Semiannual Groundwater Monitoring Report
Second Quarter 2011 and Third Quarter 2011
Laborde Canyon (Lockheed Martin Beaumont Site 2)
Beaumont, California

Prepared for:

LOCKHEED MARTIN

Prepared by:

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TC# 25241-02.0302 / December 2011

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LOCKHEED MARTIN

December 12, 2011

Mr. Daniel Zogaib
Southern California Cleanup Operations
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Subject: Submittal of the *Semiannual Groundwater Monitoring Report, Second Quarter 2011 and Third Quarter 2011, Laborde Canyon (Lockheed Martin Beaumont Site 2), Beaumont, California*

Dear Mr. Zogaib:

Please find enclosed one hard copy of the body of the report and two compact disks with the report body and appendices of the *Semiannual Groundwater Monitoring Report, Second Quarter 2011 and Third Quarter 2011, Laborde Canyon (Lockheed Martin Beaumont Site 2), Beaumont, California* for your review and approval or comment.

In the meantime, if you have any questions regarding this submittal, please contact me at 818-847-9901 or brian.thorne@lmco.com.

Sincerely,

Brian T. Thorne
Project Lead

Enclosure: *Semiannual Groundwater Monitoring Report, Second Quarter 2011 and Third Quarter 2011, Laborde Canyon (Lockheed Martin Beaumont Site 2), Beaumont, California*

Copy: Gene Matsushita, LMC (electronic and hard copy)
Sally Drinkard, CDM (electronic copy)
Tom Villeneuve, Tetra Tech (electronic copy)

BUR224 Beaumont 2 transmittal of Q2 and Q3 GWMR

Semiannual Groundwater Monitoring Report Second Quarter 2011 and Third Quarter 2011 Laborde Canyon (Lockheed Martin Beaumont Site 2) Beaumont, California

Prepared for:

Lockheed Martin Corporation

Prepared by:

Tetra Tech, Inc.

December 2011

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TABLE OF CONTENTS

Section **Page**

LIST OF FIGURES

Page

LIST OF TABLES

Page

APPENDICES

Acronyms

a	This data validation qualifier means the analyte was found in the method blank.
AFCEE	Air Force Center for Environmental Excellence
B	This data validation qualifier means the sample result is < 5 times the blank contamination. Cross contamination is suspected.
Babcock	E.S. Babcock & Sons, Inc.
bgs	below ground surface
CAM	California Assessment Manual
CDHS	California Department of Health Services
cfs	cubic feet per second
COPCs	chemical(s) of potential concern
COV	Coefficient of Variation
CSM	conceptual site model
1,2-DCA	1,2-dichloroethane
1,1 -DCE	1,1-dichloroethene
DO	dissolved oxygen
DTSC	California Department of Toxic Substances Control
DWNL	California Department of Public Health drinking water notification level
EC	electrical conductivity
EPA	United States Environmental Protection Agency
ft/ft	feet per foot
ft/day	feet per day

GCR	Grand Central Rocket Company
GMP	Groundwater Monitoring Program
HCP	Habitat Conservation Plan
J	This data validation qualifier means the analyte was positively identified, but the concentration is an estimated value.
k	This data validation qualifier means the analyte was found in a field blank.
LAC	Lockheed Aircraft Corporation
LCS	laboratory control sample
LMC	Lockheed Martin Corporation
LPC	Lockheed Propulsion Company
MAROS	Monitoring and Remediation Optimization System
MW	monitoring well
MCL	California Department of Public Health maximum contaminant level
MDLs	method detection limits
MEF	Mt. Eden formation
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
msl	mean sea level
µg/L	micrograms per liter
µg/L/yr	micrograms per liter per year
NA	not applicable/not available/not analyzed
NTUs	nephelometric turbidity units
NWS	National Weather Service
ORP	oxidation/reduction potential
%/yr	percent change per year with respect to the sample mean

PQL	practical quantitation limit
q	This data validation qualifier means the analyte detected was below the PQL.
QAL	Quaternary alluvium
QA/QC	quality assurance/quality control
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
Report	Semiannual Groundwater Monitoring Report
RPD	relative percent difference
S	Mann-Kendall statistic
SAP	sampling and analysis plan
SKR	Stephens' Kangaroo rat
STF	San Timoteo formation
TCE	trichloroethene
TDS	Total Dissolved Solids
U.S.	United States
USFWS	United States Fish and Wildlife Service
VOCs	volatile organic compounds
WDA	Waste Discharge Area
wSTF	weathered San Timoteo formation

Section 1 Introduction

This Semiannual Groundwater Monitoring Report (Report) has been prepared by Tetra Tech, Inc. (Tetra Tech), on behalf of Lockheed Martin Corporation (LMC) and presents the results of the second quarter 2011 and third quarter 2011 groundwater monitoring activities for the Laborde Canyon (Lockheed Martin Beaumont Site 2) (Site) Groundwater Monitoring Program (GMP). The Site is located southwest of the City of Beaumont, Riverside County, California (Figure 1-1). Currently, the Site is inactive with the exception of ongoing investigative activities performed under Consent Order (HSA 88/89-034, amended January 1, 1991) with the California Department of Toxic Substances Control (DTSC).

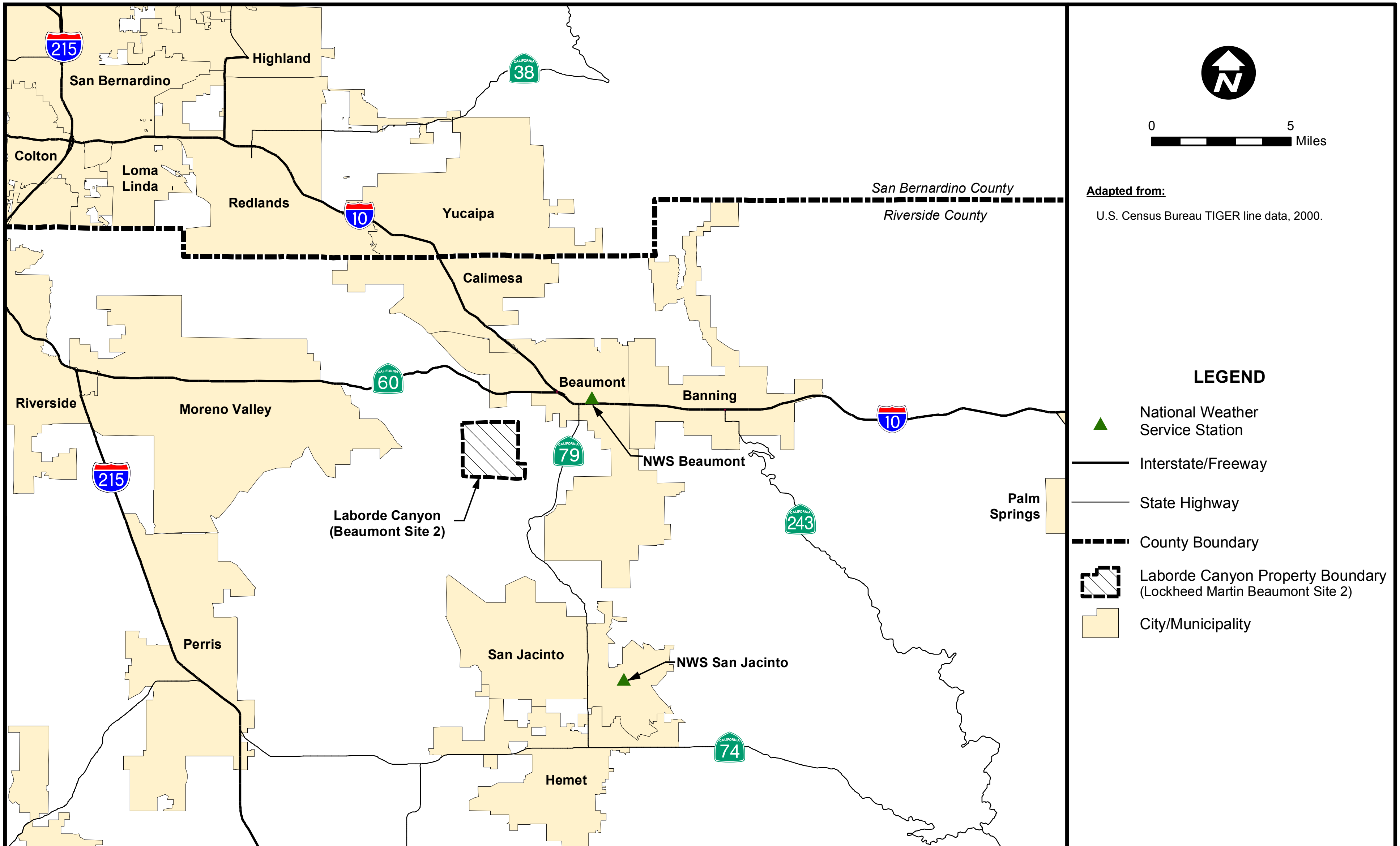
The objectives of this Report are to:

- Briefly summarize the Site history
- Document the water quality monitoring procedures and results
- Analyze and evaluate the water quality monitoring data generated.

This Report is organized into the following sections: 1) Introduction, 2) Summary of Monitoring Activities, 3) Groundwater Monitoring Results, 4) Summary and Conclusions, and 5) References. A brief description of the previous site environmental investigations and the current conceptual site model (CSM) is provided in Appendix A.

1.1 Site Background

The Site is a 2,668-acre parcel located southwest of Beaumont, California. The parcels that comprise the Site were owned by individuals and the United States (U.S.) government prior to 1958. Between 1958 and 1960, portions of the Site were purchased by the Grand Central Rocket Company (GCR) and utilized as a remote test facility for early space and defense program efforts. In 1960, Lockheed Aircraft Corporation (LAC) purchased one-half interest in GCR. GCR became a wholly-owned subsidiary of LAC in 1961. The remaining parcels of land that comprise the Site were purchased from the U.S. government between 1961 and 1964. In 1963, Lockheed Propulsion Company (LPC) became an operating division of LAC and was responsible for the operation of the Site until its closure in 1974. The Site was utilized by GCR and LPC from 1958 to 1974 for



Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 1-1
Regional Location of Laborde Canyon (Beaumont Site 2)

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small rocket motor assembly, testing operations, propellant incineration, and minor disposal activities. Ogden Labs is known to have leased portions of the Site during the 1970s (Radian, 1986).

In 1989, the California Department of Health Services (CDHS) issued a Consent Order requiring LMC to clean up contamination at the Site related to past testing activities (CDHS, 1989). Based on investigative and cleanup activities performed at the Site, the DTSC, as a successor agency, issued a no further remedial action letter to LMC in 1993.

Based on regulatory interest in perchlorate and 1,4-dioxane, a groundwater sample was collected from an inactive groundwater production well (identified as W2-3) at the Site in January 2003. The sample was analyzed for volatile organic compounds (VOCs), perchlorate, and 1,4-dioxane to determine the potential presence and concentration of those chemicals in groundwater. The analytical results indicated that VOCs and 1,4-dioxane were not present at or above their respective method detection limits (MDLs). However, perchlorate was reported at a concentration of 4,080 micrograms per liter (µg/L), which exceeded the then-current California Department of Public Health drinking water notification level (DWNL) of 6 µg/L. In October 2007, the DWNL was replaced by the California Department of Public Health maximum contaminant level (MCL) of 6 µg/L. Based on the detection of perchlorate in the groundwater sample collected, the DTSC reopened the Site for further assessment in August 2004.

Four primary historical operational areas have been identified at the Site (Figure 1-2). Each operational area was used for various activities associated with rocket motor assembly, testing, and propellant incineration. In addition, a Waste Discharge Area (WDA) has been defined. A brief description of each area follows.

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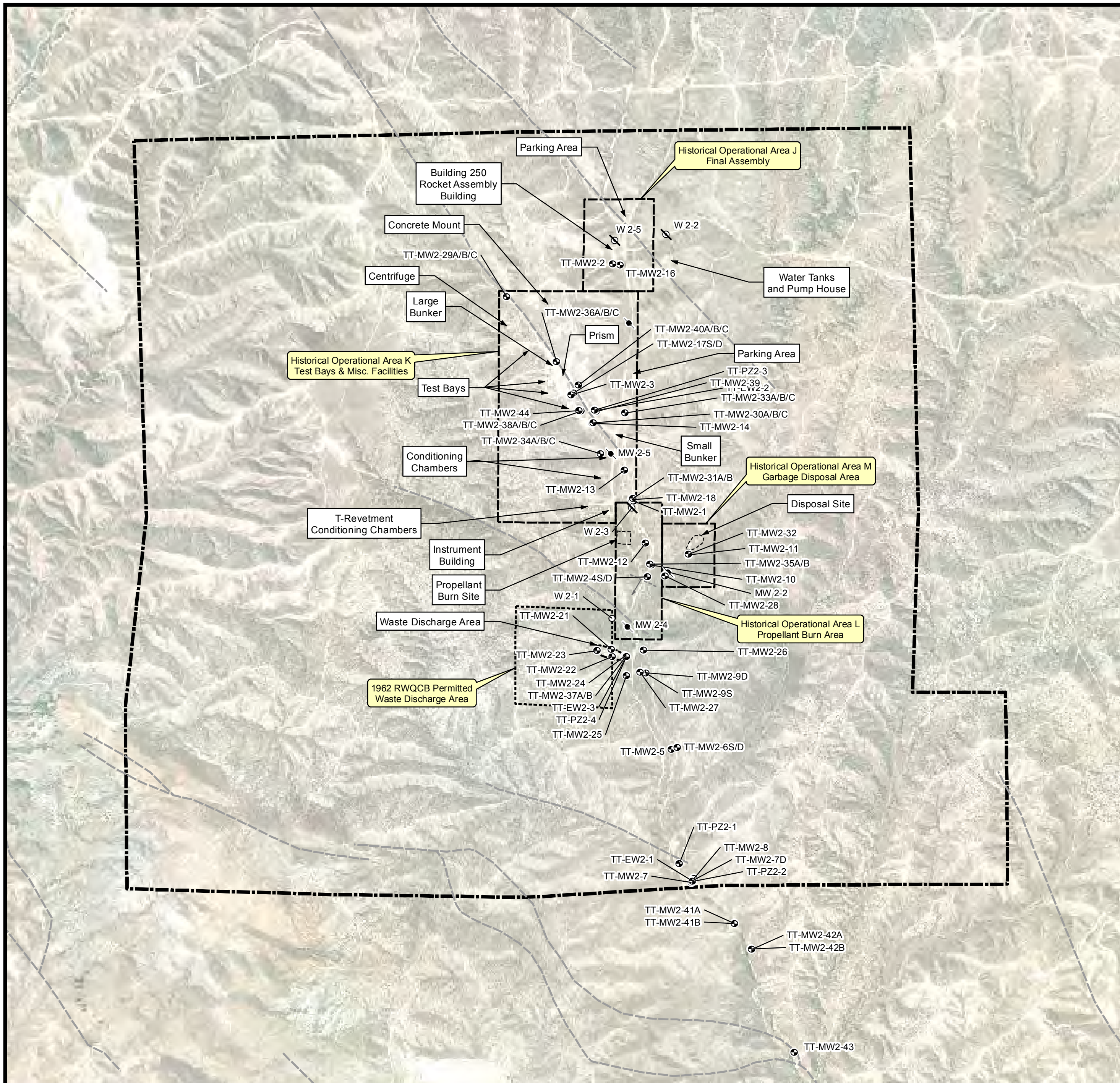

0 1,000 2,000
Feet

Adapted from:

March 2007 aerial photograph.

Faults from the, *Site 2 Lineament Study, Tetra Tech, 2009.*

LEGEND

- Groundwater Monitoring Well Location
- Destroyed Production Well Location
- Destroyed Monitoring Well Location
- Reported Production Well Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Waste Discharge Area
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

Note: Laborde Canyon property boundary (Lockheed Martin Beaumont Site 2) from Hillwig-Goodrow survey, May 2004.

Disposal and Propellent Burn Site perimeters are estimated (Radian, 1986a).

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 1-2
Historical Operational Areas and Site Features

Historical Operational Area J (Area J) –Final Assembly

Rocket motor casings with solid propellant were transported to Building 250, where final assembly of the rocket hardware was conducted. The building was used from 1970 to 1974 for final assembly and shipment of short-range attack missile rocket motors. Rocket motor assembly operations included installation of the nozzle and headcap, pressure check of the motor, installation of electrical systems, and preparations for shipment. During plant closure in 1974, all usable parts of this facility were dismantled, taken off the Site, and sold (Radian, 1986).

Historical Operational Area K (Area K) – Test Bays and Miscellaneous Facilities

The primary features included a large earthen structure known as the "Prism," conditioning chambers, a centrifuge, and four test bays with two associated bunkers.

The Prism was reportedly built between 1984 and 1990, and was used to test radar by General Dynamics (Tetra Tech, 2007b). Details concerning construction of the Prism are not available, but it appears to have been constructed with soils from near the test bays.

The conditioning chambers were used to examine the effects of extreme temperatures on rocket motors and to meet specification requirements (Radian, 1986). A centrifuge was located in the northwestern portion of Area K, where rocket motors were tested in order to determine if the solid propellant would separate from its casing under increased gravitational forces.

Four test bays were present at the Site. Initially, only three test bays were known; however, a former employee reported in an interview that a fourth test bay, located north of the other three bays, was also used in Area K (Tetra Tech, 2009). The initial testing activities had a history of explosions that destroyed complete test areas, especially during the period when GCR operated at the Site (Radian, 1986). While vestiges from three test bays are currently visible at the Site, the fourth was reportedly destroyed by such an explosion during testing. After a motor failure occurred, the area surrounding the test bay was reportedly inspected to recover any unburned propellant.

Historical Operational Area L (Area L) – Propellant Burn Area

Solid propellant was reportedly transported to the burn area and set directly on the ground surface for burning (Radian, 1986). No pits or trenches were dug as part of the burning process. The solid propellant was saturated with diesel fuel to initiate combustion. Reportedly, the solid propellant would burn rapidly. No evidence or physical features identify the precise location of burning activities, and previous site investigations (Tetra Tech, 2005; Tetra Tech, 2010a) found no evidence of significant contamination in Area L, suggesting that propellant incineration may not have been conducted in this area of the Site.

Historical Operational Area M (Area M) – Garbage Disposal Area

A garbage disposal area was located adjacent to a small creek at the Site (Radian, 1986). Scrap metal, paper, wood, and concrete materials were disposed of at the disposal site by LPC. Hazardous materials, including explosives and propellants, were never disposed of at the disposal site by LPC, according to employee interviews. However, Ogden Labs, a company that tested valves and explosive items, reportedly used this site for disposal of hazardous waste. In 1972, a Lockheed Safety Technician was exposed to toxic vapors of unsymmetrical dimethyl hydrazine from a pressurized gas container located within the disposal site. Based on potential exposure risks to occupants, LPC's safety group required Ogden Labs to take measures to remove any potentially hazardous materials at the disposal site. Shortly thereafter, a disposal company was contracted by Ogden Labs to clean up the disposal site (Radian, 1986).

Waste Discharge Area

In 2007, LMC discovered the existence of Santa Ana River Basin Regional Water Pollution Control Board Resolution 62-24, dated September 14, 1962. Resolution 62-24 prescribed requirements for the "discharge of industrial wastes (rocket fuel residuum) to excavated pits." The discharge area was described as two shallow basins protected by two-foot berms, located in a small canyon on the western side of Laborde Canyon, in the SW quarter of the NW quarter of Section 19, Township 3 South, Range 1 West, San Bernardino Baseline and Meridian. Resolution 62-24 further described the wastes to be discharged as "residue remaining after the manufacturing refuse is burned," and indicated that the amount of material to be discharged was "approximately 5,000 gallons per year."

The exact nature of the waste proposed for discharge is not clear from Resolution 62-24. The description of the waste material suggests that the area may have been used for burning propellant; but the description of the quantity of material to be discharged suggests that the waste may have been liquid rather than solid. A 1961 aerial photograph shows the WDA as a large cleared area with roads leading to two circular structures, suggesting that the WDA was in use by 1961 (Tetra

Tech, 2009). Investigation of this area (Tetra Tech, 2007b and 2008) found evidence for perchlorate impacts in both soil and groundwater.

Features remaining at the WDA include two roughly circular depressions surrounded by earthen berms, at the location of the circular structures identified in the 1961 aerial photograph.

Section 2 Summary of Monitoring Activities

Section 2 summarizes the second quarter 2011 and third quarter 2011 groundwater monitoring activities conducted at the Site. The results of these monitoring events are discussed in Section 3.

2.1 Groundwater Level Measurements

Groundwater level measurements are collected at the Site on a quarterly basis from all available wells. Water level measurements were proposed for 69 wells and two piezometers for second quarter 2011, prior to third quarter 2011 water level measurements, two extraction wells and two piezometers were installed for the purpose of hydraulic testing, so during third quarter 2011, water level measurements were proposed for 71 wells and four piezometers. During second quarter 2011, groundwater level measurements were collected from 67 monitoring wells and two piezometers on 1 June 2010. During third quarter 2011, groundwater level measurements were collected from 69 monitoring wells and four piezometers between 15 August 2011 and 16 August 2011. Two monitoring wells, TT-MW2-29A and TT-MW2-43, were found to be dry during both quarters. Copies of the field data sheets from the water quality monitoring events are presented in Appendix B. A summary of well construction details is presented in Appendix C.

In order to correlate observed changes in groundwater levels with local precipitation, precipitation data is collected from the local weather station in Beaumont. During second quarter 2011, the Beaumont National Weather Service (NWS) station reported approximately 1.09 inches of precipitation. During third quarter 2011, the Beaumont NWS station reported approximately 0.27 inches of precipitation.

2.2 Surface Water Flow and Sampling

The Site is bisected by Laborde Canyon, a major north-south oriented canyon which represents the principal drainage for the Site. Ephemeral storm water drains to the south through Laborde Canyon toward the San Jacinto Valley. The 2,821-acre watershed for the Site is dry when there is no rainfall. Consequently, no permanent streams, creeks, or other major surface water bodies, other than a spring on the former Wolfskill property, occur at the Site.

Storm water sampling locations SW-01 through SW-07 are located in ephemeral stream beds within Laborde Canyon and major side canyons. Storm water runoff drains to the stream beds during periods of heavy precipitation and flows south through the Site and the former Wolfskill property, eventually crossing beneath Gilman Hot Springs Road. Water is present in the stream beds only during periods of heavy, prolonged precipitation. Surface water sampling locations WS-1, WS-2, and WS-3 are located at a spring approximately three quarters of a mile south of the southern site boundary on the former Wolfskill property. Surface water is generally present at one or more of these sampling locations throughout the year. Figure 2-1 shows the storm water and surface water sampling locations.

The areas within Laborde Canyon where surface water was observed were mapped during the second quarter 2011 and third quarter 2011 groundwater monitoring events. In addition, stream flow was estimated at two locations (SF-1, located at Gilman Hot Springs Road; and SF-2, located at the southern boundary of the property), if flowing water was present. The two stream flow measurement locations are shown on Figure 2-1.

