

**Travis Air Force Base
Environmental Management
Building 570, Travis AFB, California
Environmental Restoration Program
Remedial Program Manager's
Meeting Minutes**

26 August 2009, 0930 Hours

Mr. Mark Smith, Travis Air Force Base (AFB), conducted the Remedial Program Manager's (RPM) meeting on 26 August 2009 at 0930 in the Base Civil Engineer's Conference Room, Building 570, Travis AFB, California. Attendees included:

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|--------------------|---|
| • Glenn Anderson | Travis AFB |
| • Lonnie Duke | Travis AFB |
| • Mark Smith | Travis AFB |
| • Gregory Parrott | Travis AFB |
| • James Chang | U.S. Environmental Protection Agency (USEPA) |
| • Alan Friedman | California Regional Water Quality Control Board (Water Board) |
| • Jose Salcedo | California Department of Toxic Substances Control (DTSC) |
| • Dezso Linbrunner | United States Army Corp of Engineers (USACE), Omaha District |
| • Rachel Hess | ITSI |
| • Mary Snow | TechLaw Inc. |
| • Mike Wray | CH2M HILL |
| • Chuck Elliott | CH2M HILL |
| • Dan Lane | CH2M HILL |
| • Doug Berwick | CH2M HILL |
| • Gavan Heinrich | CH2M HILL |

Handouts distributed at the meeting and presentations included:

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| • Attachment 1 | Meeting Agenda |
| • Attachment 2 | Master Meeting, Teleconference, and Document Schedules |
| • Attachment 3 | SBBGWTP Monthly Data Sheet (July 2009) |
| • Attachment 4 | CGWTP Monthly Data Sheet (July 2009) |
| • Attachment 5 | Presentation: SD036/SD037 RPO Work Plan |
| • Attachment 6 | Presentation: DP039 RPO Work Plan |
| • Attachment 7 | Presentation: ST018 RD/RA Work Plan (POCO) |
| • Attachment 8 | Presentation: Program Update |

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 22 July 2009 RPM meeting minutes were approved and finalized as written, with the following exception of paragraph 5A.

Mr. Friedman requested some changes to the text in paragraph 5A.

B. Action Item Review

Actions Items from July were reviewed.

Action item 1- has been closed and the revised Remedial Action Work Plan for Sediment Sites was made available for review.

Action item 2 - Ms. Hess will get first draft of the revisions to the Remedial Action Work Plan for FT005 to Mr. Duke sometime in September. The work at FT005 is not expected to be conducted until next year.

Action item 3 – schedule for field work at Sediment Sites was just received and it will be sent to RAB members.

C. Master Meeting and Document Schedule Review

The Travis AFB Master Meeting and Document Schedule was discussed during this meeting (see Attachment 2).

Travis AFB Annual Meeting and Teleconference Schedule

- The next RPM meeting will be 23 September 2009. The RAB meeting will be held on 22 October 2009.

Travis AFB Master Document Schedule

- Basewide GW ROD, Potrero Hills Annex ROD: No change.
- RD/RA QAPP Update: Moved to historical.
- Model QAPP Update: The Model QAPP is in draft version. Before the final is published, we will incorporate any comments and responses from the draft. Then we will submit the draft-final and have 30 days before it becomes final.
- Comprehensive Site Evaluation Phase II Work Plan: No change.
- Focused Feasibility Study (FFS): No change.

- Phases 1 & 2 Vapor Intrusion Report: No change. Ms. Royer has received the results from the laboratory and is going through the data validation process. When Mr. Anderson receives results from Ms. Royer he will forward them to Mr. Chang. He will also ask James if the EPA received their results back from their testing and data validation.
- Phytostabilization Tech Memo: It went final yesterday, 25 August 2009. Mr. Anderson sent an email with electronic version to everyone.
- SS016 RPO Work Plan: Dates have been updated to reflect revised dates. Received comments from EPA. Mr. Salcedo stated that he would have no comments on the document. We will proceed with responses to EPA comments and finalize the document.
- Field Sampling Plan: No change.
- Natural Attenuation Assessment Report (NAAR): Dates have been updated to reflect actual (based on getting drafts out today). Since the draft files were too large to email, Mr. Anderson handed everyone the document on a CD during today's RPM meeting.
- DP039 RPO Work Plan: Dates have been updated to reflect revised due dates.
- SD036/SD037 RPO Work Plan: No change. The agencies will be getting the draft document within the next two weeks.
- ST018 POCO Remedial Action (RA) Work Plan: No change. The document will be coming out soon. Also doing some review as to where the treatment equipment should be located. A presentation of this work plan will be given later today.
- Site ST032 POCO Evaluation Work Plan: No change.
- ST027B Site Characterization Report: No change. Still working on completing the final round of investigation.
- LF008 Rebound Test Tech Memo: No change. Mr. Anderson is reviewing, and it will be going out draft in the next couple of weeks.
- Quarterly Newsletter (Guardian): The newsletter will be updated to advertise the next RAB meeting, which will be held in October.

2. CURRENT PROJECTS

A. Treatment Plant Operation and Maintenance Update

Mr. Duke reported on the water treatment plant status.

South Base Boundary Groundwater Treatment Plant (see Attachment 2)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 2.9 million gallons of groundwater were extracted and treated during the month of July 2009. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 78.4 gallons per minute (gpm) and electrical power usage was 14,220 kWh; 19,481 pounds of CO₂ was created (based on DOE calculation). Approximately 2.0 pounds of volatile organic compounds (VOCs) were removed in July. The total mass of VOCs removed since the startup of the system is 367 pounds (see Attachment 3).

No shutdowns or restarts occurred in July 2009. Samples were collected on 8 and 9 of July 2009. Total VOC concentration was very low again. TCE and cis-1,2-DCE were the only VOCs detected in the influent sample. 1,2-Dichloroethane, the indicator chemical for Site FT005, was not detected in the influent sample. VOCs were not detected in the effluent sample, indicating good treatment efficiency.

No additional optimization activities were conducted during July.

Central Groundwater Treatment Plant (see Attachment 4)

The Central Groundwater Treatment Plant (CGWTP) was restarted in 07 July after going to GAC-only carbon treatment. The plant was operated for 24 hours before the monthly samples were collected on 08 July. Upon restart, we had some problems with the ThOx unit, and it was immediately shut down due to a faulty flame monitoring controller. We happened to have an extra one available and replaced it. The CGWTP performed at 74.5% uptime with approximately 1.5 million gallons of groundwater extracted and treated during the month of July 2009. All treated water was diverted to the storm drain. The average flow rate for the CGWTP, while operating, was 43 gpm. Electrical power usage was 1,120 kWh for all equipment connected to the Central plant; 26,885 pounds of CO₂ were created. Natural gas usage for the ThOx was 1,206 therms. Approximately 4.83 pounds of VOCs were removed from groundwater, and 3.15 pounds from vapor, in July. The total mass of VOCs removed since the startup of the system is 11,081 pounds (see Attachment 4). For comparison purposes, the electrical power usage in April, when the UV/Ox system was on, was 31,780 kWh. Reduction in electrical power usage and resulting in CO₂ reduction will all be tracked in the annual RPO reports.

There has been some discussion of possibly diverting the treated water from the Central Plant to the duck pond. This will require the installation of a 3,000-foot pipe to reach the duck pond.

Optimization activities: CGWTP was offline for GAC change-out and other routine maintenance for approximately 5 weeks. Essentially a 5 week rebound period. The vapor extraction wells that feed into the WTTP were sampled after rebound period; results are attached (table 2).

B. Field Work Update

Mr. Duke thanked everyone for agreeing to use the Triad approach brought up in last month's meeting, allowing us to start the field work aggressively.

SS016: Installing wells, and revising our understanding of subsurface conditions at the site. No data yet, but there are lots of samples in the lab. We are learning some interesting things about this site; bedrock is not exactly where we thought it was. The conceptual site model will be changing. Two wells installed by the Air Force back in the 80's were found while locating utilities. They were installed near the former oil/water separator.

ST027: The Airfield Manager wants the runway closed while this work is done because of the close proximity of the drill rig. Originally we thought the drilling would take place over Labor Day weekend, but it does not look like that is going to happen. The Airfield Manager will allow us to drill between 28 September and 5 October 2009, because the base will be conducting a large rubber removal project at that time. When the rubber removal is completed, they are going to close the other runway for a long term construction project. This means we have to complete the fieldwork before the second runway is closed. Once they start the runway construction, there will be no access for drilling equipment for about 18-24 months. We will need to install some wells while we are out there, and use the Passive Diffusion Bags (PDB) process for faster sampling collection. Mr. Chang asked if we can get the work done within that window. Mr. Duke answered yes.

SD036, SD037, DP039, ST018: Several sites where field work will be conducted over the next several months. The sediment remediation project at Union Creek will be mobilizing after Labor Day. It is going to be real busy at these sites from now through October. Mr. Chang reminded Lonnie to send out a field schedule. Lonnie said it will be in a presentation today. Also, to please keep in mind we need some flexibility in that schedule due to runway closures, and keeping drillers busy.

C. Military Munitions Response Program (MMRP)

Mr. Anderson gave an update on the MMRP. As mentioned on the MMDS portion of this meeting, we do have dates and we think we can finalize the Phase 2 work plan. Travis involvement in this program is very minor. The MMRP is a sister program to Environmental Restoration Program. We have the old skeet range, which we are not sure if anyone shot there or not; however, we still have to investigate. There are some igloos that were used to store the conventional portion of nuclear weapons. We are treating them as if they were Environmental Restoration Program sites. In addition, we are working with a new consulting firm and folks from the U.S. Army Corps of Engineers that oversee the MMRP and it has been very slow going. There is a congressional mandate to complete this work by the end of 2010. We will do whatever we can to help make that happen. They have to get the Phase 2 work plan finalized, and we have to agree to it. If the schedule changes, it is because they have not met our standards.

3. PRESENTATIONS

A. SD036/SD037 RPO Work Plan (see Attachment 5)

Mr. Berwick gave a presentation for sites SD036 and SD037 as they are similar sites, and are in pretty close proximity to each other. As a result, they are in the same work plan. SD036/SD037 is in the WIOU, the western portion of the base. They both have hotspots of TCE greater than 1,000 ppb, located near sanitary sewer lines. Existing remedial processes in the WIOU include both groundwater and soil vapor extraction and treatment. Mr. Smith asked about the significance of the 1,000 ppb standard. Mr. Elliott replied that the system was designed to extract and to treat VOCs greater than 1,000 ppb, and it has achieved that goal in the entire western part of the base except for these residual hotspots. Mr. Berwick said the extracted groundwater is treated with carbon at the Central Groundwater Treatment Plant (CGWTP). The soil vapor is treated at the West Transfer Treatment Plant (WTTP). The historical investigations for SD036 and SD037 point to breaks, cracks and misaligned joints in the sewer line as potential sources of the contamination. Mr. Wray indicated that the video surveys of the sanitary sewer were done in 2000/2001. Mr. Berwick said he believed the depth of the sewer line is around 15 feet bgs, right at the water level. In some spots inside the pipeline they found standing water, possibly indicating infiltration of groundwater. Mr. Smith stated we are still extracting the groundwater from that area, enough to lower the water table so it doesn't seep into the creek. Mr. Elliott added that years ago outfalls had significant TCE concentrations and now they are non-detect. Mr. Heinrich asked what the blue and orange lines were on the maps. Mr. Berwick said the blue line is part of the sanitary sewer that has a recommendation for grouting and patch work. The orange line represents a recommendation for replacement.

Phase 1 of the field investigation – Hot spot delineation: Define the TCE hot spots greater than 1,000 ppb.

Phase 2 of the field investigation – Remediation Optimization: Utilize findings during characterization activities to optimize existing remediation efforts via Emulsified Vegetable Oil (EVO) injections.

Mr. Linbrunner asked how much EVO is injected into those wells that will allow it to last 5 years. Mr. Berwick said it depends if you use the design tool; it basically estimates how much is required based on mass, stoichiometry, and how much is going to adhere to the soil. Mr. Berwick indicated that the design tool is included in the work plan.

Mr. Duke said SD037 will be a challenge because of the C-17 hangar construction in progress. The drilling will have to be conducted on the weekends to avoid interference with the construction.

B. DP039 RPO Work Plan (see Attachment 6)

Mr. Berwick gave a presentation on DP039 RPO Work Plan. The plume originated near Building 755. There is a bioreactor in the DP039 source area now. Other remedial processes in the area include a permeable reactive barrier, a phytoremediation system, dual phase extraction and treatment (former), and Monitored Natural Attenuation (MNA) in the downgradient portion. The bioreactor is located in the source area, near the sump on the northwest corner of building 755. Mr. Smith said he is real pleased with progress at this site. This is one of the sites where a lot of applications were tested, and which did not cost the base a lot of money.

Soil Vapor Extraction removed 495 pounds of VOC mass, 99% in the vapor phase within 6 months. The dual phase worked really well as it decreased source area concentrations down to less than 1,000 ppb. In the seven years of operation the majority of contaminant mass was removed in vapor phase. The solar-powered bioreactor is now installed where the dual extraction wells were located.

The phytoremediation study is ongoing and the next mobilization will be in October.

MNA continues to stabilize the downgradient portion of the plume. Evidence of the plume migration in the central part of the plume, east of the phytoremediation area, is threatening the effectiveness of MNA in the downgradient portion of the plume. To prevent further migration, injection of Emulsified Vegetable Oil (EVO), into a bio barrier will be conducted. Mr. Chang asked what the TCE concentration levels were when this first started. Mr. Berwick said it was in the high 1,000's (ppb).

