be addressed. As an interim measure, until funding could be secured for further investigation, 650,000 gallons of the groundwater was pumped from the site, treated

and disposed of in the base sanitary sewer system. This lowered the concentrations of contaminants in groundwater, however, additional work is planned under a new site, IR Site 1121 Site 1D Groundwater. This site is for soil only; and was closed through the ROD and the RACR.

- Data Gap Analysis for Groundwater Work Plan — complete
- *Data Gap Analysis Field Work* — *complete*
- Data Gap Analysis Report — complete

SITE CLOSED Site 1111 – 26 Area Ash and Debris Disposal Area

This burn ash site was remediated and four quarters of groundwater monitoring have been completed. The site was revegetated and a report was written summarizing the actions that had been completed to date, and why the site qualified for unrestricted land use. A No Further Action Record of Decision (ROD) was signed on April 19, 2013.

- Proposed Plan for No Further Action — complete
- Record of Decision for NFA — complete

Site 1114 – 41 Area Arroyo

This site was created to investigate the PCE concentrations in one well that used to be associated with IR Site 9 (closed). A Site Inspection was carried out and described low-level concentrations of TPH and vinyl chlorides in soil gas and groundwater. A Remedial Investigation was conducted to validate the findings of the SI and to complete a risk assessment for the site. The EPA did not agree with the proposed NFA, so an interim Removal Action was planned to address elevated concentrations in groundwater.

- Remedial Investigation Report — complete
- **Engineering Evaluation/Cost Analysis & Action Memorandum** — **complete**
- **Removal Action Work Plan** — **complete**
- ***Removal Action*** — ***in progress***
- Work Plan for Performance Monitoring — 10/25/2013
- **Removal Action Completion Report** — **2014***
- Performance Monitoring Report — 2015*
- Proposed Plan — 2015*
- Record of Decision — 2016*

Dates were changed as a result of EPA's disagreement with site closure

Site 1115 – 13 Area FSSG Lot

There are two plumes underneath the parking lot at this site, one shallow and one deep, containing chlorinated solvents and benzene. A pilot study to evaluate the effectiveness of in-situ bioremediation of chlorinated solvents in groundwater was completed. The technology was successful at reducing contaminant

concentrations, but the site geology limited its effectiveness. A Technical Memorandum detailing the pilot study is complete. A work plan to collect more data is final and the results have been included in a Remedial Investigation/Feasibility Study that is currently under review. The Feasibility Study identified remedial alternatives for various Target Treatment Zones (TTZs) throughout the site. Pilot studies are planned to address the different plumes and contaminants at the site.

- Tech Memo — complete
- **Work Plan to collect additional data for site** — **complete**
- ***Field Work to collect additional data*** — ***complete***
- **Remedial Investigation/Feasibility Study Report** — **4/30/2013**
- Pilot Study Work Plan for TTZ-1S — 3/18/2014
- Pilot Study Work Plan for TTZ-2L and TTZ-2S — 1/8/2014*
- Field Work for TTZ-1S Pilot Study — 2014*
- Field Work for TTZ-2L and TTZ-2S Pilot Study — 6/19/2014*
- Pilot Study Report for TTZ-1S — 2015*
- Pilot Study Report for TTZ-2L and TTZ-2S — 2016*
- Proposed Plan — 2017*
- Record of Decision — 2018*

Dates were changed as a result of the September 15, 2011 FFA meeting

Site 1116 – 14 Area Groundwater

Nine USTs were transferred from the UST Program to the IR Program due to low-levels of chlorinated solvents. A Site Inspection was completed and six of the sites do not warrant further action under the IR Program. The three other sites will be remediated. An Engineering Evaluation/Cost Analysis (EE/CA) and Action Memo has been completed for this site. A Removal Action Work Plan, with a report detailing the results of a limited investigation to close data gaps as an appendix, is complete. The removal action will address the mainly petroleum sources at the old USTs, along with Dual-Phase Extraction (DPE) at one site and an Enhanced Insitu Bioremediation (EISB) pilot study at another site. The limited investigation that was conducted in 2012 indicated that the TCE plumes at the site are not likely associated with the USTs. Therefore, additional investigation will be conducted to delineate the TCE plumes and to find a source, if possible.

- EE/CA and Action Memorandum — (3 subsites – Moving Forward) — complete
- Expanded Site Inspection WP — (3 subsites – Moving Forward) — complete
- *Field Work for Site Inspection* — (3 subsites – Moving Forward) — complete
- **Expanded Site Inspection Report** — **(3 subsites – Moving Forward)** — **appendix to RAWP**
- **Removal Action Work Plan (RAWP)** — **(3 subsites – Moving Forward)** — **complete**
- ***Interim Removal Action*** — ***(3 subsites – Moving Forward)*** — ***8/14/2013***
- Additional Investigation Work Plan — 10/13/2013
- *Additional Investigation Field work* — *2014**
- Removal Action Completion Report — (3 subsites – Moving Forward) — 2014*
- Additional Investigation Report — 2014*

- Proposed Plan 2015*
- Record of Decision 2016*

Dates were changed as a result of the September 17, 2012 FFA meeting.

Site 1117 – 15/16 Area Groundwater

Six USTs were transferred from the UST Program to the IR Program due to low-levels of chlorinated solvents. The agencies have reviewed the Site Inspection Report recommending the site move into the Remedial Investigation phase. A Remedial Investigation Work Plan is with the agencies for review.

- *Field Work for Site Inspection* *complete*
- Site Inspection Report complete
- **Remedial Investigation Work Plan** **5/6/2013**
- ***Remedial Investigation Field Work*** ***11/27/2013****
- **Remedial Investigation Report** **2014***
- Proposed Plan 2015*
- Record of Decision 2016*

Remedial Investigation added based on agency comments on Site Inspection

Site 1118 – 21/26/52 Area Groundwater

Three USTs were transferred from the UST Program to the IR Program due to low-levels of chlorinated solvents. The Site Inspection report was reviewed by the regulatory agencies and additional work, including a soil gas investigation, is needed to verify if no further action is appropriate for these sites. Field work for an Extended Site Inspection Work Plan is complete and a report detailing the findings is being prepared.

- **Extended Site Inspection (ESI) Work Plan** **complete**
- *Field Work for Site Inspection* *complete*
- Extended Site Inspection Report 12/16/2013
- Proposed Plan 2015*
- Record of Decision 2016*

Dates changed as a result of document quality issues

Site 1119 – 26 Area Groundwater

This site was created to investigate the source or sources of chlorinated solvents in the 26 Area production wells. Field work for the Remedial Investigation has been completed. TCE had been discovered at two of the wells and further investigation is needed to delineate extent of contamination and to locate the source, if possible. An addendum to the Remedial Investigation Work Plan is complete and field work is in progress.

- *Field Work for Remedial Investigation* *complete*
- **Work Plan Addendum to Delineate Source** **complete**

- ***Additional RI Field Work*** — ***complete***
- **RI/FS Report** — **12/19/2013**
- Proposed Plan — 2014*
- Record of Decision — 2015*

Dates changed as a result of the Jan 19, 2011 FFA meeting

Site 62 – Asphalt Batch Plant

This site was created when a transformer containing PCBs tipped over and spilled. A Site Inspection was performed, however data was missing and further investigation was needed. An Extended Site Inspection Work Plan was completed. Field work hasn't been completed and is due to begin soon.

- Extended Site Inspection Work Plan — complete
- ***Field Work for Extended Site Inspection*** — ***9/30/2013***
- **Extended Site Inspection Report** — **12/20/2013**
- Proposed Plan — 2014*
- Record of Decision — 2015*

Dates changed as a result of the September 17, 2012 meeting

Site 1120 – Stuart Mesa Pesticide Maintenance Areas

This site was created in 2012 to address pesticide contamination due to agricultural maintenance activities. A Phase II Environmental Assessment was completed for this site in support of real estate agreement closure. The Environmental Assessment is analogous to a Site Inspection, so this site enters the Installation Restoration Program at the Remedial Investigation stage.

- Remedial Investigation Work Plan — 1/16/2014
- *Remedial Investigation Field Work* — *2014**
- Remedial Investigation Report — 2015*
- Proposed Plan — 2016*
- Record of Decision — 2017*

Site 1121 – Site 1D Groundwater

This site was created in 2012 to differentiate Site 1D groundwater from Site 1D soil, which was closed with a previous remedial action and Record of Decision. There is a plume consisting of elevated concentrations of VOCs, metals, and pesticides.

- Remedial Investigation Work Plan — complete
- *Remedial Investigation Field Work* — *11/15/2013*
- Remedial Investigation Report — 2014*

- Proposed Plan 2015*
- Record of Decision 2016*

Site 1122 – Shot Fall Zone

This site was created in 2013 to address lead and Polycyclic Aromatic Hydrocarbon contamination due to overshot from skeet range activities off base. Limited soil samples were collected that indicated elevated levels of lead, so the site will come into the Installation Restoration Program at the Site Inspection stage.

- Site Inspection Work Plan 10/30/2013
- *Site Inspection Field Work* *2014**
- Site Inspection Report 2015*
- Proposed Plan 2016*
- Record of Decision 2017*

Five Year Review – Sites 6 (22/23 Area Groundwater) and Site 7 Box Canyon Landfill

- Five Year Review 4/16/2014

MCB CAMP PENDLETON
SITE 1119 PROJECT UPDATE

19 September 2013

111th FFA Meeting

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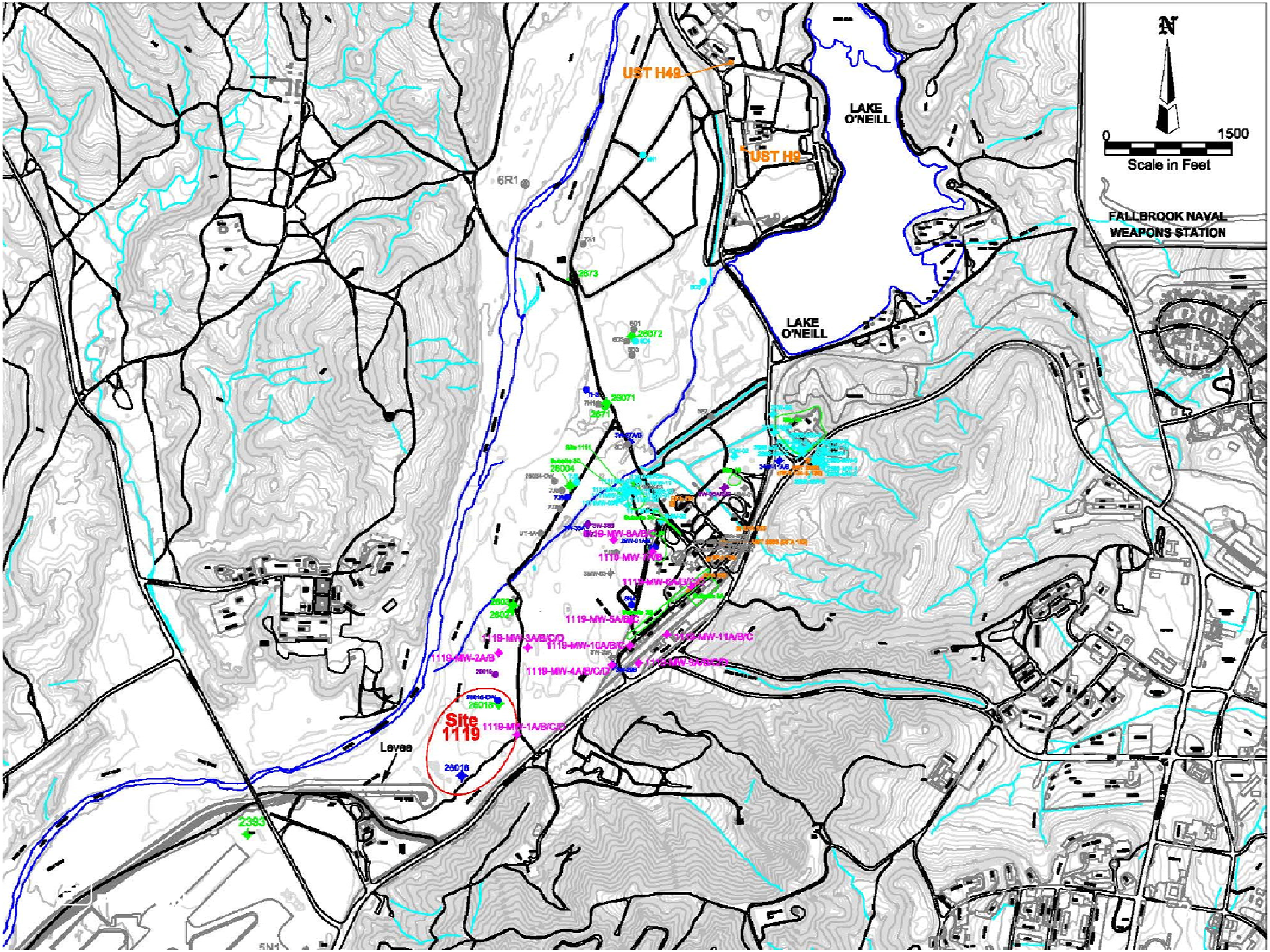
SITE 1119

Site History

- Defined as groundwater in the vicinity of Base wells 26016 and 26018.
- Previous groundwater detections in 26016 included 11 micrograms per liter (µg/L) of TCE during a constant discharge test conducted by CDM in 2008 and 0.51 µg/L of TCE in a USGS sample at 65 ft bgs collected in 2009.
- USGS testing at 26016 also reported 1,2,3-TCP at 0.0064 µg/L in the 80-foot depth specific sample. Low level *cis*-1,2-DCE was also detected at 65 ft bgs (0.45 µg/L). No other analytical results have indicated the presence of 1,2,3-TCP in wells 26016 or 26018.
- Sampling at production well 26018 has indicated multiple TCE detections, with a maximum detection of 2.6 µg/L collected by FMD in 2009, and multiple detections of approximately 2 µg/L, including recent samples tested as part of the liquid-phase granular activated carbon (LGAC) operations at well 26018. These detections were consistent with test results (2.1 µg/L) from a surface discharge sample collected by the USGS in 2009.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26071
26004
1119-MW-8A/B/C
1119-MW-9A/B/C
1119-MW-3A/B/C/D
1119-MW-10A/B/C
1119-MW-11A/B/C
1119-MW-2A/B
1119-MW-4A/B/C/D
Site
1119
1119-MW-1A/B/C/D
Levee
26016
2383

SITE 1119

First Phase Fieldwork Summary

July 2011 - Measured water levels in 47 existing wells. Pulled old pumps to sample. Sampled 12 existing wells.