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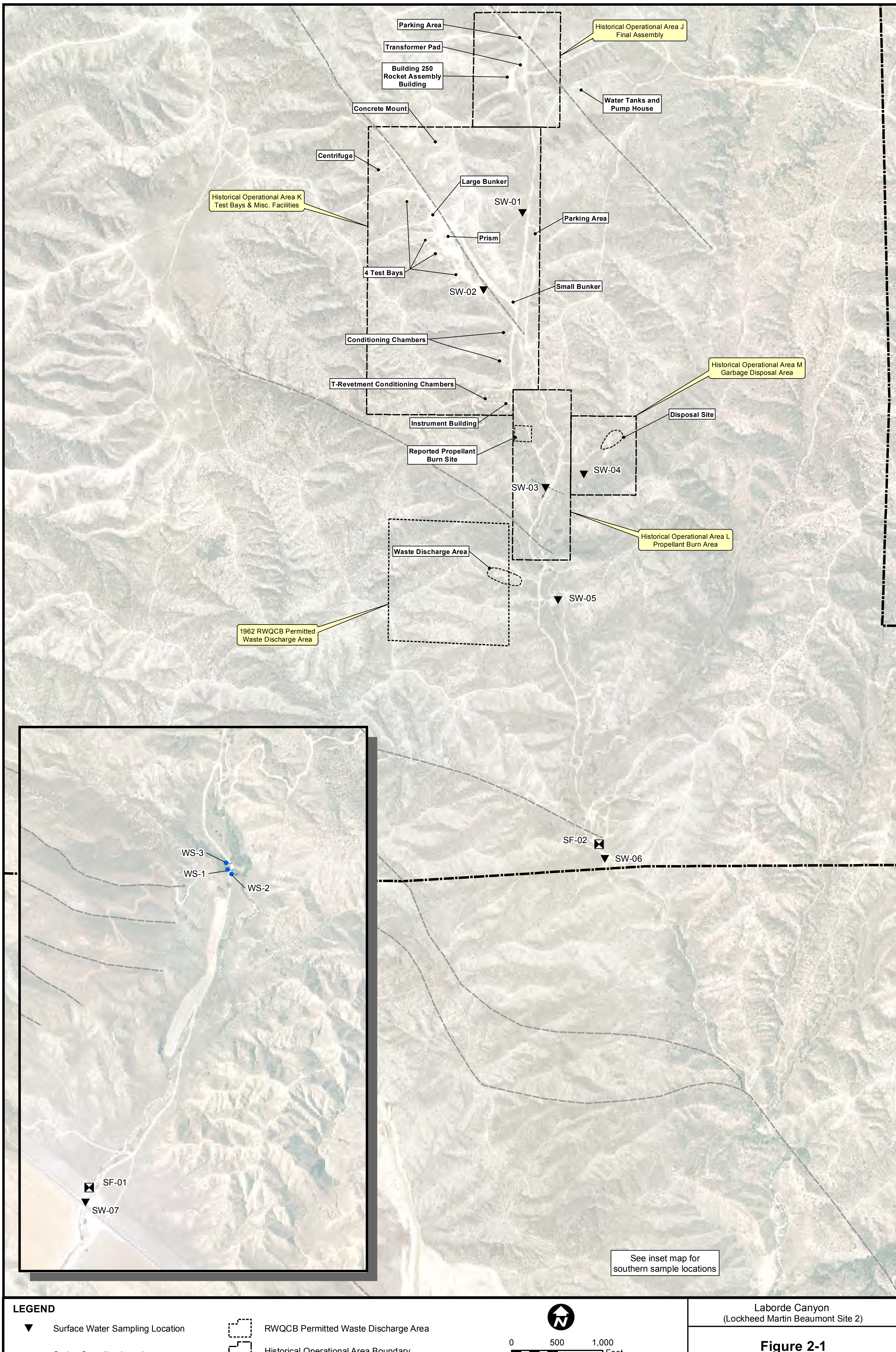


LEGEND

- Surface Water Sampling Location
- Spring Sampling Location
- Stream Flow Sampling Point
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

N

0 500 1,000 Feet

Adapted from: April 2007 aerial photograph

Note: Laborde Canyon property boundary (Lockheed Martin Beaumont Site 2) from Hillwig-Goodrow survey, May 2004

Faults from the, *Site 2 Lineament Study, Tetra Tech, 2009*

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 2-1

Surface and Storm Water Sampling Locations

2.3 Groundwater Sampling

The GMP has a quarterly, semiannual, and annual frequency as shown in Appendix A, Table 1-1. Both groundwater and surface water are sampled as part of the GMP. The annual event is the major monitoring event, and the quarterly and semiannual events are smaller, minor events. All new wells are sampled quarterly for one year, after which they are evaluated and reclassified. The semiannual event includes horizontal extent, vertical distribution, increasing contaminant, and guard wells, and occurs during the second and fourth quarter of each year. The annual monitoring event also includes background wells, and takes place during the second quarter of each year. The groundwater monitoring schedule is reviewed and modified as necessary annually following the second quarter groundwater monitoring event. Modifications to the sampling schedule are made in accordance with the approved Groundwater Sampling and Analysis Plan (SAP) (Tetra Tech, 2007a). The second and third quarter 2011 sampling events follow the schedule proposed in the Second and Third Quarter 2010 monitoring report (Tetra Tech, 2010c), which was submitted to the DTSC in December 2010 and approved with no comments to the proposed schedule.

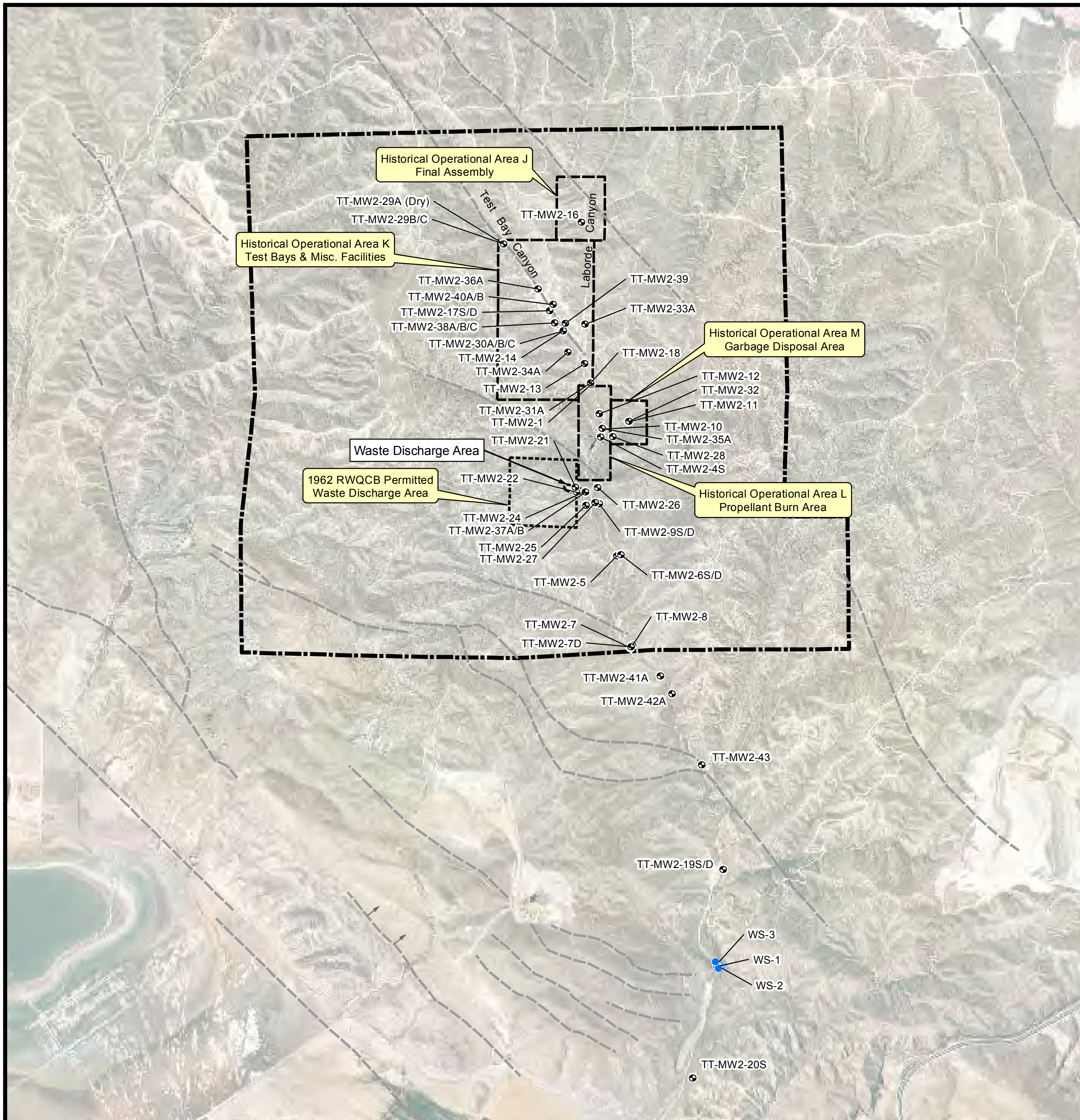
During the second quarter 2011 monitoring event, a total of 62 sampling locations (52 groundwater monitoring wells, seven offsite private production wells or springs, and three surface water sampling locations) were proposed for water quality monitoring. One offsite private spring, PPW-2-6, and two monitoring wells, TT-MW2-29A and TT-MW2-43, were dry and could not be sampled. Therefore, water quality data was collected from 50 monitoring wells, six private production wells or springs, and three surface water sampling locations during this event. Table 2-1 lists the locations monitored for the second quarter 2011 monitoring event, analytical methods, sampling dates, and quality assurance/quality control (QA/QC) samples collected. Figure 2-2 illustrates the sample locations sampled for the second quarter 2011 monitoring event. During the third quarter 2011 monitoring event, no groundwater monitoring wells, offsite private production wells or springs, or surface water samples were scheduled to be collected.

Table 2-1 Sampling Schedule and Analysis Method - Second Quarter 2011

Sample Location	Sample Date	VOCs (1)	1,4-Dioxane (2)	Perchlorate (3)	CAM 17 Metals - Total (4)	RDX (5)	Comments and QA /QC Samples
WS-1	6/22/2011	-	-	X	-	-	Spring Sample, MS/MSD
WS-2	6/22/2011	-	-	X	-	-	Spring Sample
WS-3	6/22/2011	-	-	X	-	-	Spring Sample
PPW-2-1	5/10/2011	-	-	X	-	-	Private Production Well
PPW-2-2	5/10/2011	-	-	X	-	-	Private Production Well
PPW-2-3	5/9/2011	-	-	X	-	-	Private Production Well
PPW-2-4	5/9/2011	-	-	X	-	-	Private Production Well
PPW-2-5	5/9/2011	-	-	X	-	-	Private Spring
PPW-2-6	NA	-	-	-	-	-	Private Spring - Dry no sample collected
PPW-2-7	5/9/2011	-	-	X	-	-	Private Spring
TT-MW2-1	6/27/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-4S	6/30/2011	-	-	X	X	-	Sample with Dedicated Pump, Duplicate TT-MW2-4S-Dup
TT-MW2-5	6/28/2011	X	X	X	-	-	Sample with Dedicated Pump
TT-MW2-6D	6/28/2011	-	-	X	X	-	Sample with Dedicated Pump
TT-MW2-6S	6/28/2011	X	X	X	-	-	Sample with Dedicated Pump
TT-MW2-7	6/28/2011	-	X	X	-	-	Sample with Dedicated Pump
TT-MW2-7D	6/28/2011	-	-	X	X	-	Sample with Dedicated Pump
TT-MW2-8	6/28/2011	-	X	X	-	-	Sample with Dedicated Pump
TT-MW2-9D	6/28/2011	-	X	X	-	-	Sample with Dedicated Pump
TT-MW2-9S	6/28/2011	X	X	X	-	-	Sample with Dedicated Pump
TT-MW2-10	6/24/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-11	6/24/2011	X	-	X	-	-	Sample with Dedicated Pump
TT-MW2-12	6/30/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-13	6/27/2011	-	-	X	-	X	Sample with Dedicated Pump, MS/MSD
TT-MW2-14	6/23/2011	X	-	X	-	-	Sample with Dedicated Pump
TT-MW2-16	6/24/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-17D	6/23/2011	X	-	X	-	-	Sample with Dedicated Pump, Duplicate TT-MW2-17D-Dup
TT-MW2-17S	6/24/2011	X	-	X	-	-	Sample with Dedicated Pump
TT-MW2-18	6/24/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW-19S	6/22/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW-19D	6/22/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW-20S	6/22/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-21	6/27/2011	X	X	X	X	-	Sample with Dedicated Pump
TT-MW2-22	6/27/2011	X	X	X	X	-	Sample with Dedicated Pump, Duplicate TT-MW2-22-Dup
TT-MW2-24	6/27/2011	X	X	X	-	X	Sample with Dedicated Pump, Duplicate TT-MW2-24-Dup
TT-MW2-25	6/28/2011	X	X	X	-	-	Sample with Dedicated Pump
TT-MW2-26	6/27/2011	X	X	X	X	-	Sample with Dedicated Pump, MS/MSD
TT-MW2-27	6/28/2011	X	X	X	X	-	Sample with Dedicated Pump
TT-MW2-28	6/24/2011	X	-	X	X	-	Sample with Dedicated Pump, Duplicate TT-MW2-28-Dup
TT-MW2-29A	NA	-	-	-	-	-	Dry well no sample collected
TT-MW2-29B	6/22/2011	-	-	X	X	-	Sample with Dedicated Pump
TT-MW2-29C	6/22/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-30A	6/23/2011	X	-	X	X	-	Sample with Dedicated Pump
TT-MW2-30B	6/23/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-30C	6/23/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-31A	6/24/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-32	6/24/2011	X	-	X	X	-	Sample with Dedicated Pump, Duplicate TT-MW2-32-Dup
TT-MW2-33A	6/24/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-34A	6/30/2011	-	-	X	-	-	Sample with Dedicated Pump, Duplicate TT-MW2-34A-Dup
TT-MW2-35A	6/24/2011	-	-	X	X	-	Sample with Dedicated Pump
TT-MW2-36A	6/22/2011	-	-	X	X	-	Sample with Dedicated Pump
TT-MW2-37A	6/29/2011	X	X	X	X	-	Sample with Dedicated Pump
TT-MW2-37B	6/29/2011	X	X	X	X	-	Sample with Dedicated Pump
TT-MW2-38A	6/23/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-38B	6/23/2011	-	-	X	X	-	Sample with Dedicated Pump
TT-MW2-38C	6/23/2011	-	-	X	X	-	Sample with Dedicated Pump
TT-MW2-39	6/30/2011	-	-	X	X	-	Sample with Dedicated Pump
TT-MW2-40A	6/22/2011	X	-	X	-	-	Sample with Dedicated Pump
TT-MW2-40B	6/22/2011	X	-	X	-	-	Sample with Dedicated Pump
TT-MW2-41A	6/29/2011	-	-	X	-	-	Sample with Dedicated Pump
TT-MW2-42A	6/29/2011	-	-	X		-	Sample with Portable Bladder Pump
TT-MW2-43	NA	-	-	-	-	-	Dry well no sample collected
Total Sample Locations:		62					
Total Samples Collected:		59					

Notes:

(shaded)	Well not sampled or surface water sample not collected.
VOCs -	Volatile Organic Compounds
RDX -	Hexahydro-1,3,5-trinitro-1,3,5-triazine
(1) -	VOCs analyzed by EPA Method 8260B
(2) -	1,4 - Dioxane analyzed by EPA Method SW8270C SIM
(3) -	Perchlorate analyzed by EPA Method E332.0
(4) -	CAM (California Assessment Manual) 17 Metals analyzed by EPA Method 6010
(5) -	RDX analyzed by EPA Method SW8330
NA -	Not available
"-"	Not analyzed
MS / MSD -	Matrix Spike / Matrix Spike Duplicate



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N

0 1,500 3,000 Feet

Adapted from:

April 2007 aerial photograph.

Faults from the, *Site 2 Lineament Study, Tetra Tech, 2009.*

LEGEND

- Groundwater Monitoring Well
- Spring
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- 1962 RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

Note: Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 2-2

Second Quarter 2011 Sample Locations

The following water quality parameters were measured and recorded on field data sheets (Appendix B) during well purging activities: water level, temperature, pH, electrical conductivity (EC), turbidity, dissolved oxygen (DO) and oxidation/reduction potential (ORP). Measurement of water quality parameters was initiated after at least one discharge hose/pump volume had been removed; purging was considered complete when the above parameters had stabilized or the well was purged dry (evacuated). Stabilization of water quality parameters was used as an indication that representative formation water had entered the well and was being purged. The criteria for stabilization of these parameters are as follows: water level ± 0.1 foot, pH ± 0.1, and EC ± 3%, turbidity < 10 nephelometric turbidity units (NTUs) (or ± 10% if turbidity stabilizes at > 10 NTUs), DO ± 0.3 mg/L and ORP ± 10 mV. Sampling instruments and equipment were maintained, calibrated, and operated in accordance with the manufacturers' specifications, guidelines, and recommendations. Groundwater monitoring wells were purged and sampled using low-flow purging and sampling techniques with dedicated double-valve sampling pumps or a portable bladder pump.

Every effort was made to collect the groundwater samples in order of increasing perchlorate and trichloroethene (TCE) concentration. Samples were placed in appropriate United States Environmental Protection Agency (EPA) method-specified containers. A sample identification label was affixed to each sample container, and sample custody was documented on a chain-of-custody record. Groundwater samples collected during the monitoring events were chilled and transported to E. S. Babcock & Sons, Inc. (Babcock), a state-accredited analytical laboratory, via courier, thus maintaining proper temperatures and sample integrity. Trip blanks were collected on each day of the monitoring events to assess potential cross-contamination of water samples while in transit. Equipment blanks were collected when sampling with non-dedicated equipment to assess cross-contamination potential of water samples via sampling equipment.

2.4 Analytical Data QA/QC

The samples were tested using approved EPA methods. Since the analytical data was obtained by following EPA-approved method criteria, the data was evaluated by using the EPA-approved validation methods described in the National Functional Guidelines (EPA, 2008 and EPA, 2010). The National Functional Guidelines contain instructions on method-required quality control parameters and on how to interpret these parameters to confer validation to environmental data results.

Quality control parameters used in validating data results included: holding times, field blanks, laboratory control samples, method blanks, duplicate environmental samples, spiked samples, and surrogate and spike recovery data.

2.5 Habitat Conservation

All monitoring activities were performed in accordance with the United States Fish and Wildlife Service (USFWS) approved Habitat Conservation Plan (HCP) (USFWS, 2005) and subsequent clarifications (LMC, 2006a and 2006b) of the HCP. Groundwater sampling activities were conducted with light duty vehicles and were supervised by a USFWS-approved biologist as specified in the Low Effect HCP.

Section 3 Groundwater Monitoring Results

The results of second quarter 2011 and third quarter 2011 groundwater monitoring events are presented in the following subsections. These subsections include tabulated summaries of the groundwater elevation and water quality data, groundwater elevation maps, and figures showing analytical results.

3.1 Groundwater Elevation and Flow

Groundwater elevations during the second quarter 2011 and third quarter 2011 monitoring events ranged from approximately 2,076 feet above mean sea level (msl) at TT-MW2-16, located in the northern portion of the Site, to about 1,820 feet above msl at TT-MW2-8, located in the southern portion of the Site. Sixty-nine monitoring wells and two piezometers were identified for groundwater level measurements during the second quarter 2011 monitoring event and 71 monitoring wells and four piezometers were identified for groundwater level measurements during the third quarter 2011 monitoring event. For the second quarter 2011 and third quarter 2011 monitoring events, two wells were dry (MW-29A and MW-43).

Depth to first groundwater ranged from about 121 feet below ground surface (bgs) at TT-MW2-29B to about 16 feet bgs at TT-MW2-8. A tabulated summary of groundwater depths and elevations is presented in Table 3-1. Groundwater elevation contour maps for wells screened in first groundwater for the second quarter 2011 and third quarter 2011 are presented in Figures 3-1 and 3-2 respectively. Hydrographs for individual wells are provided in Appendix D.

