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June 15, 2010

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Subject: **2009 Annual Progress Report - Regional Groundwater Remediation Program**
Middlefield-Ellis-Whisman ("MEW") Area
Mountain View, California

Dear Ms. Lee:

Attached please find the 2009 Annual Progress Report for the Regional Groundwater Remediation Program (RGRP), prepared by Geosyntec Consultants on behalf of Schlumberger Technology Corporation, the Project Coordinator for the MEW Area RGRP.

This annual progress report is being submitted in accordance with U.S. Environmental Protection Agency (EPA) Section XV of the Administrative Order for Remedial Design and Remedial Action (106 Order).

If you have any questions regarding this 2009 Annual Progress Report, please feel free to call me.

Very truly yours,

Du'Bois J. Ferguson
Remediation Manager

Enclosure

Prepared for

Schlumberger Technology Corporation
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2009 ANNUAL PROGRESS REPORT

MIDDLEFIELD-ELLIS-WHISMAN REGIONAL GROUNDWATER REMEDIATION PROGRAM

MOUNTAIN VIEW, CALIFORNIA

Prepared by

Geosyntec consultants

engineers | scientists | innovators

475 14th Street, Suite 400
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Project Number WR1128

15 June 2010

2009 Annual Progress Report
Middlefield-Ellis-Whisman
Regional Groundwater Remediation Program
Mountain View, California

Prepared by

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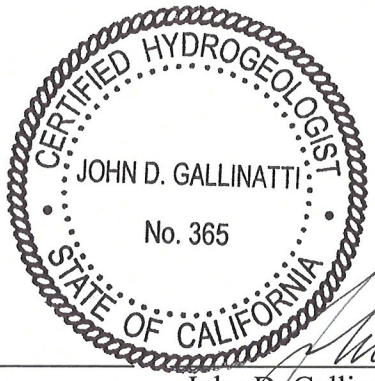

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Project Number: WR1128
15 June 2010

Geosyntec consultants

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ACRONYMS AND ABBREVIATIONS

106 Order	Section 106 Unilateral Administrative Order for Remedial Design and Remedial Action
bgs	below ground surface
BRAC	Base Realignment and Closure
cis-1,2-DCE	cis-1,2-dichloroethene
cm/sec	centimeter per second
DHS	Department of Health Services
DoD	Department of Defense
EPA	Environmental Protection Agency
FFA	Federal Facilities Agreement
FFS	focused feasibility study
former Building 18	644 National Avenue
GAC	granular activated carbon
gpm	gallons per minute
GETS	groundwater extraction and treatment system
µg/L	micrograms per Liter
$\mu g/m^3$	micrograms per cubic meter
K	hydraulic conductivity
MCLs	maximum contaminant levels
MEW	Middlefield-Ellis-Whisman
mg/kg	milligram per kilogram
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
North of 101	RGRP Treatment System at Corner of Wescoat Road and McCord Avenue, Moffett Field
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
O&M	operations and maintenance
ppb	parts per billion

ppm	parts per million
PLC	programmable logic control
PRPs	potentially responsible parties
QA/QC	quality analysis and quality control
RGRP	Regional Groundwater Remediation Program
RI	remedial investigation
RI/FS	remedial investigation and feasibility study
ROD	Record of Decision
RRWs	regional recovery wells
SCADA	supervisory control and data acquisition
SCVWD	Santa Clara Valley Water District
SCRWs	source control recovery wells
SMP	settlement measurement point
South of 101	RGRP Treatment System at 644 National Avenue
TCE	trichloroethylene
VFD	variable frequency drive
VOCs	volatile organic compounds
VPC	vapor phase carbon
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region
WATS	Westside Aquifer Treatment System

1. INTRODUCTION

This 2009 Annual Progress Report was prepared at the direction of Schlumberger Technology Corporation, the Project Coordinator for the Middlefield-Ellis-Whisman (MEW) Regional Groundwater Remediation Program (RGRP). The progress report was prepared by Geosyntec Consultants (Geosyntec) with assistance from Weiss Associates.

The progress report, summarizing MEW RGRP activities from 1 January through 31 December 2009, is being submitted to United States Environmental Protection Agency (EPA) in accordance with:

- Section XV of the 1990 Administrative Order for Remedial Design and Remedial Action issued by EPA (106 Order);
- Section XI of the Consent Decree entered in Action No. 20275 (N.D. Cal.) in 1992 (Consent Decree); and
- EPA correspondence prescribing annual report contents (EPA, 2005).

The 106 Order and Consent Decree responded to the presence of volatile organic compounds (VOCs) in soil and groundwater.

1.1 Site Background

The MEW study area, located in Mountain View, California (Figure 1), encompasses an approximately 1 square mile area, bisected by Interstate Highway 101 (Figure 2). South of Highway 101, the MEW Study Area includes three National Priority List (NPL) sites (Fairchild Semiconductor Corp. - Mountain View Superfund Site; Intel Corp. - Mountain View Superfund Site; and, Raytheon Company Superfund Site) and several non-Superfund sites within an approximately 100-acre area bounded by Middlefield Road on the south, Ellis Street on the east, Whisman Road on the west, and Highway 101 on the north. North of Highway 101, the MEW study area extends across portions of Former Naval Air Station (NAS) Moffett Field and the National Aeronautics and Space Administration (NASA) Ames Research Center and includes Moffett Field Superfund Site.

Remedial actions for the MEW study area are specified in a 1989 Record of Decision (ROD) issued by EPA and two subsequent Explanations of Significant Difference (EPA, 1989, 1990, 1996).

As specified in the ROD, groundwater cleanup included initial actions (completed) and the current long-term remedial phase (EPA, 1989)[1].

The VOCs addressed in the MEW ROD are assigned to both facility-specific and regional responsibilities. Each MEW Company is responsible for investigation, remediation, and source control for VOCs in soil and groundwater at their facility-specific properties south of Highway 101. The MEW Companies are jointly responsible, through the RGRP, for remediation of VOCs in groundwater that is not being captured by the facility-specific source control systems or that cannot be attributed to a single source (EPA, 2004). The MEW Companies are:

- **106 Order**: Fairchild Semiconductor Corporation, Schlumberger Technology Corporation, NEC Electronics Inc. (NEC), Sumitomo Mitsubishi Silicon America (SUMCO, formerly Siltec Corporation), SMI Holding LLC (SMI), Vishay General Semiconductor (Vishay, formerly General Instrument Corporation), National Semiconductor Corporation, Tracor X-Ray, and Union Carbide (now known as Dow Chemical Company). National Semiconductor Corporation, Tracor X-Ray, and Union Carbide are not involved with the active investigation and cleanup of the MEW Site (EPA, 2004).
- **Consent Decree**: Raytheon Company, Intel Corporation.

Responsibility for VOCs in groundwater north of Highway 101 is allocated between the MEW RGRP, Navy, and NASA. Navy is regulated by EPA under a Federal Facilities Agreement (FFA).

[1] The soil cleanup goals have been met at all of the MEW Companies' properties (EPA, 2004).

1.2 Local Hydrology

The MEW study area is located in the Santa Clara Valley Groundwater Sub-basin, the northern-most of three interconnected groundwater basins within Santa Clara County (SCVWD, 2001). The groundwater flow direction is northerly, toward San Francisco Bay, and generally sub-parallel to the ground slope.

The MEW study area lies within the northern portion of the sub-basin, where the hydrostratigraphy is divided into upper and lower water-bearing zones, separated by an extensive regional aquitard (SCVWD, 1989).

The upper water-bearing zone is subdivided into two water-bearing zones: the A Zone (roughly between 20 and 45 feet below ground surface [bgs]) and the B Zone (roughly between 50 and 160 feet bgs), which are separated by the A/B Aquitard. The B Zone is subdivided into three zones (B1, B2, and B3 Zones). The A/B Aquitard appears to be laterally continuous across the study area south of Highway 101, but may be discontinuous north of the highway (Tetra Tech FW, 2005).

The lower water-bearing zone occurs below a depth of about 200 feet bgs. The lower water bearing zone is subdivided into the C Zone (which extends to about 240 feet bgs) and the Deep Zone. The aquitard separating the upper and lower water-bearing zones is represented as the B/C Aquitard and is the major confining layer beneath the site.

The water-bearing zones are summarized below.

Water-Bearing Zones	Approximate Depth Interval Below Ground Surface
A[1]	20-45 feet
B1[2]	50-75 feet
B2	75-110 feet
B3	120-160 feet
C	200-240 feet
Deep	>240 feet

[1] The Navy and NASA refer to this zone as A1 north of Highway 101.
[2] The Navy and NASA refer to this zone as A2 north of Highway 101.

The following table summarizes the estimated ranges of hydraulic conductivity, horizontal gradient, saturated thickness, and transmissivity for the A and B Zones.

Water Bearing Zone	Estimated Hydraulic Conductivity (ft/day)		Approximate Horizontal Gradient	Saturated Thickness (ft)	Transmissivity (ft^2/day)	
	Low	High			Low	High
A-zone	6	480	0.004	15	44	4,400
B1-zone	20	260	0.003	25	150	2,600
B2-zone	0.4	5	0.002 to 0.005	35	2	230
B3-zone	0.5	5	0.001 to 0.002	40	5	130

Regionally, groundwater flow is generally toward the north in the A and B Zones under non-pumping conditions. Groundwater flow in the C Zone and Deep Zone is predominantly to the north-northwest. In general, the horizontal gradients are steeper in the southern portion of the Site and flatten to the north as the groundwater approaches San Francisco Bay. Because the MEW study area is near the northern discharge side of the groundwater basin, vertical gradients are generally upward.

Groundwater hydraulic gradients are locally modified by the operation of MEW groundwater recovery wells (both source control and regional recovery wells) and slurry walls, resulting in steeper gradients in the vicinity of pumping wells and overall gradients towards the central core of the MEW study area. Hydraulic capture resulting from the recovery wells is described in Section 2.4.

1.3 Description of Remedy and Summary of Remedial Action

As specified in the ROD, the current RGRP remedy consists of groundwater extraction and treatment. The RGRP groundwater extraction and treatment systems are designed to control and remove volatile organic compounds (VOCs) migrating beyond the source control recovery wells (SCRWs) that are operated by the PRPs.

The RGRP remedy is designed to protect local water supplies and to remediate or control groundwater that contains elevated concentrations of chemicals, including

control of discharge of such groundwater to surface water.[2, 3] Groundwater cleanup goals are 5 µg/L for TCE in shallow groundwater (A and B zones) and 0.8 µg/L for TCE in deep groundwater (C and Deep Zones).[4]

Effectiveness of the remedy is monitored using a network of RGRP monitoring wells (Tables 1A and 1B) that are currently monitored according to the schedule provided on Table 2. This regional information compliments the facility-specific chemical data and capture zone analyses provided in Annual Progress Reports submitted to EPA by the individual MEW PRPs, NASA, and the Navy.

The RGRP extraction systems are summarized in Table 3. The regional plume north of Highway 101 is addressed by 15 Regional Recovery Wells (RRWs) that convey groundwater to the North of 101 Treatment System located on the corner of Wescoat Road and McCord Avenue, Moffett Field. The regional plume south of Highway 101 is addressed by ten RRWs that convey groundwater to the South of 101 Treatment System, located at 644 National Avenue, and five RRWs that convey groundwater to Fairchild facility-specific systems.

The groundwater remedy is operated according to the Operation and Maintenance (O&M) manuals for each system (Locus, 1999, 2000a). Treated groundwater is discharged to Stevens Creek in compliance with National Pollutant Discharge Elimination System (NPDES) Permit CAG912003, Order No. R2-2009-0059. As discussed in Section 3.1, the North of 101 groundwater treatment system has a bypass valve that allows treated groundwater to be diverted for reuse by NASA when needed.

1.4 Summary of 2009 Site Activities and Deliverables

Ongoing site activities include:

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[2] The objectives of the groundwater remedy design are described in the ROD and the Feasibility Study (Canonie, 1988).

[3] The ROD also contains design objective for vadose soil that has been achieved and is not applicable to the RGRP.

[4] Groundwater cleanup goals are presented in the ROD.

- O&M of treatment systems;
- Assessment of remedial progress; and
- Planning for future remedial activities.

Specific site activities and deliverables by month in 2009 are listed below.

January 2009

- 8 January, 2 April and 26 October – Circulated updated project distribution list
- 15 January – "All Parties" meeting with EPA
- 30 January – Submitted to EPA revisions to their 15 January 2009 draft framework for the site-wide groundwater feasibility study
- 30 January - Submitted to the Water Board the Fourth Quarter and Annual 2008 Self-Monitoring Report under NPDES Discharge Permit No. CAG912003

March 2009

- 26 March – Semi-annual groundwater elevation measurements in RGRP groundwater monitoring and extraction wells

April 2009

- 30 April - Submitted to Water Board the First Quarter 2009 Self-Monitoring Report under NPDES Discharge Permit No. CAG912003

May 2009

- 1 May, 21 May, 4 June, 15 June, 16 June, and 17 June – Submitted information requested by EPA for the Second Five-Year Review
- 5 May – Completed site inspection for Second Five-Year Review with EPA

June 2009

- 15 June – Submitted to EPA the 2008 Annual Progress Report for the RGRP
- 16 June – Submitted final feasibility study for vapor intrusion to EPA based on comments received 2 June

- 22 June – Submitted final remedial investigation for vapor intrusion to EPA based on comments received 6 June

July 2009

- 23 July – Attended public meeting on proposed plan for vapor intrusion
- 30 July - Submitted to Water Board the Second Quarter 2009 Self-Monitoring Report under NPDES Discharge Permit No. CAG912003

September 2009

- 8 September through 15 October – Vapor sampling of 10 commercial buildings (H&A March 2010)

October 2009

- 30 October - Submitted to Water Board the Third Quarter 2009 Self-Monitoring Report under NPDES Discharge Permit No. CAG912003

November 2009

- 19 November – Semi-annual groundwater elevation measurements in RGRP groundwater monitoring and extraction wells
- 2 November through 8 December – Annual monitoring of RGRP groundwater monitoring and extraction wells

December 2009

- 1 December – Perform annual settlement elevation survey of designated settlement measuring points

2. GROUNDWATER EXTRACTION AND TREATMENT SYSTEM

2.1 System Description

Two groundwater extraction and treatment systems (GETS) are associated with the RGRP. The RGRP GETS are referred to as the North of 101 and South of 101 treatment systems. Treated groundwater from the RGRP GETS is discharged under the requirements of Order No. R2-2009-0059, NPDES Permit No. CAG912003 (VOC General Permit). These systems receive groundwater extracted from 25 RRWs. There are eleven additional RRWs (six currently operating) treated by Fairchild GETS. Table 3 lists the RRWs and their associated groundwater zones and GETS.

2.1.1 North of 101

The North of 101 GETS is located near the corner of Wescoat Road and McCord Avenue on Moffett Field and is shown in Figure 3. The North of 101 GETS includes the following components:

- 15 RRWs
- Conveyance piping
- Sediment filter
- Anti-scaling compound storage and metering system
- Two shallow-tray air-strippers in series
- A duct heater to reduce the water content of the air stripper off-gas stream
- Two 4,000-pound vapor-phase granular activated carbon (GAC) vessels in series to remove VOC from the air stripper off-gas, and
- Electrical distribution and control panels including:
    - a programmable logic controller (PLC)
    - Auto-dialer, and
    - a supervisory control and data acquisition (SCADA) computer.

2.1.2 South of 101

The South of 101 GETS is located at 644 National Avenue and is shown in Figure 3. The South of 101 GETS includes the following components:

- 10 RRWs
- Conveyance piping
- Sediment filter
- Three 10,000-pound liquid-phase GAC vessels in series, and
- Electrical distribution and control panels including:
  - a PLC
  - Auto-dialer, and
  - SCADA computer.

In addition, groundwater extracted from the sump collection system at the former Fairchild Building 18 (644 National Avenue) is diverted to the South of 101 GETS during GAC change-outs at Fairchild System 1.

2.1.2.1 RGRP Wells Treated by Fairchild Treatment Systems

There are 11 RRWs connected to the three Fairchild GETS (Table 3). Groundwater is treated using liquid-phase GAC at the Fairchild GETS.

Six of these wells were operated in 2009. 2009 extraction rates from these wells were used in the capture zone evaluation and were provided by Weiss Associates.

Five deep RRWs were not operated in 2009. Groundwater extraction and treatment ceased in RRWs DW3-505R and DW3-219 in 2002. These wells were sampled semi-annually for two years and then annually thereafter if TCE concentrations were less than 0.8 µg/L. TCE concentrations in groundwater samples from DW3-505R have remained less than 0.8 µg/L since 2002 and this well is sampled annually. RRW DW3-219 was operated from 1 August 2005 to 19 June 2006 after TCE concentrations increased above 5 µg/L in early 2005. TCE concentrations subsequently declined and

RRW DW3-219 has been sampled at least semi-annually since then. In 2009, RRW DW3-219 was sampled quarterly and TCE concentrations ranged from 0.9 to 0.6 µg/L.

RRW DW3-244, DW3-334, and DW3-364 were shut down with approval of EPA in 2006 to reduce the possibility of inducing migration of VOCs from shallower water-bearing zones or from shallower depths in the deep water-bearing zone.

2.2 Operation and Maintenance

The North of 101 GETS removed approximately 468 pounds of VOCs from 53.3 million gallons of groundwater during 2009. The South of 101 GETS removed approximately 420 pounds of VOCs from 31.9 million gallons of groundwater in 2009. Table 4 summarizes the volume of groundwater treated, the influent total VOC concentrations and the mass of VOC treated by each RGRP GETS per month during 2009. Figures 4 and 5 illustrate the cumulative volume of groundwater and VOC mass removal for each of the GETS systems since 1998. In total, approximately 18,000 pounds of VOCs in 1.3 billion gallons of groundwater have been treated by the RGRP GETS.

Table 5 summarizes the VOC sampling results from the GETS NPDES compliance samples. TCE and cis-DCE are detected at higher concentrations in GETS influent samples as compared to other detected VOCs. TCE concentrations ranged from 690 to 1,000 µg/L in the North of 101 influent samples and from 1,300 to 1,800 µg/L in the South of 101 influent samples collected in 2009.

Table 6 presents target flow rates and 2009 average monthly flow rates for each RRW. Target flow rates were established in August 2007 based on the 2006 RGRP Annual Progress Report (Weiss, 2006). Since that time, target rates for four RRWs (REG-7B1, REG-10A, REG-3A and REG-4A) have been adjusted[5]. Monthly average extraction rates (gallons per minute) for each RRW treated by an RGRP GETS in 2009 are provided in Table 7. These rates were calculated by dividing the volume of groundwater extracted by an RRW (gallons) and dividing by the time (minutes) between meter readings.

[5] See Table 6 notes

In 2009, weekly average flow rates from each RRW are calculated and compared to the target rate for that RRW. Adjustments to the flow control valves are made at an RRW if the average rate deviates by more than +/- 20% of the target rate. If the target rate for an RRW cannot be achieved, the pump is assessed and replaced if necessary. If the target rates cannot be achieved after the pump has been replaced, redevelopment is considered.

Non-routine GETS operation and maintenance activities in 2009 are summarized in Tables 8a and 8b. In four cases, EPA was notified of system down time. In September 2009, the Water Board was also notified. Notifications to the EPA and Water Board are required for extraction well and system down-time events as follows:

- EPA: The owner and/or operator of the RGRP/Fairchild treatment system will make a best effort to orally notify EPA within 24 hours of a RRW or system shutdown that occurs for more than 72 hours (N101 and S101 O&M Manuals).
- Water Board: If the treatment system is shut down for more than 120 consecutive hours after the start up period (maintenance, repair, violations, etc.) the reason(s) for shut down, proposed corrective action(s), and estimated start-up date shall be orally reported to the Water Board within five days of shut down and a written submission shall also be provided within 15 days of shut down (Order No.R2-2004-0055, VOC General NPDES Permit No. CAG912003, expired October 2009).

Well redevelopment by surging and bailing was conducted at four N101 RRWs in August 2009. The sustainable flow rate from RRW REG-12B1 increased 2 to 3 gpm after redevelopment. The frequency of well cycling decreased after well redevelopment activities at RRW REG-6A and REG-10B1. The extraction rate and frequency of well cycling did not improve after redevelopment of RRW REG-6A.

In addition, the following O&M compliance activities were conducted during this reporting period:

- Submitted monthly statements of groundwater volumes extracted from North of 101 and South 101 RRWs to the Santa Clara Valley Water District;
- Disposed of spent sediment filters from the North of 101 and South of 101 treatment systems and spent carbon from South of 101 treatment system

compound as hazardous waste (spent carbon from North of 101 system managed as non-hazardous waste);

- Renewed the Site Environmental Compliance Plan and permit to store hazardous materials (i.e., 93% sulfuric acid used to neutralize GETS effluent following GAC replacements) at South of 101 with the City of Mountain View;
- Submitted the renewed permit to store hazardous materials at North of 101 with the Santa Clara County Department of Environmental Health; and
- Submitted the renewed air permit to operate both the primary and secondary air strippers at North of 101 with the Bay Area Air Quality Management District September 21.

2.3 Groundwater Level Monitoring

Groundwater levels are measured semi-annually (Table 2) in approximately 1000 wells for the purpose of monitoring the hydraulic performance of RGRP and facility-specific groundwater remedies in the MEW study area. Table 9 summarizes the construction details for RGRP monitoring and extraction wells used in the water level monitoring program. Groundwater levels were measured on 26 March and 19 November.[6] Water levels measured in RGRP wells during 2009 are included in Appendix I.

Groundwater levels in most MEW wells were measured monthly from 1984 to 1993 and quarterly from 1993 to 2004. On 2 December 2004, the EPA approved a reduction of the groundwater elevation measurement frequency from quarterly to semi-annually for the MEW RGRP well network (Weiss, 2006). However, some MEW companies continue to measure site-specific groundwater levels quarterly in March, May, August and November as part of slurry wall evaluation activities. Conditional EPA approval was received on 31 October 2007 to eliminate 75 wells from the groundwater elevation monitoring well network (EPA, 2007).

The following modification was made to the water level monitoring program for 2009:

[6] March and November are the months statistically evaluated to be the most representative of the seasonal high and low water levels, respectively.

- 17 wells were monitored voluntarily for water levels and chemistry to improve resolution of groundwater elevation and TCE concentration contours – 92A, 95A, 16A, 23A, 61A, 68A, 134A, SIL4A, SIL12A, 4B1, 154B1, 155B1, 67B1, RW-4B1, RW-13B1, W9SC-20, 40B2, RW-1C.

Hydrographs of selected monitoring wells are presented in Figures 6 and 7. Figure 6 includes a set of A Zone hydrographs from along a north-south line through the MEW study area. These hydrographs indicate that the magnitude of seasonal and long-term water level fluctuations in the A Zone is very small relative to water level variations across the study area. Figure 7 presents hydrographs from a series of well clusters wherein adjacent wells are screened in different hydrostratigraphic zones. These hydrographs provide a representative measure of vertical hydraulic gradients between zones.

The groundwater elevations were used to construct groundwater elevation contour maps of the five water-bearing zones in the region (A/A1, B1/A2, B2, B3 and C/Deep) for each of the March and November monitoring periods. Groundwater elevations from monitoring wells and from piezometers installed in the filter pack of extraction wells were used in contouring. The groundwater elevation contour maps were created using KT3D_H2O version 3.0, a geostatistical software package (Tonkin and Larson, 2002).[7] As opposed to most interpolation programs that require a choice between linear and logarithmic kriging, this version of KT3D allows for linear-log ordinary kriging using linear kriging in areas distant from recovery wells and point logarithmic kriging in the vicinity of recovery wells. The flow rates from the extraction wells were input to the program in order to allow for a variable radial distance of transition from linear to logarithmic kriging. A spherical variogram was specified with grid spacing of 30 feet.

Ten groundwater elevation contour maps are presented in Figures 8 through 17 (the capture zones included on the figures are discussed below in Section 2.4). Appendix B includes the ten contour maps, presented at a larger scale with posted groundwater elevation data and without the estimated capture zones.

[7] The KT3D software package was developed as part of the Geostatistical Software Library (GSLIB) at Stanford University and was subsequently modified by S.S. Papadopulos and Associates, Inc. to include well drift (Deutsh and Journal 1998, Tonkin and Larson 2002).

2.4 Hydraulic Control and Capture Zone Analysis

The water level monitoring described in Section 2.3 provides the basis for evaluating the hydraulic performance of the RGRP and facility-specific groundwater remedies. The hydraulic capture area achieved by one or more recovery wells cannot be directly measured, but rather requires analysis and interpretation of the measured water levels and extraction rates. The following discussion summarizes the basis for estimating the capture zones.

2.4.1 Methodology

In evaluating groundwater capture for RGRP wells, consideration was given to the EPA guidance document *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems* (EPA, 2008). The following steps were used to perform the hydraulic evaluation of the groundwater remedy.

- The site conceptual model, remedy objectives, slurry wall locations, and target capture zones were available from previous studies and prior annual monitoring reports[8];
- Water level measurements from March and November 2009 were interpolated to generate groundwater elevation contour maps as described in Section 2.3;
- Pumping rates from RRWs and SCRWs were compiled from available sources;
- Hydraulic capture from each RRW and SCRW was estimated based on graphical flow-net analysis of the contour maps;
- A water balance calculation was used to check the total width of capture estimated from the graphical analysis;
- Water level data from well clusters were analyzed for the distribution of vertical gradients; and
- VOC time-series trends in monitoring wells were reviewed for confirming evidence of hydraulic capture (Section 2.5).

[8] For example, EPA Second 5-Year Review (EPA 2009a) and 2008 Annual Progress Report (Weiss, 2009).

2.4.2 Estimated Extraction Well Capture

Estimated capture zones for the RRWs in March and November 2009 are shown in Figures 8 through 17. The capture zones were estimated by graphical flow-net analysis, using the groundwater elevation contour maps (Section 2.3). The graphical analysis was guided by backward particle tracking using TransientTracker in KT3D_H20 and calculated distances to the stagnation point and capture zone width based on the analytical solution of Javandel and Tsang (1986). The KT3D_H20 particle tracking method and analytical calculations assume homogeneous, two-dimensional groundwater flow with a single regional estimated value of transmissivity. These methods were used as supporting lines of evidence to evaluate capture together with the groundwater elevation contour maps. The RGRP regional contour maps and capture zone maps encompass the facility-specific areas. Capture zones from the facility-specific sites were reviewed and incorporated in the RGRP capture evaluation. The final capture zones as presented in Figures 8 through 17 are based on professional judgment in consideration of the above analyses, known site conditions, and experience with similar sites.

2.4.3 Capture Width Based on Combined Flow Rate Analysis

The capture zone analysis described in 2.4.2 above was developed on a well-by-well basis. However, the net result of the combined capture zones from all RRWs is an area of hydraulic capture significantly wider than the distribution of VOCs in groundwater. An independent check of the capture zones presented in Figures 8 through 17 was developed by using the combined 2009 groundwater extraction rates for all RRWs and SCRWs to estimate the total capture width in each zone (A, B1, B2, and B3). The estimated capture widths were then compared to the distribution of TCE in groundwater (Section 2.5) measured in map view for each zone. If the estimated width of capture is greater than the trans-gradient width of the TCE distribution in groundwater, then hydraulic containment of the plume is indicated.

The calculations of capture width for each zone based on the total extraction rate, regional hydraulic gradient, hydraulic conductivity, and zone thickness are shown in Table 10.

