Final

Travis Air Force Base
Environmental Management
Building 571, Travis AFB, California
Environmental Restoration Program
Remedial Program Manager's
Meeting Minutes

30 March 2010, 0800 Hours

Mr. Mark Smith, Travis Air Force Base (AFB), conducted the Remedial Program Manager's (RPM) meeting on 30 March 2010 at 0800 in the Main Conference Room, Building 571, Travis AFB, California. Attendees included:

- Glenn Anderson — Travis AFB
- Lonnie Duke — Travis AFB
- Mark Smith — Travis AFB
- Gregory Parrott — Travis AFB
- Dezso Linbrunner — United States Army Corp of Engineers (USACE), Omaha District
- James Chang — U.S. Environmental Protection Agency (USEPA)
- Rich Freitas — U.S. Environmental Protection Agency (USEPA)
- Jose Salcedo — California Department of Toxic Substances Control (DTSC)
- Alan Friedman — California Regional Water Quality Control Board (Water Board)
- Mary Snow — Tech Law, Inc.
- Rachel Hess — ITSI
- Chuck Clyde — ITSI
- Chuck Elliott — CH2M HILL
- Loren Krook — CH2M HILL
- Leslie Royer — CH2M HILL
- Mike Wray — CH2M HILL

Handouts distributed at the meeting and presentations included:

- Attachment 1 — Meeting Agenda
- Attachment 2 — Master Meeting and Document Schedules
- Attachment 3 — SBBGWTP Monthly Data Sheet (January and February 2010)
- Attachment 4 — CGWTP Monthly Data Sheet (January and February 2010)
- Attachment 5 — NGWTP Monthly Data Sheet (January 2010)
- Attachment 6 — Presentation: 2010 Field Installations Update

- Attachment 7 Presentation: Program Update: Activities Completed, In Progress and Upcoming and Drilling schedule
- Attachment 8 Presentation: 2009 Groundwater Treatment Plant RPO Annual Report

1. ADMINISTRATIVE

A. Previous Meeting Minutes

The 27 January 2010 RPM meeting minutes were approved and finalized as written.

B. Action Item Review

All action items from January have been closed.

C. Master Meeting and Document Schedule Review (attachment 2)

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 22 April 2010, tentative start time at 1:00 PM. The next RAB meeting will be on 22 April 2010.

Travis AFB Master Document Schedule

— Focused Feasibility Study (FFS): No change.

— Proposed Plan (PP): No change.

— Record of Decision (ROD): No change.

— Potrero Hills Annex: (FFS, PP, and ROD): No change.

— Union Creek Sites SD001 and SD033 Remedial Action Report: The Draft report was handed to the Agencies on a CD during the meeting. Agencies comments are due 01 June 2010.

— Vapor Intrusion Assessment Report: Finalized this month. Mr. Anderson expressed his appreciation to the agencies for helping the Base with the period of performance limitations, and a special thanks to EPA in helping with the fieldwork. Mr. Chang asked if Travis received and understood the comments that were provided from the EPA risk assessor, Mr. Stralka Mr. Anderson stated that he did, and added that there will always be some uncertainties with any assessment. You can measure the mass going into a building through the sub-slab, but there are some questions that science cannot answer. At this point, the use of the assessment in the remedy selection process is more of a risk management issue.

— Natural Attenuation Assessment Report (NAAR): On the schedule for finalization in April. Travis sent out the response-to–comments (RTC) table to the agencies. The Water Board and DTSC indicated that the RTCs were adequate. Mr. Anderson requested to table the EPA response to the RTCs.

— DP039 RPO Work Plan: Travis is preparing RTCs.

— FT005 Data Gap Work Plan: Preparing to go out in the field next month, as more site characterization is needed. EPA provided comments on the Work Plan. Travis is working on the RTCs to EPA comments. Mr. Friedman indicated the Water Board will have no comments, and Mr. Salcedo indicated that DTSC will have no comments.

— SD036/SD037 RPO Work Plan: Waiting on EPA approval of RTCs.

— ST027B Site Characterization Report: Mr. Duke will send out draft to agencies on 31 March 2010.

— Quarterly Newsletter (April 2010): Mr. Anderson will prepare the draft newsletter and get in the mail to the agencies as soon as possible. The draft Guardian will be sent to the agencies, including Marcus Simpson and David Cooper, before the RAB meeting.

— 2008/2009 GSAP: Waiting on approval of one last RTC from EPA.

— 2009 GWTP RPO Annual Report: Scheduled to go out draft on 13 April 2010.

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 3 and 4)

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 92.6% uptime, (downtime was due to power outages), and 3.0 million gallons of groundwater were extracted and treated during the month of January 2010. All of the treated water was discharged to Union Creek. The average flow rate for the SBBGWTP was 90.3 gallons per minute (gpm) and electrical power usage was 11,640 kWh; 16,000 pounds of CO_2 was created (based on DOE calculation). Approximately 0.89 pounds of volatile organic compounds (VOCs) were removed in January. The total mass of VOCs removed since the startup of the system is 375 pounds (see Attachment 3).

The South Base Boundary Groundwater Treatment Plant (SBBGWTP) performed at 100% uptime, and 4.3 million gallons of groundwater were extracted and treated during the month of February 2010. All of the treated water was discharged to Union

Creek. The average flow rate for the SBBGWTP was 90.3 gallons per minute (gpm) and electrical power usage was 16.980 kWh; 23,000 pounds of CO_2 was created (based on DOE calculation). Approximately 1.56 pounds of volatile organic compounds (VOCs) were removed in February. The total mass of VOCs removed since the startup of the system is 377 pounds (see Attachment 3).

Central Groundwater Treatment Plant (see Attachment 5 and 6)

The CGWTP performed at 97.7% uptime with approximately 1.5 million gallons of groundwater extracted and treated during the month of January 2010. All treated water was diverted to the storm drain. The average flow rate for the CGWTP, while operating, was 42.9 gpm and electrical power usage was 13,433 kWh for all equipment connected to the Central plant; approximately 18,403 pounds of CO_2 was created. Natural gas usage for the ThOx was 1,112 therms. Approximately 4.04 pounds of VOCs were removed from groundwater, and 7.85 pounds from vapor, in January. The total mass of VOCs removed since the startup of the system is 11,554 pounds (see Attachment 4).

The CGWTP performed at 100% uptime with approximately 2.0 million gallons of groundwater extracted and treated during the month of February 2010. All treated water was diverted to the storm drain. The average flow rate for the CGWTP, while operating, was 48.6 gpm and electrical power usage was 15,441 kWh for all equipment connected to the Central plant; approximately 21,154 pounds of CO_2 was created. Natural gas usage for the ThOx was 92 therms. Approximately 6.96 pounds of VOCs were removed from groundwater, and 0.62 pounds from vapor, in February. The ThOx unit was shutdown most of February due to frequent burner flame-out alarms, most likely due to high winds and low natural gas pressures. Also, there was a malfunction of the hand-off-auto switch on the transfer pump. The total mass of VOCs removed since the startup of the system is 11,554 pounds (see Attachment 4).

The ThOx unit will be taken off-line in accordance with optimization of the Site SS016 interim remedy. As mentioned before the ThOx unit generates a lot of CO_2, over 200 tons annually if 100% operational. The initial thought was the Base could have both ThOx and the bioreactor operational. However, they are very close together, and the vapor extraction system creates an aerobic condition, which is not conducive to the bioreactor operation. Removal of the ThOx unit will also cut down on generation of green house gasses. Mr. Anderson said the unit will not be disposed of, but rather it will be placed in a protected area in the event we need to bring it back into service.

North Groundwater Treatment Plant

The installation of two small GAC units to treat extracted groundwater from Site LF007C has been completed. The new GAC units, located in the NGWTP, were brought online on 15 January for the initial compliance sampling. The treated water flowed into a large holding tank located just outside the treatment compound. Note that all of the energy needed to extract and convey groundwater from the wells at Site LF007C, through the GAC vessels, is powered by the solar panels on the wells. This remedial solution is off the grid, and completely sustainable.

The NGWTP was shutdown after conducting the initial compliance sampling. The system will remain shut down for the wet season, and will not be returned to service until the vernal pools dissipate in the spring. This schedule complies with the US Fish and Wildlife requirement. The Base is considering asking permission of the US Fish and Wildlife to operate the system during the wet season. Mr. Wray said the groundwater table at Site LF007C, and the water levels in the vernal pools are a lot closer together than originally thought. Ms. Royer stated that when it rains, a lot it recharges the groundwater and the water starts to come up above the well cap, creating an "Artesian Condition". She indicated that it would make sense to pump year round to expedite cleanup. Mr. Anderson suggested consideration of using just one of the extraction wells located in the middle of the TCE plume. Mr. Wray suggested once we identify the full extent of the plume that we then make a decision. (see Attachment 5).

B. CAMU Lysimeter Monitoring

Mr. Duke reported on the CAMU Lysimeter Monitoring.

The purpose of the lysimeter is to measure the amount of rainfall that is percolating through the cap. If the water infiltration rate exceeds one inch, the Base is supposed to notify the regulators. With all the rain we have had, the lysimeter shows that the one inch of percolation through the cap has been exceeded and the regulatory agencies are hereby notified; however, the data is questionable. Both the current and previous CAMU monitoring contractors have expressed concerns about the accuracy of the lysimeter. Mr. Duke asked Ms. Hess from ITSI, the current contractor, to elaborate on the lysimeters history. (Mr. Duke was not at Travis when the lysimeter was installed).

Ms. Hess said Mr. Clyde from ITSI monitors the lysimeter to make sure the cap is in good shape, checks the condition of the vegetation, and performs general maintenance. The lysimeter measures two parameters; percolation of rainwater into the cap and percolation passing through the cap. There seems to be a lack of confidence in the lysimeter's performance, based on the influent and effluent values. Mr. Clyde indicated that he did not think the lysimeter was representative of the whole CAMU. Mr. Friedman asked what type of discrepancies they are seeing. Ms. Hess said the influent reading was recently 1.68 inches, and the effluent reading 4.2 inches. So, the lysimeter readings suggest there is more percolation through the cap

than is entering it. Mr. Clyde installed stakes to measure any potential movement with the CAMU cap. Mr. Duke said we have to let the regulators know when the cap exceeds over one inch of percolation, but it does not specify an action to be taken. Known COCs in the CAMU are not being detected in the surrounding groundwater. Mr. Duke said if the data is questionable, then there is no good reason to collect it. Mr. Freidman agreed. Mr. Chang agreed as long as we put it into the Land Use Controls and Monitoring report. Mr. Salcedo also agreed. Travis will investigate where the requirement for the lysimeter came from and if it is a regulatory requirement. Mr. Duke added that we are still performing the methane readings. Travis is going to build a fence all the way around the CAMU. The CAMU is behind the firing range so it is not likely there will be a lot of traffic, but the fence should eliminate any unauthorized access to the CAMU cap.

C. New Fire Station Project

Mr. Duke reported on the New Fire Station Project

The Navy Resident Officer in Charge of Construction (ROICC) oversees large construction projects on Base. One of their contractors and quality insurance evaluators contacted Mr. Duke to notify him of the new fire station scheduled to be built right next to the Central Groundwater Treatment Plant. Mr. Duke met with the Navy representative and the contractor at the future site of the new fire station to review the blueprints. The blueprints showed the new fire station building was located directly over a monitoring well. Mr. Duke said it would be best to decommission the well before construction started. The contractor agreed, and will contact a C57 state certified contractor to properly decommission the well. The well will be sampled before it is decommissioned. Ms. Royer added that the last few samples from that well were non-detect for the site COCs. In addition, there is another monitoring well nearby, and outside of the building footprint. Mr. Salcedo asked the depth of the well that is to be decommissioned. Ms. Royer answered 30 feet deep, and that most of the wells in that area are 10 to 20 feet deep. Bedrock is at 30 feet. Mr. Duke noticed a blue line with a “W” indicating a waterline and asked the contractor about that. Their intent was to tie into that water line. Mr. Duke explained that the water line is a conveyance pipe for the TARA extraction wells, and that it contains untreated water. The contractor will need to relocate the water line so as to be outside of the building footprint.

Mr. Duke also suggested they consider putting in a passive ventilation system because the building will be close to the TCE groundwater plume. The contractor will go back to the architects and make the necessary revisions to the project design to allow for the pipe relocation and the passive ventilation system.

When the works begins, the CGWTP will have to shut down for about 5 to 6 weeks for construction. Mr. Duke asked the contractor and Navy representative if they

would consider using the treated water for their landscaping. Mr. Smith added they seemed receptive to the idea.

Mr. Smith said this project has been in the works for a long time and that Civil Engineering was aware of the environmental concerns at this location. The proper NEPA process documentation was followed about five years ago, however, the information was not passed onto the contractor.

Mr. Smith asked Mr. Duke to talk about the DERA funding issue with respect to beneficial uses of treated water. Mr. Duke showed on a map where lawns were once green by using the treated water from the central plant for irrigation. That project was originally funded by the DERA program. Subsequently, it was determined that the Base could not use DERA funding for irrigation, and if the Base wanted to use the treated water they would have to pay for maintenance of the irrigation system. The next map showed where the grass had turned brown because the Base could no longer use the treated water for irrigation. Mr. Duke said he will make a point at the next Technology Transfer Workshop, scheduled for next month, that they should re-evaluate the use of DERA funding for implementation of beneficial uses on the Base.

A map was provided to show the location of the future fire station.

D. EPA Expectations Discussion

Mr. Smith said the Base recently received a letter from Mr. Chang expressing general items of concern and asked Mr. Chang to elaborate. Mr. Chang said he wanted to document issues that the EPA leadership is generally concerned with. He stated that EPA wants consideration given to the time-to-cleanup plot for any daughter products that may come from breakdown of TCE. Also, when the Focused Feasibility Study (FFS) is issued, it has to be very logical and easy to follow. The cross sections will need to be shown so that managers can understand them, and to connect the dots. Mr. Wray asked if “connect the dots” was meant for the plumes, or for the lithology. Mr. Chang said lithology. There is a lot of history and he wants a narrative for each of the plumes.

Mr. Elliott reiterated that it would technically incorrect to “connect the dots” for lithologic units within the alluvium layer at Travis. The alluvium unit at Travis is relatively thin, and the lithology of the alluvium is composed of very small discontinuous lenses of sand, silt, and clay. These lenses simply cannot be correlated between borings, except in very rare instances. To do so would be incorrect. The alluvium/bedrock contact could be correlated at most sites (and this has been done on the cross sections). Also, the shale and sandstone bedrock units can usually be distinguished from each other and correlated in places.

Mr. Anderson thanked Mr. Chang for his comments, and thought this would better be discussed in the FFS scoping meeting, following the RPM meeting.

E. Vapor Intrusion Assessment Update

Mr. Anderson reported on the VI Assessment Update

When the assessment was completed, there were vapor monitoring probes left in the buildings. Because there was a possibility that the probes could provide a preferential pathway for contaminants (i.e., cleaning chemicals, etc) into soil and groundwater, the base felt it important to backfill the holes and remove the monitoring points. Mr. Anderson recognized Mr. Chang's concerns that we may need to collect more samples in the future. However, Travis wanted to remove the possibility of anyone getting hurt or the possibility of a spill going down one of these holes. Mr. Chang agreed that it was a good idea to abandon the monitoring points.

3. Presentations

A. 2010 Field Installations Update (see attachment 6)

Mr. Wray gave a presentation of the 2010 Field Installation Update.

Mr. Wray referenced a recent map to show the shrinking plumes. Please see attachment 6 for details on the sites. Questions were not asked during this presentation.

The key points made in the presentation include:

<u>Site DP039</u>

- The 500 µg/L TCE plume is defined laterally and vertically
- Bedrock encountered between about 50 to 60 feet below ground surface (bgs)
- Three new monitoring wells will be installed to complete the performance monitoring network, for a total of 15 monitoring wells (6 monitoring well pairs and 3 injection wells)
- 13 EVO injection wells to be installed across the plume, downgradient of the 500 µg/L TCE plume
- Approximately 25,000 lbs of EVO will be injected to form the biobarrier, followed by performance monitoring

<u>Site SS016</u>

- Soil vapor extraction will be discontinued due to limited effectiveness and to promote anaerobic conditions in the source area
- The Therm/Ox unit will be removed
- A bioreactor will be installed in the Wash Rack area which will remove a large mass of VOCs down to below the bedrock surface – the excavation will be approximately 20ft by 20ft by 20ft (and more likely 25ft deep)

- The existing horizontal extraction well (EW03x16) will be tied into the bioreactor for recirculation
- A cutoff wall was discussed previously to be located downgradient from the bioreactor – but due to all the dry borings encountered, the cutoff wall will not be installed initially
- Install five new monitoring wells to add to the performance monitoring network of six wells

Site SD036

- Investigation of the 1,000 µg/L TCE plume is not yet complete – still need to step out to the southwest, the north, and the northeast
- Found concentrations as high as 10,000 µg/L TCE in the northern part of Site SD036
- After the hot spot is defined, revise the EVO design

Site SD037

- Install triple-completion monitoring wells (in separate borings) at two downgradient locations, to complete the performance monitoring network of 11 wells
- Install 7 EVO injection wells in hot spot area
- Inject 36,000 lbs of EVO, followed by performance monitoring

Site SS015

- GSAP recently detected increasing VOC concentrations at Site SS015
- A previous vegetable oil treatability study was conducted at this site, and was performing well until the recent changes in the plume
- Will install several monitoring wells (already in progress)

Mr. Wray handed out a schedule of field activities (see attachment 7). He warned that the drilling was going a bit faster than expected, and that the schedule was constantly changing. So, if anybody wanted to come to the field to observe work, they should check with the Base or him before coming out.

B. Program Update: Activities Completed, In Progress and Upcoming (see Attachment 7)

Mr. Wray gave an update on field activities. Questions were not asked during this presentation.

Please see attachment 7 for details.

C. Annual RPO Report (see attachment 8)

Mr. Wray gave a presentation of the Annual RPO Report. Please attachment 8 for details.

4. New Action Item Review

A. EPA Dioxin Issues

Mr. Chang said EPA Headquarters is asking for the highest level of Dioxin cleanup on bases. A two-page survey from EPA was emailed to the Base. Mr. Anderson said he has a copy, and requested to discuss with Mr. Chang after the meeting.

B. Schedule NAAR RTC Meeting

Schedule NAAR RTC Meeting: It was determined to move this discussion to the FFS scoping meeting, scheduled right after the RPM meeting. In addition, a conference call with Travis AFB and EPA to discuss specific responses to EPA's comments on the NAAR should be scheduled.

5. PROGRAM/ISSUES/UPDATE

None.

6. Potential Response To Comments Meetings

FT005 Data Gap Investigation Work Plan: Travis AFB is preparing responses to EPA comments.

General Discussion

7. Action Items

1.	Travis AFB	Review CAMU design to determine if lysimeter is a regulatory requirement.	TBD	
2.	Travis AFB	Schedule a RAB tour at site SS016 for when the bioreactor is being installed.	TBD	

3	Travis AFB	Schedule a teleconference on MNA with EPA.	TBD	

Mr. Smith adjourned the meeting at 11:30am.

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM
REMEDIAL PROGRAM MANAGER'S MEETING
BLDG 571, Main Conference Room (8am to 11am)
and
BLDG 570, Main Conference Room (11am)
30 March 2010, 8:00 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. CAMU Lysimeter Monitoring (Rachel)
C. New fire station project (Lonnie)
D. EPA Expectations Discussion (Glenn)
E. VI Assessment Update (Glenn)

3. Presentations

A. 2010 Field Installations Update
B. Program update: activities completed, in progress and upcoming
C. Annual RPO Report

4. New Action Item Review

A. EPA Dioxin Issues (James)
B. Schedule NAAR RTC Meeting (All)

5. PROGRAM/ISSUES/UPDATE

6. Potential Response to Comments Meetings

FT005 Data Gap Investigation WP

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.)
01-27-10	—	—
—	—	—
03-30-10	—	—
04-22-10 (PM)	—	04-22-10
05-19-10	—	—
06-23-10	—	—
07-21-10	—	—
08-25-10	—	—
09-22-10	—	—
10-20-10	—	10-21-10
—	11-17-10	—
12-08-10	—	—

As of: 03/30/2010

Travis AFB Master Document Schedule

PRIMARY DOCUMENTS			
Life Cycle	Basewide Groundwater		
	Focused Feasibility Study Travis, Glenn Anderson CH2M Hill, Loren Krook	Proposed Plan Travis, Glenn Anderson CH2M HILL, Loren Krook	Record of Decision Travis, Glenn Anderson CH2M HILL, Tony Jaegel
Scoping Meeting	**(03-30-10)**	NA	**01-24-07**
Predraft to AF/Service Center	06-18-10	12-08-10	06-08-11
AF/Service Center Comments Due	07-02-10	01-03-11	06-22-11
Draft to Agencies	07-16-10	01-10-11	07-06-11
Draft to RAB	07-16-10	01-10-11	07-06-11
Agency Comments Due	09-17-10	03-09-11	08-31-11
Response to Comments Meeting	**10-21-10**	**03-23-11**	09-22-11
Agency Concurrence with Remedy	NA	NA	09-29-11
Public Comment Period	NA	03-31-11 to 04-27-11	NA
Public Meeting	**NA**	**04-21-11**	**NA**
Response to Comments Due	11-18-10	06-14-11	10-27-11
Draft Final Due	11-18-10	06-14-11	10-27-11
Final Due	12-20-10	07-14-11	11-24-11

PRIMARY DOCUMENTS				
	Potrero Hills Annex Travis, Glenn Anderson			Union Creek Sites SD001 &SD033 Remedial Action Travis, Lonnie Duke ITSI, Rachel Hess
Life Cycle	FFS	**Proposed Plan**	**ROD**	**Completion Report**
Scoping Meeting	**180 days after Water Board Order Rescinded**	**+470 days**	**+735 days**	**NA**
Predraft to AF/Service Center	+ 270 days	+530 days	+ 915 days	01/06/10
AF/Service Center Comments Due	+ 300 days	+560 days	+ 975 days	02/05/10
Draft to Agencies	+330 days	+590 days	+ 1035 days	03/30/10
Draft to RAB	+ 330 days	+590 days	+ 1035 days	03/30/10
Agency Comments Due	+390 days	+650 days	+ 1095 days	06/01/10
Response to Comments Meeting	**+ 405 days**	**+665 days**	**+ 1110 days**	**06/23/10**
Agency Concurrence with Remedy	NA	NA	+ 1130 days	NA
Public Comment Period	NA	+735 to 765 days	NA	NA
Public Meeting	**NA**	**+745 days**	**NA**	**NA**
Response to Comments Due	+430 days	+695days	+ 1190 days	07/21/10
Draft Final Due	+430 days	+695 days	+ 1190 days	07/21/10
Final Due	+460 days	+725 days	+ 1250 days	08/20/10

SECONDARY DOCUMENTS		
Life Cycle	Phases 1 and 2 Vapor Intrusion Report Travis, Glenn Anderson CH2M HILL, Leslie Royer	Vapor Intrusion Assessment Report** Travis, Glenn Anderson CH2M HILL, Leslie Royer
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	12-08-08	01-04-10
AF/Service Center Comments Due	12-15-08	01-14-10
Draft to Agencies	01-12-09	01-22-10
Draft to RAB	01-12-09	01-22-10
Agency Comments Due	02-17-09	02-26-10
Response to Comments Meeting	**02-25-09**	03-03-10
Response to Comments Due	TBD*	03-24-10
Draft Final Due	NA	NA
Final Due	TBD*	03-24-10
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**

*The Vapor Intrusion report will be rescheduled to incorporate the Phase 3 data and evaluation per discussion with EPA on 30 March 2009.

**The Vapor Intrusion Assessment Report contains the results of Phases 1, 2, and 3 of the Vapor Intrusion Assessment and a data evaluation. This report complies with the decisions made during the 30 March 2009 EPA-Travis AFB meeting.