Mr. Berwick stated phase 1 is the plume delineation portion of the project, and would be conducted to figure out where to place the biowall. Phase 2 will carry out the EVO injections. The EVO injections are long lasting; an estimated 5-year life from one injection. The barrier will prevent higher concentrations of TCE from migrating into the downgradient portion of the plume, which is effectively being controlled by MNA.

Mr. Duke said building 755 is scheduled for demolition beginning 14 September 2009. So we will have all the access we need at the site. Mr. Chang asked why not take out the sump (the source of the solvent contamination) when the building is gone. Mr. Duke said the sump is gone. It was located where the bioreactor is now. The sump was removed back in 1992.

C. ST018 RD/RA Work Plan (POCO) (see Attachment 7)

Mr. Heinrich gave a presentation on the ST018 RD/RA Work Plan (POCO). We are at the remedial design stage of this project. The site has a dissolved gasoline and MTBE plume that is emanating from the two gas stations (North Gas Station (NGS), and South Gas Station (SGS)). The site is located in the EIOU. The gas stations have been operating from the mid 1960s to present. The NGS underground storage tanks (UST) were replaced in 1988. SGS UST was replaced in 1994. They removed 1700

cubic yards of impacted soil. MTBE was discovered and investigated by Lawrence Livermore Lab in 1997. These sites have been part of the GSAP monitoring program since 1993. In 2008 the Air Force completed an MNA study and three remedies to address TPH-gasoline and MTBE in groundwater were identified for comparison. There is evidence for intrinsic biodegradation of TPH-gasoline, but it is not expected to be effective for MTBE. The corrective action plan identified groundwater extraction wells with virgin coconut LGAC treatment as the selected remedy. Mr. Heinrich gave a description of the hydrogeology of the site.

The remedial target area is the dissolved MTBE plume, down to the MCL of 13 µg/L. The data used to design the system is from the second quarter 2009 GSAP event. The plume extends from the NGS approximately 700 feet downgradient to the vicinity of PZ10NSx18 (shown on map). The concentration of MTBE was 11.9 µg/L from the second quarter 2009 data. There is some uncertainty of the downgradient extent of the MTBE plume. In monitoring well MW786x18, the first event in 2007 showed a concentration of 100 ppb MTBE. The concentration in that well spiked up to over 1000 ppb in subsequent sampling events, and then dropped back down below the MCL. There may be a slug of MTBE that is moving slowly down-gradient.

The pre-design investigation will include the sampling of existing monitoring wells that have not been sampled in a while to confirm concentrations in the plume axis and downgradient of plume. Then soil borings will be drilled and grab groundwater samples collected at four locations. The conceptual design will be updated based on the investigation results. The soil borings will be converted to extraction wells if they are within the plume. If not, the step-out approach will be used to determine final locations for the extraction wells. The goal is to reduce the remedial time frame and to control migration of the MTBE. The treatment system will include three 2,000 pound LGAC vessels and will discharge treated water to the storm sewer. Mr. Wray added that the Air Force would be saving money, as we will be moving the surplus LGAC treatment system from the Central Plant. Mr. Heinrich showed on the map where the treatment system will be located. Mr. Duke added that the system should be installed this year.

D. Program Update: Activities Completed, In Progress and Upcoming (see Attachment 8)

Mr. Wray gave an update on field work.

Note that the Field schedule was added as a fourth slide.

“Completed” Slide:

ST032 POCO Tier 1 POCO Evaluation work plan has gone final. Phytostabilization Demonstration tech memo just went final this week.

“In Progress” Slide:

Comprehensive Site Evaluation Phase II is draft. Field sampling plan is still draft. SS016 RPO work plan is draft. NAAR report is draft. Model QAPP just turned draft final.

Field work: Drilling at site SS016, and just barely started at DP039 in the downgradient area down below the phyto area.

Ms. Hess added we will be starting the creek remedial action next week.

“Upcoming work” Slide:

The 2009 GSAP annual report will be submitted draft in November. LF007 site characterization is still on the list, but is delayed due to the California Tiger Salamander and vernal pool issues. SD036 will start this week. SD037 will start this weekend. According to the data received we need to move the investigation area a little bit to the east at site SS030, which is outside the current easement; and we are working on a right-of-entry agreement. Mr. Duke added it will be difficult to work once the rainy season begins. Mr. Heinrich gave a presentation on ST018 today. The ST027 phase 3 schedule has been changed from Labor Day to the end of September/early October. ST014 still has one more monitoring well to install, and Mr. Heinrich added that it will be challenging to core through the thick parking apron at the remaining location. SD001/SD033 will be starting in September. Ms. Hess said ITSI will start with site SD033 first. Mr. Chang asked Ms. Hess if SD001/SD033 work will be completed in the month of September. Ms. Hess said that is their goal. Ms. Hess handed out the construction schedule (will be added to attachments). Mr. Chang suggested coordinating a site visit for RAB members when ITSI is performing the field work. Mr. Chang asked to let him know when we do follow up with the phyto sampling; because Mr. Nagle would like to be present.

4. NEW ACTION ITEM REVIEW

No new action items.

5. PROGRAM/ISSUES/UPDATE

None.

6. POTENTIAL RESPONSE TO COMMENTS (RTC) MEETINGS

None.

General Discussion

Mr. Chang said as we are quickly going towards compiling the Feasibility Study (FS), and one of the things he would like for Travis to consider is to revise the conceptual site models to update/include cross sections. He indicated that their past concerns have always included updating the cross sections. For example the presentation given today the POCO site had a good cross section. All groundwater sites that require response actions need updated cross sections as EPA will not accept the FS without them.

Mr. Anderson said we will see what we can do. Mr. Chang asked if the cross sections from the old RI could be used. Mr. Wray said it would be very challenging to use the old cross sections (we do not have the original files for these diagrams, and it is not clear if the data used to produce those cross sections is available). Mr. Elliott added that several of the cross sections will change significantly based on recently acquired data. Mr. Wray said that for instance, SS016 we are finding very different conditions than we expected. Mr. Elliott said that in general we have a similar situation at other base locations where there is a real thin saturated alluvium zone and shallow bedrock. So the cross sections are not as great a value as they would seem on the surface. What they used to do in the RI is to find the sand stringers in different places a 100 feet apart and would exaggerate the vertical, enough to make them look like they were significant and continuous. We have since found that is not the case.

Ms. Snow said they understand the concerns; but there seemed to be a reasonable cross section presented for site ST018. If the site conceptual models are outdated, then a modern model that presents the current state of Travis both in plan and subsurface view needs to be prepared. Mr. Heinrich said ST018 is a little bit different, because most of the wells were drilled in the 1990s. We added a few wells in strategic locations, but the site was very well characterized in 1995. The cross sections are from a Parsons 1996 report. It is fairly accurate because of the great number of borings and monitoring wells. Mr. Anderson said we concentrated a lot of effort in a very small area, because the underground storage tanks were the sources of contamination. We cannot compare ST018 to other areas with very expansive fields.

Mr. Chang offered to meet and work through the cross section issues. Mr. Anderson said he might take him up on his offer of support.

5. Action Items

ITEM	RESPONSIBLE	ACTION ITEM	DUE DATE	STATUS
1.	Air Force	Update document schedule to include revised names and dates in Remedial Action Work Plan for Sediment Sites	July 2009	Closed
2.	Air Force	Update document schedule to include revised names and dates for interim plans for FT005	July 2009	Open
3.	Air Force	Coordinate site visit of sediment excavations with RAB members	TBD	Open

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
REMEDIAL PROGRAM MANAGER'S MEETING
26 August 2009, 9:30 A.M.
AGENDA

1. ADMINISTRATIVE

- A. PREVIOUS MEETING MINUTES
- B. ACTION ITEM REVIEW
- C. MASTER MEETING AND DOCUMENT SCHEDULE REVIEW

2. CURRENT PROJECTS

- A. TREATMENT PLANT OPERATION AND MAINTENANCE UPDATE (LONNIE)
- B. FIELD WORK UPDATE (LONNIE)
- C. MMRP (GLENN)

3. PRESENTATIONS

- A. SD036/SD037 RPO WORK PLAN
- B. DP039 RPO WORK PLAN
- C. ST018 RD/RA WORK PLAN (POCO)
- B. PROGRAM UPDATE: ACTIVITIES COMPLETED, IN PROGRESS AND UPCOMING

4. NEW ACTION ITEM REVIEW

5. PROGRAM/ISSUES/UPDATE

6. POTENTIAL RESPONSE TO COMMENTS MEETINGS

- SS016 RPO WORK PLAN
- MODEL QAPP

Travis AFB Master Document Schedule

Annual Meeting and Teleconference Schedule

Monthly RPM Meeting (Begins at 9:30 a.m.)	RPM Teleconference (Begins at 9:30 a.m.)	Restoration Advisory Board Meeting (Begins at 7:00 p.m.) (Poster Session at 6:30 p.m.)
01-28-09		—
02-25-09		—
03-25-09		—
04-22-09		04-23-09
05-20-09		—
06-24-09		—
07-22-09		—
08-26-09		—
09-23-09		—
10-21-09		10-22-09
—	11-16-09	—
12-09-09		—

Travis AFB Master Document Schedule

PRIMARY DOCUMENTS				
Life Cycle	Basewide Groundwater Travis, Glenn Anderson		Potrero Hills Annex Travis, Glenn Anderson	Model QAPP Update Travis, Glenn Anderson ITSI, Rachel Hess
	Proposed Plan	ROD	ROD	Plan
Scoping Meeting	NA	01-24-07	180 days after Water Board Order Rescinded	06-26-09
Predraft to AF/Service Center	04-14-10	07-21-10	+ 360 days	07-03-09
AF/Service Center Comments Due	04-28-10	08-04-10	+ 420 days	07-10-09
Draft to Agencies	05-12-10	08-18-10	+ 480 days	07-20-09
Draft to RAB	05-12-10	08-18-10	+ 480 days	07-20-09
Agency Comments Due	07-07-10	10-13-10	+ 540 days	08-20-09
Response to Comments Meeting	TBD	TBD	+ 555 days	08-26-09
Agency Concurrence with Remedy	TBD	NA	+ 570 days	NA
Public Comment Period	TBD	NA	+ 615 to 645 days	NA
Public Meeting	TBD	NA	+ 625 days	NA
Response to Comments Due	TBD	TBD	+ 640 days	08-31-09
Draft Final Due	08-04-10	11-10-10	+ 640 days	09-07-09
Final Due	09-01-10	12-08-10	+ 700 days	10-07-09

PRIMARY DOCUMENTS		
Life Cycle	Comprehensive Site Evaluation Phase II Travis, Glenn Anderson Sky Research, Ian Roberts	Focused Feasibility Study Travis, Glenn Anderson CH2M Hill, Loren Krook
	Work Plan	FFS
Scoping Meeting	NA	NA
Predraft to AF/Service Center	01-15-09	09-17-09
AF/Service Center Comments Due	02-12-09	10-01-09
Draft to Agencies	04-29-09	10-15-09
Draft to RAB	04-29-09	10-15-09
Agency Comments Due	08-10-09	12-17-09
Response to Comments Meeting	09-23-09	01-20-10
Agency Concurrence with Remedy	NA	NA
Public Comment Period	NA	NA
Public Meeting	NA	NA
Response to Comments Due	09-30-09	02-17-10
Draft Final Due	09-30-09	02-17-10
Final Due	10-30-09	03-17-10

SECONDARY DOCUMENTS			
Life Cycle	Phases 1 and 2 Vapor Intrusion Report Travis, Glenn Anderson CH2M HILL, Leslie Royer	Phytostabilization Tech Memo Travis, Glenn Anderson Parsons, Bill Plaehn	SS016 RPO Work Plan Travis AFB, Lonnie Duke CH2M HILL, Doug Berwick
Scoping Meeting	NA	10-09-08	NA
Predraft to AF/Service Center	12-08-08	02-09-09	06-11-09
AF/Service Center Comments Due	12-15-08	02-16-09	06-25-09
Draft to Agencies	01-12-09	04-29-09	07-02-09
Draft to RAB	01-12-09	04-29-09	07-02-09
Agency Comments Due	02-17-09	05-29-09	08-03-09
Response to Comments Meeting	02-25-09	07-22-09	TBD
Response to Comments Due	TBD*	07-28-09	TBD
Draft Final Due	NA	NA	NA
Final Due	TBD*	08-26-09	TBD
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

*The Vapor Intrusion report will be rescheduled to incorporate the Phase 3 data and evaluation per discussion with EPA on 30 March.