Table 3-1 Groundwater Elevation Data - Second Quarter 2011 and Third Quarter 2011

Well ID	Measuring Point Elevation (feet msl)	Second Quarter 2011				Third Quarter 2011			
		Date Measured	Depth to Water (from Measuring Point, feet)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from First Quarter 2011 (feet)	Date Measured	Depth to Water (from Measuring Point, feet)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from Second Quarter 2011 (feet)
TT-EW2-1	1840.24	06/01/11	20.18	1820.06	-0.18	8/15/2011	20.79	1819.45	0.61
TT-EW2-2	NA	NA	NA	NA	NA	8/15/2011	56.46	NA	NA
TT-EW2-3	NA	NA	NA	NA	NA	8/15/2011	53.06	NA	NA
TT-MW2-1	2035.21	06/01/11	58.71	1976.50	-0.19	8/15/2011	58.39	1976.82	-0.32
TT-MW2-2	2137.75	06/01/11	70.81	2066.94	0.13	8/15/2011	70.75	2067.00	-0.06
TT-MW2-3	2094.66	06/01/11	70.26	2024.40	-0.22	8/15/2011	70.12	2024.54	-0.14
TT-MW2-4S	1986.94	06/01/11	50.19	1936.75	-0.11	8/15/2011	50.35	1936.59	0.16
TT-MW2-4D	1987.17	06/01/11	58.13	1929.04	0.06	8/15/2011	58.30	1928.87	0.17
TT-MW2-5	1911.31	06/01/11	39.11	1872.20	-0.22	8/15/2011	39.34	1871.97	0.23
TT-MW2-6S	1908.00	06/01/11	35.19	1872.81	0.03	8/15/2011	35.63	1872.37	0.44
TT-MW2-6D	1908.07	06/01/11	36.33	1871.74	-0.06	8/15/2011	36.66	1871.41	0.33
TT-MW2-7	1839.25	06/01/11	18.72	1820.53	-0.58	8/15/2011	19.30	1819.95	0.58
TT-MW2-7D	1838.96	06/01/11	17.53	1821.43	0.02	8/15/2011	17.94	1821.02	0.41
TT-MW2-8	1836.32	06/01/11	15.45	1820.87	-1.17	8/15/2011	17.01	1819.31	1.56
TT-MW2-9S	1938.38	06/01/11	39.00	1899.38	-0.45	8/15/2011	38.99	1899.39	-0.01
TT-MW2-9D	1938.78	06/01/11	42.74	1896.04	-0.08	8/15/2011	42.87	1895.91	0.13
TT-MW2-10	2001.57	06/01/11	57.78	1943.79	0.00	8/15/2011	57.87	1943.70	0.09
TT-MW2-11	2004.51	06/01/11	49.55	1954.96	-0.29	8/15/2011	49.78	1954.73	0.23
TT-MW2-12	2016.26	06/01/11	51.26	1965.00	-0.02	8/15/2011	51.26	1965.00	0.00
TT-MW2-13	2049.39	06/01/11	65.46	1983.93	-0.55	8/15/2011	64.55	1984.84	-0.91
TT-MW2-14	2074.78	06/01/11	61.90	2012.88	-0.74	8/15/2011	62.50	2012.28	0.60
TT-MW2-16	2137.20	06/01/11	61.34	2075.86	-0.60	8/15/2011	61.16	2076.04	-0.18
TT-MW2-17S	2095.55	06/01/11	71.36	2024.19	-0.11	8/15/2011	71.13	2024.42	-0.23
TT-MW2-17D	2095.33	06/01/11	71.03	2024.30	-0.22	8/15/2011	70.94	2024.39	-0.09
TT-MW2-18	2035.32	06/01/11	58.59	1976.73	-0.18	8/15/2011	58.29	1977.03	-0.30
TT-MW2-19S	1698.18	06/01/11	45.52	1652.66	-0.19	8/16/2011	45.37	1652.81	-0.15
TT-MW2-19D	1698.15	06/01/11	24.17	1673.98	0.01	8/15/2011	24.37	1673.78	0.20
TT-MW2-20S	1587.10	06/01/11	32.73	1554.37	-0.55	8/16/2011	32.40	1554.70	-0.33
TT-MW2-20D	1587.62	06/01/11	31.96	1555.66	-0.55	8/15/2011	31.64	1555.98	-0.32
TT-MW2-21	1978.45	06/01/11	66.65	1911.80	0.10	8/15/2011	66.58	1911.87	-0.07
TT-MW2-22	1975.86	06/01/11	65.39	1910.47	0.06	8/15/2011	65.37	1910.49	-0.02
TT-MW2-23	1995.17	06/01/11	83.31	1911.86	0.10	8/15/2011	83.25	1911.92	-0.06
TT-MW2-24	1964.26	06/01/11	54.01	1910.25	0.06	8/15/2011	54.09	1910.17	0.08
TT-MW2-25	1966.96	06/01/11	64.20	1902.76	0.01	8/15/2011	64.11	1902.85	-0.09
TT-MW2-26	1944.43	06/01/11	37.21	1907.22	-0.54	8/15/2011	37.58	1906.85	0.37
TT-MW2-27	1948.27	06/01/11	49.71	1898.56	-0.64	8/15/2011	49.64	1898.63	-0.07
TT-MW2-28	1995.65	06/01/11	61.59	1934.06	-0.41	8/15/2011	61.89	1933.76	0.30

Notes:
NA - Not available
msl - Mean sea level
#.## - Denotes an increase in groundwater elevation
- #.## - Denotes a decrease in groundwater elevation

Table 3-1 Groundwater Elevation Data - Second Quarter 2011 and Third Quarter 2011 (Continued)

Well ID	Measuring Point Elevation (feet msl)	Second Quarter 2011				Third Quarter 2011			
		Date Measured	Depth to Water (from Measuring Point, feet)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from First Quarter 2011 (feet)	Date Measured	Depth to Water (from Measuring Point, feet)	Groundwater Elevation (feet msl)	Groundwater Elevation Change from Second Quarter 2011 (feet)
TT-MW2-29A	2147.77	06/01/11	Dry	Dry	NA	8/15/2011	Dry	Dry	NA
TT-MW2-29B	2147.90	06/01/11	121.37	2026.53	-0.09	8/15/2011	121.32	2026.58	-0.05
TT-MW2-29C	2147.83	06/01/11	127.68	2020.15	0.08	8/15/2011	127.66	2020.17	-0.02
TT-MW2-30A	2074.37	06/01/11	70.57	2003.80	-0.69	8/15/2011	70.70	2003.67	0.13
TT-MW2-30B	2074.41	06/01/11	73.61	2000.80	-0.57	8/15/2011	73.51	2000.90	-0.10
TT-MW2-30C	2074.35	06/01/11	76.52	1997.83	-0.45	8/15/2011	76.29	1998.06	-0.23
TT-MW2-31A	2036.11	06/01/11	59.68	1976.43	-0.10	8/15/2011	59.42	1976.69	-0.26
TT-MW2-31B	2036.15	06/01/11	66.77	1969.38	0.39	8/15/2011	67.04	1969.11	0.27
TT-MW2-32	2004.87	06/01/11	53.34	1951.53	-0.16	8/15/2011	53.33	1951.54	-0.01
TT-MW2-33A	2070.54	06/01/11	61.14	2009.40	-0.06	8/15/2011	61.13	2009.41	-0.01
TT-MW2-33B	2070.54	06/01/11	65.44	2005.10	-0.19	8/15/2011	65.43	2005.11	-0.01
TT-MW2-33C	2070.54	06/01/11	63.68	2006.86	-0.11	8/15/2011	63.73	2006.81	0.05
TT-MW2-34A	2066.84	06/01/11	66.51	2000.33	0.00	8/15/2011	66.35	2000.49	-0.16
TT-MW2-34B	2066.85	06/01/11	72.83	1994.02	-0.31	8/15/2011	72.57	1994.28	-0.26
TT-MW2-34C	2066.84	06/01/11	74.85	1991.99	-0.07	8/15/2011	74.66	1992.18	-0.19
TT-MW2-35A	2003.20	06/01/11	49.51	1953.69	0.40	8/15/2011	49.82	1953.38	0.31
TT-MW2-35B	2003.20	06/01/11	54.49	1948.71	0.36	8/15/2011	54.61	1948.59	0.12
TT-MW2-36A	2100.99	06/01/11	79.13	2021.86	0.04	8/15/2011	79.05	2021.94	-0.08
TT-MW2-36B	2101.04	06/01/11	79.79	2021.25	0.01	8/15/2011	79.73	2021.31	-0.06
TT-MW2-36C	2100.88	06/01/11	79.76	2021.12	0.03	8/15/2011	79.71	2021.17	-0.05
TT-MW2-37A	1963.62	06/01/11	63.11	1900.51	0.08	8/15/2011	63.19	1900.43	0.08
TT-MW2-37B	1963.67	06/01/11	71.13	1892.54	0.14	8/15/2011	71.22	1892.45	0.09
TT-MW2-38A	2084.56	06/01/11	58.03	2026.53	-0.05	8/15/2011	58.25	2026.31	0.22
TT-MW2-38B	2084.42	06/01/11	79.44	2004.98	-0.53	8/15/2011	79.49	2004.93	0.05
TT-MW2-38C	2084.63	06/01/11	85.06	1999.57	-1.12	8/15/2011	86.94	1997.69	1.88
TT-MW2-39	2079.53	06/01/11	59.56	2019.97	-0.17	8/15/2011	58.87	2020.66	-0.69
TT-MW2-40A	2096.28	06/01/11	72.10	2024.18	-0.21	8/15/2011	71.99	2024.29	-0.11
TT-MW2-40B	2096.24	06/01/11	82.69	2013.55	-0.22	8/15/2011	82.73	2013.51	0.04
TT-MW2-40C	2096.28	06/01/11	87.98	2008.30	-0.13	8/15/2011	87.93	2008.35	-0.05
Tt-MW2-41A	1812.47	06/01/11	19.91	1792.56	-0.14	8/16/2011	22.10	1790.37	2.19
Tt-MW2-41B	1812.22	06/01/11	16.70	1795.52	-0.35	8/16/2011	19.00	1793.22	2.30
Tt-MW2-42A	1799.06	06/01/11	24.56	1774.50	-0.39	8/16/2011	26.08	1772.98	1.52
Tt-MW2-42B	1799.07	06/01/11	22.79	1776.28	-0.55	8/16/2011	23.81	1775.26	1.02
Tt-MW2-43	1771.44	06/01/11	Dry	Dry	NA	8/16/2011	Dry	Dry	NA
TT-PZ2-1	1847.06	06/01/11	17.87	1829.19	-0.65	8/15/2011	18.45	1828.61	0.58
TT-PZ2-2	1840.76	06/01/11	20.13	1820.63	-0.22	8/15/2011	20.75	1820.01	0.62
TT-PZ2-3	NA	NA	NA	NA	NA	8/15/2011	56.34	NA	NA
TT-PZ2-4	NA	NA	NA	NA	NA	8/15/2011	52.12	NA	NA

Notes:
NA - Not applicable
msl - Mean sea level
#.## - Denotes an increase in groundwater elevation
- #.## - Denotes a decrease in groundwater elevation

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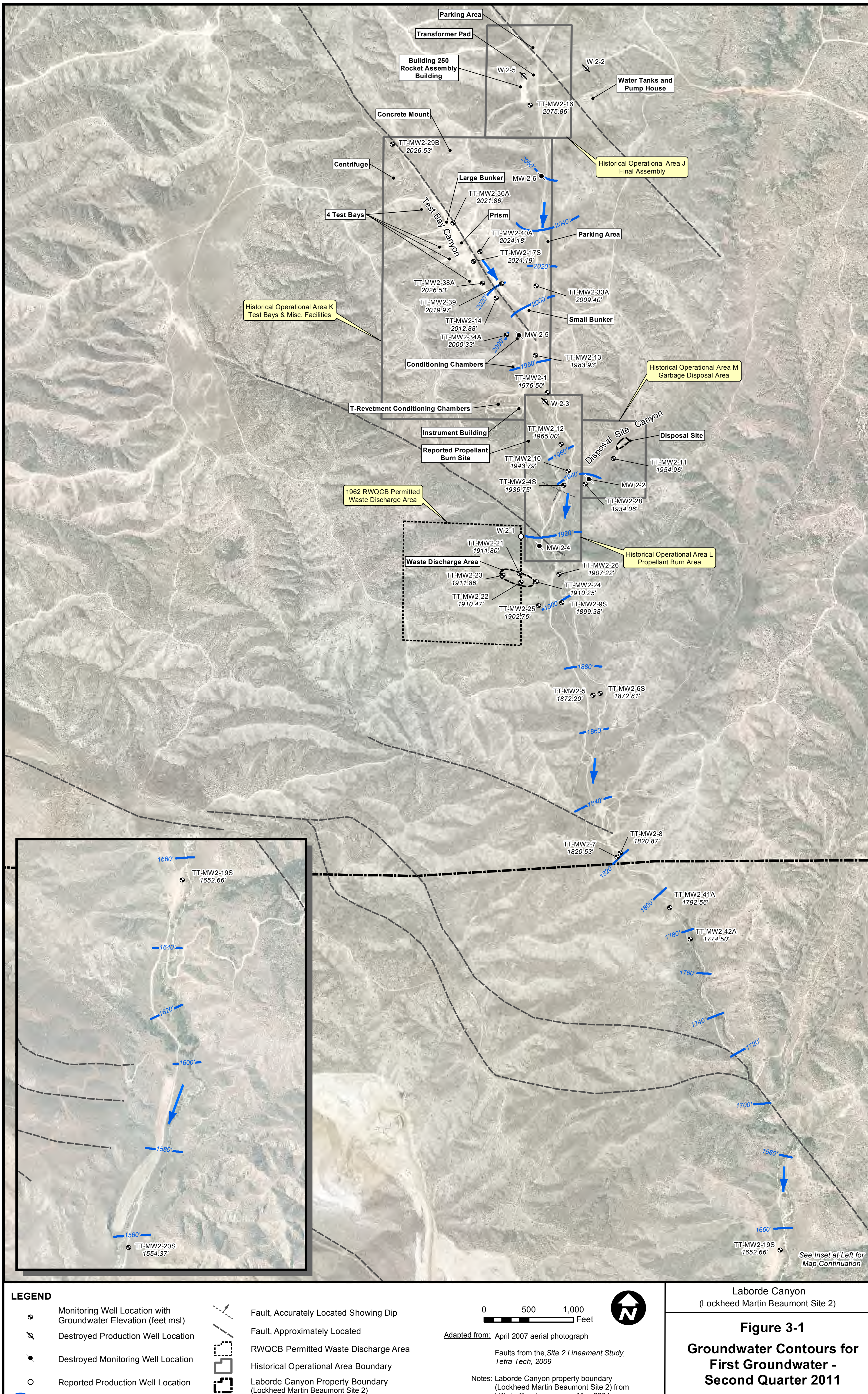

LEGEND

- Monitoring Well Location with Groundwater Elevation (feet msl)
- Destroyed Production Well Location
- Destroyed Monitoring Well Location
- Reported Production Well Location
- Groundwater Elevation Contour
- Groundwater Flow Direction
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

0 500 1,000 Feet

Adapted from: April 2007 aerial photograph

Faults from the *Site 2 Lineament Study, Tetra Tech, 2009*

Notes: Laborde Canyon property boundary (Lockheed Martin Beaumont Site 2) from Hillwig-Goodrow survey, May 2004

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-1

Groundwater Contours for First Groundwater - Second Quarter 2011

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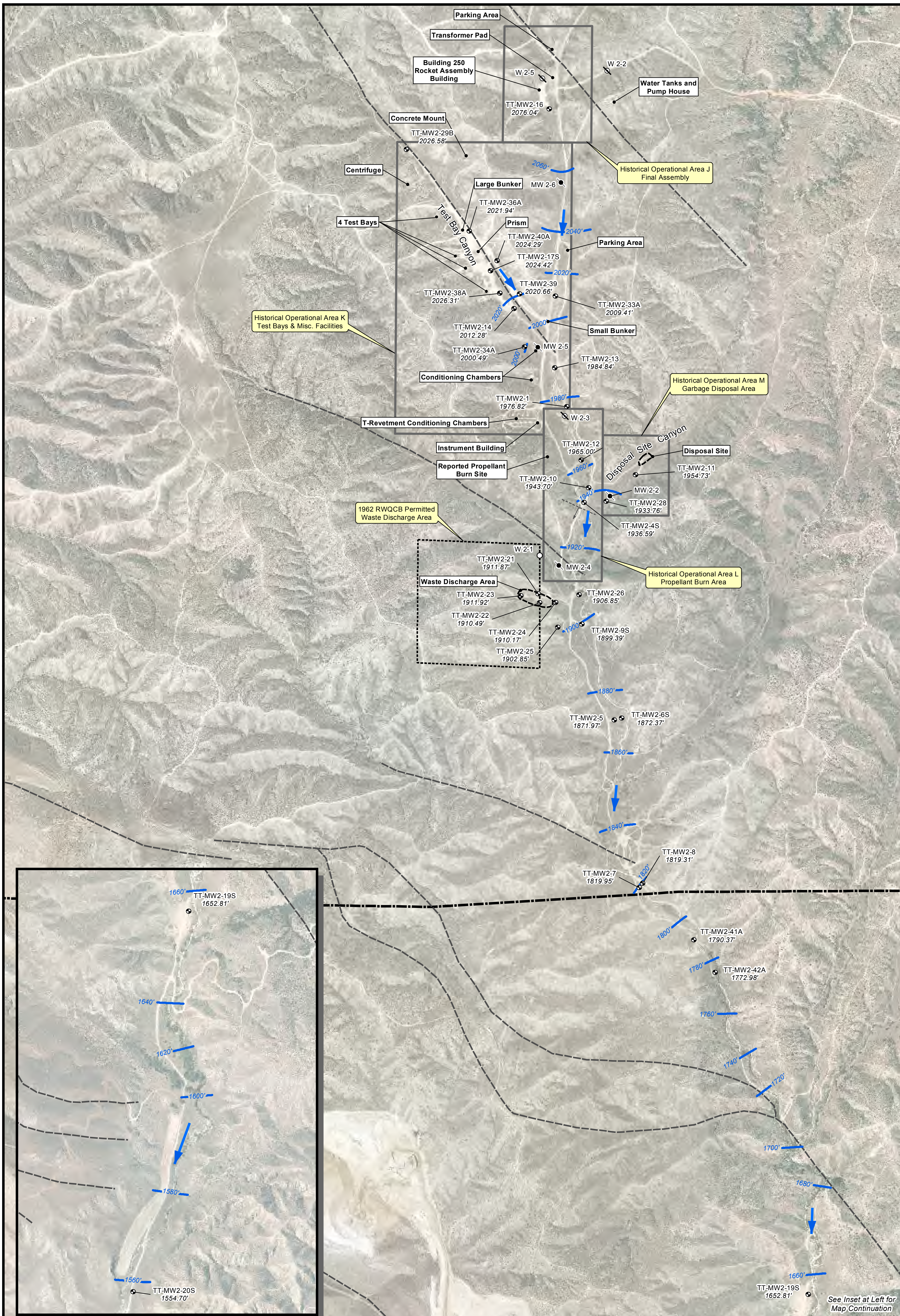

LEGEND

- Monitoring Well Location with Groundwater Elevation (feet msl)
- Destroyed Production Well Location
- Destroyed Monitoring Well Location
- Reported Production Well Location
- Groundwater Elevation Contour
- Groundwater Flow Direction
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

0 500 1,000 Feet

Adapted from: April 2007 aerial photograph

Faults from the *Site 2 Lineament Study, Tetra Tech, 2009*

Notes: Laborde Canyon property boundary (Lockheed Martin Beaumont Site 2) from Hillwig-Goodrow survey, May 2004

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-2

Groundwater Contours for First Groundwater - Third Quarter 2011

During second quarter 2011, the Beaumont NWS reported approximately 1.09 inches of precipitation, and the average site-wide groundwater elevation decreased approximately 0.21 foot. During third quarter 2011, the Beaumont NWS reported approximately 0.27 inches of precipitation and the average site-wide groundwater elevation increased approximately 0.18 feet. Table 3-2 presents the range and average change in groundwater elevation by area. Figures 3-3 and 3-4 present elevation differences between the first quarter 2011 and second quarter 2011, and between the second quarter 2011 and third quarter 2011 groundwater monitoring events, respectively.

Table 3-2 Groundwater Elevation Change - Second Quarter 2011 and Third Quarter 2011

Site Area	Range of Groundwater Elevation Change - Second Quarter 2011 (feet)		Average Change By Area (feet)	Range of Groundwater Elevation Change - Third Quarter 2011 (feet)		Average Change By Area (feet)
J	-0.60	0.13	-0.23	-0.18	-0.06	-0.12
K	-1.12	0.39	-0.22	-0.91	1.88	-0.04
L	-0.11	0.40	0.12	0.00	0.31	0.14
M	-0.41	-0.16	-0.29	-0.01	0.30	0.17
WDA	0.06	0.14	0.09	-0.07	0.09	0.02
LC	-1.17	0.03	-0.34	-0.09	2.30	0.71
WS	-0.55	0.01	-0.32	-0.33	0.20	-0.15

Notes:

J - Final Assembly Area
K - Former Test Bay Area
L - Former Burn Area
M - Garbage Disposal Area
WDA - Former Waste Discharge Area
LC - Lower Canyon
WS - Former Wolfskill property

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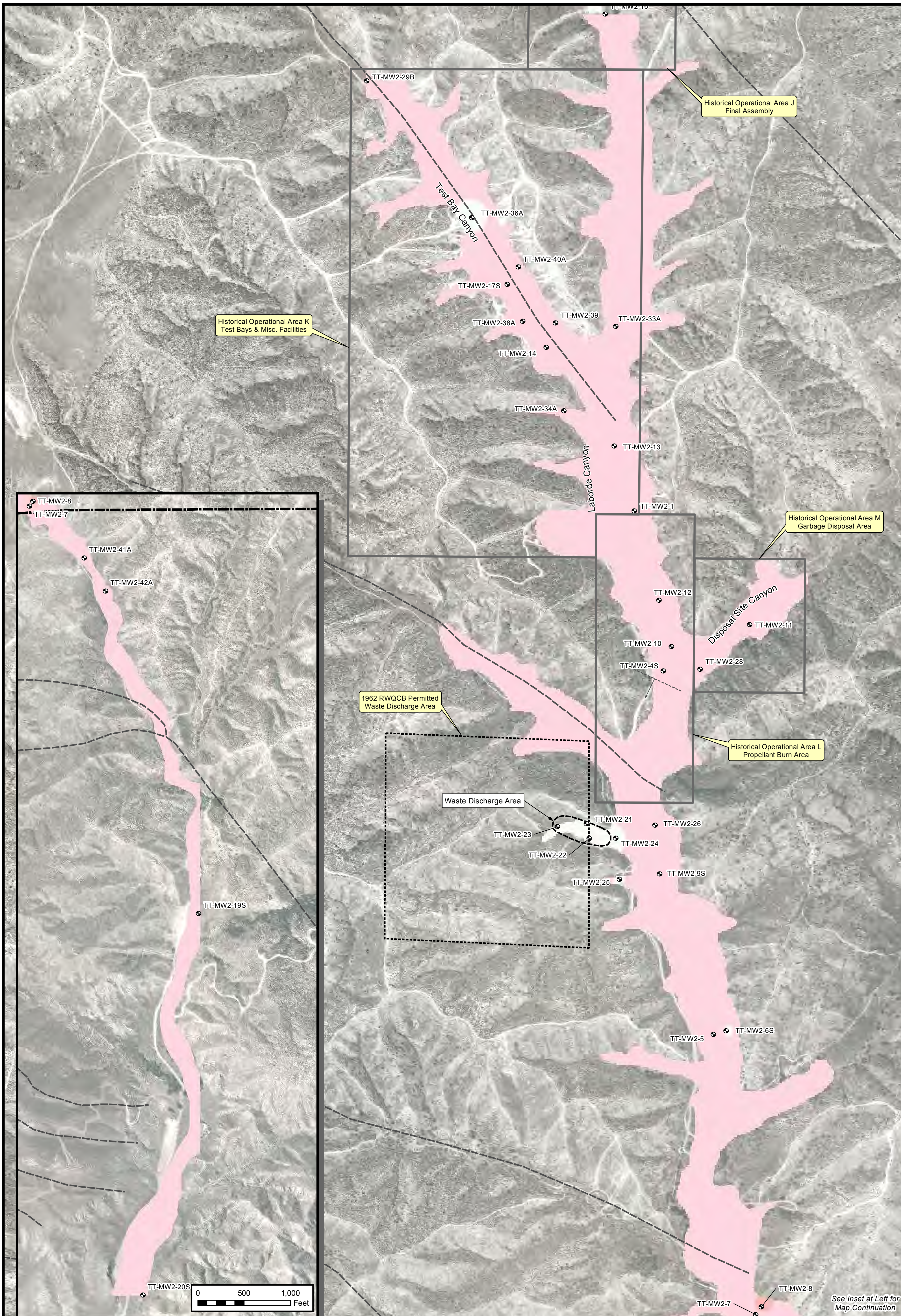


LEGEND

- Monitoring Well Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Waste Discharge Area
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

Groundwater Elevation Change in Feet
(from previous quarter)