SECONDARY DOCUMENTS			
Life Cycle	**Natural Attenuation Assessment Report** **Travis AFB, Glenn Anderson** **CH2M HILL, Leslie Royer**	**DP039 RPO Work Plan** **Travis AFB, Glenn Anderson** **CH2M HILL, Loren Krook**	**FT005 Data Gap Work Plan** **Travis, Lonnie Duke** **ITSI, Rachel Hess**
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	07-07-09	09-17-09	10/22/09
AF/Service Center Comments Due	07-21-09	10-01-09	11/20/09
Draft to Agencies	08-26-09	10-11-09	02/05/10
Draft to RAB	08-26-09	10-11-09	02/05/10
Agency Comments Due	10-15-09	11-13-09 (TBD)	03/08/10
Response to Comments Meeting	**01-27-10**	**12-09-09**	**03/30/10**
Response to Comments Due	04-16-10	(TBD)	04/22/10
Draft Final Due	NA	NA	NA
Final Due	04-16-10	(TBD)	04/22/10
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	ST027B Site Characterization Report Travis AFB, Lonnie Duke CH2M HILL, Gavan Heinrich
Scoping Meeting	**NA**	**NA**
Predraft to AF/Service Center	08-13-09	02-23-10
AF/Service Center Comments Due	08-27-09	03-08-10
Draft to Agencies	10-01-09	03-29-10
Draft to RAB	10-01-09	03-29-10
Agency Comments Due	11-02-09 (TBD)	04-28-10
Response to Comments Meeting	**11-16-09 (TBD)**	**05-19-10**
Response to Comments Due	12-22-09 (TBD)	05-26-10
Draft Final Due	NA	NA
Final Due	12-22-09 (TBD)	05-26-10
Public Comment Period	NA	NA
Public Meeting	**NA**	**NA**

INFORMATIONAL DOCUMENTS			
Life Cycle	Quarterly Newsletters (April 2010) Travis, Glenn Anderson	2008/2009 GSAP Travis AFB, Lonnie Duke CH2M HILL, Leslie Royer	2009 GWTP RPO Annual Report Travis AFB, Lonnie Duke CH2M HILL, Doug Berwick
Scoping Meeting	**NA**	**NA**	**NA**
Predraft to AF/Service Center	NA	10-26-09	03-09-10
AF/Service Center Comments Due	NA	11-09-09	03-30-10
Draft to Agencies	04-15-10	12-07-09	04-13-10
Draft to RAB	NA	12-07-09	04-13-10
Agency Comments Due	04-23-10	01-15-10	05-13-10
Response to Comments Meeting	**TBD**	**01-27-10**	**05-19-10**
Response to Comments Due	04-28-10	(TBD)	06-01-10
Draft Final Due	NA	NA	NA
Final Due	04-30-10	(TBD)	06-01-10
Public Comment Period	NA	**NA**	**NA**
Public Meeting	**NA**	**NA**	**NA**

HISTORICAL			
Life Cycle	**Model QAPP Update** **Travis, Glenn Anderson** **ITSI, Rachel Hess**	**Comprehensive Site Evaluation Phase II Work Plan** **Travis, Glenn Anderson** **Sky Research, Ian Roberts**	**Field Sampling Plan** **Travis AFB, Glenn Anderson** **CH2M HILL, Loren Krook**
Scoping Meeting	**06-26-09**	**NA**	**NA**
Predraft to AF/Service Center	07-03-09	01-15-09	04-28-09
AF/Service Center Comments Due	07-10-09	02-12-09	05-12-09
Draft to Agencies	07-20-09	04-29-09	06-26-09
Draft to RAB	07-20-09	04-29-09	06-26-09
Agency Comments Due	08-18-09	08-10-09	07-27-09 (08-20-09)
Response to Comments Meeting	**08-26-09**	**09-23-09**	**09-23-09**
Response to Comments Due	08-24-09	09-28-09	09-08-09
Draft Final Due	09-01-09	10-13-09	09-28-09
Final Due	10-02-09	11-13-09	11-04-09
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

HISTORICAL			
Life Cycle	**SS016 RPO Work Plan Travis AFB, Lonnie Duke CH2M HILL, Doug Berwick**	**ST018 POCO Remedial Action Work Plan 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**
Predraft to AF/Service Center	06-11-09	08-18-09	08-14-09
AF/Service Center Comments Due	06-25-09	09-01-09	08-28-09
Draft to Agencies	07-02-09	09-15-09	09-17-09
Draft to RAB	07-02-09	09-15-09	09-17-09
Agency Comments Due	08-26-09	10-13-09	10-19-09 (11-04-09)
Response to Comments Meeting	09-23-09	**10-21-09**	**10-21-09 (12-09-09)**
Response to Comments Due	11-02-09	11-24-09	11-10-09 (12-11-09)
Draft Final Due	NA	NA	NA
Final Due	11-02-09	11-24-09	11-10-09 (01-20-10)
Public Comment Period	NA	NA	NA
Public Meeting	**NA**	**NA**	**NA**

South Base Boundary Groundwater Treatment Plant
Monthly Data Sheet

Report Number: 115 **Reporting Period: 30 January – 26 February 2010** **Date Submitted: 18 March 2010**

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 – February 2010

Operating Time: **673 hours**

Percent Uptime: **100%**

Electrical Power Usage: **16,980 kWh**

Gallons Treated: **4.3 million gallons**

Gallons Treated Since July 1998: **679 million gallons**

Volume Discharged to Union Creek: **4.3 million gallons**

VOC Mass Removed: **1.56 pounds**[a]

VOC Mass Removed Since July 1998: **377pounds**

Rolling 12-Month Cost per Pound of Mass Removed[c]: $4,867

Monthly Cost per Pound of Mass Removed[c]: $5,456

[a] Calculated using January 2010 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.
[c] Increased costs are due to annual reporting expenses

Flow Rates

Average Groundwater Total Flow Rate: 107 gpm[a]

Average Flow Rate (gpm)[b]							
FT005[c]				SS029		SS030	
EW01x05	Off line	EW736x05	Off line	EW01x29	1.2	EW01x30	5.4
EW02x05	Off line	EW737x05	Off line	EW02x29	5.5	EW02x30	1.9
EW03x05	Off line	EW742x05	Off line	EW03x29	Off line[d]	EW03x30	3.5
EW731x05	Off line	EW743x05	Off line	EW04x29	9.7[f]	EW04x30	22.0
EW732x05	Off line	EW744x05	Off line	EW05x29	Off Line[e]	EW05x30	11.1
EW733x05	Off line	EW745x05	Off line	EW06x29	21.7	EW06x30	Dry
EW734x05	Off line	EW746x05	Off line	EW07x29	17.2	EW711x30	10.0[f]
EW735x05	Off line						
FT005 Total:		**Off line**		**SS029 Total:**	**55.3**	**SS030 Total:**	**53.9**

[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 wells at FT005 were taken off line in accordance with the *2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant.*
[d] Extraction well is off line due to low VOC concentrations.
[e] Extraction well offline due to faulty Variable Frequency Drive (VFD) at the well head.
[f] Extraction well online, but has a faulty flow meter. Average flow rate is from previous month's readings.

gpm—gallons per minute

Shutdown/Restart Summary

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
SBBGWTP (water)	None				
SBBGWTP = South Base Boundary Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater samples at the SBBGWTP were collected on 2 February 2010. Sample results are presented in Table 1. The total VOC concentration (43.4 µg/L) in the influent sample has increased since the January 2010 sample (35.6 µg/L) was collected. TCE and cis-1,2-DCE were the only VOCs detected in the influent sample. VOCs were not detected in the effluent sample, indicating good treatment efficiency.

During February 2010, well EW03x30 was brought back online after having been shut down since February 2004 due to low VOC concentrations in the vicinity of that well. During installation activities, the power wiring between the wellhead and the first electrical pullbox (sub-grade vault approximately 300 feet from the wellhead) was replaced. In addition, the groundwater pump in well EW03x30 was also replaced. Following installation, the pump was restarted on 9 February 2010 and left online for the remainder of February 2010.

Optimization Activities

EW03x30 was originally taken out of service in February 2004 due to low VOC concentrations in the vicinity of that well. In January 2010, EW03x30 was brought back on line in order to optimize hydraulic capture of the existing Site SS030 TCE plume. However, shortly after activating the extraction pump, the well malfunctioned. Initial flow rates from this well have indicated that EW03x30 will provide an additional 4 to 5 gpm of overall flow to the SBBGWTP. Groundwater extraction from all wells within Site SS030, including EW03x30 will maximize capture of the Site SS030 TCE plume.

No other optimization activities were performed.

Table 1
Summary of Groundwater Analytical Data for February 2010 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	2 February 2010 (µg/L)	
				Influent	Effluent
Halogenated Volatile Organics					
Bromodichloromethane	5.0	0.15	0	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND
Chloroform	5.0	0.16	0	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND
1,1-Dichloroethane	5.0	0.19	0	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	2.4	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND
Trichloroethene	5.0	0.19	0	41	ND
Vinyl Chloride	0.5	0.18	0	ND	ND
Non-Halogenated Volatile Organics					
Benzene	1.0	0.17	0	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND
Toluene	5.0	0.14	0	ND	ND
Xylenes	5.0	0.23 – 0.5	0	ND	ND
Other					
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50.5	0	NM	ND
Total Suspended Solids (mg/L)	NE	1.0	0	11 J	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

South Base Boundary Groundwater Treatment Plant
Monthly Data Sheet

Report Number: 114 **Reporting Period: 4 January – 29 January 2010** **Date Submitted: 03 March 2010**

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 – January 2010

Operating Time: **555 hours**

Percent Uptime: **92.6%**

Electrical Power Usage: **11,640 kWh**

Gallons Treated: **3.0 million gallons**

Gallons Treated Since July 1998: **674 million gallons**

Volume Discharged to Union Creek: **3.0 million gallons**

VOC Mass Removed: **0.89 pounds**[a]

VOC Mass Removed Since July 1998: **375pounds**

Rolling 12-Month Cost per Pound of Mass Removed[c]: $4,832

Monthly Cost per Pound of Mass Removed[c]: $8,191

[a] Calculated using January 2010 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.
[c] Increased costs are due to annual reporting expenses

Flow Rates

Average Groundwater Total Flow Rate: 90.3 gpm[a]

Average Flow Rate (gpm)[b]							
FT005[c]				SS029		SS030	
EW01x05	Off line	EW736x05	Off line	EW01x29	1.4	EW01x30	4.3
EW02x05	Off line	EW737x05	Off line	EW02x29	5.4	EW02x30	1.8
EW03x05	Off line	EW742x05	Off line	EW03x29	Off line[d]	EW03x30	Off line[d]
EW731x05	Off line	EW743x05	Off line	EW04x29	9.7[f]	EW04x30	22.2
EW732x05	Off line	EW744x05	Off line	EW05x29	Off Line[e]	EW05x30	11.6
EW733x05	Off line	EW745x05	Off line	EW06x29	21.6	EW06x30	Dry
EW734x05	Off line	EW746x05	Off line	EW07x29	17.2	EW711x30	10.0
EW735x05	Off line						
FT005 Total:		**Off line**		**SS029 Total:**	**55.3**	**SS030 Total:**	**49.9**

[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 wells at FT005 were taken off line in accordance with the *2008 Annual Remedial Process Optimization Report for the Central Groundwater Treatment Plant, North Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant.*
[d] Extraction well is off line due to low VOC concentrations.
[e] Extraction well offline due to faulty Variable Frequency Drive (VFD) at the well head.
[f] Extraction well online, but has a broken flow meter. Average flow rate is from December 2009

gpm—gallons per minute

Shutdown/Restart Summary

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
SBBGWTP (water)	Various		Various		Various power outages in the beginning of January 2010 lead to the system being shutdown for approximately 44 hours in the reporting period
SBBGWTP = South Base Boundary Groundwater Treatment Plant					

Summary of O&M Activities

Monthly groundwater samples at the SBBGWTP were collected on 14 January 2010. Sample results are presented in Table 1. The total VOC concentration (35.6 µg/L) in the influent sample has decreased since the December 2009 sample (44.1 µg/L) was collected. TCE and cis-1,2-DCE were the only VOCs detected in the influent sample. VOCs were not detected in the effluent sample, indicating good treatment efficiency.

The January 2010 monitoring period was from 4 January through 29 January 2010. The December 2009 monthly report included the first four days in January 2010 due to a power outage that affected several areas across the base, including the SBBGWTP. As a result of the power outage, several instrument meters could not be read between 30 December and 4 January.

Optimization Activities

EW03x30 was originally taken out of service in February 2004 due to low VOC concentrations in the vicinity of that well. In January 2010, EW03x30 was brought back on line in order to optimize hydraulic capture of the existing Site SS030 TCE plume. However, shortly after activating the extraction pump, the well malfunctioned. Historical flow rates from this well have indicated that EW03x30 can provide an additional 4 gpm of overall flow to the SBBGWTP. It is anticipated that EW03x30 will be returned to full service in February 2010 when EW03x30 can be fully repaired. Groundwater extraction from all wells within Site SS030, including EW03x30 will maximize capture of the Site SS030 TCE plume.

No other optimization activities were performed.

Table 1
Summary of Groundwater Analytical Data for January 2010 – South Base Boundary Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	14 January 2009 (µg/L)	
				Influent	Effluent
Halogenated Volatile Organics					
Bromodichloromethane	5.0	0.15	0	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND
Chloroform	5.0	0.16	0	ND	ND
Dibromochloromethane	5.0	0.13	0	ND	ND
1,1-Dichloroethane	5.0	0.19	0	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND
1,1-Dichloroethene	5.0	0.19	0	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	2.0	ND
trans-1,2-Dichloroethene	5.0	0.33	0	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND
Tetrachloroethene	5.0	0.21	0	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND
1,1,2-Trichloroethane	5.0	0.20	0	ND	ND
Trichloroethene	5.0	0.19	0	33.6	ND
Vinyl Chloride	0.5	0.18	0	ND	ND
Non-Halogenated Volatile Organics					
Benzene	1.0	0.17	0	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND
Toluene	5.0	0.14	0	ND	ND
Xylenes	5.0	0.23 – 0.5	0	ND	ND
Other					
Total Petroleum Hydrocarbons – Gasoline	50	8.5	0	NM	ND
Total Petroleum Hydrocarbons – Diesel	50	50	0	NM	ND
Total Suspended Solids (mg/L)	NE	1.0	0	15 J	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: 127 **Reporting Period: 30 January 2010 – 26 February 2010** **Date Submitted: 18 March 2010**

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 – February 2010

Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	675 hours	**CGWTP:**	100%	**CGWTP:**	63 kWh
WTTP:	Water: 673 hours	**WTTP:**	Water: 100%	**WTTP:**	12,429 kWh
	Vapor: 0 hours		Vapor: 0%		
ThOx:	22 hours	**ThOx:**	3.3%	**ThOx:**	2,949 kWh

ThOx: Natural Gas Usage: 92 therms

Gallons Treated: **2.0 million gallons**

Gallons Treated Since January 1996: **425 million gallons**

VOC Mass Removed:

6.96 lbs (groundwater only)[a]

0.62 lbs (vapor only)[b]

VOC Mass Removed Since January 1996:

2,478 lbs from groundwater

8,676 lbs from vapor

ThOx DRE: 100%

Rolling 12-Month Cost per Pound of Mass Removed: $1,604[c]

Monthly Cost per Pound of Mass Removed: $1,651 [c]

[a] Calculated using February 2010 EPA Method SW8260B analytical results.
[b] Total VOC vapor mass removed was calculated using EPA Method TO-14 analytical results for the ThOx system.
[c] Costs include operations and maintenance, reporting, analytical laboratory, project management, and electric and natural gas costs related to operation of the system. Lower costs reflect utility cost savings since the UV/Ox system has been taken off line.

DRE = destruction removal efficiency

Flow Rates

Average Groundwater Flow Rate: **48.6 gpm**[a]

Location	Average Flow Rate	
	Groundwater (gpm)[b]	Soil Vapor (scfm)
EW01x16	23.1	NA
EW02x16	6.7	NA
EW03x16	1.2	NA[c]
EW605x16	11.7	NA[c]
EW610x16	5.2	NA[c]
WTTP	5.6[d]	Off line
ThOx	1.0[d]	68.0

[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] as measured by the effluent groundwater pumped to the CGWTP divided by the operating time of the WTTP.

gpm = gallons per minute
NA = not applicable/not available
scfm = standard cubic feet per minute

Flow Rates from Wells Sites that Feed into the WTTP

Average Flow Rate from the WIOU, DP039, and LF008 Extraction Wells (gpm)[a]							
SD037/ SD043				SD033/SD034/ DP039		LF008/SD036	
EW599x37	4.0	EW705x37	1.2	EW501x33	0.6	EW719x08	Off line[c]
EW700x37	4.4	EW706x37	0.7	EW503x33	1.5	EW720x08	Off line[c]
EW701x37	1.2	EW707x37	1.5	EW01x34	0.3	EW721x08	Off line[c]
EW702x37	1.5	EW510x37	4.1	EW03x34	1.0	EW593x36	2.5
EW703x37	0.9	EW511x37	1.6	EW563x39	Off line[b]	EW594x36	0.8
EW704x37	2.0	EW555x43	0.2	EW782x39	Off line[b]	EW595x36	0.3

gpm—gallons per minute

[a] Extraction well flow rates are based on instantaneous readings during February 2010. These rates are not consistent with the overall effluent flow rate from the WTTP to the CGWTP.
[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	None		Various		
WTTP (Groundwater):					
WTTP	None		Various		
WTTP (Vapor):					
WTTP	24 August 2009				SVE system shut down for rebound study
ThOx (Vapor):					
ThOx	Various in February 2010		Various in February 2010		Shutdown due to frequent burner flame out alarms, likely due to high winds and low natural gas pressures. Additionally, malfunction of the hand-off-auto switch on the transfer pump.

CGWTP = Central Groundwater Treatment Plant
WTTP = West Treatment and Transfer Plant
ThOx = Thermal Oxidation System

Summary of O&M Activities

Monthly groundwater and vapor sampling at the CGWTP was performed on 2 February 2010. Groundwater sample results are summarized in Table 1. The total VOC concentration (420.7 µg/L) in the January 2010 CGWTP influent groundwater sample has increased since the January 2010 (323.7 µg/L) sample was taken. No VOCs were detected in the effluent sample.

During February 2010, the flow rates seen at each extraction well throughout the WTTP did not appear to be consistent with the flow rate of groundwater being sent from the WTTP to the CGWTP. The cause of this discrepancy is currently being investigated. Further details regarding this issue will be presented in the March 2010 data sheet.

The sump pump located in the WTTP compound was taken off line for repair on 8 February 2010. The pump had a cracked impeller that prevented it from functioning correctly. The impeller was repaired and returned to service on 22 February 2010.

Throughout February 2010, the ThOx unit was unable to remain online for any consistent time period. Several burner flame out alarms were the cause of several system shut downs, likely due to high wind conditions at Travis AFB. Additionally, the transfer pump on the ThOx unit did not function properly due to a faulty hand-off-auto switch located on the ThOx control panel. Because of the faulty switch, water would accumulate within the ThOx system and ultimately trip the high water alarm. The switch will be replaced in March 2010, and the system will be brought back online. Frequent monitoring of system activity will ensure the highest amount of system uptime in March 2010.

Optimization Activities

No optimization activities were performed in January 2010.

Table 1
Summary of Groundwater Analytical Data for February 2010 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	2 February 2010 (µg/L)				
			N/C	Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Bromodichloromethane	5.0	0.15	0	ND	ND	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND	ND
1,2-Dichlorobenzene	5.0	0.08	0	ND	ND	ND	ND
1.3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	0.71	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.19	0	68.8	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	3.6	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	0.74	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND	ND
Trichloroethene	5.0	1.9	0	347	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	ND	ND	ND	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.17	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND	ND
Total Xylenes	5.0	0.5 – 0.23	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

Central Groundwater Treatment Plant Monthly Data Sheet

Report Number: 126 **Reporting Period: 4 January 2009 – 29 January 2010** **Date Submitted: 03 March 2010**

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 – January 2010

Operating Time:		Percent Uptime:		Electrical Power Usage:	
CGWTP:	582 hours	**CGWTP:**	97.7%	**CGWTP:**	58 kWh
WTTP:	Water: 461 hours	**WTTP:**	Water: 76.3%	**WTTP:**	9,019 kWh
	Vapor: 0 hours		Vapor: 0%		
ThOx:	280 hours	**ThOx:**	46.9%	**ThOx:**	4,356 kWh

ThOx: Natural Gas Usage: 1,112 therms

Gallons Treated: **1.5 million gallons**

Gallons Treated Since January 1996: **423 million gallons**

VOC Mass Removed:

4.04 lbs (groundwater only)[a]

7.85 lbs (vapor only)[b]

VOC Mass Removed Since January 1996:

2,471 lbs from groundwater

8,675 lbs from vapor

ThOx DRE: 100%

Rolling 12-Month Cost per Pound of Mass Removed: $1,571[c]

Monthly Cost per Pound of Mass Removed: $1,026 [c]

[a] Calculated using January 2010 EPA Method SW8260B analytical results.
[b] Total VOC vapor mass removed was calculated using EPA Method TO-14 analytical results for the ThOx system.
[c] Costs include operations and maintenance, reporting, analytical laboratory, project management, and electric and natural gas costs related to operation of the system. Lower costs reflect utility cost savings since the UV/Ox system has been taken off line, and high vapor-phase mass removal.

DRE = destruction removal efficiency

Flow Rates

Average Groundwater Flow Rate: **42.9 gpm**[a]

Location	Average Flow Rate	
	Groundwater (gpm)[b]	**Soil Vapor (scfm)**
EW01x16	22.8	NA
EW02x16	6.6	NA
EW03x16	1.2	NA[c]
EW605x16	11.8	NA[c]
EW610x16	5.5	NA[c]
WTTP	4.18[de]	Off line
ThOx	0.17[d]	68.0

[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] as measured by the effluent groundwater pumped to the CGWTP divided by the operating time.
[e] Low flow rate due to downtime at WTTP throughout January 2010.

gpm = gallons per minute
NA = not applicable/not available
scfm = standard cubic feet per minute

Flow Rates from Wells Sites that Feed into the WTTP

Average Flow Rate from the WIOU, DP039, and LF008 Extraction Wells (gpm)[a]							
SD037/ SD043				SD033/SD034/ DP039		LF008/SD036	
EW599x37	4.3	EW705x37	1.2	EW501x33	0.5	EW719x08	Off line[c]
EW700x37	4.4	EW706x37	0.7	EW503x33	1.6	EW720x08	Off line[c]
EW701x37	1.1	EW707x37	1.0	EW01x34	0.2	EW721x08	Off line[c]
EW702x37	2.6	EW510x37	4.1	EW03x34	1.0	EW593x36	2.6
EW703x37	1.2	EW511x37	1.7	EW563x39	Off line[b]	EW594x36	0.9
EW704x37	2.1	EW555x43	0.6	EW782x39	Off line[b]	EW595x36	0.2

gpm—gallons per minute

[a] Extraction well flow rates are based on instantaneous readings during January 2010.
[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	Various		Various		Various power outages during early morning hours led to approximately fourteen (14) total hours of system downtime in January 2010.
WTTP (Groundwater):					
WTTP	Various		Various		In addition to the listed shutdown, the WTTP was also off periodically for power testing and power outages. All together this time added up to approximately 144 hours (~6 days)
WTTP	26 January 2010	14:00	27 January 2010	16:00	Shutdown for repair on eductor pump and bag filter outlet leaks
WTTP (Vapor):					
WTTP	24 August 2009				SVE system shut down for rebound study
ThOx (Vapor):					
ThOx	22 January 2010	10:30	25 January 2010	13:45	Shutdown due to high water level in OSA equipment vault

CGWTP = Central Groundwater Treatment Plant
WTTP = West Treatment and Transfer Plant
ThOx = Thermal Oxidation System

Summary of O&M Activities

Monthly groundwater and vapor sampling at the CGWTP was performed on 15 January 2010. Groundwater sample results are summarized in Table 1. The total VOC concentration (323.7 µg/L) in the January 2010 CGWTP influent groundwater sample has decreased since the December 2009 (342.8 µg/L) sample was taken. No VOCs were detected in the effluent sample.

The January 2010 monitoring period goes from 4 January 2010 through 29 January 2010. The first four (4) days in January 2010 were included in the December 2009 monthly report due to a power outage that affected several areas across the base, including the WTTP and ThOx. As a result of the power outage, several instrument meters could not be read between December 30 and January 04.

Following construction paving work on the parking apron just south of the ThOx unit, wells EW605x16 and EW610x16 were brought back online. EW610x16 was repaired and brought back on line on 11 January 2010.

Two (2) leaks were identified and fixed at the WTTP in January 2010. A new diaphragm valve for the recirculation line and a ball valve for the bag filter outlet were purchased an installed. The WTTP was taken off line on 26 January to initiate the repair work, and restarted on 27 January..

Optimization Activities

No optimization activities were performed in January 2010.

Table 1
Summary of Groundwater Analytical Data for January 2010 – Central Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	15 January 2009 (µg/L)				
			N/C	Influent	After Carbon 1 Effluent	After Carbon 2 Effluent	System Effluent
Halogenated Volatile Organics							
Bromodichloromethane	5.0	0.15	0	ND	ND	ND	ND
Carbon Tetrachloride	0.5	0.14	0	ND	ND	ND	ND
Chloroform	5.0	0.16	0	ND	ND	ND	ND
1,2-Dichlorobenzene	5.0	0.08	0	ND	ND	ND	ND
1.3-Dichlorobenzene	5.0	0.15	0	ND	ND	ND	ND
1,4-Dichlorobenzene	5.0	0.15	0	ND	ND	ND	ND
1,1-Dichloroethane	5.0	0.15	0	ND	ND	ND	ND
1,2-Dichloroethane	0.5	0.15	0	ND	ND	ND	ND
1,1-Dichloroethene	5.0	0.19	0	0.64	ND	ND	ND
cis-1,2-Dichloroethene	5.0	0.95	0	60.9	ND	ND	ND
trans-1,2-Dichloroethene	5.0	0.33	0	2.8	ND	ND	ND
Methylene Chloride	5.0	0.66	0	ND	ND	ND	ND
Tetrachloroethene	5.0	0.21	0	0.67	ND	ND	ND
1,1,1-Trichloroethane	5.0	0.14	0	ND	ND	ND	ND
1,1,2-Trichloroethane	5.0	0.2	0	ND	ND	ND	ND
Trichloroethene	5.0	0.95	0	261	ND	ND	ND
Vinyl Chloride	0.5	0.18	0	0.49 J	ND	ND	ND
Non-Halogenated Volatile Organics							
Benzene	1.0	0.17	0	ND	ND	ND	ND
Ethylbenzene	5.0	0.22	0	ND	ND	ND	ND
Toluene	5.0	0.14	0	ND	ND	ND	ND
Total Xylenes	5.0	0.5 – 0.23	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

North Groundwater Treatment Plant Monthly Data Sheet

Report Number: 106 **Reporting Period: 4-28 January 2010** **Date Submitted: 03 March 2010**

This data sheet includes the following: results for the operation of the groundwater extraction systems; a summary of flow rates for the individual extraction wells; a brief description of any shutdowns or significant events related to the systems: and a summary of analytical results for selected samples collected.