SECONDARY DOCUMENTS			
Life Cycle	Field Sampling Plan Travis AFB, Glenn Anderson CH2M HILL, Loren Krook	Natural Attenuation Assessment Report Travis AFB, Glenn Anderson CH2M HILL, Leslie Royer	DP039 RPO Work Plan Travis AFB, Glenn Anderson CH2M HILL, Doug Berwick
Scoping Meeting	NA	NA	NA
Predraft to AF/Service Center	04-28-09	07-07-09	08-26-09
AF/Service Center Comments Due	05-12-09	07-21-09	09-09-09
Draft to Agencies	06-26-09	08-26-09	09-17-09
Draft to RAB	06-26-09	08-26-09	09-17-09
Agency Comments Due	07-27-09 (08-20-09)	09-25-09	10-16-09
Response to Comments Meeting	09-03-09	10-07-09	10-21-09
Response to Comments Due	09-11-09	10-23-09	11-20-09
Draft Final Due	NA	NA	NA
Final Due	09-11-09	10-23-09	11-20-09
Public Comment Period	NA	NA	NA
Public Meeting	NA	NA	NA

SECONDARY DOCUMENTS				
Life Cycle	SD036/SD037 RPO Work Plan Travis AFB, Lonnie Duke CH2M HILL, Tony Chakurian	ST018 POCO Remedial Action Work Plan Travis AFB, Lonnie Duke CH2M HILL, Gavan Heinrich	ST027B Site Characterization Report Travis AFB, Lonnie Duke CH2M HILL, Gavan Heinrich	LF008 Rebound Test Technical Memorandum Travis AFB, Glenn Anderson CH2M HILL, Doug Berwick
Scoping Meeting	NA	NA	NA	NA
Predraft to AF/Service Center	08-13-09	08-18-09	12-18-09	08-14-09
AF/Service Center Comments Due	08-27-09	09-01-09	01-01-10	08-28-09
Draft to Agencies	09-10-09	09-15-09	01-18-10	09-11-09
Draft to RAB	09-10-09	09-15-09	01-18-10	09-11-09
Agency Comments Due	10-21-09	10-13-09	02-19-10	10-13-09
Response to Comments Meeting	10-21-09	10-21-09	02-24-09	10-21-09
Response to Comments Due	11-25-09	10-28-09	03-10-10	11-10-09
Draft Final Due	NA	NA	NA	NA
Final Due	11-25-09	10-28-09	03-10-10	11-10-09
Public Comment Period	NA	NA	NA	NA
Public Meeting	NA	NA	NA	NA

INFORMATIONAL DOCUMENTS		
Life Cycle	Quarterly Newsletters (Oct 2009) Travis, Glenn Anderson	2008/2009 GSAP Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer
Scoping Meeting	NA	NA
Predraft to AF/Service Center	NA	10-26-09
AF/Service Center Comments Due	NA	11-09-09
Draft to Agencies	09-17-2009	11-23-09
Draft to RAB	NA	11-23-09
Agency Comments Due	10-02-2009	01-15-10
Response to Comments Meeting	TBD	01-28-10
Response to Comments Due	10-06-2009	02-24-10
Draft Final Due	NA	NA
Final Due	10-09-2009	02-24-10
Public Comment Period	NA	NA
Public Meeting	NA	NA

HISTORICAL		
Life Cycle	RD/RA QAPP Update Travis, Glenn Anderson CH2M Hill, Mark Fesler	SITE ST032 POCO Evaluation Work Plan Travis AFB, Lonnie Duke CH2M HILL, Gavan Heinrich
Scoping Meeting	NA	NA
Predraft to AF/Service Center	12-30-08	05-12-09
AF/Service Center Comments Due	01-16-09	05-26-09
Draft to Agencies	02-06-09	06-09-09
Draft to RAB	02-06-09	06-09-09
Agency Comments Due	04-10-09	07-29-09
Response to Comments Meeting	04-22-09	08-05-09
Response to Comments Due	04-29-09	08-13-09
Draft Final Due	06-11-09	NA
Final Due	07-13-09	08-13-09
Public Comment Period	NA	NA
Public Meeting	NA	NA

South Base Boundary Groundwater Treatment Plant

Monthly Data Sheet

Report Number: 107

Reporting Period: 1-31 July 2009

Date Submitted: 21 August 2009

This data sheet includes the following: results for the operation of the South Base Boundary Groundwater Treatment Plant (SBBGWTP), a summary of flow rates for the individual extraction wells, a brief description of any shutdowns or significant events related to the system, and a summary of analytical results for selected samples collected.

Operations Summary – July 2009

Operating Time: **744 hours**

Percent Uptime: 100%

Electrical Power Usage: 14.220 kWh

Gallons Treated: **2.9 million gallons**

Gallons Treated Since July 1998: **656 million gallons**

Volume Discharged to Union Creek: **2.9 million gallons**

VOC Mass Removed: **2.0 pounds^a**

VOC Mass Removed Since July 1998: **367 pounds**

Rolling 12-Month Cost per Pound of Mass Removed: \$3,777^b

Monthly Cost per Pound of Mass Removed: \$6,165^b

^a Calculated using July 2009 EPA Method SW8260B analytical results.

^b Costs include operations and maintenance, reporting, analytical laboratory, project management, and utility costs related to operation of the system.

Flow Rates

Average Groundwater Total Flow Rate: 78.4 gpm^a

Average Flow Rate (gpm) ^b							
FT005				SS029		SS030	
EW01x05	0.4	EW736x05	Off line ^c	EW01x29	.9	EW01x30	4.7
EW02x05	1.4	EW737x05	Off line ^c	EW02x29	5.4	EW02x30	2.9
EW03x05	3.2	EW742x05	Off line ^c	EW03x29	Off line ^d	EW03x30	Off line ^d
EW731x05	Off line ^c	EW743x05	Off line ^d	EW04x29	9.6	EW04x30	25.3
EW732x05	Off line ^c	EW744x05	Off line ^c	EW05x29	1.2	EW05x30	11.6
EW733x05	Off line ^c	EW745x05	Off line ^c	EW06x29	12.8	EW06x30	Dry ^f
EW734x05	Off line ^e	EW746x05	Off line ^c	EW07x29	16.0	EW711x30	16.8
EW735x05	Off line ^c						
FT005 Total:		5.0		SS029 Total:		45.9	SS030 Total: 61.3

^a The average groundwater flow rate was calculated using the Union Creek Discharge Totalizer and dividing it by the operating time of the plant.

^b Extraction well flow rates are based on the average of the weekly readings.

^c Extraction well was shut down for a rebound study in December 2007 based on the *Work Plan for RPO Actions at Sites SD031, FT004, and FT005* (CH2M HILL, 2007).

^d Extraction well is off line due to low VOC concentrations.

^e Extraction well was not operational during July 2009 due to malfunctioning equipment.

gpm—gallons per minute

Shutdown/Restart Summary

No shutdowns or restarts occurred in July 2009.

Summary of O&M Activities

Monthly groundwater samples at the SBBGWTP were collected on 8 and 9 July 2009. Sample results are presented in Table 1. The total VOC concentration (74.9 µg/L) in the influent sample is similar to the June 2009 sample (74.0 µg/L). TCE and cis-1,2-DCE were the only VOCs detected in the influent sample. 1,2-Dichloroethane, the indicator chemical for Site FT005, was not detected in the influent sample. VOCs were not detected in the effluent sample, indicating good treatment efficiency.

The extraction well pumps in wells EW04x30 and EW711x30 were replaced on 27 July and 30 July 2009. Both the pump and motor were replaced in each well. The older, malfunctioning pumps were replaced with identical model new pumps. Both EW04x30 and EW711x30 are currently online.

The supply of sequestering agent for use with the SBBGWTP air stripper decreased to one drum during July 2009. An additional eight (8) drums of this sequestering agent were ordered in July 2009, and will be delivered in August 2009. The sequestering agent is added to the process water being fed into the air stripper and works to prevent hard water/mineral buildup inside the air stripper.

Optimization Activities

On 4 December 2007, nine extraction wells (EW731x05, EW732x05, EW733x05, EW737x05, and EW742x05 through EW746x05) were shut down for rebound testing in accordance with the *Work Plan for Remedial Process Optimization (RPO) Actions at Sites SD031, FT004, and FT005* (CH2M HILL, 2007). These wells continue to remain off line.

All of the extraction wells within FT005 will be turned off as part of a continuing rebound study in accordance with the optimization activities discussed in the *2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant* (CH2M HILL, 2009). Prior to initiating the extended rebound study, analytical results from FT005 monitoring and extraction well samples collected during the June 2009 GSAP event will be used to ensure that contaminant concentrations have stabilized or decreased, and that the rebound study remains appropriate. The remaining FT005 wells that remain online will likely be turned off in August 2009. All of the equipment no longer in use at FT005 will be cataloged and stored as appropriate for future use.

No other optimization activities were performed.

Table 1

Summary of Groundwater Analytical Data for July 2009 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum ^a (µg/L)	Detection Limit (µg/L)	N/C	8 July 2009 (µg/L)	
				Influent	Effluent
Halogenated Volatile Organics					
Bromodichloromethane	5.0	0.17	0	ND	ND
Carbon Tetrachloride	0.5	0.18	0	ND	ND
Chloroform	5.0	0.17	0	ND	ND
Dibromochloromethane	5.0	0.17	0	ND	ND
1,1-Dichloroethane	5.0	0.24	0	ND	ND
1,2-Dichloroethane	0.5	0.22	0	ND	ND
1,1-Dichloroethene	5.0	0.24	0	ND	ND
cis-1,2-Dichloroethene	5.0	0.23	0	4.6	ND
trans-1,2-Dichloroethene	5.0	0.54	0	ND	ND
Methylene Chloride	5.0	0.61	0	ND	ND
Tetrachloroethene	5.0	0.2	0	ND	ND
1,1,1-Trichloroethane	5.0	0.16	0	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND
Trichloroethene	5.0	1	0	70.3	ND
Vinyl Chloride	0.5	0.24	0	ND	ND
Non-Halogenated Volatile Organics					
Benzene	1.0	0.091	0	ND	ND
Ethylbenzene	5.0	0.15	0	ND	ND
Toluene	5.0	0.098	0	ND	ND
Xylenes	5.0	0.093 - 024	0	ND	ND
Other					
Total Petroleum Hydrocarbons – Gasoline	50	8	0	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	47.2	0	NM	ND
Total Suspended Solids (mg/L)	NE	2.5	0	5.5	NM

^a In accordance with Appendix B of the *Travis AFB South Base Boundary Groundwater Treatment Plant Operations and Maintenance Manual* (CH2M HILL, 2004).

J = analyte concentration is considered an estimated value
mg/L = milligrams per liter
N/C = number of samples out of compliance with discharge limits
ND = not detected
NE = not established
NM = not measured
µg/L = micrograms per liter

Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 119

Reporting Period: 1-31 July 2009

Date Submitted: 21 August 2009

This data sheet includes the following: results for the operation of the Central Groundwater Treatment Plant (CGWTP), West Treatment and Transfer Plant (WTTP), and thermal oxidation (ThOx) system (previously referred to as the two-phase extraction [TPE] system). A summary of flow rates for the CGWTP, WTTP, ThOx, and extraction wells EW01x16, EW02x16, EW03x16, EW605x16, and EW610x16; a brief description of any shutdowns or significant events related to the systems, and a summary of analytical results for selected samples collected are also included on this data sheet.

Operations Summary – July 2009

Operating Time:

CGWTP: 554 hours

WTTP: Water: 579 hours

Vapor: 525 hours

ThOx: 280 hours

ThOx: Natural Gas Usage: 1,206 therms

Percent Uptime:

CGWTP: 74.5%

WTTP: Water: 77.8%

Vapor: 70.6%

ThOx: 37.6%

Electrical Power Usage:

CGWTP: 1,120 kWh

WTTP: 15,615 kWh

ThOx: 2,889 kWh

Gallons Treated: **1.5 million gallons**

Gallons Treated Since January 1996: **415 million gallons**

VOC Mass Removed:

4.83 lbs (groundwater only)^a

3.15 lbs (vapor only)^b

VOC Mass Removed Since January 1996:

2,447 lbs from groundwater

8,634 lbs from vapor

ThOx DRE: 98.4%

Rolling 12-Month Cost per Pound of Mass Removed: \$1,238^c

Monthly Cost per Pound of Mass Removed: \$11,195^c

^a Calculated using July 2009 EPA Method SW8260B analytical results.

^b Total VOC vapor mass removed was calculated using March 2009 EPA Method TO-14 analytical results for the ThOx system and June 2009 EPA Method TO-14 analytical results for the WTTP SVE system.

^c Costs include operations and maintenance, reporting, analytical laboratory, project management, and electric and natural gas costs related to operation of the system. July 2009 cost reflects carbon change out services performed in May 2009.

DRE = destruction removal efficiency

Flow Rates

Average Groundwater Flow Rate: **43 gpm^a**

Location	Average Flow Rate	
	Groundwater (gpm) ^b	Soil Vapor (scfm)
EW01x16	23.3	NA
EW02x16	6.8	NA
EW03x16	0.9	NA ^c
EW605x16	off line ^d	NA ^c
EW610x16	off line ^d	NA ^c
TPE-W	NA	NA ^c
WTTP	17.0 ^e	91.3
ThOx	1.4 ^e	52.7

^a as measured by the effluent discharge to the storm drain divided by the operating time during the month.

^b as measured by extraction well totalizer divided by the operating time.

^c soil vapor was extracted from this well; however, the flow rates are not measured at individual wells at SS016.

^d Well offline due to construction activities on the parking apron. Wells damaged during concrete repair.

^e as measured by the effluent groundwater pumped to the CGWTP divided by the operating time.

gpm = gallons per minute

NA = not applicable/not available

scfm = standard cubic feet per minute

Flow Rates

Average Flow Rate from the WIOU, DP039, and LF008 Extraction Wells (gpm) ^a							
SD037/ SD043				SD033/SD034/ DP039		LF008/SD036	
EW599x37	4.2	EW705x37	1.3	EW501x33	0.7	EW719x08	Off line ^c
EW700x37	3.4	EW706x37	1.8	EW503x33	1.7	EW720x08	Off line ^c
EW701x37	1.2	EW707x37	1.0	EW01x34	0.3	EW721x08	Off line ^c
EW702x37	2.1	EW510x37	4.3	EW03x34	0.5	EW593x36	2.4
EW703x37	0.8	EW511x37	1.4	EW563x39	Off line ^b	EW594x36	1.2
EW704x37	2.3	EW555x43	0.4	EW782x39	Off line ^b	EW595x36	0.9

gpm—gallons per minute

^a Extraction well flow rates are based on the average of previous month's readings.

^b Extraction wells were shut off to facilitate the Bioreactor Sustainability Study at Site DP039.

^c Extraction wells shut off to support a rebound study at Site LF008.