The results indicate that the predicted capture width based on the total extraction rate is greater than the measured trans-gradient width of TCE in groundwater, thereby providing an additional line of evidence that hydraulic containment is achieved.

2.4.4 Vertical Gradients

Hydrographs for selected Site wells showing vertical gradients are shown in Figure 7. The vertical gradients depicted in the hydrographs are summarized as follows:

- South of Highway 101 and north of the Raytheon Slurry wall the vertical gradients are upward between all zones (graph 1 on Figure 7);
- South of Highway 101 and east of the Fairchild Building 1-4 Slurry Wall the vertical gradients are downward between the A and B1 zones and upward between the B1 and B2 zones (graph 2 on Figure 7);
- North of Highway 101 (approximately 1000 ft) the vertical gradients are upward between the A and B1 zones and downward between the B1 and B2 zones (graph 3 on Figure 7); and,
- North of Highway 101 (approximately 5000 ft) the vertical gradient between the A and B1 zones is neutral (graph 4 on Figure 7).

2.5 Groundwater Quality Monitoring

The 2009 annual groundwater quality monitoring event was conducted in November and December 2009. Groundwater samples were collected from the RGRP wells and were analyzed for VOCs in compliance with the MEW monitoring schedule and O&M manuals (Table 3). A total of 231 RGRP wells were sampled in 2009. Of these wells, 215 were sampled as part of the required monitoring schedule and 16 were sampled voluntarily. VOC concentration versus time graphs for all the RGRP wells are included in Appendix D.

A summary of the analytical results including historical results for the last five years (2004 to 2009) is presented in Appendix E and the analytical reports are included in Appendix F.

Text and tables summarizing the sampling and analysis quality assurance and quality control (QA/QC) parameters for all RGRP groundwater samples collected in 2009

along with the QA/QC acceptance criteria for VOC analytical methods and results are presented in Appendix G.

2.5.1 TCE Isoconcentration Contour Maps

TCE isoconcentration contour maps were created for the 2009 annual sampling event. The 2009 TCE contour maps were based on the existing 2008 TCE contour maps (Weiss, 2009) with contours modified as needed to reflect decreases or increases in TCE concentrations from 2008 to 2009. The TCE isoconcentration maps for 2009 are presented for the A Zone, B1 Zone, B2 Zone, B3 Zone, and C Zone in Figures 18 to 22 respectively. The same contour maps are presented at a larger scale with posted data in Appendix C.

2.5.2 Other Samples Collected This Reporting Period

DW3-219 was sampled quarterly in 2009 (February, May, July, and November) because the concentrations in this well have fluctuated near the cleanup goal of 0.8 µg/L. TCE concentrations in DW3-219 in 2009 ranged from 0.9 µg/L in May to 0.6 µg/L in November.

Seven wells are sampled annually for selected metals per the schedules in the O&M manuals for the RGRP, and as follows: 22A and 10B2 (arsenic), 42A (antimony, cadmium), 54A (cadmium), SIL12A (antimony), and RW-1B1 and RW-2B1 (lead). Current and historical results are provided in Appendix E.

2.5.3 Remedy Performance

In conjunction with the hydraulic analysis described in Section 2.4, the VOC monitoring data provides an additional line of evidence for assessing remedy performance.

In the 2009 annual monitoring event all of the RGRP wells sampled had TCE concentrations that were within or below historical ranges, except monitoring well 10C. TCE was detected for the first time at 10C during the 2009 event at a concentration of 20 µg/L.

Based on the VOC versus time graphs presented in Appendix D, the TCE concentrations appear to be stable or decreasing in 97% of the RGRP wells[9]. Approximately 45% of the RGRP wells display decreasing TCE concentration trends and 52% show no trend or are stable. Of the 30 RRWs operational in 2009, 28 display decreasing TCE concentration trends and two are stable (REG-1B1, RW-9B2).

The small percentage of wells that appear to have recent increasing TCE concentration trends include the following:

- A-Zone: 134A, 14E14A, and 173A;
- B1-Zone: R13B1, W89-14; and,
- B2-Zone: 17B2, 51B2.

The TCE concentration increase in each of these wells was less than an order of magnitude over the last 5 years.

Fourteen of the RRWs display increasing cis-1,2-DCE concentrations, likely indicative of naturally occurring in-situ biodegradation. The influence of naturally occurring biodegradation on attenuation of VOC concentrations will be further evaluated during the planned site-wide groundwater feasibility study.

The VOC time series data described above indicate that the combined MEW remedies are performing as designed to control or remediate VOCs in groundwater.

The spatial distribution of VOC monitoring data can also be used to assess remedy performance. Figures 23 through 27 present maps of the A Zone, B1 Zone, B2 Zone, B3 Zone, and C Zone, respectively, with the November 2009 hydraulic capture zones (Section 2.4, Figures 8, 10, 12, 14, and 16) overlain on the November 2009 TCE isoconcentration maps. In addition, Figures 28 and 29 present the area of the TCE in groundwater that is the responsibility of MEW parties.[10] These figures illustrate nearly

[9] All graphs were visually inspected for the presence of discernible trends. If visual inspection suggested a possible increasing trend, a Mann-Kendall analysis was performed to evaluate if the trend was statistically significant.

[10] North of Highway 101 the areas of responsibility have been allocated between the MEW parties, Navy, and NASA based on negotiated allocation agreements.

complete hydraulic capture, with only a few fringe areas of low TCE concentrations outside of the capture zones.

The following three wells, located within the area of RGRP responsibility, are downgradient of the hydraulic capture zones and have TCE concentrations above 5 µg/L in 2009:

- WU4-19 (B1/A2 Zone): The TCE concentration is 24 µg/L and concentrations have been decreasing since 2006 (Appendix D, Figure D-182). These data indicate that the current remedies are effective in this area despite the apparent gap in the capture zone overlay.
- Wells 51B2 and 17B2 (B2 Zone): The TCE concentrations are 35µg/L and 13µg/L, respectively. Over the last ten years, TCE concentrations have increased in 51B2 and 17B2. The B2 capture zones upgradient from these wells (Figures 12 and 25) appear to be more than sufficient to prevent migration of VOCs, therefore the source of these VOC concentrations requires further evaluation.

2.6 Compliance

The RGRP GETS discharge treated groundwater to the local storm drain systems under an NPDES permit. The RGRP NPDES permit (CAG912003/Order No. R2-2004-0055) expired on 30 September 2009 and was renewed (CAG912003/Order No. R2-2009-0059) effective 1 October 2009. All field measurements and samples required under the NPDES were collected. Permit compliance reports are issued quarterly to the Water Board and requirements are summarized on Table 3.

Both systems operated within the effluent limits established by the NPDES permits for the entire period. VOC results from samples collected for NPDES compliance are summarized in Table 6. NPDES permit CAG912003 includes "trigger" effluent criteria that are not discharge criteria, however require additional sampling and evaluation of GETS influent and treatment processes if exceeded. Samples from the North of 101 exceeded effluent "triggers" for copper and selenium in November 2009. As a result, monthly effluent samples were collected on the first quarter of 2010 and analysis of the results will be provided to the Water Board and stakeholders prior to February 2011, as required by permit CAG912003.

The North of 101 system operated in compliance with BAAQMD Permit to Operate #11384.

3. OTHER ACTIVITIES

3.1 Water Reuse

The MEW ROD specifies that extracted groundwater should be reused to the maximum extent feasible. Currently, treated water from the RGRP North of 101 groundwater treatment system is designated for reuse by NASA or discharge to Stevens Creek. The North of 101 system has a bypass valve that allows treated groundwater to be diverted, further treated by microfiltration and reverse osmosis, and then reused by NASA's Unitary Wind Tunnel Cooling Tower or Arc Jet Facilities when needed. NASA reused approximately 2,738,100 gallons of treated NASA and MEW groundwater in 2009.

During 2009, the RGRP coordinated with NASA on their plans to expand water reuse that may include additional N101 effluent, as well as NASA and Navy treatment system effluent. NASA gathered information to support engineering design and permitting, including silt density testing of N101 effluent on 28 October 2009, and piping walk-through on 24 November 2009. NASA plans to submit a Notice of Intent to the Water Board for a NPDES discharge permit as part of preliminary engineering, with final design in 2010, and construction in 2011.

3.2 Air/Vapor Intrusion

On 8 March 2006, EPA sent a letter to the MEW Companies, NASA, and the Navy requesting a Supplemental Remedial Investigation/Feasibility Study (RI/FS) Work Plan and a RI/FS Report for vapor intrusion (EPA, 2006). The following actions have been taken in response to the EPA request.

- An RI/FS Work Plan was submitted to EPA on 12 May 2006 (Locus, 2006a).
- By e-mail, on 16 June 2006, EPA conditionally approved the RI/FS Work Plan.
- A Supplemental RI Report was submitted to EPA on 14 August 2006 (Locus, 2006b).
- A Supplemental FS Report was submitted to EPA on 16 October 2006 (Locus, 2006c).
- EPA provided comments via email on the Supplemental RI/FS on 15 November 2007.

- A Revised Supplemental FS Report was submitted to EPA on 24 January 2008 (Locus, 2008a).
- A Revised Supplemental RI Report was submitted to EPA on 15 February 2008 (Locus, 2008b).
- EPA presented revisions to the Revised Supplemental RI and FS reports on 8 June 2009.
- The MEW Parties provided comments to the EPA revisions to the Revised Supplemental FS and RI in e-mails dated 16 June 2009 and 22 June 2009, respectively.
- The comments were incorporated into the Final Supplemental Feasibility Study for Vapor Intrusion Pathway for the MEW Study Area, which was issued by Haley & Aldrich and Locus Technologies on 29 June 2009 (Haley & Aldrich 2009).
- EPA issued its Proposed Plan for the Vapor Intrusion Pathway at the MEW Study Area on 9 July 2009 (EPA, 2009a).
- The public comment period for the Proposed Plan began on 10 July 2009.
- Based on comments received during the public comment period, EPA issued Potential Changes to the Proposed Vapor Intrusion Remedy on 20 August 2009 (EPA, 2009b).
- September - October 2009 sampling of 10 commercial buildings (H&A, 2010).
- The public comment period for the Proposed Plan was closed on 7 November 2009.
- At the time of this report, EPA is in the process of reviewing and responding to the public comments on the Proposed Plan, and amending the ROD to address the VI pathway.

3.3 Groundwater Optimization Evaluation Study

In response to a request from EPA[11], an Optimization Evaluation Report for the RGRP was submitted to the EPA on 3 September 2008 (Geosyntec, 2008). The evaluation

[11] Letter from EPA to MEW Parties dated 5 June 2008,

considered previous efficiency evaluations at the Site (Northgate, 2007a-c and 2008a and b) and recommended implementing an optimization program for the RGRP. EPA has not issued comments on the Optimization Report.

3.4 Second Five-Year Review

On 30 September 2009, EPA released the Final Second Five-Year Review Report for the MEW Study Area (EPA, 2009c).

3.5 Soil Settlement Survey

An annual survey has been conducted at the Site since 1998 to monitor soil settlement elevations. The purpose of these annual measurements is to evaluate whether survey data and associated groundwater elevation data indicate that there has been soil settlement associated with the MEW groundwater withdrawal.

Kier and Wright Civil Engineers & Surveyors, Inc. surveyed the Settlement Measurement Points (SMPs) in December 2009 using the City of Mountain View vertical control benchmark No. 111-46. The results of the survey are presented in Appendix H.

Geosyntec reviewed the historical settlement and water level elevation data and concluded that the small amplitude ground elevation fluctuations do not appear to be related to groundwater extraction operations.

Consistent with this finding, if pumping is maintained at current rates, Geosyntec considers that future monitoring can be reduced to every two years, with the possibility for future reductions in monitoring frequency if the observed trends remain consistent.

4. PROBLEMS ENCOUNTERED

Section 2.2 summarizes the non-routine O&M events that occurred at the North of 101 and South of 101 treatment systems. No other problems related to operation of the treatment systems were encountered.

5. TECHNICAL ASSESSMENT

The following assessment of the groundwater remedy performance was made based on data collected through 2009.

- The remedy is functioning as intended. Based on 2009 data, the RGRP treatment systems continue to function as intended. An Annual Remedy Performance Checklist and summary of recommendations from the 2004 five year remedy review is included in Appendix A.
- Capture zones are adequate. Groundwater elevations, graphical flow net analysis, capture zone width calculations and VOC concentration trends provide converging lines of evidence that the Site extraction wells are achieving adequate horizontal and vertical capture of the regional plume.
- VOC concentrations are decreasing over time. Appendix D shows that most RGRP wells have stable or decreasing TCE concentrations. The TCE concentrations in wells 51B2 and 17B2 should be further evaluated.
- The 2009 groundwater elevation data indicate that vertical gradients are consistent with historical trends. (Figure 7).

While concentrations within the core of the TCE plume have historically decreased by an order of magnitude or more, the perimeter extent of TCE concentrations has largely stabilized and treatment system influent concentrations have generally declined.

6. CONCLUSIONS AND RECOMMENDATIONS

During 2009, the RGRP treatment systems removed a total of 888 pounds of VOCs from 85 million gallons of extracted groundwater. The North of 101 and South of 101 treatment systems operated on a nearly continuous basis (93% and 98%, respectively) and no significant problems related to the system operations were noted in 2009.

The technical assessment concludes that the groundwater remedy is performing as intended. Vapor issues are being addressed in the independent process described in Section 3.2 above.

Groundwater elevations, graphical flow net analysis, capture zone width calculations, and VOC concentration trends provide converging lines of evidence that the Site extraction wells are achieving adequate horizontal and vertical capture of the regional plume.

Trend analyses indicate stable or decreasing concentrations in 97% of the RGRP wells in each zone. The TCE concentrations observed in wells 51B2 and 17B2 should be further evaluated.

The modifications to the RGRP recommended in the 2008 Optimization Evaluation should be implemented following receipt of EPA comments or approval.

7. UPCOMING WORK IN 2010 AND PLANNED FUTURE ACTIVITIES

January	• Pump and Treat System O&M • 4th Quarter and Annual NPDES reporting
February	• Pump and Treat System O&M
March	• Pump and Treat System O&M • Quarterly system effluent sampling (NPDES) • Groundwater level measurements
April	• Pump and Treat System O&M • 1st Quarter NPDES reporting
May	• Pump and Treat System O&M
June	• Pump and Treat System O&M • Quarterly system effluent sampling (NPDES) • Submit Annual Progress Report to EPA
July	• Pump and Treat System O&M • 2nd Quarter NPDES reporting
August	• Pump and Treat System O&M
September	• Pump and Treat System O&M • Quarterly system effluent sampling (NPDES)
October	• Pump and Treat System O&M • 3rd Quarter NPDES reporting
November	• Pump and Treat System O&M • Groundwater level measurements • Groundwater sampling South of 101
December	• Pump and Treat System O&M • Quarterly system effluent sampling (NPDES) • Groundwater sampling North of 101

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TABLES

Table 1A
2009 RGRP Wells North of 101 Listed by Owner
MEW Regional Groundwater Remediation Program
Mountain View, California

Owner: Fairchild (North of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
65A	4B1 [1]	17B2			
72A	46B1	51B2			
73A	47B1	54B2			
74A	48B1	82B2			
75A	49B1	123B2			
81A	50B1				
82A	68B1				
88A	78B1				
89A	79B1				
92A [2]	81B1				
93A	83B1				
95A [2]	87B1				
	139B1				
	154B1 [2]				
	155B1 [2]				

Owner: MEW RGRP (North of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
REG-2A	REG-5B(1)				
REG-3A	REG-6B(1)				
REG-4A	REG-7B(1)				
REG-5A	REG-8B(1)				
REG-6A	REG-9B(1)				
REG-7A	REG-10B(1)				
REG-8A	REG-12B(1)				
REG-9A	W89-13B1-R				
W89-03A-R					
W89-04A-R					

Owner: NASA (North of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
14D02A					
14D09A					
14D13A [3]					
14E14A					
15H05A					

Owner: Navy (North of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
W9-16	W9-17				
W9-38 [3]	W9-25				
W12-6	W9-41 [3]				
W14-3	W9SC-20				
W60-2	W14-5				
W89-1	W89-11				
W89-2	W89-12				
W89-5	W89-14				
W89-7	WNB-14				
W89-8	WU4-2				
W89-9	WU4-4				
WT14-1	WU4-5				
WU4-1	WU4-6 [3]				
WU4-3	WU4-7				
WU4-16	WU4-12				
WU4-18	WU4-13				
	WU4-19				

Notes:
[1] Well added to RGRP in 2009.
[2] Voluntary well added to RGRP in 2009.
[3] chemistry only

Table 1B
2009 RGRP Wells South of 101 Listed by Owner
MEW Regional Groundwater Remediation Program
Mountain View, California

Owner: Fairchild (South of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
1A	8B1	6B2	28B3	6C	DW3-551
16A [1]	13B1	15B2	30B3	8C	
20A	14B1	16B2	44B3	9C	
21A	26B1	36B2	133B3	10C	
23A [1]	32B1	37B2		11C	
26A	33B1	40B2 [1]		DW2-234	
29A	56B1	43B2			
41A [2,3]	67B1 [1]	62B2			
45A	69B1 [2,3]	75B2			
59A [2,3]	74B1	76B2			
61A [1]	77B1	89B2			
62A	91B1	113B2			
77A	92B1	125B2			
78A	93B1 [2,3]	129B2			
79A	98B1	132B2			
99A	103B1	134B2			
105A [2,3]	105B1				
106A [2,3]	112B1				
109A	119B1				
126A [2,3]	122B1				
134A [1]	124B1				
138A [2,3]	140B1				
139A [2,3]	143B1				
141A [2,3]	RW-2(B1)				
142A	RW-4(B1) [1]				
144A					
153A					
159A [2,3]					
162A					
173A					

Owner: Intel (South of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
IM9A	I9B1				
	IM5B(1)				
	IM9B(1)				

Owner: MEW RGRP (South of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
REG-1A	ME1B1	38B2	65B3	DW3-219	DW3-244
REG-10A	ME2B1	NEC8B2			DW3-334
REG-11A	NEC8B1	NEC18B2			DW3-364
REG-12A	NEC14B1	REG-1B(2)			DW3-505R
REG-MW-1A	NEC18B1	REG-3B(2)			
REG-MW-2A	REG-1B(1)	REG-MW-1B(2)			
RW-9A	REG-2B(1)	RW-9(B2)			
	REG-3B(1)				
	REG-4B(1)				
	REG-11B(1)				
	REG-MW-1B(1)				
	REG-MW-2B(1)				
	RW-9(B1)R				

Owner: Raytheon (South of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
R22A	R6B1	R13B2	R5B3	DW1-230	
R24A	R13B1	R30B2	R9B3	R4C	
R25A	R16B1	R40B1(B2)	R27B3		
R29A	R22B1	R41B2	R54B3		
R31A	R46B1	R50B2	R56B3		
R32A	RP22B	R52B2	R61B3		
R43A		R55B2			
R46A					
R57A					
R59A					

Owner: Siltec (South of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
SIL4A [1]					
SIL12A [1]					

Owner: Silva (South of 101)					
A/A1	**A2/B1**	**B2**	**B3**	**C**	**Deep**
RW-13B(1) [1]					
RW-1C [1]					

Notes:
[1] Voluntary well added to RGRP in 2009. [2] Well added to RGRP in 2009. [3] water level only

Table 2
2009 Monitoring and Reporting Schedule
MEW Regional Groundwater Remediation Program
Mountain View, California

System / Wells	Analysis[1]	Frequency
Wells		
Wells	Water Level	March, November
Wells	VOCs by EPA Method 8260B	November or December[7]
Wells	Standard Observations (pH, Temperature, Specific Conductivity)	November or December
Wells	Sampling for Selected Metals[2]	November or December
North of 101 Treatment System		
System Influent (before AS 1)[3]	VOCs by EPA Method 8260B	Monthly
System Influent (before AS 1)	pH and Temp	Monthly
System Influent (before AS 1)	1,4-Dioxane by EPA Method 8270C SIM	May, October
System Midpoint (AS 1&2)	VOCs by EPA Method 8260B	Monthly
System Midpoint (AS 1&2)	pH and Temp	Monthly
System Effluent (after AS 2)	VOCs by EPA Method 8260B	Monthly
System Effluent (after AS 2)	pH and Temp	Monthly
System Effluent (after AS 2)	1,4-Dioxane by EPA Method 8270C SIM[5]	May, October
System Effluent (after AS 2)	Metals[4] by EPA Method noted	October
System Effluent (after AS 2)	Fish Toxicity, 96-Hr by US EPA-821-R-02-012 Test, Method 2019.0	October
System Effluent (after AS 2)	Turbidity by EPA Method 180.1	October
System Effluent (after AS 2)	Hardness and Salinity by standard methods	October
South of 101 Treatment System		
System Influent (before GAC 1)[6]	VOCs by EPA Method 8260B	Quarterly
System Influent (before GAC 1)	pH and Temp	Quarterly
Midpoint 1 (GAC 1&2)	VOCs by EPA Method 8260B	Monthly
Midpoint 1 (GAC 1&2)	pH and Temp	Monthly
Midpoint 2 (GAC 2&3)	VOCs by EPA Method 8260B	Seven Times in 2009
Midpoint 2 (GAC 2&3)	pH and Temp	Seven Times in 2009
System Effluent (after GAC 3)	VOCs by EPA Method 8260B	Monthly
System Effluent (after GAC 3)	pH and Temp	Monthly
System Effluent (after GAC 3)	Metals[4] by EPA Method noted	October
System Effluent (after GAC 3)	Fish Toxicity, 96-Hr by US EPA-821-R-02-012 Test, Method 2019.0	October
System Effluent (after GAC 3)	Turbidity by EPA Method 180.1	October
System Effluent (after GAC 3)	Hardness and Salinity by standard methods	October

Notes:

1 EPA Methods used reflect transition from Order No. R2-2004-055 to Order No. R2-2009-0059, NPDES Permit No. CAG912003

2 Metals analyzed at following wells locations:

Arsenic (As) = 22A, 10B2

Antimony (Sb) = 42A, SIL12A

Cadmium (Cd) = 42A, 54A

Lead (Pb) = RW-1(B1), RW-2(B1)

3 AS = Air Stripper

4 US EPA Method 200.8 and 6010B for Sb, As, Be, Cd, Cr, Cu, Pb, Ni, Se, Ag, and Tl. US EPA Method 200.8 and 245.1 for Zn. US EPA Method SM4500CN-E for CN. US EPA Method 245.1/1631 for Hg. US EPA Method 7196A for Hexavalent Chromium.

5 SIM = selective ion mode

6 GAC = Granular Activated Carbon

7 RRW DW3-219 was sampled in May and November 2009 (bi-annually per criteria for Silva RRW shut-down).

Table 3
Regional Recovery Wells and Associated Treatment Systems
MEW Regional Groundwater Remediation Program
Mountain View, California

Facility	Regional Recovery Wells By Aquifer				
	A/A1	**B1**	**B2**	**B3**	**C/Deep**
Regional Remediation Program Treatment Systems					
North of 101	REG-2A REG-3A REG-4A REG-5A REG-6A REG-7A REG-8A REG-9A	REG-5B1 REG-6B1 REG-7B1 REG-8B1 REG-9B1 REG-10B1 REG-12B1			
South of 101	REG-1A REG-10A REG-11A REG-12A	REG-1B1 REG-2B1 REG-3B1 REG-11B1	REG-1B2 REG-3B2		
Fairchild Treatment Systems					
System 1		REG-4B1	38B2		
System 3	RW-9	RW-9B1	RW-9B2		
System 19				65B3	DW3-219 [1] DW3-244 [2] DW3-334 [2] DW3-364 [2] DW3-505R [3]

Notes:
1. Well was originally turned off in 2002, operated temporarily from 29 July 2005 through 19 June 2006, and has remained off since that time with EPA approval.
2. Well was turned off with EPA approval in November 2006.
3. Well was turned off with EPA approval in 2002.

Table 4
2009 Monthly VOC Mass Removal
MEW Regional Groundwater Remediation Program
Mountain View, CA

	Total Groundwater Extracted[1] (gallons)	Influent VOC Concentration[2] (mg/L)	Total VOC Mass Removed[3] (pounds)
North of 101			
January	2,368,405	1.03	20.3
February	4,328,420	1.00	36.1
March	5,199,619	1.11	48.1
April	4,871,685	1.30	52.7
May	4,509,690	1.11	41.7
June	5,477,086	1.03	47.1
July	4,404,830	1.07	39.2
August	5,086,852	0.94	39.7
September	3,735,333	0.93	28.9
October	4,317,785	1.05	37.7
November	3,565,504	1.12	33.3
December	5,422,530	0.96	43.2
2009 Cumulative	53,287,739		468.1
South of 101			
January	2,622,880		42.7
February	2,240,240	1.95	36.5
March	2,831,390		46.1
April	2,258,780		29.3
May	2,482,110	1.56	32.2
June	3,004,910		39.0
July	2,644,470		31.1
August	3,066,190	1.41	36.0
September	2,460,910		28.9
October	2,591,630		30.8
November	3,176,630	1.43	37.8
December	2,497,640		29.7
2009 Cumulative	31,877,780		420.1

Notes:

1. Total groundwater extracted each month was obtained from the NPDES quarterly reports.

2. Influent VOC concentrations were obtained from the NPDES quarterly reports. System influent samples are analyzed monthly for North of 101 System and quarterly for South of 101 System.

3. Total VOC Mass Removed is calculated by multiplying Total Groundwater Extracted (gallons) by the influent VOC concentration (mg/L) and a Unit Conversion factor of 0.00000833, based on 3.785 L/gal and $2.2X10^{-6}$ lbs/mg.