Operations Summary – January 2010[a]

Operating Time: **Water:** ~ 15 hours[b]

Percent Uptime: **Water:** 2.5%

Electrical Power Usage: **Not Measured**

Gallons Treated: **~200**

Gallons Treated Since March 2000: **82.5 million gallons**

Volume Discharged to Duck Pond[c]: **0**

Volume Discharged to Storm Drain[c]: **0**

Percentage of Treated Water to Beneficial Use: **0%**

VOC Mass Removed:

NM

VOC Mass Removed Since March 2000:

174.3 lbs from groundwater

Rolling 12-Month Cost per Pound of Mass Removed: NM

Monthly Cost per Pound of Mass Removed: NM

[a] NGWTP was shut down on 17 February 2009 due to standing water forming in vernal pools at Site LF007C. The plant was not restarted for the remainder of 2009.
[b] The NGWTP was briefly turned on to collect groundwater samples on 14 and 15 January 2010.
[c] Treated water remains in the irrigation holding tank.

Flow Rates

Average Groundwater Total Flow Rate: **NM**

Location	Average Flow Rate (gpm)
EW565x31	NM
EW566x31	NM
EW567x31	NM
EW576x04	NM
EW577x04	NM
EW578x04	NM
EW579x04	NM
EW580x04	NM
EW621x04	NM
EW622x04	NM
EW623x04	NM
EW614x07	NM
EW615x07	NM

NGWTP briefly brought online 14 and 15 January 2010 for sampling. No flow rates were measured.
gpm = gallons per minute

Shutdown/Restart Summary

Location	Shutdown		Restart		Cause
	Date	Time	Date	Time	
NGWTP (water)	17 February 2009	13:00	14 January 2010	11:00	NGWTP was shutdown due to standing water forming in the vernal pools at Site LF007C. The system was restarted to collect samples from system with new GAC configuration.
NGWTP (water)	14 January 2010	16:00	15 January 2010	07:55	NGWTP was restarted to continue sampling.
NGWTP (water)	15 January 2010	16:00			NGWTP shutdown to review sample results of groundwater treated by new configuration.
NGWTP = North Groundwater Treatment Plant					

Summary of O&M Activities

On 17 February 2009, the solar wells at Site LF007C (EW614x07 and EW615x07) were shut down for the rainy season. In addition, the NGWTP was shut down as proposed in the *Technical Memorandum for the Remedial Process Optimization (RPO) at Sites SD031, FT004, and LF007C* (Travis AFB, 10 June 2008), in conjunction with shutting down extraction at Site LF007C for the wet season. The system was not restarted for the remainder of 2009.

On 15 January 2010, the LF007C extraction system was started up and run for about 15 hours in order to collect groundwater samples from the system influent and system effluent. The treated water flowed into the large holding tank just outside of the treatment compound. The water stored in the tank has not been discharged. Following sample collection, the NGWTP was taken off line. The system was taken off line in order to confirm that the groundwater extracted from Site LF007C was being adequately treated prior to discharge. Full analytical results from the 15 January 2010 sampling event are presented in Table 1.

Recent modifications to the NGWTP were completed in December 2009. These modifications included reconfiguring the NGWTP to treat water only from the Site LF007C groundwater extraction wells (see the 2008 Annual Remedial Process Optimization Report for the North Groundwater Treatment Plant, Central Groundwater Treatment Plant, and South Base Boundary Groundwater Treatment Plant for details regarding operation of the NGWTP), and adding two 200-pound granular activated carbon vessels in series to the treatment train.

The analytical data presented in Table 1 shows that the VOC contamination in the system influent sample (cis-1,2-DCE, TCE) is completely remediated by the GAC treatment. The analytical data also show that TPH concentrations (both diesel and gasoline range) in the system effluent sample were in excess of discharge limits.

Following sample collection on 15 January 2010, the NGWTP was taken off line while waiting for analytical results. Before receiving those results, however, heavy rains at Travis AFB resulted in the formation of vernal pools at Site LF007C. As a result, the NGWTP remains off line. After the vernal pools have dissipated, system samples from the NGWTP will again be collected prior to returning the NGWTP to full-time operation. Additional TPH samples will also be collected from the influent system sample location to compare with system effluent sample results. Travis AFB will continue to monitor influent and effluent groundwater concentrations to ensure optimal system performance.

Optimization Activities

In December 2009, the NGWTP was reconfigured to be able to treat extracted groundwater from only the Site LF007C solar wells with two (2) granular activated carbon (GAC) vessels plumbed in series. The system is currently set-up to bypass the wet well and the air stripper. Treatment of extracted groundwater from Site LF007C is accomplished through use of two (2) 200-pound GAC vessels. All of the energy needed to process the groundwater through the GAC vessels is provided by the solar extraction wells. As a result of this reconfiguration, the NGWTP can continue to treat groundwater from Site LF007C in a sustainable manner. This reconfiguration effectively bypasses two frequently or continuously running transfer pumps: one from the wet well into the air stripper, and one from the air stripper into the irrigation holding tank. In addition, this optimization removes the need for the continuously running air stripper positive displacement blower, thus lowering electrical energy consumption at the NGWTP.

No other optimization activities were conducted in January 2009.

Table 1
Summary of Groundwater Analytical Data for January 2010 – North Groundwater Treatment Plant

Constituent	Instantaneous Maximum[a] (µg/L)	Detection Limit (µg/L)	N/C	15 January 2010 (µg/L) Influent	Effluent[b]
Halogenated Volatile Organics					
Bromodichloromethane	5.0	0.18	0	ND	ND
Bromoform	5.0	0.10	0	ND	ND
Carbon Tetrachloride	0.5	0.22	0	ND	ND
Chloroform	5.0	0.17	0	ND	ND
Dibromochloromethane	5.0	0.10	0	ND	ND
1,3-Dichlorobenzene	5.0	0.13	0	ND	ND
1,4-Dichlorobenzene	5.0	0.10	0	ND	ND
1,1-Dichloroethane	5.0	0.19	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	0.16	0	0.37 J	ND
trans-1,2-Dichloroethene	5.0	0.21	0	ND	ND
Methylene Chloride	5.0	0.27	0	ND	ND
Tetrachloroethene	5.0	0.16	0	ND	ND
1,1,1-Trichloroethane	5.0	0.20	0	ND	ND
1,1,2-Trichloroethane	5.0	0.14	0	ND	ND
Trichloroethene	5.0	0.50	0	5.2	ND
Vinyl Chloride	0.5	0.19	0	ND	ND
Non-Halogenated Volatile Organics					
Benzene	1.0	0.12	0	ND	ND
Ethylbenzene	5.0	0.10	0	ND	ND
Toluene	5.0	0.14	0	ND	ND
Xylenes	5.0	0.10 – 0.21	0	ND	ND
Other					
Total Petroleum Hydrocarbons – Gasoline	50	50	0	NM	160
Total Petroleum Hydrocarbons – Diesel	50	100	0	NM	170

[a] In accordance with Appendix G of the *Travis AFB North Groundwater Treatment Plant Operations and Maintenance Manual*, Sites FT004, SD031, and LF007 Area C (URS Group, Inc., 2005).

b The effluent stream contained detectable amounts of 2-butanone and acetone. These constituents are likely remnants of PVC glue and primer used when constructing the NGWTP reconfiguration. These constituents are expected to dissipate over time.

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

2010 Field Installations Update

Travis Air Force Base, California

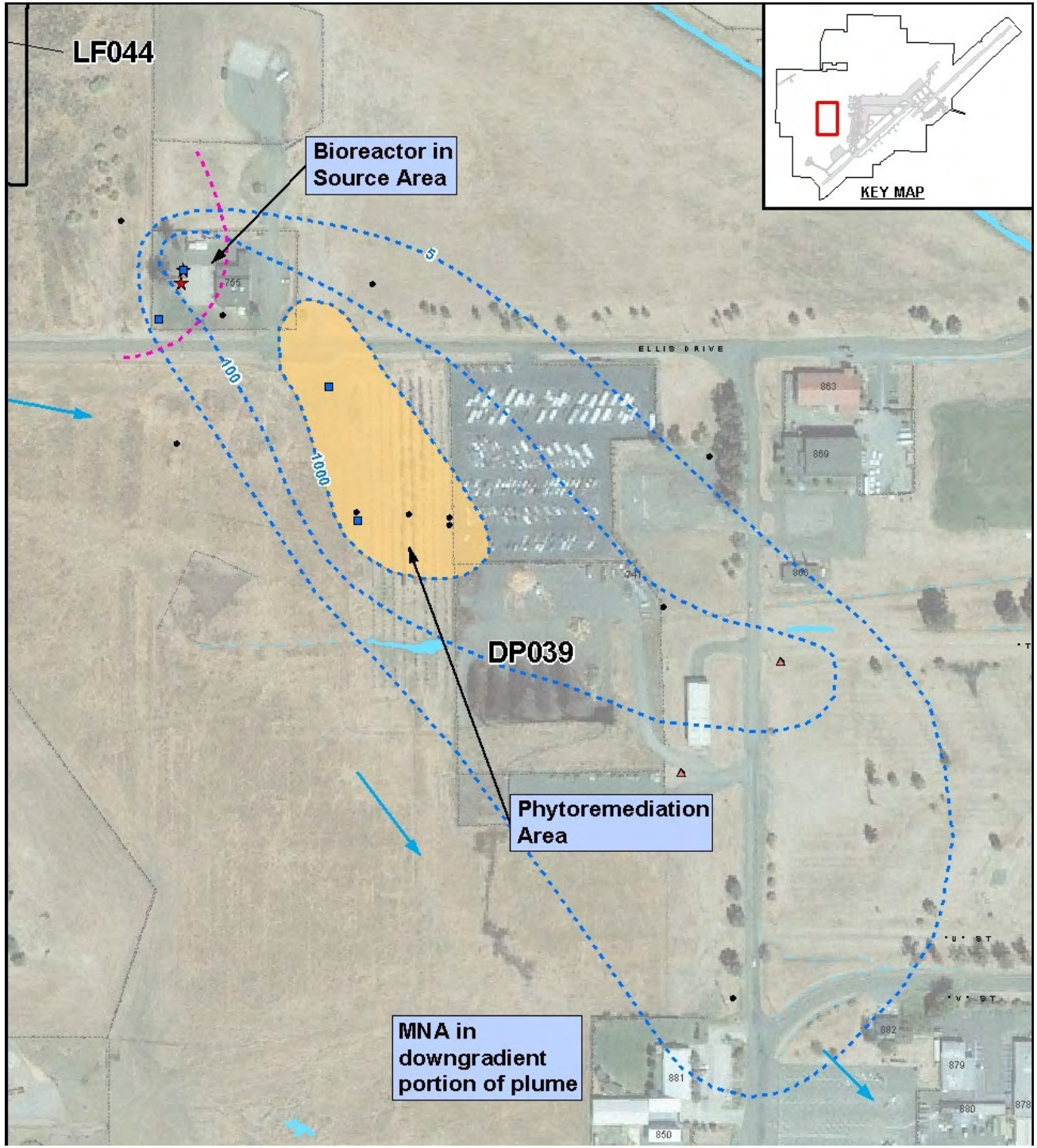
March 30, 2010

Installations in Progress

- Site DP039 Mid-Plume
- Site SS016 OSA Source Area
- Site SS030 Eastern Edge of Plume
- Site SD036 Hot Spot
- Site SD037 Hot Spot
- Site ST027B Plume Characterization
- Site SS015 Plume

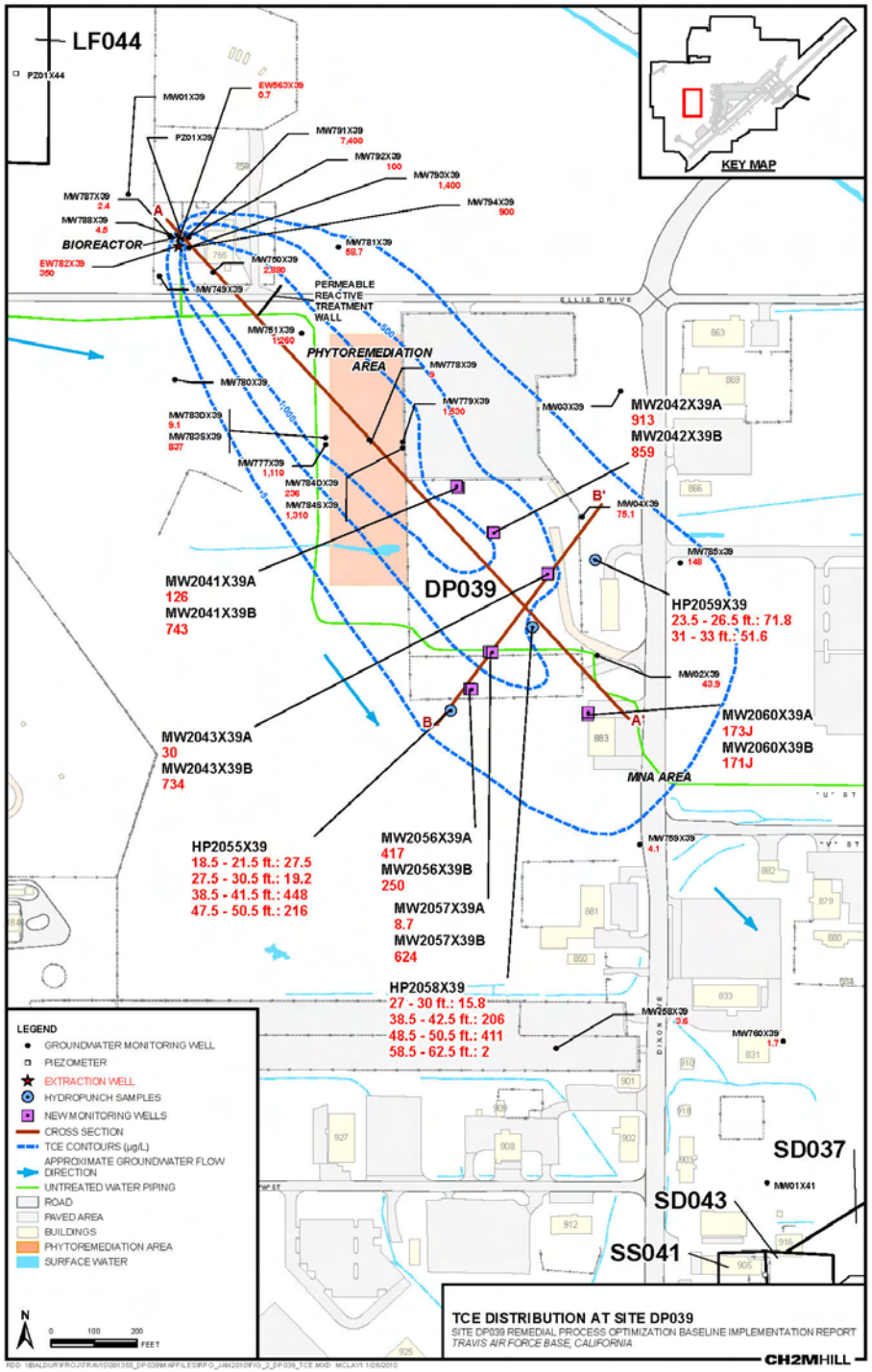
Site DP039

- Contaminant plume of TCE originates near Building 755
- Remedial processes operating at the site include a bioreactor, phytoremediation area, and MNA


LF044
Bioreactor in Source Area
KEY MAP
5
100
1000
ELLIS DRIVE
DP039
Phytoremediation Area
MNA in downgradient portion of plume

Investigation Results – DP039

- The 500 µg/L plume is defined in all directions and vertically
- The TCE concentrations >500 µg/L were found further to the southeast than anticipated
- Bedrock encountered at about 50 to 60 ft bgs across the planned biobarrier area


LF044
PZ01X44
KEY MAP
MW01X39
EW563X39
0.7
PZ01X39
MW791X39
7,400
MW792X39
100
MW793X39
1,400
MW794X39
900
MW787X39
2.4
MW788X39
4.5
A
BIOREACTOR
EW782X39
350
MW781X39
58.7
MW750X39
2,590
MW749X39
PERMEABLE REACTIVE TREATMENT WALL
ELLIS DRIVE
MW751X39
1,260
PHYTOREMEDIATION AREA
MW778X39
9
MW780X39
MW779X39
1,530
MW03X39
MW2042X39A
913
MW2042X39B
859
MW783DX39
9.1
MW783SX39
837
MW777X39
1,110
MW784DX39
236
MW784SX39
1,310
B'
MW04X39
78.1
MW785X39
148
MW2041X39A
126
MW2041X39B
743
DP039
HP2059X39
23.5 - 26.5 ft.: 71.8
31 - 33 ft.: 51.6
MW02X39
43.9
B
A'
MW2060X39A
173J
MW2060X39B
171J
MW2043X39A
30
MW2043X39B
734
MNA AREA
HP2055X39
18.5 - 21.5 ft.: 27.5
27.5 - 30.5 ft.: 19.2
38.5 - 41.5 ft.: 448
47.5 - 50.5 ft.: 216
MW2056X39A
417
MW2056X39B
250
MW759X39
4.1
MW2057X39A
8.7
MW2057X39B
624
HP2058X39
27 - 30 ft.: 15.8
38.5 - 42.5 ft.: 206
48.5 - 50.5 ft.: 411
58.5 - 62.5 ft.: 2
MW758X39
3.6
MW760X39
1.7
DIXON AVE
SD037
MW01X41
SD043
SS041
LEGEND
GROUNDWATER MONITORING WELL
PIEZOMETER
EXTRACTION WELL
HYDROPUNCH SAMPLES
NEW MONITORING WELLS
CROSS SECTION
TCE CONTOURS (µg/L)
APPROXIMATE GROUNDWATER FLOW DIRECTION
UNTREATED WATER PIPING
ROAD
PAVED AREA
BUILDINGS
PHYTOREMEDIATION AREA
SURFACE WATER
N
0 100 200
FEET
TCE DISTRIBUTION AT SITE DP039
SITE DP039 REMEDIAL PROCESS OPTIMIZATION BASELINE IMPLEMENTATION REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA
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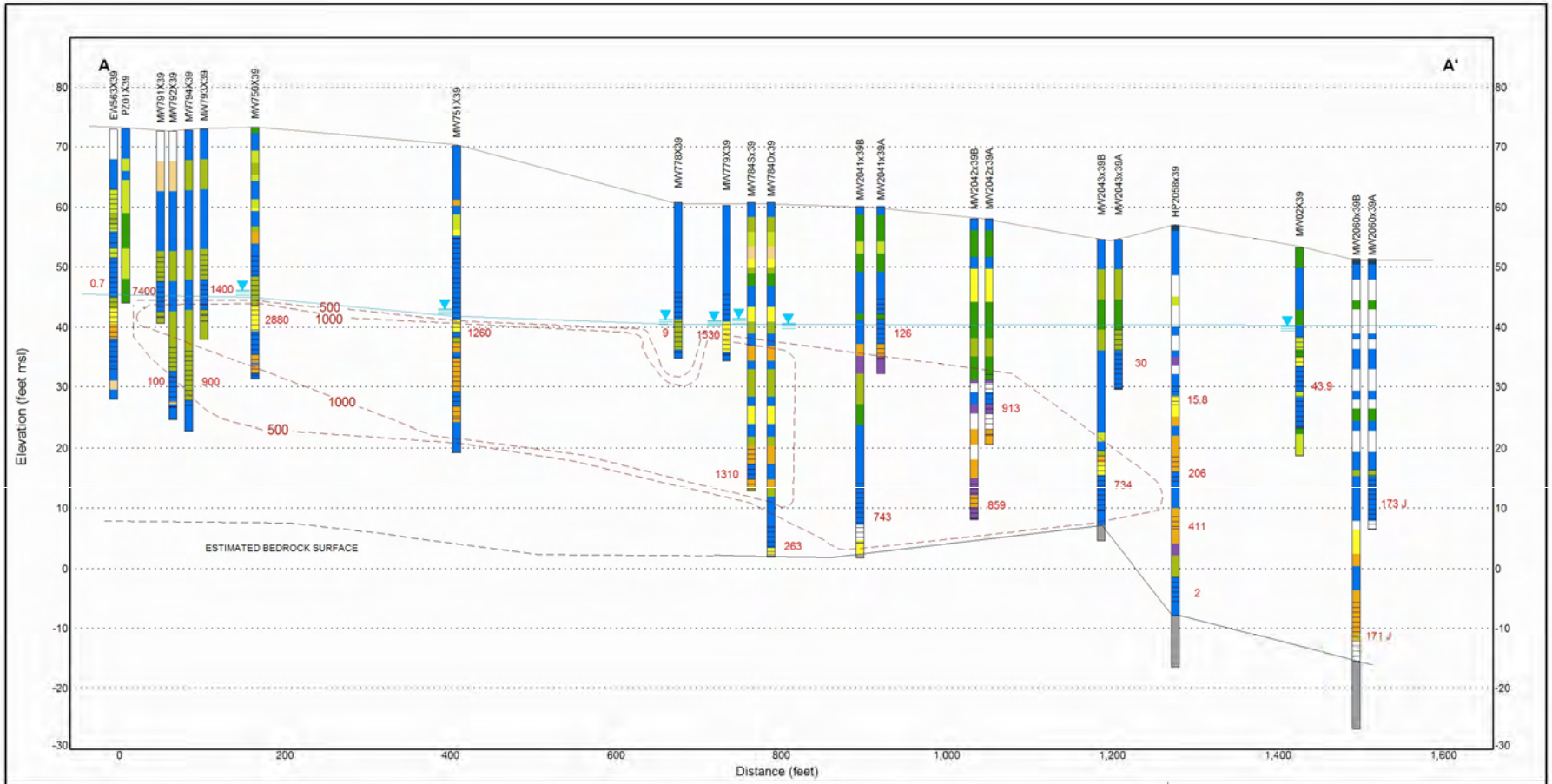

SOIL AND LITHOLOGY

SCREEN INTERVAL

APPROXIMATE SECOND QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

5 APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L) BASED ON MAX 2009 DECTECTION

SCALE EXAGGERATION - 7.3:1 (H:V)

NO SAMPLE/NO RECOVERY
FILL/ASPHALT
TOPSOIL/ORGANIC SOIL
WELL GRADED GRAVEL (GW)
POORLY GRADED GRAVEL (GP)
SILTY GRAVEL (GM)
CLAYEY GRAVEL (GC)
WELL GRADED SAND (SW)
POORLY GRADED SAND (SP)
SILTY SAND (SM)
CLAYEY SAND (SC)
SILT (ML)
ELASTIC SILT (MH)
LEAN CLAY (CL)
FAT CLAY (CH)
SILTSTONE
SANDSTONE
SHALE
ALLUVIUM (NO DATA)

DP039 CROSS-SECTION A

SITE DP039 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

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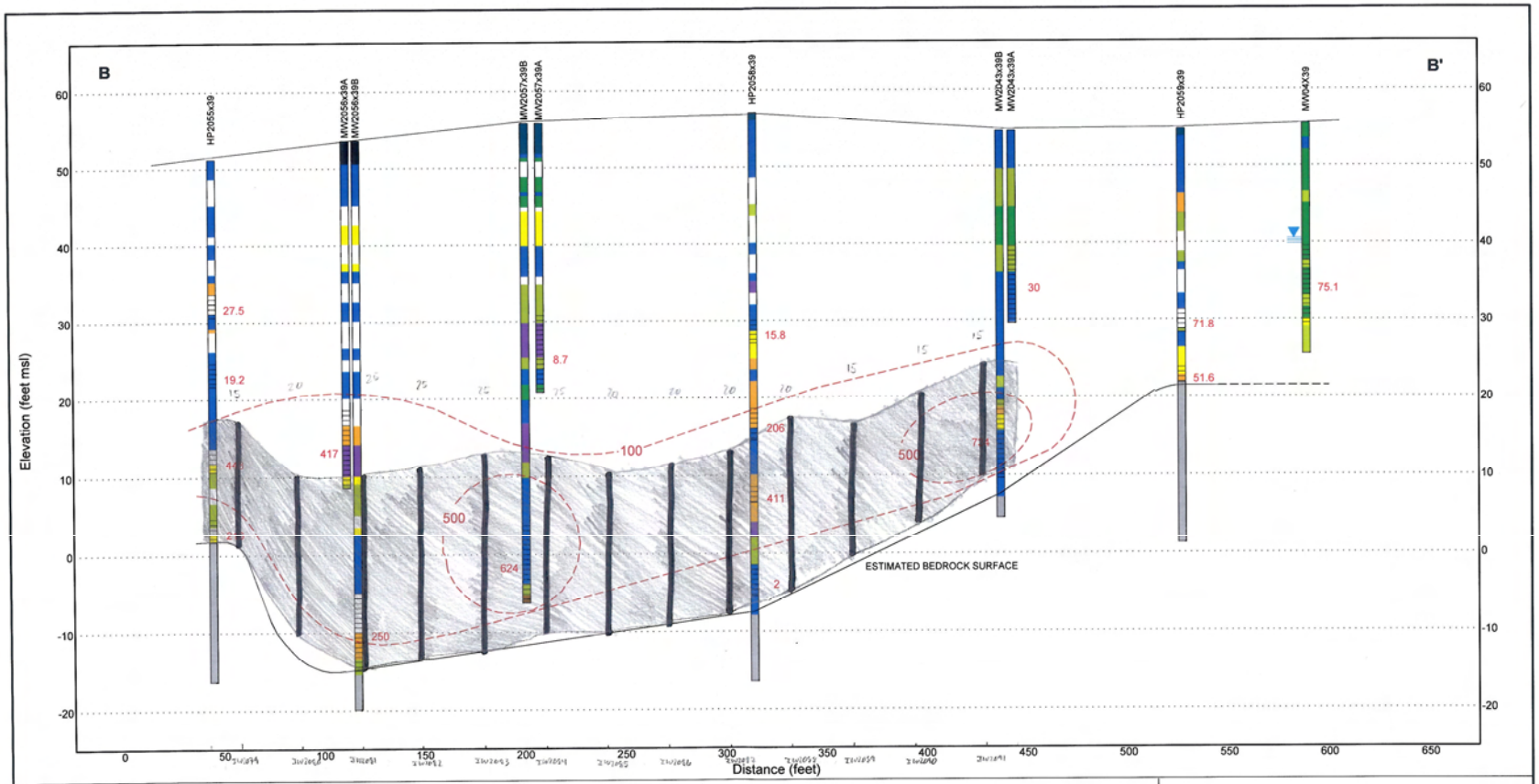