Shutdown/Restart Summary

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
CGWTP (Groundwater):					
CGWTP	27 May 2009	08:00	7 July 2009	08:30	Restart after rebound period
CGWTP	10 July 2009	09:00	10 July 2009	10:45	Damage to EW610x16 and EW 605x16 piping from construction activities. Wells isolated, system back online.
WTTP (Groundwater):					
WTTP	27 May 2009	08:00	7 July 2009	10:00	Restart after rebound period
WTTP	10 July 2009	09:00	10 July 2009	12:30	CGWTP back online, restart WTTP
WTTP (Vapor):					
WTTP	27 May 2009	08:00	9 July 2009	12:00	Restart after rebound period
WTTP	10 July 2009	09:00	10 July 2009	12:30	CGWTP back online, restart WTTP
ThOx (Vapor):					
ThOx	27 May 2009	08:00	13 July 2009	14:30	Restart after rebound period with Blower #1 online
ThOx	10 July 2009	0900	10 July 2009	13:00	CGWTP back online, restart ThOx
ThOx	13 July 2009	22:45	14 July 2009	10:15	Level switch alarm in EW610x16
ThOx	14 July 2009	13:15	20 July 2009	08:30	Well level switches in 605 and 610 prevented ThOx from running
CGWTP = Central Groundwater Treatment Plant WTTP = West Treatment and Transfer Plant ThOx = Thermal Oxidation System					

Summary of O&M Activities

Monthly groundwater sampling at the CGWTP was performed on 8 July 2009 while vapor samples were collected from wells throughout the WIOU on 13 July 2009, and from the ThOx system on 13 July 2009. Groundwater sample results are summarized in Table 1. The total VOC concentration (385.4 µg/L) in the July 2009 CGWTP influent groundwater sample has decreased since the June 2009 event. Benzene, toluene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene were not detected in the system influent.

On 10 July 2009, piping associated with extraction wells EW605x16 and EW610x16 were damaged during construction activities on the parking apron just south of the ThOx unit (Site SS016). At the time of this incident, neither extraction well was in service due to interlocking alarm conditions present at the ThOx unit. Because of the damage, both wells were isolated and taken offline pending their repair.

The CGWTP was offline for the month of June due to carbon change out activities. Each system (CGWTP, ThOx, and WTTP) was restarted on 8 July 2009. Upon restart, the ThOx system immediately shut down due to several system alarms. A faulty flame monitoring controller was replaced during troubleshooting activities, and the ThOx was once again restarted on 13 July, 2009. Once restarted, the ThOx unit continued to shut itself down due to system alarms.

Troubleshooting activities determined that water level controls in wells EW605x16 and EW610x16 were the cause of these intermittent system alarms. Both of these wells are typically operated in dual phase mode, that is, groundwater and soil vapor are collected simultaneously. Groundwater is collected through use of groundwater extraction pumps while soil vapor is collected by the ThOx system. The level controllers in each well work to prevent the ThOx unit from extracting groundwater. Because both wells had been taken offline during the carbon change out, the water levels had elevated high enough in each well to trigger these level controllers and shut down the ThOx. Since both wells were to remain offline, these level controls were bypassed in order to allow the ThOx unit to continue extracting soil vapor from wells EW003x16 and TPE-W.

Soil vapor samples were collected from the ThOx system in addition to each well associated with the WTTT SVE system. Analytical results from these samples are presented in Table 2.

Optimization Activities

As mentioned in the *Final 2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant* (annual RPO) (CH2M HILL, 2009), several of the soil vapor extraction wells associated with the WTTT SVE system likely contain low concentrations of VOCs. In an effort to optimize mass removal efforts from the WTTT SVE system, each well feeding the WTTT SVE system was sampled to determine which wells were producing the least amount of VOC. As seen in Table 2, all wells leading to the WTTT SVE system contained total VOC vapor concentrations of less than 1,000 ppbv. All of these results are representative of rebound conditions since the WTTT SVE system was taken offline for approximately five (5) weeks during carbon change out activities.

In accordance with the annual RPO report, all eight (8) wells associated with the WTTT SVE system will be taken offline. These wells will undergo an extended rebound study throughout the rest of the interim period. This optimization will continue the effort of base-wide systems optimization. These wells will be turned off in August 2009. During the rebound study period, each well will be sampled (soil gas) on an annual basis to monitor rebound concentrations.

Soil vapor samples from the ThOx system were also collected in July 2009 in order to determine which wells were producing the most VOC mass. Wells EW003x16 and TPE-W were sampled along with the ThOx influent (THOXVINFL) and effluent (THOXVEFF). Wells EW605x16 and EW610x16 could not be sampled due to construction activities and pipeline damage in the vicinity of EW610x16. Analytical results from these samples are presented in Table 3.

EW003x16 contained the highest concentration of VOCs (approximately 54,000 ppbv) along with TPE-W (approximately 23,000 ppbv). These results reflect rebound conditions since the ThOx system was offline for approximately six (6) weeks prior to sample collection. The combined influent VOC concentration was approximately 3,400 ppbv which is substantially lower than either EW003x16 or TPE-W individually. The soil vapor samples collected from wells EW003x16 and TPE-W were taken at each well's respective wellhead and represent vapor VOC concentrations within each well. Analytical results from the combined ThOx influent sample likely indicates that some form of dilution is taking place since that sample contains lower concentrations of VOCs than either of the two wells supplying the system. The soil vapor pipelines leading into the ThOx system will be examined in August 2009 in order to determine why the influent sample contains a lower VOC concentration than either of the two wells feeding the system.

The planned optimization of running the ThOx system in pulsed mode (as discussed in the annual RPO) is still currently being evaluated. It was anticipated that wells EW605x16 and EW610x16 would be turned off to optimize the ThOx system performance prior to collecting soil vapor samples. Although samples were not collected from these two wells, they remain offline due to pipeline damage. The ThOx system will continue its focused extraction from wells EW003x16 and TPE-W.

No other optimizations were performed in July 2009.

Table 1
Summary of Groundwater Analytical Data for July 2009 – Central Groundwater Treatment Plant

8 July 2009 (µg/L)							
Constituent	Instantaneous Maximum ^a (µg/L)	Detection Limit (µg/L)					
			N/C	Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Bromodichloromethane	5.0	0.18 – 0.36	0	ND	ND	ND	ND
Carbon Tetrachloride	0.5	0.22 – 0.44	0	ND	ND	ND	ND
Chloroform	5.0	0.17 – 0.34	0	ND	ND	ND	ND
1,2-Dichlorobenzene	5.0	0.16 – 0.32	0	ND	ND	ND	ND
1,3-Dichlorobenzene	5.0	0.13 – 0.26	0	ND	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.10 – 0.20	0	ND	ND	ND	ND
1,1-Dichloroethane	5.0	0.19 – 0.38	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.22 – 0.44	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.24 – 0.48	0	.78	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.16 – 0.32	0	52.5	ND	ND	1.8
trans-1,2-Dichloroethene	5.0	0.21 – 0.42	0	3.4	ND	ND	ND
Methylene Chloride	5.0	0.27 – 0.54	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.16 – 0.32	0	ND	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.20 – 0.40	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.14 – 0.28	0	ND	ND	ND	ND
Trichloroethene	5.0	0.50 – 1.0	0	313	ND	ND	1.2
Vinyl Chloride	0.5	0.19 – 0.38	0	ND	ND	ND	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.12 – 0.24	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.10 – 0.20	0	ND	ND	ND	ND
Toluene	5.0	0.14 – 0.28	0	ND	ND	ND	ND
Total Xylenes	5.0	0.10 - 0.42	0	ND	ND	ND	ND

^a In accordance with Appendix G of the *Travis AFB Central Groundwater Treatment Plant Operations and Maintenance Manual* (URS Group, Inc., 2002).

J = analyte concentration is considered an estimated value
N/C = number of samples out of compliance with discharge limits
ND = not detected
µg/L = micrograms per liter

Table 2
Soil Vapor Analytical Data for July 2009

Constituent	9 and 13 July 2009 (ppbv)					
	EW593x36	EW594x36	EW595x36	EW510x37	EW599x37	EW700x37
Volatile Organics						
Acetone	2	ND (1.2)	3.6	2.8	ND (2.99)	65.2
Chloroform	0.52	ND (0.604)	ND (0.604)	1.7	ND (1.51)	ND (0.151)
Chloromethane	ND (0.286)	ND (1.15)	ND (1.08)	ND (1.43)	ND (2.86)	0.37 J
cis-1,2-Dichloroethene	15.7	3.96	2.72	10.2	48.4	1.23
1,1-Dichloroethene	ND (0.198)	ND (0.792)	ND (0.792)	ND (0.956)	ND (1.98)	ND (0.198)
Ethylbenzene	ND (0.191)	ND (0.764)	ND (0.764)	ND (0.955)	ND (1.91)	ND (0.191)
Hexane	ND (0.131)	ND (0.526)	ND (0.526)	ND (0.657)	ND (1.31)	ND (0.131)
Methyl Ethyl Ketone (2-Butanone)	ND (0.406)	ND (1.62)	ND (1.62)	ND (2.03)	ND (4.06)	2.68
Tetrachloroethene	5.1	ND (0.764)	0.92 J	3	ND (1.91)	0.22 J
trans-1,2-Dichloroethene	1.67	ND (0.765)	0.88 J	1.6 J	10.8	ND (0.191)
Trichloroethene	20.9	192	303	397	496	6.49
Toluene	ND (0.156)	ND (0.622)	ND (0.622)	ND (0.778)	ND (1.56)	ND (0.156)
Xylenes, m,p-	ND (0.489)	ND (1.96)	ND (1.96)	ND (2.44)	ND (4.89)	ND (0.489)
Vinyl Chloride	0.65	ND (0.931)	ND (0.931)	ND (1.16)	ND (2.33)	ND (0.233)
Total VOCs	47	196	311	416	555	77

J = analyte concentration is considered an estimated value
ND = not detected
ppbv = parts per billion by volume
() = detection limit

Table 2 (continued)
Soil Vapor Analytical Data for July 2009

Constituent	9 and 13 July 2009 (ppbv)					
	EW704x37	EW707x37	EW03x16	TPEVEFF	THOXVIN	THOXVEFF
Volatile Organics						
Acetone	1.36	ND (2.99)	ND (22.6)	ND (9.86)	ND (5.98)	ND (5.98)
Chloroform	1.76	8.9	ND (11.4)	ND (4.99)	ND (3.02)	ND (3.02)
Chloromethane	ND (0.573)	ND (2.86)	ND (21.7)	ND (9.45)	ND (5.73)	ND (5.73)
cis-1,2-Dichloroethene	3.28	ND (1.35)	13,700	2,210	190	ND (2.7)
1,1-Dichloroethene	ND (0.396)	ND (1.98)	59	7.59 J	ND (3.96)	ND (3.96)
Ethylbenzene	ND (0.382)	ND (1.91)	ND (14.4)	ND (6.3)	ND (3.82)	ND (3.82)
Hexane	ND (0.263)	ND (1.31)	ND (9.94)	575	84.2	ND (2.63)
Methyl Ethyl Ketone (2-Butanone)	ND (0.811)	ND (4.06)	ND (30.7)	ND (13.4)	ND (8.11)	ND (8.11)
Tetrachloroethene	0.7 J	3.1 J	92.2	30.7	7.4 J	ND (3.82)
trans-1,2-Dichloroethene	0.42 J	ND (1.91)	74.1	34.3	ND (3.82)	ND (3.82)
Trichloroethene	181	706	39,600	19,700	3,040	12
Toluene	ND (0.311)	ND (1.56)	ND (11.8)	52.1	29.4	ND (3.11)
Xylenes, m,p-	ND (0.978)	ND (4.89)	ND (37)	ND (16.1)	9.8 J	ND (9.78)
Vinyl Chloride	ND (0.465)	ND (2.33)	550	25.7	ND (4.65)	ND (4.65)
Total VOCs	189	736	54,161	22,781	3,434	12

J = analyte concentration is considered an estimated value
ND = not detected
ppbv = parts per billion by volume
() = detection limit