Collected groundwater samples at 26016 and 26018-OW using passive diffusion bags (PDBs) and hydrasleeves.

August 2011 - Well locations 1119-MW1 through 1119-MW8 determined based on initial groundwater sampling results and review of data from Stetson Engineers, including depth to bedrock and alluvial thickness maps. Summary e-mail sent to Team.

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SITE 1119
First Phase Fieldwork Summary

September 2011 - Based on review of additional well data provided at meeting, two additional existing OWR wells (7J1 and 26019) were sampled using passive diffusion bags (PDBs) and hydrasleeves.

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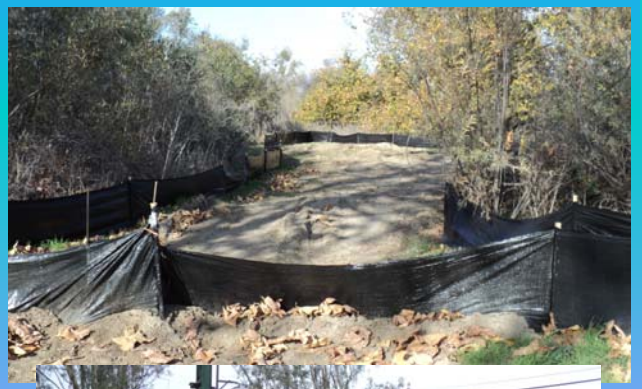
SITE 1119

First Phase Fieldwork Summary (continued)

October 2011 - Toad fencing installed at three locations.

November 2011 - Installed 26 new monitoring wells at 8 locations. Began well development.

December 2011 - Completed well development. Collected groundwater samples from the 26 new wells and 4 existing wells that could not be sampled during the breeding season (bringing the total to 78 groundwater samples collected from discrete well screens and PDBs and hydrasleeves).



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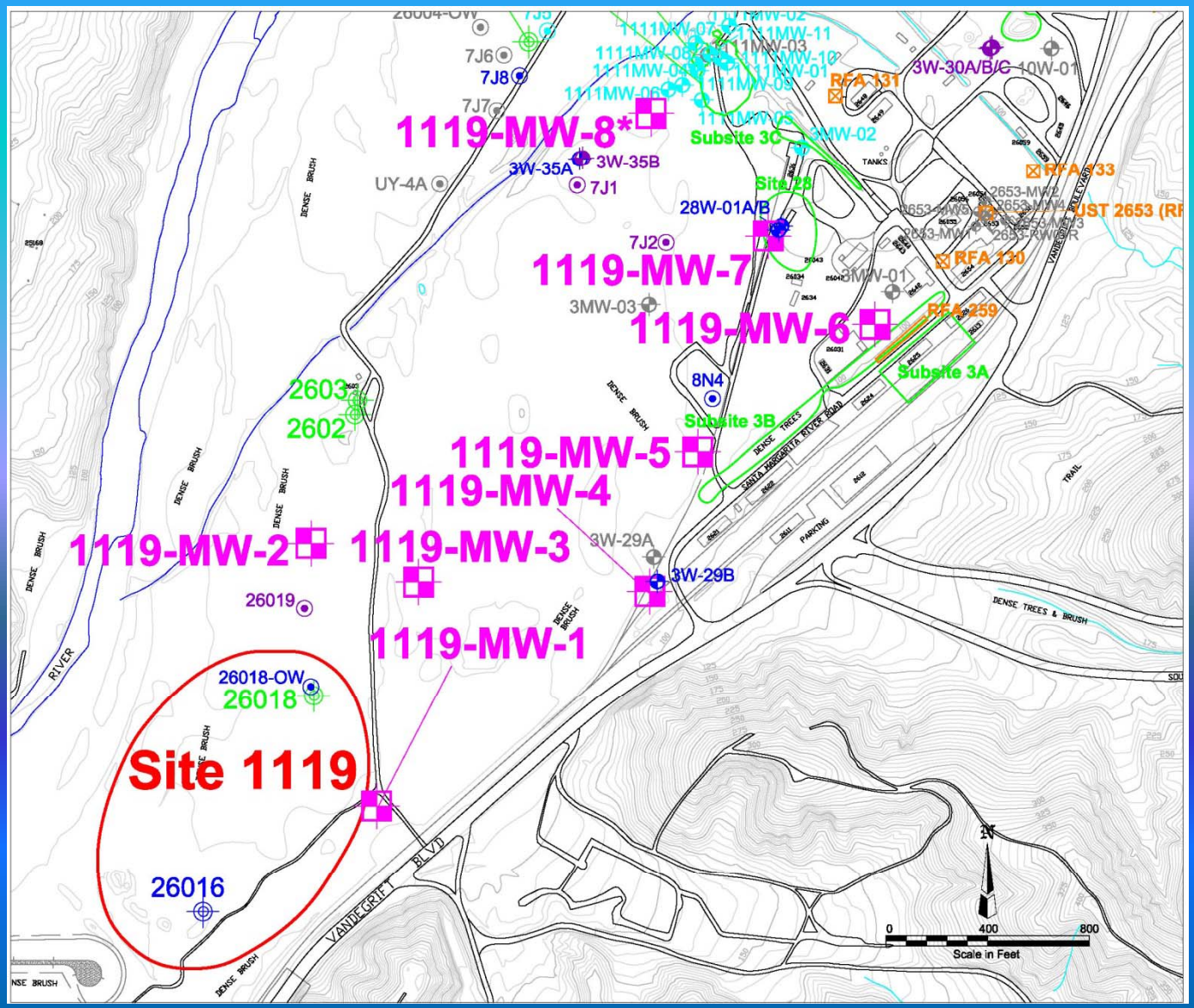
First Phase Well Locations



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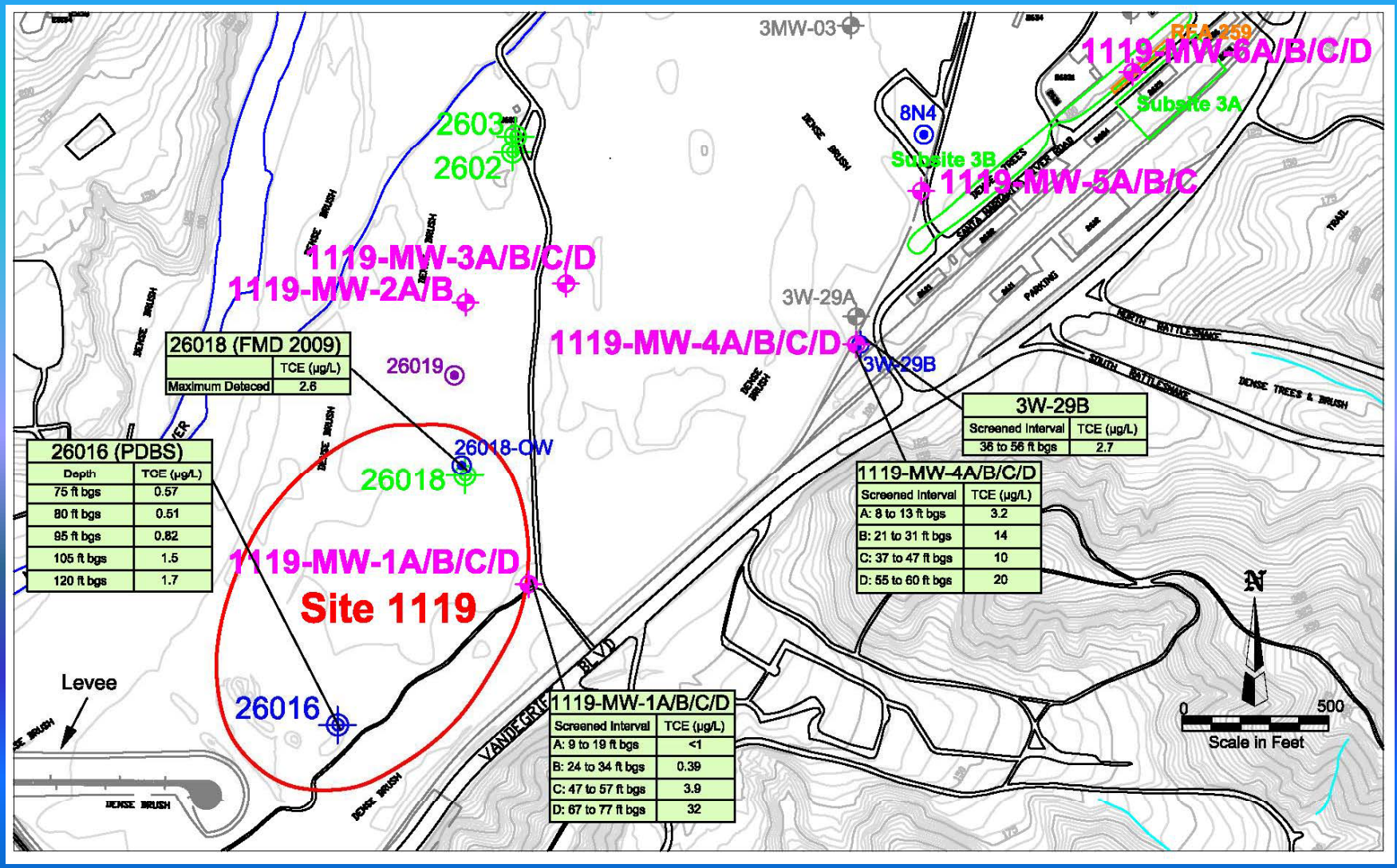
First Phase Results

- TCE detected in new monitoring wells 1119-MW-1 and 1119-MW-4 at multiple depths.
- TCE concentrations generally highest in middle to lower portion of aquifer.
- Highest concentrations along southeast edge of valley (i.e., southeast edge of aquifer), limited to downstream of Rattlesnake Canyon.
- Possible source area near Building 2611.
- Higher concentrations historically detected in Well 26016 than in 26018; Well 26016 is closer to southeast edge of valley.
- The various locations where VOCs were not detected helps to isolate the potential source location of TCE at Site 1119 (i.e., former sites in a large upgradient portion of the basin are not contributing sources).

SITE 1119

First Phase - 2011 TCE Detections



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Second Phase Investigation Objective

- To further define the area of contamination identified in the first mobilization.

Second Phase Investigation Scope

- Soil gas survey (41 points).
- Three new monitoring well locations.
- Maximum total depth of the deepest new monitoring wells is 86 feet bgs.
- Three to four separate screens at each well cluster location to provide vertical delineation.