SOIL AND LITHOLOGY

- SCREEN INTERVAL
- APPROXIMATE SECOND QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)
- 6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009
- 5 APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L) BASED OF MAX 2009 DECTECTION
- SCALE EXAGGERATION - 3.8:1 (H:V)

- NO SAMPLE/NO RECOVERY
- FILL/ASPHALT
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

FIGURE B
DP039 CROSS-SECTION B
SITE DP039 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

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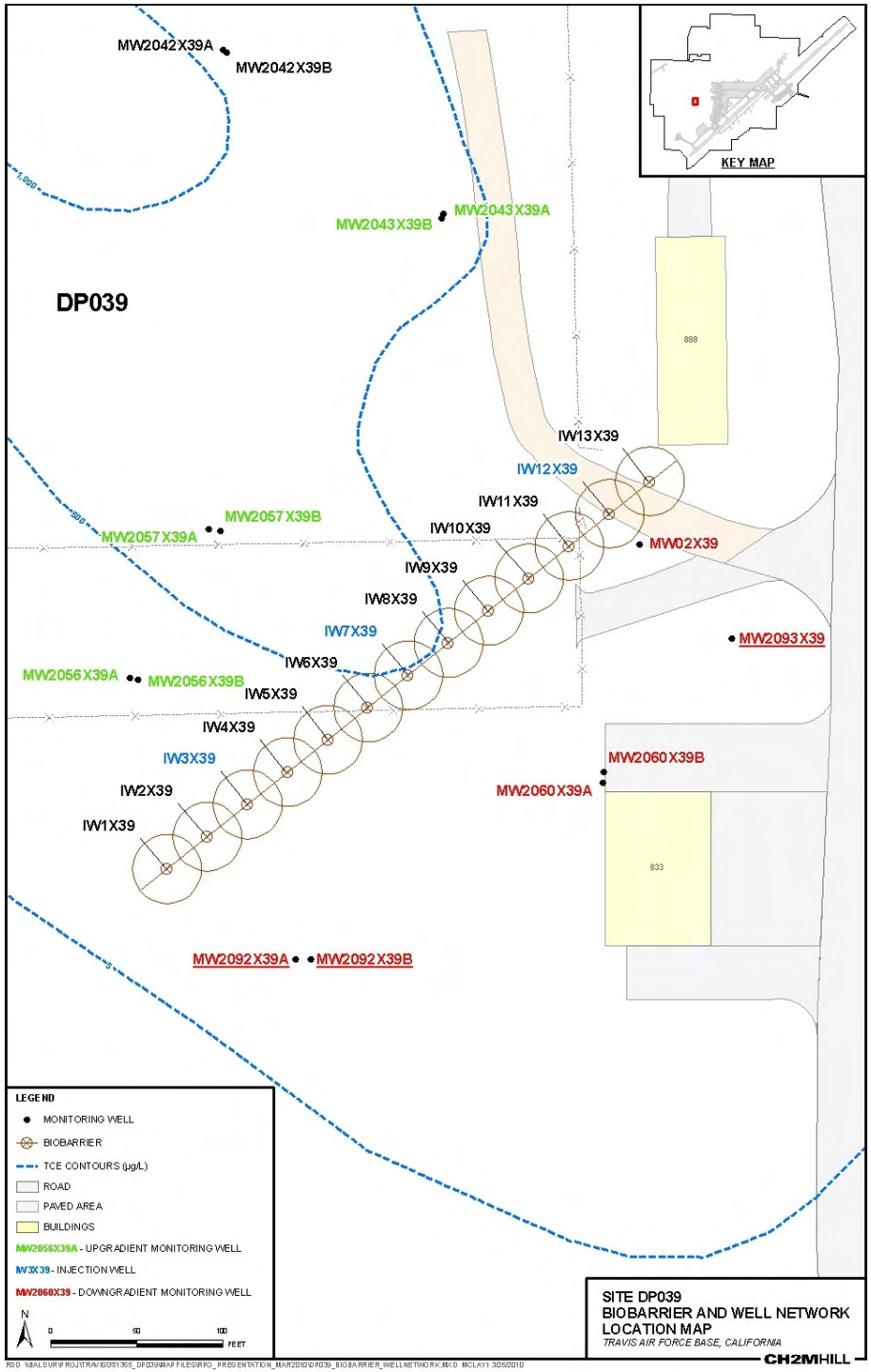
\\YOSEMITE\PROJ\TRAVISAIRFORCEBASE\COMMONFILES\GINT FILES\TRAVIS_AFB_GINT_SECTIONS\MASTER_DATA\TRAVIS_2009_SAMPLING_EVENT.GPJ;

Site DP039—Next Steps

- Install 3 new monitoring wells to complement the existing well pairs (for total of 15 wells in the performance monitoring network)
- Install 13 EVO injection wells across the plume, downgradient of the 500 µg/L contour (change well radius from 40 ft to 30 ft
- Inject about 25,000 lbs of EVO to form the biobarrier
- Initiate performance monitoring of the remedy optimization
- Prepare a completion report after EVO injection is finished
- Evaluate ongoing progress in GSAP reports


MW2042X39A
MW2042X39B
KEY MAP
MW2043X39B
MW2043X39A
DP039
888
IW13X39
IW12X39
IW11X39
IW10X39
MW2057X39B
MW2057X39A
MW02X39
IW9X39
IW8X39
IW7X39
MW2093X39
IW6X39
MW2056X39A
MW2056X39B
IW5X39
IW4X39
IW3X39
MW2060X39B
IW2X39
MW2060X39A
IW1X39
833
MW2092X39A
MW2092X39B
LEGEND
MONITORING WELL
BIOBARRIER
TCE CONTOURS (µg/L)
ROAD
PAVED AREA
BUILDINGS
MW2056X39A - UPGRADIENT MONITORING WELL
IW3X39 - INJECTION WELL
MW2060X39 - DOWNGRADIENT MONITORING WELL
N
0
50
100
FEET
SITE DP039
BIOBARRIER AND WELL NETWORK
LOCATION MAP
TRAVIS AIR FORCE BASE, CALIFORNIA
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Site DP039 Performance Monitoring Plan

- **Monitoring Well Network**

  -six (6) upgradient wells (MW2056x39A&B, MW2057x39A&B, and MW2043x39A&B)

  -three (3) performance wells (IW3x39, IW7x39, and IW12x39)

  -six (6) compliance wells (MW2060A&B, MW02x39, new well pair to the southwest, and new well to the northeast)

- **Analytes**

  -VOCs (including VC), Dissolved Hydrocarbon Gasses, Total Organic Carbon, Nitrate/Nitrite, Sulfate, Chloride, Sulfide, Ferrous Iron, Alkalinity, pH, ORP, Temperature, EC, DO

- **Frequency**

  -Pre-Installation: All wells sampled in baseline event

  -Post-Installation: Semi-Annually for first two (2) years, Annually thereafter

Site SS016 OSA

- Contaminant plume of trichloroethene (TCE) begins in OSA and travels southeast beneath active runway
- Existing remedial processes include groundwater extraction & treatment (GAC), and soil vapor extraction and treatment (Therm/Ox)

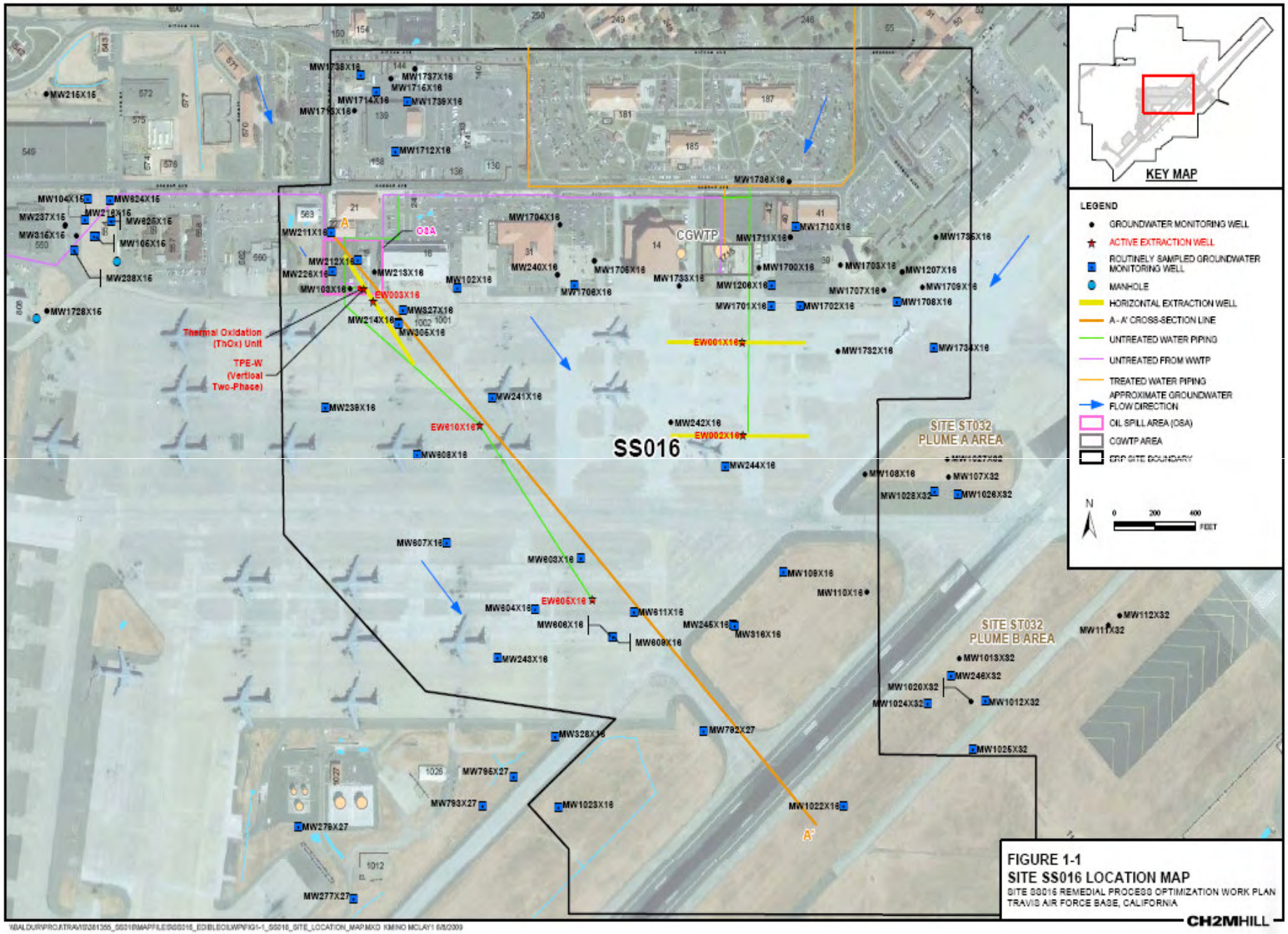

FIGURE 1-1
SITE SS016 LOCATION MAP
SITE SS016 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

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\\BALDUR\PROJ\TRAV\0381355_SS016\MAPFILES\SS016_EDIBLE\OILWP\FIG1-1_SS016_SITE_LOCATION_MAP.MXD KIMINO MCLAY1 6/8/2009

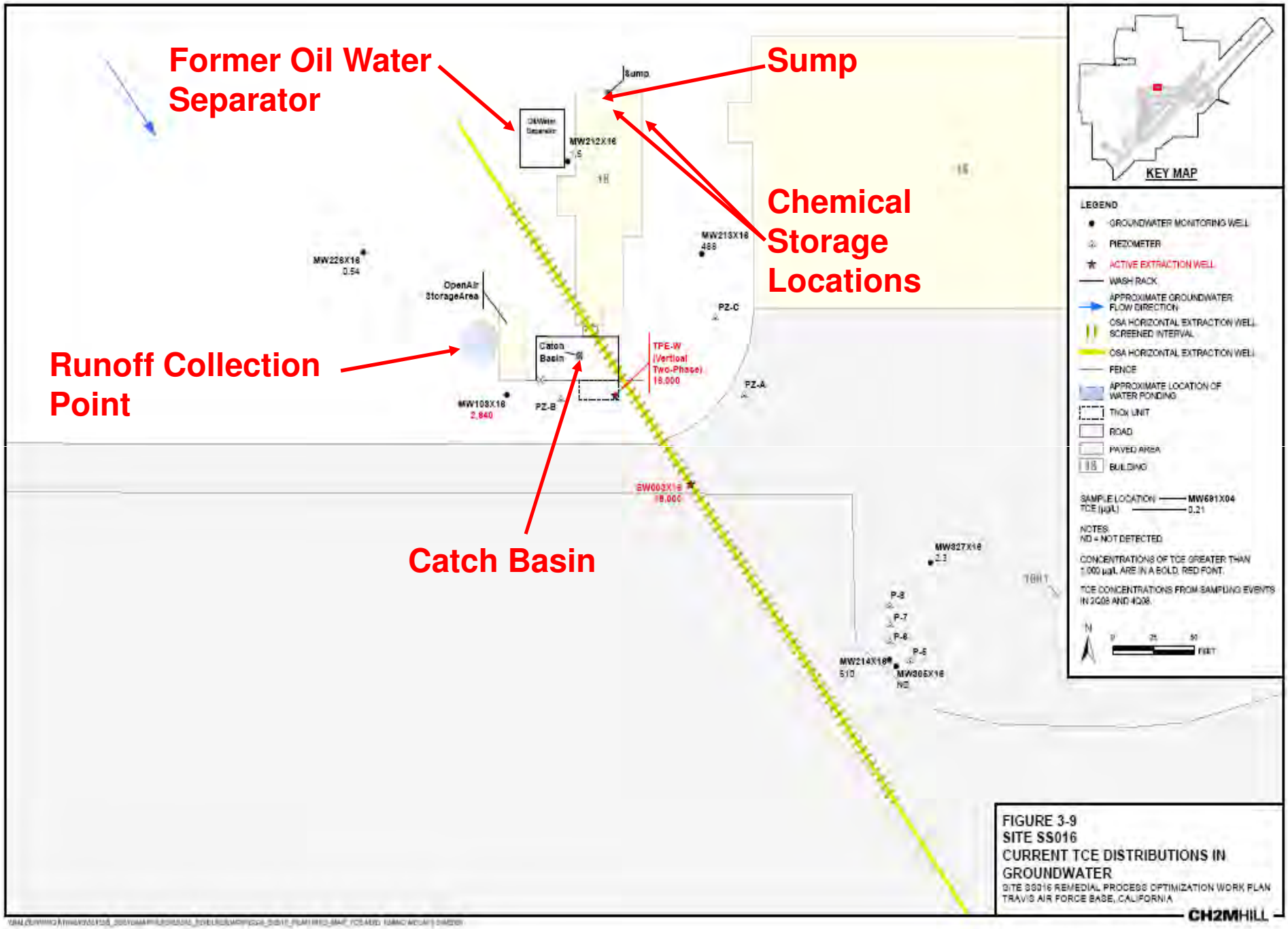

FIGURE 3-9
SITE SS016
CURRENT TCE DISTRIBUTIONS IN GROUNDWATER
SITE SS016 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

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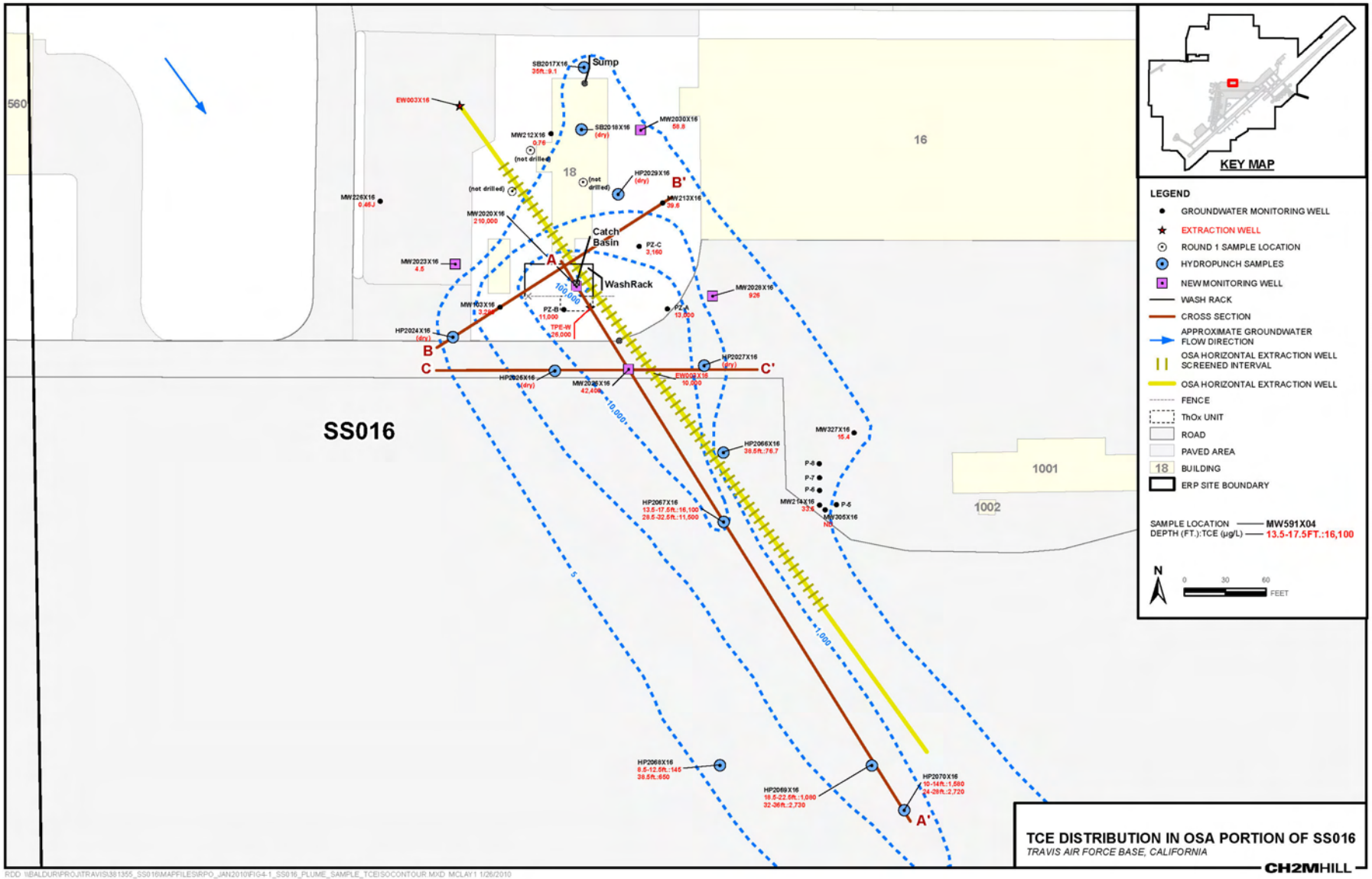
Work Plan Phased Approach

- Phase 1 – Site characterization and plume delineation
  - Define the TCE plume to 1,000 µg/L
  - Confirm source area(s)
- Phase 2 – Remediation Optimization
  - Utilize findings during field investigation activities to optimize the site remedy

Investigation Results – SS016

- Source of TCE plume appears to be the Wash Rack
- The 1,000 µg/L TCE plume is defined in the source area
- Bedrock (siltstone & sandstone) is shallow ~15 ft bgs across the source area
- The alluvium is mostly clay and silt, and is dry for the most part
- TCE found in shallow fractured bedrock



TCE DISTRIBUTION IN OSA PORTION OF SS016

TRAVIS AIR FORCE BASE, CALIFORNIA

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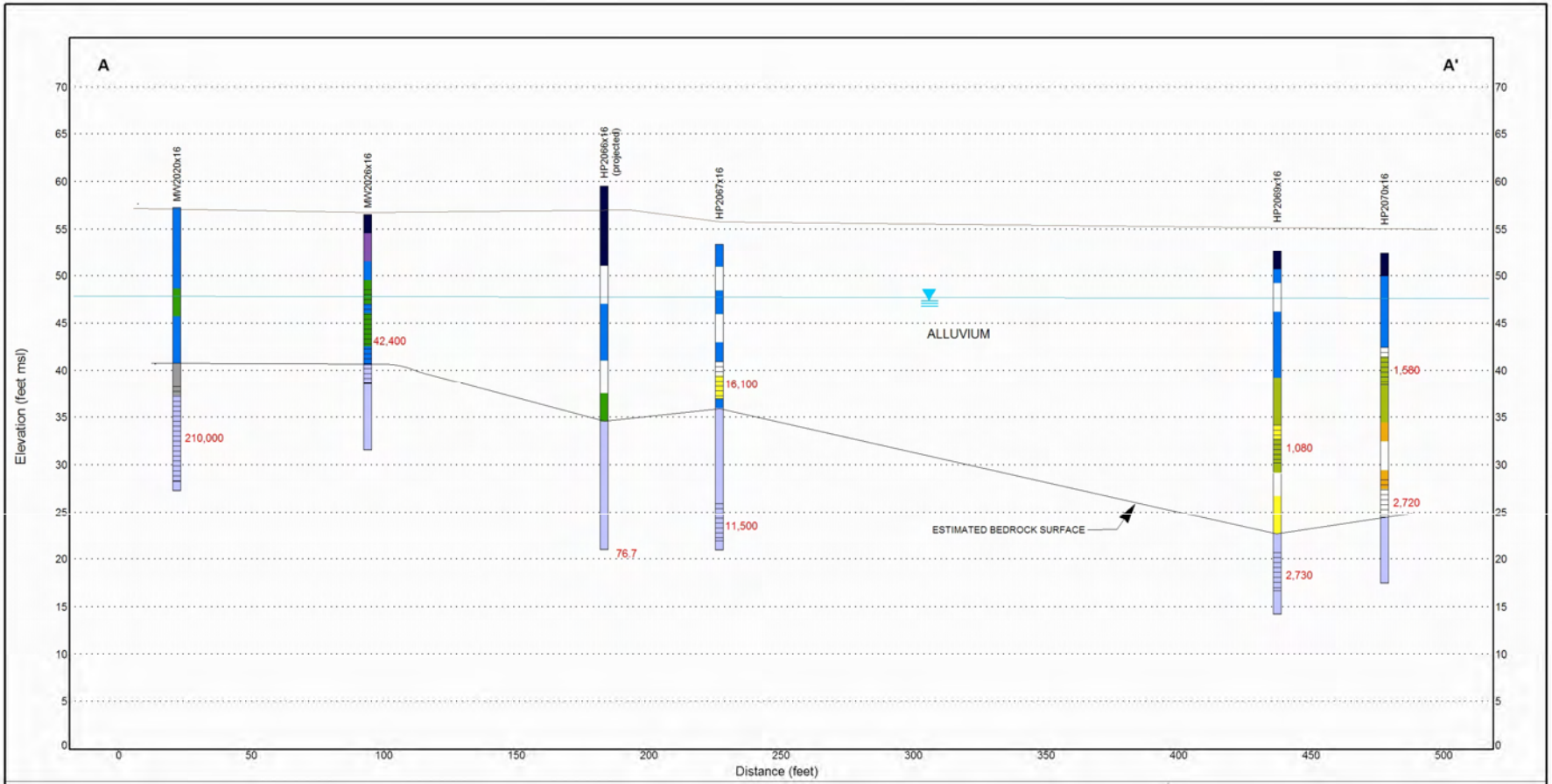
RDD \\BALDUR\PROJ\TRAVIS\381355_SS016\MAPFILES\RPO_JAN2010\FIG4-1_SS016_PLUME_SAMPLE_TCEISOCONTOUR.MXD MCLAY1 1/26/2010



SCREEN INTERVAL

APPROXIMATE SECOND QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

SCALE EXAGGERATION - 3.6:1 (H:V)

NOTE: HP2066X16 IS LOCATED OUTSIDE OF THE GROUNDWATER PLUME AND HAVE BEEN PROJECTED ONTO THE CROSS-SECTION

SOIL AND LITHOLOGY

- NO SAMPLE/NO RECOVERY
- FILL/ASPHALT
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