- 0.01 — 1
- -0.99 — 0
- -1.99 — -1

0 300 600
Feet

Adapted from: April 2007 aerial photograph

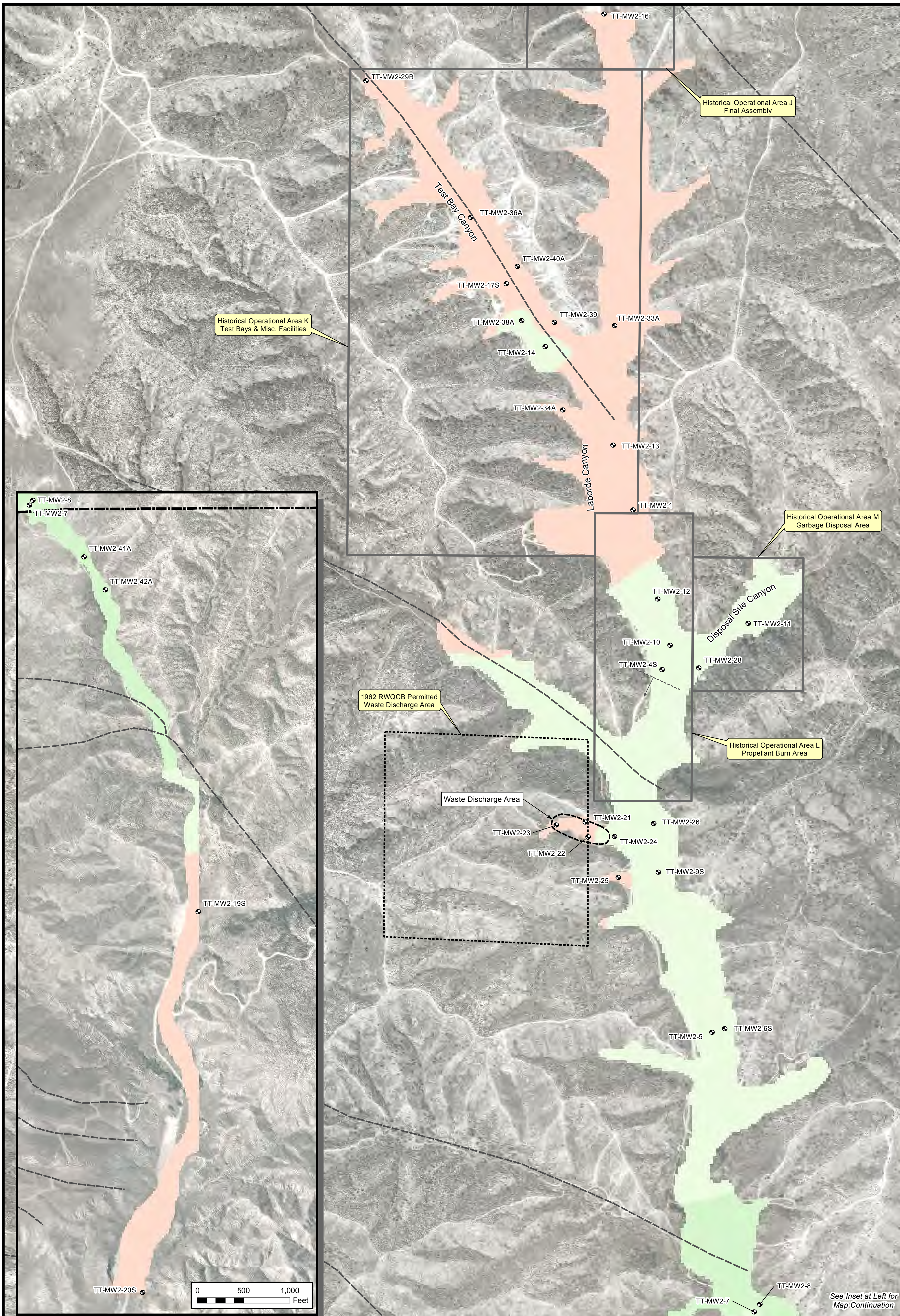
Faults from the, *Site 2 Lineament Study, Tetra Tech, 2009*

Notes: Laborde Canyon property boundary (Lockheed Martin Beaumont Site 2) from Hillwig-Goodrow survey, May 2004

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-3

Changes in Groundwater Elevation - Second Quarter 2011



LEGEND

- Monitoring Well Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Waste Discharge Area
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

Groundwater Elevation Change in Feet
(from previous quarter)

- 2.01 — 4
- 1.01 — 2
- 0 - 1
- -0.99 — 0

0 300 600 Feet

Adapted from: April 2007 aerial photograph

Faults from the, *Site 2 Lineament Study, Tetra Tech, 2009*

Notes: Laborde Canyon property boundary (Lockheed Martin Beaumont Site 2) from Hillwig-Goodrow survey, May 2004

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-4

Changes in Groundwater Elevation - Third Quarter 2011

3.2 Groundwater Gradients

Horizontal groundwater gradients are calculated using a segmented path from well to well that approximates the overall site flowline. The horizontal gradient is a measure of the change in the hydraulic head divided by the distance between wells (i.e., the slope of the water table). The average horizontal groundwater gradient calculated between TT-MW2-16 and TT-MW2-6S from the second quarter 2011 and third quarter 2011 groundwater monitoring events for the shallow wells screened in the weathered San Timoteo formation (wSTF) was 0.030 feet per foot (ft/ft). The horizontal groundwater gradient calculated between TT-MW2-2 and TT-MW2-6D for deeper wells screened in the San Timoteo formation (STF) was 0.029 ft/ft during the second quarter 2011 and third quarter 2011 groundwater monitoring events.

Vertical groundwater gradients are calculated from individual clusters of wells. Well clusters are used to measure the differences in static water level at different depths within the aquifer. The vertical gradient is a comparison of static water level between wells at different depths within the aquifer and is an indication of the vertical head difference (downward - negative gradient, upward - positive gradient) of groundwater. Vertical groundwater gradients at the Site are generally downward. The vertical gradients range from -0.31 ft/ft at well cluster TT-MW2-4S and 4D located in Area L, to +0.19 ft/ft at well cluster TT-MW2-19S and 19D located on the former Wolfskill property. A summary of calculated horizontal and vertical groundwater gradients is presented in Table 3-3. A complete listing of historical horizontal and vertical groundwater gradients and associated calculations is presented in Appendix E.

Table 3-3 Summary of Horizontal and Vertical Groundwater Gradients

Horizontal Groundwater Gradients **(feet / foot), approximating a flowline perpendicular to groundwater contours**

- - -	**Overall** STF **TT-MW2-2** to **TT-MW2-6D**	**Overall** QAL/WSTF **TT-MW2-16** to **TT-MW2-6S**
Previous Quarter (March 2011)	0.029	0.030
Second Quarter (June 2011)	0.029	0.030
Third Quarter (August 2011)	0.029	0.030

Vertical Groundwater Gradients **(feet / foot)**

- -	**Area J**	**Area K**	**Area K**	**Area L**	**Southern portion of Site 2**	**Southern portion of Site 2**	**Southern portion of Site 2**	**Former Wolfskill Property**	**Former Wolfskill Property**
deep screen	**TT-MW2-2** (STF)	**TT-MW2-17D** (QAL/WSTF)	**TT-MW2-18** (STF)	**TT-MW2-4D** (STF)	**TT-MW2-9D** (STF)	**TT-MW2-6D** (STF)	**TT-MW2-7D** (STF)	**TT-MW2-19D** (MEF)	**TT-MW2-20D** (MEF)
shallow screen	**TT-MW2-16** (QAL/WSTF)	**TT-MW2-17S** (QAL/WSTF)	**TT-MW2-1** (QAL / WSTF)	**TT-MW2-4S** (STF)	**TT-MW2-9S** (QAL/WSTF)	**TT-MW2-6S** (QAL/WSTF)	**TT-MW2-7** (QAL/WSTF)	**TT-MW2-19S** (QAL/MEF)	**TT-MW2-20S** (QAL)
Previous Quarter (March 2011)	-0.17	0.00	0.01	-0.30	-0.11	-0.06	0.04	0.19	0.01
Second Quarter (June 2011)	-0.19	0.00	0.01	-0.31	-0.13	-0.06	0.02	0.19	0.01
Third Quarter (August 2011)	-0.19	0.00	0.01	-0.31	-0.13	-0.05	0.03	0.19	0.01

Notes:

STF - San Timoteo formation
MEF - Mt. Eden formation
QAL - Quaternary alluvium
QAL/WSTF - Quaternary alluvium and weathered San Timoteo formation
QAL/MEF - Quaternary alluvium and Mt. Eden formation

3.3 Surface Water Flow

During the second quarter 2011 and third quarter 2011, the Laborde Canyon drainage channel was walked to determine the presence, nature, and quantity of surface water within the creek bed. Surface water was not present during the second quarter 2011 and third quarter 2011 monitoring events, so stream flow measurements were not taken.

If surface water had been present the locations where surface water was encountered would have been plotted and a determination made whether the water was flowing or stagnant. Where flowing water was encountered, the flow rate was determined using a modified version of the method presented in the USEPA Volunteer Stream Monitoring: A Methods Manual (USEPA, 1997). Stream flow would also have been estimated at two fixed locations (SF-1, located near Gilman Hot Springs at the southeast border of the Site; and SF-2, located in the vicinity of TT-MW2-8), if flowing water were present.

At each location a section of the stream bed that is relatively straight for a distance of at least 20 feet would have been chosen for measurement. This 20-foot section would have been marked and width measurements taken at various points to determine the average width. Depth measurements would have been collected at five points along the width of the stream to determine the average depth of the stream. The average width and average depth measurements would then be multiplied together to estimate the channel cross-sectional area. Velocity would have been measured by releasing a float upstream and recording the time it took to traverse the 20-foot marked section.

At each section three time measurements would have been taken and averaged. The length of the measured section would be divided by the average time to obtain a velocity. This result would then be multiplied by a correction factor of 0.9 to account for friction between the water and stream bed. The average cross-sectional area would then have been multiplied by the corrected average surface velocity to obtain the average flow in cubic feet of water per second (cfs) through that section of the stream.

3.4 Analytical Data Summary

Groundwater and surface water samples collected during the second quarter 2011 monitoring event were analyzed for perchlorate. Select wells were also sampled for VOCs, 1,4-dioxane, hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), and CAM 17 Metals. Groundwater and surface water samples were not scheduled to be collected during the third quarter 2011 monitoring event.

A summary of validated laboratory analytical results for analytes detected above their respective MDLs during the second quarter 2011 monitoring event is presented in Tables 3-4 and 3-5. Analytes with sample results above the published MCL or DWNL are indicated by bold type in Tables 3-4 and 3-5. Table 3-6 presents summary statistics for validated organic and inorganic analytes detected during the monitoring event. A complete list of the analytes tested, along with validated sample results by analytical method, is provided in Appendix F. Laboratory analytical data packages, which include all environmental, field QC, and laboratory QC results, are provided in Appendix G. A consolidated laboratory data summary table is presented in Appendix H.

Table 3-4 Summary of Validated Detected Organic Analytes - Second Quarter 2011

Sample Location	Sample Date	RDX	1,4-Dioxane	Acetone	2-Butanone	Benzene	Carbon Disulfide	Chloroform	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethene	c-1,2-Dichloroethene	t-1,2-Dichloroethene	Ethylbenzene	2-Hexanone	Methylene Chloride	Toluene	1,1,2-Trichloroethane	Trichloroethene	Xylenes (m+p)
All results reported in µg/L unless otherwise stated																				
TT-MW2-5	6/28/2011	NA	**1.0**	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	<0.25	<0.36
TT-MW2-6S	6/28/2011	NA	0.11 Jq	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	<0.25	<0.36
TT-MW2-7	6/28/2011	NA	0.11 Jq	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-8	6/28/2011	NA	<0.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-9S	6/28/2011	NA	**15**	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	1.6	<0.36
TT-MW2-9D	6/28/2011	NA	<0.10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-11	6/24/2011	NA	NA	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	0.18 Jq	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	**5.9**	<0.36
TT-MW2-13	6/27/2011	**0.83 Jq**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-14	6/23/2011	NA	NA	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	0.34 Jq	<0.22	<0.31	<0.25	<0.36
TT-MW2-17D	6/23/2011	NA	NA	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	**6.0**	<0.36
TT-MW2-17S	6/24/2011	NA	NA	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	0.35 Jq	<0.36
TT-MW2-21	6/27/2011	NA	<0.10	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	**5.2**	<0.22	<0.31	4.3	<0.36
TT-MW2-22	6/27/2011	NA	**53**	<5.0	<1.2	0.83	<0.36	<0.46	3.1	**0.70**	**21**	2.2	0.58	<0.26	<1.2	3.6	<0.22	<0.31	**420**	<0.36
TT-MW2-24	6/27/2011	**2.1**	**320**	<5.0	<1.2	0.19 Jq	<0.36	3.1	0.76	**0.57**	2.5	<0.18	<0.10	<0.26	<1.2	0.58 Jq	<0.22	0.56	**92**	<0.36
TT-MW2-25	6/28/2011	NA	<0.10	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	<0.25	<0.36
TT-MW2-26	6/27/2011	NA	<0.10	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	<0.25	<0.36
TT-MW2-27	6/28/2011	NA	0.66	<5.0	<1.2	<0.14	0.75	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	<0.25	<0.36
TT-MW2-28	6/24/2011	NA	NA	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	<0.25	<0.36
TT-MW2-30A	6/23/2011	NA	NA	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	<0.25	<0.36
TT-MW2-32	6/24/2011	NA	NA	<5.0	<1.2	<0.14	1.1	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	<0.25	<0.36
TT-MW2-37A	6/29/2011	NA	**18**	52	9.9	0.48 Jq	<0.36	<0.46	<0.098	<0.21	0.26 Jq	<0.18	<0.10	<0.26	1.5 Jq	<0.15	0.39 Jq	<0.31	3.5	<0.36
TT-MW2-37B	6/29/2011	NA	0.40	<5.0	<1.2	<0.14	18	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	0.57	<0.31	<0.25	<0.36
TT-MW2-40A	6/22/2011	NA	NA	<5.0	<1.2	<0.14	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	<0.26	<1.2	<0.15	<0.22	<0.31	<0.25	<0.36
TT-MW2-40B	6/22/2011	NA	NA	<5.0	<1.2	**5.6**	<0.36	<0.46	<0.098	<0.21	<0.12	<0.18	<0.10	0.41 Jq	<1.2	<0.15	3.1	<0.31	<0.25	0.61
Method Detection Limit		0.20	0.10	5.0	1.2	0.14	0.36	0.46	0.098	0.21	0.12	0.18	0.10	0.26	1.2	0.15	0.22	0.31	0.25	0.36
MCL (unless noted) / DWNL		0.3 (1)	1 (1)	-	-	1	160 (1)	-	5	0.5	6	6	10	300	-	5	150	5	5	1750

Notes: Only analytes positively detected in samples are presented in this table. For a complete list of constituents analyzed, refer to the laboratory data package.

µg/L - Micrograms per liter
MCL - California Department of Public Health maximum contaminant level
DWNL - California Department of Public Health drinking water notification level
RDX - Hexahydro-1,3,5-trinitro-1,3,5-triazine
(1) - DWNL
" - " MCL/DWNL not established
Bold - MCL or DWNL exceeded

NA - Not analyzed
< # - Method detection limit concentration is shown.
J - The analyte was positively identified, but the concentration is an estimated value.
q - The analyte detection was below the Practical Quantitation Limit (PQL).

Table 3-5 Summary of Validated Detected Inorganic Analytes - Second Quarter 2011

Sample Location	Sample Date	Perchlorate -ug/L	Arsenic - mg/L	Antimony - mg/L	Barium - mg/L	Cobalt -mg/L	Chromium -mg/L	Copper -mg/L	Lead -mg/L	Molybdenum -mg/L	Nickel -mg/L	Silver -mg/L	Selenium -mg/L	Vanadium - mg/L	Zinc -mg/L
WS-1	6/22/2011	0.091 Jq	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WS-2	6/22/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WS-3	6/22/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PPW-2-1	5/10/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PPW-2-2	5/10/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PPW-2-3	5/9/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PPW-2-4	5/9/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PPW-2-5	5/9/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PPW-2-7	5/9/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-1	6/27/2011	**6,500**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-4S	6/30/2011	0.62	**0.039**	<0.00018	0.0087 Jq	<0.00019	0.0052 Jq	0.0032 BJaq	<0.00019	0.016	0.0015 Jq	<0.00022	0.0020 Jq	**0.069**	0.0020 Jq
TT-MW2-5	6/28/2011	**850**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-6S	6/28/2011	**190**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-6D	6/28/2011	<0.071	0.004	<0.00018	0.0087 Jq	<0.00019	<0.0019	0.0023 BJaq	<0.00019	0.0025 Jq	0.00056 BJaq	<0.00022	<0.0014	<0.0041	<0.0015
TT-MW2-7	6/28/2011	**340**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-7D	6/28/2011	<0.071	**0.014**	<0.00018	0.0034 Jq	<0.00019	<0.0019	0.0021 BJaq	0.00024 Jq	0.016	0.0015 Jq	<0.00022	<0.0014	0.013	0.0040 Jq
TT-MW2-8	6/28/2011	**300**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-9S	6/28/2011	**9,200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-9D	6/28/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-10	6/24/2011	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-11	6/24/2011	**210**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-12	6/30/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-13	6/27/2011	**5,700**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-14	6/23/2011	**41,000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-16	6/24/2011	3.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-17S	6/24/2011	**1,300**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-17D	6/23/2011	**90,000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-18	6/24/2011	**12,000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-19S	6/22/2011	4.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-19D	6/22/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Method Detection Limit		0.071	0.0012	0.00018	0.0049	0.00019	0.0019	0.0030	0.00019	0.0032	0.0020	0.00022	0.0014	0.0041	0.0015
MCL (unless noted) / DWNL		6	0.01	0.006	1	-	0.05	1.3	0.015	-	0.1	0.1	0.05	0.05 (1)	5

Notes: Only analytes positively detected in samples are presented in this table. For a complete list of constituents analyzed, refer to the laboratory data package.

µg/L - Micrograms per liter
mg/L - Milligrams per liter
MCL - California Department of Public Health maximum contaminant level
DWNL - California Department of Public Health drinking water notification level
(1) - DWNL
" - " MCL/DWNL not established
NA - Not analyzed

Bold - MCL or DWNL exceeded.
< # - Method detection limit concentration is shown.
B - The sample result was less than 5 times blank contamination. Cross contamination is suspected.
J - The analyte was positively identified, but the concentration is an estimated value.
a - The analyte was found in the method blank.
k - The analyte was found in a field blank.
q - The analyte detection was below the Practical Quantitation Limit (PQL).

Table 3-5 Summary of Validated Detected Inorganic Analytes - Second Quarter 2011 (continued)

Sample Location	Sample Date	Perchlorate -ug/L	Arsenic - mg/L	Antimony - mg/L	Barium - mg/L	Cobalt -mg/L	Chromium -mg/L	Copper -mg/L	Lead -mg/L	Molybdenum -mg/L	Nickel -mg/L	Silver -mg/L	Selenium -mg/L	Vanadium - mg/L	Zinc -mg/L
TT-MW2-20S	6/22/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-21	6/27/2011	**17**	**0.014**	<0.00018	0.0036 Jq	<0.00019	<0.0019	0.0022 Jq	<0.00019	0.016	0.0059 Jq	<0.00022	<0.0014	0.0072 Jq	0.0050 Jq
TT-MW2-22	6/27/2011	<0.071	**0.010**	<0.00018	0.0024 Jq	<0.00019	<0.0019	0.0032 Jq	<0.00019	0.0092 Jq	0.0011 Jq	<0.00022	<0.0014	<0.0041	0.0043 Jq
TT-MW2-24	6/27/2011	**160,000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-25	6/28/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-26	6/27/2011	**100**	0.0012 Jq	<0.00018	0.061 Jq	0.0013 Jq	0.0062 Jq	0.0042 BJaq	<0.00019	0.0037 Jq	**0.33**	0.00029 BJaq	0.0061	<0.0041	<0.0015
TT-MW2-27	6/28/2011	**260**	0.0022	<0.00018	0.012 Jq	0.0011 Jq	0.014	0.0058 BJaq	<0.00019	0.0079 Jq	**0.20**	<0.00022	<0.0014	0.0089 Jq	0.0085 Jq
TT-MW2-28	6/24/2011	1.8	0.0026	0.00031 Jq	0.016 Jq	0.00055 Jq	0.0028 Jq	0.0086 Jq	<0.00019	0.030	**0.15**	<0.00022	<0.0014	<0.0041	0.0079 Jq
TT-MW2-29B	6/22/2011	0.50	0.0092	<0.00018	0.0049 Jq	0.00026 Jq	0.0047 Jq	0.0030 Jq	0.00052 Jq	0.0032 Jq	0.0020 Jq	<0.00022	<0.0014	0.024	0.0080 Jq
TT-MW2-29C	6/22/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-30A	6/23/2011	**640**	**0.022**	<0.00018	0.0029 Jq	<0.00019	<0.0019	0.0013 Jq	<0.00019	0.0021 Jq	0.00021 Jq	<0.00022	<0.0014	**0.13**	0.0015 Jq
TT-MW2-30B	6/23/2011	**2,200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-30C	6/23/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-31A	6/24/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-32	6/24/2011	<0.071	**0.057**	<0.00018	0.0050 Jq	<0.00019	<0.0019	0.0018 Jq	0.00020 Jq	0.012	0.00058 Jq	<0.00022	<0.0014	**0.089**	0.0056 Jq
TT-MW2-33A	6/24/2011	0.45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-34A	6/30/2011	5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-35A	6/24/2011	<0.35	0.0069	<0.00018	0.030 Jq	<0.00019	0.0045 Jq	0.0055 Jq	<0.00019	0.070	0.0024 Jq	<0.00022	<0.0014	<0.0041	0.0065 Jq
TT-MW2-36A	6/22/2011	<0.071	**0.011**	<0.00018	0.0015 Jq	<0.00019	<0.0019	0.0029 Jq	0.00031 Jq	0.0043 Jq	0.0021 Jq	<0.00022	<0.0014	<0.0041	0.0032 Jq
TT-MW2-37A	6/29/2011	1.2	<0.0012	<0.00018	**1.6**	0.0015 Jq	0.036	0.0071 BJaq	0.0014 Jq	0.0064 Jq	0.020	<0.00022	0.0015 Jq	<0.0041	0.0035 Jq
TT-MW2-37B	6/29/2011	**14**	**0.021**	0.00019 Jq	0.014 Jq	<0.00019	<0.0019	0.0026 BJaq	<0.00019	0.095	0.0039 Jq	<0.00022	<0.0014	<0.0041	0.0021 Jq
TT-MW2-38A	6/23/2011	**250,000**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-38B	6/23/2011	**4,600**	0.0076	0.00042 Jq	0.011 Jq	<0.00019	0.0029 Jq	0.0022 Jq	<0.00019	0.044	0.0015 Jq	<0.00022	<0.0014	<0.0041	0.0021 Jq
TT-MW2-38C	6/23/2011	**160,000**	<0.0012	<0.00018	0.097 Jq	0.00021 Jq	<0.0019	0.0032 Jq	<0.00019	0.0031 Jq	0.0064 Jq	<0.00022	0.0050	<0.0041	0.0046 Jq
TT-MW2-39	6/30/2011	**7.1**	0.0030	0.00020 Jq	0.24	0.0016 Jq	<0.0019	0.0043 BJaq	<0.00019	0.0070 Jq	**0.21**	<0.00022	0.017	<0.0041	<0.0015
TT-MW2-40A	6/22/2011	**9.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-40B	6/22/2011	2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-41A	6/29/2011	<0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TT-MW2-42A	6/29/2011	<0.071	**0.013**	<0.00018	0.0079 Jq	0.00038 Jq	<0.0019	0.0050 BJakq	0.00081 Jq	0.0094 Jq	0.0025 BJkq	<0.00022	<0.0014	0.0071 Jq	0.0065 BJkq
Method Detection Limit		0.071	0.0012	0.00018	0.0049	0.00019	0.0019	0.0030	0.00019	0.0032	0.0020	0.00022	0.0014	0.0041	0.0015
MCL (unless noted) / DWNL		6	0.01	0.006	1	-	0.05	1.3	0.015	-	0.1	0.1	0.05	0.05 (1)	5

Notes: Only analytes positively detected in samples are presented in this table. For a complete list of constituents analyzed, refer to the laboratory data package.