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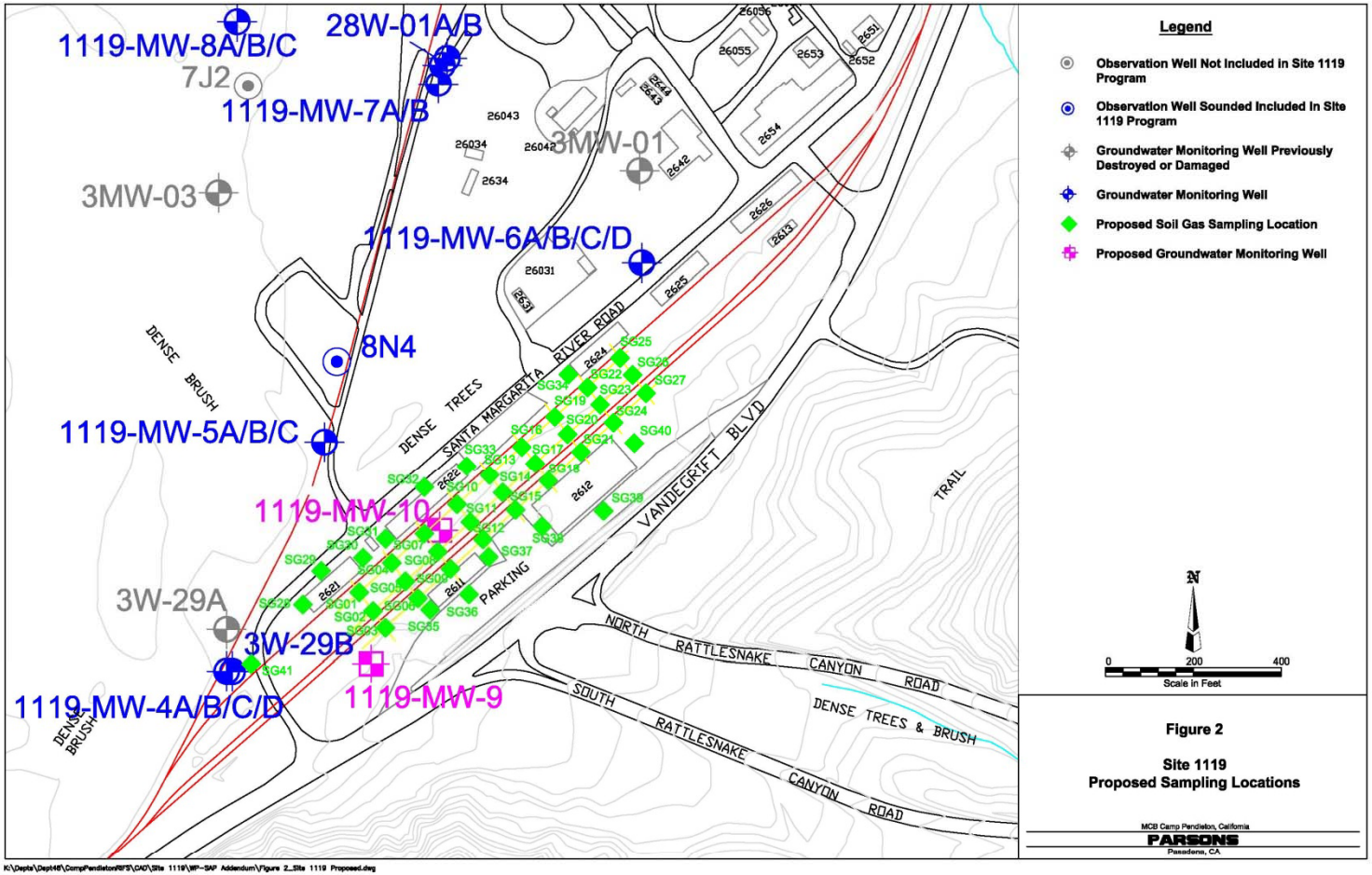
Second Phase Planned Sampling Locations



SITE 1119

Second Phase Fieldwork Summary

April 2013 - The soil gas sample grid was laid out by the surveyor.

April/May 2013 - Soil gas probes were installed using hand augers.

May 2013 - Soil gas purge testing was conducted on May 10, and soil gas sampling was conducted from May 20 to 24.

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Second Phase Fieldwork Summary (Continued)

June 2013 - Preliminary soil gas analytical results were received on June 11 and the well locations were finalized on June 17 based on the soil gas data.

The decision was made to install wells at three locations to get better coverage based on the soil gas results.

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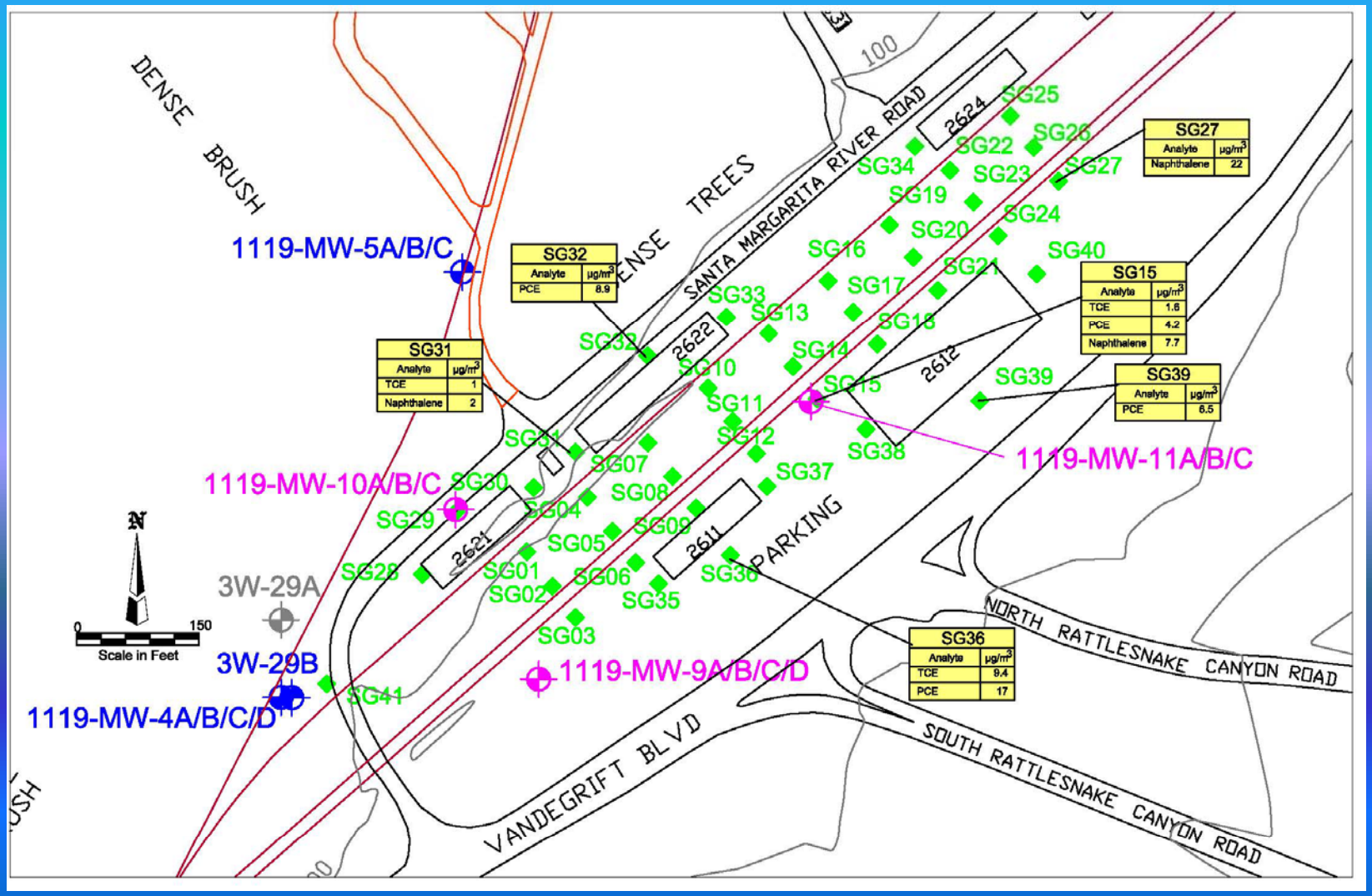
Second Phase – 2013 Highest Soil Gas Detections



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Second Phase Fieldwork Summary (Continued)

June 2013 - Ten groundwater monitoring wells were installed at three locations from June 17 to 21. The wells were developed from June 25 to 28.

July 2013 - Groundwater Samples were collected from July 2 to 4.

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Second Phase Results

- TCE detected in new monitoring wells 1119-MW-9 and 1119-MW-10 at multiple depths.
- TCE concentrations tend to be higher in middle portion of the aquifer (approximately 30 to 60 feet bgs) close to source area
- Possible source area near Building 2611.

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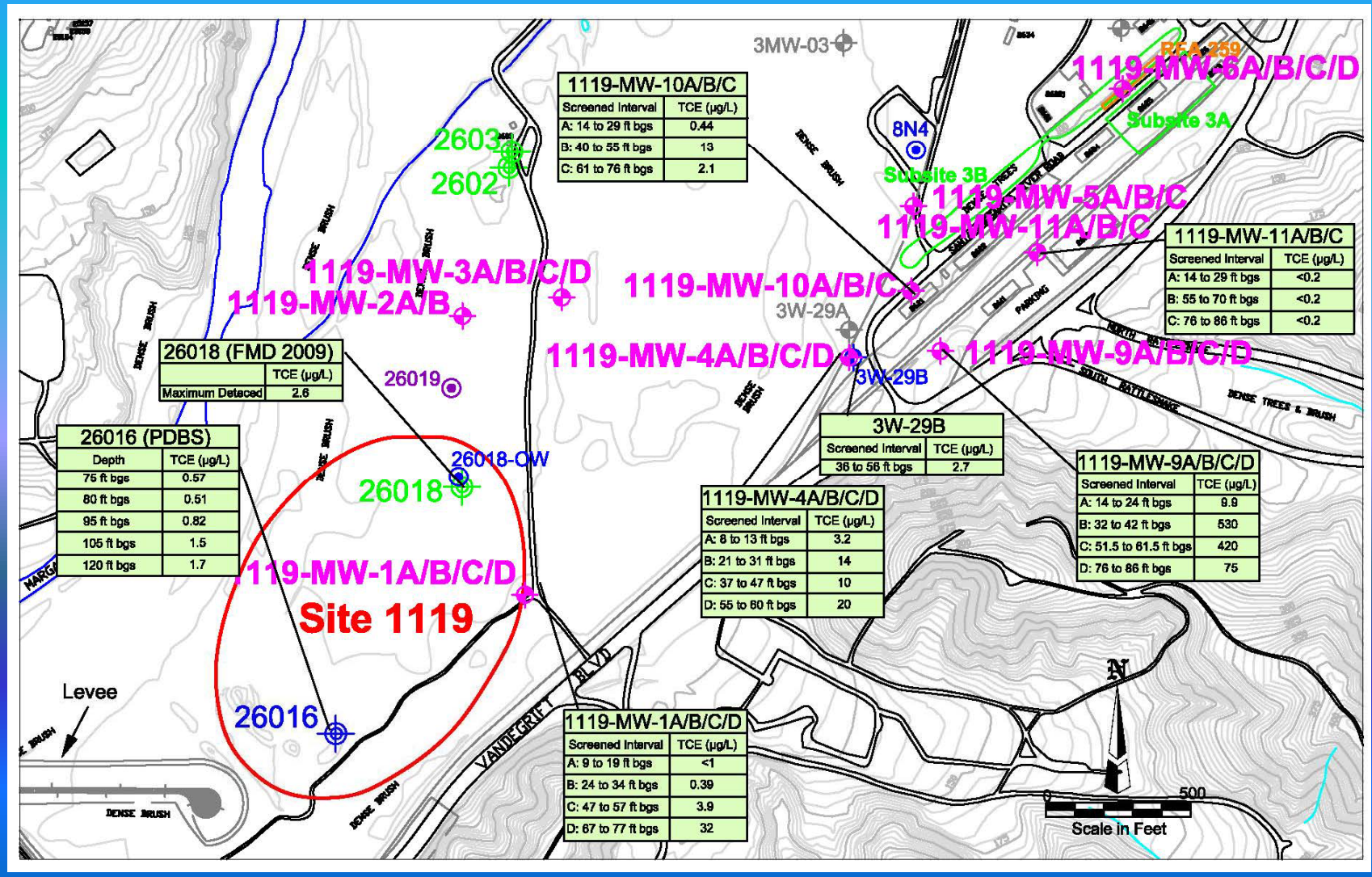
2011 and 2013 TCE Detections