SS016 CROSS-SECTION A

SITE SS016 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

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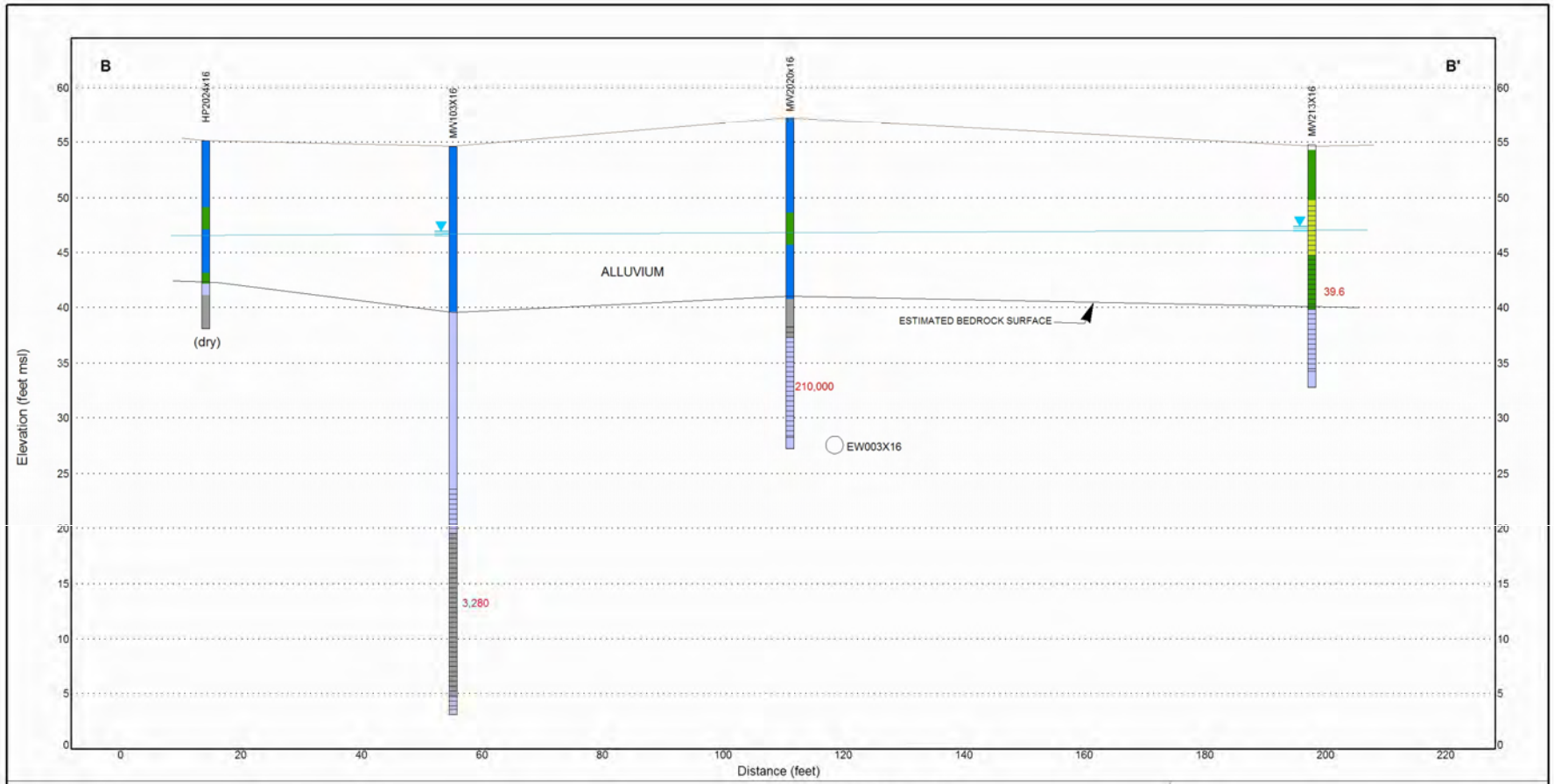

SCREEN INTERVAL

APPROXIMATE SECOND QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

SCALE EXAGGERATION - 1.8:1 (H:V)

SOIL AND LITHOLOGY

NO SAMPLE/NO RECOVERY	WELL GRADED SAND (SW)	LEAN CLAY (CL)
TOPSOIL/ORGANIC SOIL	POORLY GRADED SAND (SP)	FAT CLAY (CH)
WELL GRADED GRAVEL (GW)	SILTY SAND (SM)	SILTSTONE
POORLY GRADED GRAVEL (GP)	CLAYEY SAND (SC)	SANDSTONE
SILTY GRAVEL (GM)	SILT (ML)	SHALE
CLAYEY GRAVEL (GC)	ELASTIC SILT (MH)	ALLUVIUM (NO DATA)

SS016 CROSS-SECTION B

SITE SS016 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

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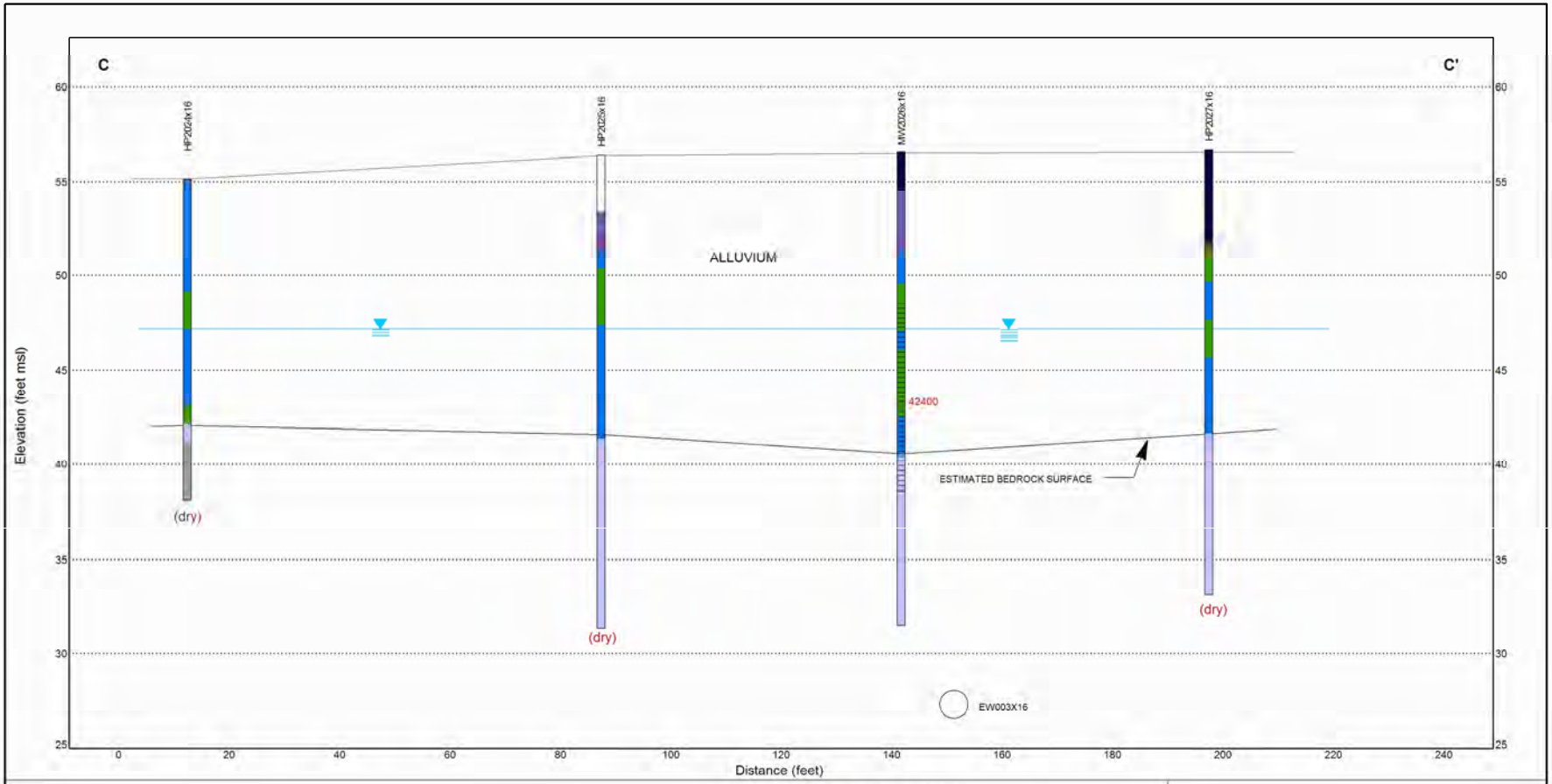

SCREEN INTERVAL

APPROXIMATE SECOND QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

SCALE EXAGERATION - 3.4:1 (H:V)

SOIL AND LITHOLOGY

- NO SAMPLE/NO RECOVERY
- FILL/ASPHALT
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

SS016 CROSS-SECTION C

SITE SS016 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

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Site SS016—Next Steps

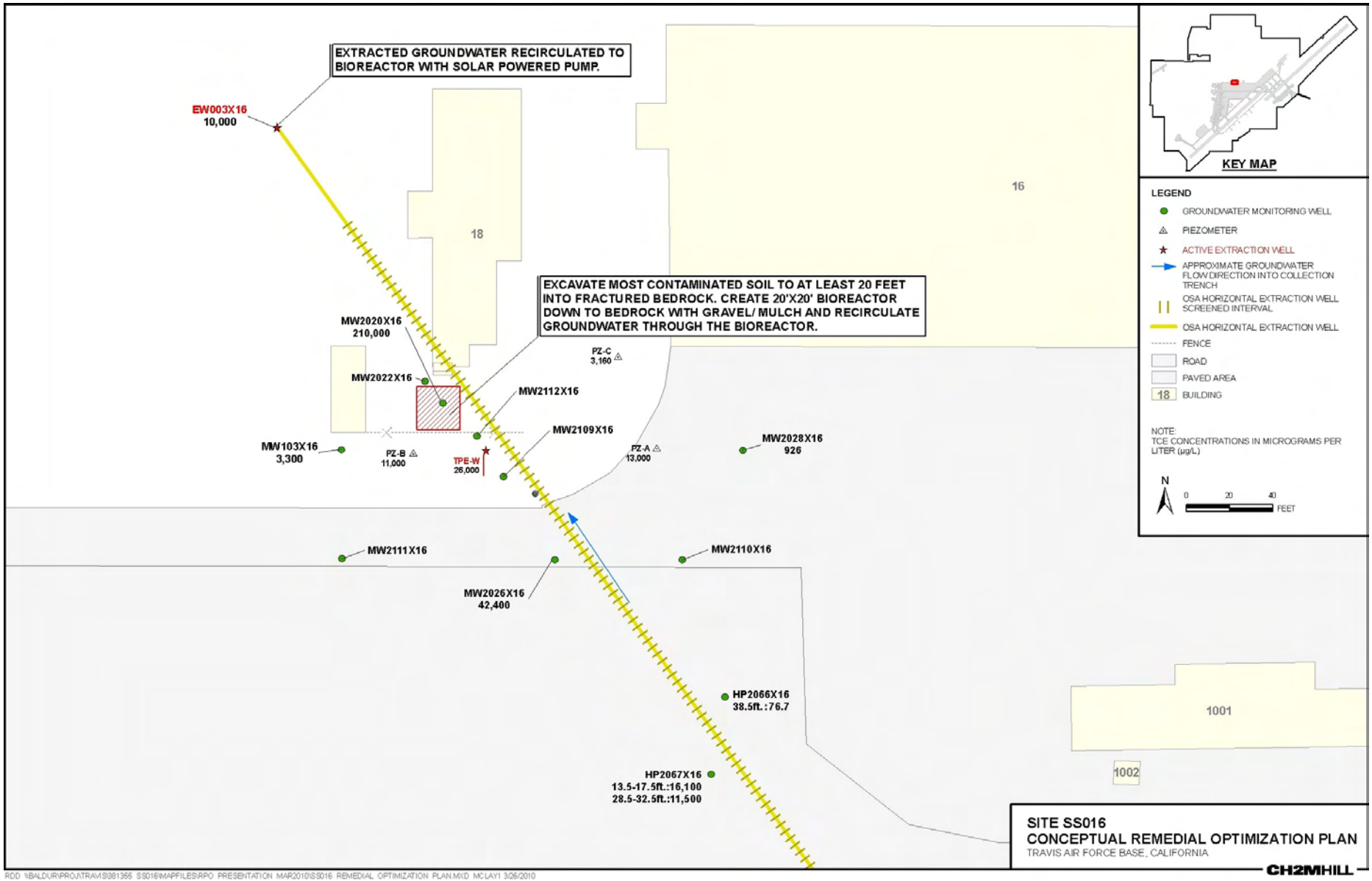
- Discontinue SVE at SS016 due to limited effectiveness and to promote anaerobic conditions in source area
- Remove the Therm/Ox unit
- Remove the Wash Rack canopy (if approved by the Air Force)

Site SS016—Next Steps

- Excavate the highly contaminated soil in Wash Rack area (at least 20’x20’x20’) down to below bedrock interface – Remove large mass of TCE in soil
- Create a gravel/mulch bioreactor in the excavation
- Tie the existing EW03x16 (horizontal well) into the bioreactor for recirculation

Site SS016—Next Steps

- Removed cutoff wall from optimization, for now, due to dry borings and questionable effectiveness
- Install five new wells to complement existing monitoring of the effectiveness of the bioreactor (in progress)
- Prepare completion report after optimization is accomplished
- Evaluate ongoing progress in GSAP reports



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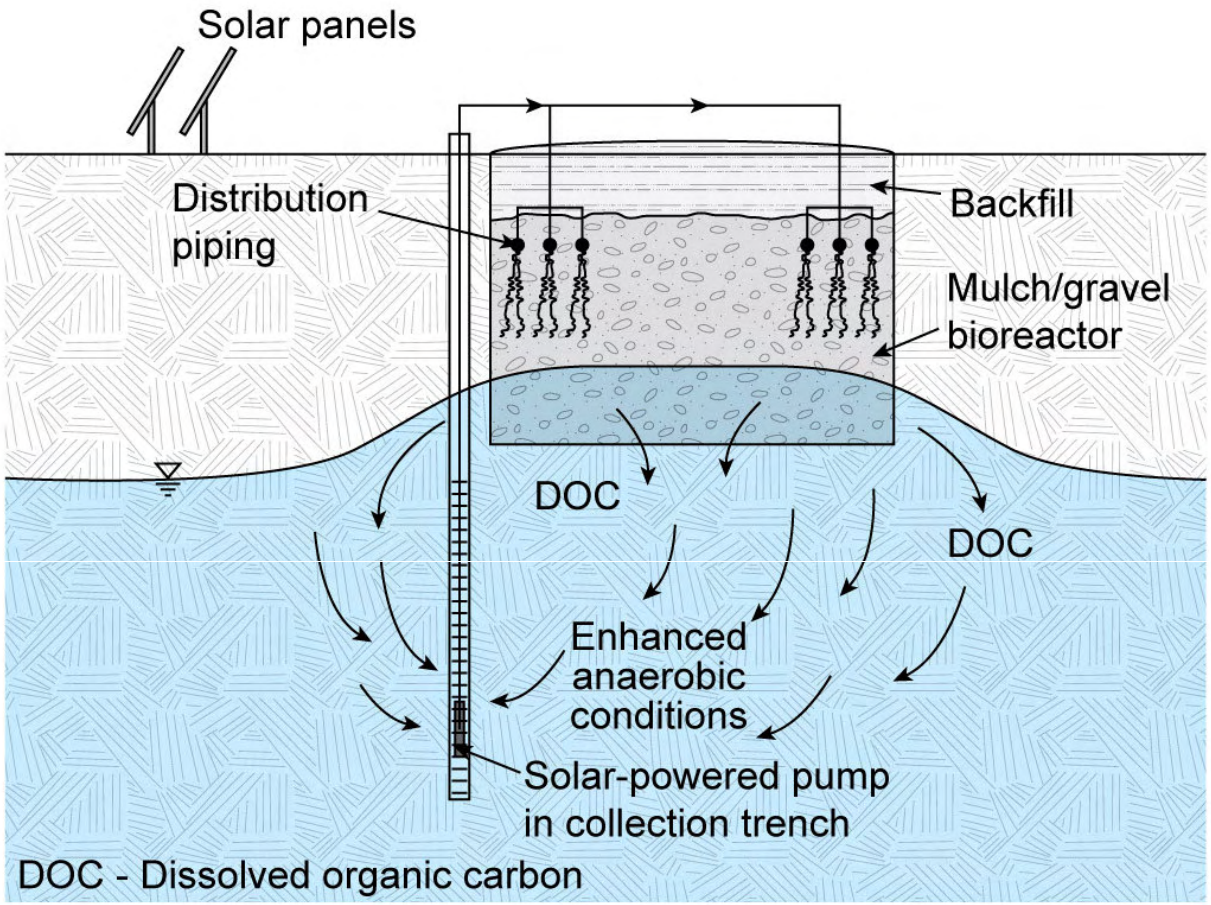


Detail A–A'
Bioreactor Cross-section

CH2MHILL

Site SS016 Performance Monitoring Plan

- **Monitoring Well Network**

  -two (2) downgradient from bioreactor, (MW2112x16 and MW2109x16)

  -three (3) further downgradient from bioreactor (MW2026x16, MW2111x16, and MW2110x16)

  -one (1) upgradient from the bioreactor (new well:MW2022x16)

  Analytes

  -VOCs (including VC), Dissolved Hydrocarbon Gasses, Total Organic Carbon, Nitrate/Nitrite, Sulfate, Chloride, Sulfide, Ferrous Iron, Alkalinity, pH, ORP, Temperature, EC, DO

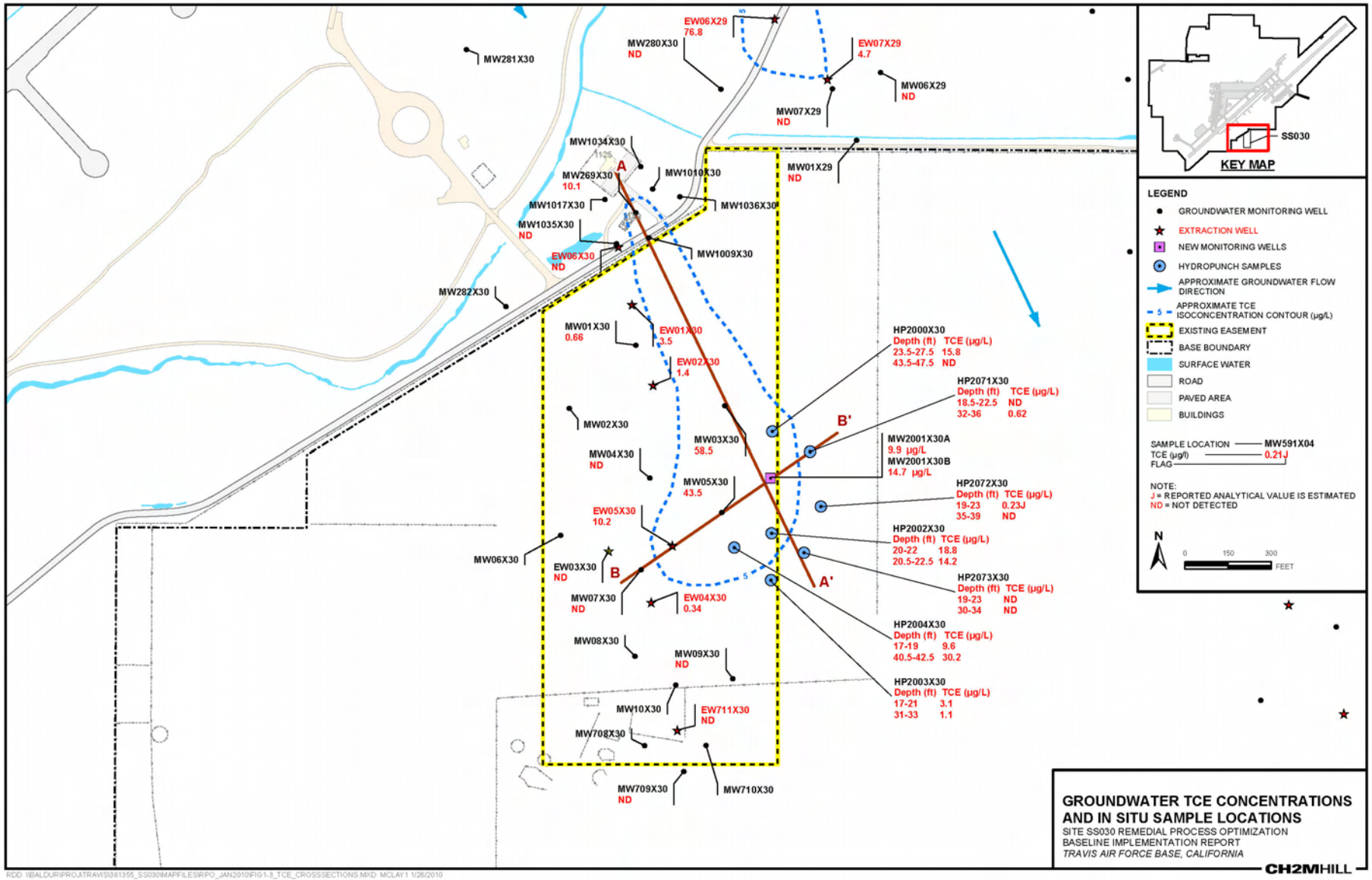
- **Frequency**

  -Pre-Installation: All wells sampled in baseline event

  -Post-Installation: Semi-Annually for first two (2) years, Annually thereafter

Site SS030

- TCE is the only contaminant detected above the IRG (MCL)
- Air Force has existing easement that covers the previously known extent of the off-base plume
- Second Five-Year Review: increasing TCE concentrations on the east side of the plume indicate contamination may be escaping hydraulic capture



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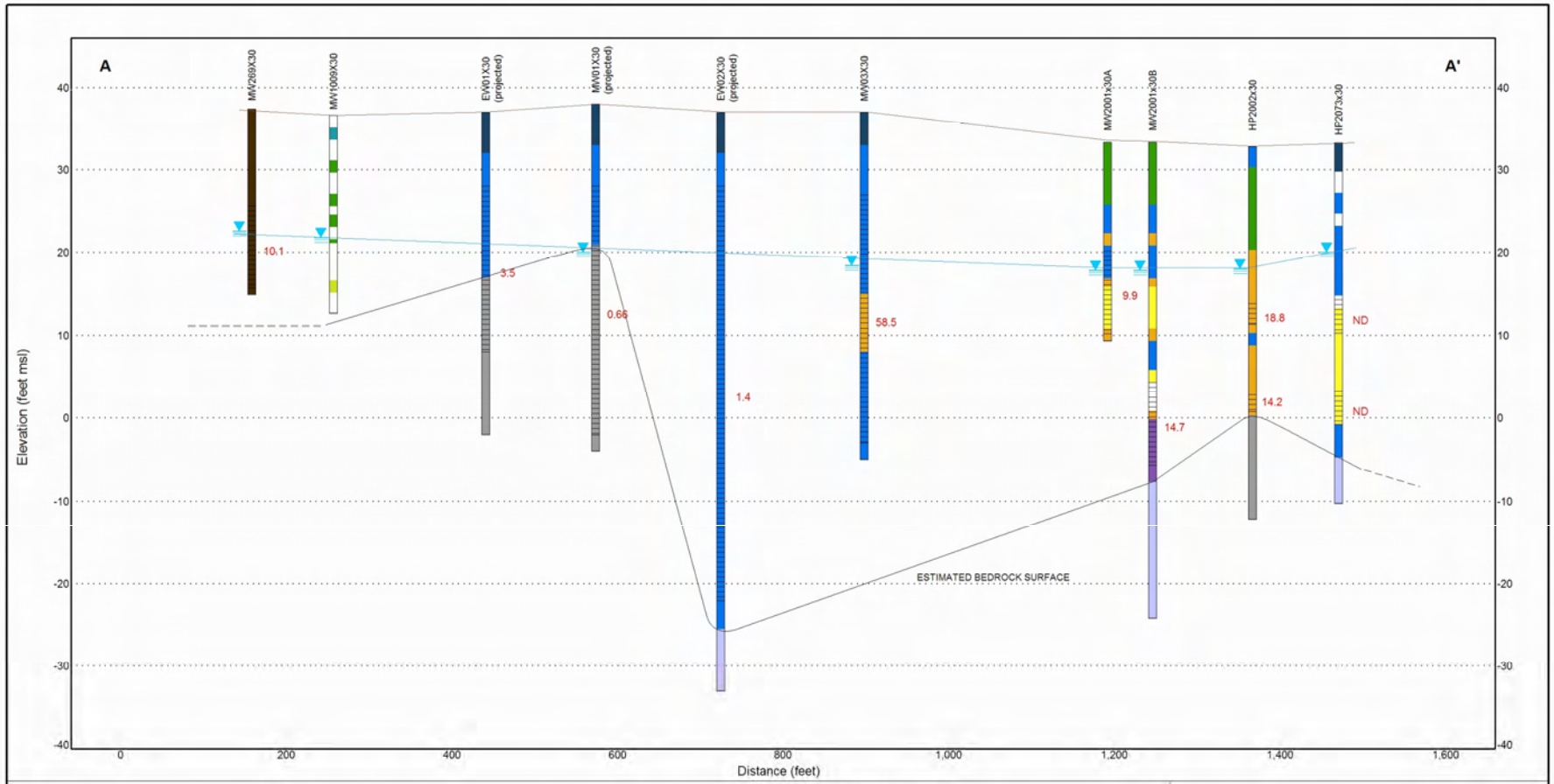