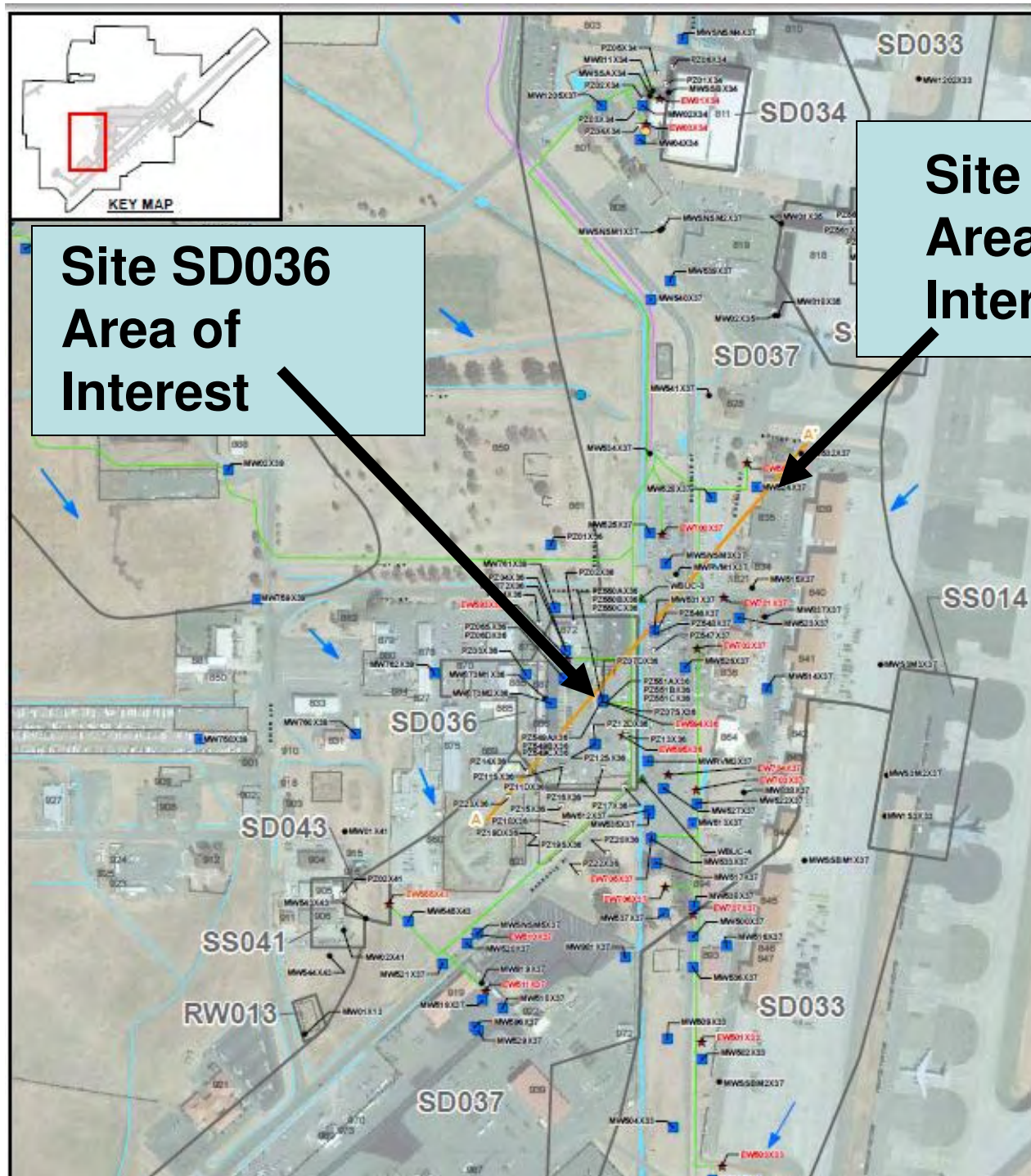
Site SD036 and SD037 Work Plan

Hot Spot Investigation and Remedial Process Optimization

Travis Air Force Base, California

Site SD036 and SD037 Description

- Associated with the WIOU in the western portion of the base
- Hot spot ($>1,000 \mu\text{g/L}$) of trichloroethene (TCE) concentrated in one small area near sanitary sewer line at each site
- Existing remedial processes in the area include both groundwater and soil vapor extraction and treatment

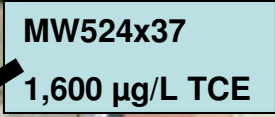


**Site SD036
Area of
Interest**

**Site SD037
Area of
Interest**



Site SD037 Hot Spot



Existing Remediation in SD036 and SD037

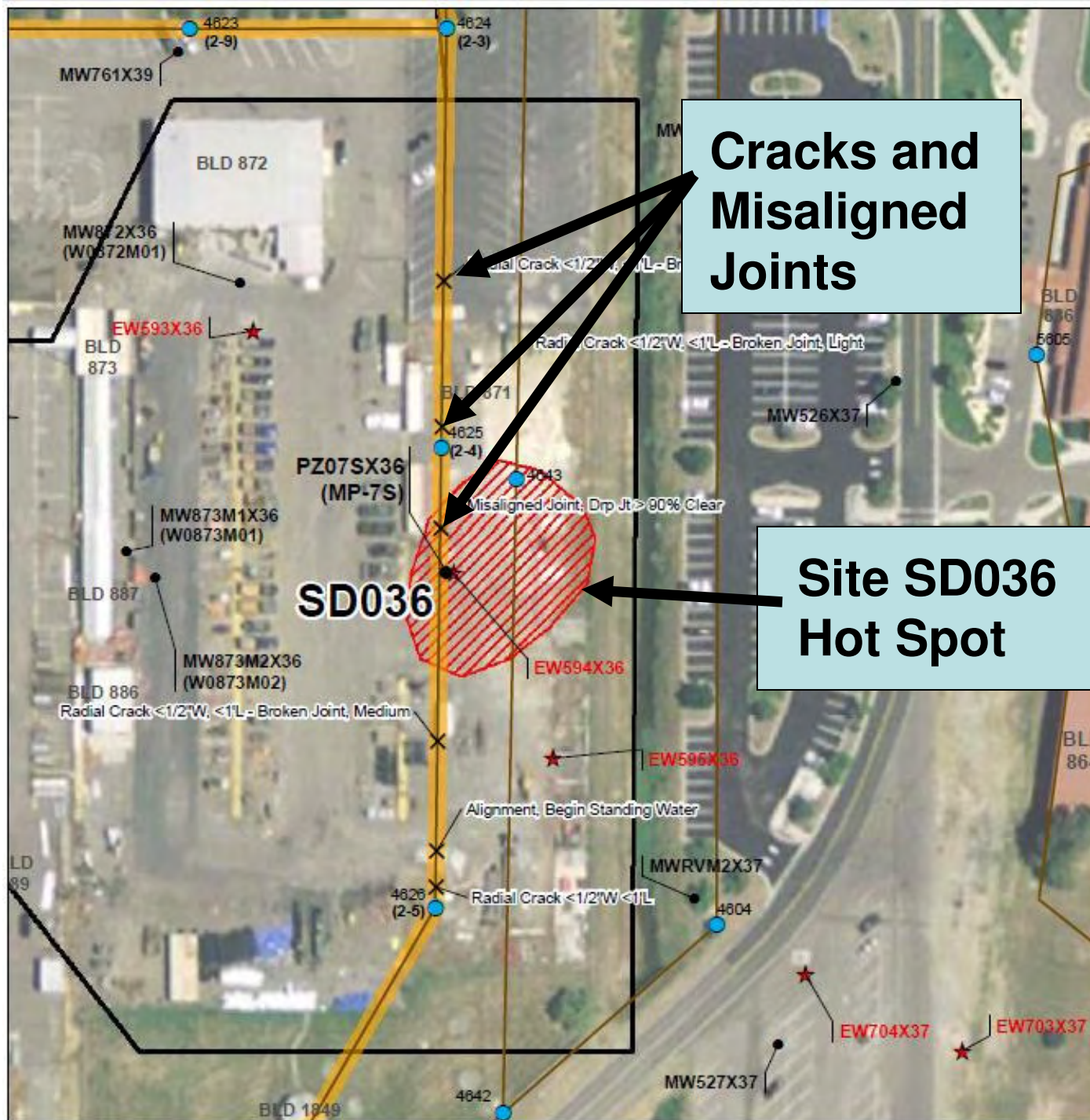
- Groundwater extraction from three (3) wells in SD036 and eleven (11) in SD037, treated at Central Groundwater Treatment Plant (CGWTP)
- Soil vapor extraction from three (3) wells in SD036 and five (5) wells from SD037, treated at the WTTP

Effectiveness of Current Remediation Efforts

- Remediation systems installed to contain plume and remove volatile organic compounds (VOCs), primarily TCE, at concentrations $\geq 1,000$ $\mu\text{g/L}$ throughout the WIOU (source control and migration control)
- Remediation systems have been effective at reducing contaminant concentrations throughout the WIOU
- Two TCE hot spots have remained above design concentrations at 1,200 $\mu\text{g/L}$ and 1,600 $\mu\text{g/L}$ in SD036 and SD037 (2Q08 GSAP)

Historical Investigations – SD036

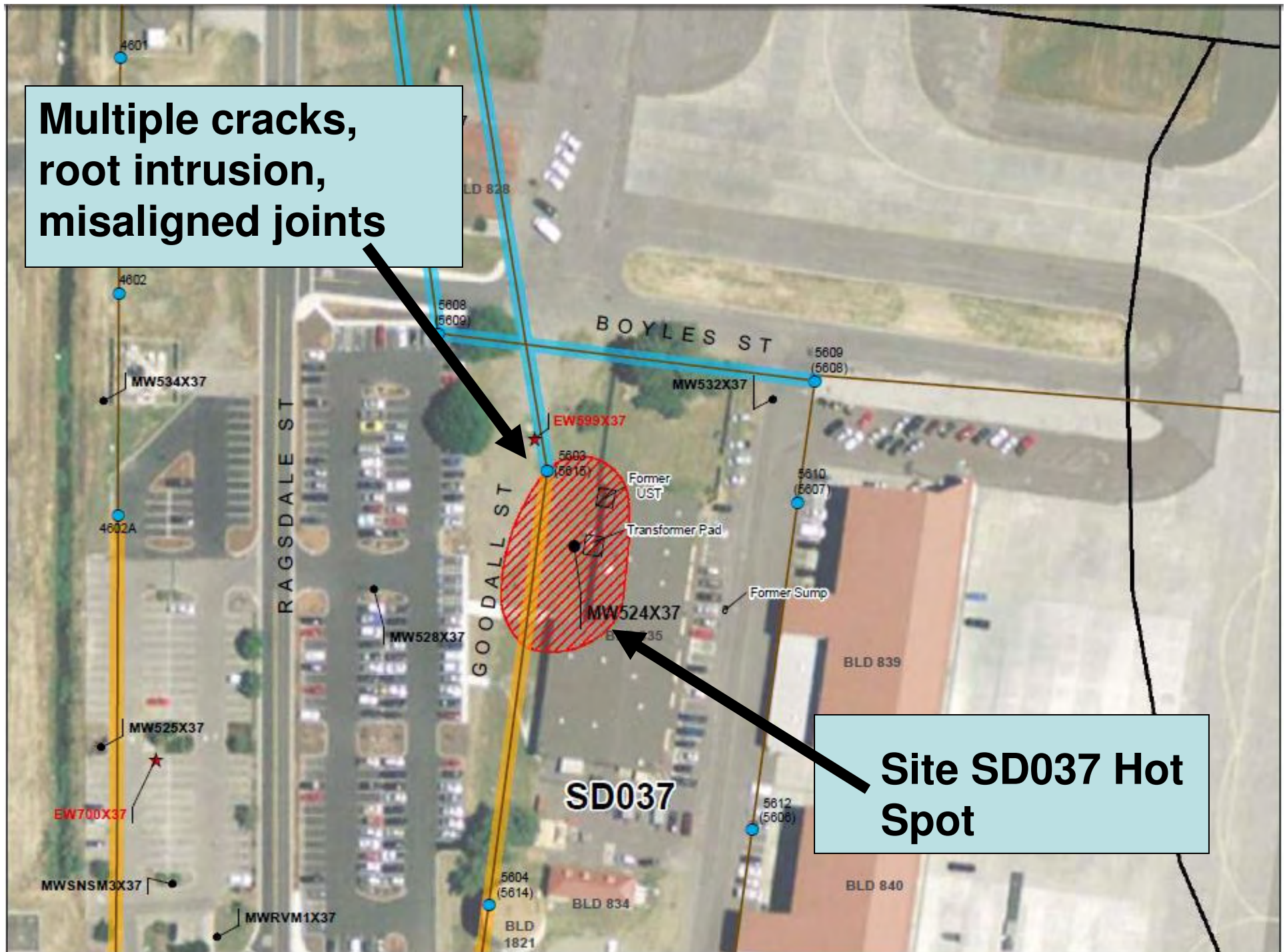
- Soil gas, soil, and groundwater investigations
- Video survey of sanitary sewer line running through the middle of the site
- Investigation findings:
 - Several breaks, cracks, and misaligned joints in sewer line. Standing water in some locations
 - Low TCE concentrations in soil gas samples
 - Elevated TCE concentrations in groundwater samples
- Conclusion: Hot spot may be result of direct discharge from sanitary sewer line



Historical Investigations – SD037

- Soil gas, soil, and groundwater investigations
- Video survey of sanitary sewer line running near building 835
- Investigation findings:
 - Several cracks, root intrusions, and misaligned joints in sewer line
 - Very low TCE concentrations in soil gas, sump and UST locations. Sump and UST eliminated as sources
 - Elevated TCE concentrations in groundwater samples
- Conclusion: Hot spot may be result of direct discharge from sanitary sewer line

**Multiple cracks,
root intrusion,
misaligned joints**



**Site SD037 Hot
Spot**

Work Plan Phased Approach

- Phase 1 – Hot spot delineation
 - Define the TCE hot spots (SD036 and SD037) to 1,000 µg/L
- Phase 2 – Remediation Optimization
 - Utilize findings during characterization activities to optimize existing remediation efforts via Emulsified Vegetable Oil injection

Emulsified Vegetable Oil Injection

- Emulsified vegetable oil enhances reductive dechlorination by stimulating anaerobic bacterial growth
- Relatively long lasting; estimated 5-year life from one injection event
- Direct remediation aimed at reducing source mass in hot spots





Implementation and Reporting

- Triad Process (input from Triad team at crucial points during both phases)
- Technical memo identifying locations of EVO injection points and monitoring wells
- EVO injection completion report
- System performance monitoring in GSAP reports