4. Abbreviations: mg/L = milligrams per liter lbs/mg = pounds per milligram; L/gal = liters per gallon

Table 5
2009 Treatment System VOC Sampling Results
MEW Regional Groundwater Remediation Program
Mountain View, California

Well	Date	Constituent (concentration in micrograms per liter, ug/L and method is 8260B)												
		Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	1,4-Dioxane	Freon 113	Methylene Chloride	PCE	1,1,1-TCA	TCE	Vinyl Chloride
North 101														
Air Stripper I Influent	1/21/2009	<10	**6.1**	<5	**8.4**	**220**	<5		**15**	<200	<5	<5	**780**	<5
Air Stripper I Influent	2/18/2009	<10	**5.8**	<5	**8.1**	**200**	**8.6**		**14**	<200	**5.3**	<5	**760**	<5
Air Stripper I Influent	3/24/2009	<1	**7.4**	<0.5	**14**	**220**	**3.8**		**17**	<20	**3.2**	**1.8**	**840**	**1.8**
Air Stripper I Influent	4/16/2009	<20	<10	<10	**14**	**270**	<10		**16**	<400	<10	<10	**1000**	<10
Air Stripper I Influent	5/22/2009	<13	<6.3	<6.3	**8.1**	**210**	<6.3	**2.8**	**13**	<250	<6.3	<6.3	**880**	<6.3
Air Stripper I Influent	6/18/2009	<13	<6.3	<6.3	**11**	**220**	**6.5**		**14**	<250	<6.3	<6.3	**780**	<6.3
Air Stripper I Influent	7/16/2009	<13	<6.3	<6.3	**6.9**	**200**	**8**		**13**	<250	<6.3	<6.3	**840**	<6.3
Air Stripper I Influent	8/20/2009	<13	<6.3	<6.3	**7.8**	**200**	<6.3		**9.3**	<250	<6.3	<6.3	**720**	<6.3
Air Stripper I Influent	9/23/2009	<10	**5.8**	<5	**8.6**	**210**	**5.7**		<20	<200	<5	<5	**700**	<5
Air Stripper I Influent	10/21/2009	<13	<6.3	<6.3	**9.6**	**220**	<6.3	**3.3**	<25	<250	<6.3	<6.3	**820**	<6.3
Air Stripper I Influent	11/20/2009	<13	<6.3	<6.3	**11**	**240**	<6.3		<25	<250	<6.3	<6.3	**870**	<6.3
Air Stripper I Influent	12/16/2009	<13	**7.6**	<6.3	**10**	**250**	<6.3		<25	<250	<6.3	<6.3	**690**	<6.3
Air Stripper 2 Influent	1/21/2009	<1	<0.5	<0.5	<0.5	**0.9**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	2/18/2009	<1	<0.5	<0.5	<0.5	**0.9**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	3/24/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	4/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	5/22/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	6/18/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	7/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	8/20/2009	<1	<0.5	<0.5	<0.5	**0.5**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	9/3/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	9/3/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	9/23/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	10/21/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	11/20/2009	<1	<0.5	<0.5	<0.5	**0.7**	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
Air Stripper 2 Influent	12/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	1/27/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	2/18/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	3/24/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	4/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	5/22/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5	**2.6**	<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	6/18/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	7/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	8/20/2009	<1	<0.5	<0.5	<0.5	**1.4**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	8/20/2009	<1	<0.5	<0.5	<0.5	**1.3**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	9/23/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	9/23/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	10/21/2009	<0.5	<0.5	<0.5	<0.5	**0.6**	<0.5		<2	<10	<0.5	<0.5	<0.5	<0.5
System Effluent	10/21/2009	<0.5	<0.5	<0.5	<0.5	**0.7**	<0.5	**3.3**	<2	<10	<0.5	<0.5	<0.5	<0.5
System Effluent	11/20/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5

Table 5
2009 Treatment System VOC Sampling Results
MEW Regional Groundwater Remediation Program
Mountain View, California

Well	Date	Constituent (concentration in micrograms per liter, ug/L and method is 8260B)												
		Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	1,4-Dioxane	Freon 113	Methylene Chloride	PCE	1,1,1-TCA	TCE	Vinyl Chloride
System Effluent	11/20/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	12/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	12/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
South 101														
System Influent	2/18/2009	<25	<13	<13	<13	**61**	<13		**93**	<500	<13	<13	**1800**	<13
System Influent	3/30/2009													<5
System Influent	5/1/2009	<25	<13	<13	<13	**44**	<13		**59**	<500	<13	<13	**1400**	<13
System Influent	5/19/2009	<20	<10	<10	<10	**45**	<10		**66**	<400	<10	<10	**1500**	<10
System Influent	8/20/2009	<14	<7.1	<7.1	<7.1	**50**	<7.1		**60**	<290	<7.1	<7.1	**1300**	<7.1
System Influent	11/20/2009	<20	<10	<10	<10	**57**	<10		**72**	<400	<10	<10	**1300**	<10
System Midpoint I	1/15/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	2/18/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	3/5/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	**0.5**
System Midpoint I	4/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	5/1/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	5/19/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	6/4/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	7/17/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	8/20/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	9/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	10/21/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	11/20/2009	<1	<0.5	<0.5	<0.5	**1.1**	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint I	12/16/2009	<1	**1.6**	<0.5	<0.5	**11**	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint 2	2/18/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	**0.5**
System Midpoint 2	3/5/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	**0.5**
System Midpoint 2	5/1/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint 2	5/19/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint 2	7/17/2009	<1	<0.5	<0.5	<0.5	**1.5**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint 2	8/20/2009	<1	<0.5	<0.5	<0.5	**1.6**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Midpoint 2	11/20/2009	<1	<0.5	<0.5	<0.5	**1.3**	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	1/15/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	2/18/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	3/30/2009	<1	<0.5	<0.5	<0.5	**0.7**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	4/16/2009	<1	<0.5	<0.5	<0.5	**1.3**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	5/19/2009	<1	<0.5	<0.5	<0.5	**1.4**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	6/4/2009	<1	<0.5	<0.5	<0.5	**1.6**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	6/4/2009	<1	<0.5	<0.5	<0.5	**1.7**	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	7/17/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	8/20/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	8/20/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<20	<0.5	<0.5	<0.5	<0.5

Table 5
2009 Treatment System VOC Sampling Results
MEW Regional Groundwater Remediation Program
Mountain View, California

Well	Date	Constituent (concentration in micrograms per liter, ug/L and method is 8260B)												
		Chloro-form	1,1-DCA	1,2-DCA	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	1,4-Dioxane	Freon 113	Methylene Chloride	PCE	1,1,1-TCA	TCE	Vinyl Chloride
System Effluent	9/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	9/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	10/21/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	10/21/2009	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<10	<0.5	<0.5	<0.5	<0.5
System Effluent	11/20/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	11/20/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	12/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5
System Effluent	12/16/2009	<1	<0.5	<0.5	<0.5	<0.5	<0.5		<2	<20	<0.5	<0.5	<0.5	<0.5

Notes:
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
1,1-DCE = 1,2-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
PCE = Tetrachloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
TCE = Trichloroethene

Table 6
Target and 2009 Average Recovery Well Flow Rates
MEW Regional Groundwater Remediation Program
Mountain View, CA

Extraction Wells	Target Flow Rate[1] (gpm)	Average 2009 Flow Rate[2] (gpm)
North of 101		
REG-2A	10.6	9.8
REG-3A	7.0	7.1
REG-4A	9.0	8.0
REG-5A	19.3	18.9
REG-8A	6.9	6.9
REG-5B(1)	17.3	16.1
REG-6B(1)	8.0	5.4
REG-7B(1)	12.0	12.2
REG-6A	4.9	2.6
REG-7A	12.8	12.7
REG-9A	7.7	8.0
REG-8B(1)	11.3	6.8
REG-9B(1)	5.3	5.9
REG-10B(1)	12.8	10.9
REG-12B(1)	10.4	6.6
South of 101		
REG-1A	11.4	10.2
REG-10A	3.0	3.2
REG-11A	4.5	4.7
REG-2B(1)	3.5	3.4
REG-3B(1)	6.0	5.2
REG-11B(1)	5.2	4.5
REG-3B(2)	4.5	4.2
REG-12A	10.0	8.5
REG-1B(1)	15.4	15.6
REG-1B(2)	3.5	3.7

Notes:

1. Target flow rates were assigned in August 2007 based on the January 2006 average flow rates (Weiss, 2006). Since that time, target flow rates for four wells have been adjusted based on well yield. Target rates for REG-7B1 and REG-10A were increased in October 2008 to reduce required maintenance. Target rates for wells REG-3A and REG-4A were decreased in October 2008 because the yield from these wells had decreased despite redevelopment.

2. Average 2009 flow rate was calculated by dividing the total volume of groundwater recovered by the time in minutes between the totalizer readings. North of 101 totalizer readings were recorded on 31 December 2008 and 28 December 2009. South of 101 totalizer readings were recorded on 29 December 2008 and 29 December 2009.

Table 7

2009 Monthly Average Recovery Well Flow Rates

MEW Regional Groundwater Remediation Program

Mountain View, CA

Extraction Well	2009 Average Monthly Flow Rate[1] (gpm)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
North of 101												
REG-2A	10.7	10.7	11.2	11.7	10.2	9.8	9.7	9.5	9.7	8.2	8.2	8.2
REG-3A	7.2	7.2	7.2	7.2	7.5	7.3	7.3	6.3	6.8	6.8	7.2	7.2
REG-4A	8.0	8.0	7.7	8.1	8.4	8.1	8.2	8.0	7.0	7.9	8.4	8.3
REG-5A	19.1	19.1	19.0	19.3	18.2	19.0	19.2	19.0	18.5	18.4	19.3	18.4
REG-8A	6.9	6.4	5.4	7.0	7.3	7.2	7.2	7.2	7.0	7.0	7.3	7.3
REG-5B(1)	15.6	15.6	16.4	16.6	16.6	14.7	16.1	16.4	14.4	14.8	17.6	17.8
REG-6B(1)	6.4	6.4	6.5	6.4	6.7	6.5	5.8	4.4	4.6	4.6	4.4	2.9
REG-7B(1)	12.3	12.2	10.8	12.3	12.7	12.4	12.5	12.4	12.1	12.0	12.6	12.6
REG-6A	2.0	2.1	2.5	1.9	1.9	1.8	1.7	2.0	3.9	3.9	4.0	4.1
REG-7A	13.6	13.6	13.6	13.6	13.0	11.8	11.9	12.1	11.3	11.2	13.2	13.2
REG-9A	7.9	7.9	7.9	8.0	8.2	8.0	8.1	8.1	7.9	7.8	8.2	8.2
REG-8B(1)	7.3	7.4	7.5	7.5	7.6	7.3	7.2	6.8	5.3	4.9	6.0	6.2
REG-9B(1)	5.8	5.8	5.8	5.9	6.1	6.0	6.0	6.0	5.8	5.8	6.1	6.1
REG-10B(1)	9.7	9.7	9.8	9.9	10.2	10.0	10.1	10.6	12.5	12.5	13.1	13.1
REG-12B(1)	5.1	5.1	6.1	6.1	6.3	6.2	6.0	6.3	6.9	7.9	8.3	8.3
South of 101												
REG-1A	10.2	11.8	10.6	10.7	10.5	10.6	10.7	10.6	9.6	9.6	9.3	8.7
REG-10A	2.9	3.6	3.4	2.0	3.6	3.5	3.5	3.0	2.4	3.8	3.5	3.2
REG-11A	4.2	4.8	4.4	4.8	4.9	3.6	4.8	5.4	5.2	5.5	5.1	4.0
REG-2B(1)	3.1	3.0	3.6	3.6	3.7	3.6	3.5	3.0	3.3	4.0	3.7	3.2
REG-3B(1)	5.5	6.1	4.5	4.8	5.2	4.9	5.2	5.1	4.8	4.3	6.1	5.8
REG-11B(1)	4.3	4.9	4.4	4.5	4.6	4.8	4.8	4.6	4.4	4.7	4.5	4.2
REG-3B(2)	4.1	4.7	4.2	4.4	4.3	4.3	4.2	3.8	4.2	4.8	3.6	3.4
REG-12A	6.7	9.9	8.7	8.9	8.0	8.6	8.8	8.2	7.8	8.8	8.6	9.8
REG-1B(1)	14.6	16.9	14.4	14.5	15.1	15.6	16.9	16.4	16.1	15.8	16.0	15.1
REG-1B(2)	4.2	4.3	4.4	4.8	4.8	4.7	3.7	2.6	2.4	2.7	2.6	2.6

Notes:

1. Monthly average extraction well flow rate for each well was calculated by dividing the volume of groundwater extracted by the time (minutes) between the effluent totalizer readings (generally taken last Monday of each month).

gpm = gallons per minute

Table 8A
Summary of 2009 Non-Routine Operation and Maintenance Activities North of 101
MEW Regional Groundwater Remediation Program
Mountain View, CA

Date	Component	Comments	Regulatory Notification
January 7-20, 2009	System	The treatment system was turned off on January 7, 2009 due to a non-functioning refrigerative dryer. The system was reconfigured to run without the chiller on a temporary basis until a new type of dryer could be ordered and installed. The system was restarted on January 20 with daily readings of system operations.	EPA: January 7, 2009
January 30, 2009	System	The treatment system was turned off for approximately 2 hours during work on the water knock out at Air Stripper 1.	N/A
February 14-17, 2009	System REG-6A	The treatment system turned off periodically between February 14 and February 17, 2009, due to vault flood alerts at REG-6A that were caused by a rain storm event. The treatment system was off-line for approximately 16 hours.	N/A
February 21-22, 2009	System	The treatment system turned off due to a pad flood alert the evening of February 21, and was restarted the following morning.	N/A
February 27, 2009	REG-5A	REG-5A had a pump fault alert on February 27, 2009, and was restarted later in the day.	N/A
March 5-9, 2009	System	The treatment system was turned off Thursday, March 5, 2009 for the installation of a duct heater in the air stream prior to the vapor carbon vessels. The system was restarted on March 6, 2009 and the heater was turned on March 9, 2009. The system was off-line for approximately 24 hours during the installation.	N/A
March 4-13, 2009	REG-7B1	REG-7B1 was cycling due to a water level probe malfunction and was off-line for a total of 27 hours.	N/A
March 12, 2009	REG-4A	REG-4A went off-line due to a low flow alert on March 12, 2009, and could not be immediately restarted due to an electrical communication problem. After troubleshooting, this well was restarted the following afternoon. REG-4A was off for approximately 33 hours.	N/A
April 1-2, 2009	System	The treatment system was turned off on April 1, 2009 for maintenance work on the primary air stripper. It was restarted the following day, and was off-line for approximately 24 hours.	N/A
April 8, 2009	System	A brief power outage in the afternoon on April 8, 2009 caused the treatment system to go off-line and send out alerts. The alerts were cleared and the system was restarted within approximately two hours.	N/A
April 28, 2009	REG-7A	REG-7A had a low flow alert the evening of April 28, 2009. It was restarted the following morning and was off-line for approximately 8 hours.	N/A
May 8-19, 2009	REG-5A	REG-5A had pump fault alerts on May 8 and 13, 2009. The pump was off-line for approximately 3 hours as a result of these alerts. The pump was replaced May 19, 2009.	N/A
June 7, 2009	REG-6A	REG-6A had a low flow alert on June 7, 2009 and was restarted later in the day. The pump was off-line for approximately 2 hours.	N/A
June 10-12, 2009	REG-6A	REG-6A had a low flow alert and was turned off as the well did not start after clearing the alarm on June 10. The pump was restarted on June 12. The pump was off-line for approximately 48 hours.	N/A
June 17, 2009	REG-4A	Extraction well REG-4A had a low flow alert on June 17, and was restarted approximately 5 hours after the alert.	N/A
June 18, 2009	REG-8B1	A short circuit at well REG-8B1 caused the treatment system to shut down for approximately 9 hours on June 18. A temporary repair was made to enable the well to run. The wires were replaced for this well on July 7, 2009.	N/A
June 30, 2009	System	A power outage caused the treatment system to be off-line for about 10 hours on June 30, 2009.	N/A
July 6-7, 2009	REG-12B1	REG-12B1 went off-line on July 6 due to a malfunctioning water level probe and was restarted on July 7. The well was off-line for approximately 24 hours.	N/A
July 22-28, 2009	REG-6B1	REG-6B1 went off-line due to low flow alerts caused by erratic flow rates on July 22 and 28. The well was off-line for a combined total of approximately 17 hours as a result of this issue. The pumping rate was reduced in this well to stabilize its flow rate.	N/A
August 24-31, 2009	Extraction Wells	Extraction wells were turned off daily between August 24 and 27 and on August 31 during well redevelopment work at REG-6A, REG-8B1, REG-10B1, and REG-12B1. The wells were off-line for up to 10 consecutive hours each during each day of redevelopment work and a maximum combined total of 80 hours during this time. The treatment system remained on during redevelopment.	N/A
August 28, 2009	Treatment System	Treatment system was off-line due to a routine carbon change on August 28 for approximately 3 hours.	N/A
August 29 - September 1, 2009	REG-8B1 and REG-12B1	REG-8B1 and REG-12B1 went off-line intermittently between August 29 and September 1, due to water level and low flow problems following their redevelopment. REG-8B1 and REG-12B1 were off-line for combined totals of approximately 47 and 18 hours, respectively as a result of these issues.	N/A
September 1, 2009	System	Treatment system went off-line due to a filter high pressure alert on September 1 for approximately 2 hours.	N/A
September 5-7, 2009	REG-12B1	REG-12B1 had low flow alerts between September 5 and 7 and was off-line for approximately 60 hours as a result of these alerts.	N/A

Table 8A
Summary of 2009 Non-Routine Operation and Maintenance Activities North of 101
MEW Regional Groundwater Remediation Program
Mountain View, CA

Date	Component	Comments	Regulatory Notification
September 7, 2009	REG-4A	REG-4A went off-line due to a pump fault alert on September 7 for approximately 21 hours.	N/A
September 7, 2009	REG-6B1	REG-6B1 went off-line due to a low flow alert on September 7 for approximately 7 hours.	N/A
September 9, 2009	REG-4A	REG-4A went off-line due to a communication error on September 9 and was off-line for approximately 44 hours before the treatment system was turned off on September 11.	N/A
September 11-18, 2009	System	The treatment system was turned off on September 11 due to a faulty bearing in the positive displacement blower. The blower could not be repaired, therefore a replacement blower was ordered. The new blower was installed and the system was restarted on September 18, 2009.	EPA: September 11, 2009 Water Board: September 17, 2009
September 18-21, 2009	REG-4A	REG-4A had a communication error with the treatment system and was not totalizing flow between September 18 and 21. However, the well was confirmed to be on during this time.	N/A
September 21-23, 2009	REG-4A and REG-6B1	REG-4A and REG-6B1 went off-line on September 21 due to pump failures. The pump for REG-4A was replaced on September 22 and the pump for REG-6B1 was replaced on September 23. The wells were off-line for approximately 24 and 48 hours, respectively.	N/A
October 3, 6, 7	REG-2A	Well REG-2A was off-line for approximately 8 hours on October 3, 6, and 7, due to low flow pump level alerts. The pumping rate was reduced to stabilize flow in the well.	N/A
October 13, 2009	Treatment System	North 101 was off-line for approximately 12 hours, due to issues with the variable frequency drives (VFDs).	N/A
October 13-14	REG-7A	REG-7A was off-line for approximately 33 hours due to flow meter problems.	N/A
October 14-16	System	The treatment system was turned off for approximately 22 hours, from October 14 to 16, for pump replacements and other routine maintenance.	N/A
October 27-28	REG-8B1	REG-8B1 was off-line for approximately 10 hours due to a faulty water level probe, which was replaced on October 28.	N/A
November 2, 2009	REG-2A	REG-2A was off-line for approximately 3 hours on November 2, due to low flow.	N/A
November 15, 2009	REG-7A	REG-7A was off-line for approximately 18 hours due to low flow caused by a broken part in the flow meter.	N/A
November 20-23	REG-6B1	REG-6B1 was off-line for approximately 62 hours due to pump cycling.	N/A
November 25-December 2	REG-6B1	REG-6B1 was off-line for approximately 48 consecutive hours as a result of multiple low flow alerts, and for a total of approximately 152 hours over the reporting period due to problems with the pressure transducer. This well was not off longer than 72 hours in any instance so no notifications were triggered.	N/A
December 7, 2009	System	The treatment system was off-line for approximately 2 hours while the VFD was repaired.	N/A
December 14-15	REG-4A	REG-4A may have been off-line for a maximum of 39 hours as a result of communication errors.	N/A
December 17-23	REG-6B1	REG-6B1 was off-line for approximately 120 hours from 6pm on December 17, until 7:30 am on December 23, due to a loss in communication with its level controls. EPA was notified on December 23.	EPA Notified December 23

Table 8B
Summary of 2009 Non-Routine Operation and Maintenance Activities South of 101
MEW Regional Groundwater Remediation Program
Mountain View, CA

Date	Component	Comments	Regulatory Notification
January 15-20, 2009	REG-10A	The pump turned off on January 15, and did not call out an alarm. The pump was discovered to be off on January 19, 2009 and was immediately restarted. However, the downtime exceeded 72 hours. The pump went off again on January 20, 2009 due to a failed power saver which was replaced and the pump restarted later in the day.	EPA: January 19, 2009.
January 22, 2009	REG-12A	The pump in this well was replaced on January 22, and the well was turned back online the same day.	N/A
January 26-28, 2009	REG-10A	The pump turned off on January 26, 2009 due to an electrical issue. Repair work was done to restart the well on January 28, 2009. The well was down for approximately 36 hours between Monday the 26th and Wednesday the 28th.	N/A
February 9, 2009	REG-10A	The pump in this well was turned off for approximately 7 hours to install a new motor saver.	N/A
February 15-17, 2009	REG-2B1	This well was off-line for approximately 29 hours between February 15 and 17 due to low flow alerts.	N/A
February 20-21, 2009	REG-2B1	The motor saver failed at this well on February 20 and was replaced and the pump restarted the following morning.	N/A
February 22-23, 2009	REG-1B2	This well was off-line for approximately 32 hours between February 22 and 23 due to low flow alerts.	N/A
March 9-10, 2009	REG-1B2	This well went off-line due to pump fault alert and was restarted the next day.	N/A
March 15-16, 2009	REG-1B2	This well went off-line on March 15 due to low flow and pump fault alerts. The pump was restarted the following day. The well was off-line for approximately 27 hours.	N/A
March 19, 2009	REG-1B2	This well went off-line due to low flow and pump fault alerts and was restarted later in the day.	N/A
March 26-27, 2009	System	The system was off-line from March 26 to 27 for a routine carbon change. The treatment system was off-line for approximately 28 hours	N/A
March 30, 2009	REG-10A	The pump in this well started cycling and called out a pump fault alert on March 30. The pump was restarted later in the day.	N/A
April 3-6, 2009	REG-10A	Extraction well REG-10A was cycling and turned off without calling out an alarm on Friday afternoon April 3, 2009 after the afternoon system checks. The well was discovered to be off-line on Monday morning and was immediately restarted. The well was off-line for approximately 70 hours over the weekend.	N/A
April 8, 2009	System	A brief power outage in the afternoon on April 8, 2009 caused the treatment system to go off-line and send out alerts. The alerts were cleared and the system was restarted within approximately two hours.	N/A
April 22, 2009	REG-3B1 and REG-10A	The pumps in wells REG-3B1, and REG-10A were replaced on April 22, 2009, and the wells were off for less than 4 hours during replacement.	N/A
May 1, 2009	System	The treatment system was turned off for approximately 3 hours on May 1, 2009 for carbon sampling.	N/A
May 6-7, 2009	System	The treatment system was off-line for approximately 4 hours due to pad flood alerts on May 6 and 7, 2009.	N/A
May 20-26, 2009	REG-12A	REG-12A shut off due to pump saver problems between 05/20/09 and 05/22/09, and again between 05/24/09 and 05/26/09 for approximately 25 and 48 hours respectively. The pump saver was replaced on 05/26/09.	N/A
June 2, 2009	REG-1B2	REG-1B2 shut off for a low flow alert on June 2 and was off for approximately 16 hours.	N/A
June 22-23, 2009	REG-3B1	REG-3B1 had pump fault and low flow alerts on June 22 and 23 causing the well to be off-line for approximately 25 hours.	N/A
July 3, 2009	REG-1B2	REG-1B2 went off-line due to a low flow alert on July 3 for approximately 2 hours.	N/A
July 14-15, 2009	REG-1B2 and REG-3B1	REG-1B2 and REG-3B1 went off-line due to low flow alerts on July 14 and were restarted on July 15 after their motor switches were replaced. Both wells were off-line for approximately 18 hours.	N/A
August 28, 2009	System	The treatment system went off-line due to a pad flood alert on August 28 for approximately 1 hour.	N/A
August 28-31, 2009	REG-2B1	REG-2B1 went off-line and could not be restarted on August 28. The pump was replaced and the well was restarted on August 31. The well was off-line for approximately 71 consecutive hours and a combined total of 90 hours as a result of this pump failure.	N/A
August 29, 2009	REG-3B2	REG-3B2 went off-line due to low flow alerts caused by a clogged paddle wheel on August 29 and September 1 for a combined total of approximately 41 hours.	N/A
September 6-7, 2009	System	REG-1A, REG-10A, REG-11A, REG-2B1. REG-3B1, REG-11B1, and REG-3B2 went off-line due to a leak detection alert on September 6 for approximately 15 hours. The alert was caused by moisture build up at the flood switch in the leak detection vault and not an actual leak. The entire treatment system was off-line for an additional 6 hours during repair.	N/A
September 22-23, 2009	REG-10A	REG-10A went off-line due to a low flow alert on September 22 and was restarted after the pump was replaced on September 23. The well was off-line for approximately 13 hours.	N/A

Table 8B
Summary of 2009 Non-Routine Operation and Maintenance Activities South of 101
MEW Regional Groundwater Remediation Program
Mountain View, CA

Date	Component	Comments	Regulatory Notification
September 26-28, 2009	REG-1B2	REG-1B2 went off-line due to a motor saver failure on September 26 and was restarted after the motor saver was replaced on September 28. The well was off-line for approximately 53 hours.	N/A
October 5, 2009	REG-1A	REG-1A was off-line for a total of approximately 4 hours due to a pump saver failure. The pump saver was replaced on October 5.	N/A
October 13, 2009	System	The treatment system was off-line for less than 1 hour due to a pad flood alert caused by the rain storm on October 13.	N/A
November 8-10	REG-3B2	REG-3B2 was off-line for a combined total of approximately 69 hours as a result of a failing pump. A new pump was installed November 10.	N/A
December 11, 2009	System	The treatment system was off-line for less than 1 hour on December 11 during upgrade of electronic controls.	N/A
December 22-23	System	The treatment system was off-line for approximately 22 hours between December 22 and 23, during a routine carbon change.	N/A
December 25-28	REG-2B1	REG-2B1 was off-line for a total of approximately 64 hours due to pump cycling and low flow alerts.	N/A

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Date Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
A/A1 Zone								
65A	6/6/1982	Fairchild (North of 101)	28.04	4	29	19 - 29	7 - 29	Monitoring Well
72A	11/11/1985	Fairchild (North of 101)	32.82	4	27	20 - 25	15 - 27	Monitoring Well
73A	7/7/1985	Fairchild (North of 101)	21.62	4	27	15 - 25	9 - 27	Monitoring Well
74A	8/8/1985	Fairchild (North of 101)	27.96	4	27	15 - 25	9 - 27	Monitoring Well
75A	11/11/1985	Fairchild (North of 101)	29.97	4	30	18 - 28	16 - 30	Monitoring Well
81A	8/8/1985	Fairchild (North of 101)	21.89	4	25	13 - 23	11 - 25	Monitoring Well
82A	8/8/1985	Fairchild (North of 101)	27.69	4	33	15 - 30	13 - 33	Monitoring Well
88A	6/6/1986	Fairchild (North of 101)	20.21	4	32	20 - 30	16 - 32	Monitoring Well
89A	6/6/1986	Fairchild (North of 101)	17.20	4	30	18 - 28	16 - 30	Monitoring Well
92A	6/6/1986	Fairchild (North of 101)	6.67	4	35	18 - 33	16 - 35	Monitoring Well
93A	6/6/1986	Fairchild (North of 101)	5.90	4	30	18 - 28	16 - 30	Monitoring Well
95A	6/6/1986	Fairchild (North of 101)	6.65	4	30	18 - 28	16 - 30	Monitoring Well
1A	2/2/1982	Fairchild (South of 101)	58.55	4	40	20 - 40	10 - 40	Monitoring Well
16A	4/4/1982	Fairchild (South of 101)	53.30	2	32	22 - 32	22 - 32	Monitoring Well
20A	2/2/1982	Fairchild (South of 101)	51.37	2	30	15 - 30	15 - 30	Monitoring Well
21A	2/2/1982	Fairchild (South of 101)	53.72	2	30	14 - 30	12 - 30	Monitoring Well
23A	2/2/1982	Fairchild (South of 101)	50.56	2	30	14 - 30	14 - 30	Monitoring Well
26A	2/2/1982	Fairchild (South of 101)	47.20	2	30	12 - 30	10 - 30	Monitoring Well
29A	2/2/1982	Fairchild (South of 101)	46.08	2	30	15 - 30	10 - 30	Monitoring Well
41A	2/2/1982	Fairchild (South of 101)	42.40		25	13 - 25	13 - 25	Monitoring Well
45A	2/2/1982	Fairchild (South of 101)	43.70	2	25	13 - 25	13 - 25	Monitoring Well
59A	2/2/1982	Fairchild (South of 101)	39.56	2	30	15 - 30	12 - 30	Monitoring Well
61A	4/4/1982	Fairchild (South of 101)	37.18	2	31	16 - 31	10 - 31	Monitoring Well
62A	2/2/1982	Fairchild (South of 101)	37.88	2	30	10 - 30	10 - 30	Monitoring Well
77A	7/7/1985	Fairchild (South of 101)	52.59	4	30	23 - 28	21 - 30	Monitoring Well
78A	8/8/1985	Fairchild (South of 101)	46.44	4	34	22 - 32	18.5 - 34	Monitoring Well
79A	7/7/1985	Fairchild (South of 101)	36.61	4	24	13 - 23	10 - 24	Monitoring Well
99A	7/7/1986	Fairchild (South of 101)	48.26	4	29	9.5 - 24.5	8 - 29	Monitoring Well
105A	7/7/1986	Fairchild (South of 101)	49.08		38	21 - 36	18 - 38	Monitoring Well
106A	7/7/1986	Fairchild (South of 101)	49.22		39	22 - 37	15 - 39	Monitoring Well