SCREEN INTERVAL

APPROXIMATE FOURTH QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

SCALE EXAGGERATION - 10:1 (H:V)

NOTE: EW01X30, MW01X30, AND EW02X30 ARE LOCATED OUTSIDE OF THE GROUNDWATER PLUME AND HAVE BEEN PROJECTED ONTO THE CROSS-SECTION

SOIL AND LITHOLOGY

- NO SAMPLE/NO RECOVERY
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

SS030 CROSS-SECTION A-A'

SITE SS030 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

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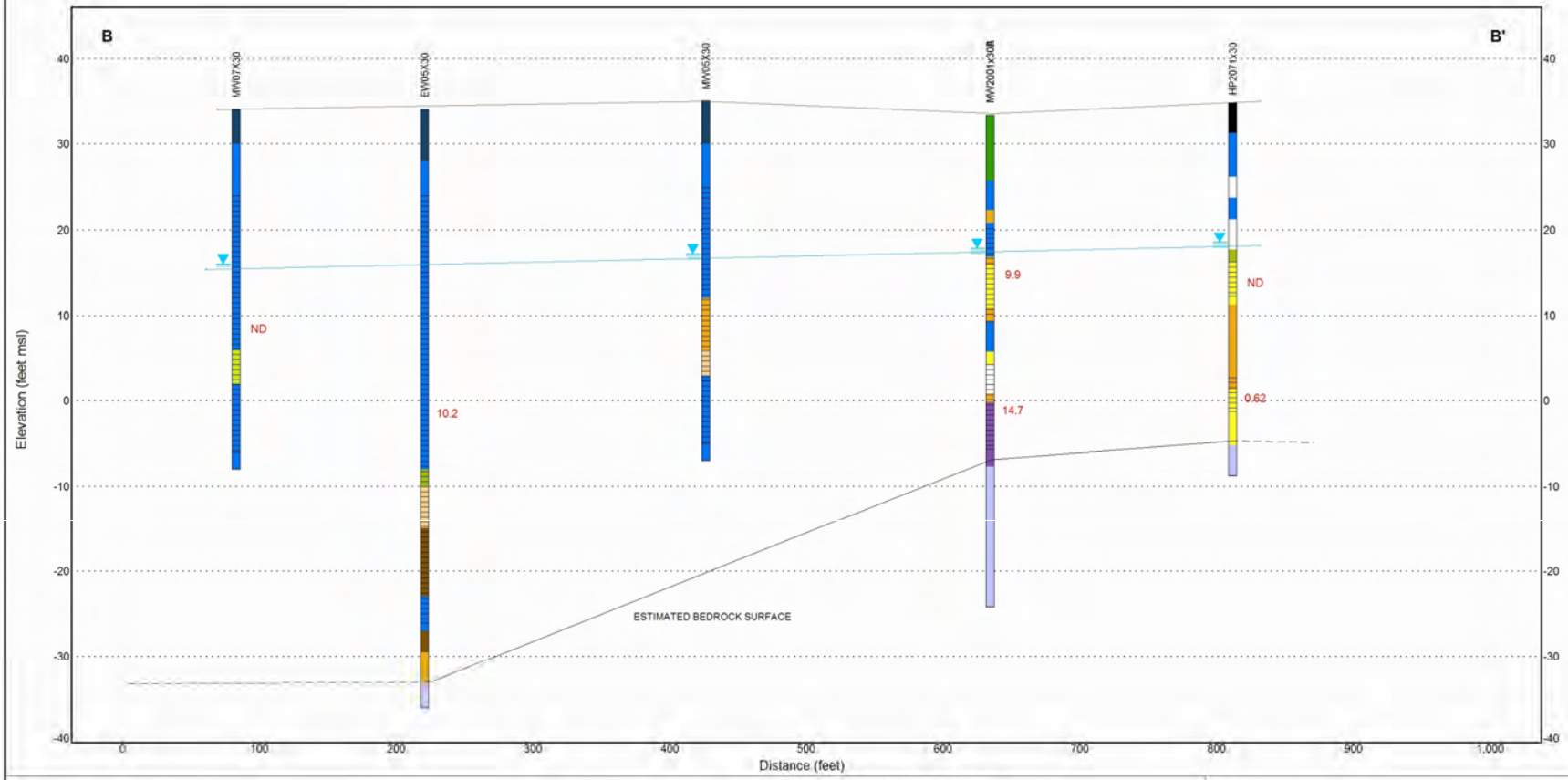

SCREEN INTERVAL

APPROXIMATE FOURTH QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

SCALE EXAGGERATION - 6.25:1 (H:V)

SOIL AND LITHOLOGY

- NO SAMPLE/NO RECOVERY
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

SS030 CROSS-SECTION B-B'

SITE SS030 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

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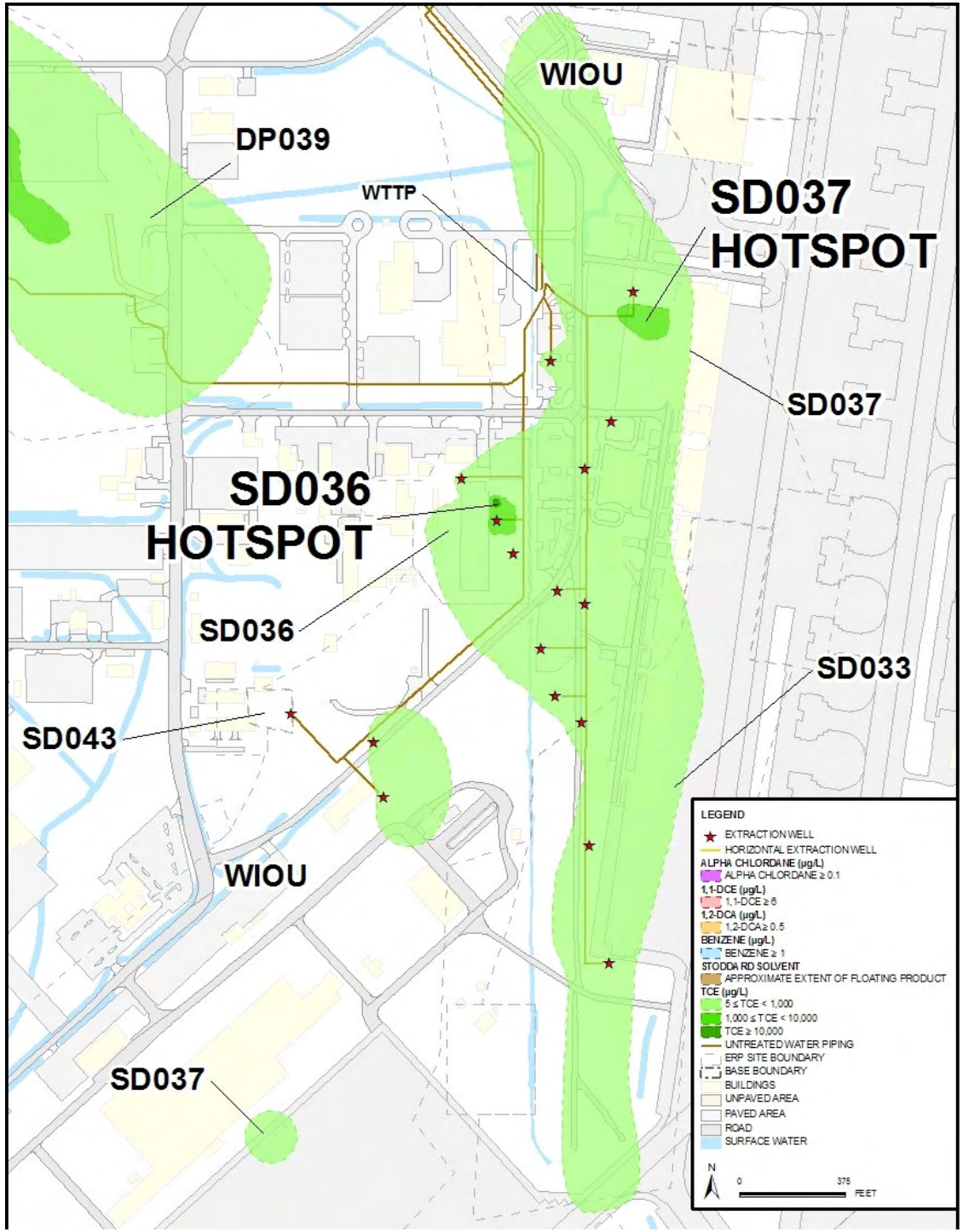
Site SS030 Next Steps

- Maximize groundwater extraction at the site – restart EW03x30 (in progress)
- Monitor groundwater levels and TCE concentrations across the site during annual GSAP event in May/June 2010
- Determine if additional monitoring wells and extraction wells are needed to obtain capture of the SS030 TCE plume following the GSAP event

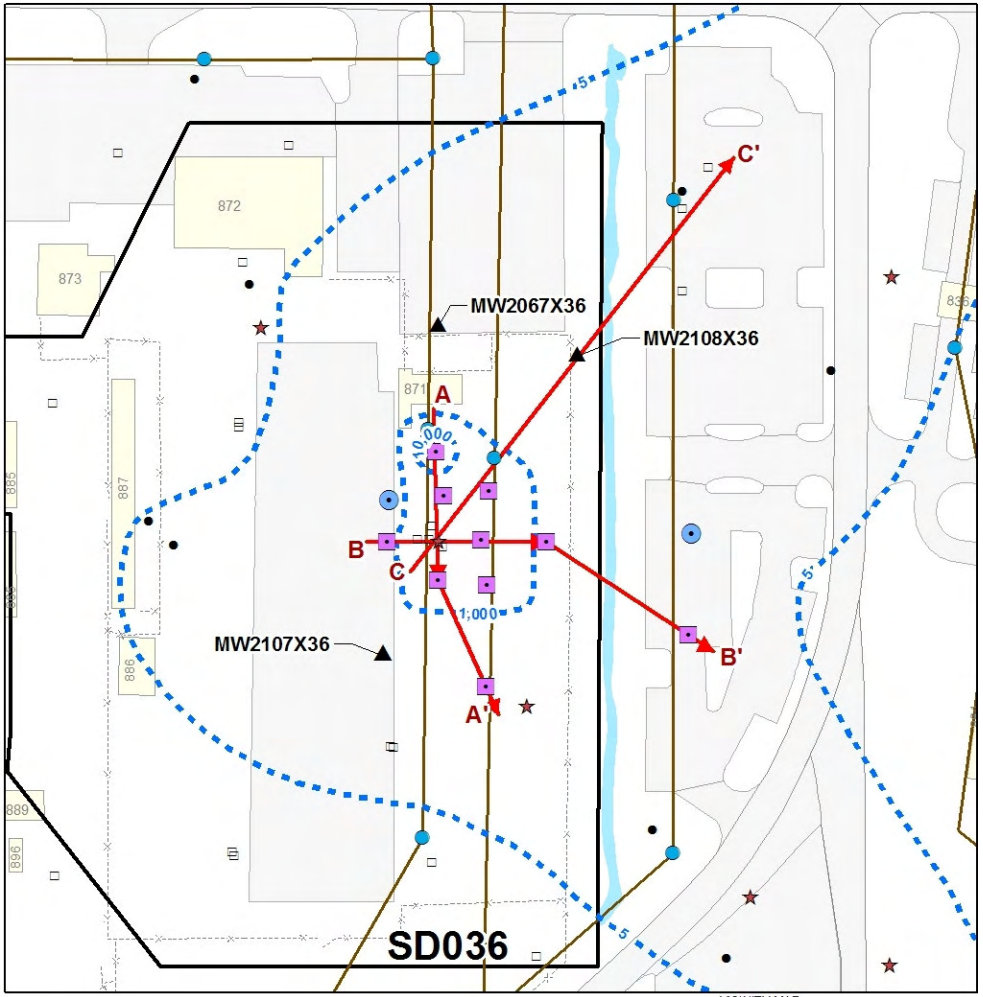
Site SD036 and SD037

- Located in the WIOU in the western portion of the base
- Hot spot (>1,000 µg/L) of trichloroethene (TCE) concentrated in one small area near sanitary sewer line at each site
- Existing remedial process in the area includes groundwater extraction and treatment

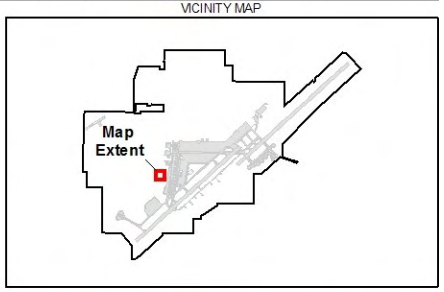

WIOU
DP039
WTTP
SD037
HOTSPOT
SD037
SD036
HOTSPOT
SD036
SD033
SD043
WIOU
SD037
LEGEND
EXTRACTION WELL
HORIZONTAL EXTRACTION WELL
ALPHA CHLORDANE (µg/L)
ALPHA CHLORDANE ≥ 0.1
1,1-DCE (µg/L)
1,1-DCE ≥ 6
1,2-DCA (µg/L)
1,2-DCA ≥ 0.5
BENZENE (µg/L)
BENZENE ≥ 1
STODDARD SOLVENT
APPROXIMATE EXTENT OF FLOATING PRODUCT
TCE (µg/L)
5 ≤ TCE < 1,000
1,000 ≤ TCE < 10,000
TCE ≥ 10,000
UNTREATED WATER PIPING
ERP SITE BOUNDARY
BASE BOUNDARY
BUILDINGS
UNPAVED AREA
PAVED AREA
ROAD
SURFACE WATER
N
0
375
FEET

Investigation Results – SD036

- Bedrock deeper than anticipated (~100 ft bgs)
- 1,000 µg/L TCE plume defined to east, south, and west
- Found TCE over 10,000 µg/L in northern portion of hot spot
- More investigation in progress to southwest, north, and northeast of the hot spot



VICINITY MAP



LEGEND

- GROUNDWATER MONITORING WELLS
- PIEZOMETER
- EXTRACTION WELLS
- HYDROPUNCH SAMPLES
- NEW MONITORING WELLS
- MANHOLE[1]
- MAIN WASTEWATER LINE
- CROSS SECTIONS
- 5 APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L)
- ROAD
- PAVED AREA
- BUILDING
- SURFACE WATER
- ERP SITE BOUNDARY

N

0 50 100
Feet

TCE DISTRIBUTION AT SD036 HOTSPOT

SD036 REMEDIAL PROCESS OPTIMIZATION BASELINE IMPLEMENTATION REPORT

TRAVIS AIR FORCE BASE, CALIFORNIA

Notes:
1. Manhole ID's based on 2000 Survey
2. Manhole ID's in parentheses based on 1994 Survey (Radian)

CH2MHILL

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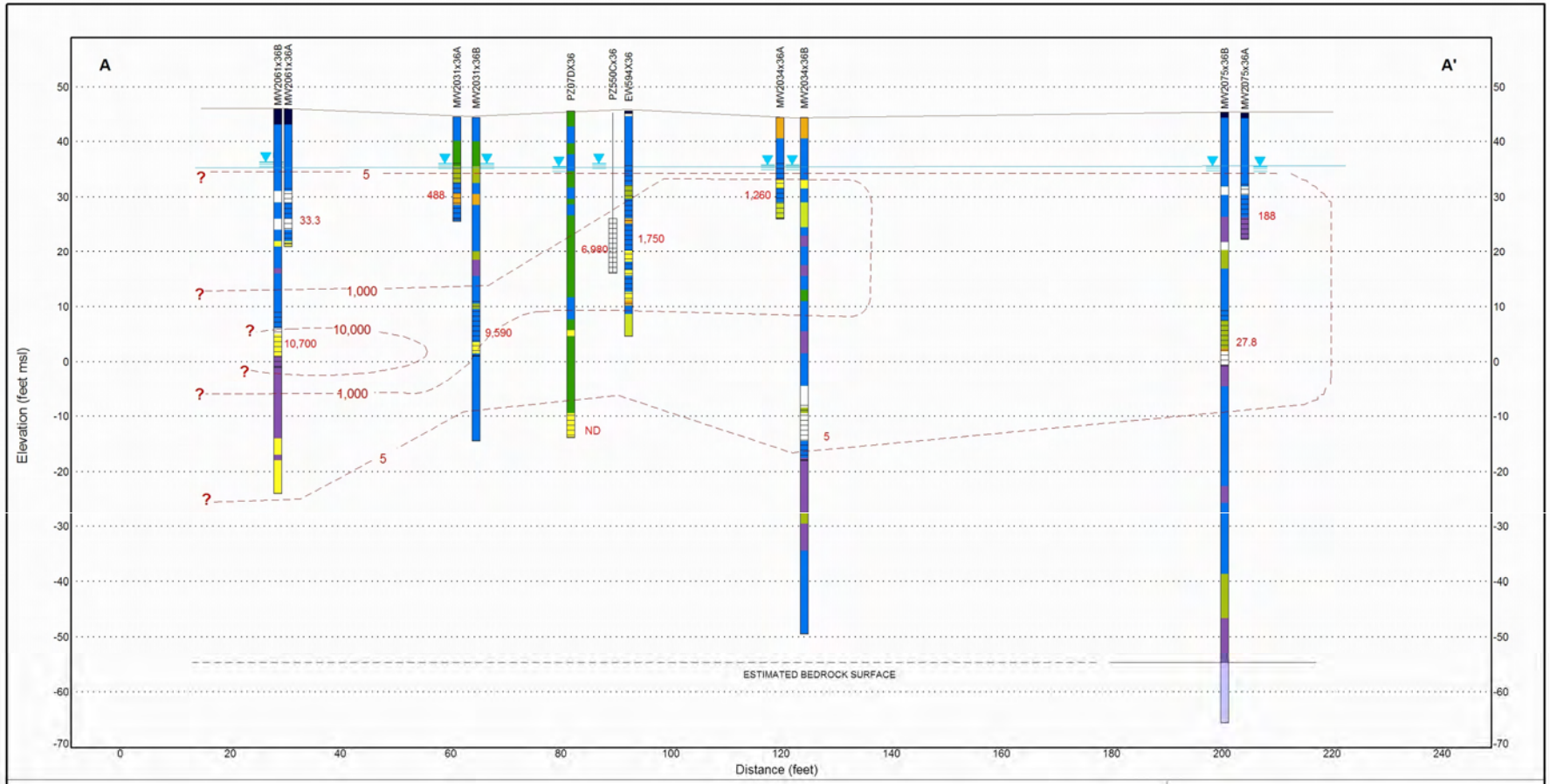


SOIL AND LITHOLOGY

- SCREEN INTERVAL
- APPROXIMATE FOURTH QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)
- 6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009
- 5 APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L) BASED ON MAX 2009 DECTECTION
- SCALE EXAGGERATION - 1:1 (H:V)

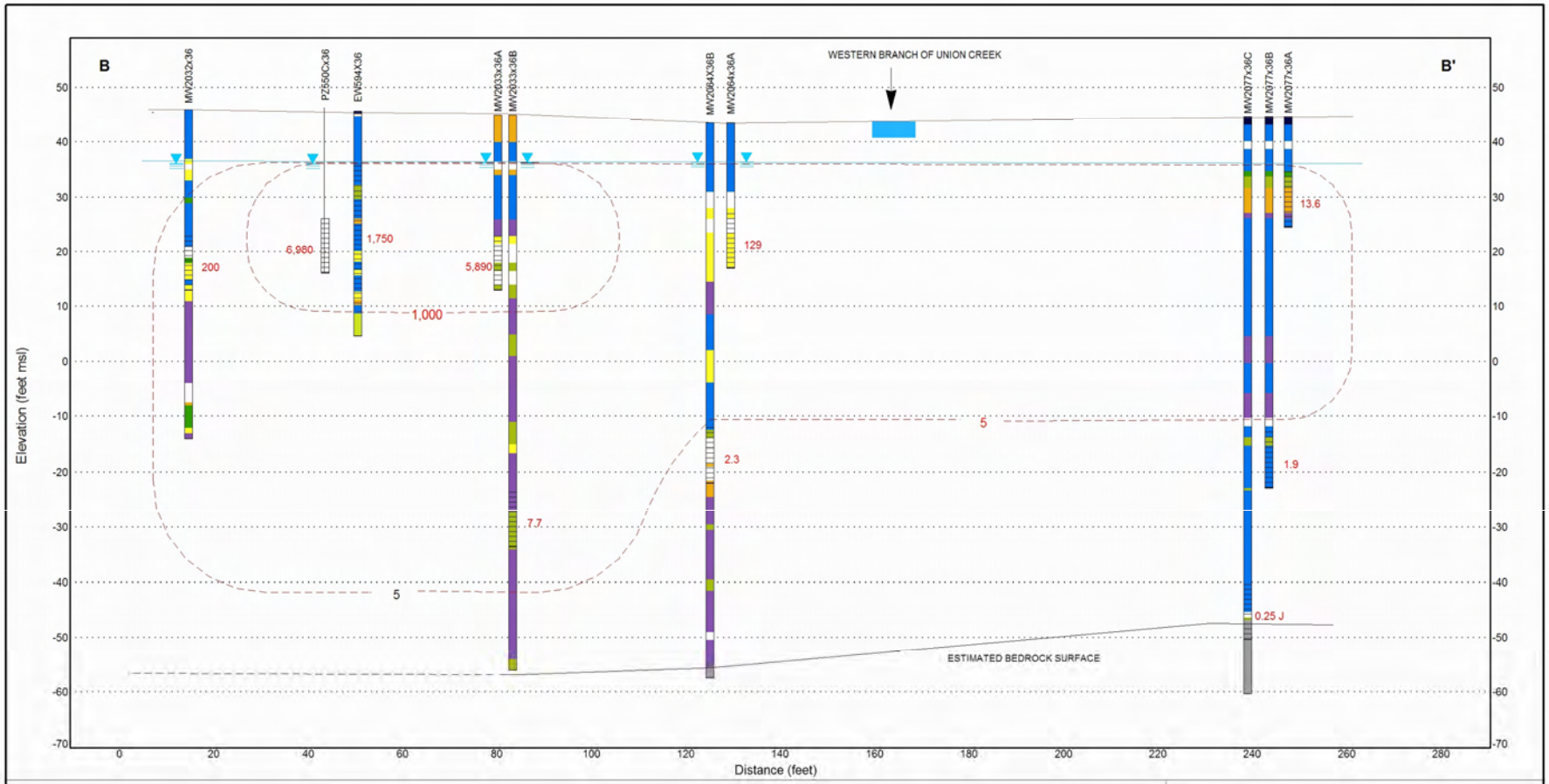
- NO SAMPLE/NO RECOVERY
- FILL/ASPHALT
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

SD036 CROSS-SECTION A

SITE SD036 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

\\YOSEMITE\PROJ\TRAVISAIRFORCEBASE\COMMONFILES\GINT FILES\TRAVIS_AFB_GINT_SECTIONS\MASTER_DATA\TRAVIS_2009_SAMPLING_EVENT.GPJ



SCREEN INTERVAL

APPROXIMATE FOURTH QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

5 APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L) BASED ON MAX 2009 DECTECTION

SCALE EXAGGERATION - 1.2:1 (H:V)

SOIL AND LITHOLOGY

- NO SAMPLE/NO RECOVERY
- FILL/ASPHALT
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

SD036 CROSS-SECTION B

SITE SD036 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

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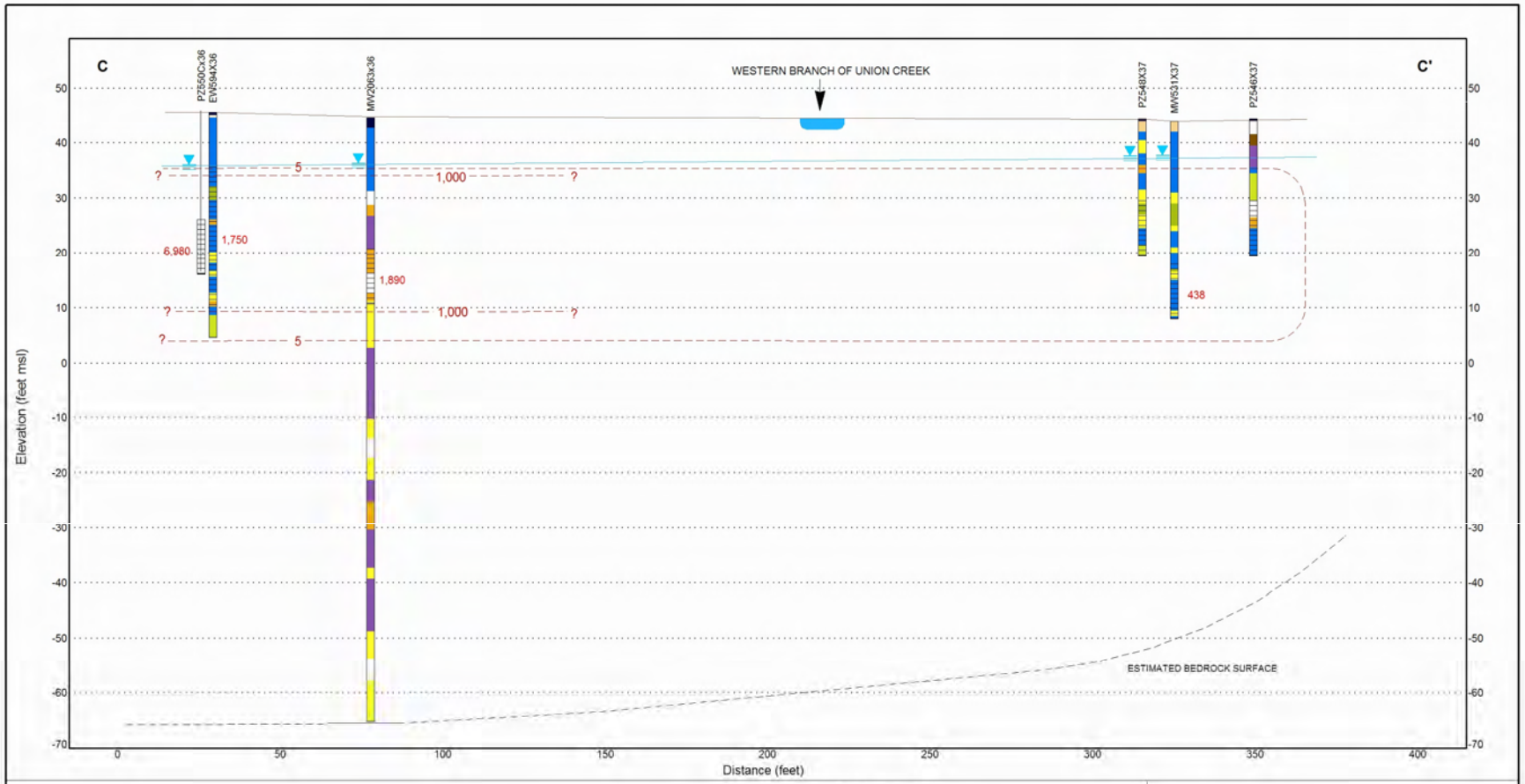