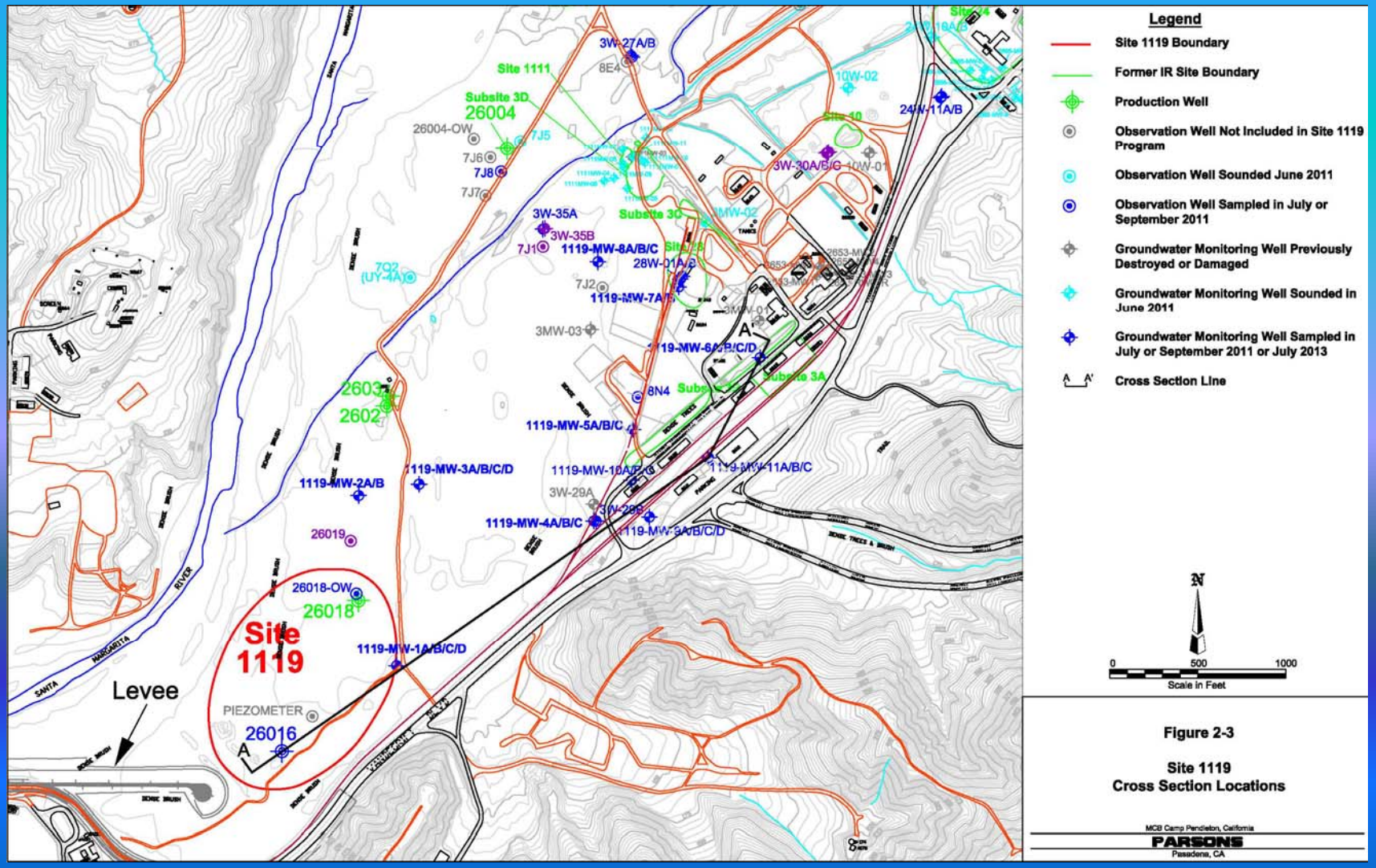
SITE 1119

Conceptual Site Model

- Upper Ysidora subbasin (UYS) is an alluvium-filled valley.
- Alluvium consists of interbedded sands, silts, and clays.
- GW flow is toward the southwest.
- Depth to bedrock in the UYS up to 150 feet based on available logs.
- Depth to bedrock in potential source area between 80 feet to 90 feet bgs.
- Bedrock consists of both Santiago Formation (La Jolla Formation) and granite, depending on location.

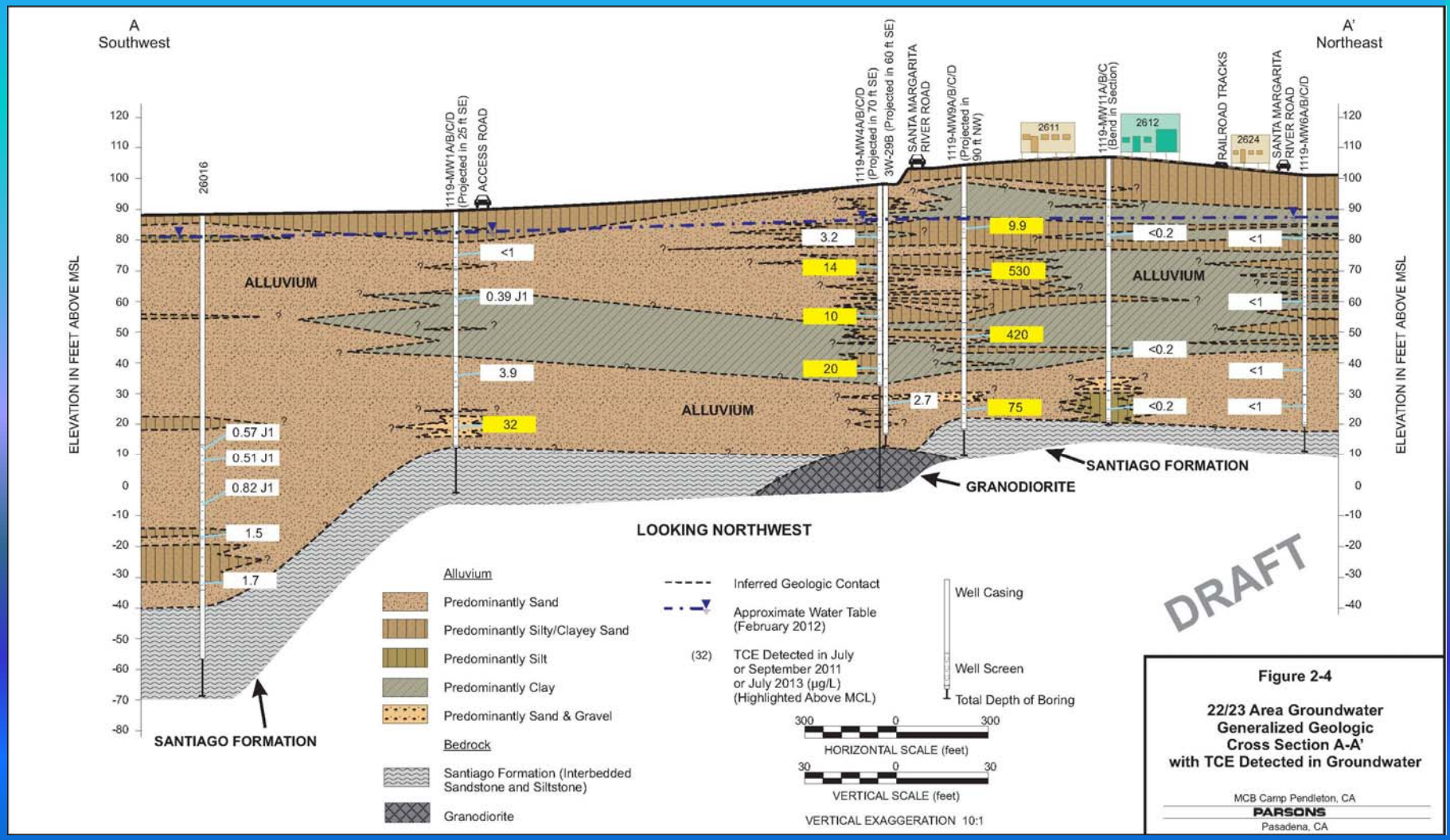
SITE 1119

Conceptual Site Model (Continued)



SITE 1119

Conceptual Site Model (Continued)



SITE 1119

Conceptual Site Model (continued)

- Migration from source area has resulted in COCs throughout much of the vertical thickness of the aquifer.
- TCE is only COC exceeding MCLs in the subbasin groundwater.
- TCE concentrations are highest in close proximity to the possible source area. Maximum TCE detections at depth of 32 to 42 feet bgs in 1119-MW-9B.
- Detectable concentrations of TCE are limited to the southwest edge of the valley (southeast edge of aquifer), downstream of identified source area.
- Former sites in a large upgradient portion of the subbasin are not contributing sources.
- Aquifer is weakly aerobic and generally pH neutral.

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Conceptual Site Model (Continued)

- No vapor intrusion risk because of the way buildings are constructed.

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Conceptual Site Model (Continued)

- Soil gas data indicates possible past releases of solvents and fuels in area around the buildings (2611, 2612, and possibly 2622).

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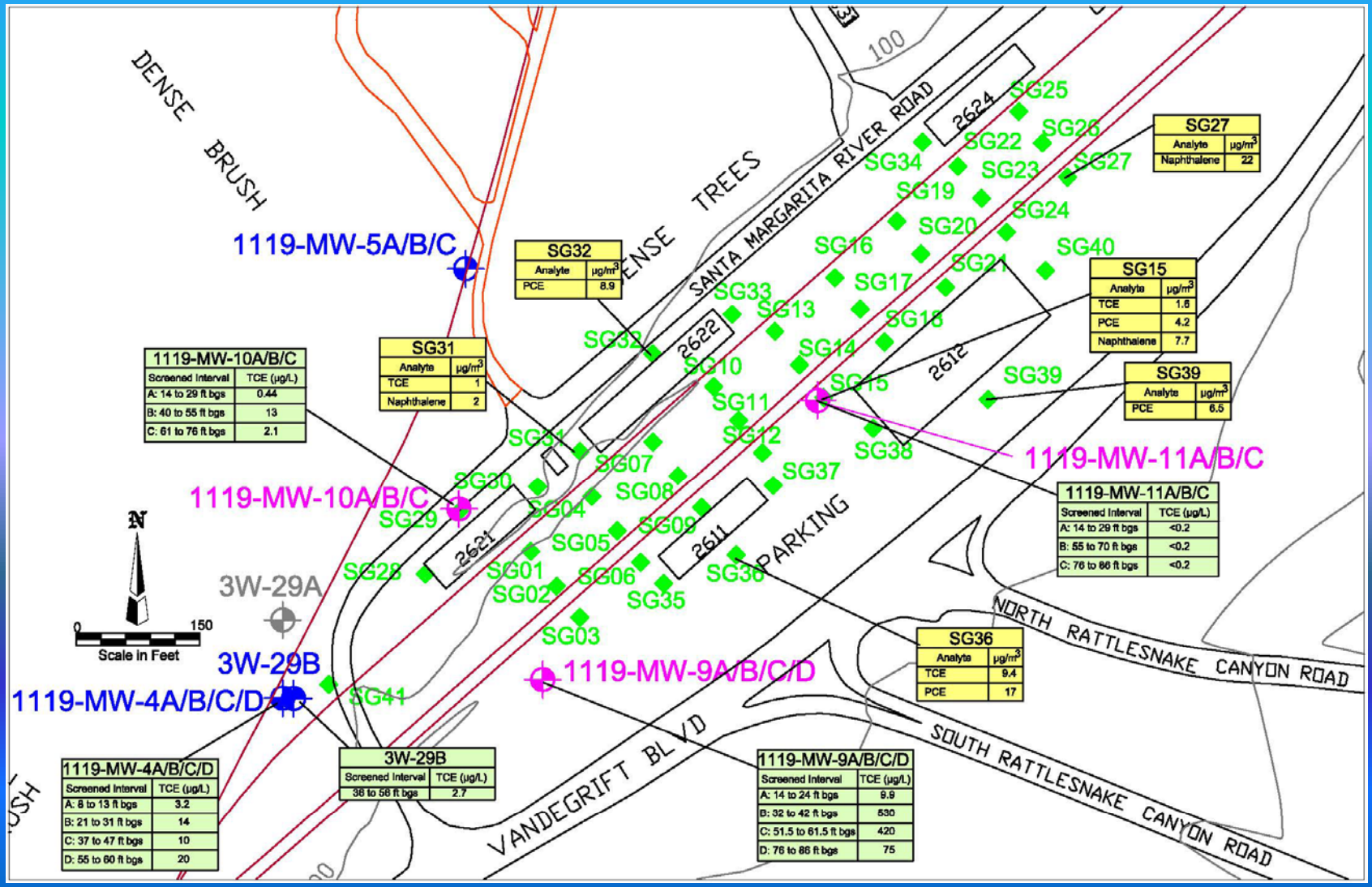
Conceptual Site Model (Continued)

- BTEX compounds were not detected in groundwater above MCLs.
- Groundwater data indicates that the highest detections are downgradient of Building 2611.
- Groundwater source area has been narrowed down to approximately 400 feet long by 300 feet wide, which is close to Buildings 2611 and 2612.
- Additional refinement of source area will be performed as part of Remedial Design.

SITE 1119

Significant Detections



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Remedies To Be Considered

- No Action
- Land Use Controls
- Long-Term Monitoring
- In Situ Treatment
- Containment
- Phytoremediation
- Excavation

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Potential Remedial Alternatives

- Selected Remedy will likely include land use controls, long-term monitoring, and possibly treatment in the source area.
- If active remedy, in situ options are more cost-effective than other options.
- If treatment were selected, then the objective would be to reduce concentrations in the source area so that remaining downgradient plume will attenuate.

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Placement of In Situ Treatment Systems

- **Containment Barrier or Barriers**
  - Groundwater leaving the source area passes through a treatment zone.
  - Permeable Reactive Barrier (PRB) installed by trenching, or a row of injection wells at a downgradient location(s).
  - Continuous PRB, or possible slurry wall combined with pass-through treatment cells
- **Treatment Grid**
  - More injection points than barrier approach
  - Gravelly aquifer would require injection wells, not push probes.
  - Faster reduction of source area concentrations, but higher upfront costs.
  - Existing buildings/utilities may limit injection locations.