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Date Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
109A	9/9/1986	Fairchild (South of 101)	41.61	4	28	12 - 27	7.5 - 28	Monitoring Well
126A	9/9/1986	Fairchild (South of 101)	42.85		40	23 - 38	18 - 40	Monitoring Well
134A	10/10/1986	Fairchild (South of 101)	53.44	4	32	20 - 30	18 - 32	Monitoring Well
138A	10/10/1986	Fairchild (South of 101)	43.60		38	34 - 37	32 - 38	Monitoring Well
139A	10/10/1986	Fairchild (South of 101)	53.21		34	16 - 31	11 - 34	Monitoring Well
141A	10/10/1986	Fairchild (South of 101)	53.25		28	16 - 26	11 - 28	Monitoring Well
142A	10/10/1986	Fairchild (South of 101)	57.27	4	29	22 - 27	20 - 29	Monitoring Well
144A	12/12/1986	Fairchild (South of 101)	59.41	4	40	23 - 38	20 - 40	Monitoring Well
153A	10/10/1991	Fairchild (South of 101)	45.70	4	23	13 - 23	12 - 25	Monitoring Well
159A		Fairchild (South of 101)	54.62		30.0	20 - 30		Monitoring Well
162A	1/13/2000	Fairchild (South of 101)	36.47	4	28	8 - 28	7 - 31	Monitoring Well
173A	10/31/2002	Fairchild (South of 101)	50.83		30.0	19 - 29		Monitoring Well
IM9A	1/1/1986	Intel (South of 101)	64.66		44.7	27.8 - 37.8	26 - 39.8	Monitoring Well
REG-2A	4/2/1998	MEW RGRP (North of 101)	32.33	6	25	10 - 25	9 - 27	Recovery Well
REG-3A	4/1/1998	MEW RGRP (North of 101)	24.26	6	28	13 - 28	12 - 30.5	Recovery Well
REG-4A	3/25/1998	MEW RGRP (North of 101)	25.22	6	31	16 - 31	14 - 33	Recovery Well
REG-5A	4/6/1998	MEW RGRP (North of 101)	29.40	6	29	14 - 29	13 - 30.5	Recovery Well
REG-6A	4/30/1998	MEW RGRP (North of 101)	13.45	6	29	24 - 29	21 - 31	Recovery Well
REG-7A	4/28/1998	MEW RGRP (North of 101)	17.11	6	27	12 - 27	11 - 28.5	Recovery Well
REG-8A	3/18/1998	MEW RGRP (North of 101)	28.72	6	31	21 - 31	18 - 34	Recovery Well
REG-9A	4/8/1998	MEW RGRP (North of 101)	24.14	6	27	17 - 27	15 - 28.5	Recovery Well
W89-03A-R		MEW RGRP (North of 101)	33.23					Monitoring Well
W89-04A-R		MEW RGRP (North of 101)	33.25					Monitoring Well
REG-1A	9/11/1997	MEW RGRP (South of 101)	35.60	6	42	22 - 42	19 - 45	Recovery Well
REG-10A	9/18/1997	MEW RGRP (South of 101)	34.83	6	40	15 - 40	12 - 42	Recovery Well
REG-11A	9/23/1997	MEW RGRP (South of 101)	35.15	6	49	29 - 49	26 - 50	Recovery Well
REG-12A	9/23/1997	MEW RGRP (South of 101)	38.04	6	28	12 - 27	11 - 30	Recovery Well
REG-MW-1A	9/5/1997	MEW RGRP (South of 101)	41.00	6	36	20 - 35	17 - 37	Monitoring Well
REG-MW-2A	8/2/1997	MEW RGRP (South of 101)	38.11	6	29.5	18.5 - 28.5	15.5 - 29.5	Monitoring Well
RW-9A	9/24/1997	MEW RGRP (South of 101)	37.83	6	25	13 - 23	10 - 25	Recovery Well
14D02A	1/1/1988	NASA (North of 101)	10.15	8	25	5 - 25	5 - 25	Monitoring Well

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Date Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
14D09A	4/4/1990	NASA (North of 101)	15.81	8	16.5	6 - 15	5 - 10.5	Monitoring Well
14D13A	12/12/1991	NASA (North of 101)	13.19	8	17	7 - 17	6 - 17	Monitoring Well
14E14A	4/4/1990	NASA (North of 101)	21.64	8	21.5		7 - 19	Monitoring Well
15H05A	6/6/1988	NASA (North of 101)	18.69	8	31.5		5 - 31	Monitoring Well
R22A	10/10/1985	Raytheon (South of 101)	73.00		47.5	27 - 47	25 - 47.5	Monitoring Well
R24A	10/10/1985	Raytheon (South of 101)	70.05		38	17 - 37	15 - 38	Monitoring Well
R25A	9/9/1985	Raytheon (South of 101)	59.20		34	14 - 34	12 - 34	Monitoring Well
R29A	10/10/1985	Raytheon (South of 101)	36.00		26	6 - 26	4 - 26	Monitoring Well
R31A	9/9/1985	Raytheon (South of 101)	34.00		24	14 - 24	12 - 24	Monitoring Well
R32A	9/9/1985	Raytheon (South of 101)	35.61		29	9 - 29	7 - 29	Monitoring Well
R43A	12/12/1985	Raytheon (South of 101)	46.00		31	10 - 30	7 - 31	Monitoring Well
R46A	2/2/1987	Raytheon (South of 101)	73.00		45	32 - 41	29 - 43	Monitoring Well
R57A	5/5/1987	Raytheon (South of 101)	53.71		33	20.5 - 32	18.5 - 33	Monitoring Well
R59A	5/5/1987	Raytheon (South of 101)	54.69		27.3	14.5 - 26	12.5 - 27.3	Monitoring Well
SIL4A	8/8/1985	Siltec (South of 101)	44.15		27	12 - 27	6 - 27	Monitoring Well
SIL12A	9/9/1985	Siltec (South of 101)	43.25		36	16 - 36	13 - 36	Monitoring Well
W9-16		U.S. Navy (North of 101)	22.42	4	30.5	19 - 29	17 - 30	Monitoring Well
W9-38		U.S. Navy (North of 101)	22.59	4	28.7	13 - 23	9 - 23	Monitoring Well
W12-6		U.S. Navy (North of 101)	7.5	4	30	20 - 25		Monitoring Well
W14-3	7/20/1988	U.S. Navy (North of 101)	31.37	4	35	15 - 30	13 - 33	Monitoring Well
W60-2		U.S. Navy (North of 101)	31.42	4	35.5	20 - 35.5		Monitoring Well
W89-1	11/9/1990	U.S. Navy (North of 101)	33.57	12	30	17.5 - 27.5	15.5 - 30	Monitoring Well
W89-2	11/8/1990	U.S. Navy (North of 101)	30.98	12	30	17 - 27	15 - 30	Monitoring Well
W89-5	11/15/1990	U.S. Navy (North of 101)	25.61	12	25	15 - 25	13 - 25	Monitoring Well
W89-7	11/12/1990	U.S. Navy (North of 101)	24.15	12	25	15 - 25	13 - 25	Monitoring Well
W89-8	11/16/1990	U.S. Navy (North of 101)	21.77	12	27	17 - 27	15 - 27	Monitoring Well
W89-9	11/18/1990	U.S. Navy (North of 101)	21.78	12	25	14.5 - 24.5	12.5 - 24.5	Monitoring Well
WT14-1	8/28/1990	U.S. Navy (North of 101)	24.80	10	18	7.8 - 17.8	6 - 0	Monitoring Well
WU4-1		U.S. Navy (North of 101)	34.97	4	30	18.8 - 28.8		Monitoring Well
WU4-3		U.S. Navy (North of 101)	25.21	4	31	25.5 - 30.5		Monitoring Well
WU4-16		U.S. Navy (North of 101)	13.89	4	27.5	17 - 27.5		Monitoring Well

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Date Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
WU4-18		U.S. Navy (North of 101)	8.17	4	24.5	9 - 24		Monitoring Well
A2/B1 Zone								
4B1	6/6/1982	Fairchild (North of 101)	27.45	4	64	54 - 64	50 - 64	Monitoring Well
46B1	8/8/1985	Fairchild (North of 101)	22.13	4	50	38 - 48	35.5 - 50	Monitoring Well
47B1	8/8/1985	Fairchild (North of 101)	21.51	4	64	57 - 62	53 - 64	Monitoring Well
48B1	8/8/1985	Fairchild (North of 101)	28.07	4	55	48 - 53	46 - 55	Monitoring Well
49B1	10/10/1985	Fairchild (North of 101)	27.89	4	71	64 - 68	62 - 71	Monitoring Well
50B1	8/8/1985	Fairchild (North of 101)	27.79	4	83	72 - 82	70 - 83	Monitoring Well
68B1	11/11/1985	Fairchild (North of 101)	29.85	4	52	46 - 51	44 - 52	Monitoring Well
78B1	6/6/1986	Fairchild (North of 101)	20.64	4	51	39 - 49	37 - 51	Monitoring Well
79B1	6/6/1986	Fairchild (North of 101)	17.08	4	54	42 - 52	38 - 54	Monitoring Well
81B1	6/6/1986	Fairchild (North of 101)	9.20	4	50	38 - 48	35.5 - 50	Monitoring Well
83B1	6/6/1986	Fairchild (North of 101)	5.80	4	58	46 - 56	37.5 - 58	Monitoring Well
87B1	6/6/1986	Fairchild (North of 101)	25.10	4	57	45 - 55	43 - 57	Monitoring Well
139B1	2/2/1988	Fairchild (North of 101)	7.06	4	70	55 - 70	51 - 73	Monitoring Well
154B1	2/21/2001	Fairchild (North of 101)	12.78	2	42	32 - 42	31 - 44	Monitoring Well
155B1	2/21/2001	Fairchild (North of 101)	19.74	2	62			Monitoring Well
8B1	7/7/1982	Fairchild (South of 101)	40.96	4	78	68 - 78	50 - 78	Monitoring Well
13B1	6/6/1985	Fairchild (South of 101)	34.80	4	69	62 - 67	55.5 - 69	Monitoring Well
14B1	7/7/1985	Fairchild (South of 101)	35.68	4	64	51 - 61	47.5 - 64	Monitoring Well
26B1	6/6/1985	Fairchild (South of 101)	52.61	4	65	58 - 63	56.5 - 65	Monitoring Well
32B1	8/8/1985	Fairchild (South of 101)	38.03	4	76	64 - 74	59 - 76	Monitoring Well
33B1	8/8/1985	Fairchild (South of 101)	46.30	4	70		54 - 70	Monitoring Well
56B1	11/11/1985	Fairchild (South of 101)	42.14	4	60	56 - 59	52 - 60	Monitoring Well
67B1	11/11/1985	Fairchild (South of 101)	36.93	4	67	56 - 62	52 - 67	Monitoring Well
69B1	12/12/1985	Fairchild (South of 101)	42.62		61	54 - 59	50 - 61	Monitoring Well
74B1	1/1/1986	Fairchild (South of 101)	51.84	4	68	56 - 66	53 - 68	Monitoring Well
77B1	4/4/1986	Fairchild (South of 101)	40.96	4	60.5	53 - 58	50 - 60.5	Monitoring Well
91B1	7/7/1986	Fairchild (South of 101)	48.44	4	60	48 - 58	43 - 60	Monitoring Well
92B1	6/6/1986	Fairchild (South of 101)	46.99	4	68	55 - 65	50 - 68	Monitoring Well
93B1	7/7/1986	Fairchild (South of 101)	55.27		69	52 - 67	45 - 69	Monitoring Well

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Date Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
98B1	7/7/1986	Fairchild (South of 101)	54.10	4	68	57 - 66	46 - 68	Monitoring Well
103B1	7/7/1986	Fairchild (South of 101)	55.20	4	82	70 - 80	67 - 82	Monitoring Well
105B1	9/9/1986	Fairchild (South of 101)	40.88	4	72	60 - 70	57 - 72	Monitoring Well
112B1	9/9/1986	Fairchild (South of 101)	46.00	4	69	62 - 67	60 - 69	Monitoring Well
119B1	10/10/1986	Fairchild (South of 101)	42.96		64	52 - 62	50 - 64	Monitoring Well
122B1	11/11/1986	Fairchild (South of 101)	59.53	4	71	64 - 69	62 - 71	Monitoring Well
124B1	12/12/1986	Fairchild (South of 101)	46.91	4	64	57 - 62	54 - 64	Monitoring Well
140B1	10/10/1986	Fairchild (South of 101)	48.91	4	85	65 - 85	63 - 86	Monitoring Well
143B1	11/11/1986	Fairchild (South of 101)	38.88	4	70	60 - 70	56 - 76	Monitoring Well
RW-2(B1)	2/2/1986	Fairchild (South of 101)	48.18	6	59	46 - 56	45 - 59	Recovery Well
RW-4(B1)	12/12/1985	Fairchild (South of 101)	42.61	6	63	50 - 60	49 - 63	Recovery Well
I9B1	6/6/1984	Intel (South of 101)	70.92		80	56 - 80	56 - 80	Monitoring Well
IM5B(1)	1/1/1986	Intel (South of 101)	60.16		62.2	49 - 59	47.2 - 62.2	Monitoring Well
IM9B(1)	1/1/1986	Intel (South of 101)	65.04		71	58 - 68	55.5 - 71	Monitoring Well
REG-5B(1)	4/22/1998	MEW RGRP (North of 101)	33.20	6	47	37 - 47	34 - 50	Recovery Well
REG-6B(1)	3/30/1998	MEW RGRP (North of 101)	24.65	6	59	49 - 59	46 -60.5	Recovery Well
REG-7B(1)	3/23/1998	MEW RGRP (North of 101)	24.32	6	58	48 - 58	47 - 60	Recovery Well
REG-8B(1)	4/14/1998	MEW RGRP (North of 101)	20.03	6	54	34 - 54	31 - 56	Recovery Well
REG-9B(1)	5/6/1998	MEW RGRP (North of 101)	13.60	6	42	32 - 42	31 - 44	Recovery Well
REG-10B(1)	4/20/1998	MEW RGRP (North of 101)	19.64	6	52	32 - 52	29 - 53.5	Recovery Well
REG-12B(1)		MEW RGRP (North of 101)	32.38	6		60 - 65		Recovery Well
W89-13B1-R		MEW RGRP (North of 101)	33.19					Monitoring Well
ME1B1	3/3/1985	MEW RGRP (South of 101)			79	69 - 74	65.3 - 79	Monitoring Well
ME2B1	5/5/1985	MEW RGRP (South of 101)			79	64 - 74	61.2 - 79	Monitoring Well
NEC8B1	10/10/1983	MEW RGRP (South of 101)	42.68	2	58	38 - 58	37 - 58	Monitoring Well
NEC14B1	2/2/1989	MEW RGRP (South of 101)	46.82	4	71	59 - 69	57 - 71	Monitoring Well
NEC18B1	2/2/1989	MEW RGRP (South of 101)	59.87	4	70.5	63 - 67	61 - 70.5	Monitoring Well
REG-1B(1)	9/4/1997	MEW RGRP (South of 101)	38.15	6	76	59 - 74	56 - 76	Recovery Well
REG-2B(1)	9/10/1997	MEW RGRP (South of 101)	35.15	6	64	39 - 64	36 - 66	Recovery Well
REG-3B(1)	12/19/1996	MEW RGRP (South of 101)	34.17	18	75	57 - 72	54 - 75	Recovery Well
REG-4B(1)		MEW RGRP (South of 101)	37.70	6				Recovery Well

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Date Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
REG-11B(1)	10/8/1997	MEW RGRP (South of 101)	35.65	6	68	58 - 68	55 - 68	Recovery Well
REG-MW-1B(1)	8/20/1997	MEW RGRP (South of 101)	40.81	6	74	53 - 73	50 - 74.5	Monitoring Well
REG-MW-2B(1)		MEW RGRP (South of 101)	41.43			57 - 67		Monitoring Well
RW-9(B1)R	2/5/1986	MEW RGRP (South of 101)	38.59	6	69	59 - 69	58 - 71.5	Recovery Well
R6B1	6/6/1985	Raytheon (South of 101)	46.00		67	54 - 65	36 - 67	Monitoring Well
R13B1	4/4/1985	Raytheon (South of 101)	35.00		48	38 - 48	36 - 48	Monitoring Well
R16B1	11/11/1985	Raytheon (South of 101)	47.00		64	58 - 64	56 - 64	Monitoring Well
R22B1	12/12/1986	Raytheon (South of 101)	62.73		73	52 - 70	50 - 73	Monitoring Well
R46B1	3/3/1987	Raytheon (South of 101)	58.00		66	56 - 65	54 - 66	Monitoring Well
RP22B	11/11/1985	Raytheon (South of 101)	63.5		57	54 - 56	52 - 57	Monitoring Well
RW-13B(1)		Silva (South of 101)	53.20					Recovery Well
W9-17		U.S. Navy (North of 101)	19.31	4	36	33 - 38	31 - 40	Monitoring Well
W9-25		U.S. Navy (North of 101)	15.26	4	42	29.5 - 39.5	27.5 - 42	Monitoring Well
W9-41		U.S. Navy (North of 101)	22.56	4	54.5	34 - 44	32 - 46	Monitoring Well
W9SC-20	2/14/1995	U.S. Navy (North of 101)	22.20	2	52.3	41.8 - 51.8		Monitoring Well
W14-5	8/12/1988	U.S. Navy (North of 101)	31.25	4	58.7	44.9 - 49.9	43 - 52	Monitoring Well
W89-11	12/7/1990	U.S. Navy (North of 101)	33.26	10	63	52 - 62	50 - 63	Monitoring Well
W89-12	12/4/1990	U.S. Navy (North of 101)	31.23	10	65	54 - 64	51 - 65	Monitoring Well
W89-14	12/9/1990	U.S. Navy (North of 101)	25.58	10	61	50 - 60	48 - 61	Monitoring Well
WNB-14	2/16/1992	U.S. Navy (North of 101)	12.35	12	61	24 - 29	22 - 61	Monitoring Well
WU4-2		U.S. Navy (North of 101)	32.55	4	60.8	54.5 - 59.5		Monitoring Well
WU4-4		U.S. Navy (North of 101)	25.21	4	59	54 - 59		Monitoring Well
WU4-5		U.S. Navy (North of 101)	33.88	4	60	53.5 - 58.5		Monitoring Well
WU4-6		U.S. Navy (North of 101)	28.46	4		59 - 64		Monitoring Well
WU4-7		U.S. Navy (North of 101)	24.00	4	54	48.5 - 53.5		Monitoring Well
WU4-12		U.S. Navy (North of 101)	21.88	4		34.5 - 44.5		Monitoring Well
WU4-13		U.S. Navy (North of 101)	22.68	4	45	34.5 - 44.5		Monitoring Well
WU4-19		U.S. Navy (North of 101)	11.39	4	41.5	36 - 41		Monitoring Well
B2 Zone								
17B2	5/5/1985	Fairchild (North of 101)	27.96	4	94	87 - 92	85.5 - 94	Monitoring Well
51B2	9/9/1985	Fairchild (North of 101)	22.07	4	99	92 - 97	88 - 99	Monitoring Well

Table 9

RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Date Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
54B2	10/10/1985	Fairchild (North of 101)	28.00	4	86	79 - 84	77 - 86	Monitoring Well
82B2	6/6/1986	Fairchild (North of 101)	6.56	4	88	71 - 86	67 - 88	Monitoring Well
123B2	11/11/1986	Fairchild (North of 101)	15.46	4	96	84 - 94	79 - 96	Monitoring Well
6B2	6/6/1982	Fairchild (South of 101)	58.83	4	91	71 - 91	63 - 91	Monitoring Well
15B2	5/5/1985	Fairchild (South of 101)	70.70	4	101	90 - 100	88.3 - 101	Monitoring Well
16B2	6/6/1985	Fairchild (South of 101)	47.18	4	87	79 - 84	77 - 87	Monitoring Well
36B2	8/8/1985	Fairchild (South of 101)	37.65	4	92.5	86 - 91	81.5 - 92.5	Monitoring Well
37B2	6/6/1985	Fairchild (South of 101)	52.57	4	95	88 - 95	85.5 - 95	Monitoring Well
40B2	7/7/1985	Fairchild (South of 101)	54.59	4	93	87 - 92	83.5 - 93	Monitoring Well
43B2	7/7/1985	Fairchild (South of 101)	36.28	4	93.5	85.5 - 91	84 - 93.5	Monitoring Well
62B2	7/7/1985	Fairchild (South of 101)	34.93	4	91	80 - 90	78 - 91	Monitoring Well
75B2	1/1/1986	Fairchild (South of 101)	46.59	4	89	82 - 87	77 - 89	Monitoring Well
76B2	3/3/1986	Fairchild (South of 101)	55.12	4	102	90 - 100	86.5 - 102	Monitoring Well
89B2	6/6/1986	Fairchild (South of 101)	48.43	4	92	80 - 90	77 - 92	Monitoring Well
113B2	9/9/1986	Fairchild (South of 101)	39.01		86	69 - 84	67 - 86	Monitoring Well
125B2	12/12/1986	Fairchild (South of 101)	46.74	4	101	94 - 99	91 - 101	Monitoring Well
129B2	1/1/1987	Fairchild (South of 101)	56.87	4	112	95 - 110	92 - 112	Monitoring Well
132B2	2/2/1987	Fairchild (South of 101)	49.21	4	91	79 - 89	78 - 91	Monitoring Well
134B2	6/6/1987	Fairchild (South of 101)	47.85	4	90	83 - 88	78 - 90	Monitoring Well
38B2	8/8/1985	MEW RGRP (South of 101)	44.09	4	90	78 - 88	71 - 90	Recovery Well
NEC8B2	10/10/1985	MEW RGRP (South of 101)	42.50	4	107	98.2 - 103	96 - 107	Monitoring Well
NEC18B2	2/2/1989	MEW RGRP (South of 101)	59.87	4	97.5	90 - 95	88 - 97.5	Monitoring Well
REG-1B(2)		MEW RGRP (South of 101)	38.20	6	92	82 - 92	80 - 93	Recovery Well
REG-3B(2)		MEW RGRP (South of 101)	34.84	6	85	75 - 85	72 - 88	Recovery Well
REG-MW-1B(2)		MEW RGRP (South of 101)	40.89	6	90	79 - 89	78 - 90	Monitoring Well
RW-9(B2)	7/7/1985	MEW RGRP (South of 101)	37.88	6	95	82.6 - 92.6	80 - 95	Recovery Well
R13B2	11/11/1985	Raytheon (South of 101)	35.00		82	65 - 82	63 - 82	Monitoring Well
R30B2	12/12/1986	Raytheon (South of 101)	63.00		101.5	78 - 100.5	76 - 101.5	Monitoring Well
R40B1(B2)	12/12/1986	Raytheon (South of 101)	54.06		85	74.5 - 84.5	73 - 85	Monitoring Well
R41B2	2/2/1987	Raytheon (South of 101)	57.00		92.5	82 - 92.5	79 - 92.5	Monitoring Well
R50B2	4/4/1987	Raytheon (South of 101)	60.00		123	118 - 122.5	116 - 123	Monitoring Well

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RGRP Monitoring Well and Extraction Well Construction Summary

MEW Regional Groundwater Remediation Program

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Well Name	Date Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
R52B2	4/4/1987	Raytheon (South of 101)	64.24		111	100 - 109.5	98 - 111	Monitoring Well
R55B2	3/3/1987	Raytheon (South of 101)	64.21		124.5	116.5 - 123	114 - 124.5	Monitoring Well
B3 Zone								
28B3	6/6/1985	Fairchild (South of 101)	46.85	4	134	122 - 132	120 - 134	Monitoring Well
30B3	6/6/1985	Fairchild (South of 101)	58.18	4	132	120 - 130	118.5 - 132	Monitoring Well
44B3	9/9/1985	Fairchild (South of 101)	37.62	4	147	129 - 144	123 - 147	Monitoring Well
133B3	6/6/1987	Fairchild (South of 101)	49.26		134	127 - 132	122 - 134	Monitoring Well
65B3	9/9/1985	MEW RGRP (South of 101)	43.36	4	133	111 - 131	108 - 133	Recovery Well
R5B3	10/10/1986	Raytheon (South of 101)	50.20		136	125 - 135	122 - 136	Monitoring Well
R9B3	10/10/1985	Raytheon (South of 101)	69.64		163	137 - 162	134 - 163	Monitoring Well
R27B3	11/11/1986	Raytheon (South of 101)	51.37		141	121.5 - 134	119 - 134	Monitoring Well
R54B3	4/4/1987	Raytheon (South of 101)	64.52		148	145 - 147.5	143 - 148	Monitoring Well
R56B3	4/4/1987	Raytheon (South of 101)	64.13		155	149 - 153.5	146.5 - 155	Monitoring Well
R61B3	5/5/1987	Raytheon (South of 101)	58.41		138.5	131.5 - 137	129.5 - 138.5	Monitoring Well
C Zone								
6C	9/9/1985	Fairchild (South of 101)	38.65	4	220	174.5 - 210	188 - 208	Monitoring Well
8C	3/3/1986	Fairchild (South of 101)	55.03	4	219	193 - 213	187 - 219	Monitoring Well
9C	10/10/1986	Fairchild (South of 101)	60.21	4	218	189.8 - 214.8	185 - 218	Monitoring Well
10C	11/11/1986	Fairchild (South of 101)	59.44	4	218	201 - 216	195 - 218	Monitoring Well
11C	6/6/1987	Fairchild (South of 101)	49.21	4	216	209 - 214	204 - 216	Monitoring Well
DW2-234	5/5/1986	Fairchild (South of 101)	59.79	4	234	200 - 230	195 - 234	Monitoring Well
DW3-219	3/3/1986	MEW RGRP (South of 101)	48.67	4	219	185 - 215	181 - 219	Recovery Well
DW1-230	11/11/1985	Raytheon (South of 101)	62.38	4	230	194 - 229	187 - 230	Monitoring Well
R4C	1/1/1986	Raytheon (South of 101)	72.00		221	200 - 220	193 - 221	Monitoring Well
RW-1C		Silva (South of 101)	53.20					Recovery Well
Deep Zone								
DW3-551	2/2/1988	Fairchild (South of 101)	47.14	6	549	544 - 549	539 - 551.5	Monitoring Well
DW3-244	2/2/1986	MEW RGRP (South of 101)	48.29	4	244	230 - 240	226 - 244	Recovery Well
DW3-334	2/2/1986	MEW RGRP (South of 101)	48.69	4	334	315 - 330	311 - 334	Recovery Well

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MEW Regional Groundwater Remediation Program

Mountain View, California

Well Name	Date Installed	Owner	TOC Elevation (ft msl)	Diameter (inches)	Well Depth (ft bgs)	Screen Interval (ft bgs)	Sand Pack Interval (ft bgs)	Well Type
DW3-364	2/2/1986	MEW RGRP (South of 101)	48.39	4	364	350 - 360	345.5 - 364	Recovery Well
DW3-505R	4/18/1997	MEW RGRP (South of 101)	48.92	6	503	490 - 500	488 - 505	Recovery Well

Notes:
TOC = Top of Casing
ft msl = Feet Mean Sea Level
ft bgs = Feet Below Ground Surface
MW = Monitoring Well
RW = Recovery Well

Table 10

Calculation of Predicted Capture Widths Based on Combined Flow Rate

MEW Regional Groundwater Remediation Program

Mountain View, California

Parameter	A-Zone	B1-Zone	B2-Zone	B3-Zone
Q = Combined pumping rate (gpm)	151	143	33	7
b = saturated aquifer thickness (ft)	15	25	35	40
i = regional hydraulic gradient (ft/ft)	0.004	0.003	0.004	0.002
K = hydraulic conductivity (ft/day)	110.9	81.1	4.3	3.2
Calculated Capture Width (ft) = Q/(K x b x i)	4,400	4,500	10,500	5,000
Measured plume width at widest point (ft)	2,400	2,800	2,500	0

Notes:

1. gpm = gallons per minute; ft = feet

2. The combined pumping rate equals the summed average 2009 flow rates of all extraction wells located within the RGRP target capture area that are outside of the slurry walls

3. Hydraulic conductivity values used are the average hydraulic conductivities reported for each aquifer zone in the Site Conceptual Model included as an Appendix to the 2008 Optimization Report.