SCREEN INTERVAL

APPROXIMATE FOURTH QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

5 APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L) BASED ON MAX 2009 DECTECTION

SCALE EXAGGERATION - 1.7:1 (H:V)

SOIL AND LITHOLOGY

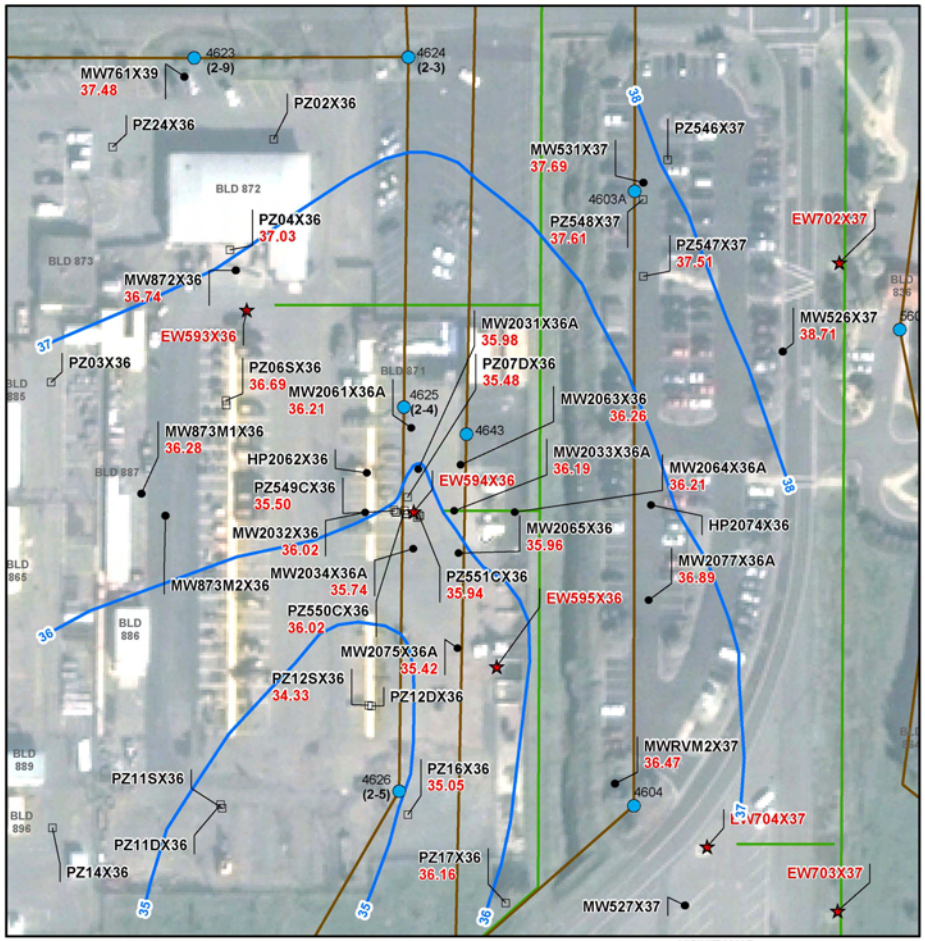
- NO SAMPLE/NO RECOVERY
- FILL/ASPHALT
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

SD036 CROSS-SECTION C

SITE SD036 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

\\YOSEMITE\PROJ\TRAVISAIRFORCEBASE\COMMONFILES\GINT FILES\TRAVIS_AFB_GINT_SECTIONS\MASTER_DATA\TRAVIS_2009_SAMPLING_EVENT.GPJ



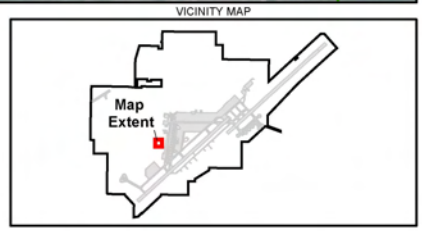
LEGEND

- GROUNDWATER MONITORING WELLS
- PIEZOMETER
- EXTRACTION WELLS
- MANHOLE[1]
- GROUNDWATER ELEVATION

N

0 50 100
Feet

VICINITY MAP



SD036 GROUNDWATER GRADIENT WITH EXTRACTION WELLS OFF, 12/24/2009

SD036 REMEDIAL PROCESS OPTIMIZATION
BASELINE IMPLEMENTATION REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

Notes:
1. Manhole ID's based on 2000 Survey
2. Manhole ID's in parentheses based on 1994 Survey (Radian)

CH2MHILL

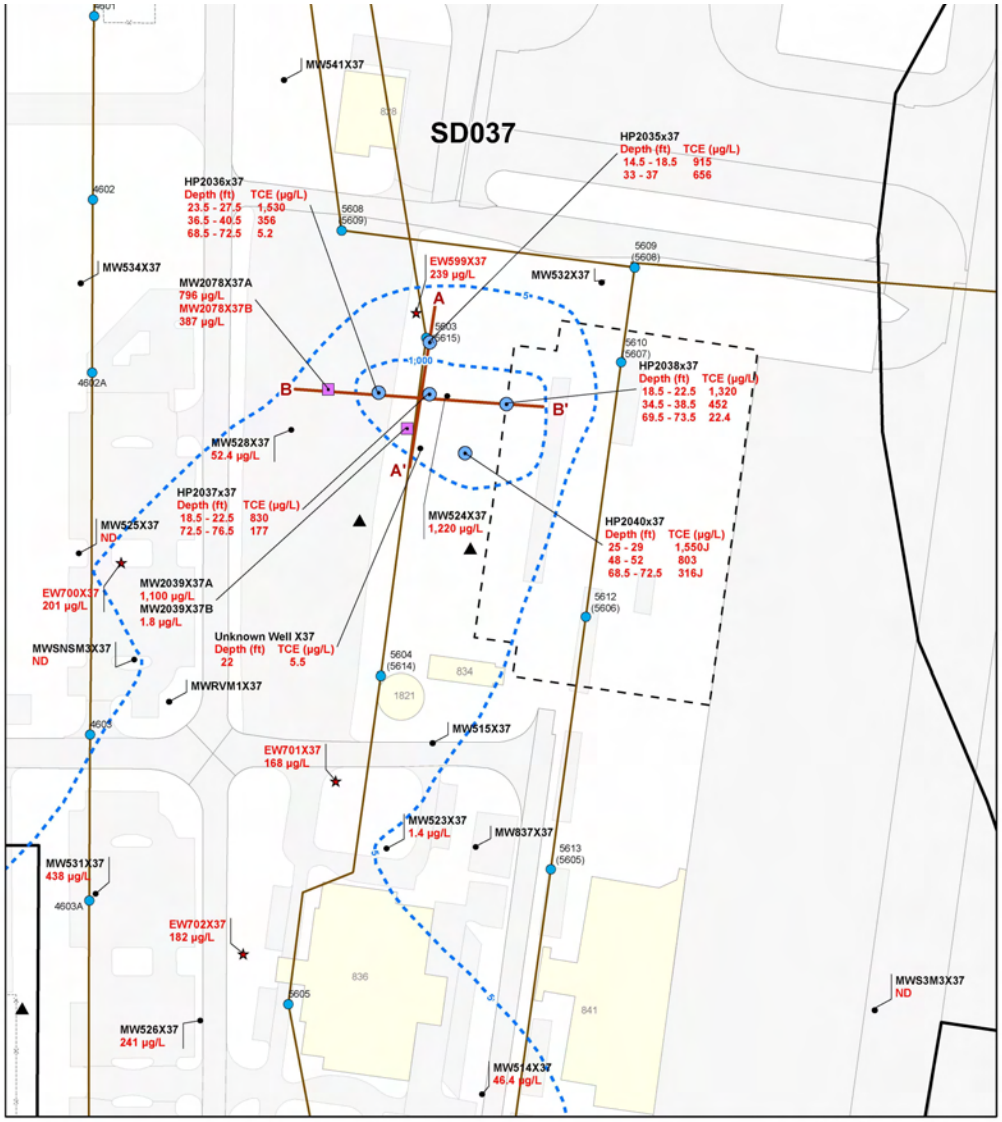
\\ZION\SACGIS\PROJ\TRAVIS_AFB\381355_SD036_SD037\MAPFILES\RPO_JAN2010\PZ07SX36_EXTRACTWELLSOFF.MXD MCLAY1 1/22/2010

SD036—Next Steps

- Need to step out to the southwest, north, & northeast (in progress)
- After hot spot is defined, optimize the EVO injection design
- Prepare summary of the investigation data, and identify locations of EVO injection points and monitoring network
- Conduct remedy optimization followed by implementation of performance monitoring
- Prepare completion report after EVO injection is accomplished
- Evaluate ongoing progress in GSAP reports

Investigation Results – SD037

- Bedrock encountered at about 45 to 70 ft bgs
- 1,000 µg/L TCE plume defined laterally and vertically except to the east, beneath the new 2-bay hangar
- No TCE concentrations significantly greater than 1,000 µg/L
- The “unknown well” with TCE at 5 µg/L disregarded since new well pair shows shallow TCE at 1,100 µg/L



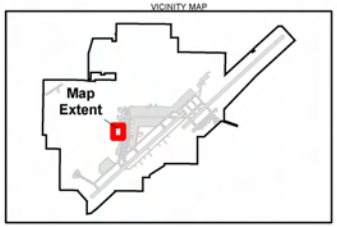
LEGEND

- GROUNDWATER MONITORING WELLS
- EXTRACTION WELLS
- HYDROPUNCH SAMPLES
- NEW MONITORING WELLS
- FUTURE STEPOUT LOCATIONS
- MANHOLE[1]
- MAIN WASTEWATER LINE
- APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L)
- NEW AIRCRAFT HANGAR
- ROAD
- PAVED AREA
- BUILDING
- ERP SITE BOUNDARY

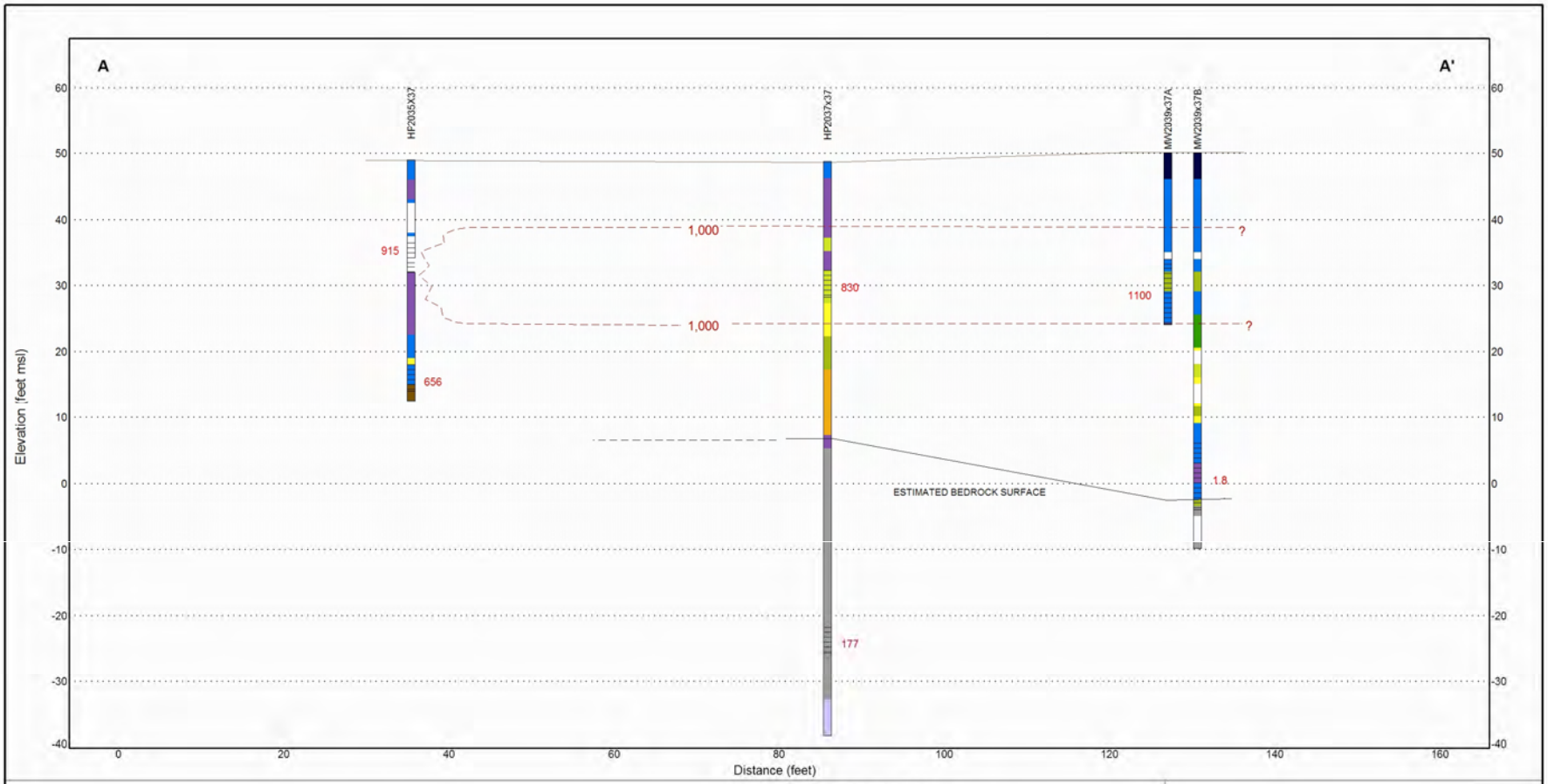
Notes:
1. Manhole ID's based on 2000 Survey (CH2M HILL)
2. Manhole ID's in parentheses based on 1991 Survey (James M. Montgomery)

0 50 100
Feet

VICINITY MAP



TCE DISTRIBUTION AT SD037 HOTSPOT
SD037 REMEDIAL PROCESS OPTIMIZATION
BASELINE IMPLEMENTATION REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA



SCREEN INTERVAL

APPROXIMATE SECOND QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

5 APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L) BASED ON MAX 2009 DECTECTION

SCALE EXAGGERATION - 0.8:1 (H:V)

SOIL AND LITHOLOGY

- NO SAMPLE/NO RECOVERY
- FILL/ASPHALT
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

SD037 CROSS-SECTION A

SITE SD037 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

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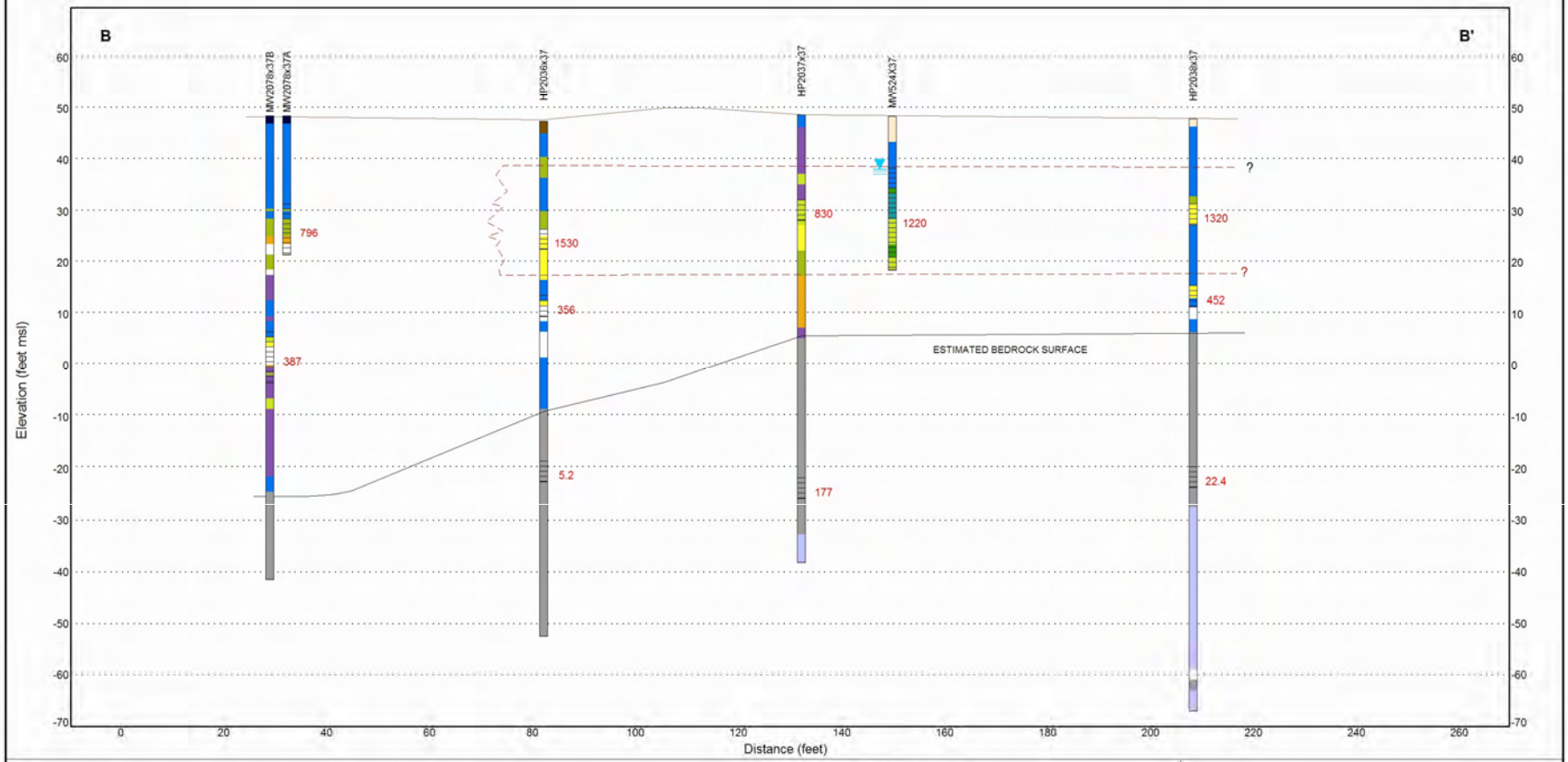

SCREEN INTERVAL

APPROXIMATE SECOND QUARTER 2009 GROUNDWATER ELEVATION (ft MSL)

6.7 TCE CONCENTRATION (µg/L) DETECTED IN 2009

5 APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L) BASED ON MAX 2009 DECTECTION

SCALE EXAGGERATION - 1:1 (H:V)

SOIL AND LITHOLOGY

- NO SAMPLE/NO RECOVERY
- FILL/ASPHALT
- TOPSOIL/ORGANIC SOIL
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE
- ALLUVIUM (NO DATA)

SD037 CROSS-SECTION B

SITE SD037 REMEDIAL PROCESS OPTIMIZATION WORK PLAN
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

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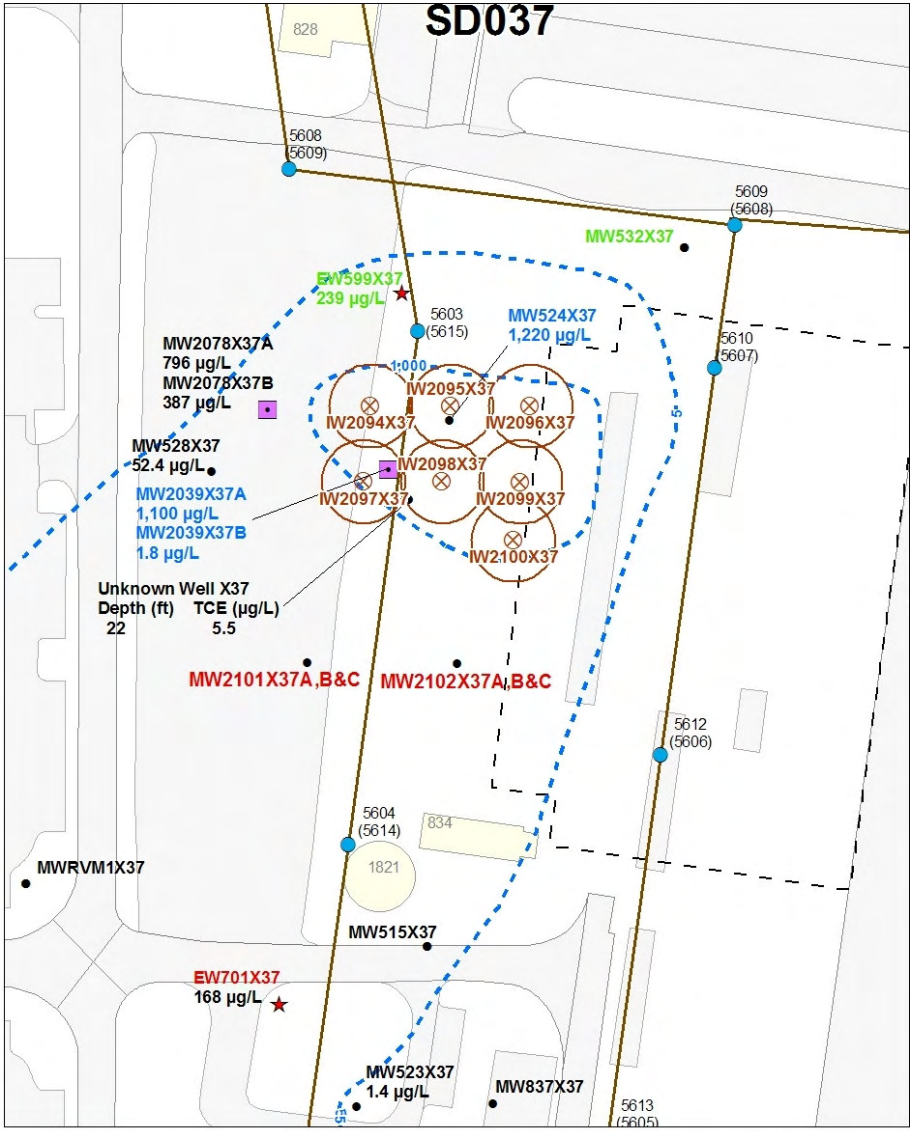
Site SD037—Next Steps

- Install downgradient well pairs at two locations
- Install 7 EVO injection wells in hot spot
- Inject 36,000 lbs of EVO and monitor effectiveness
- Initiate performance monitoring of the remedy optimization
- Prepare completion report after EVO injection is accomplished
- Evaluate ongoing progress in GSAP reports



LEGEND

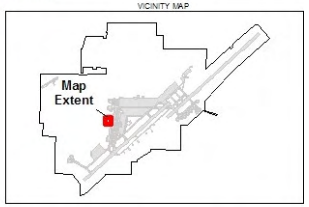
- GROUNDWATER MONITORING WELLS
- EXTRACTION WELLS
- NEW MONITORING WELLS
- MANHOLE[1]
- MAIN WASTEWATER LINE
- APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L)
- NEW AIRCRAFT HANGAR
- ROAD
- PAVED AREA
- BUILDING
- ERP SITE BOUNDARY

IW1X37 - INJECTION WELL
MW524X37 - PERFORMANCE MONITORING WELL
MW2101X37A,B&C - COMPLIANCE MONITORING WELL
MW532X37 - UPGRADIENT MONITORING WELL

Notes:
1. Manhole ID's based on 2000 Survey (CH2M HILL)
2. Manhole ID's in parentheses based on 1991 Survey (James M. Montgomery)

0 30 60
Feet

VICINITY MAP



TCE DISTRIBUTION AT SD037 HOTSPOT
SD037 REMEDIAL PROCESS OPTIMIZATION
BASELINE IMPLEMENTATION REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