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Possible In Situ Treatment Technologies

- Thermal Resistive Heating/SVE
- AS/SVE
- Reactive Metals
- Chemical Oxidation
- In Situ Bioremediation
- Abiotic Geochemical Degradation

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Discussion of Treatment Technologies

- **Thermal Resistive Heating/SVE**
  - Fast, when used in ideal conditions
  - Very costly
  - Possible indoor air risk if vapors not captured
  - New power supply lines/utilities
  - Possible low GSR score
  - Limited effectiveness at this site due to depth of COCs in groundwater
- **AS/SVE**
  - Limited effectiveness due to depth of COCs in groundwater , thickness of aquifer, and interbedded /heterogeneous fine-grained deposits

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Discussion of Treatment Technologies (Continued)

- **Reactive Metals**
  - Particle size affects reaction rate.
  - Possibly installed in conjunction with a slurry wall, or injected as a continuous curtain.
  - Possibly installed in combination with a slurry wall and "gates" with treatment occurring as groundwater flows through the reactive zone in the gates.
  - Relatively short life span; longer than chemical oxidation, but would need multiple re-injections or replacement.
  - May be more effective with the grid approach at this site.

SITE 1119

Discussion of Treatment Technologies (Continued)

- **Chemical Oxidation**
  - Delivered via injection wells
  - Usually limited to a specific area, and limited timeframe (days or weeks)
  - Applicable if source is small to moderate size and, rather than a large dilute zone
  - Permanganate or persulfate lasts longer but is less powerful/reactive
  - Site source area may be too thick to be cost-effective
  - Use in a barrier not very effective due to the need for long-term reactions in the aquifer
  - Would require multiple re-injections of oxidants

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Discussion of Treatment Technologies (Continued)

- **In Situ Bioremediation**
  - Feasible to create favorable geochemical conditions in a barrier zone or source area application
  - Effective for a longer-term than chemical oxidation or reactive metals.
  - Possible methane, vinyl chloride in soil gas
  - Favorable GSR score
  - May be more effective with a grid application due to potential for fouling/clogging as a PRB curtain
  - Potential mobilization of metals (e.g., arsenic), but can usually be mitigated/monitored

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Discussion of Treatment Technologies (Continued)

- **Abiotic geochemical degradation**
  - Produce reactive metals in situ
  - Relatively new; research ongoing
  - Could be a component of in situ bioremediation
  - Starts working faster than anaerobic reductive dechlorination
  - Degrades ethenes to endpoints without intermediate compound production (e.g., VC)
  - Need to monitor/mitigate potential H_2S
  - For this site, would likely involve sulfate compound added to groundwater

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Discussion of Treatment Technologies (Continued)

- **Excavation of Hot Spot(s)**
  - If a specific concentrated near-surface source is found, then direct removal would be outlined in the RD plan, but unlikely given time since release.
- **Phytoremediation**
  - May be applicable if used on the upgradient side of an impermeable barrier to mitigate groundwater mounding

MCB CAMP PENDLETON CHAPPO SUBBASIN INVESTIGATION

19 September 2013

111th FFA Meeting

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CHAPPO SUBBASIN INVESTIGATION

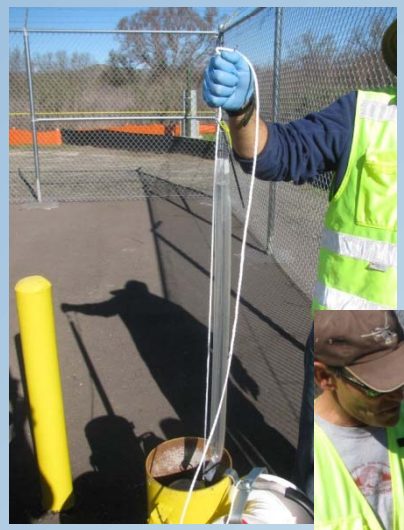
Presentation Summary:

- Well Installation and Sampling
- Geology/Hydrogeology
- Bedrock Depth
- Laboratory Results
- Planned Next Steps

CHAPPO SUBBASIN INVESTIGATION

Well Installation and Sampling

- Four locations were selected in consultation with NAVFAC SW, Environmental Security, Office of Water Resources, Facilities Maintenance Division, and Stetson Engineers.
- Prior to new well installations, groundwater samples were collected from existing monitoring well CH-5A (near new well 330924) using Hydrasleeves® and passive diffusion bags (PDBs), on December 28, 2012 and January 18, 2013, respectively.



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CHAPPO SUBBASIN INVESTIGATION

Well Installation and Sampling (continued)

- Toad fencing was installed at three of the locations.
- Monitoring wells installed using rotosonic drilling in January and February 2013 at four locations. (see figure)

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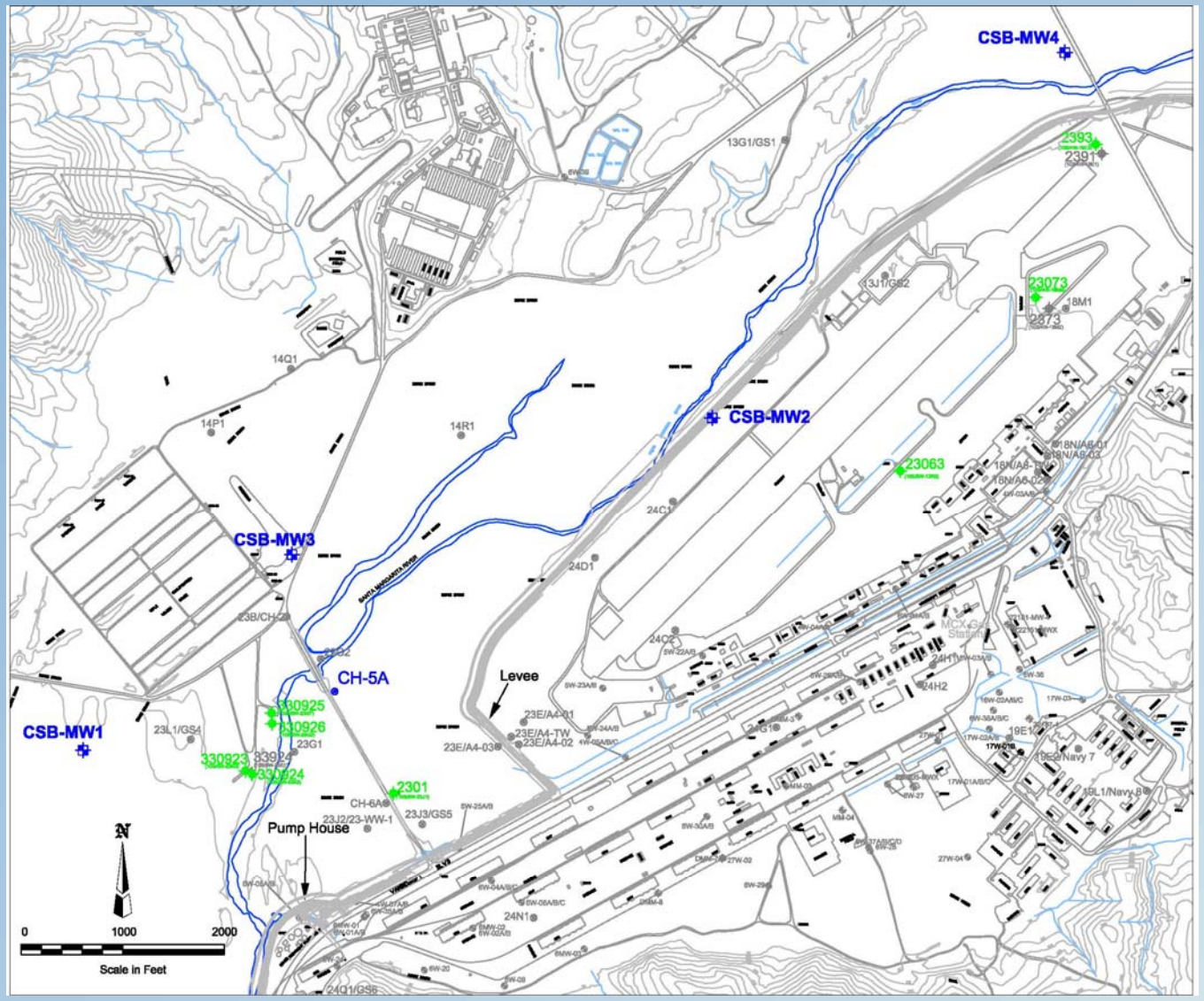
CHAPPO SUBBASIN INVESTIGATION

Well Locations



CHAPPO SUBBASIN INVESTIGATION

Well Installation and Sampling (continued)

- Five separate well casings were installed at each location; well screens were placed at higher permeability intervals.
- Geophysical logging was conducted at each of the four locations and included both gamma and resistivity surveys.
- Groundwater samples were collected from nineteen wells from March 12 to 15, 2013. The last well (CSB-MW3E) was not sampled in March because of problems with the well casing construction, but this well was subsequently sampled with a small-diameter pump on July 8, 2013.

CHAPPO SUBBASIN INVESTIGATION

Geology/Hydrogeology

- Fine to medium grained sands were prevalent in the upper 50 feet in all locations. However, due to the requirements for a well sanitary seal, this 50-foot interval would not be available for use in a production well .
- Coarse grained deposits below 50 feet were more limited. Thickest deposit of coarse grained sands and/or gravel below 50 feet was found in CSB-MW2 (~44 feet).
- Wells were drilled to bedrock (sandstone/siltstone typical of the Santiago Formation).

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CHAPPO SUBBASIN INVESTIGATION

Geology/Hydrogeology

- The depths where higher permeability zones were observed that may be more suitable for possible future groundwater extraction are summarized below.

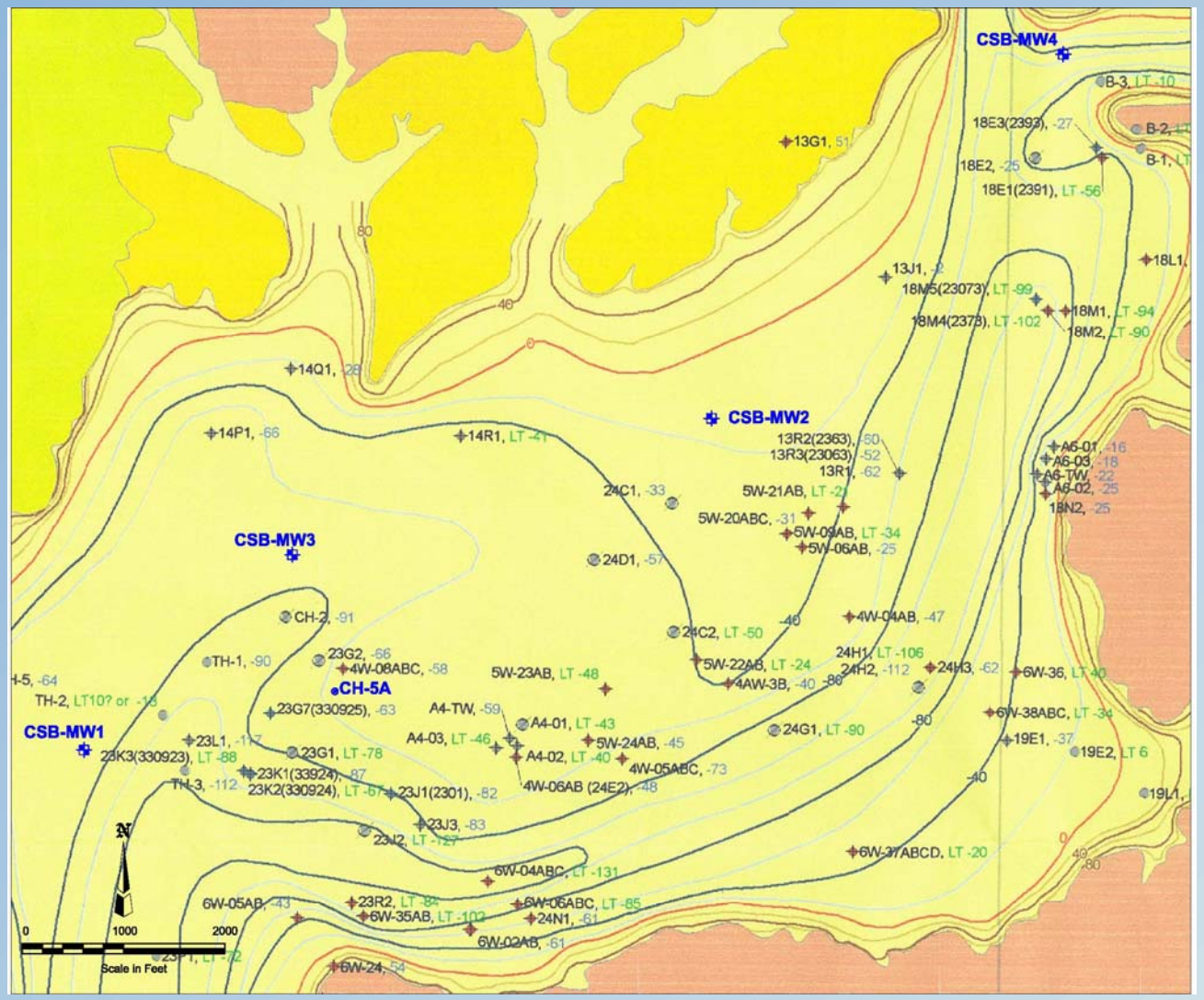
	CSB-MW1	CSB-MW2	CSB-MW3	CSB-MW4
Highest Permeability Units				
Thickness (ft)	36	44	11	0
Depths (ft bgs)	50-56 140-160	75-100 121-140	96-107	NA
Moderately Permeable Units				
Thickness (ft)	19	25	8	12
Depths (ft bgs)	67-86	50-58 67-70 100-110 117-120	54-56 90-96	50-55 103-115
Combined Thickness of All Permeable Units (ft)	55	69	19	12
Depth to Bedrock (ft bgs)	160	141	110	120