4. 1 cubic foot = 7.48 gallons

5. 1 day = 1440 minutes

Assumptions:

1. Homogeneous, isotropic, confined aquifer of infinite extent

2. Uniform regional horizontal hydraulic gradient

3. No net recharge (or net recharge is accounted for in the regional hydraulic gradient)

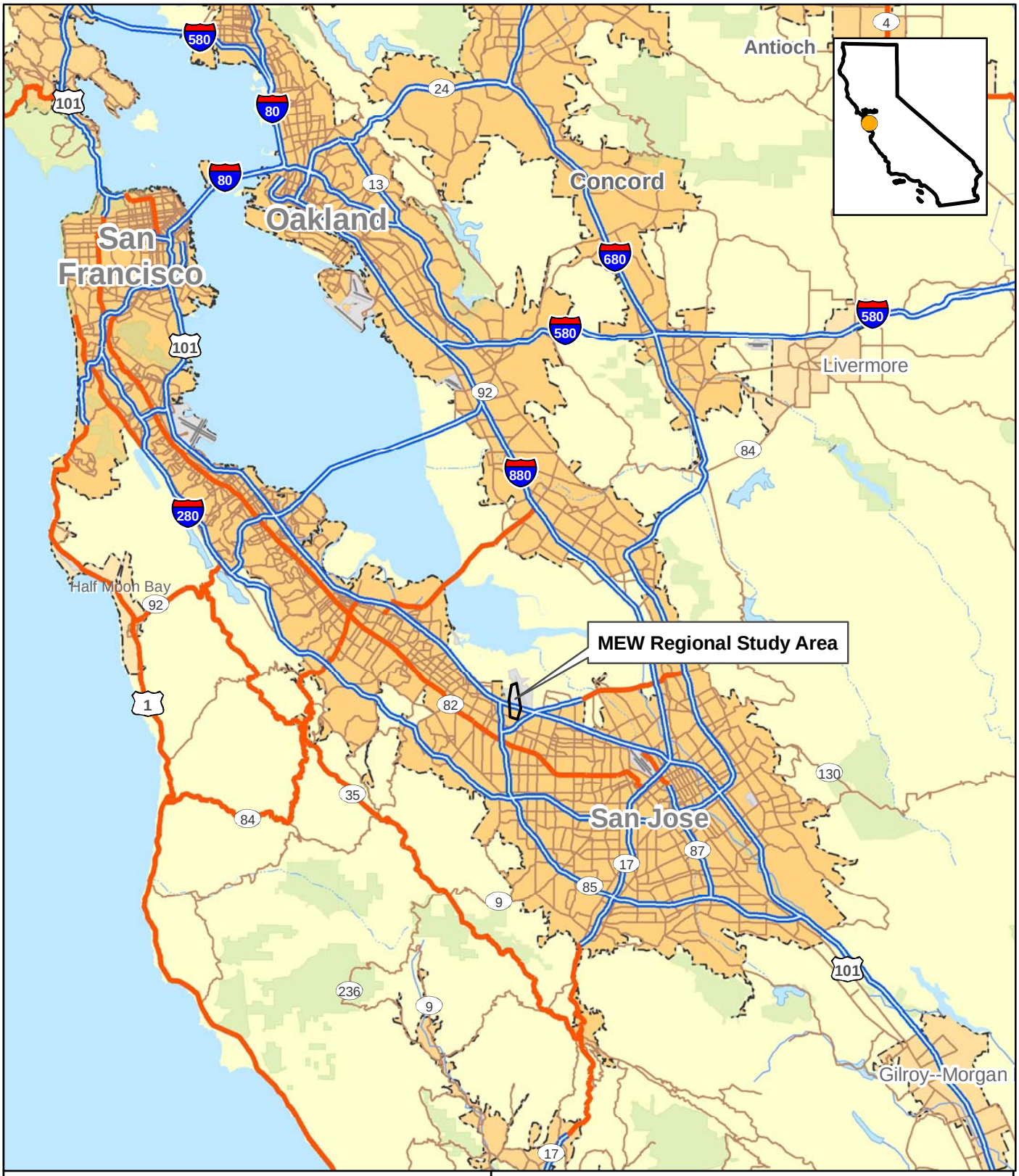
4. Uniform aquifer thickness

5. Fully penetrating extraction well

6. Steady-state flow

7. Negligible vertical gradient

FIGURES



N

0 80,000 Feet

Site Location Map

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Figure **1**

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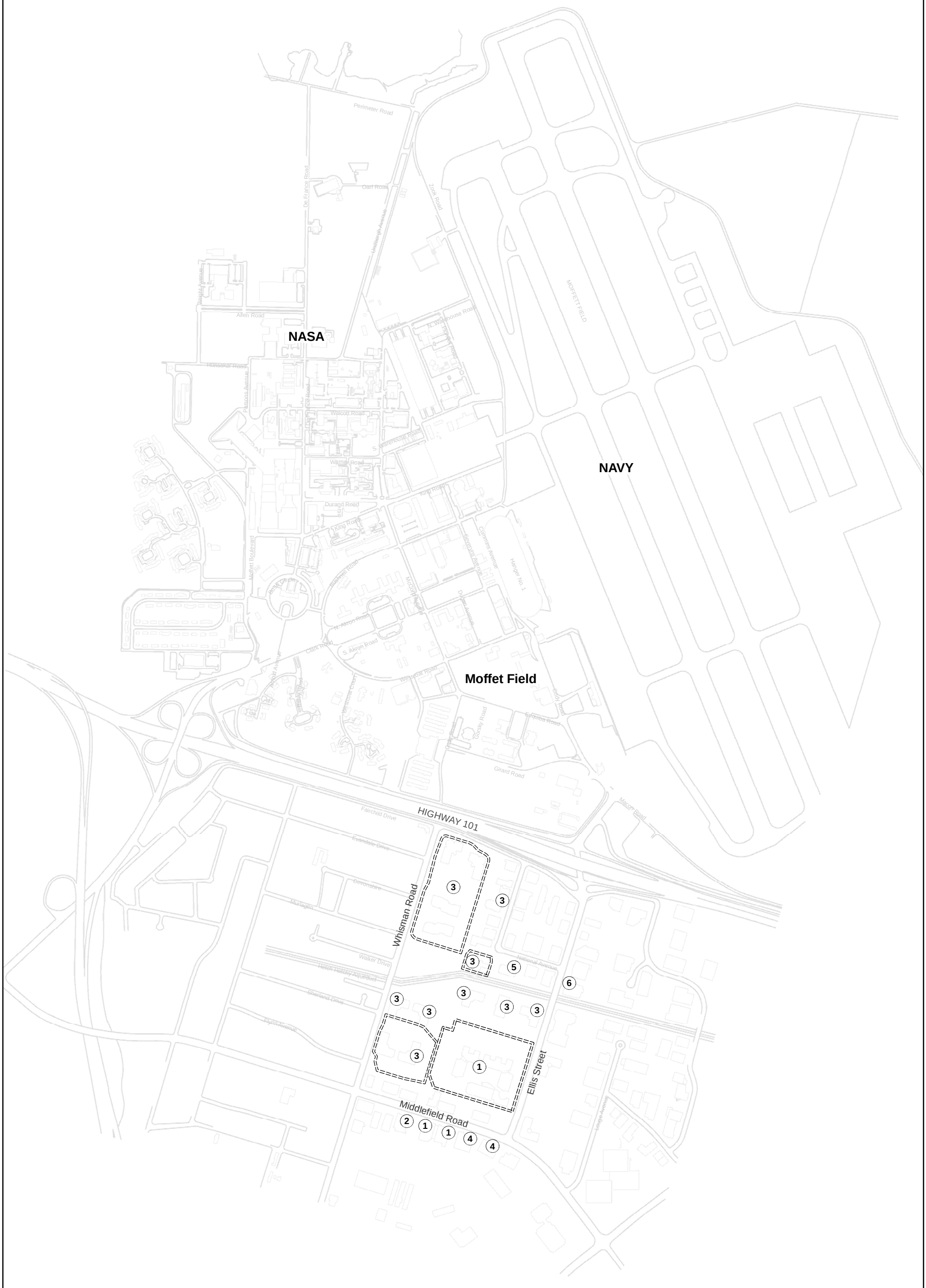
P:\GIS\MEW\Project\Regional\2009_AR\SiteLocation.mxd



Legend

==== Slurry Wall

Building

Road

MEW Sites

1. Former Raytheon Company
2. Former Intel Corporation
3. Former Fairchild Semiconductor Corporation
4. SMI Holding; LLC
5. Vishay GSI, Inc, Inc/Sumco Phoenix Corporation
6. NEC Electronics America, Inc

N

1,000 500 0 1,000 Feet

Locations of the MEW Sites

MEW Regional Groundwater Remediation Program
Mountain View, California

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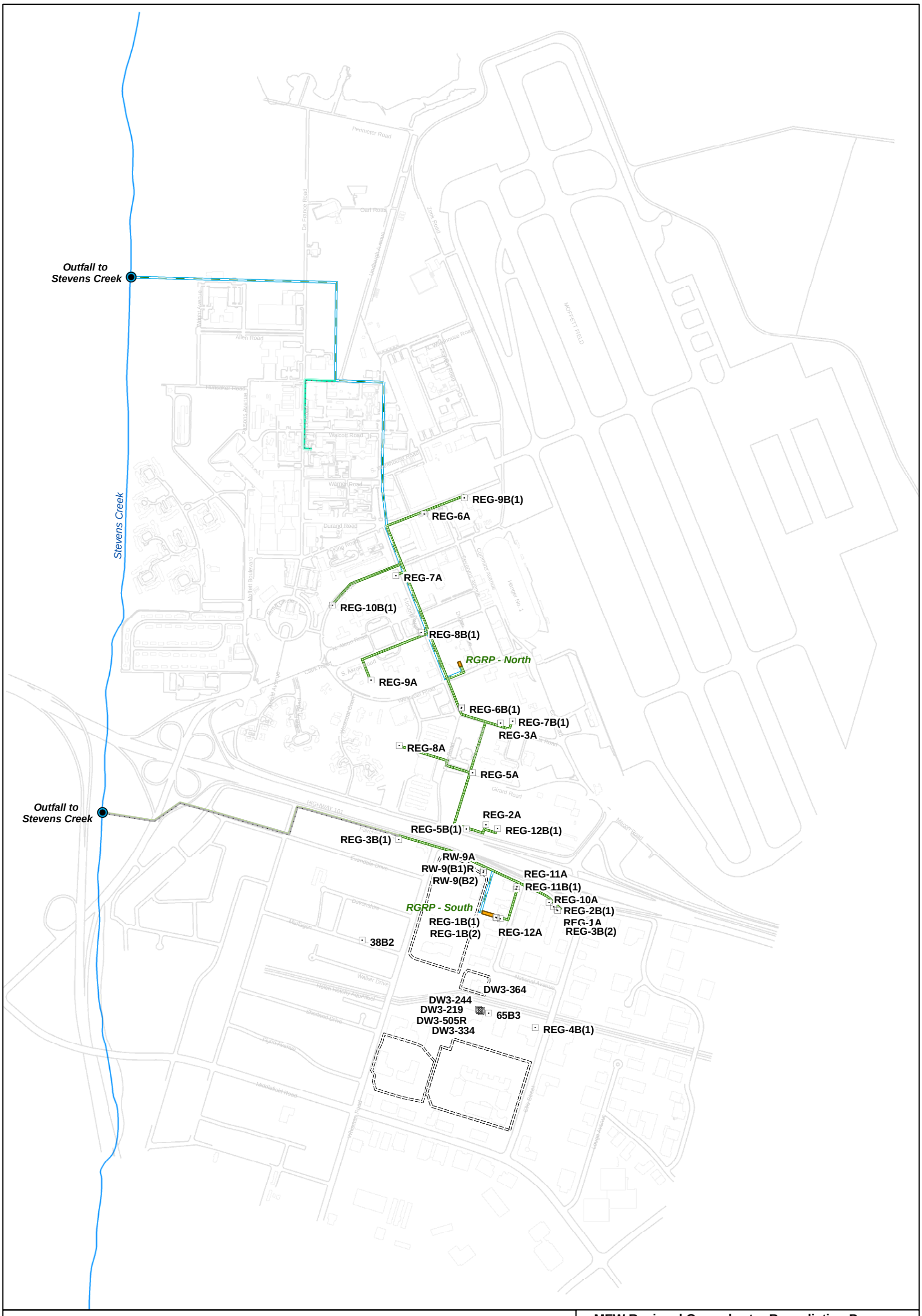
Figure **2**

P:\GIS\MEW\Project\Regional\2009_AR\MtnViewSites.mxd



Legend

- Recovery Well On
- Recovery Well Off
- Groundwater Treatment Plant
- Regional System Treatment Pipeline
- Regional System Discharge Pipeline
- NASA Reuse Pipeline
- Storm Drain, Approximately Located
- Slurry Wall
- Building
- Road
- Stevens Creek

1,000 500 0 1,000 Feet

MEW Regional Groundwater Remediation Program
Groundwater Treatment Systems
North and South of Highway 101

MEW Regional Groundwater Remediation Program
Mountain View, California

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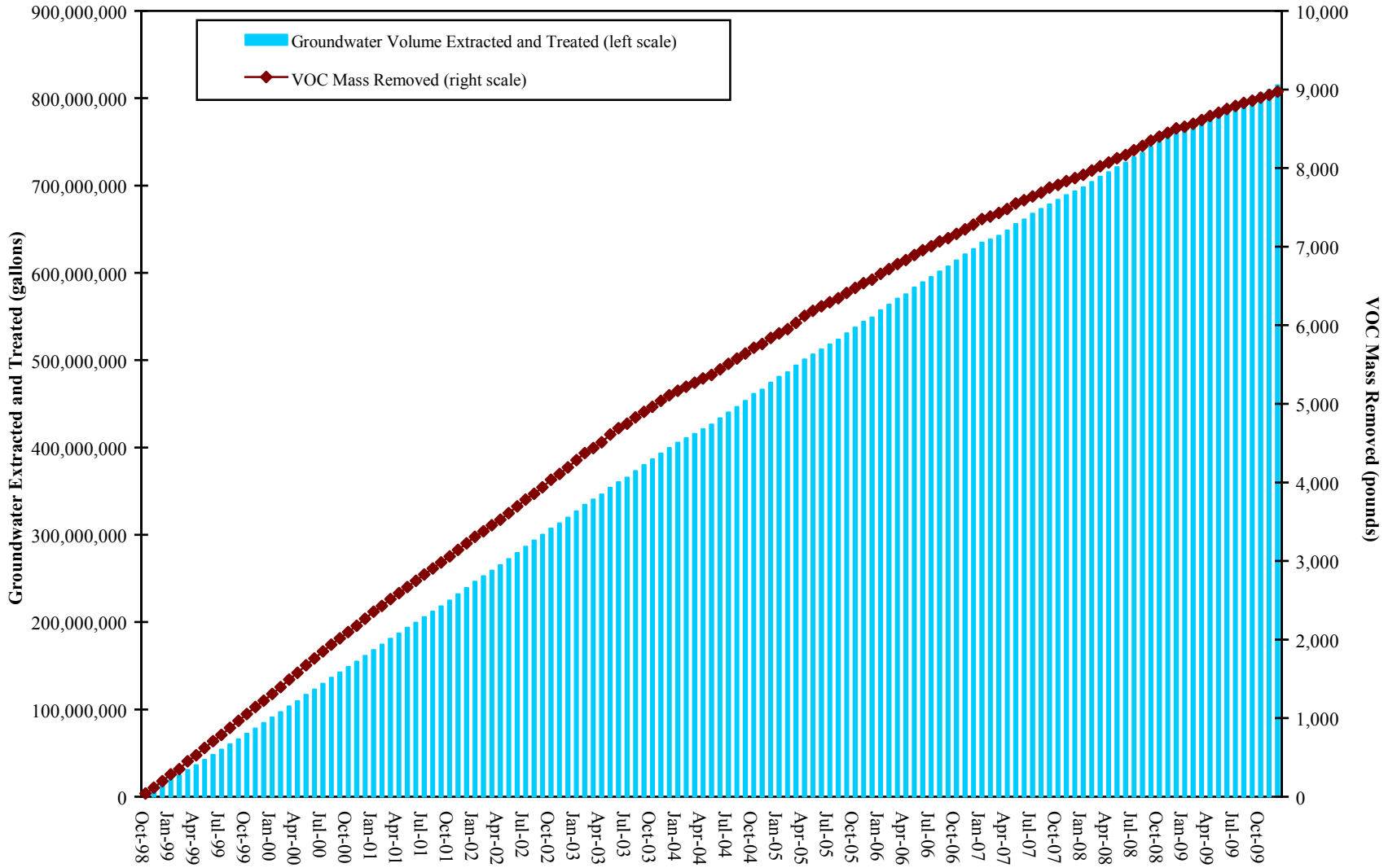
Figure **3**

P:\GIS\MEW\Project\Regional\2009_AR\TreatmentSystems.mxd



Cumulative Groundwater Extracted and VOC Mass Removed, North of 101

MEW Regional Groundwater Remediation Program
Mountain View, California

Source: Fourth Quarter and 2009 Annual Self-Monitoring Report, MEW RGRP Treatment System, South 101 (Weiss, 2010b)

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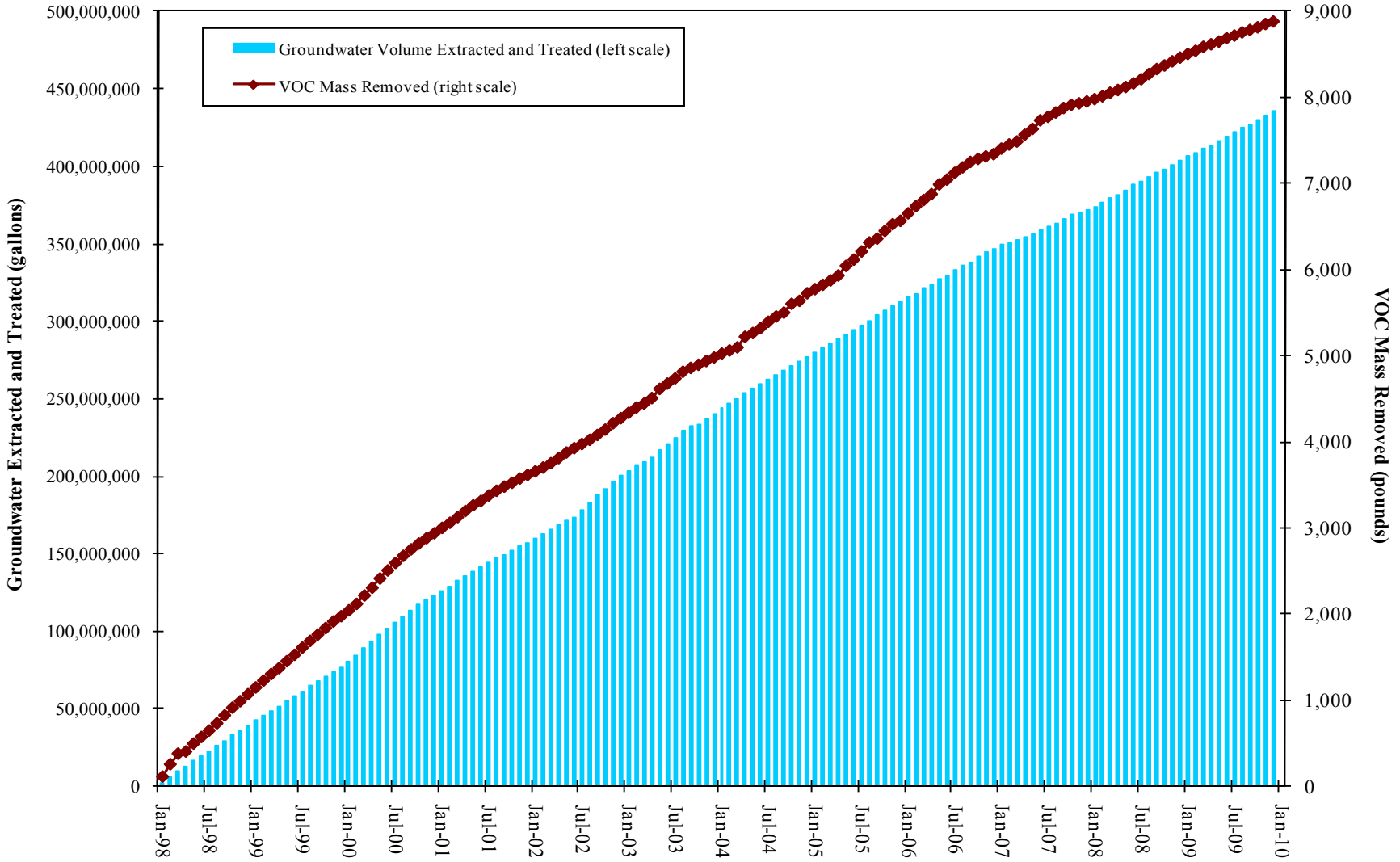
Figure 4

P:\GIS\MEW\AI\Regional\2009_AR\Figure4.AI



Cumulative Groundwater Extracted and VOC Mass Removed, South of 101

MEW Regional Groundwater Remediation Program
Mountain View, California

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Figure 5

Source: Fourth Quarter and 2009 Annual Self-Monitoring Report, MEW RGRP Treatment System, South 101 (Weiss, 2010a)

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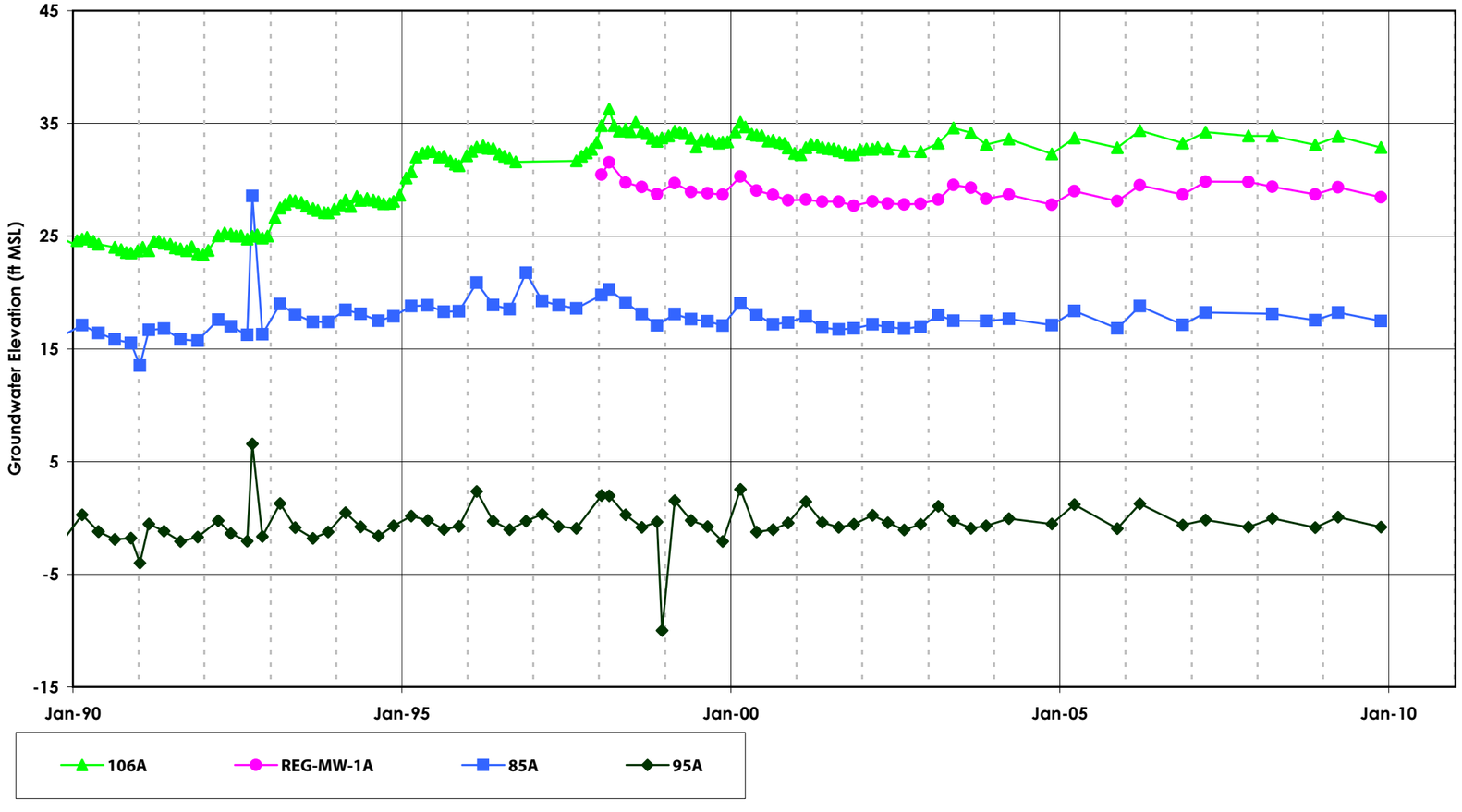