\\ZION\SACGIS\PROJ\TRAVIS_AFB\381355_SD036_SD037\MAPFILES\RPO_PRESENTATION_MAR2010\FIG4-2_TCE_DISTRIBATSD037HOTSPOT_ZOOMMARKUP.MXD MCLAY1 3/26/2010

Site SD037 Performance Monitoring Plan

- **Monitoring Well Network**

  -two (2) upgradient wells (EW599x37 and MW532x37)

  -three (3) performance wells (MW2039x37A, MW2039x37B, and MW524x37)

  -four (4) compliance wells (two (2) new well pairs to the south and southeast of the treatment zone)
- **Analytes**

  -VOCs (including VC), Dissolved Hydrocarbon Gasses, Total Organic Carbon, Nitrate/Nitrite, Sulfate, Chloride, Sulfide, Ferrous Iron, Alkalinity, pH, ORP, Temperature, EC, DO
- **Frequency**

  -Pre-Installation: All wells sampled in baseline event

  -Post-Installation: Semi-Annually for first two (2) years, Annually thereafter

Site SS015 Description

- Located in the NEWIOU
- Contaminant Plume of TCE originated from 3 former facilities in vicinity of Bldg 554
- Site selected for MNA assessment in NEWIOU Groundwater IROD
- In 1997, a treatability study of enhanced MNA using vegetable oil was conducted

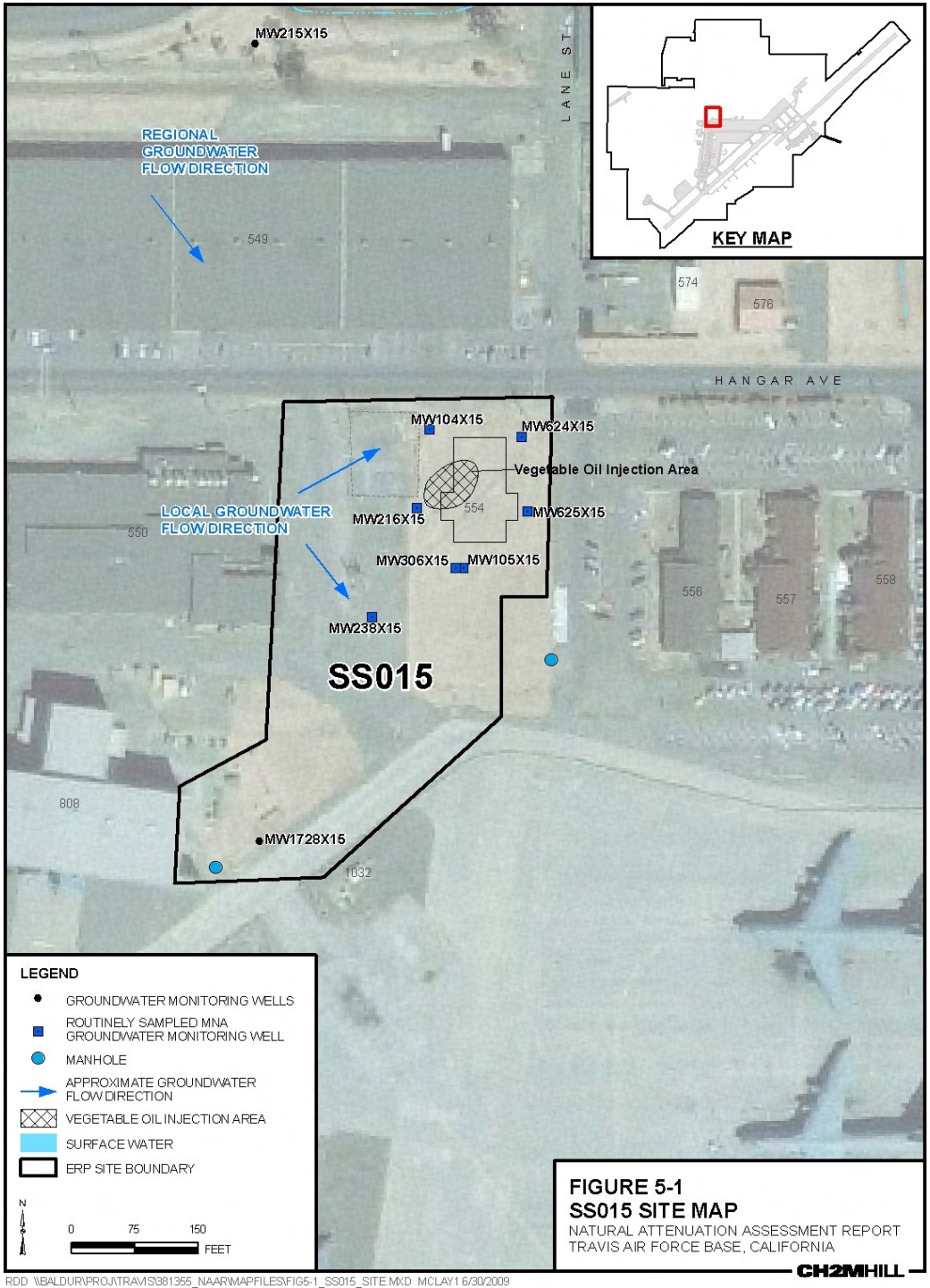


FIGURE 5-1
SS015 SITE MAP
NATURAL ATTENUATION ASSESSMENT REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

RDD \\BALDUR\PROJ\TRAVIS\381355_NAAR\MAPFILES\FIG5-1_SS015_SITE.MXD MCLAY1 6/30/2009

Site SS015 Description (cont'd)

- A natural attenuation assessment was performed in 2009 and reported in the NAAR
- The interim remedial action objective is migration control
- The 2nd 5-year Review concluded the interim remedy was functioning as intended by the IROD

Site SS015 Status

- Source area COCs were affected by the vegetable oil treatability study
- TCE, PCE, and cis1,2-DCE decreased in the source area from 2004 to 2007
- The COCs rebounded from 2007 through 2009
- Vinyl Chloride concentrations are increasing

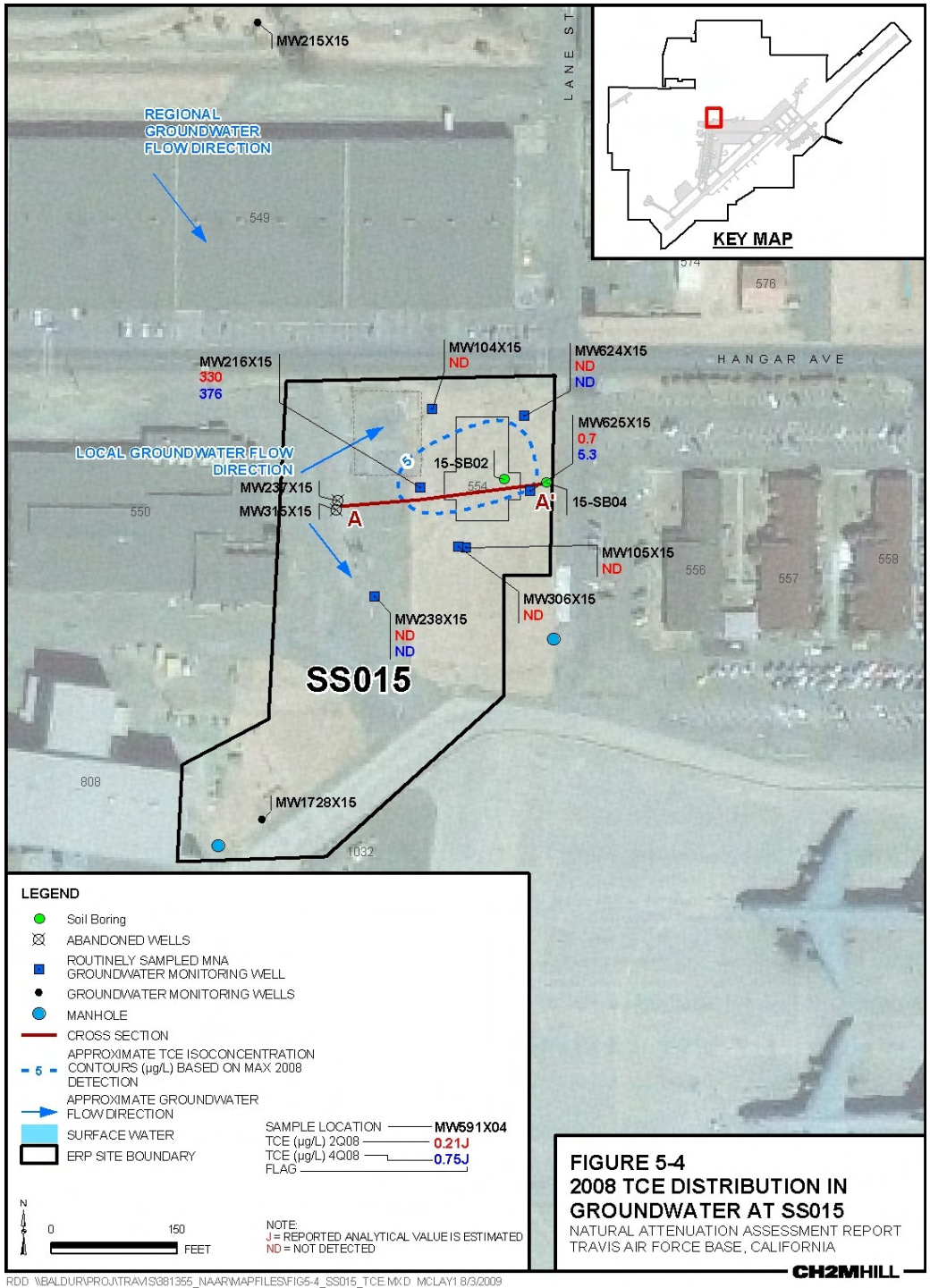


FIGURE 5-4
2008 TCE DISTRIBUTION IN GROUNDWATER AT SS015
NATURAL ATTENUATION ASSESSMENT REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

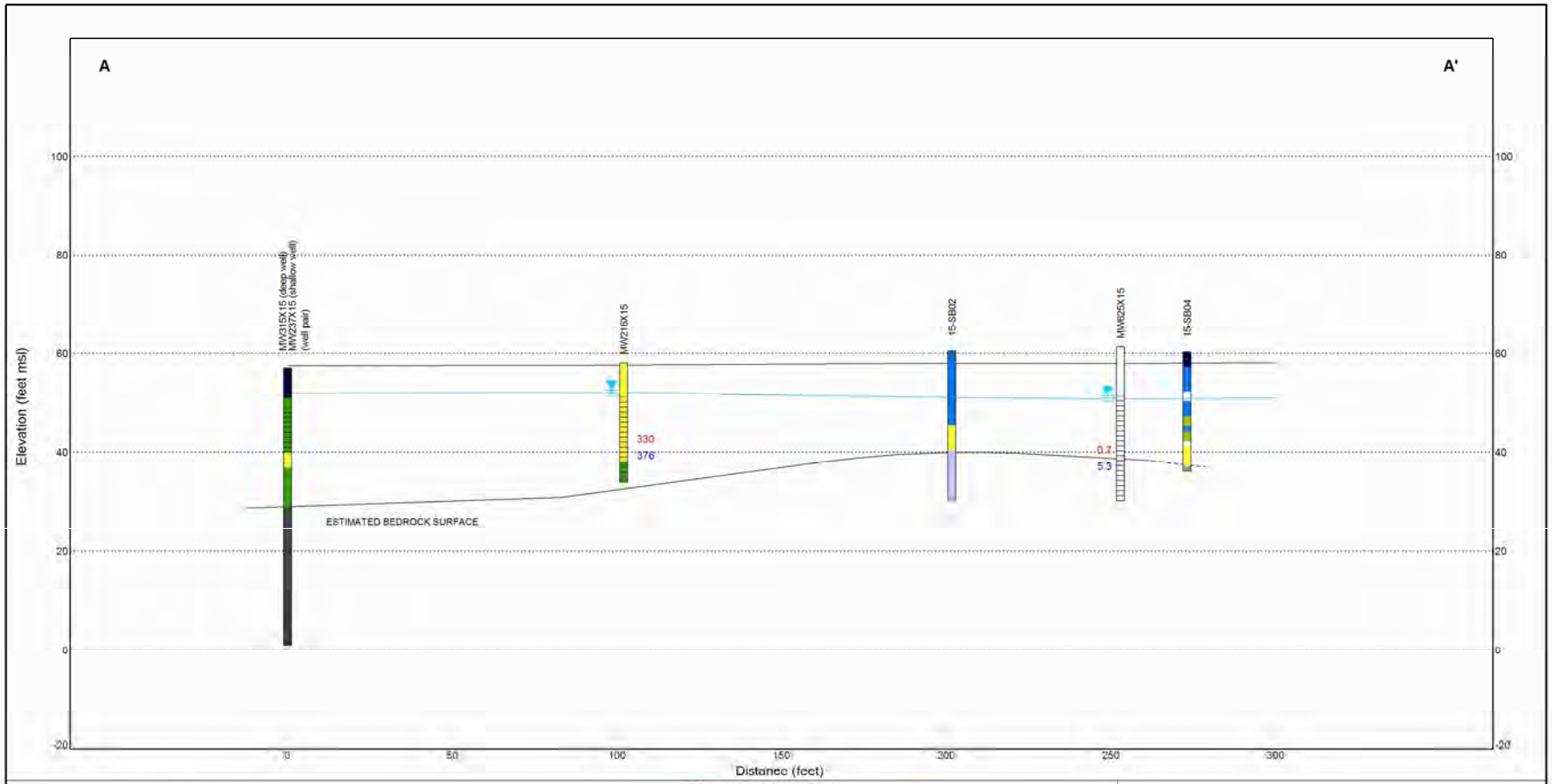
RDD \\BALDUR\PROJ\TRAVIS\381355_NAAR\MAPFILES\FIG5-4_SS015_TCE.MXD MCLAY1 8/3/2009

Site SS015 Status (cont'd)

- Elevated cis1,2-DCE and VC confirm that ERD was working and that the biological component of natural attenuation can be effectively enhanced at the site
- Daughter product concentrations are an order-of-magnitude higher than the parent compounds
- Rebound of TCE & PCE indicate that insufficient vegetable oil remains to complete the degradation process
- The plume appears to be slowly migrating eastward

Site SS015 Hydrogeology

- ~ 20 ft of unconsolidated alluvium overlies sedimentary bedrock
- The bedrock consists of shale and sandstone
- The alluvium is composed of discontinuous lenses of sand, silt, and clay
- The water table is ~10 ft bgs, and the saturated zone is ~10 ft thick



SOIL AND LITHOLOGY

- SCREEN INTERVAL
- APPROXIMATE SECOND QUARTER 2008 GROUNDWATER ELEVATION (ft MSL)
- 6.7 TCE CONCENTRATION (µg/L) DETECTED IN THE SECOND QUARTER 2008
- 6.7 TCE CONCENTRATION (µg/L) DETECTED IN THE FOURTH QUARTER 2008
- 5 APPROXIMATE TCE ISOCONCENTRATION CONTOUR (µg/L) BASED ON MAX 2008 DETECTION

SCALE EXAGGERATION - 1.5:1 (H:V)

NOTES:
1) SEE FIGURE 5-4 FOR CROSS SECTION LINE
2) WELL PAIR MW315X15 AND MW237X15 HAVE BEEN DECOMMISSIONED.

- NO SAMPLE/NO RECOVERY
- FILL/ASPHALT
- WELL GRADED GRAVEL (GW)
- POORLY GRADED GRAVEL (GP)
- SILTY GRAVEL (GM)
- CLAYEY GRAVEL (GC)
- WELL GRADED SAND (SW)
- POORLY GRADED SAND (SP)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILT (ML)
- ELASTIC SILT (MH)
- LEAN CLAY (CL)
- FAT CLAY (CH)
- SILTSTONE
- SANDSTONE
- SHALE

FIGURE 5-2
SS015 GEOLOGIC CROSS SECTION
NATURAL ATTENUATION ASSESSMENT REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

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Site SS015 Hydrogeology (cont'd)

- TCE extends laterally from source area ~ 120 ft to the east
- Monitoring well screened intervals at the site range from 5 to 58 ft bgs and are adequate to monitor vertical extent of contamination
- A submerged ridge of sandstone traverses the site from the northwest to the southeast, and influences groundwater flow

Site SS015 Next Steps

- Investigate extent of VOCs in the source area and downgradient
- Install alluvium-screened shallow well adjacent to MW624x15 (completed)
- Install monitoring well west of source-area well MW216x15 (completed)
- Install monitoring well downgradient of MW624x15 and MW625x15
- Install monitoring well southeast of MW625x15
- Evaluate investigation results and report back to the RPM in April or May meeting

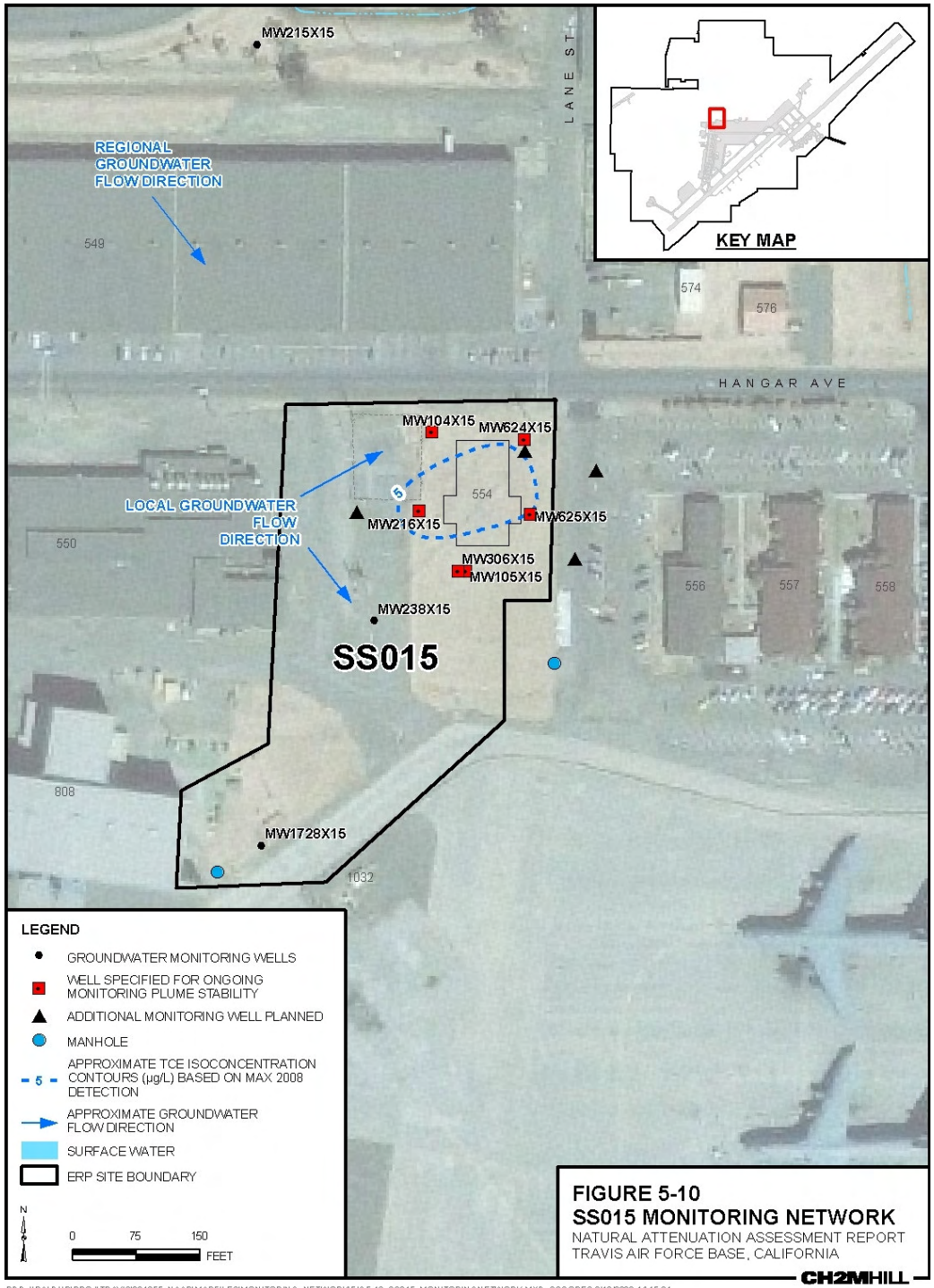

FIGURE 5-10
SS015 MONITORING NETWORK
NATURAL ATTENUATION ASSESSMENT REPORT
TRAVIS AIR FORCE BASE, CALIFORNIA

CH2MHILL

RDD \\BALDUR\PROJ\TRAVIS\381355 NAAR\MAPFILES\MONITORING NETWORK\FIG5-10 SS015 MONITORING NETWORK.MXD SSCOPES 8/12/2009 14:15:21

Questions/Comments?

Travis AFB
Groundwater Program

Management Overview Briefing

RPM Meeting
March 30, 2010

Completed Documents

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
- Model QAPP
- LF008 Rebound Test Tech Memo

Documents

- Comprehensive Site Evaluation Phase II Work Plan
- Field Sampling Plan (FSP)
- SS016 RPO Work Plan
- ST018 POCO RA Work Plan
- ***Vapor Intrusion Assessment Report***

Completed Field Work

Field Work

- ST027B Gore Sorber Survey – Ph 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 – Ph 1
- ST027 Site Characterization -Ph 3
- ST014 Monitor Well Install - Subsite 3
- SD001/SD033 Sediment RA
- SS016 Site Characterization (source area)

Field Work

- DP039 Site Characterization (mid plume)
- ST018 Site Characterization
- SS030 Site Characterization (Off-site VOC Plume)
- DP039 Site Characterization (for Biobarrier Placement)

In-Progress Documents & Field Work

Documents

- Natural Attenuation Assessment Report (NAAR) (Draft)
- SD036/SD037 RPO Work Plan (Draft)
- DP039 RPO Work Plan (Draft)
- 2008/2009 GSAP Annual Report (Draft)
- ***FT005 Data Gap Work Plan (Draft)***
- ***Union Creek Sites SD001 & SD033 Remedial Action (Draft)***

Field Work

- ***SD036 Additional Site Characterization (north & east)***
- ***DP039 Monitoring Well & Biobarrier Injection Well Installation***
- ***SD037 Monitoring Well & EOS Injection Well Installation***
- ***SS016 Monitoring Well Installation***
- ***SS015 Site Characterization***
- ***SS014 & ST032 Q1 2010 MNA Sampling***

Upcoming Documents & Field Work

Documents

• ST027B Site Characterization Report	March
• 2009 GWTP RPO Annual Report	April
• ***Quarterly Newsletter (April 2010)***	***April***
• Focused Feasibility Study (FFS)	***TBD***

Field Work

• LF007C Site Characterization (Wetlands)	TBD
• ST018 GETS Installation	TBD
• 2010 GSAP Annual Event	April
• SS016 Bioreactor Installation	***TBD***

2009 Groundwater Treatment Plant RPO Annual Report

Travis Air Force Base

RPM Meeting

March 30, 2010

SBBGWTP 2009 Highlights

- 35.8 million gallons of groundwater treated during 2009 at the SBBGWTP
- 19.4 pounds of VOCs removed during 2009
- 89.1% total system uptime during 2009
- 75.2 gpm average system flow rate during 2009
- No discharge violations during 2009

SBBGWTP System Modifications and plans for 2010

- All Site FT005 groundwater extraction wells taken off line as of 31 August 2009
- Two monitoring wells installed on the off-base portion of Site SS030, near easement boundary
- Keep all Site FT005 extraction wells off line during 2010
- Operate all extraction wells at Site SS030, including EW03x30, during 2010 to enhance hydraulic capture of Site SS030 TCE plume

CGWTP 2009 Operational Highlights

- 220 million gallons of groundwater treated during 2009
- 33.2 million cubic feet of soil vapor treated during 2009
- 133 pounds of VOCs removed (vapor and groundwater) during 2009
- 76.1% system uptime during 2009
- 58.5 gpm average system flowrate during 2009

CGWTP System Modification

- Carbon change out of 40,000 pounds conducted in May 2009
- UV/Ox system bypassed following carbon change out, approximate 90% reduction in GHG production at CGWTP
- WTTP SVE taken off line in August 2010 for rebound study
- Rebound study results at Site LF008 indicated no rebound in pesticide contamination

CGWTP Plans for 2010

- Shut down 5 WIOU extraction wells for a 12-month rebound study
- Collect vapor samples from WTTP SVE wells in June 2010 to evaluate 12-month rebound conditions
- Take EW01x34 and EW03x34 off line for a period of 6 months to help evaluate nature of Stoddard solvent source
- Pursue funding to convert WIOU extraction wells to solar power

NGWTP 2009 Operational Highlights

- 0.36 million gallons of groundwater treated at NGWTP during 2009
- 0.08 pounds of contaminant mass removed during 2009
- 5.9 gpm average flow rate during 2009
- NGWTP off line from 17 February through 31 December 2009 to facilitate an ongoing rebound study at Sites SD031 and FT004, and because of vernal pool formation at Site LF007C

NGWTP Sytem modifications and plans for 2010

- NGWTP modified in December 2009 to treat all groundwater from Site LF007C with GAC
- Install one or more additional monitoring wells at Site LF007C in 2010
- Install on or more extraction wells (if needed) at Site LF007C following a site investigation in 2010
- Resume groundwater extraction from Site LF007C extraction wells in 2010