μg/L - Micrograms per liter
mg/L - Milligrams per liter
MCL - California Department of Public Health maximum contaminant level
DWNL - California Department of Public Health drinking water notification level
(1) - DWNL
" - " MCL/DWNL not established
NA - Not analyzed

Bold - MCL or DWNL exceeded
< # - Method detection limit concentration is shown.
B - The sample result was less than 5 times blank contamination. Cross contamination is suspected.
J - The analyte was positively identified, but the concentration is an estimated value.
a - The analyte was found in the method blank.
k - The analyte was found in a field blank.
q - The analyte detection was below the Practical Quantitation Limit (PQL).

Table 3-6 Summary Statistics for Validated Detected Organic and Inorganic Analytes - Second Quarter 2011

Organic Analytes Detected	Total Number of Samples Analyzed	Total Number of Detections (1)	Number of Detections Exceeding MCL or DWNL (1)	MCL / DWNL		Minimum Concentration Detected		Maximum Concentration Detected	
1,4-Dioxane	14	9	5	1 (2)	μg/L	0.11	μg/L	320	μg/L
Acetone	20	1	0	-	μg/L	52	μg/L	52	μg/L
2-Butanone	20	1	0	-	μg/L	9.9	μg/L	9.9	μg/L
Benzene	20	4	1	1	μg/L	0.19	μg/L	5.6	μg/L
Carbon Disulfide	20	3	0	160 (2)	μg/L	0.75	μg/L	18	μg/L
Chloroform	20	1	0	-	μg/L	3.1	μg/L	3.1	μg/L
1, 1-Dichloroethane	20	2	0	5	μg/L	0.76	μg/L	3.1	μg/L
1, 2-Dichloroethane	20	2	2	0.5	μg/L	0.57	μg/L	0.70	μg/L
1, 1-Dichloroethene	20	3	1	6	μg/L	0.26	μg/L	21	μg/L
cis-1, 2-Dichloroethene	20	2	0	6	μg/L	0.18	μg/L	2.2	μg/L
trans-1, 2-Dichloroethene	20	1	0	10	μg/L	0.58	μg/L	0.58	μg/L
Ethylbenzene	20	1	0	300	μg/L	0.41	μg/L	0.41	μg/L
2-Hexanone	20	1	0	-	μg/L	1.5	μg/L	1.5	μg/L
Methylene Chloride	20	4	1	5	μg/L	0.34	μg/L	5.2	μg/L
Toluene	20	3	0	150	μg/L	0.39	μg/L	3.1	μg/L
1, 1, 2-Trichloroethane	20	1	0	5	μg/L	0.56	μg/L	0.56	μg/L
Trichloroethene	20	8	4	5	μg/L	0.35	μg/L	420	μg/L
Xylenes (m+p)	20	1	0	1750	μg/L	0.61	μg/L	0.61	μg/L
RDX	2	2	2	0.3 (2)	μg/L	0.83	μg/L	2.1	μg/L
Inorganic Analytes Detected	**Total Number of Samples Analyzed**	**Total Number of Detections (1)**	**Number of Detections Exceeding MCL or DWNL (1)**	**MCL / DWNL**		**Minimum Concentration Detected**		**Maximum Concentration Detected**	
Perchlorate	59	35	24	6	μg/L	0.091	μg/L	250,000	μg/L
Arsenic (total)	19	17	9	0.01	mg/L	0.0012	mg/L	0.570	mg/L
Antimony (total)	19	4	0	0.006	mg/L	0.00019	mg/L	0.00042	mg/L
Barium (total)	19	19	1	1	mg/L	0.0015	mg/L	1.6	mg/L
Cobalt (total)	19	8	0	-	mg/L	0.00021	mg/L	0.0016	mg/L
Chromium (total)	19	8	0	0.05	mg/L	0.0028	mg/L	0.036	mg/L
Copper (total)	19	10	0	1.3	mg/L	0.0013	mg/L	0.0086	mg/L
Lead (total)	19	6	0	0.015	mg/L	0.00020	mg/L	0.0014	mg/L
Molybdenum (total)	19	19	0	-	mg/L	0.0021	mg/L	0.095	mg/L
Nickel (total)	19	17	4	0.1	mg/L	0.00021	mg/L	0.33	mg/L
Selenium (total)	19	5	0	0.05	mg/L	0.0015	mg/L	0.017	mg/L
Vanadium (total)	19	8	3	0.05 (2)	mg/L	0.0071	mg/L	0.13	mg/L
Zinc (total)	19	15	0	5	mg/L	0.0015	mg/L	0.0085	mg/L

Notes: Only analytes positively detected in groundwater or surface water samples are presented in this table. For a complete list of constituents analyzed, refer to the laboratory data package.

(1) - Number of detections excludes sample duplicates, trip blanks, and equipment blanks.
(2) - California Department of Public Health drinking water notification level
MCL - California Department of Public Health maximum contaminant level
DWNL - California Department of Public Health drinking water notification level.
" - " MCL/DWNL not established
μg/L - Micrograms per liter
mg/L - Milligrams per liter
RDX - Hexahydro-1,3,5-trinitro-1,3,5-triazine

3.4.1 Data Quality Review

The quality control samples were reviewed as described in the Beaumont Sites 1 and 2, Programmatic Sampling and Analysis Plan (Tetra Tech, 2010b). The data for the groundwater sampling activities was contained in analytical data packages generated by E.S. Babcock & Sons, Inc. and EMAX Laboratories Inc. These data packages were reviewed using the latest versions of the EPA's Contract Laboratory Program National Functional Guidelines for Organic and Inorganic Superfund Data Review (EPA, 2008 and 2010).

Preservation criteria, holding times, field blanks, laboratory control samples (LCS), method blanks, duplicate environmental samples, spiked samples, and surrogate and spike recovery data was reviewed. Within each environmental sample the sample-specific quality control spike recoveries were examined. These data examinations include comparing statistically calculated control limits to percent recoveries of all spiked analytes and duplicate spiked analytes. Relative percent difference (RPD) control limits are compared to actual spiked (MS/MSD) RPD results. Surrogate recoveries were examined for all organic compound analyses and compared to their control limits.

Environmental samples were analyzed by the following methods: Method E332.0 for perchlorate, Method SW8270C SIM for 1,4-dioxane, Method SW6020 for metals, Method SW8260B for VOCs, and Method SW8330 for RDX. Unless otherwise noted below, all data results met required criteria, are of known precision and accuracy, did not require qualification, and may be used as reported.

Method SW6020 for metals had some data qualified for blank contamination. Method blank contamination caused 3.1 percent (11 of 357) of the total data to be qualified. Equipment blank contamination caused 0.8 percent (3 of 357) of the total data to be qualified. Blank qualified data may be considered not detected data at an elevated detection level equal to the blank contamination.

The laboratory continues with ongoing corrective actions to reduce metal detections in laboratory method blanks above the method detection limit.

3.5 Chemicals of Potential Concern (COPCs)

The identification of chemicals of potential concern (COPCs) is an ongoing process that takes place annually as part of the second quarter sampling event and is reported in the Second and Third Quarter Semiannual Groundwater Monitoring Report. The purpose of identifying COPCs is to establish a list of analytes that best represents the extent and magnitude of affected groundwater and to focus more detailed analysis on those analytes. The analytes were organized and evaluated in two groups, organic and inorganic, and divided into primary and secondary COPCs. Tables 3-4 and 3-5 present a summary of the validated organic and inorganic analytes detected during the second quarter 2011 monitoring event. Data that is "B" qualified because of its association with either laboratory blank or field cross contamination is not included in the COPC evaluation.

The COPC identification process does not eliminate analytes from testing, but does reduce the number of analytes that are evaluated and discussed during reporting. While all of the secondary COPCs will continue to be tested during future monitoring events because of their association with other analytes that are listed as primary COPCs, they are not discussed further because they are detected on a more limited or inconsistent basis, and/or are detected at concentrations below a regulatory threshold. The standard list of analytes for each method will continue to be tested for and screened annually to insure that the appropriate COPCs are being identified and evaluated. Table 3-7 presents a summary of the Laborde Canyon COPCs. Time-series graphs of perchlorate and TCE concentrations are provided in Appendix I.

Table 3-7 Groundwater Chemicals of Potential Concern

Analyte	Classification
Perchlorate	Primary
Trichloroethene	Primary
1,4-Dioxane	Primary
Benzene	Secondary
Methylene Chloride	Secondary
RDX	Secondary
Notes:	
RDX - Hexahydro-1,3,5-trinitro-1,3,5-triazine	

3.5.1 Organic Analytes

Seven organic analytes (RDX, benzene, 1,4-dioxane, 1,2-dichloroethane [1,2-DCA], 1,1-dichloroethene [1,1-DCE], methylene chloride, and TCE) were detected above their respective MCL or DWNL during the second quarter 2011 monitoring event. Table 3-4 presents a summary of validated organic analyte concentrations reported in groundwater samples collected during the second quarter 2011 groundwater monitoring event.

1,4-Dioxane was reported in groundwater samples collected from nine monitoring wells (TT-MW2-5, TT-MW2-6S, TT-MW2-7, TT-MW2-9S, TT-MW2-22, TT-MW2-24, TT-MW2-27, TT-MW2-37A, and TT-MW2-37B) during the second quarter 2011 monitoring event at concentrations ranging from 0.11 µg/L to 320 µg/L. All wells are located within or just downgradient from the former WDA. The DWNL for 1,4-dioxane is 1 µg/L.

1,2-DCA was reported in groundwater samples collected from two monitoring wells (TT-MW2-22 and TT-MW2-24) located in the former WDA during the second quarter 2011 monitoring event at concentrations of 0.70 µg/L and 0.57 µg/L respectively. The MCL for 1,2-DCA is 0.5 µg/L.

1,1-DCE was reported in groundwater samples collected from two monitoring wells (TT-MW2-22 and TT-MW2-24) located in the former WDA during the second quarter 2011 monitoring event at concentrations of 21 µg/L and 2.5 µg/L respectively. The MCL for 1,1-DCE is 6 µg/L.

Benzene was reported below the MCL in groundwater samples collected from three monitoring wells (TT-MW2-22, TT-MW2-24, and TT-MW2-37A) located in the former WDA at concentrations ranging from 0.19 µg/L to 0.83 µg/L. In monitoring well TT-MW2-40B, located in Area K, benzene was reported above the MCL at a concentration of 5.6 µg/L during the second quarter 2011 monitoring event. The MCL for benzene is 1 µg/L.

RDX was reported in groundwater samples collected from two monitoring wells in two locations during the second quarter 2011 monitoring event: TT-MW2-13, located in Area K, and TT-MW2-24, located in the former WDA, at concentrations of 0.83 µg/L and 2.1 µg/L respectively. The DWNL for RDX is 0.3 µg/L. These results are consistent with historic data.

Methylene chloride was reported in groundwater samples collected from three monitoring wells (TT-MW2-21, TT-MW2-22 and TT-MW2-24) located in the WDA at concentrations ranging from 0.58 µg/L to 5.2 µg/L, and from one well (TT-MW2-14) located in Area K at a concentration of 0.34 µg/L, during the second quarter 2011 monitoring event. Previously, methylene chloride has been detected as high as 220 µg/L in monitoring well TT-MW2-21. The MCL for methylene chloride is 5 µg/L.

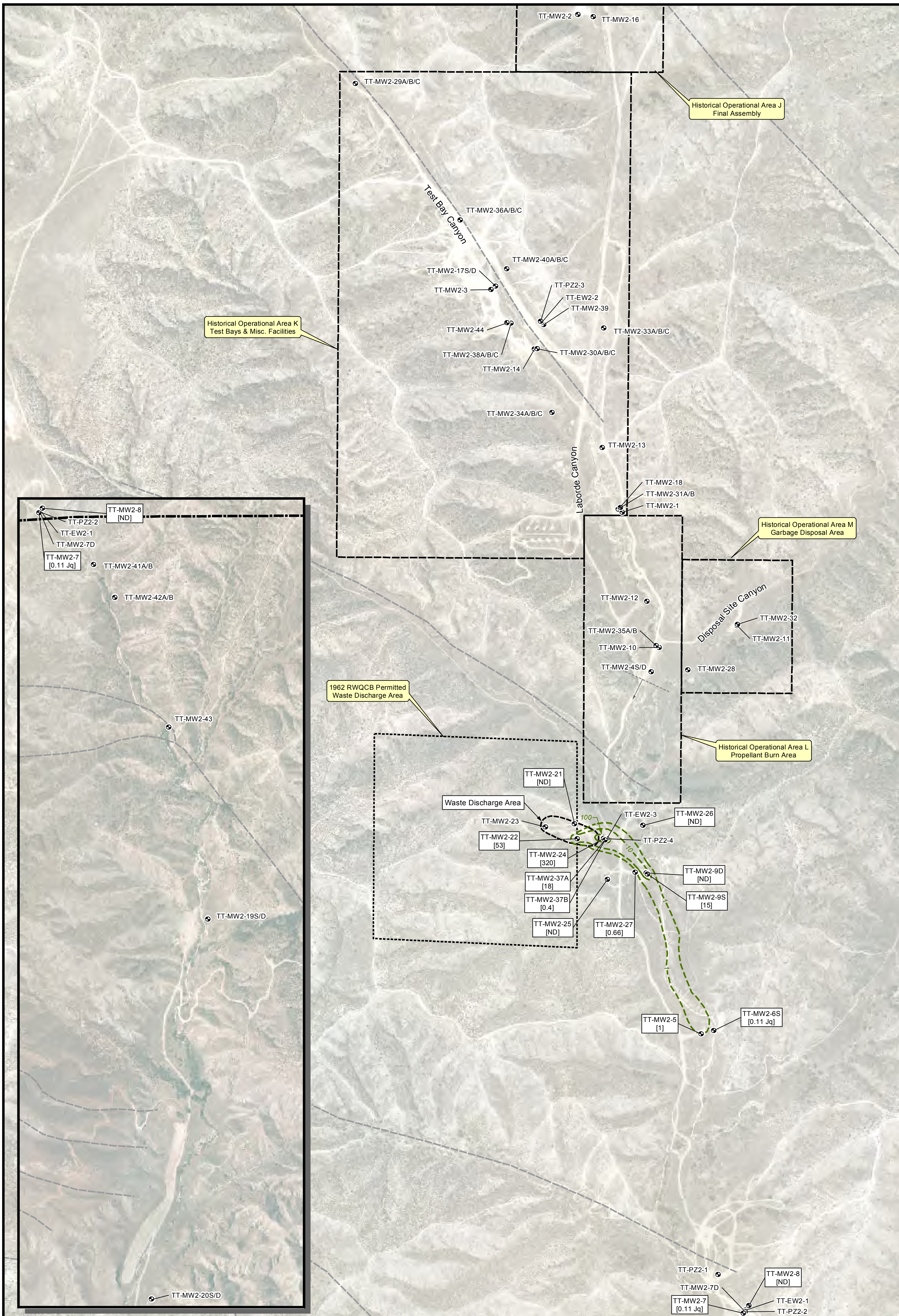
TCE was reported in groundwater samples collected from four monitoring wells (TT-MW2-21, TT-MW2-22, TT-MW2-24, and TT-MW2-37A) located in the WDA during the second quarter 2011 monitoring event at concentrations ranging from 3.5 µg/L to 420 µg/L. TCE was also detected in monitoring well TT-MW2-11, located in Area M, at a concentration of 5.9 µg/L; and in monitoring wells TT-MW2-17S and TT-MS2-17D, located in Area K, at concentrations of 0.35 µg/L and 6.0 µg/L, respectively. The MCL for TCE is 5 µg/L. Time-series graphs of TCE are provided in Appendix I.

Other organic analytes detected at low levels during the second quarter 2011 groundwater monitoring event were acetone, 2-butanone, carbon disulfide, chloroform, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, ethylbenzene, 2-hexanone, toluene, 1,1,2-trichloroethane, and xylenes. None of these compounds exceeded their MCL or DWNL, and generally they are not detected consistently from event to event.

3.5.2 Organic COPCs

Based on the analysis above and the concentrations detected during previous groundwater monitoring events, TCE and 1,4-dioxane are identified as primary organic COPCs, and benzene, methylene chloride, and RDX are identified as secondary COPCs at the Site. The remaining 14 organic analytes were either detected below their respective MCL or DWNL or at relatively low concentrations. Their distribution and concentrations in groundwater will continue to be monitored and the results evaluated. Figures 3-5 and 3-6 present sampling results for 1,4-dioxane and TCE for groundwater samples collected during the second quarter 2011 monitoring event.

Path: X:\GIS\Lockheed S2 Q2Q311\DIOX_Isocon.mxd



LEGEND

- Well Sample Location with 1,4-Dioxane Concentration [µg/L]
- 1,4-Dioxane Isoconcentration Contour (Dashed where inferred)
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Waste Discharge Area
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

0 300 600 Feet

N

Adapted from: April 2007 aerial photograph.

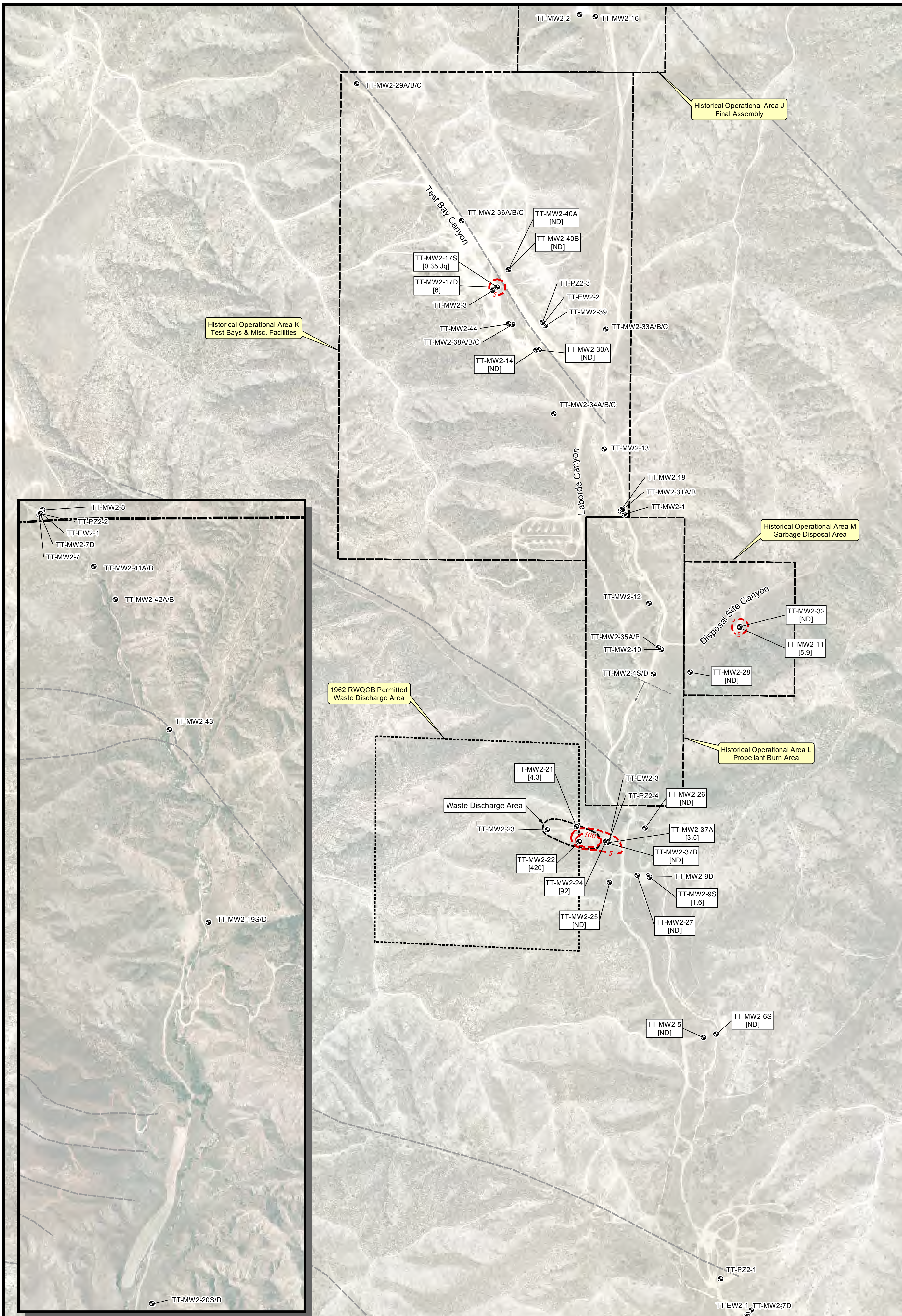
Faults from the *Site 2 Lineament Study, Tetra Tech, 2009.*

Notes: Results shown for sampled locations only.

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-5
1,4-Dioxane
Isoconcentration Map (µg/L)
Second Quarter 2011

Path: X:\GIS\Lockheed S2 Q2Q311\TCE_Isocon.mxd



LEGEND

- Well Sample Location with TCE Concentration [µg/L]
- Trichloroethene Isoconcentration Contour (Dashed where inferred)
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Waste Discharge Area
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

0 300 600
Feet

Adapted from: April 2007 aerial photograph.

Faults from the *Site 2 Lineament Study, Tetra Tech, 2009.*

Notes: Results shown for sampled locations only.

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-6
Trichloroethene (TCE)
Isoconcentration Map (µg/L)
Second Quarter 2011

3.5.3 Inorganic Analytes

Five inorganic analytes (perchlorate, total arsenic, total barium, total nickel, and total vanadium) were detected in groundwater above a published MCL or DWNL. Table 3-5 presents a summary of validated inorganic analyte concentrations reported in groundwater samples collected during the second quarter 2011 groundwater monitoring event.

Perchlorate was reported in groundwater samples collected from 35 of 59 locations sampled during the second quarter 2011 groundwater monitoring event at concentrations up to 250,000 µg/L. The California MCL for perchlorate is 6 µg/L. Time-series graphs of perchlorate are provided in Appendix I.