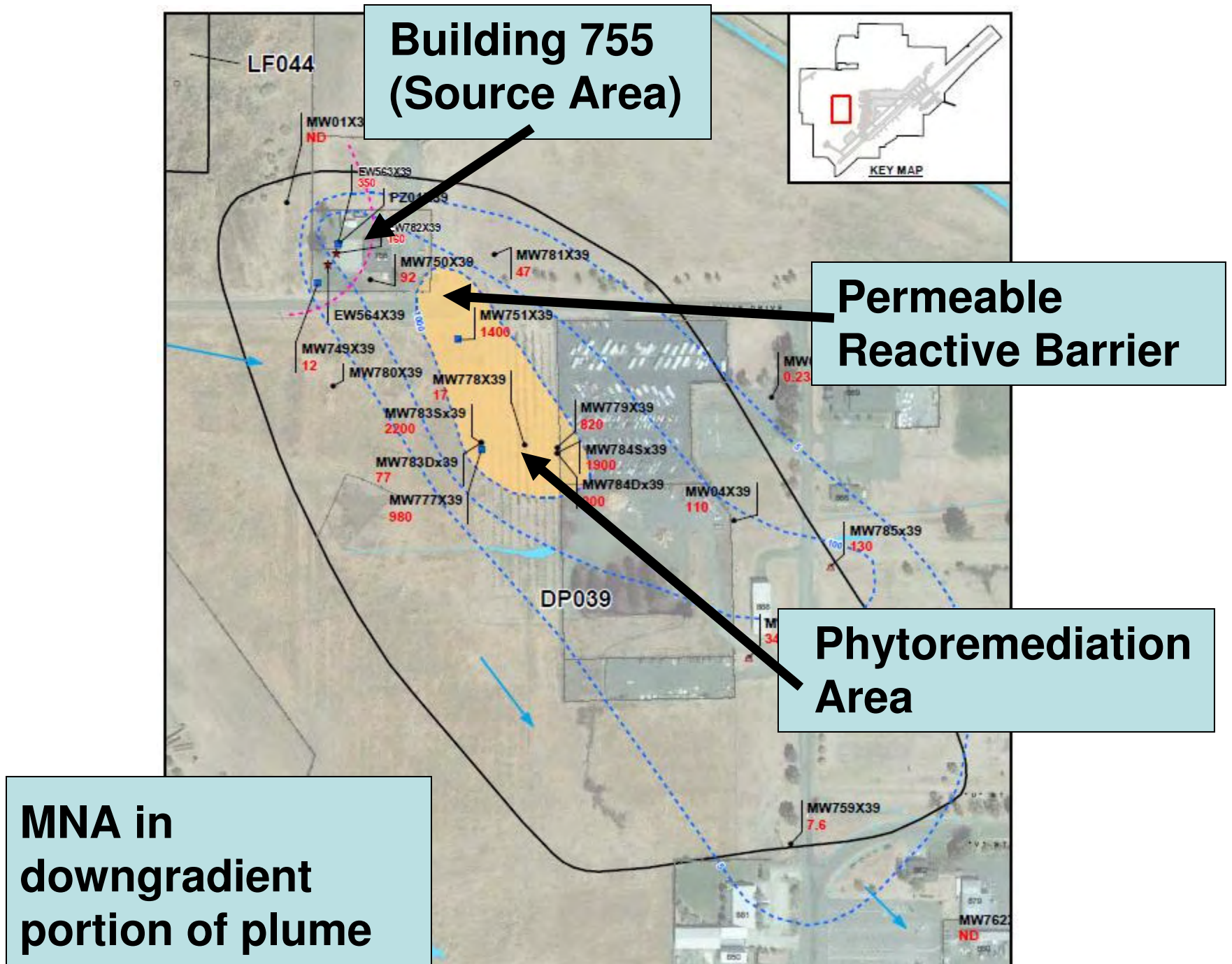
Site DP039 Work Plan

Remedial Process Optimization

Travis Air Force Base, California

Site DP039 Description

- Approximately 40 acres in the West/Annexes/Basewide Operable Unit (WABOU)
- Contaminant plume of trichloroethene (TCE) originating near Building 755
- Remedial processes in the area have included a bioreactor, permeable reactive barrier, phytoremediation zone, dual phase extraction and treatment, and monitored natural attenuation (MNA)



Remediation Efforts

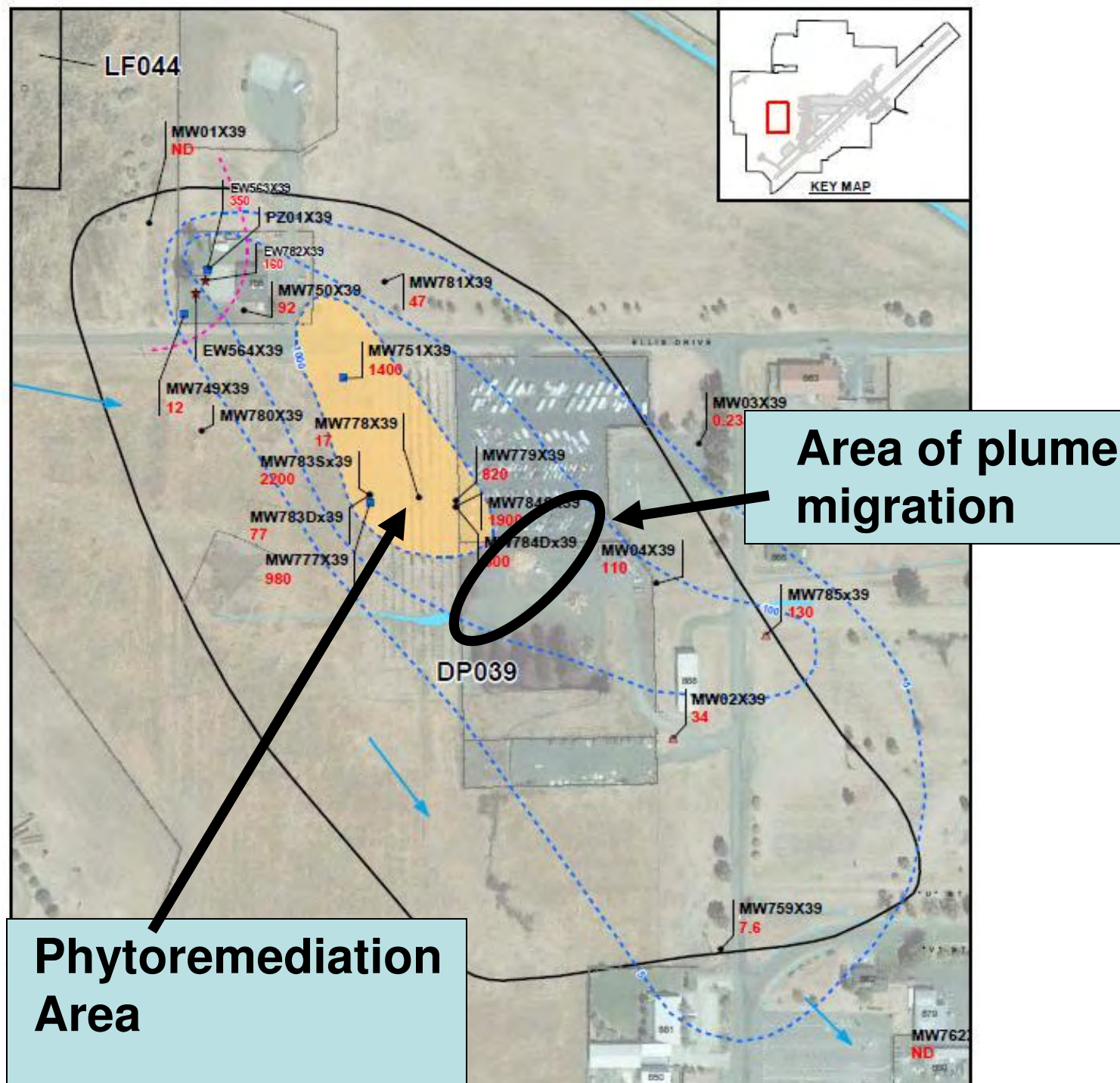
- Site DP039 IRAOs were selected as source area containment and treatment, and migration control
- Remedies selected to achieve objectives were GET in the source area, and MNA in the downgradient portion of the plume

Remediation Efforts (continued)

- Three treatability studies conducted
 - Soil vapor extraction and vacuum dewatering
 - Permeable reactive treatment wall
 - Phytoremediation
- Soil vapor extraction removed 495 pounds of VOC mass, 99% in the vapor phase, within six (6) months
- Permeable reactive treatment wall test results inconclusive. Not much, if any, groundwater passing through the treatment wall
- Phytoremediation study ongoing, evidence of transpiration

Remediation Efforts (continued)

- Permanent dual phase extraction (DPE) wells installed following SVE study – TCE concentrations reduced in source area to less than 1,000 µg/L in groundwater in approximately seven (7) years of operation
- Bioreactor installed in source area (fourth quarter 2008) to replace GET and DPE
- Phytoremediation evaluation ongoing
- MNA continues to stabilize downgradient portion of plume
- Evidence of plume migration in the central part of the plume, east of the phytoremediation area, is threatening the effectiveness of MNA in the downgradient portion of the plume
- This area of plume migration will be addressed via emulsified vegetable oil (EVO) injection as an RPO activity.

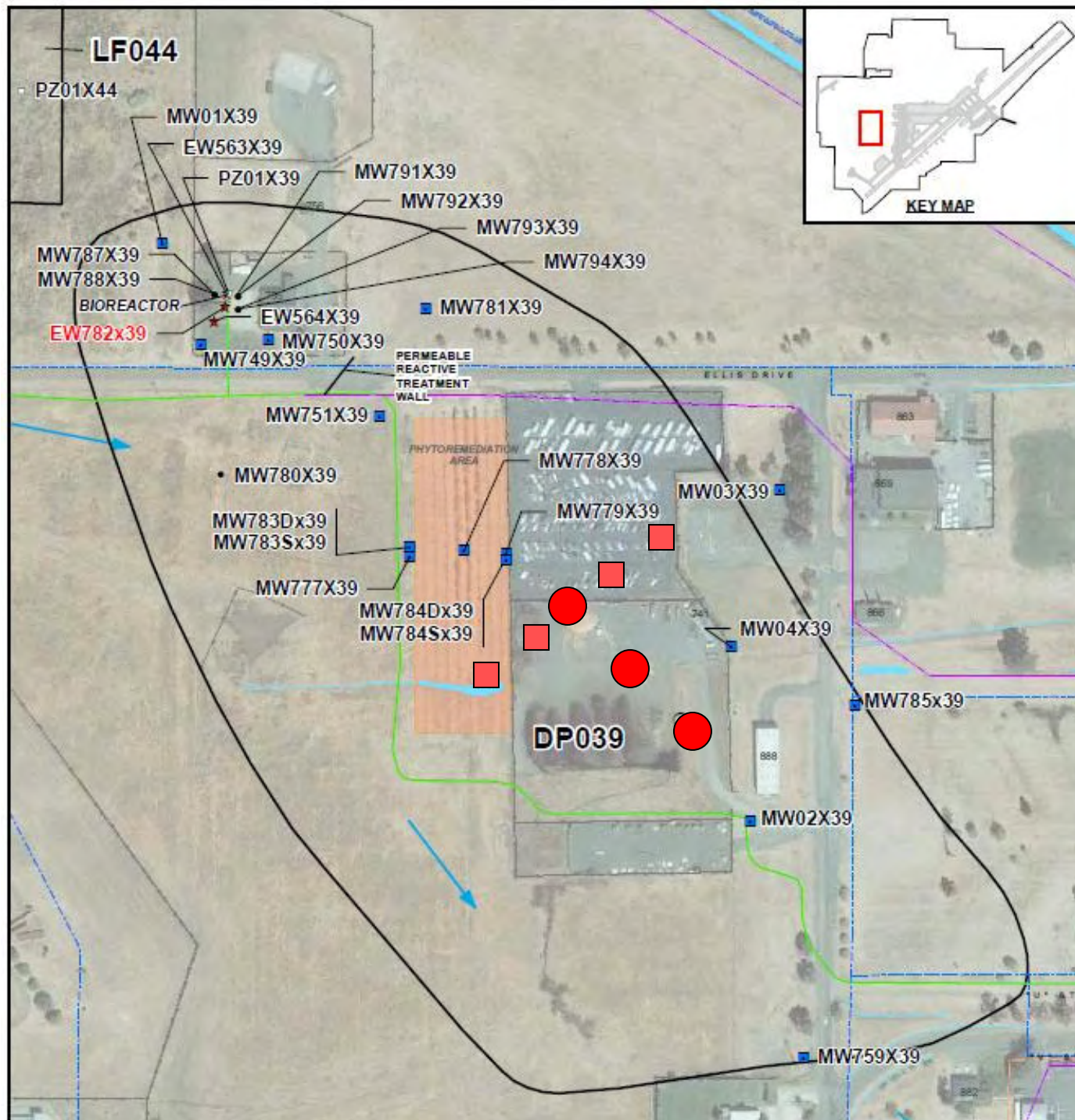


Work Plan Phased Approach

- Phase 1 – TCE plume delineation
 - Define extent of TCE plume to 500 µg/L
- Phase 2 – Remediation Optimization
 - Utilize findings during characterization activities to optimize EVO injection

Emulsified Vegetable Oil Injection

- Emulsified vegetable oil enhances reductive dechlorination by stimulating anaerobic bacterial growth
- Relatively long lasting; estimated 5-year life from one injection event
- Barrier approach used to prevent higher concentrations of TCE from migrating into downgradient portion of plume currently controlled by MNA



Implementation and Reporting

- Triad Process
- Technical memo identifying locations of EVO injection points (barrier location) and monitoring wells
- EVO injection completion report
- System performance monitoring in GSAP reports

ST018 Remedial Design/Remedial Action

Travis Air Force Base
California

ST018 Site Description

- Located in EIOU
- Site uses: North and South Base Exchange Gas Stations (NGS and SGS)
- Gas stations have operated from mid-1960s to present
 - NGS: USTs replaced in 1988
 - SGS: USTs replaced in 1994 – 1,700 cubic yards of impacted soil excavated and removed