Bedrock Depth

Well	Depth to Bedrock (feet)	Elevation of Bedrock (feet amsl)	Actual Depth of Bedrock Relative to Map
CSB-MW1	160	-111	41 feet deeper
CSB-MW2	141	-49	29 feet deeper
CSB-MW3	110	- 54.5	15 feet shallower
CSB-MW4	120	-36.5	3 feet shallower

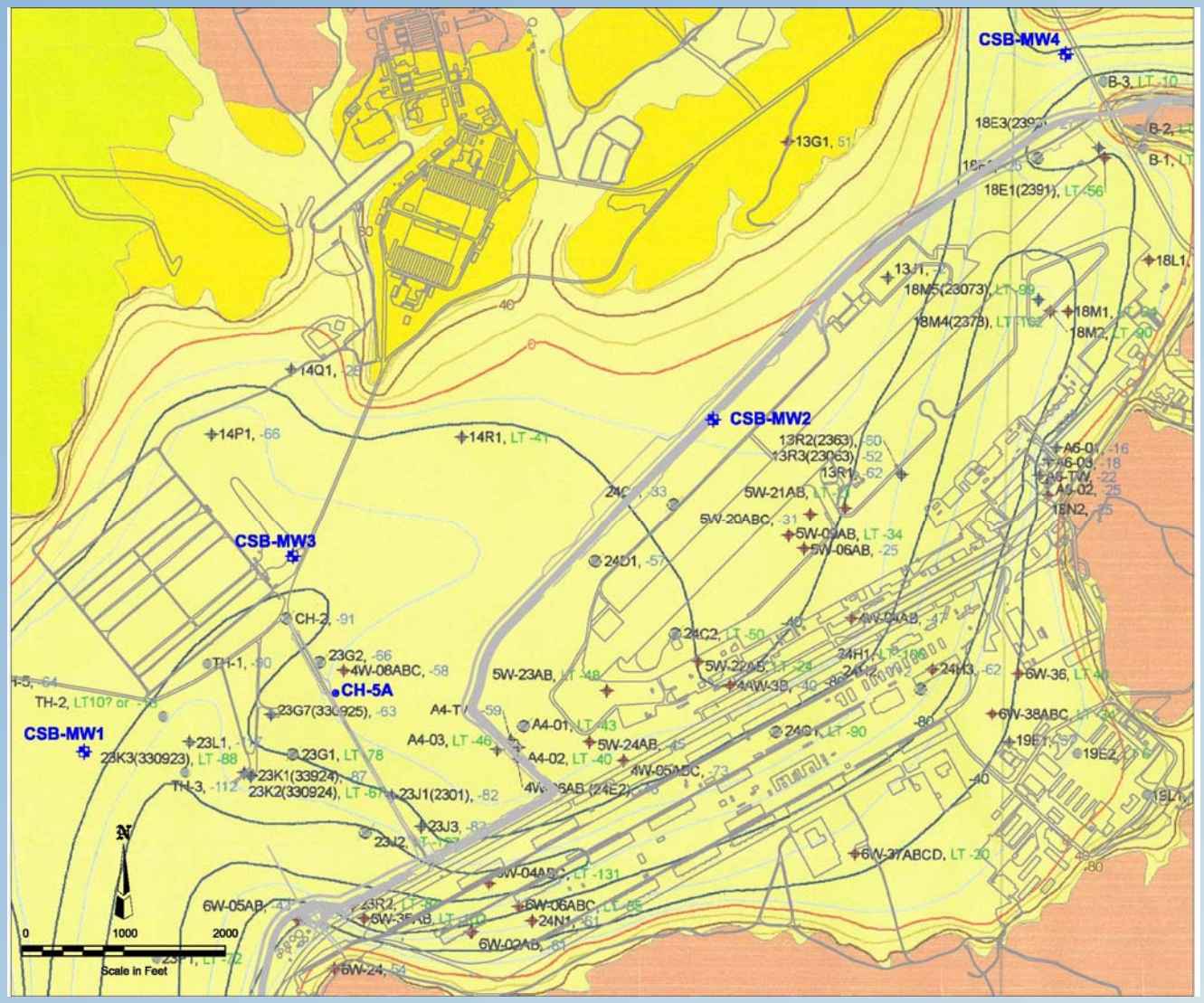
CHAPPO SUBBASIN INVESTIGATION

Bedrock Map



CHAPPO SUBBASIN INVESTIGATION

Bedrock Map



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CHAPPO SUBBASIN INVESTIGATION

Laboratory Results

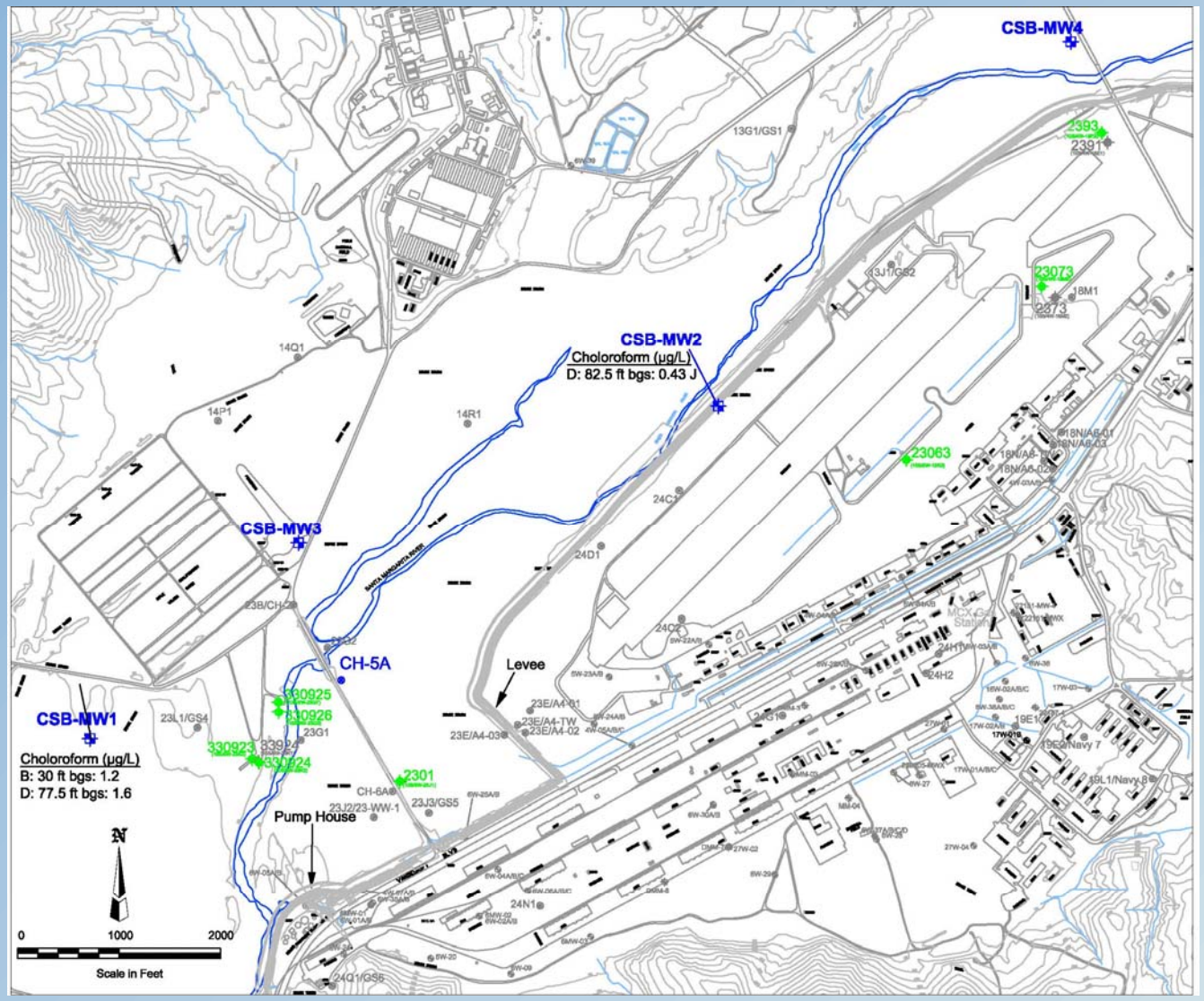
- No volatile organic compounds were detected above their respective maximum contaminant levels (MCLs) or notification levels (NLs). Detected chemicals included 1,2,3-trichloropropane (TCP), 1,2,4-trimethylbenzene, 4-isopropyltoluene,acetone, benzene, carbon disulfide, chloroform, ethylbenzene, m/p-xylene, methylene chloride, o-xylene, toluene, and TCE.

- Chloroform was detected above its USEPA Tap Water Regional Screening Level (RSL). The Tap Water RSL for chloroform is 0.39 µg/L. Chloroform was detected in CSB-MW1B and CSB-MW1D at approximately 30 and 77.5 feet bgs at 1.2 and 1.6 µg/L, respectively. It was also detected above the USEPA Tap Water RSL in CSB-MW2D at approximately 82.5 feet bgs at 0.43 J µg/L.

- 1,2,3-TCP was also detected above its USEPA Tap Water RSL of 0.00065 µg/L. 1,2,3-TCP was detected in CSB-MW4A at approximately 22.5 feet bgs at 0.0033 J µg/L.

CHAPPO SUBBASIN INVESTIGATION

Chloroform Detected Above RSLs



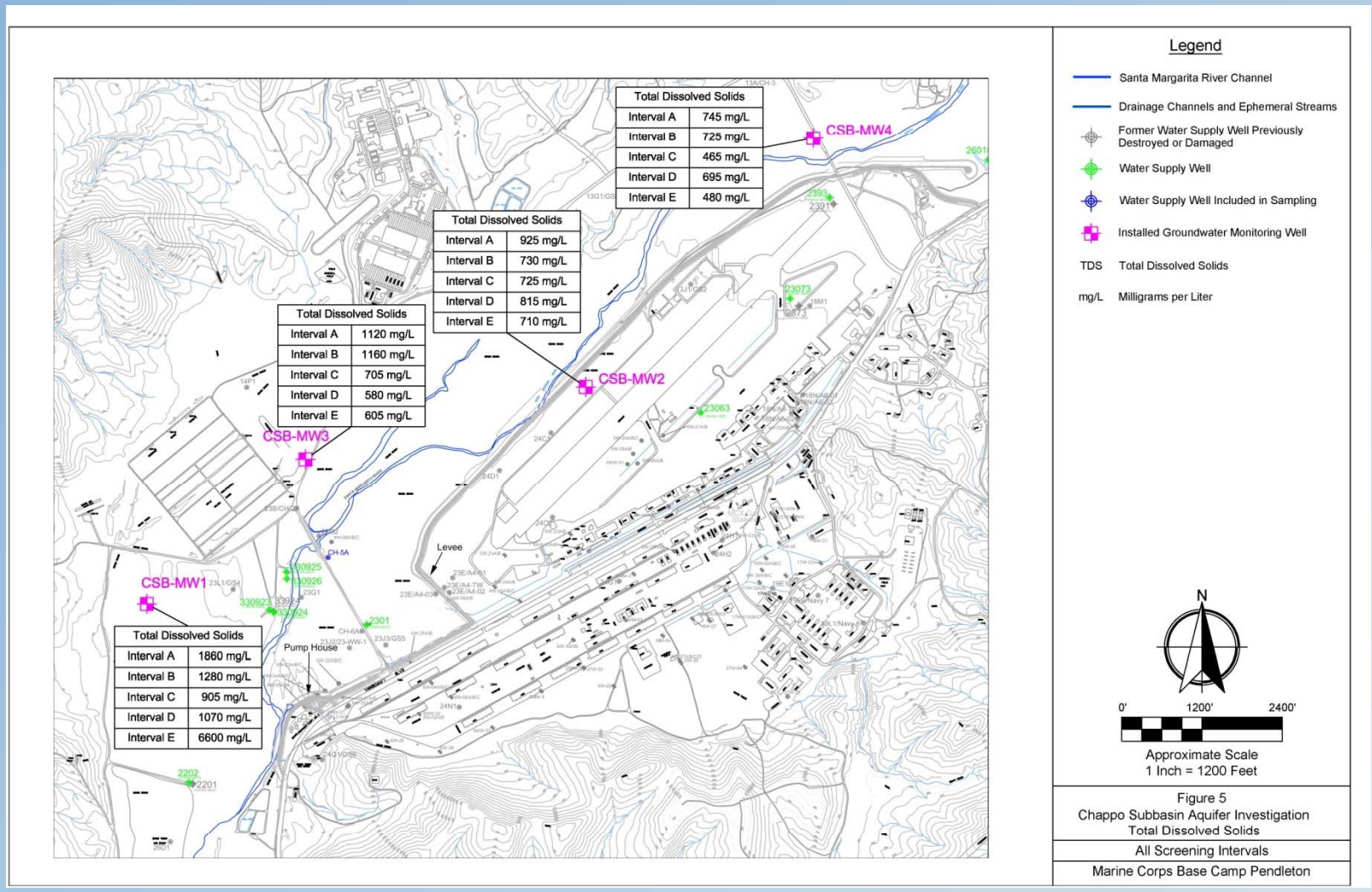
CHAPPO SUBBASIN INVESTIGATION

Laboratory Results

- For general chemistry parameters, Chloride, Sulfate, and TDS exceeded secondary MCLs
  - CSB-MW1 – Chloride (up to 3,200 above), Sulfate (up to 390), and TDS (up to 6,000 mg/L) exceeded Federal and California's secondary MCLs of 250, 250, and 500 mg/kg, respectively
  - CSB-MW2 - TDS up to 925 mg/L
  - CSB-MW3 - Chloride up to 320 mg/L and TDS up to 1,160 mg/L
  - CSB-MW4 - TDS up to 745 mg/L