Total arsenic was detected in 17 of 19 unfiltered samples collected from groundwater monitoring wells during the second quarter 2011 groundwater monitoring event. The concentrations ranged from 0.0012 to 0.570 mg/L. Nine of the wells had concentrations that exceeded the 0.01 mg/L MCL for arsenic. Generally, concentrations of arsenic in wells screened in the STF are elevated, while those screened in the QAL/wSTF are not. Groundwater in many of these same wells, including those with arsenic concentrations above the MCL, exhibits low DO and low ORP. Oxidizing conditions favor the formation of As(V) (arsenate) oxyanions, which sorb strongly to iron and aluminum oxide minerals in the aquifer, whereas reducing conditions favor the formation of As(III) (arsenite) oxyanions, which are not as strongly sorbed to iron and aluminum oxides. These sorption reactions are the dominant control on arsenic solubility and transport in the environment. Therefore, it is possible that the elevated arsenic concentrations observed in wells with more reducing conditions are naturally occurring.

Total barium was detected in 19 of 19 unfiltered samples collected from groundwater monitoring wells during the second quarter 2011 groundwater monitoring event. The concentrations ranged from 0.0015 to 1.6 mg/L. One well (TT-MW2-37A), had a concentration that exceeded the 1.0 mg/L MCL for barium.

Total nickel was detected in 17 of 19 unfiltered samples collected from groundwater monitoring wells during the second quarter 2011 groundwater monitoring event. The concentrations ranged from 0.00021 to 0.33 mg/L. Four wells had concentrations that exceeded the 0.1 mg/L MCL for nickel.

Total vanadium was detected in eight of 19 unfiltered samples collected from groundwater monitoring wells during the second quarter 2011 groundwater monitoring event. The concentrations ranged from 0.0071 to 0.13 mg/L. Three wells had concentrations that exceeded the 0.05 mg/L DWNL for vanadium.

3.5.4 Inorganic COPCs

Based on the analysis above and the concentrations detected during previous groundwater monitoring events, perchlorate is the only inorganic COPC identified at the Site. No secondary COPCs were identified. Figure 3-7 presents a perchlorate isoconcentration map for groundwater samples collected for the second quarter 2011.

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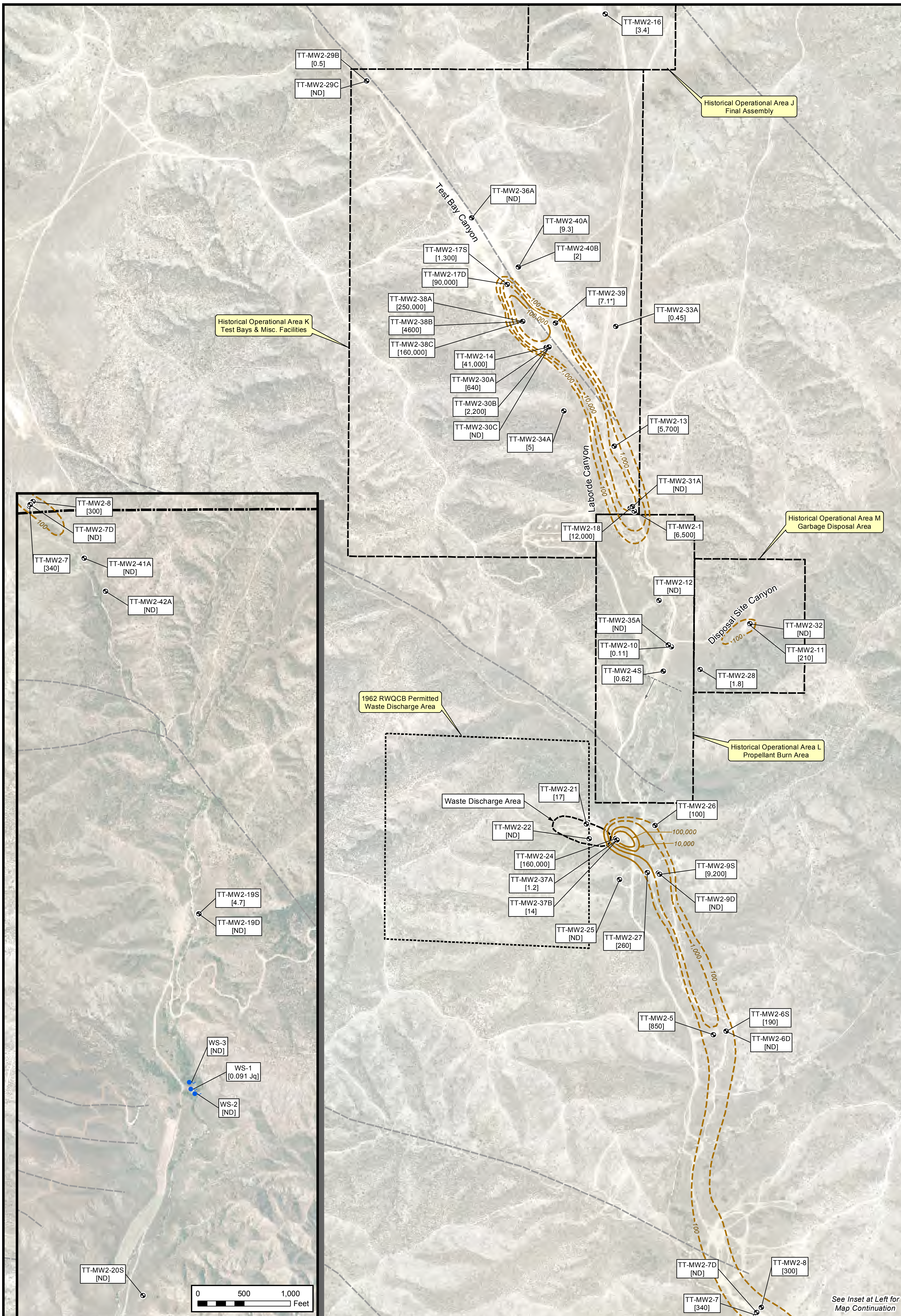


LEGEND

- Well Sample Location with Perchlorate Concentration [µg/L]
- Spring Sample Location with Perchlorate Concentration [µg/L]
- Perchlorate Isoconcentration Contour (Dashed where inferred)
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- Waste Discharge Area
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Laborde Canyon Property Boundary (Lockheed Martin Beaumont Site 2)

0 300 600 Feet

Adapted from: April 2007 aerial photograph.

Faults from the *Site 2 Lineament Study, Tetra Tech, 2009.*

Notes: Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

Results shown for sampled locations only.

* Anomalous value not used in contour.

Laborde Canyon (Lockheed Martin Beaumont Site 2)

Figure 3-7

Perchlorate Isoconcentration Map (µg/L) Second Quarter 2011

3.6 Private Production Wells and Springs

Four offsite private production wells and three offsite springs were scheduled to be sampled for perchlorate by Method E332.0 during the second quarter 2011 sampling event. One spring was not sampled because it was dry. The four production wells and two remaining springs were sampled on 9 May 2011 and 10 May 2011. Perchlorate was not detected in any of the offsite private production well or spring samples during the second quarter 2011 sampling event.

3.7 Surface Water and Storm Water Sampling Results

Surface water samples were collected for perchlorate at three locations, WS-1, WS-2 and WS-3, from a spring on the former Wolfskill property during the second quarter 2011 (Figure 2-1). Perchlorate was detected at one of the three location, WS-1, at a concentration of 0.091 µg/L. The California MCL for perchlorate is 6 µg/L. No other surface water samples were collected during this reporting period.

3.8 Temporal Trends in Groundwater Chemical Concentrations

All groundwater and surface water monitoring locations sampled and tested between fourth quarter 2010 and third quarter 2011 were included in the trend analyses. Samples were collected from 50 monitoring wells and 8 fixed surface water locations. Temporal trend analyses were performed for perchlorate, TCE, methylene chloride, 1,4-dioxane, and RDX. The temporal trend analyses were performed using data from September 2004 through September 2011. Statistical trend analyses were conducted for the entire period of record to evaluate the long-term trends at the Site, and to assess the variability observed in the data, since many locations fluctuate considerably from quarter to quarter.

Time trend analysis was conducted using the Monitoring and Remediation Optimization System (MAROS) developed by the Air Force Center for Environmental Excellence (AFCEE, 2006). MAROS is a statistical database application developed to assist with groundwater quality data trend analysis and long-term monitoring optimization at contaminated groundwater sites. The software performs parametric and nonparametric trend analyses to evaluate temporal and spatial contaminant trends using Mann-Kendall and linear regression methods. Brief descriptions of the methods follow.

- Mann-Kendall Analysis – This statistical procedure was used to evaluate the data for trends. It is a non-parametric statistical procedure that is well suited for analyzing trends in data over time that do not require assumptions as to the statistical distribution of the data and can be used with irregular sampling intervals and missing data. The Mann-Kendall test for trends is suitable for analyzing data that follows a normal or non-normal distribution pattern. The Mann-Kendall test has no distributional assumptions and allows for irregularly spaced measurement periods. The advantage with this approach involves cases where outliers in the data would produce biased estimates of the least squares estimated slope.

- Linear Regression Analysis – This statistical procedure was used to estimate the magnitude of the trends. A parametric statistical procedure is typically used for analyzing trends in data over time and requires a normal statistical distribution of the data.

There are seven statistical concentration trend types derived from Mann-Kendall analysis: 1) decreasing, 2) increasing 3) no trend (displaying two sets of conditions), 4) probably decreasing, 5) probably increasing, 6) stable, and 7) non-detect (all sample results are below the detection limit). If a location has less than four quarters of data then the Mann-Kendall analysis cannot be run and not applicable (NA) is applied to the results. The criteria used to evaluate the statistical concentration trend types are summarized in Table 3-8.

Table 3-8 Mann-Kendall Concentration Trend Matrix

Mann-Kendall Statistic (S)	Confidence in Trend	Concentration Trend
S > 0	> 95%	Increasing
S > 0	90 - 95%	Probably Increasing
S > 0	< 90%	No Trend
S ≤ 0	< 90% and COV ≥ 1	No Trend
S ≤ 0	< 90% and COV < 1	Stable
S < 0	90 - 95%	Probably Decreasing
S < 0	> 95%	Decreasing
ND	-	Non-detect
NA	-	Not applicable

Notes:
> - Greater than
< - Less than
≤ - Less than or equal to
COV - Coefficient of Variation
S - Mann-Kendall statistic
ND - All results non-detect
NA - Not applicable, less than four quarters of data

The Mann-Kendall statistic (S) measures the trend in the data. Positive values indicate an increase in constituent concentrations over time, whereas negative values indicate a decrease in constituent concentrations over time. The strength of the trend is proportional to the magnitude of the Mann-Kendall statistic (i.e., large magnitudes indicate a strong trend).

The coefficient of variation (COV) is a statistical measure of how the individual data points vary about the mean value. Values less than or near 1.00 indicate that the data forms a relatively close group about the mean value. Values larger than 1.00 indicate that the data shows a greater degree of scatter about the mean.

The confidence in trend is the statistical confidence that the constituent concentration is increasing (S>0) or decreasing (S<0).

Temporal trends were analyzed for up to 50 monitoring wells and eight surface water or spring sample locations. Any single location may have different trends for each of the five analytes evaluated. The results of the Mann-Kendall trend analysis are provided in Appendix J; a summary of the Mann-Kendall results is presented in Table 3-9.

Table 3-9 Summary of Mann-Kendall Trend Analysis of COPCs for 2011 Sampled Monitoring Wells

Analyte	Locations Tested	Insufficient Data	No Trend	Non Detect	Decreasing Trend	Probably Decreasing Trend	Stable Trend	Probably Increasing Trend	Increasing Trend
Trichloroethene	20	0	2	11	0	0	1	0	6
Methylene Chloride	20	0	6	7	4	1	1	0	1
Perchlorate	50	0	18	3	8	3	6	4	8
1,4-Dioxane	14	0	6	4	0	0	2	0	2
RDX	2	1	0	0	0	0	1	0	0
Total Analysis	106	1	32	25	12	4	11	4	17

Notes:

COPC - Chemicals of Potential Concern

The 21 probably increasing or increasing trends were found at 16 groundwater monitoring locations. The area of the Site where they are located, the location identification, and the COPC that has the increasing or probably increasing trend are listed below.

Six wells located in Area K:

- TT-MW2-1: perchlorate
- TT-MW2-17S: TCE
- TT-MW2-17D: perchlorate
- TT-MW2-34A: perchlorate

- TT-MW2-38A: perchlorate
- TT-MW2-38C: perchlorate

One well located in Area L:

- TT-MW2-4S: perchlorate

One well located in Area M:

- TT-MW2-11: TCE

Four wells located in the former WDA:

- TT-MW2-21: perchlorate, TCE, and methylene chloride
- TT-MW2-22: TCE
- TT-MW2-24: perchlorate
- TT-MW2-37A: 1,4-dioxane, and TCE

Three wells located just downgradient and crossgradient, respectively, of the former WDA:

- TT-MW2-9S: 1,4-dioxane, perchlorate, and TCE,
- TT-MW2-26: perchlorate
- TT-MW2-27: perchlorate

One well located on the former Wolfskill property:

- TT-MW2-19S: perchlorate

Table 3-10 provides a summary of the magnitude of the trend changes (ug/L/yr) and the percent change with respect to the mean experienced at the Site through third quarter 2011. These trends were generated using the MAROS software. Figures 3-8 through 3-12 present a spatial representation of the results of the trend analysis for monitoring well locations.

Table 3-10 Magnitude of Trends Detected for COPCs for 2011 Sampled Monitoring Wells

Analyte	Decreasing Trend		Probably Decreasing Trend		Probably Increasing Trend				Increasing Trend			
	Number	Magnitude (ug/L/yr)	Number	Magnitude (ug/L/yr)	Number	Location	Magnitude (ug/L/yr)	Magnitude (%/yr)	Number	Location	Magnitude (ug/L/yr)	Magnitude (%/yr)
Trichloroethene	0	NA	0	NA	0	NA	NA	NA	6	TT-MW2-9S	0.12	32.9
										TT-MW2-11	0.24	3.47
										TT-MW2-17S	0.03	15.9
										TT-MW2-21	0.99	54.8
										TT-MW2-22	81.8	29.2
										TT-MW2-37A	0.60	60.2
Methylene Chloride	4	0.22 to 111	1	0.04	0	NA	NA	NA	1	TT-MW2-21	1.07	34.7
Perchlorate	8	0.04 to 9,252	3	9.86 to 90,520	4	TT-MW2-17D	1,898	3.65	8	TT-MW2-1	372	6.21
						TT-MW2-24	3,833	2.74		TT-MW2-4S	0.04	6.75
						TT-MW2-34A	0.55	36.5		TT-MW2-9S	1,330	49.3
						TT-MW2-38C	66,248	201		TT-MW2-19S	1.28	34.7
										TT-MW2-21	2.63	67.5
										TT-MW2-26	19.6	29.2
										TT-MW2-27	57.5	38.3
										TT-MW2-38A	46,720	29.2
1,4-Dioxane	0	NA	0	NA	0	NA	NA	NA	2	TT-MW2-9S	1.59	17.70
										TT-MW2-37A	2.85	31.03
RDX	0	NA	0	NA	0	NA	NA	NA	0	NA	NA	NA

Notes:

ug/L/yr - Micrograms per liter per year

%/yr - Percent change per year with respect to the sample mean

NA - Not applicable

COPCs - Chemicals of potential concern

For the eight surface water locations, eight trends were evaluated. Of the eight trends that were evaluated: zero had insufficient data, two had no trend, one was non-detect, one had a decreasing trend, zero had a probably decreasing trend, four had a stable trend, zero had a probably increasing trend, and zero had an increasing trend. A summary of the Mann-Kendall trend analysis is presented in Table 3-11.

Table 3-11 Summary of Mann-Kendall Trend Analysis of COPCs for 2011 Sampled Surface Water and Spring Locations

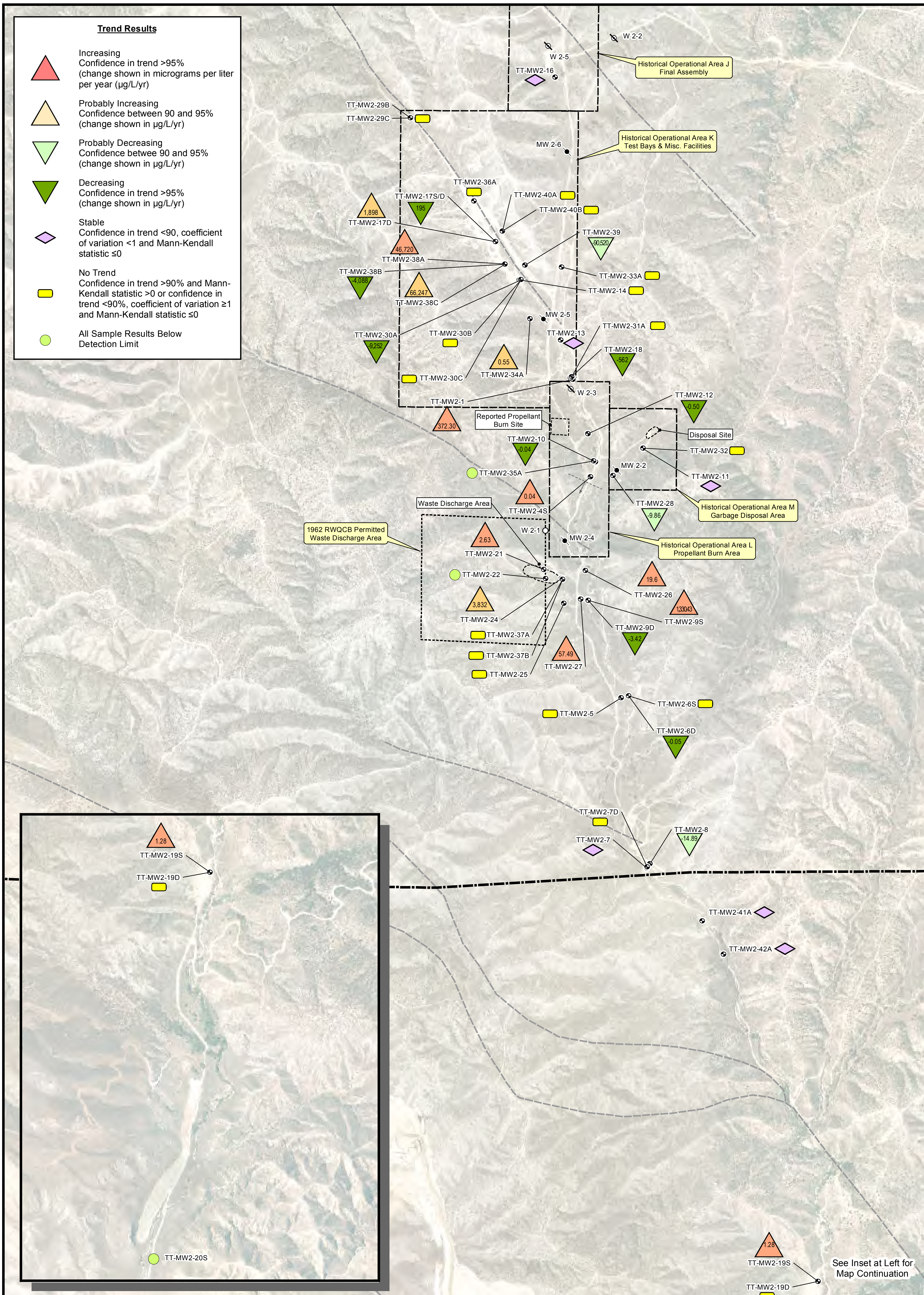
Analyte	Locations Tested	Insufficient Data	No Trend	Non-Detect	Decreasing Trend	Probably Decreasing Trend	Stable Trend	Probably Increasing Trend	Increasing Trend
Trichloroethene	0	0	0	0	0	0	0	0	0
Methylene Chloride	0	0	0	0	0	0	0	0	0
Perchlorate	8	0	2	1	1	0	4	0	0
1,4-Dioxane	0	0	0	0	0	0	0	0	0
RDX	0	0	0	0	0	0	0	0	0
Total Analysis	8	0	2	1	1	0	4	0	0

Notes:

COPCs - Chemicals of potential concern

Surface water location WS-1 had a decreasing trend for perchlorate. The remaining surface water locations had either no trend, a stable trend, or were non-detect. Appendix J presents a summary of the results of the Mann-Kendall and linear regression analyses and a comparison of the historical TCE and perchlorate trend analyses.

Path: X:\GIS\Lockheed S2 Q2Q311\Trend_Perc.mxd



LEGEND

- Monitoring Well Location
- Destroyed Production Well Location
- Destroyed Monitoring Well Location
- Reported Production Well Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Beaumont Site 2 Property Boundary

Adapted from:

April 2007 aerial photograph.