ST018 Site Investigation

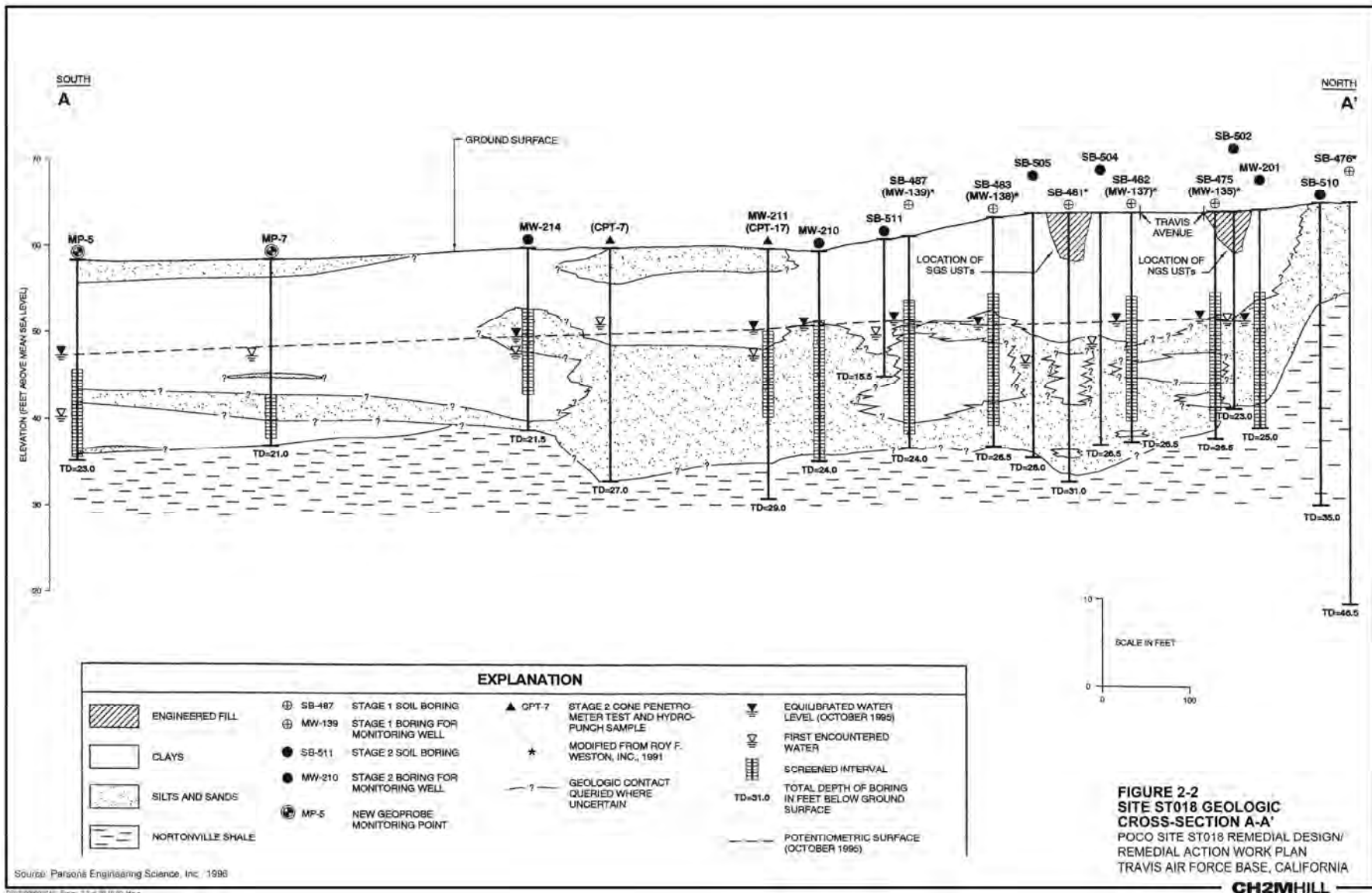
- ST018 identified as a POCO site based on the Stage 1 RI/FS (Weston, 1991) and Stage 2 RI Report for the North and South Gas Station (Parsons, 1995)
- MTBE discovered and investigated by LLNL in 1997
- Groundwater monitoring as part of GSAP since 1993

ST018 Site Investigation (continued)

- Corrective Action Plan completed in 2008
 - Evaluated MNA and three active remedies to address TPH-gasoline and MTBE in groundwater
 - Evidence for intrinsic biodegradation of TPH-gasoline
 - Intrinsic biodegradation not expected to be effective for MTBE
 - Groundwater extraction with treatment by LGAC selected to treat MTBE

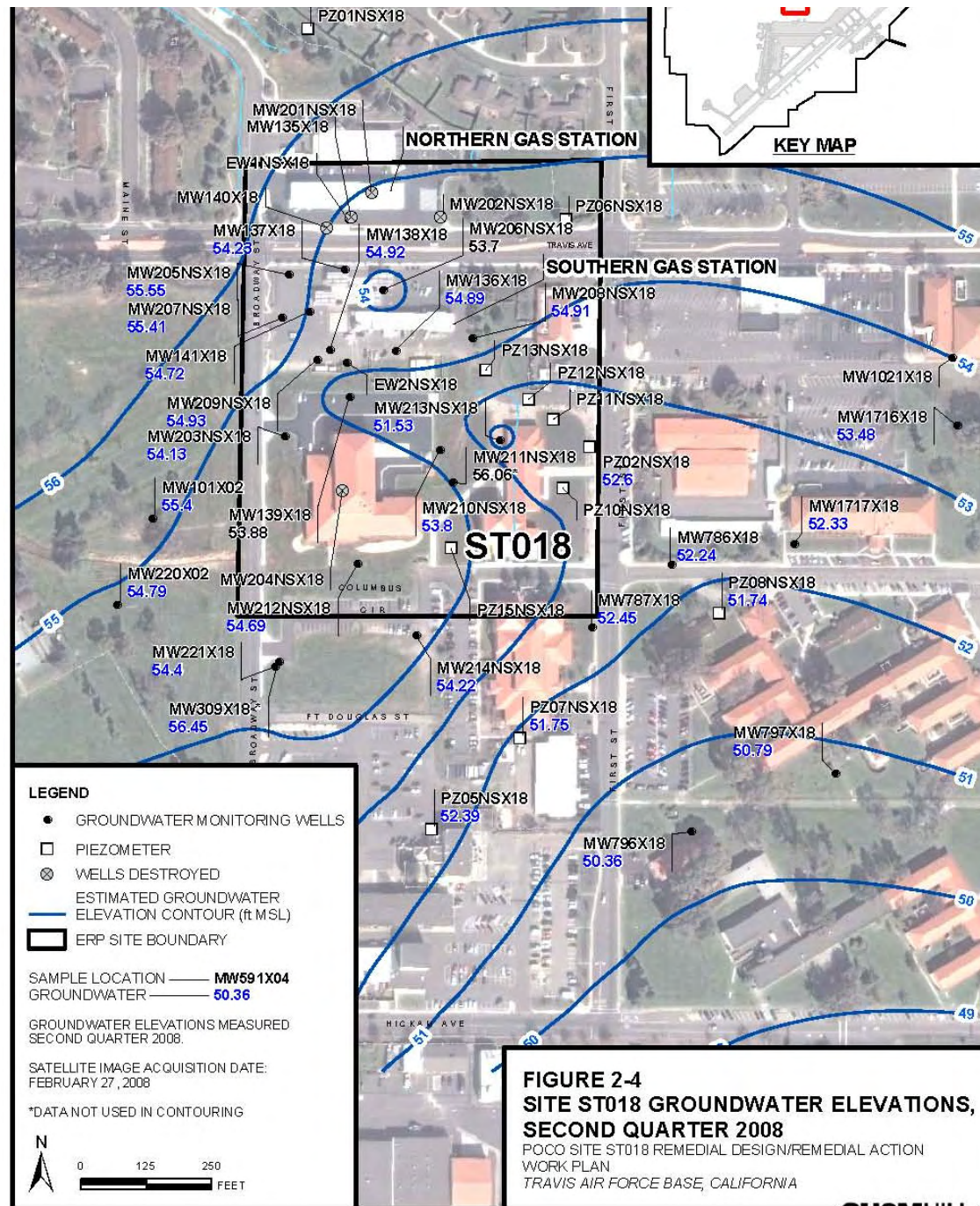
ST018 Hydrogeology

- Geology
 - Clay unit from ground surface to 10 or 15 feet below surface
 - Sand/silt unit from 10 or 15 feet to about 30 feet below surface
 - Nortonville Shale (bedrock) at about 30 feet below surface



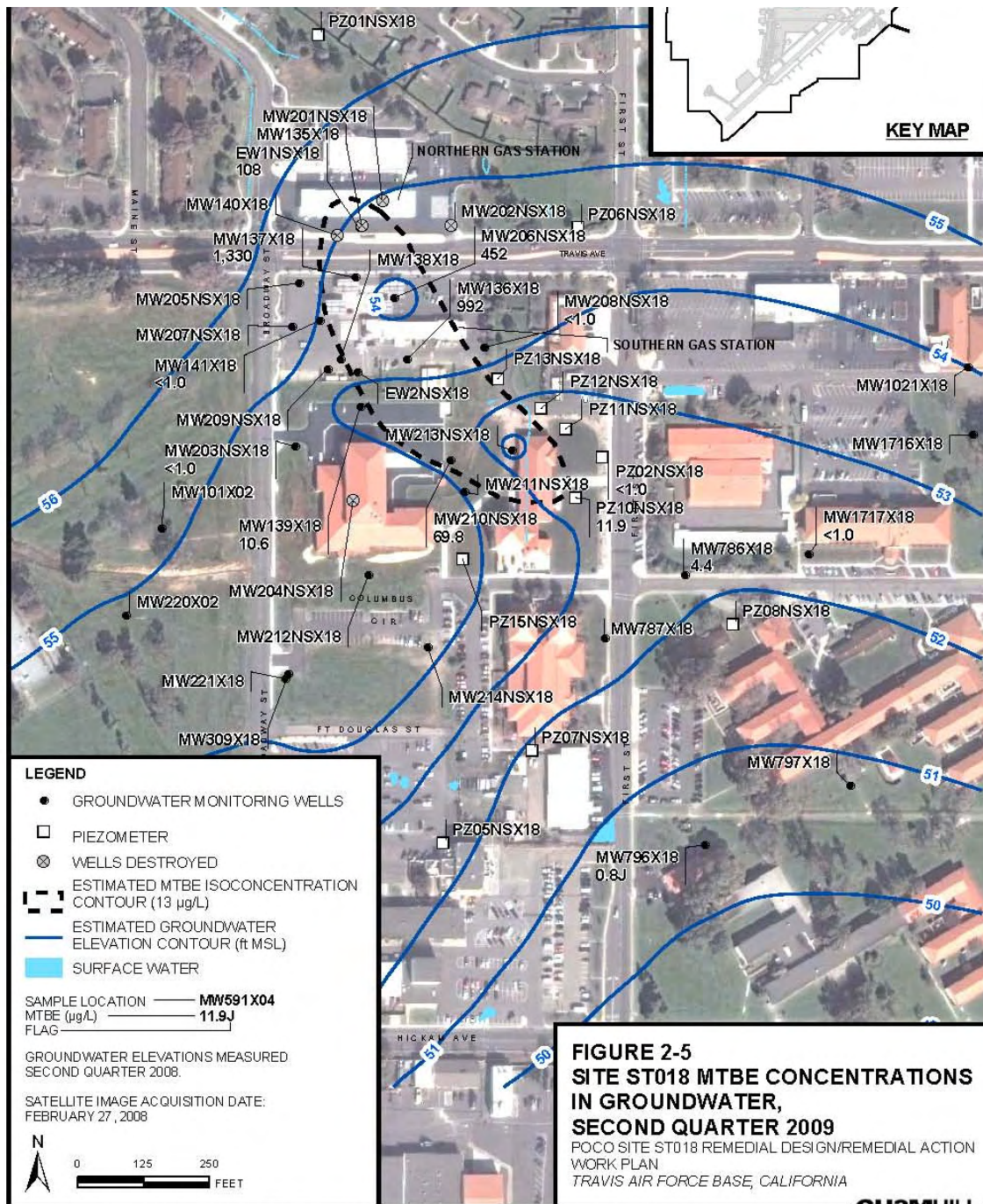
ST018 Hydrogeology (continued)

- Thin alluvial aquifer occurs primarily in sand/silt unit from about 10 to 30 feet below surface.
- Groundwater flows to southeast but flow direction varies locally, possibly due to variations in basal contact with bedrock