CHAPPO SUBBASIN INVESTIGATION

TDS Above Secondary MCLs



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CHAPPO SUBBASIN INVESTIGATION

Summary

	CSB-MW1	CSB-MW2	CSB-MW3	CSB-MW4
Geology/Hydrogeology				
Highest Permeability Units				
Thickness (ft)	36	44	11	0
Depths (ft bgs)	50-56 140-160	75-100 121-140	96-107	NA
Moderately Permeable Units				
Thickness (ft)	19	25	8	12
Depths (ft bgs)	67-86	50-58 67-70 100-110 117-120	54-56 90-96	50-55 103-115
Combined Thickness of All Permeable Units (ft)	55	69	19	12
Depth to Bedrock (ft bgs)	160	141	110	120
Laboratory Results				
Chloroform (Tap Water RSL 0.19 µg/L)	1.2 at 30 ft bgs 1.6 at 77.5 ft bgs	0.43J at 82.5 ft bgs		
1,2,3-TCP (Tap Water RSL 0.00065 µg/L)				0.0033J at 22.5 ft bgs
Chloride (Secondary MCL 250 mg/L)	230 to 3,200	130 to 160	120 to 320	120 to 140
Sulfate (Secondary MCL 250 mg/L)	130 to 390	160 to 220	62 to 210	45 to 190
TDS (Secondary MCL 500 mg/L)	905 to 6,600	710 to 925	580 to 1,160	465 to 745

CHAPPO SUBBASIN INVESTIGATION

Planned Actions Going Forward

- Meeting held August 21, 2013 to decide aquifer test well location.
- Test well will likely be 8- to 12-inch diameter, and tested to obtain hydraulic conductivity and more representative sample of groundwater within a larger radius of influence.
- DON and ES currently coordinating with MCAS regarding access and logistics for test well and supply well.

New IR Sites

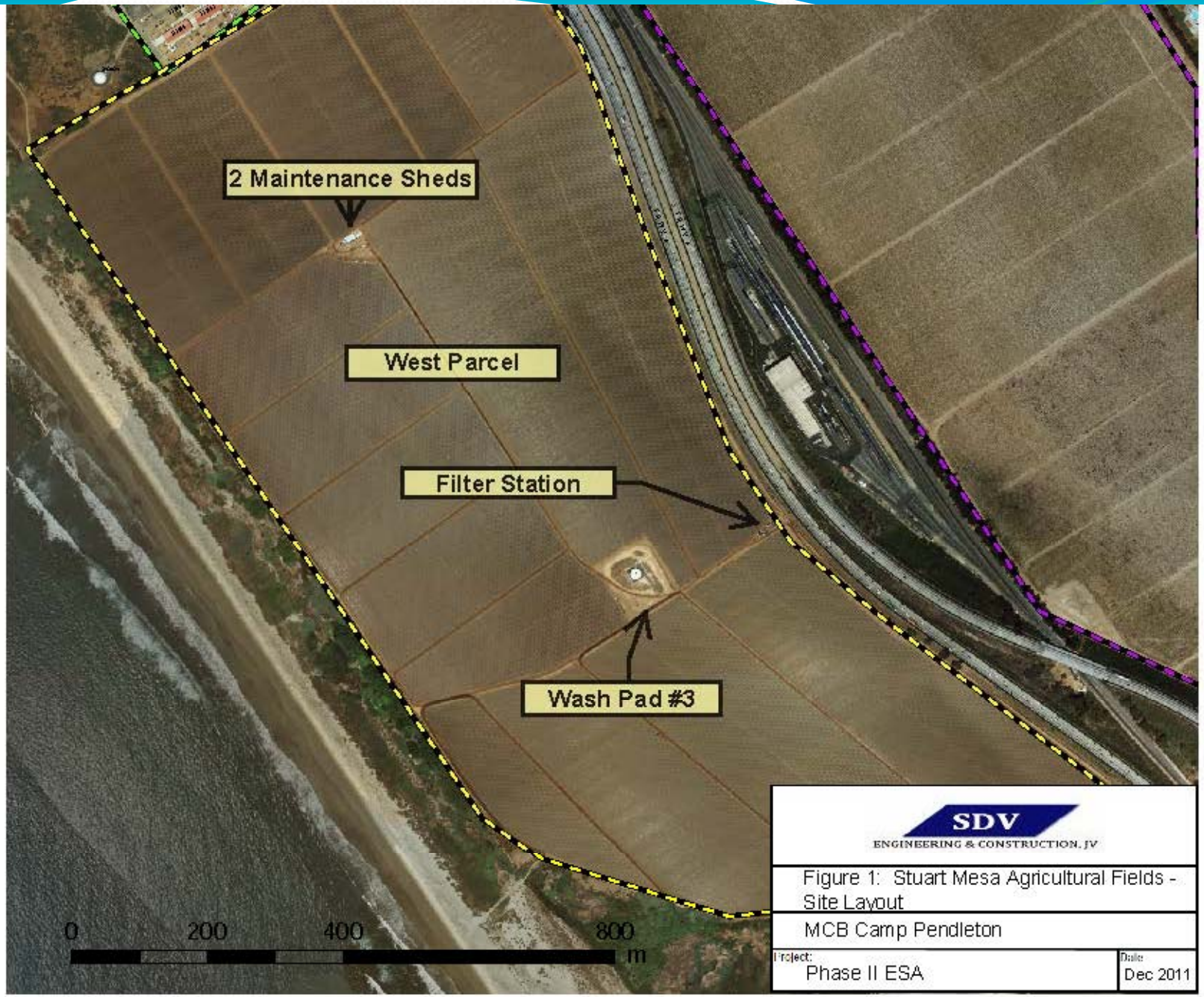
111th FFA Meeting

September 19, 2013

Site 1120 – Stuart Mesa Pesticide Maintenance Areas

- Approximately 10.8 acres.
- The Site was used as a maintenance facility compound (MFC) for farm process functions for at least 70 years.
- The property is currently vacant since the lease held by Harry Singh and Sons has expired as of January 2011.
- Bordered on the west by I-5, Stuart Mesa West Agricultural Field and Marine Corps Tactical Systems Support Activity (MCTSSA), on the south by the Stuart Mesa East Agricultural Field and to the north by Cockleberry Canyon


Maintenance Facility Compound
MCTSSA
Staging Area
Interstate 5
East Parcel
2 Maintenance Sheds
West Parcel
N


2 Maintenance Sheds
West Parcel
Filter Station
Wash Pad #3
0
200
400
800
m
SDV
ENGINEERING & CONSTRUCTION, JV
Figure 1: Stuart Mesa Agricultural Fields - Site Layout
MCB Camp Pendleton
Project:
Phase II ESA
Date:
Dec 2011

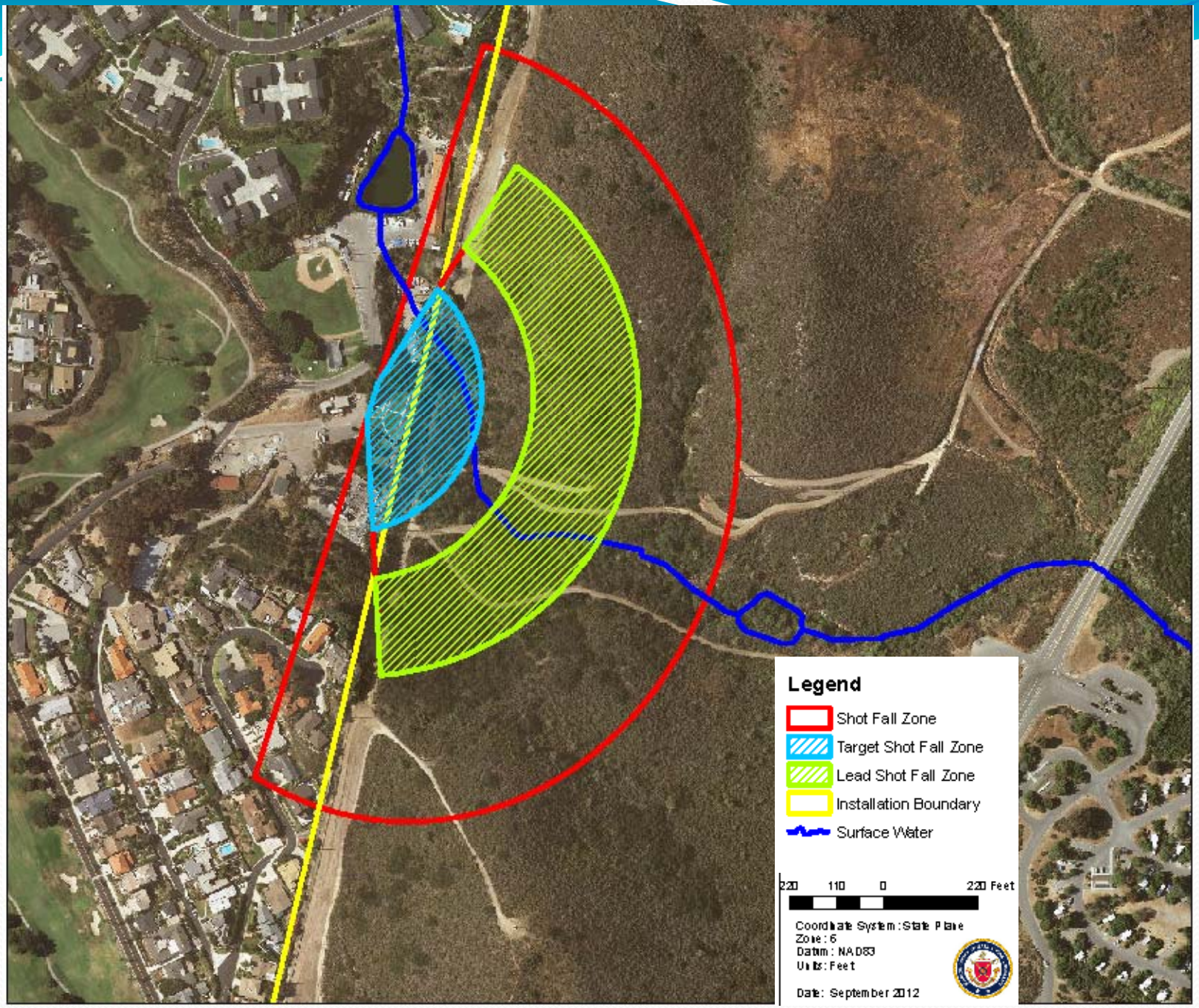
Site 1120 – Marine Corps Tactical Systems Support Activity (MCTSSA)

- Environmental Assessment for MCTSSA Expansion started Jan 2011
- Toxaphene/petroleum must be remediated before Finding of No Significant Impact (FONSI) can be signed – no conditional FONSIs
- RWQCB lead agency under same voluntary program as pesticide remediation
- Excavation work plan final Sep 2013
- Excavation 16-18 Sep 2013
- RI Work Plan for Site 1120 (Jan 2014) will include information from MCTSSA excavation closure report

Site 1122 – Shot Fall Zone

- History
  - 1941: Police range
  - 1965: Elks Lodge of San Clemente
  - 2010: closed by Camp Pendleton
- Shot Fall Zone on Camp Pendleton land leased to State Parks as San Mateo Campground
- Habitat for T/E species
  - Pacific pocket mouse
  - Arroyo toad
  - coastal California gnatcatcher
- Limited sampling conducted in 2012


MCB Camp Pendleton
Elks Lodge Skeet Range
San Clemente
San Onofre State Beach
San Clemente State Beach
N El Camino Real
S El Camino Real
Avenida Presidio
Avenida Vista Montana
Avenida Salvador
Cristianitos Rd
San Mateo Creek
San Mateo Rd
Basilone Rd
San Onofre Creek
El Camino Real
Old Pacific Hwy
5
2,900 1,450 0 2,900 Feet
Coordinate System: State Plane
Zone: 6
Datum: NAD83
Units: Feet
Date: September 2012


Legend
Shot Fall Zone
Target Shot Fall Zone
Lead Shot Fall Zone
Installation Boundary
Surface Water
220 110 0 220 Feet
Coordinate System: State Plane
Zone: 6
Datum: NAD83
Units: Feet
Date: September 2012

Site 1122 – Shot Fall Zone Field Sampling Report

- Field work March 2012
  - 11 surface soil (+ 2 duplicates) and 2 subsurface soil
  - 4 sediment and 4 surface water
- Field Sampling Report (Sept. 2012)
  - Soil
    - 6 of 15 samples exceeded CHHSL for lead (80 mg/kg)
    - 6 of 15 samples exceeded EPA RSLs for one or more PAHs
    - 8 of 15 samples exceeded CHHSL for benzo(a)pyrene (.038 µg/kg)
  - Sediment
    - 1 of 4 samples exceeded EPA BTAG for lead (47 mg/kg)
    - 3 of 4 samples exceeded EPA BTAG for one or more PAHs
  - Surface water
    - 0 of 4 samples exceeded DoD surface screening for dissolved lead (59 µg/L)
    - ND for PAHs
- Recommended further evaluation for munitions constituents.