Faults from the *Site 2 Lineament Study, Tetra Tech, 2009.*

Note:

Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

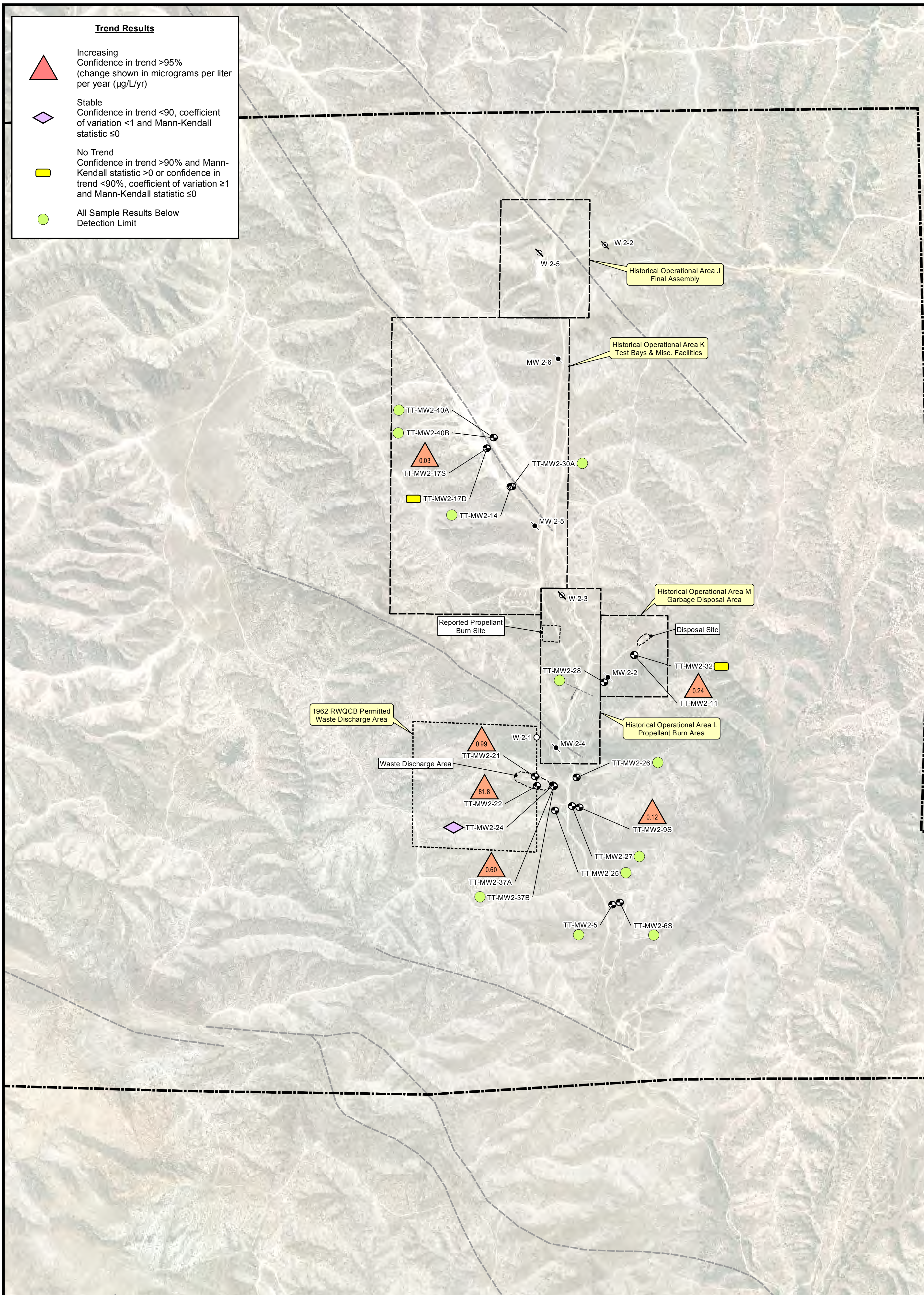
0 500 1,000 Feet

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-8

Perchlorate Statistical Analysis Summary Results

Path: X:\GIS\Lockheed S2 Q2Q311\Trend_TCE.mxd



LEGEND

- Monitoring Well Location
- Destroyed Production Well Location
- Destroyed Monitoring Well Location
- Reported Production Well Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Beaumont Site 2 Property Boundary

Adapted from:

April 2007 aerial photograph.

Faults from the *Site 2 Lineament Study, Tetra Tech, 2009.*

Note:

Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

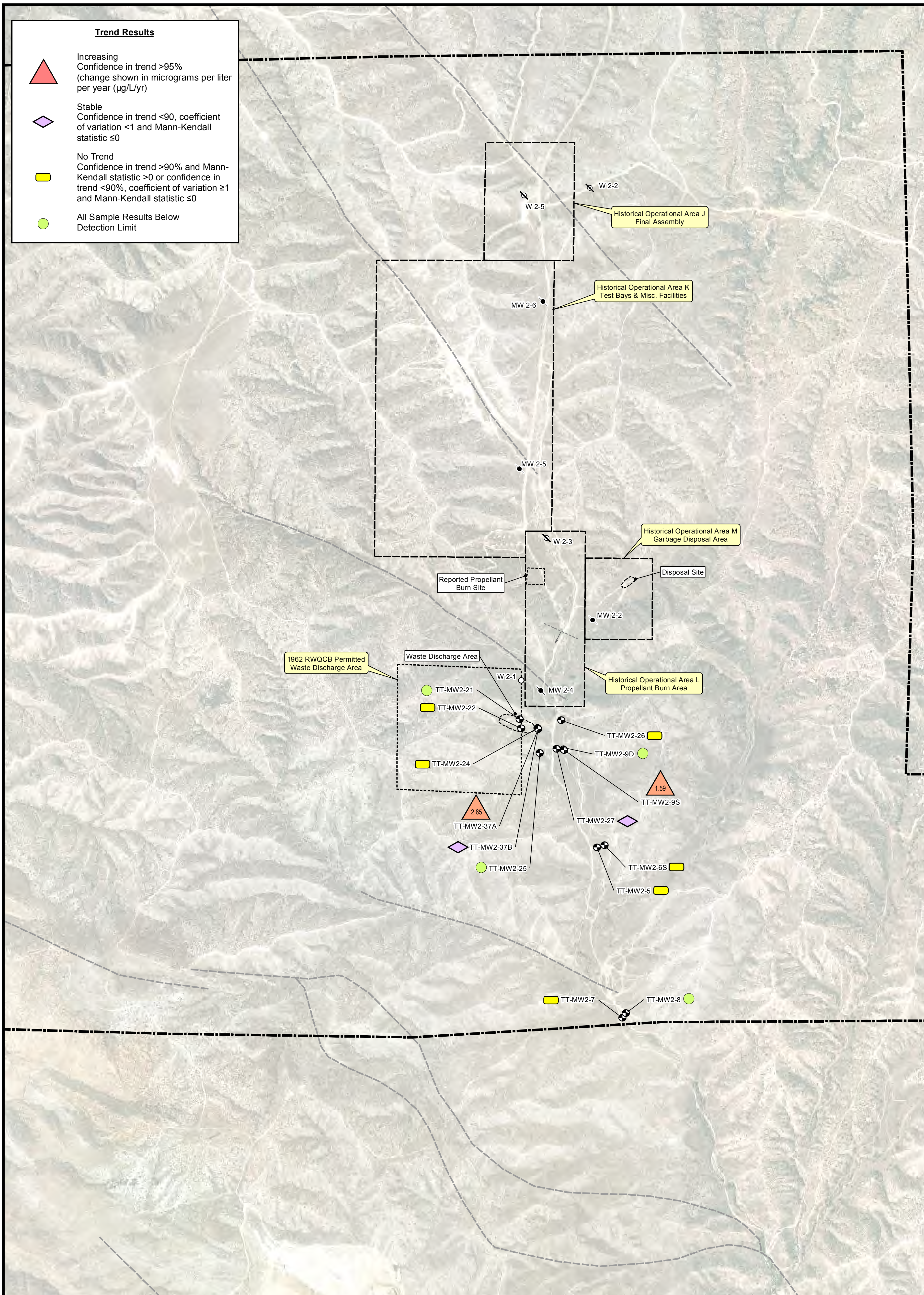
0 500 1,000 Feet

N

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-9

TCE Statistical Analysis Summary Results



LEGEND

- Monitoring Well Location
- Destroyed Production Well Location
- Destroyed Monitoring Well Location
- Reported Production Well Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Beaumont Site 2 Property Boundary

Adapted from:

April 2007 aerial photograph.

Faults from the *Site 2 Lineament Study, Tetra Tech, 2009.*

Note:

Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

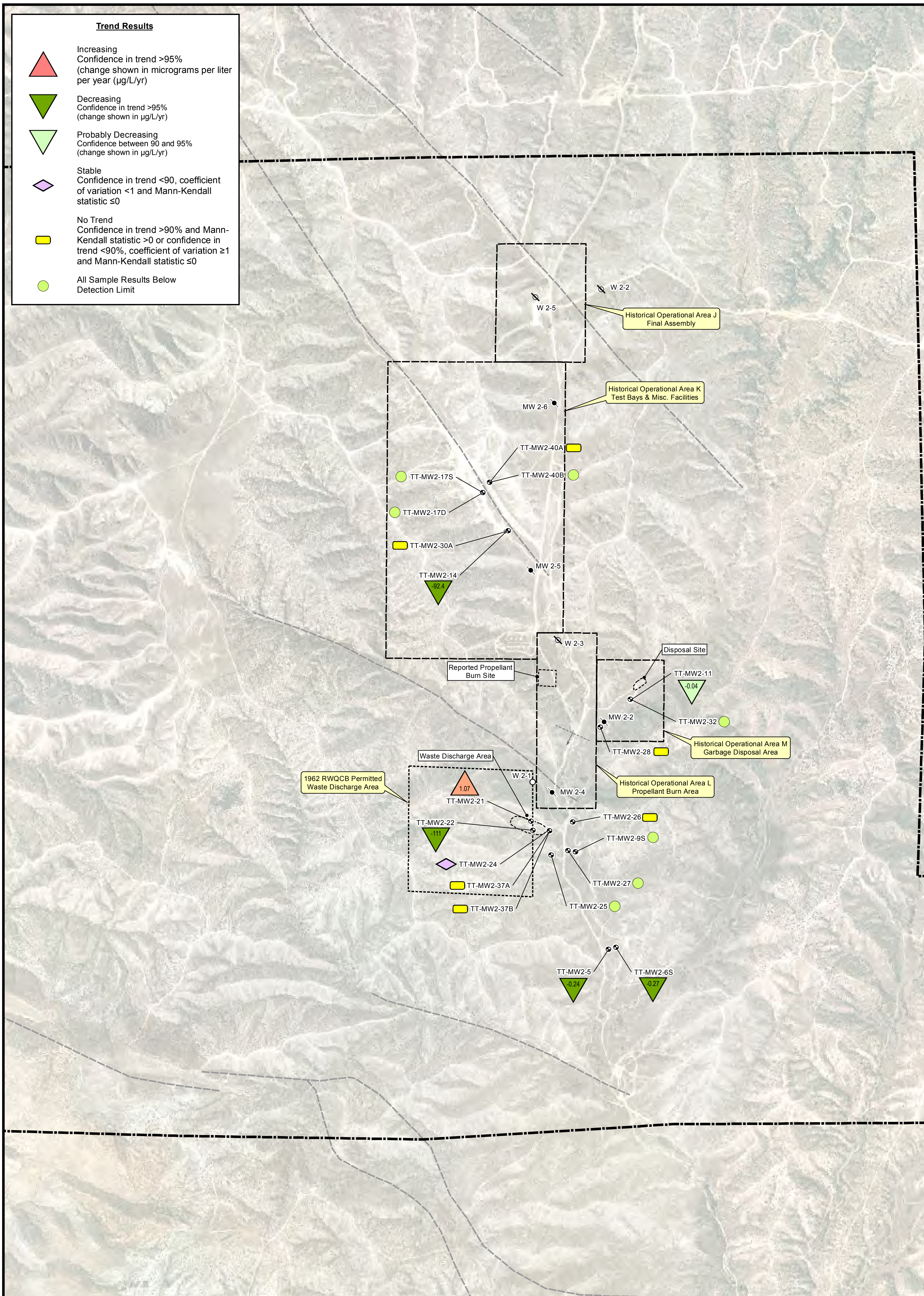
0 500 1,000 Feet

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-10

1,4-Dioxane Statistical Analysis Summary Results

Path: X:\GIS\Lockheed S2 Q2Q311\Trend_MCL.mxd



LEGEND

- Monitiring Well Location
- Destroyed Production Well Location
- Destroyed Monitoring Well Location
- Reported Production Well Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Beaumont Site 2 Property Boundary

Adapted from:

April 2007 aerial photograph.

Faults from the *Site 2 Lineament Study, Tetra Tech, 2009.*

Note:

Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

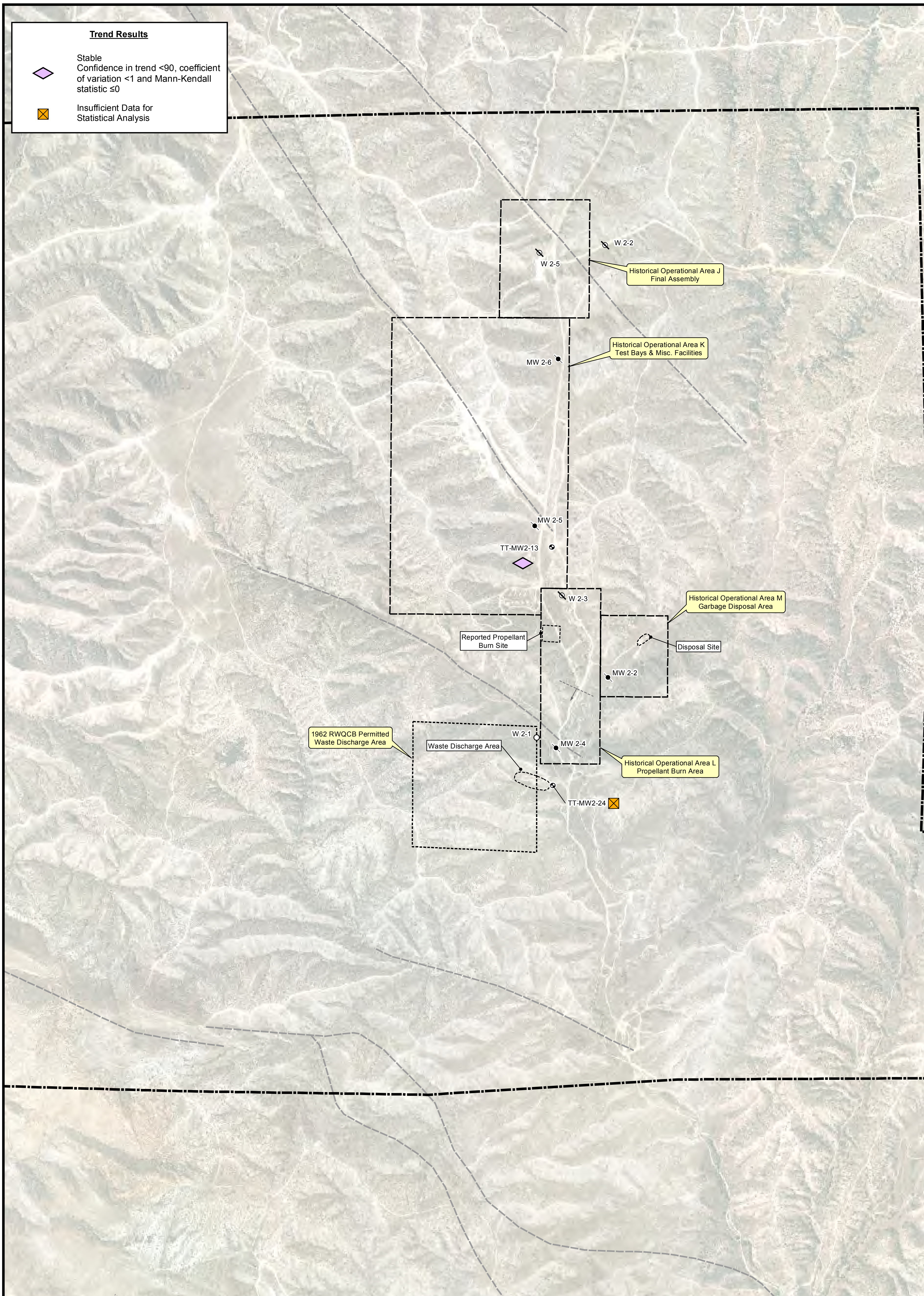
0 500 1,000 Feet

N

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-11

Methylene Chloride Statistical Analysis Summary Results



LEGEND

- Monitoring Well Location
- Destroyed Production Well Location
- Destroyed Monitoring Well Location
- Reported Production Well Location
- Fault, Accurately Located Showing Dip
- Fault, Approximately Located
- RWQCB Permitted Waste Discharge Area
- Historical Operational Area Boundary
- Beaumont Site 2 Property Boundary

Adapted from:

April 2007 aerial photograph.

Faults from the, *Site 2 Lineament Study, Tetra Tech, 2009.*

Note:

Beaumont Site 2 property boundary from Hillwig-Goodrow survey, May 2004.

0 500 1,000 Feet

Laborde Canyon
(Lockheed Martin Beaumont Site 2)

Figure 3-12

RDX Statistical Analysis Summary Results

3.9 Habitat Conservation

Consistent with the U.S. Fish and Wildlife Service approved HCP (USFWS, 2005) and subsequent clarifications (LMC, 2006a and 2006b) of the HCP describing activities for environmental remediation at the Site, field activities were performed under the supervision of a USFWS-approved biologist. No impact to Stephens' Kangaroo rat (SKR) occurred during the performance of field activities related to the second quarter 2011 and third quarter 2011 monitoring events.

Section 4 Summary and Conclusions

This section summarizes the results of the second quarter 2011 and third quarter 2011 groundwater monitoring events. During the second quarter 2011 monitoring event, 67 monitoring well locations and two piezometers were measured for groundwater levels and 50 monitoring wells, three surface water locations, and six private production wells and/or spring samples were sampled for groundwater quality. One private spring and two monitoring wells, TT-MW2-29A and TT-MW2-43, were dry during the second quarter 2011 monitoring event. During the third quarter 2011 monitoring event, 69 monitoring well locations and four piezometers were measured for groundwater levels. Groundwater and surface water samples were not scheduled to be collected during the third quarter 2011 monitoring event. Two monitoring wells, TT-MW2-29A and TT-MW2-43, were found to be dry during the third quarter 2011 monitoring event.

4.1 Groundwater Elevation and Flow

The Beaumont National Weather Station reported approximately 1.09 inches of rain during second quarter 2011 and approximately 0.27 inches of precipitation during third quarter 2011. During this time period, groundwater elevations generally decreased across the site. During second quarter 2011, groundwater elevation increases were seen in the central portion of the site in area L and the WDA, and groundwater elevation decreases were seen in other areas. During third quarter 2011, groundwater elevation increases were seen in the central and southern portion of the site, and elevation decreases were seen in the northern portion of the site and on the former Wolfskill property.

Groundwater elevations during the second quarter 2011 monitoring event ranged from approximately 2,176 feet above msl in the northern portion of the Site, to about 1,821 feet above msl in the southern portion of the Site. Depth to groundwater ranged from about 121 feet bgs to about 15 feet bgs. Groundwater elevations during the third quarter 2011 monitoring event ranged from approximately 2,176 feet above msl in the northern portion of the Site, to about 1,819 feet above msl in the southern portion of the Site. Depth to groundwater ranged from about 121 feet bgs to about 17 feet bgs.

Based on the measured groundwater elevations, the current CSM, and the southward sloping topography at the Site, groundwater flow appears to be to the south, generally following the topography of Laborde Canyon. The overall groundwater elevation at the Site has decreased four to six feet since fourth quarter 2005 with the greatest decrease over time seen in monitoring well TT-MW2-1 (5.7 feet). Limited seasonal fluctuations can be seen to varying degrees following periods of precipitation.

Generally, the seasonal fluctuations in the northern portion of the Site are less pronounced and have a three- to four-month delay before a change in groundwater elevation is noticeable. The wells in Test Bay Canyon, however, appear to respond faster and have a greater change in elevation compared with wells in the main portion of Laborde canyon.

In the southern portion of the Site between the WDA and the southern Site boundary, seasonal fluctuations tend to be more pronounced and have a shorter response time. This is most noticeable in the shallow wells located near the southern property boundary and in the riparian area just south of the property boundary.

On the former Wolfskill property, groundwater elevations have remained relatively stable with noticeable seasonal fluctuations.

Although the data are limited in many of the newer wells, the overall long-term decreasing trend in groundwater elevation appears to generally correspond to long-term precipitation patterns.

4.1.1 Groundwater Gradients

Horizontal groundwater gradients across the Site are relatively constant. The horizontal groundwater gradients calculated between TT-MW2-16 and TT-MW2-6S from the second quarter 2011 and third quarter 2011 groundwater monitoring events for the wSTF-screened wells averaged 0.030 ft/ft. The horizontal groundwater gradients calculated between TT-MW2-2 and TT-MW2-6D for the second quarter 2011 and third quarter 2011 groundwater monitoring events for the deeper STF-screened wells averaged 0.029 ft/ft.

Generally the vertical gradients are downward on-site and upward from the Site boundary south. The vertical gradients range from negative 0.31 ft/ft to positive 0.19 ft/ft. A summary of calculated horizontal and vertical groundwater gradients is presented in Table 3-3 and in Appendix E.

4.2 Surface Water Flow

During the second quarter 2011 and third quarter 2011, the Laborde Canyon drainage channel was walked to determine the presence, nature, and quantity of surface water within the creek beds. Two locations, SF-1 and SF-2, were selected for stream flow measurements. SF-1 is located near Gilman Hot Springs at the southeast border of the Site, and SF-2 is located in the vicinity of TT-MW2-8. Surface water was not present during the second quarter 2011 and third quarter 2011 monitoring events, so stream flow measurements were not taken.

4.3 Water Quality Monitoring

Both groundwater and surface water samples are collected as part of the GMP. The GMP has a quarterly/semiannual/annual frequency. The annual events are larger major monitoring events and the quarterly and semiannual events are smaller minor events. All new wells are sampled quarterly for one year. The semiannual wells are sampled second and fourth quarter of each year, and the annual wells are sampled second quarter of each year.

Groundwater samples collected during the second quarter 2011 monitoring event were analyzed for perchlorate. Select locations were also analyzed for VOCs, 1,4-dioxane, RDX, and CAM 17 Metals. Based on the historical operations at the Site and groundwater monitoring results, perchlorate, TCE, and 1,4-dioxane were identified as primary COPCs. Benzene, methylene chloride, and RDX were identified as secondary COPCs.

4.3.1 Private Production Wells and Springs

Samples from select offsite private production wells and springs were collected as part of the second quarter 2011 monitoring event. Wells and springs were selected that are in close proximity to the Site boundary to monitor for potential impact to offsite water supplies from groundwater leaving the Site. No COPCs were detected in the private production wells or springs that were sampled. The private production wells will continue to be monitored annually during the second quarter sampling event.

4.3.2 Surface Water and Storm Water

Surface water samples are collected from seven storm water sample locations within the Laborde Canyon stream bed, and at three locations at a spring located on the former Wolfskill property. Water is generally present in the Laborde Canyon creek bed only during periods of heavy, prolonged precipitation.

During the second quarter 2011 sampling event, surface water samples were collected from the three spring locations. The samples were analyzed for perchlorate. The remaining seven storm water sampling locations in Laborde Canyon were dry at the time of sampling. Perchlorate was detected in one surface water sample, WS-1, at a concentration of 0.091 µg/L during the second quarter 2011 monitoring event. No other surface water samples were collected during this reporting period.

4.3.3 Groundwater

Area J – Final Assembly

Site COPCs have not been detected above their respective MCLs or DWNLs in Area J. During second quarter 2011, perchlorate was detected in monitoring well TT-MW2-16 at a concentration of 3.4 µg/L. Previously, perchlorate has been detected at concentrations up to 4.94 µg/L in TT-MW2-16. The source of the perchlorate has been investigated but remains unknown.

Area K – Test Bays and Miscellaneous Facilities

Perchlorate, TCE, methylene chloride, and RDX have been detected in Area K. Previously, perchlorate has been detected as high as 190,000 µg/L in Area K. During second quarter 2011 perchlorate was detected at concentrations ranging from below the MDL to 250,000 µg/L. Area K has been identified as a source of perchlorate in groundwater.

TCE has been detected consistently in TT-MW2-17D at concentrations up to 1.2 µg/L. During second quarter 2011 TCE was detected at a concentration of 6.0 µg/L in TT-MW2-17D. Additionally, TCE was detected at a concentration of 0.35 µg/L in TT-MW2-17S. TCE has not been detected in other wells located in Area K. The source of the TCE is unknown.