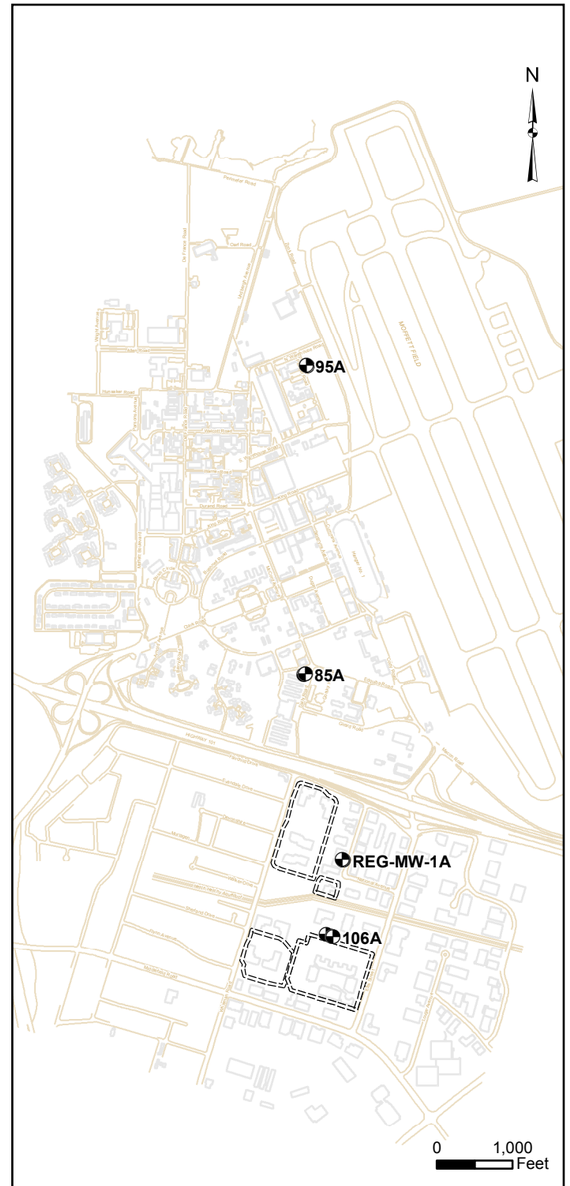

Hydrograph of Selected A Zone Wells
January 1990 through December 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

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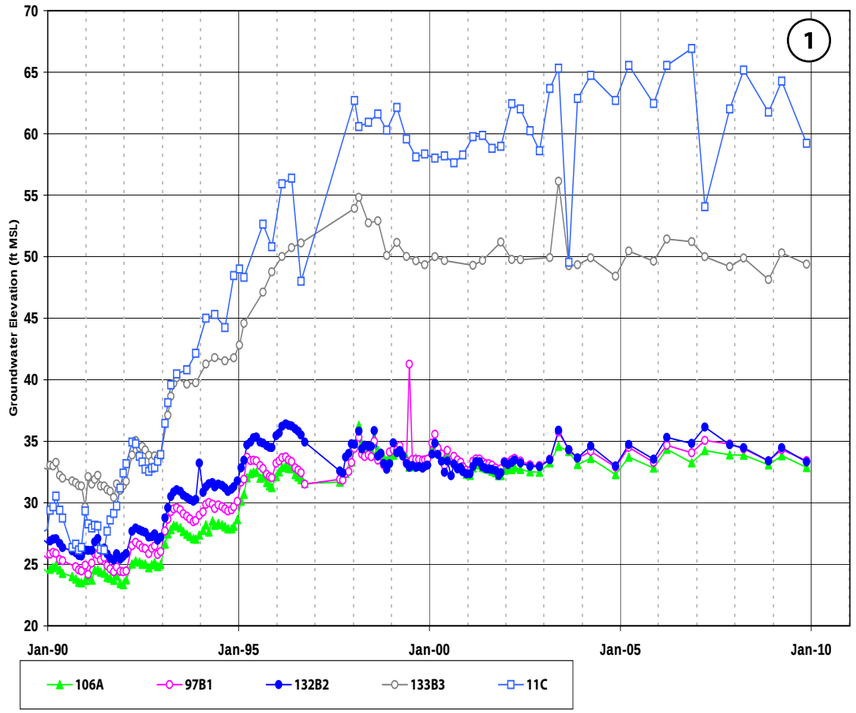
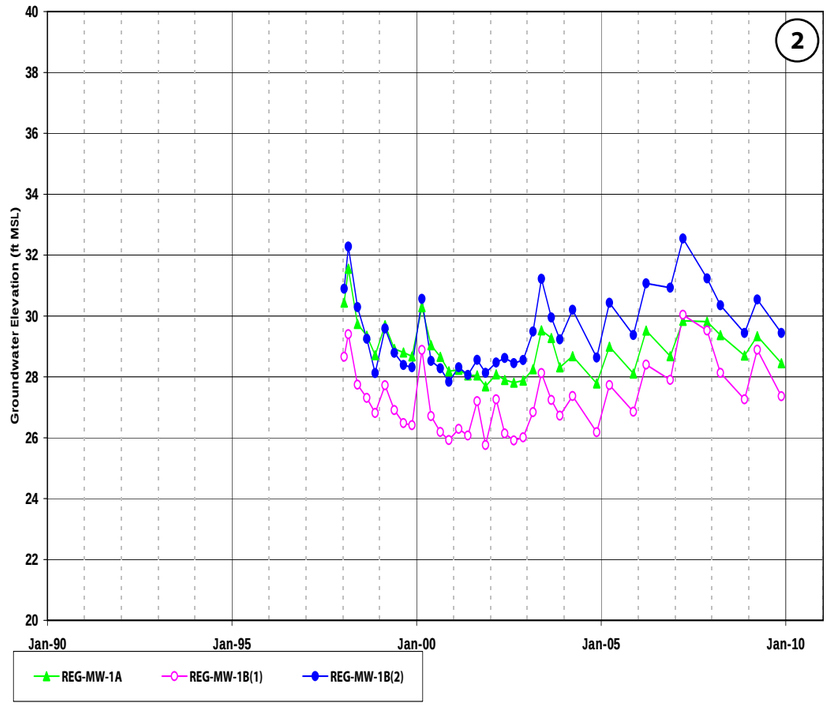
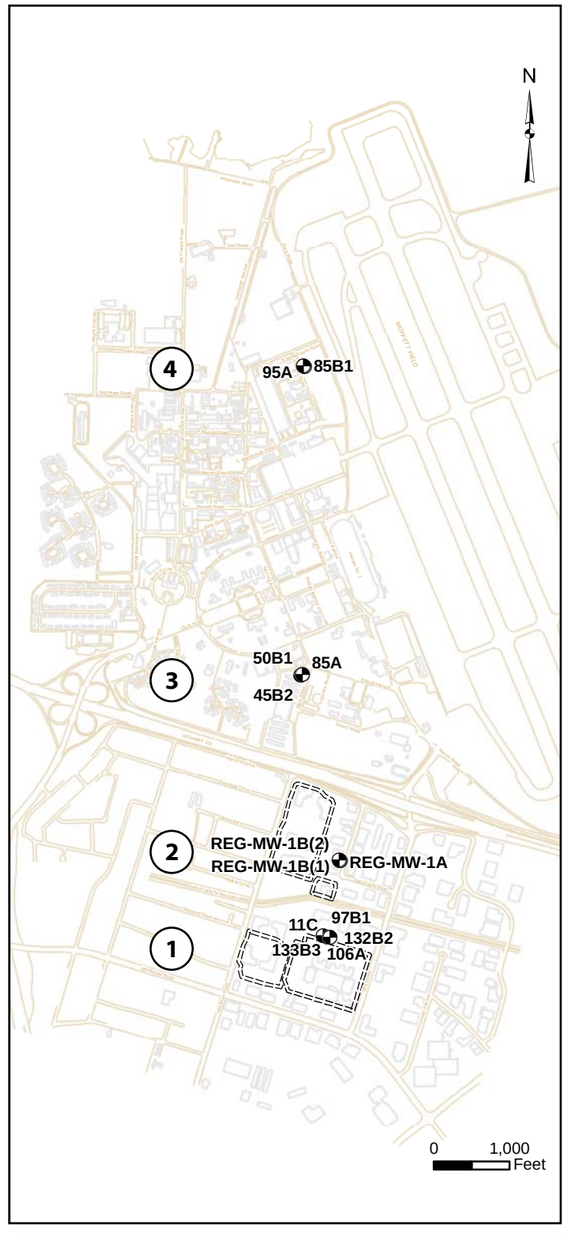
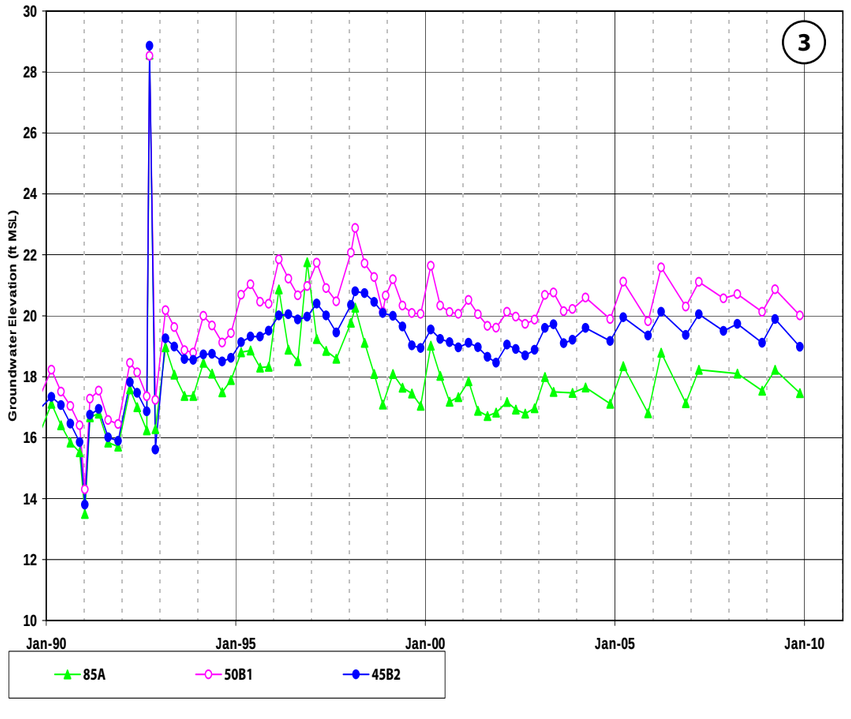
Figure 6

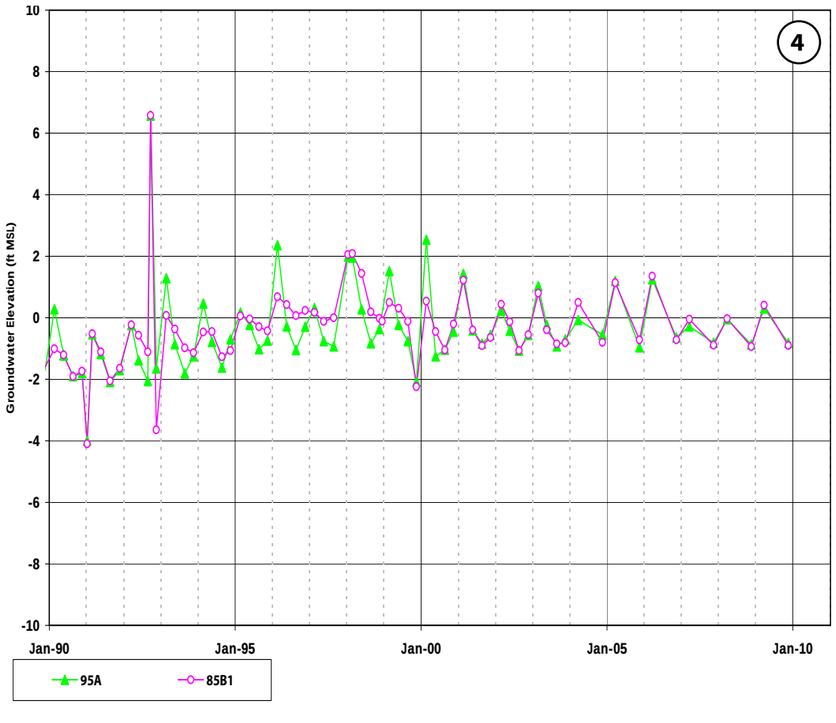
P:\GIS\MEW\AI\Regional\2009_AR\Figure6.AI











Hydrograph of Selected Wells Across Water-Bearing Zones
January 1990 through December 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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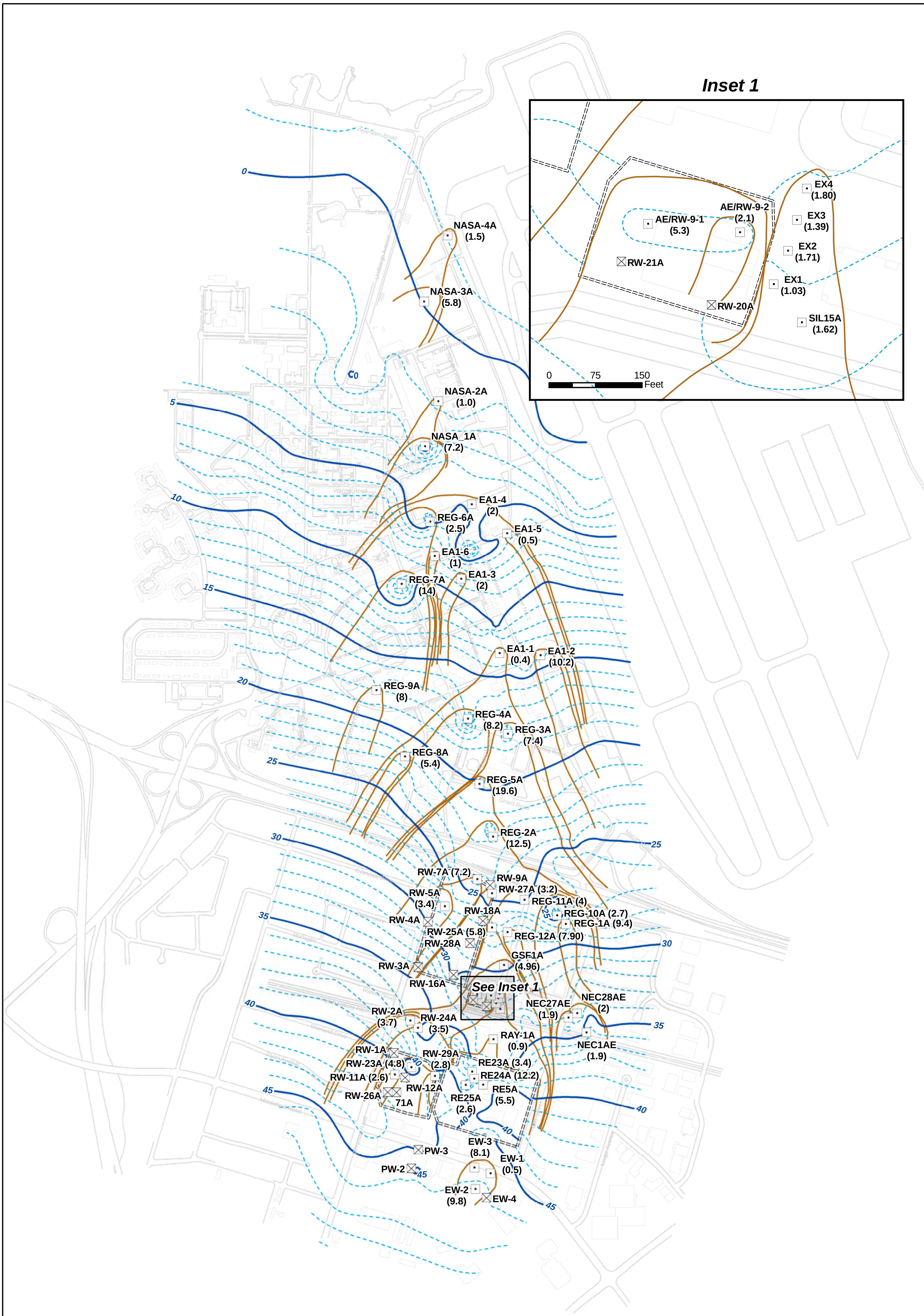
Figure **7**

P:\GIS\MEW\A\I\Regional\2009_AR\Figure7.AI



Legend

⊡ Recovery Well On

☒ Recovery Well Off

Groundwater Elevation Contours

5 foot interval

1 foot interval

Estimated Capture Zone

Building

Road

==== Slurry Wall

(9.8) Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 26 March 2009

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

N

A/A1 Zone Groundwater Elevation Contours and Estimated Capture Zones 26 March 2009

MEW Regional Groundwater Remediation Program Mountain View, California

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Figure **8**

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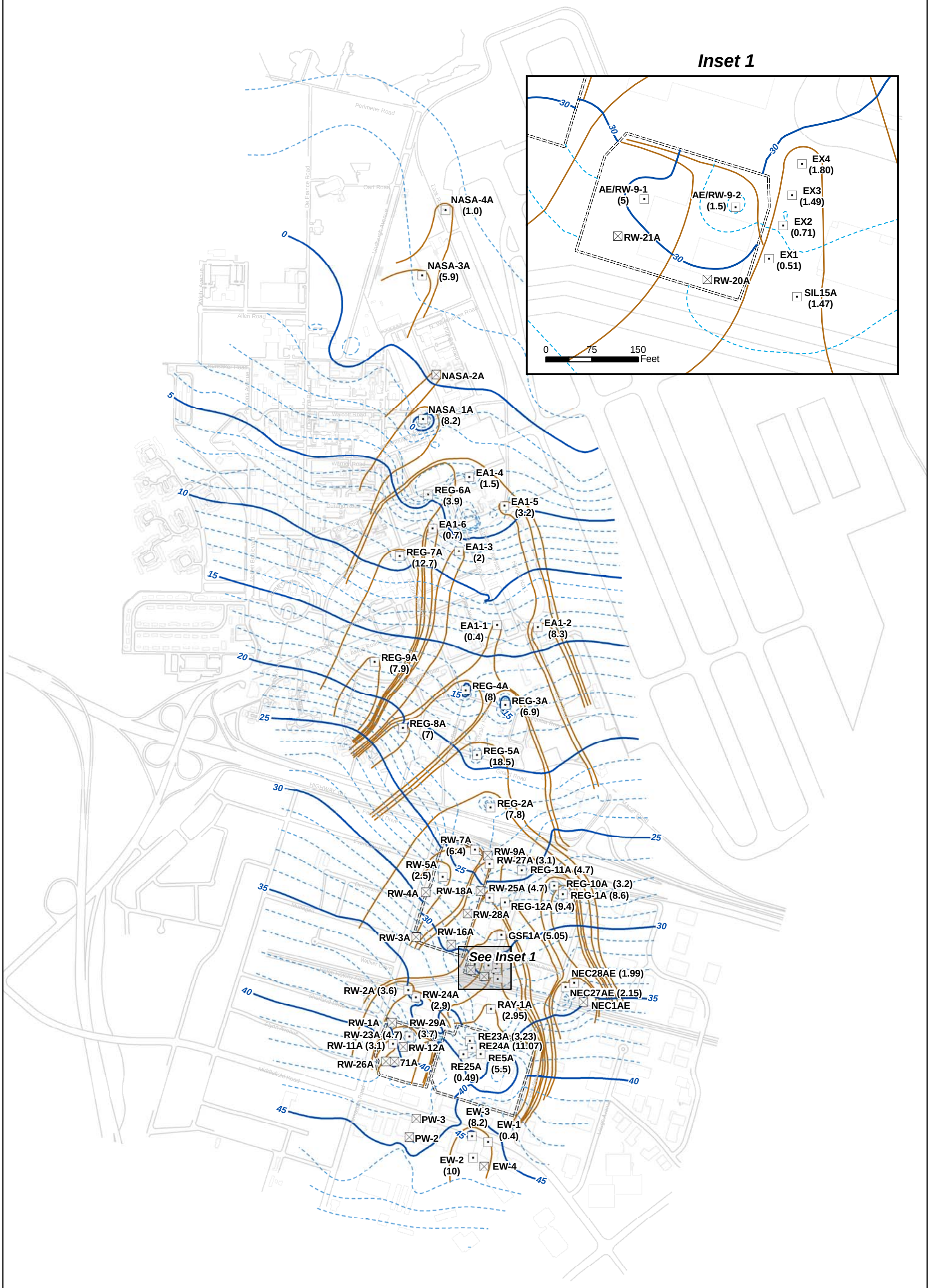

Legend

- Recovery Well On
- Recovery Well Off

Groundwater Elevation Contours

- 5 foot interval
- 1 foot interval

- Estimated Capture Zone
- Building
- Road
- ==== Slurry Wall

(0.4) Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 19 November 2009

1,000 500 0 1,000 Feet

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

A/A1 Zone Groundwater Elevation Contours and Estimated Capture Zones 19 November 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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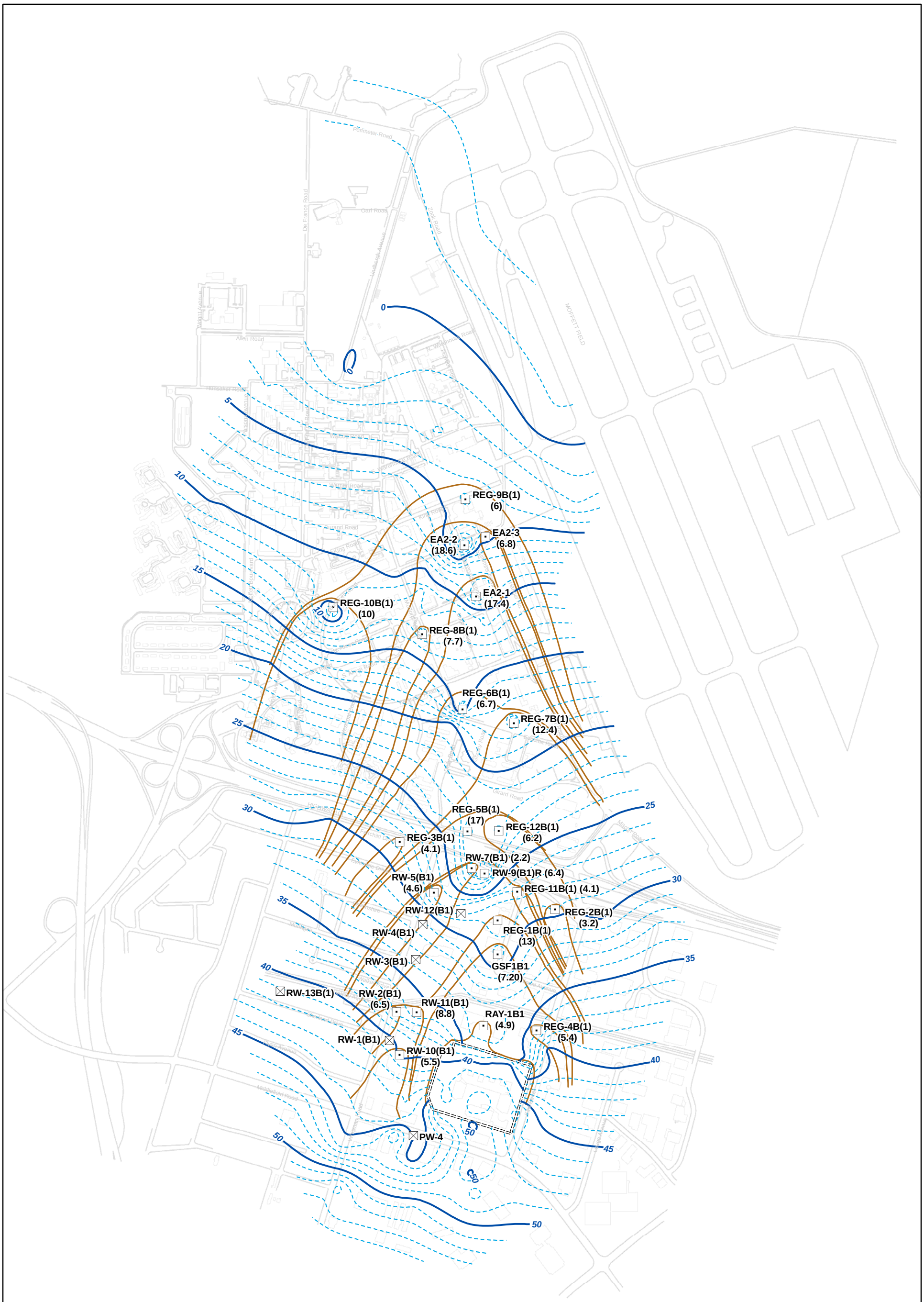
Figure **9**

P:\GIS\MEW\Project\Regional\2009_AR\POT\GGW_AA1_Nov2009_CZ.mxd



Legend

- Recovery Well On
- Recovery Well Off

Groundwater Elevation Contours

- 5 foot interval
- 1 foot interval; 54; 53; 52; 51

- Estimated Capture Zone
- Building
- Road
- ==== Slurry Wall

(5.5) Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 26 March 2009

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

B1/A2 Zone Groundwater Elevation Contours and Estimated Capture Zones 26 March 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

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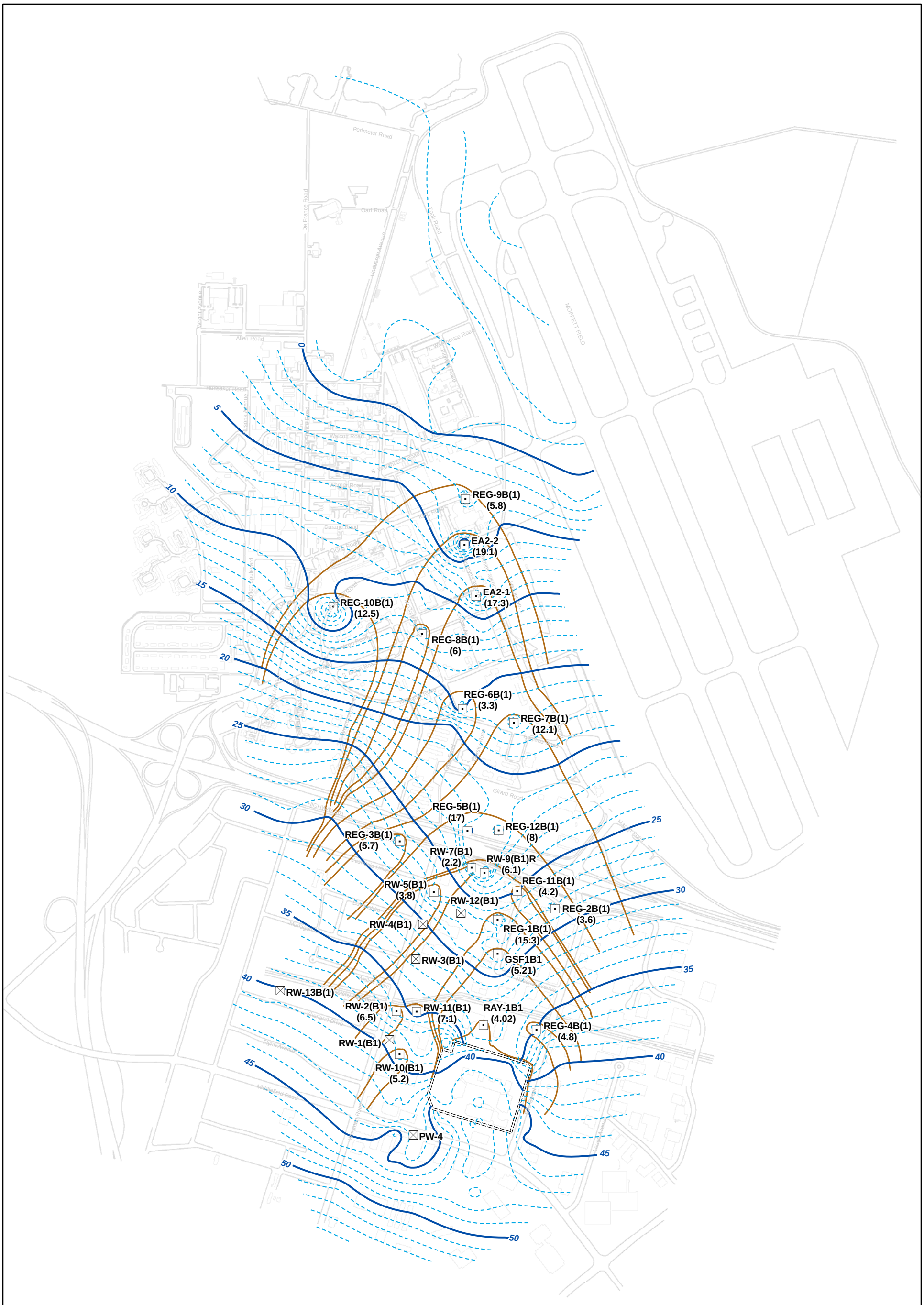
Figure **10**