Site 1122 – Shot Fall Zone Site Inspection

- Coordinating with USFWS for T/E species
- Draft work plan/SAP: Oct 2013
- Field work: Jan 2014
- Draft SI Report: June 2014
- Sampling: MC (Pb, AS, Sb) and PAHs
  - Soil – surface and subsurface
  - Sediment
  - Water – surface, ground, and storm

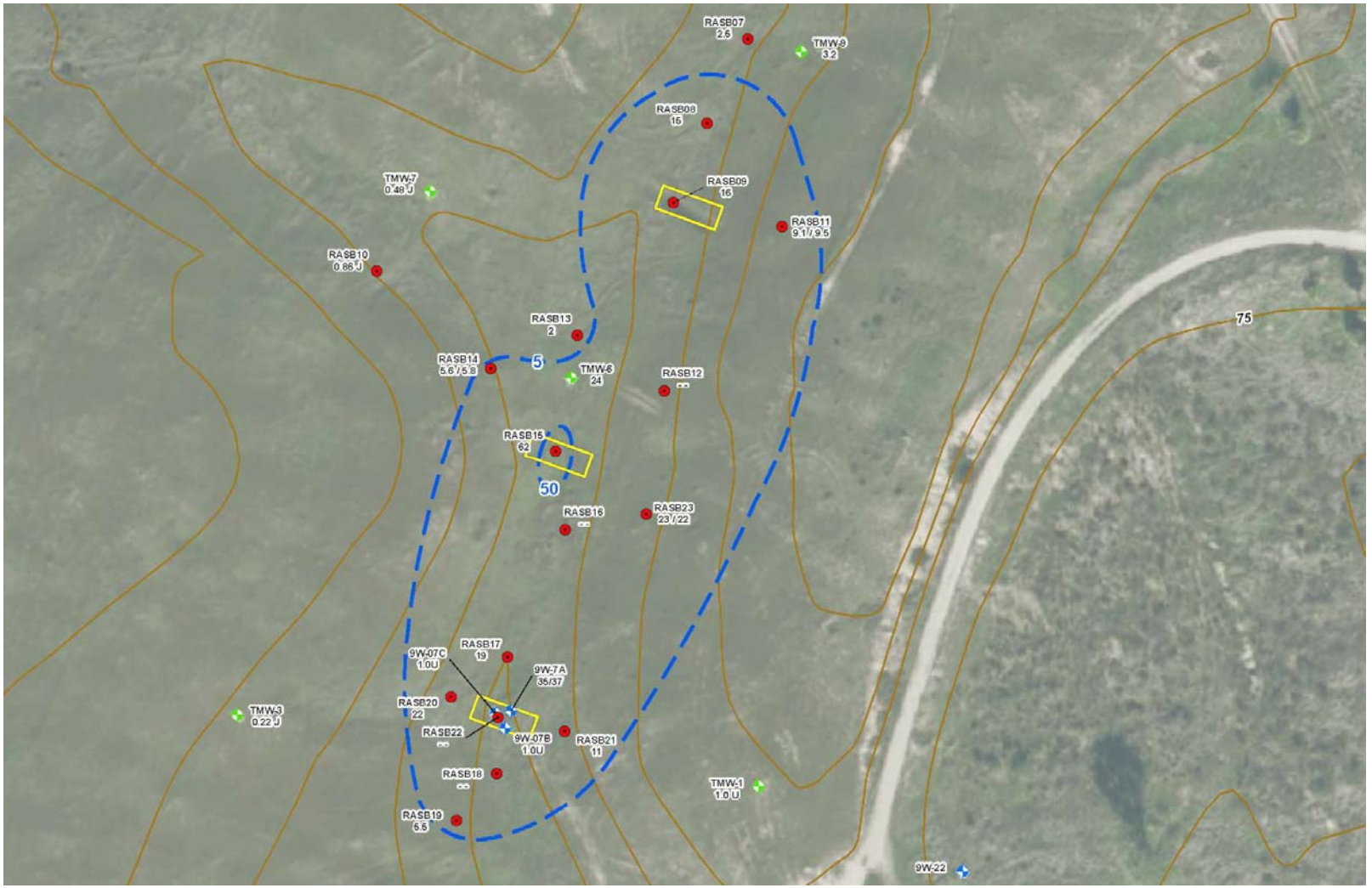
NTCRA Progress Update
IR Site 1114
MCB Camp Pendleton

19 September 2013

Overview of NTCRA

- **Goal is to address PCE in groundwater**
- **NTCRA Work Plan finalized in July 2013**
- **Fieldwork began in August 2013**
- **Trenching and well installation complete**
- **Groundwater extraction and treatment will begin this week (September 17th)**
- **Main fieldwork expected complete in October**

Overview of NTCRA Location



Elements of NTCRA

- ✓ **Trench excavation and backfill**
- ✓ **Extraction well installation**
- **Installation and operation of groundwater extraction system**
- **Soil disposal**
- **Emplacement of bio-stimulation and augmentation substrates**
- **Site restoration**
- **Monitoring**

Field Activities – Site Preparation

Field Activities – Site Preparation

Reinforcing the Site Entrance

Field Activities – Site Preparation

Field Activities – Well Destruction

Trench Area Preparation

Trench No. 1 – Upgradient Location

Trench Area Preparation

Trench No. 1 – Upgradient Location

Trench Area Preparation

Trench No. 2 – Middle Location

Trench Area Preparation

Trench No. 2 – Middle Location

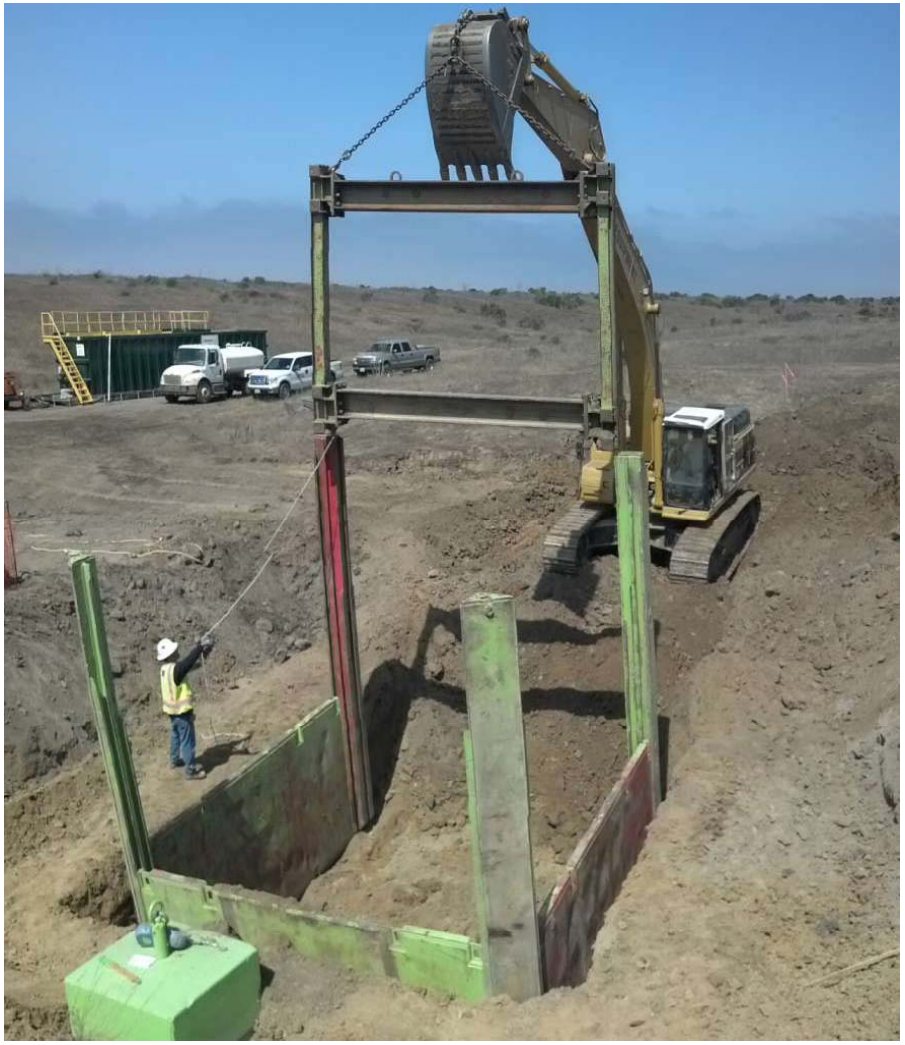
Trench Area Preparation

Trench No. 3 – Former Location of Monitoring Well 9W-07A

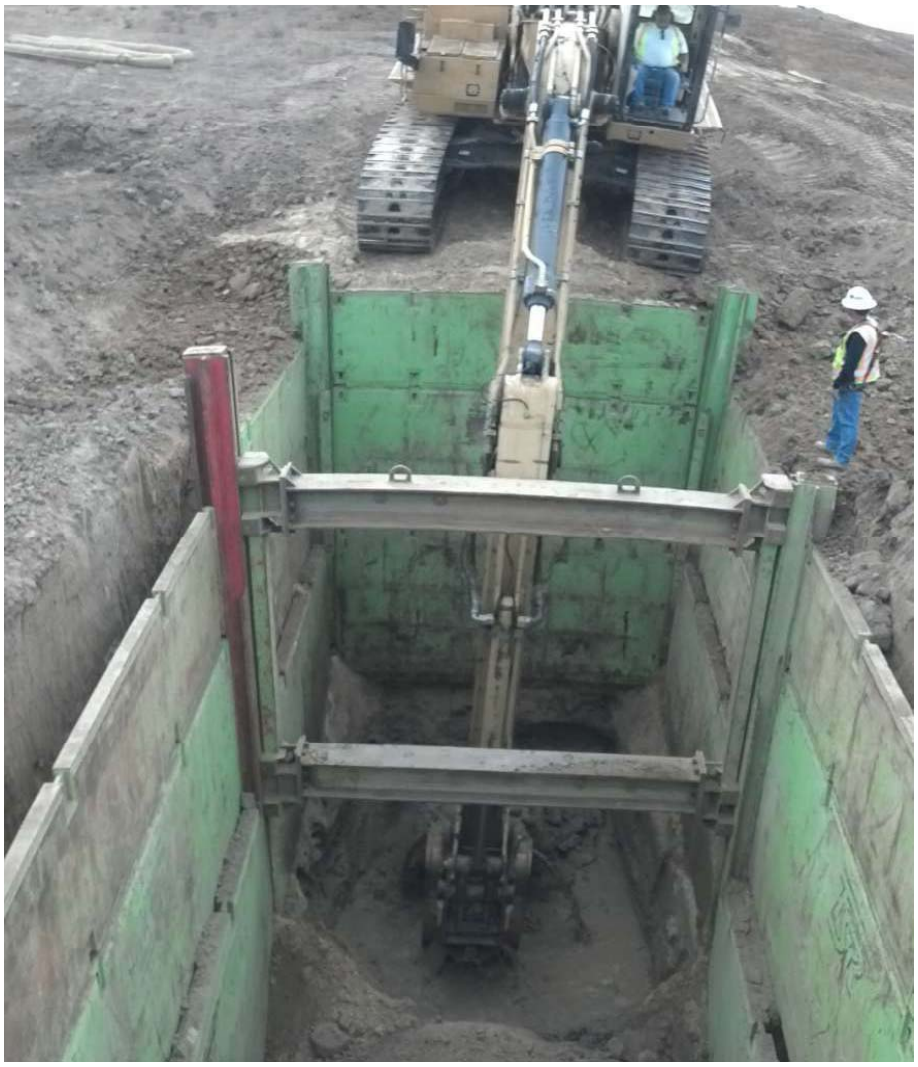
Trench Area Preparation

Trench No. 3 – Former Location of Monitoring Well 9W-07A

Shoring Installation



Excavation Progress



Backfilling – Filter Fabric Emplacement

Backfilling – Rock Emplacement

Soil Stockpile Management

Soil Stockpile Management

Survey and Markout Extraction Well Locations

Extraction Well Installation

Groundwater Treatment System

Elements of NTCRA Remaining

- **Installation and operation of groundwater extraction system – installation complete, approx. 4 weeks of operation forthcoming**
- **Soil disposal – complete this week**
- **Emplacement of bio-stimulation and augmentation substrates – following groundwater extraction (October)**
- **Site restoration (November)**
- **Monitoring (2014)**