ST018 Remedial Target Area

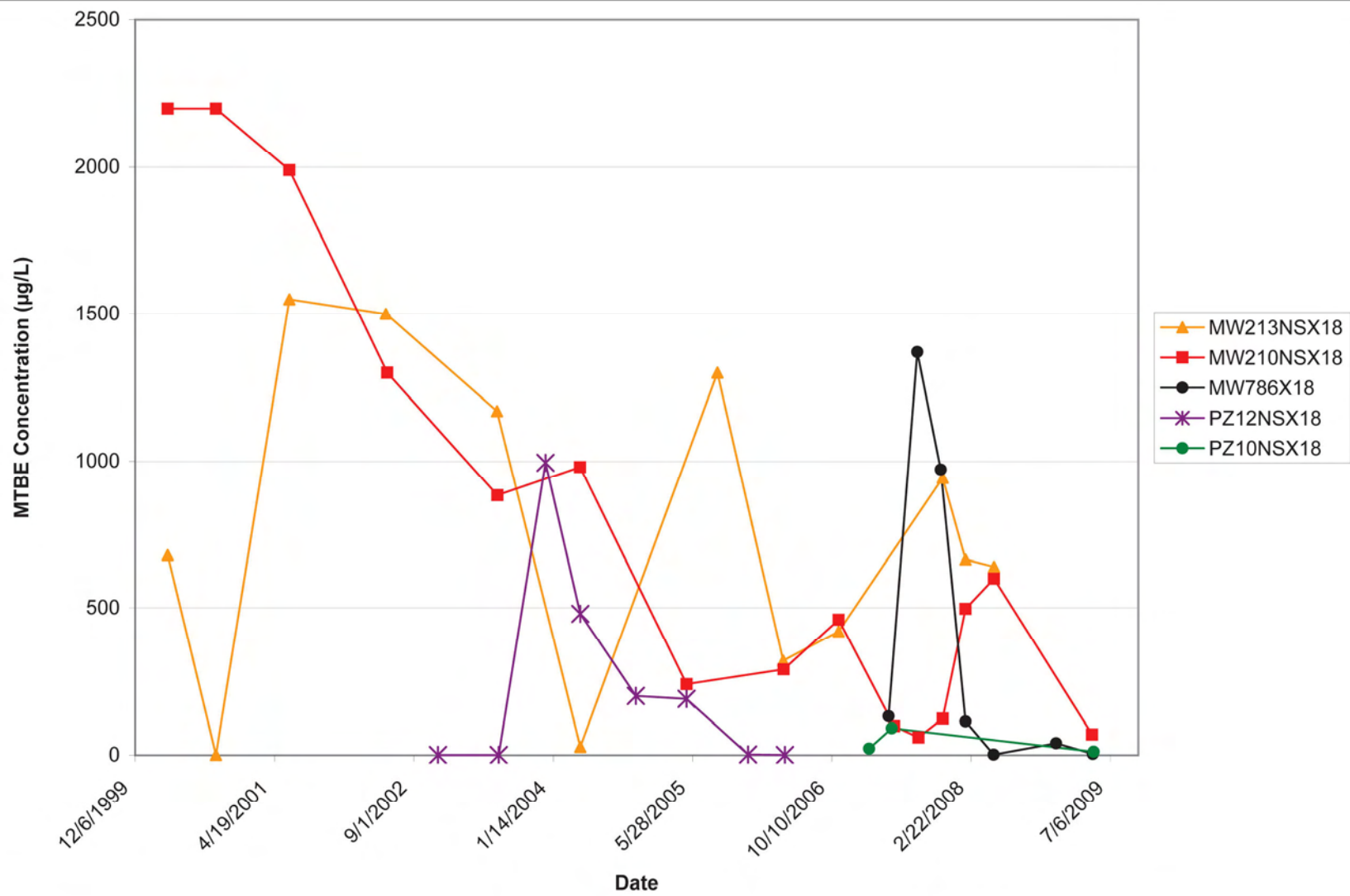
- Dissolved 13 $\mu\text{g/L}$ MTBE plume
 - Second quarter 2009 - Plume extended from NGS approximately 700 feet downgradient to vicinity of PZ10NSX18
 - Some uncertainty about extent of MTBE downgradient of PZ10NSX18 and MW786X18



RDD \\BALDUR\PROJECTS\TRAVIS\381355_ST018\MAPFILES\POCO_REMEDIALDESIGN\ACTION_WP\FIG2-5_ST018_POCO_MTBE_GW_2009.MXD MCLAY1 7/17/2009

ST018 Remedial Target Area (continued)

- Slug hypothesis
 - MTBE impacted groundwater migrated past PZ12NSX18 in 2003 and MW786X18 in 2007
 - MTBE concentrations in both wells below Primary MCL (13 µg/L) during most recent sampling events
 - MTBE “slug” may now be located between MW786X18 and MW796X18



**FIGURE 2-6
SITE ST018 MTBE CONCENTRATIONS
VERSUS TIME**

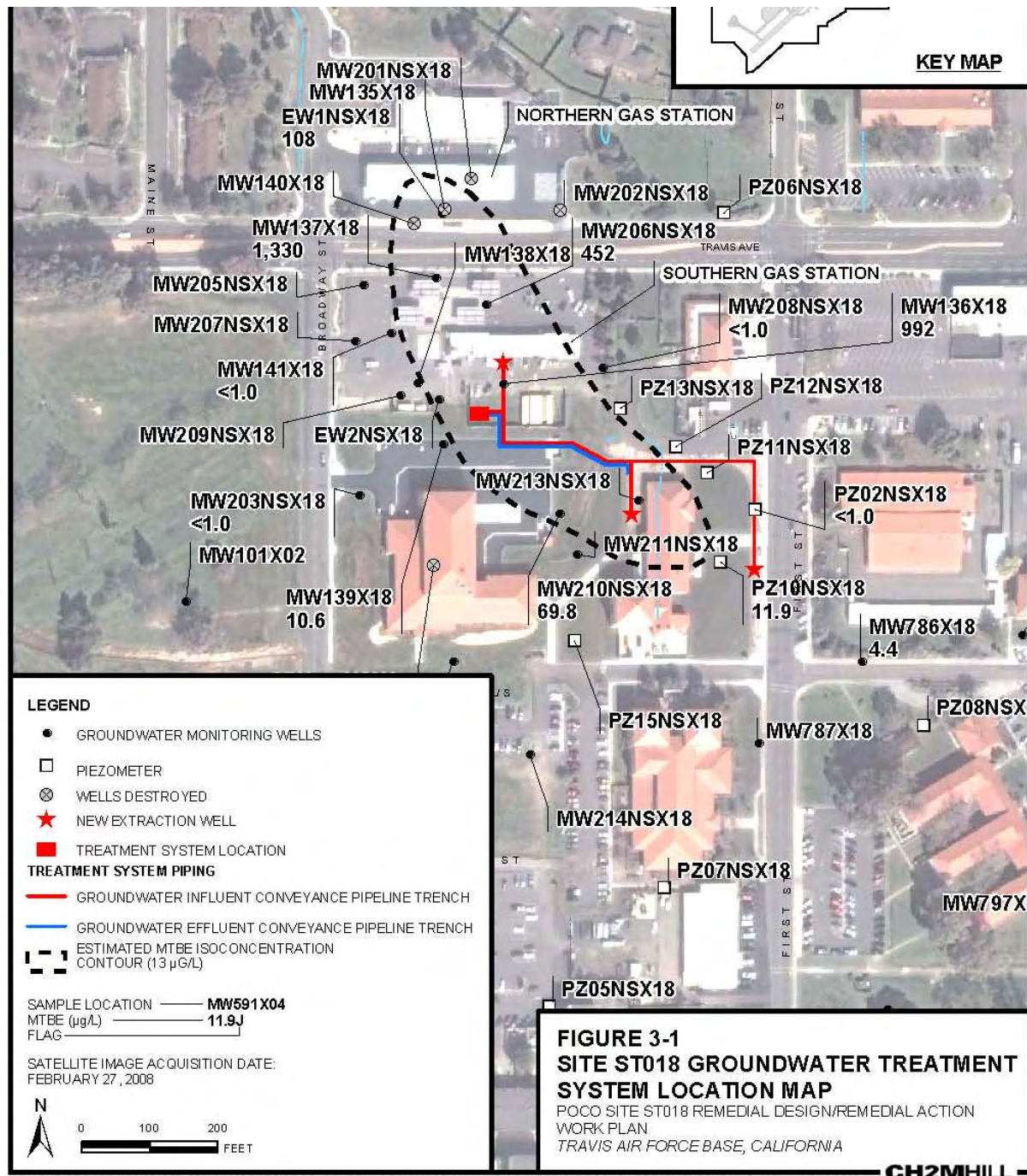
POCO SITE ST018 REMEDIAL DESIGN/
REMEDIAL ACTION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

ST018 Pre-Design Investigation

- Sample existing monitoring wells to confirm concentrations in the plume axis and downgradient of plume – MW213X27, MW797X18, and PZ12NSX18
- Drill soil borings and collect grab groundwater samples at four locations
 - Sample groundwater at all planned extraction well locations prior to installing extraction wells
 - Sample groundwater downgradient of MW786X18 to evaluate “slug” hypothesis

ST018 Update Conceptual Design

- Update conceptual design in CAP based on results of Triad-style pre-design investigation
 - Convert soil borings to extraction wells if within or immediately downgradient of plume axis
 - Convert soil borings to monitoring wells if useful for cross-gradient or downgradient plume monitoring
 - Abandon borings if not useful for extraction or monitoring
 - Drill additional borings and install wells, if needed, to capture or define the 13- $\mu\text{g/L}$ MTBE plume



\\BALDUR\PROJ\TRAVIS\381355_ST018\MAP FILES\POCO_REMEDIALDESIGN\ACTION_W\WP\FIG3-1_ST018_POCO_GWTREATMENTSYS.MXD MCLAY1 8/10/2009

ST018 System Design

- Extraction System – two or more 6-inch diameter extraction wells installed within and at the downgradient end of the 13- $\mu\text{g/L}$ MTBE plume
- Conveyance System – 1-inch and 2-inch diameter HDPE piping installed in below ground trenches

ST018 System Design (continued)

- Treatment System
 - Three 2,000-pound carbon vessels loaded with virgin coconut LGAC connected in series
 - Discharge to on-base storm sewer meeting max daily effluent limitations in NPDES General Permit
- Performance Monitoring
 - Influent, between-vessel, and effluent sampling to measure mass removal and verify compliance with effluent limitations
 - Quarterly or semiannual gauging and sampling of select monitoring wells to evaluate plume reduction and capture

Travis AFB Groundwater Program

Management Overview Briefing

RPM Meeting
August 26, 2009

Completed Documents & Field Work

Documents

- Basewide Health & Safety Plan (HSP)
- Action Plan
- 2007/2008 GSAP Annual Report
- LF007C RPO Work Plan
- LF008 Rebound Study Work Plan
- SS014 Tier 1 POCO Evaluation WP
- ST027B Site Characterization WP
- SS030 RPO Work Plan
- ST032 POCO Technical Memo
- DP039 Bioreactor Work Plan
- 2008 Annual GWTP RPO Report
- Passive Diffusion Bag (PDB) Technical Memo
- RD/RA QAPP Update
- ***ST032 Tier 1 POCO Evaluation WP***
- ***Phytostabilization Demonstration Tech Memo***

Field Work

- ST027B Gore Sorber Survey – Phase 1
- ST027B Field Sampling – Phase 2
- GSAP 2008 Semi-annual Event
- ST027B Installation of Wells – Phase 3
- SS014 Site Characterization
- LF008 Rebound Study
- GSAP Annual Sampling Event
- SS030 Site Characterization – Phase 1

In-Progress Documents & Field Work

Documents

- Comprehensive Site Evaluation Phase II (Draft)
- Field Sampling Plan (FSP) (Draft)
- ST032 POCO Evaluation Work Plan (Draft)
- SS016 RPO Work Plan (Draft)
- Natural Attenuation Assessment Report (NAAR) (Draft)
- ***Model QAPP (Draft-Final)***

Field Work

- ***SS016 Site Characterization (source area)***
- ***DP039 Site Characterization (down gradient)***

Upcoming Documents & Field Work

Documents

• SD036/SD037 RPO Work Plan	September
• ST018 RA Work Plan	September
• DP039 RPO Work Plan	September
• LF008 Rebound Study Tech Memo	September
• Focused Feasibility Study	October
• 2008/2009 GSAP Annual Report	November
• ST027B Site Characterization Report	December
• Phases 1, 2 and 3 Vapor Intrusion Report	TBD

Field Work

• LF007C Site Characterization (Wetlands)	TBD
• SD036/SD037 Site Characterization	September
• SS030 Site Characterization (Phase 2)	Sept/October
• ST018 Site Characterization	September
• ST027 Site Characterization (Phase 3)	Sept/Oct
• ST014 Monitor Well Install (Site 3)	September
• SD001/SD033 Sediment RA	September

Field Work Schedule

WEEK OF: August 24, 2009

Site	17-Aug	24-Aug	31-Aug	7-Sep	14-Sep	21-Sep	28-Sep	5-Oct	12-Oct
SD016	Phase 1					Phase 2			
SD036		Phase 1	(Weekend of 8/29 & 30)			Phase 2			
SD037			Phase 1				Phase 2		
SD030			Phase 2		(Depends on Right-of-Entry)				
ST027							Phase 3 & 4	(including weekend of 10/3 & 4)	
DP039		Phase 1						Phase 2	
ST018					Phase 1			Phase 2	
ST014					Phase 2				Phase 3



Travis Air Force Base
Environmental Restoration Program
Sites SD001 and SD033
Construction Schedule September/October 2009

Sun 30	Mon 31	Tue 9/1/2009	Wed 2	Thu 3	Fri 4	Sat 5
	Biological survey	Excavation survey		Mob equip		
Sun 6	Mon 7	Tue 8	Wed 9	Thu 10	Fri 11	Sat 12
	Labor Day	SD033 Set up zones Lay down area Const. cofferdam Set sump pumps Dewater excav.	Clear & grub Excavate	Sample Collect turtles at SD001	Mob equipment to SD001	
Sun 13	Mon 14	Tue 15	Wed 16	Thu 17	Fri 18	Sat 19
	SD001 Const. cofferdams Dewater	Remove vegetation	Excavate Sample		Mob Equipment to SD033	
Collect turtles at SD001						



Travis Air Force Base
Environmental Restoration Program
Sites SD001 and SD033
Construction Schedule September/October 2009

Sun 20	Mon 21	Tue 22	Wed 23	Thu 24	Fri 25	Sat 26
	SD033 Dewater Over excavate 	 Sample 	 Grade creek banks Inst. BMP's Mob equipment SD001 	SD001 Remove dams Inst. BMP's 	Mob equipment SD033 	
Sun 27	Mon 28	Tue 29	Wed 30	Thu 10/1/2009	Fri 2	Sat 3
	SD033 Over excavate Sample Install riprap 	 Inst. BMP's 	 Remove dams Site restoration 	Stockpile Load out stockpile 		
Sun 4	Mon 5	Tue 6	Wed 7	Thu 8	Fri 9	Sat 10
	Demobilize					