P:\GIS\MEW\Project\Regional\2009_AR\POT\GGW_B1A2_Mar2009_CZ.mxd



Legend

- Recovery Well On
- Recovery Well Off
- **Groundwater Elevation Contours**
  - 5 foot interval
  - 1 foot interval; 54; 53; 52; 51
- Estimated Capture Zone
- Building
- Road
- ==== Slurry Wall

(5.2) Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 19 November 2009

1,000 500 0 1,000 Feet

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

B1/A2 Zone Groundwater Elevation Contours and Estimated Capture Zones 19 November 2009

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Mountain View, California

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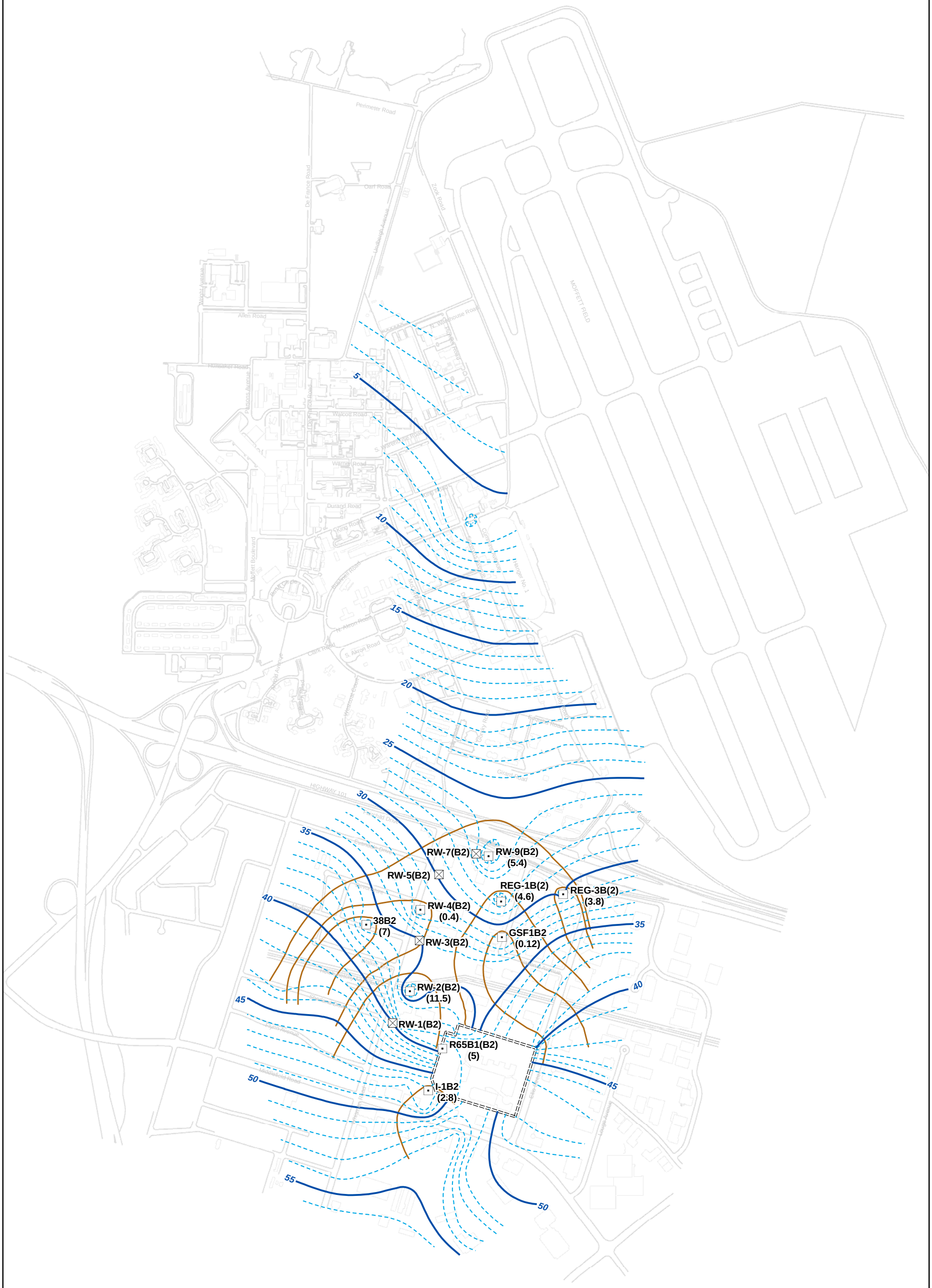
Figure **11**

P:\GIS\MEW\Project\Regional\2009_AR\POT\GGW_B1A2_Nov2009_CZ.mxd



Legend

- Recovery Well On
- Recovery Well Off
- **Groundwater Elevation Contours**
  - 5 foot interval
  - 1 foot interval; 54; 53; 52; 51; 56
- ==== Slurry Wall
- Estimated Capture Zone
- Building
- Road

(2.8) Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 26 March 2009

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

B2 Zone Groundwater Elevation Contours and Estimated Capture Zones 26 March 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

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Figure **12**

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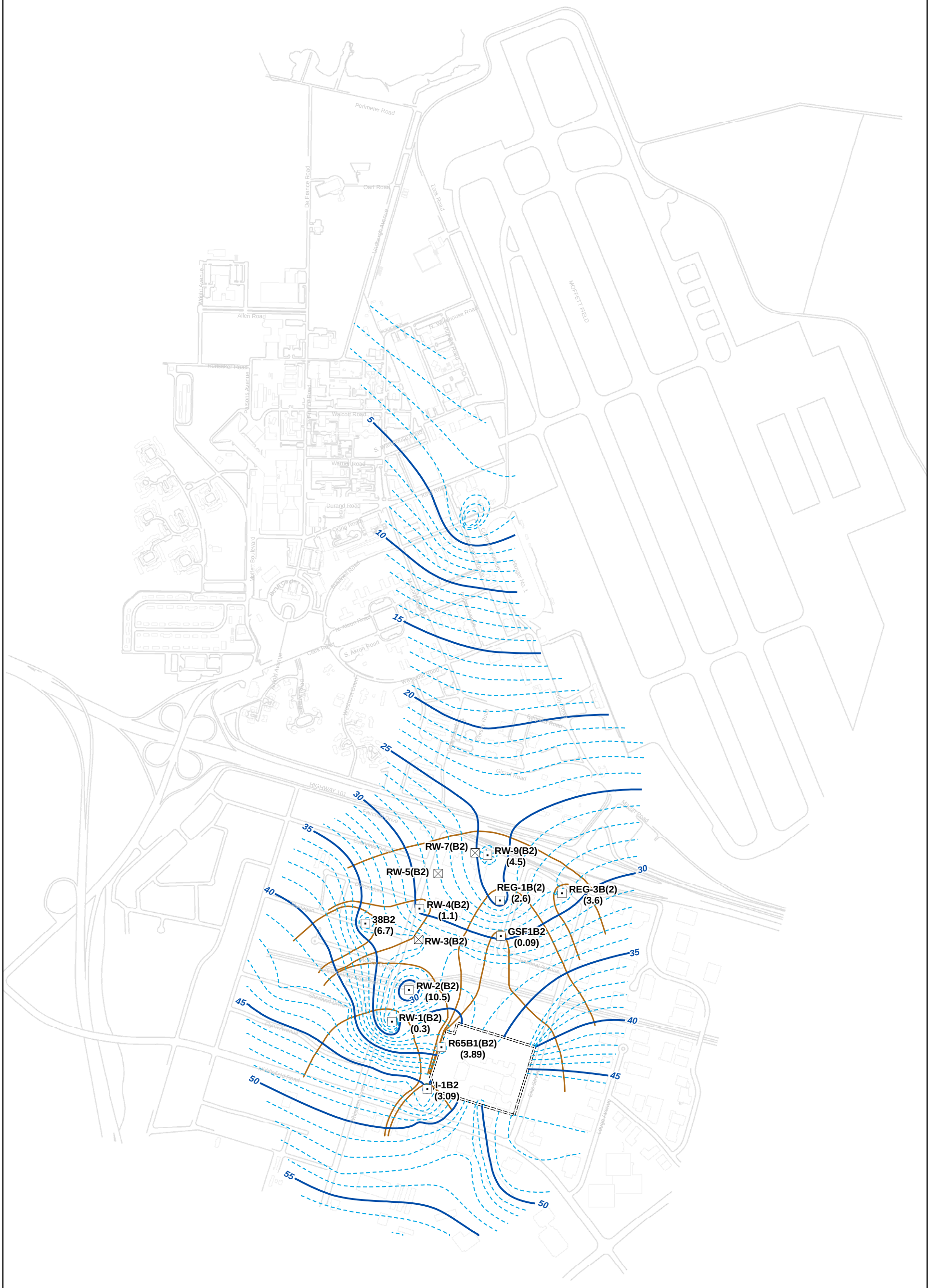
P:\GIS\MEW\Project\Regional\2009_AR\POT\GGW_B2_Mar2009_CZ.mxd



Legend

- Recovery Well On
- Recovery Well Off
- **(0.3)** Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 19 November 2009

Groundwater Elevation Contours

- 5 foot interval
- 1 foot interval; 54; 53; 52; 51; 57; 56

- ==== Slurry Wall
- Estimated Capture Zone
- Building
- Road

1,000 500 0 1,000 Feet

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

B2 Zone Groundwater Elevation Contours and Estimated Capture Zones 19 November 2009

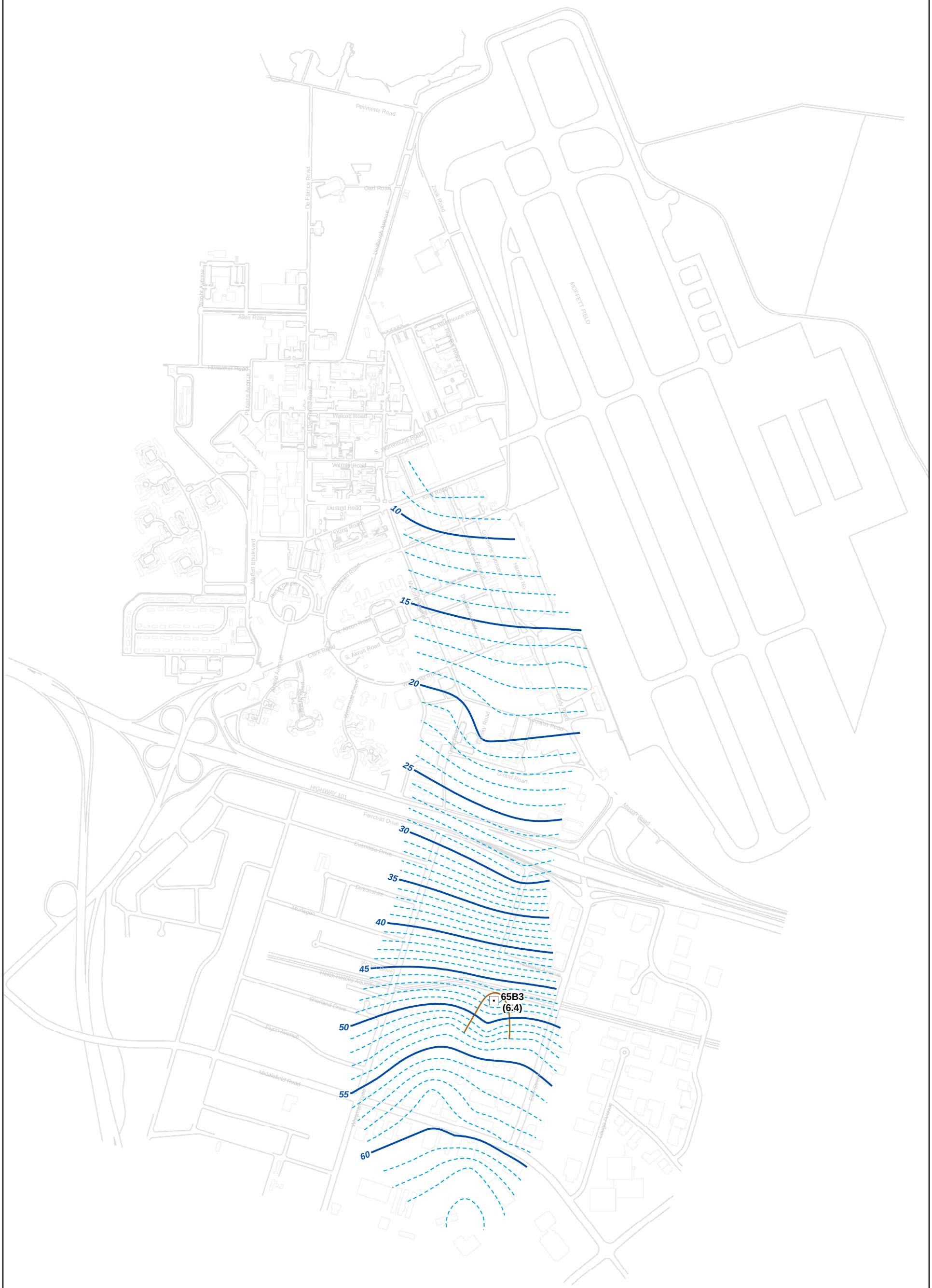
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Figure **13**

Oakland | June 2010

P:\GIS\MEW\Project\Regional\2009_AR\POT\GGW_B2_Nov2009_CZ.mxd



Legend

- Recovery Well On
- Recovery Well Off
- **Groundwater Elevation Contours**
  - 5 foot interval
  - 1 foot interval
- Estimated Capture Zone
- Building
- Road

(6.4) Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 26 March 2009

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

B3 Zone Groundwater Elevation Contours and Estimated Capture Zones 26 March 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

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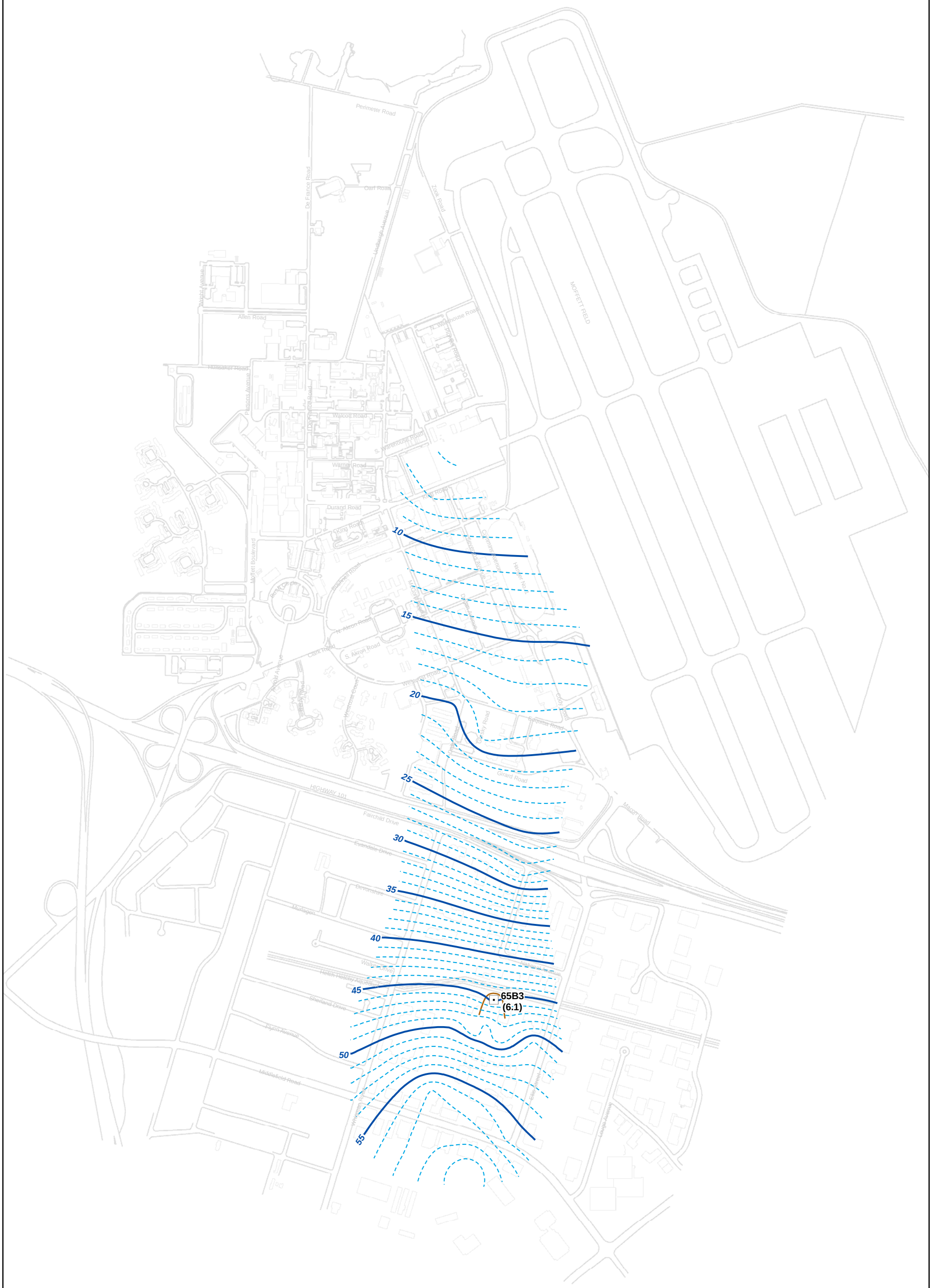
Figure **14**

P:\GIS\MEW\Project\Regional\2009_AR\POT\GGW_B3_Mar2009_CZ.mxd



Legend

- Recovery Well On
- Recovery Well Off
- **Groundwater Elevation Contours**
  - 5 foot interval
  - 1 foot interval
- Estimated Capture Zone
- Building
- Road

(6.1) Pumping Rate in gallons per minute, calculated from weekly totalizer readings ending week of 19 November 2009

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

B3 Zone Groundwater Elevation Contours and Estimated Capture Zones 19 November 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

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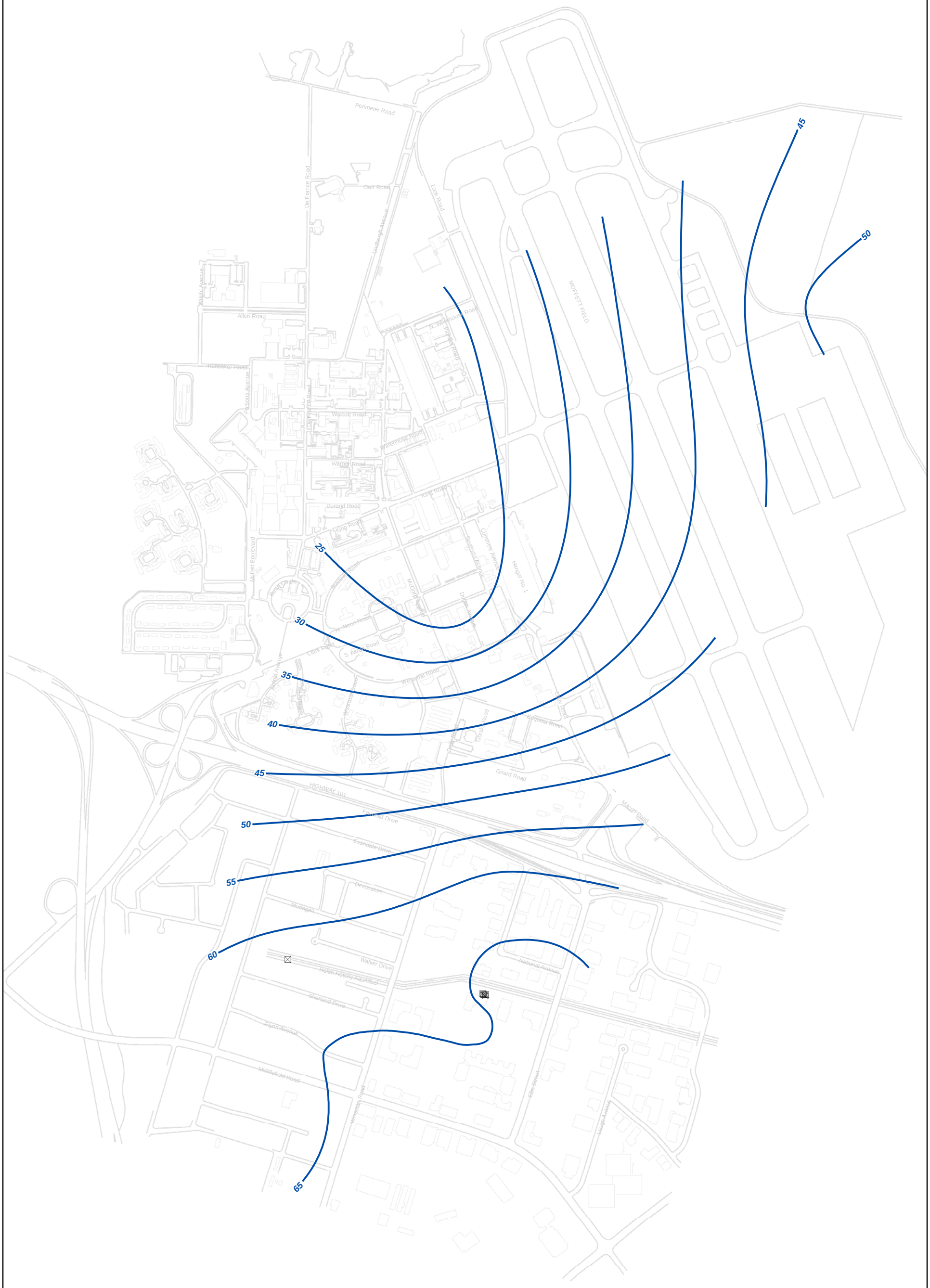
Figure **15**

P:\GIS\MEW\Project\Regional\2009_AR\POT\GGW_B3_Nov2009_CZ.mxd



Legend

- Recovery Well On
- Recovery Well Off

Groundwater Elevation Contours

- 5 foot interval
- 1 foot interval

- Building
- Road

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

C and Deep Zone Groundwater Elevation Contours 26 March 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | June 2010

Figure **16**

P:\GIS\MEW\Project\Regional\2009_AR\POT\GGW_CDeep_Mar2009_CZ.mxd

Legend

- Recovery Well On
- Recovery Well Off

Groundwater Elevation Contours

- 5 foot interval
- 1 foot interval

- Building
- Road

Note:
Groundwater elevation contour map with posted data provided in Appendix B.

1,000 500 0 1,000 Feet

C and Deep Zone Groundwater Elevation Contours 19 November 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

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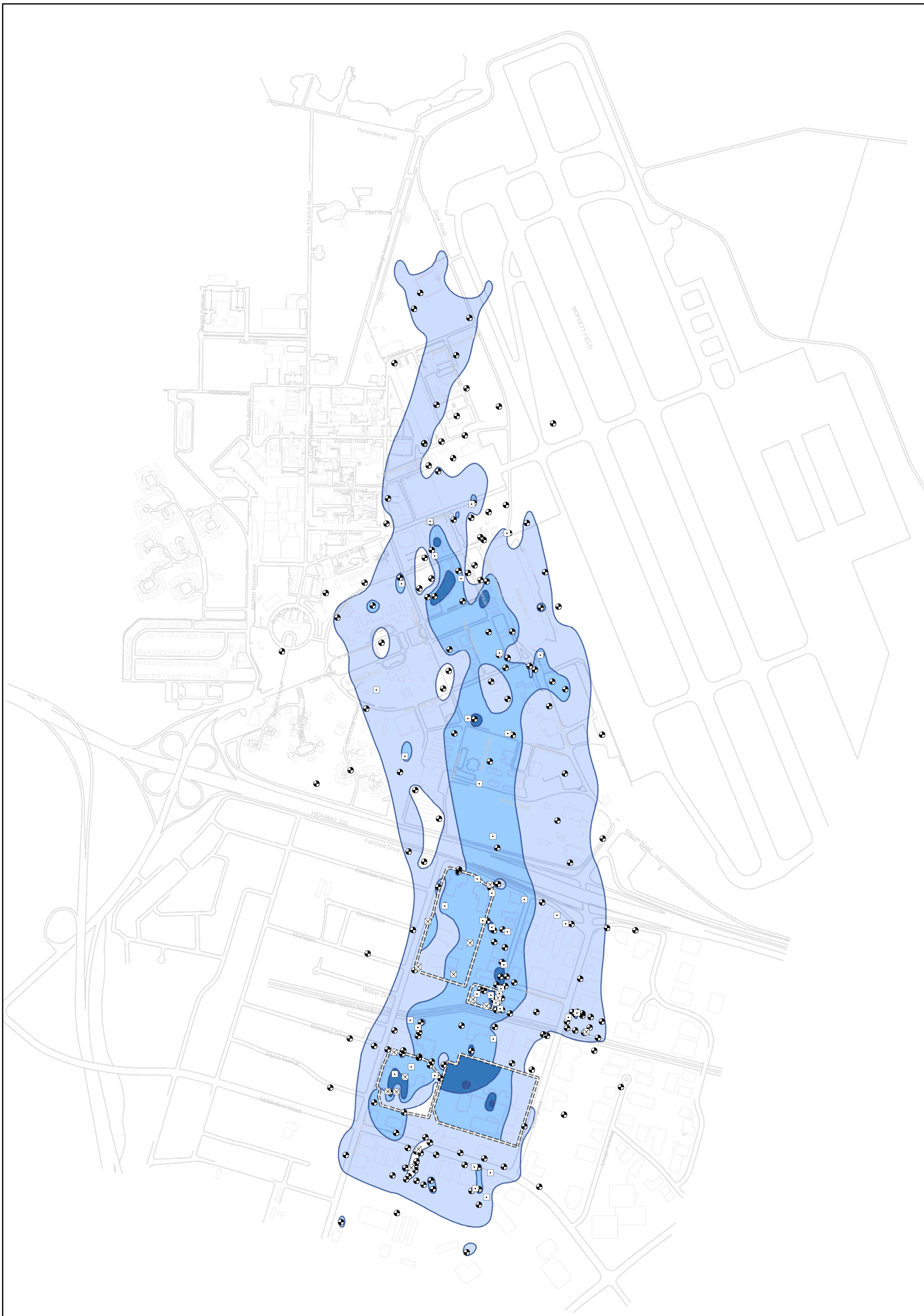
Figure **17**

P:\GIS\MEW\Project\Regional\2009_AR\POT\GGW_CDeep_Nov2009_CZ.mxd



Legend

⊡	Recovery Well On
⊠	Recovery Well Off
◕	Monitoring Well

TCE Concentration

- 5 - 100 ug/L
- 100 - 1,000 ug/L
- 1,000 - 10,000 ug/L
- Greater than 10,000 ug/L

Building

Road

==== Slurry Wall

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
ug/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.

A/A1 Zone TCE Concentrations
November/December 2009

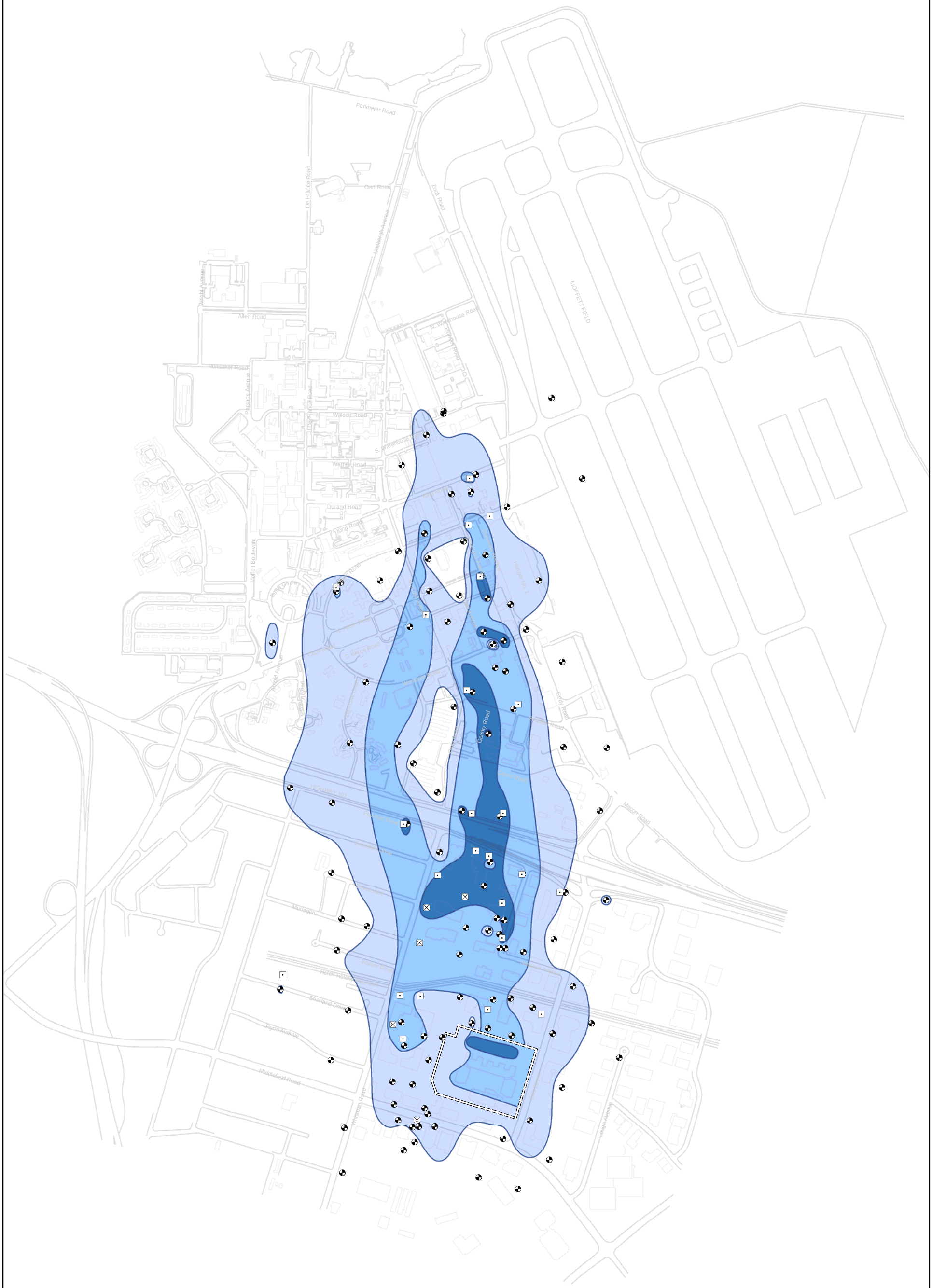
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Figure 18

Oakland | June 2010

P:\GIS\MEW\Project\Regional\2009_AR\TCE\TCE_AA1_Nov2009.mxd



Legend

- Recovery Well On
- Recovery Well Off
- Monitoring Well

TCE Concentration

- 5 - 100 ug/L
- 100 - 1,000 ug/L
- 1,000 - 10,000 ug/L
- Greater than 10,000 ug/L

- Building
- Road
- ==== Slurry Wall

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
ug/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.

B1/A2 Zone TCE Concentrations November/December 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

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Oakland | June 2010

Figure **19**

P:\GIS\MEW\Project\Regional\2009_AR\TCE\TCE_B1A2_Nov2009.mxd

Legend

- Recovery Well On
- Recovery Well Off
- Monitoring Well

TCE Concentration

- 5 - 100 ug/L
- 100 - 1,000 ug/L
- 1,000 - 10,000 ug/L
- Greater than 10,000 ug/L

- Building
- Road

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
ug/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.

B2 Zone TCE Concentrations November/December 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | June 2010

Figure **20**

P:\GIS\MEW\Project\Regional\2009_AR\TCE\TCE_B2_Nov2009.mxd

Legend

- Recovery Well On
- Recovery Well Off
- Monitoring Well

TCE Concentration

- 5 - 100 ug/L
- 100 - 1,000 ug/L
- 1,000 - 10,000 ug/L
- Greater than 10,000 ug/L

- Building
- Road

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
ug/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.
TCE not detected above 5 ug/L

B3 Zone TCE Concentrations November/December 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

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Oakland | June 2010

Figure **21**

P:\GIS\MEW\Project\Regional\2009_AR\TCE\TCE_B3_Nov2009.mxd

Legend

- Recovery Well On
- Recovery Well Off
- Monitoring Well

TCE Concentration

- 5 - 100 ug/L
- 100 - 1,000 ug/L
- 1,000 - 10,000 ug/L
- Greater than 10,000 ug/L

- Building
- Road

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
ug/L = micrograms per liter
TCE isoconcentration contour map with posted data provided in Appendix C.

C and Deep Zone TCE Concentrations November/December 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | June 2010

Figure **22**

P:\GIS\MEW\Project\Regional\2009_AR\TCE\TCE_CDeep_Nov2009.mxd

Legend

- Recovery Well On
- Recovery Well Off

TCE Concentration

- 5 - 100 ug/L
- 100 - 1,000 ug/L
- 1,000 - 10,000 ug/L
- Greater than 10,000 ug/L

- Capture Zone
- Building
- Road
- ==== Slurry Wall

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
ug/L = micrograms per liter

A/A1 Zone TCE Concentrations and Estimated Capture Zones November/December 2009

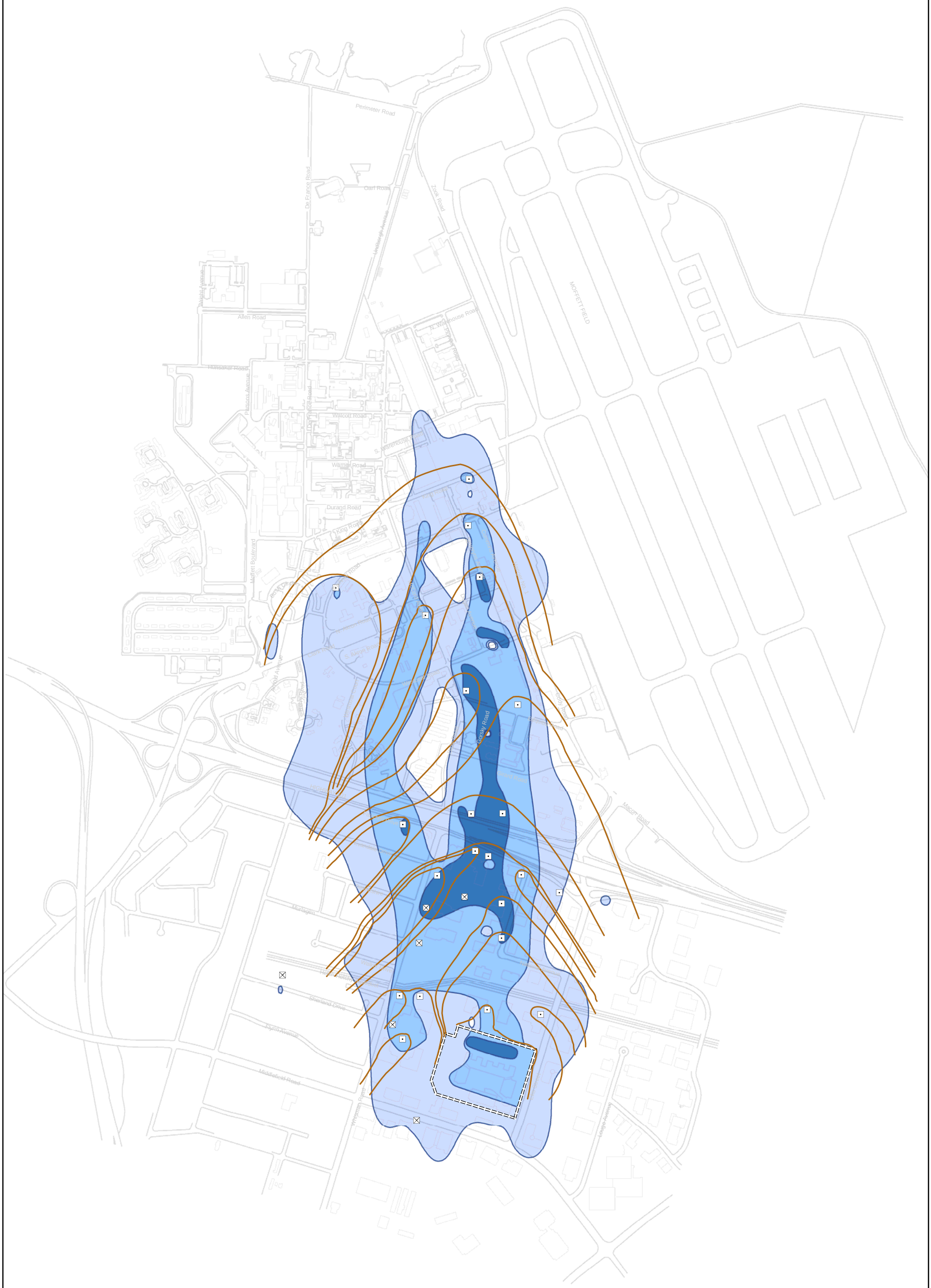
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | June 2010

Figure **23**

P:\GIS\MEW\Project\Regional\2009_AR\CZ\11x17\TCE_AA1_Nov2009_CZ.mxd



Legend

- Recovery Well On
- Recovery Well Off

TCE Concentration

- 5 - 100 ug/L
- 100 - 1,000 ug/L
- 1,000 - 10,000 ug/L
- Greater than 10,000 ug/L

- Capture Zone
- Building
- Road
- ==== Slurry Wall

N

1,000 500 0 1,000 Feet

Notes:
TCE = Trichloroethene
ug/L = micrograms per liter

B1/A2 Zone TCE Concentrations and Estimated Capture Zones November/December 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

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Oakland | June 2010

Figure **24**

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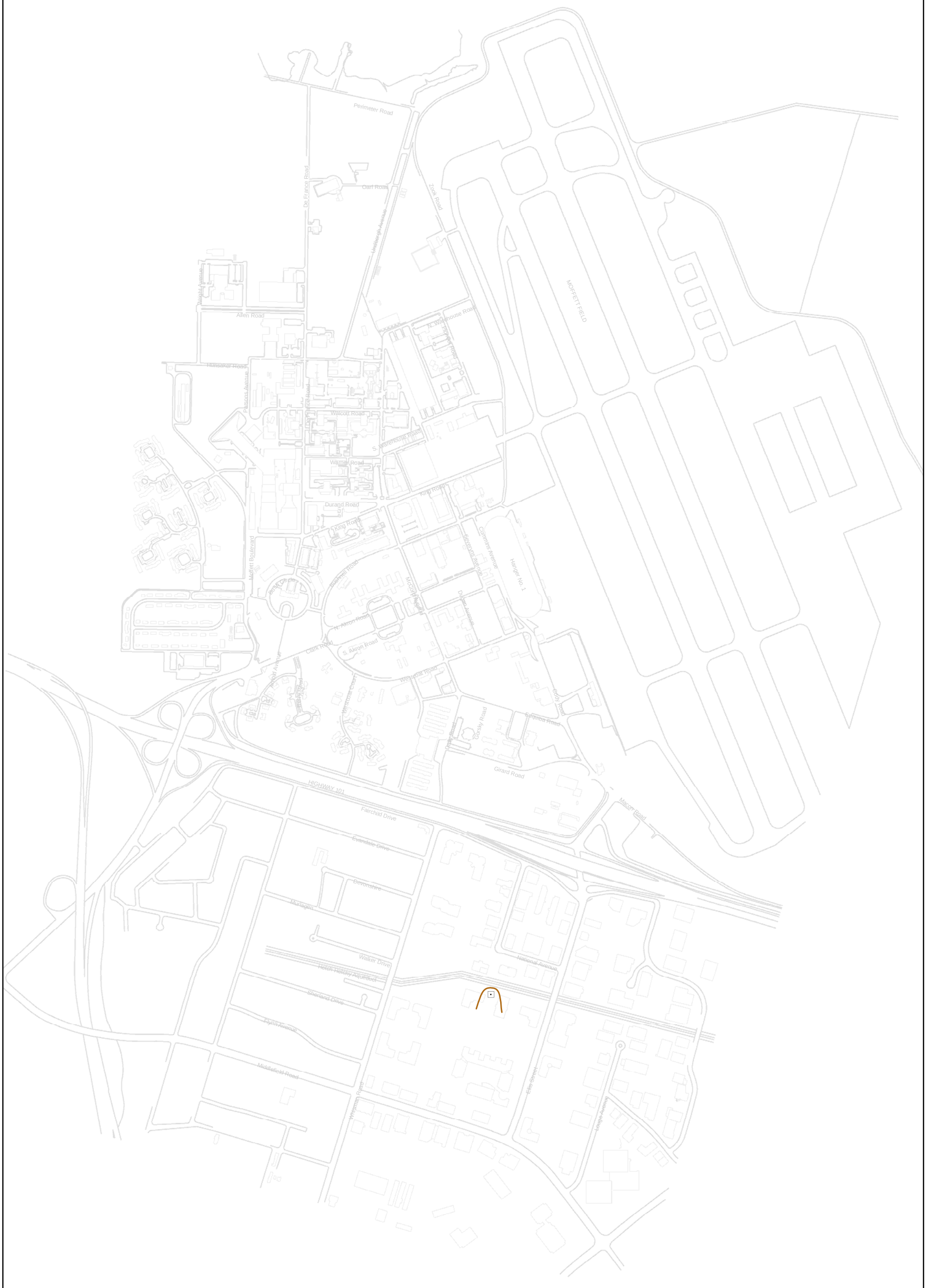
Perimeter Road
De France Road
Oarl Road
Lindbergh Avenue
Zook Road
MOFFETT FIELD
Wright Avenue
Allen Road
N. Warehouse Road
Pioneer Road
Hunsaker Road
Parsons Avenue
Walcott Road
S. Warehouse Road
Warner Road
King Road
Durand Road
Moffett Boulevard
Bushnell Road
McCoy Avenue
Cummins Avenue
Hangar No. 1
N. Akron Road
S. Akron Road
Clark Road
Westcourt Road
Girard Road
Edgewood Road
Macon Road
HIGHWAY 101
Fairchild Drive
Middlefield Road
Whisman Road
Ellis Street
Logue Avenue
Sherland Drive
Flynn Avenue
1,000
500
0
1,000 Feet
N
Legend
Recovery Well On
Recovery Well Off
TCE Concentration
5 - 100 ug/L
100 - 1,000 ug/L
1,000 - 10,000 ug/L
Greater than 10,000 ug/L
Slurry Wall
Capture Zone
Building
Road
Notes:
TCE = Trichloroethene
ug/L = micrograms per liter
B2 Zone TCE Concentrations
and Estimated Capture Zones
November/December 2009
MEW Regional Groundwater Remediation Program
Mountain View, California
Geosyntec consultants
Oakland
June 2010
Figure
25
P:\GIS\MEW\Project\Regional\2009_AR\CZ\11x17\TCE_B2_Nov2009_CZ.mxd



Legend

- Recovery Well On
- Recovery Well Off

TCE Concentration

- 5 - 100 ug/L
- 100 - 1,000 ug/L
- 1,000 - 10,000 ug/L
- Greater than 10,000 ug/L

- Capture Zone
- Building
- Road

Notes:
TCE = Trichloroethene
ug/L = micrograms per liter
TCE not detected above 5 ug/L

N

1,000 500 0 1,000 Feet

B3 Zone TCE Concentrations and Estimated Capture Zones November/December 2009

MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

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Figure **26**

P:\GIS\MEW\Project\Regional\2009_AR\CZ\11x17\TCE_B3_Nov2009_CZ.mxd

Notes:
TCE = Trichloroethene
ug/L = micrograms per liter
No estimated capture zone in C and Deep Aquifer because recovery wells are off.

C and Deep Zone TCE Concentrations and Estimated Capture Zones November/December 2009

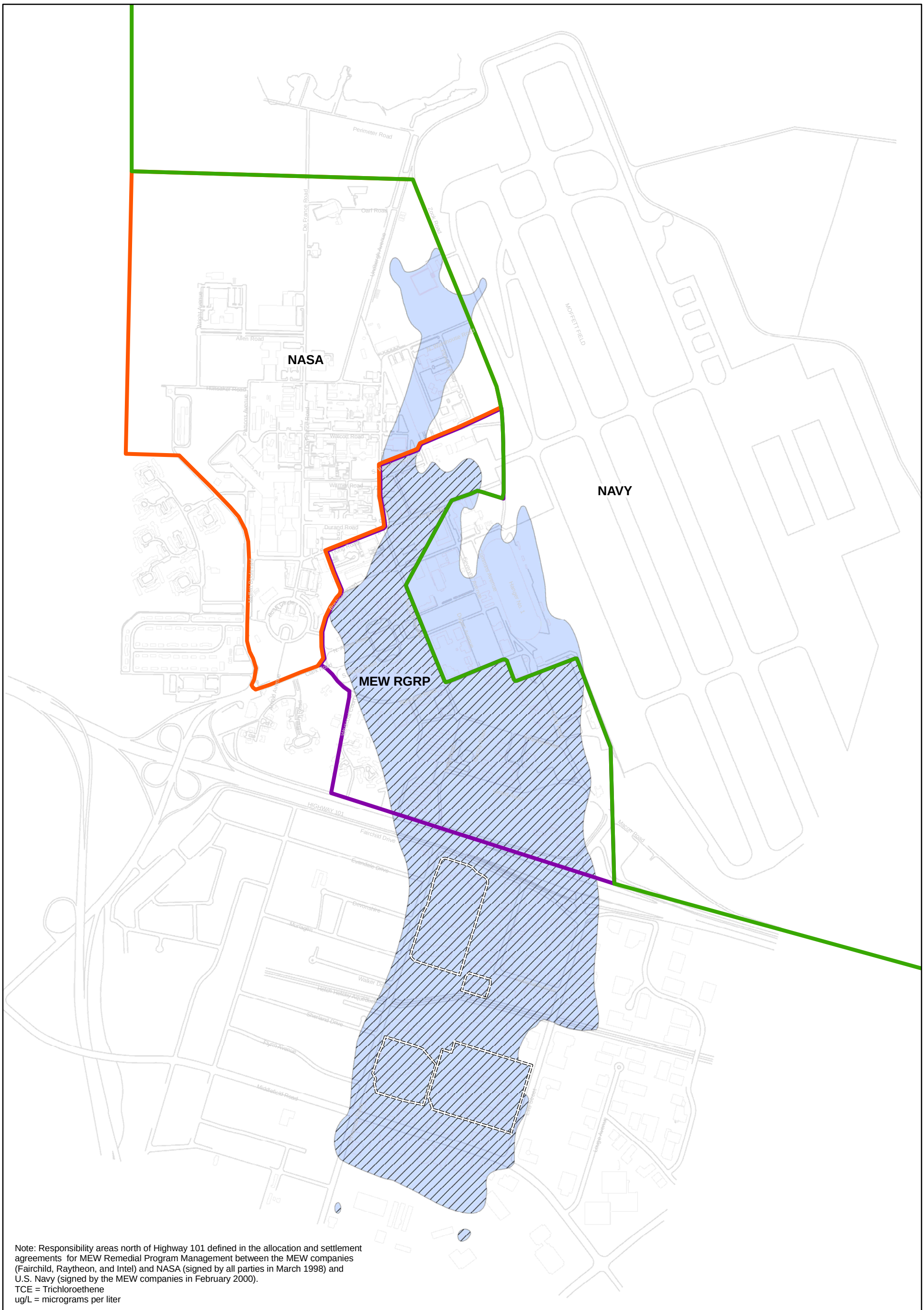
MEW Regional Groundwater Remediation Program
Mountain View, California

Geosyntec consultants

Oakland | June 2010

Figure **27**

P:\GIS\MEW\Project\Regional\2009_AR\CZ\11x17\TCE_CDeep_Nov2009_CZ.mxd



Note: Responsibility areas north of Highway 101 defined in the allocation and settlement agreements for MEW Remedial Program Management between the MEW companies (Fairchild, Raytheon, and Intel) and NASA (signed by all parties in March 1998) and U.S. Navy (signed by the MEW companies in February 2000).
TCE = Trichloroethene
ug/L = micrograms per liter

Legend

- MEW RGRP Target Capture Area
- TCE Plume Boundary
- NASA Area of Responsibility
- U.S. Navy Area of Responsibility
- MEW RGRP (North of 101) Area of Responsibility
- ==== Slurry Wall
- Building
- Road

N

1,000 500 0 1,000 Feet

Target Capture Area, A/A1 Zone

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Mountain View, California

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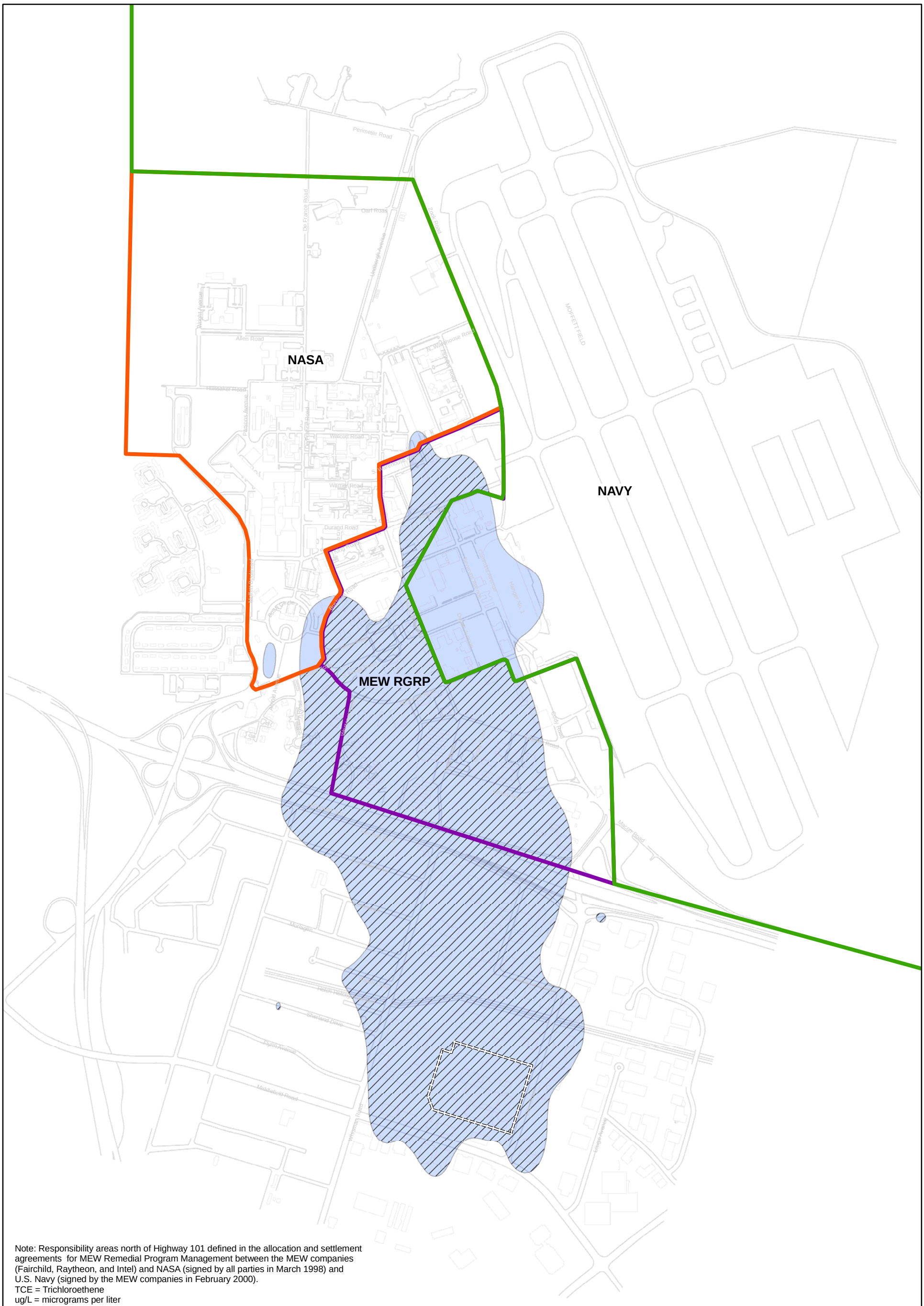
Figure **28**

P:\GIS\MEW\Project\Regional\2009_AR\Target_Capture_AA1.mxd



Note: Responsibility areas north of Highway 101 defined in the allocation and settlement agreements for MEW Remedial Program Management between the MEW companies (Fairchild, Raytheon, and Intel) and NASA (signed by all parties in March 1998) and U.S. Navy (signed by the MEW companies in February 2000).
TCE = Trichloroethene
ug/L = micrograms per liter

Legend

- NASA Area of Responsibility
- U.S. Navy Area of Responsibility
- MEW RGRP (North of 101) Area of Responsibility
- MEW RGRP Target Capture Area
- TCE Plume Boundary
- ==== Slurry Wall
- Building
- Road

N

1,000 500 0 1,000 Feet

Target Capture Area, B1/A2 Zone

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Figure **29**

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