Methylene chloride has been detected at concentrations ranging from 380 µg/L in fourth quarter 2006 to 0.34 µg/L in second quarter 2011 in monitoring well TT-MW2-14. Methylene chloride has not been detected consistently in other monitoring wells located in Area K. The source of the methylene chloride is unknown.

Previously, RDX has been detected in two monitoring wells, TT-MW2-1 and TT-MW2-13, at concentrations up to 1.6 µg/L in Area K. Additional sampling has been conducted for RDX in select monitoring wells located upgradient and downgradient of these two wells and in wells screened in deeper intervals in comparison to TT-MW2-1 and TT-MW2-13, and it has not been detected above the MDL. RDX continues to be detected in TT-MW2-13 but has not been detected in TT-MW2-1 since October 2007. During second quarter 2011 RDX was detected at a concentration of 0.83 µg/L in TT-MW2-13. The source of the RDX has been investigated (Tetra Tech, 2010a) but remains unknown.

Area L – Propellant Burn Area

Perchlorate is the only Site COPC to be detected in Area L. Area L is located downgradient of Area K, a known perchlorate source area. Previously, perchlorate was detected at concentrations up to 9.98 µg/L. During second quarter 2011, perchlorate was detected in monitoring wells TT-MW2-4S and TT-MW2-10 at concentrations of 0.62 µg/L and 0.11 µg/L, respectively. There is currently no indication that a perchlorate source is present in Area L; the perchlorate detected in Area L groundwater appears to have originated upgradient in Area K.

Area M - Garbage Disposal Area

Perchlorate and TCE have been detected in Area M. Previously, perchlorate was detected at concentrations up to 469 µg/L in well TT-MW2-11. During the second quarter 2011, perchlorate was detected at concentrations ranging from below the MDL to 210 µg/L. Area M has been identified as a source of perchlorate in groundwater.

TCE has been consistently detected in groundwater samples collected from monitoring well TT-MW2-11 at concentrations up to 9.2 µg/L. During the second quarter 2011, TCE was detected at a concentration of 5.9 µg/L. TCE has not been detected in other wells in Area M.

Waste Discharge Area

Perchlorate, TCE, methylene chloride, 1,4-dioxane, and RDX have been detected in the WDA. The WDA is located downgradient of operational areas J, K, L, and M but they do not appear to be contributing to the impacts observed in at the WDA in a material way.

Previously, perchlorate was detected at concentrations as high as 190,000 µg/L. Perchlorate was detected in groundwater at concentrations ranging from below the MDL to 160,000 µg/L during the second quarter 2011. The former WDA has been identified as a source of perchlorate in groundwater.

Previously, TCE was detected at concentrations as high as 460 µg/L in monitoring wells located in the WDA. During the second quarter 2011, TCE was detected in groundwater at concentrations ranging from below the MDL to 420 µg/L. The WDA has been identified as a source of TCE in groundwater. TCE has not been detected consistently, or above the MCL in monitoring wells downgradient of the WDA.

Methylene chloride was detected as high as 220 µg/L in monitoring well TT-MW2-22 during second quarter 2008. Since that time, the concentration of methylene chloride has dropped to a concentration of 5.2 µg/L during the second quarter 2011. Methylene chloride has not been detected in monitoring wells downgradient of the former WDA.

Previously, 1,4-dioxane was detected as high as 420 µg/L in monitoring wells located in the former WDA. 1,4-Dioxane was detected in groundwater at concentrations ranging from below the MDL to 320 µg/L during the second quarter 2011. The WDA has been identified as a source of 1,4-dioxane in groundwater, and this constituent has been detected in downgradient monitoring wells. The 1,4-dioxane DWNL is 1 µg/L.

Previously, RDX was reported in groundwater samples collected from monitoring well TT-MW2-24 located at the former WDA at concentrations as high as 5.9 µg/L. During second quarter 2011 RDX was detected in TT-MW2-24 at a concentration of 2.1 µg/L. RDX has not been detected in other wells located in or downgradient of the former WDA. The DWNL for RDX is 0.3 µg/L.

Lower Canyon and Riparian Corridor

Perchlorate, TCE, and 1,4-dioxane have been detected in the lower portion of Laborde Canyon downgradient from the WDA. Perchlorate has also been detected in the riparian corridor south of the property boundary. In the lower section of Laborde Canyon, perchlorate was detected at concentrations as high as 10,000 µg/L, up to 519 µg/L at the southern Site boundary, and up to 0.18 µg/L in the riparian corridor south of the southern Site boundary. During the second quarter 2011, perchlorate was detected in groundwater at concentrations ranging from 850 µg/L in the northern portion of the lower Laborde Canyon to below the MDL in the riparian corridor. No source of perchlorate has been identified in the lower canyon or at the southern Site boundary. The perchlorate appears to have originated in the former WDA.

TCE was detected in monitoring well TT-MW2-9S located in the northern portion of the lower Laborde Canyon at a concentration of 1.6 µg/L during the second quarter 2011 monitoring event. TCE has not been detected in other wells located in the lower canyon or riparian corridor area. The source of the TCE appears to be the WDA.

During the second quarter 2011 monitoring event, 1,4-dioxane was detected in groundwater at concentrations ranging from 15 µg/L in the northern portion of the lower Laborde Canyon to below the MDL in the riparian corridor. No source of 1,4-dioxane has been identified in the lower canyon or at the southern Site boundary. The 1,4-dioxane appears to have originated in the former WDA.

Former Wolfskill Property

On the former Wolfskill property, south of the southern Site boundary, perchlorate was detected in TT-MW1-19S during second quarter 2011 at a concentration of 4.7 µg/L. These results are consistent with historic results. Perchlorate has not been detected in monitoring well TT-MW2-20S or TT-MW2-20D, located approximately one half mile south of TT-MW2-19S.

Summary

Based on the data available at this time, the TCE, methylene chloride, and RDX plumes in groundwater appear to be small and isolated. These plumes do not extend offsite. The 1,4-dioxane plume is limited to the WDA and lower Laborde Canyon, and does not appear to extend offsite. The perchlorate plume does appear to extend offsite, but the offsite extent of perchlorate appears to be limited by naturally-occurring phytoremediation or biodegradation in the riparian corridor south of the southern Site boundary. The perchlorate detected in monitoring well TT-MW2-19S located on the former Wolfskill property appears to be an isolated impacted area which may have resulted from preferential flow in higher-conductivity alluvium during a prolonged period of heavy precipitation in the past.

4.4 Temporal Trend Analysis

Groundwater sampling results from the 50 wells and eight surface water locations sampled between fourth quarter 2010 and third quarter 2011 were included in the temporal trend analyses. Temporal trend analysis of perchlorate, TCE, methylene chloride, 1,4-dioxane, and RDX (the Site COPCs) were performed using data from second quarter 2004 to third quarter 2011. This temporal trend analysis updates the analysis presented in the Second Quarter 2010 and Third Quarter 2010

Groundwater Monitoring Report (Tetra Tech, 2010c). The temporal trends were analyzed using Mann-Kendall and linear regression methods. The magnitudes of the trends are presented as changes in concentration per year.

The number of increasing or probably increasing trend wells has increased from 11 wells in 2010 to 16 wells in the 2011 temporal trend analyses. This increase is attributed to the relatively large number of new wells that have been installed in the last several years (41 new wells since 2008), and the number of wells that have historically yielded no trend or had insufficient data to test for a trend. The number of decreasing trend, probably decreasing trend, and stable trend wells has increased during this period as well. Tables 4-1 through 4-4 display a summary of the historic trend analyses for TCE, perchlorate, and 1,4-dioxane.

Table 4-1 Historic TCE Trend Summary in Monitoring Wells

Trend Category	Locations Tested					
	2006	**2007**	**2008**	**2009**	**2010**	**2011**
"N/A"-Insufficient Data	3	0	6	30	2	0
"ND" - Non-Detect (new designation)	--	--	--	--	7	3
"NT" - No Trend	5	5	2	12	31	18
"S" - Stable	0	8	7	11	10	6
"I" - Increasing	0	4	5	3	7	8
"PI" -Probably Increasing	0	0	1	1	1	4
"D" - Decreasing	0	4	3	3	5	8
"PD" -Probably Decreasing	0	0	1	1	1	3
Total Locations Tested	8	21	25	61	64	50
Notes: -- ND (non-detect) was not a category designation prior to the 2010 statistics.						

Table 4-2 Historic Perchlorate Trend Summary in Monitoring Wells

Trend Category	Locations Tested					
	2006	**2007**	**2008**	**2009**	**2010**	**2011**
"N/A"-Insufficient Data	3	0	6	31	0	0
"ND" – Non-Detect (new designation)	--	--	--	--	50	11
"NT" - No Trend	1	1	2	1	5	2
"S" - Stable	4	20	16	24	0	1
"I" - Increasing	0	0	1	1	4	6
"PI" -Probably Increasing	0	0	0	1	0	0
"D" - Decreasing	0	0	0	0	0	0
"PD" -Probably Decreasing	0	0	0	0	0	0
Total Locations Tested	8	21	25	58	59	20
Notes: -- ND (non-detect) was not a category designation prior to the 2010 statistics.						

Table 4-3 Historic 1,4-Dioxane Trend Summary in Monitoring Wells

Trend Category	Locations Tested					
	2006	2007	2008	2009	2010	2011
"N/A"-Insufficient Data	--	--	--	22	0	0
"ND" – Non-Detect (new designation)	--	--	--	--	6	4
"NT" - No Trend	--	--	--	0	6	6
"S" - Stable	--	--	--	0	1	2
"I" - Increasing	--	--	--	0	0	2
"PI" -Probably Increasing	--	--	--	0	0	0
"D" - Decreasing	--	--	--	0	0	0
"PD" -Probably Decreasing	--	--	--	0	0	0
Total Locations Tested	0	0	0	22	13	14

Notes:
-- ND (non-detect) was not a category designation prior to the 2010 statistics.

Table 4-4 Historic Perchlorate Trend Summary in Surface Water

Trend Category	Locations Tested					
	2006	2007	2008	2009	2010	2011
"N/A"-Insufficient Data	0	0	0	1	5	0
"ND" – Non-Detect (new designation)	--	--	--	--	1	1
"NT" - No Trend	0	0	0	1	0	2
"S" - Stable	0	0	0	0	1	4
"I" - Increasing	0	0	0	0	0	0
"PI" -Probably Increasing	0	0	0	0	0	0
"D" - Decreasing	0	0	0	0	1	1
"PD" -Probably Decreasing	0	0	0	0	0	0
Total Locations	0	0	0	2	8	8

Notes:
-- ND (non-detect) was not a category designation prior to the 2010 statistics.

A summary of the trend analysis results for the 16 well locations with increasing or probably increasing trends is presented in Table 4-5. The second quarter 2011 concentrations and percent change that these increases represent with respect to the mean of the data used to calculate each trend is also presented in Table 4-5.

Table 4-5 Summary of Increasing COPC Trends – Second Quarter 2011

Analyte:	Perchlorate				Trichloroethene				Methylene Chloride				1,4-Dioxane				RDX	
Well Location	Q2 - 2011 Results (µg/L)	Trend	Magnitude (µg/L/yr)	Magnitude (%/yr)	Q2 - 2011 Results (µg/L)	Trend	Magnitude (µg/L/yr)	Magnitude (%/yr)	Q2 - 2011 Results (µg/L)	Trend	Magnitude (µg/L/yr)	Magnitude (%/yr)	Q2 - 2011 Results (µg/L)	Trend	Magnitude (µg/L/yr)	Magnitude (%/yr)	Q2 - 2011 Results (µg/L)	Trend
Area K																		
TT-MW2-1	**6,500**	**Increasing**	372	6.21	-	Not Analyzed			-	Not Analyzed			-	Not Analyzed			-	Not Analyzed
TT-MW2-17S	**1,300**	**Decreasing**	196	2.92	0.35 Jq	Increasing	0.03	15.9	<0.15	Non-Detect			-	Not Analyzed			-	Not Analyzed
TT-MW2-17D	**90,000**	**Probably Increasing**	1,898	3.65	**6.0**	**No Trend**			<0.15	Non-Detect			-	Not Analyzed			-	Not Analyzed
TT-MW2-34A	5.0	Probably Increasing	0.55	36.5	-	Not Analyzed			-	Not Analyzed			-	Not Analyzed			-	Not Analyzed
TT-MW2-38A	**250,000**	**Increasing**	46,720	29.2	-	Not Analyzed			-	Not Analyzed			-	Not Analyzed			-	Not Analyzed
TT-MW2-38C	**160,000**	**Probably Increasing**	66,248	201	-	Not Analyzed			-	Not Analyzed			-	Not Analyzed			-	Not Analyzed
Area M																		
TT-MW2-11	**210**	**Stable**			**5.9**	**Increasing**	0.24	3.47	<0.15	Probably Decreasing	-0.04	-12.2	-	Not Analyzed			-	Not Analyzed
Area L																		
TT-MW2-4S	0.62	Increasing	0.04	6.75	-	Not Analyzed			-	Not Analyzed			-	Not Analyzed			-	Not Analyzed
Former Waste Discharge Area																		
TT-MW2-21	**17**	**Increasing**	2.63	67.5	4.3	Increasing	0.99	54.8	**5.2**	**Increasing**	1.07	34.7	<0.10	Non-Detect			-	Not Analyzed
TT-MW2-22	<0.071	Non Detect			**420**	**Increasing**	81.8	29.2	3.6	Decreasing	-111	-69.4	**53**	No Trend			-	Not Analyzed
TT-MW2-24	**160,000**	**Probably Increasing**	3,833	2.74	**92**	**Stable**			0.58 Jq	Stable			**320**	No Trend			**2.1**	Insufficient Data
TT-MW2-37A	1.2	No Trend			3.5	Increasing	0.60	60.2	<0.15	No Trend			**18**	**Increasing**	2.85	31.0	-	Not Analyzed
Lower Canyon (Downgradient and Crossgradient of the Former Waste Discharge Area)																		
TT-MW2-9S	**9,200**	**Increasing**	1,330	49.3	1.6	Increasing	0.12	32.9	<0.15	Non-Detect			**15**	**Increasing**	1.59	17.7	-	Not Analyzed
TT-MW2-26	**100**	**Increasing**	19.6	29.2	<0.25	Non Detect			<0.15	No Trend			<0.10	No Trend			-	Not Analyzed
TT-MW2-27	**260**	**Increasing**	57.5	38.3	<0.25	Non Detect			<0.15	Non-Detect			0.66	Stable			-	Not Analyzed
Former Wolfskill Property																		
TT-MW2-19S	4.7	Increasing	1.28	34.7	-	Not Analyzed			-	Not Analyzed			-	Not Analyzed			-	Not Analyzed
MCL / DWNL	6.0				5.0				5.0				3 (1)				0.3 (1)	

Notes:

Shading indicates locations where the magnitude of the increasing or probably increasing trend represents greater than a 20 percent change.

%/yr - Percent change per year with respect to the sample mean

µg/L - Micrograms per liter

MCL - California Department of Public Health maximum contaminant level

DWNL - California Department of Public Health drinking water notification level

(1) - DWNL

Bold - MDL or DWNL exceeded.

NA - Not analyzed

< # - Method detection limit concentration is shown.

J - The analyte was positively identified, but the concentration is an estimated value.

q - The analyte detected was below the Practical Quantitation Limit (PQL).

Area K – Area K is one of the primary source areas for the Site COPCs. Six of the 16 wells identified with increasing trends were from monitoring wells located in this area. Of these six wells, two (TT-MW2-17S and TT-MW2-34C) are wells which have low-level detections of the increasing concentration analyte. Six of the wells in Area K had decreasing or probably decreasing trends. The remaining 11 wells located in Area K were either non-detect for all analytes or displayed no trend or a stable trend.

Area L (Downgradient of Area K) – There are no known contaminant sources in Area L. One of the 16 wells identified with increasing trends was from a monitoring well located in this area. The remaining three wells located in Area L were either non-detect for all analytes (TT-MW2-35A) or displayed a decreasing trend (TT-MW2-10 and TT-MW2-12).

Area M – Area M is a secondary source area for the Site COPCs. One of the 16 wells identified with increasing trends was from a monitoring well located in this area. The remaining two wells located in Area M were either non-detect for all analytes (TT-MW2-32) or displayed a decreasing trend (TT-MW2-28).

Former Waste Discharge Area – The former WDA is one of the primary source areas for the Site COPCs. Four of the 16 wells identified with increasing or probably increasing trends were from monitoring wells located in this area. The remaining well located in the former WDA (TT-MW2-37B) was either non-detect for all analytes or displayed no trend or a stable trend.

Lower Canyon Area (Downgradient or Crossgradient of the Former Waste Discharge Area) – There are no known contaminant sources in the lower canyon area. Three of the 16 wells with increasing trends identified were from monitoring wells located in this area. Five of the wells in the lower canyon had decreasing or probably decreasing trends. The remaining five wells located in lower canyon were either non-detect for all analytes or displayed no trend or a stable trend. Two of the Site's guard wells are located in this area. Guard wells TT-MW2-41A and TT-MW2-42A are located approximately 600 feet and 1,000 feet south of the Site boundary respectively, and displayed stable COPC trends. It is believed that natural attenuation of perchlorate may be occurring in the riparian area between the Site boundary and the guard wells. The COPC plumes diminish significantly through this area.

Former Wolfskill Property – There are no known contaminant sources on the former Wolfskill Property. One of the 16 wells with increasing trends identified was a monitoring well located in this area. The remaining two wells located in the lower canyon were either non-detect for all samples analyzed or displayed no trend. The remaining Site guard wells are located in this area. Guard wells TT-MW2-19S and D and TT-MW2-20S are located approximately 0.9 miles and 1.7 miles south of the Site boundary, respectively. Guard wells TT-MW2-19S, TT-MW2-19D, and TT-MW2-20S primarily displayed non-detect, no trend or decreasing COPC trends, with the exception of TT-MW2-19S, which had an increasing perchlorate trend.

The relatively short time frame represented by the data analyzed, (half of the wells have less than two years of data), makes it difficult to know the reason for the trends observed. The trends may represent plume migration, seasonal fluctuations in concentration due to the continuing drought conditions experienced at the Site. Further, early data in a monitoring program can be biased by temporary changes in water chemistry resulting from well installation. It can take several monitoring events before these temporary changes are reversed and representative groundwater is sampled. As the period of record grows, and the number of data points increases, the trends should become better defined and more reliable long-term trends should emerge from the data. In general, the plume morphology has not changed and the majority of the wells and the surface water locations display a stable trend, no trend, or are non-detect.

4.5 Groundwater Monitoring Program and the Groundwater Quality Monitoring Network

Twenty-eight quarters of water quality monitoring have been conducted at the Site since the September 2004 well installation activities. Groundwater samples have been routinely analyzed for VOCs and perchlorate. Selected testing for CAM 17 Metals, general minerals, 1,4-dioxane, RDX, N-nitrosodimethylamine, 1,2,3-trichloropropane, and hexavalent chromium has also been performed. A groundwater monitoring SAP was prepared to optimize and better define the GMP at the Site (Tetra Tech, 2007a). In concurrence with DTSC, groundwater monitoring will continue to be performed in accordance with the SAP.

4.5.1 Groundwater Sampling Frequency

The primary criterion utilized in determining the sampling frequency of a monitoring well is the well classification (i.e., function of each well) (Tetra Tech, 2007a). Groundwater monitoring-well classifications are based on the evaluation of the temporal trends, spatial distribution analyses, and other qualitative criteria. During the previous reporting period, horizontal extent wells, vertical distribution wells, increasing contaminant trend wells, background wells, guard wells, and new wells were sampled. Table 4-6 presents a summary of the frequency of groundwater sampling by well classification.

Table 4-6 Well Classification and Sampling Frequency

Well Classification	Frequency
Horizontal Extent Wells	Semiannual
Vertical Distribution Wells	Semiannual
Increasing Contaminant Trend Wells	Semiannual
Background Wells	Annual
Remedial Monitoring Wells	Varies, based on remedial action proposed
Guard Wells	Semiannual
New Wells	4 quarters then reclassify
Redundant Wells	Suspend (no sampling)

4.5.2 Proposed Changes

The sampling frequency for wells with an increasing trend may be increased to semiannual if the magnitude of the trend and the wells' location warrant an increased frequency. Regardless of the outcome of the trend analysis, guard wells will continue to be sampled semiannually. The monitoring frequency of all other wells exhibiting an increasing trend will be evaluated on a case-by-case basis, with particular attention given to the magnitude of the trend and the location of the well. For the second quarter 2011 trend analysis, six of the 16 locations with increasing or probably increasing trends had trend magnitudes of less than 20% per year. The six locations with lower magnitude trends are considered to be less critical than the ten locations with magnitudes greater than 20% per year. Only those wells with trends magnitudes greater than 20% per year are considered to be increasing trend wells for the purpose of well classification.

Based on the results of the temporal trend analysis and the magnitude of their trends, continued semiannual sampling is proposed for increasing or probably increasing concentration trend wells TT-MW2-21, TT-MW2-22, and TT-MW2-37A located in the former WDA, TT-MW2-9S and TT-MW2-26 located in the lower canyon area, and TT-MW2-19S located on the former Wolfskill Property. Additionally it is proposed to reclassify monitoring wells TT-MW2-34A and TT-MW2-38A located in Area K, and TT-MW2-27 located in the lower canyon, as increasing trend wells.

Due to the change in the low magnitude increasing trend in 2010 to no trend in 2011, it is proposed that monitoring well TT-MW2-29C, located in Area K, return to its previously approved annual sampling frequency. Due to the limited magnitude of the trends, it is proposed that monitoring wells TT-MW2-1, TT-MW2-17S, and TT-MW2-17D, located in Area K, TT-MW2-11 located in Area M, TT-MW2-4S located in Area L, and TT-MW2-24 located in the former WDA retain their previous classifications of horizontal extent (TT-MW2-1, TT-MW2-17S, TT-MW2-11 TT-MW2-4S and TT-MW2-24) and vertical distribution (TT-MW2-17D) and previously approved semi-annual sampling frequencies.

Perchlorate concentrations in monitoring well TT-MW2-38C have increased from non-detectable to 160,000 over a period of one year, and a probably increasing trend was noted in the trend analysis. Based on the high perchlorate concentrations observed in shallow groundwater at TT-MW2-38A and the magnitude of the concentration increase observed in TT-MW2-38C, it is possible that the TT-MW2-38C well casing has developed a leak. A plan to investigate this possibility is being developed, and DTSC will be apprised of the results as they are obtained. TT-MW2-38C will be sampled semi-annually until the structural integrity of the well is investigated. Based on that information a determination will be made to destroy the well or to continue sampling.

The analytical scheme is evaluated annually during the second quarter of each year and changes may be proposed to accommodate expanded Site knowledge or changing Site conditions. The classifications of the wells in the network and the corresponding sampling frequency are also evaluated annually during the second quarter of each year and modified to accommodate expanded knowledge or changing conditions.

The proposed groundwater analytical program includes the following suite of analysis:

Perchlorate quarterly for all new monitoring wells, and semiannually or annually in all monitored wells, by EPA Method E332.0

VOCs, including oxygenates, quarterly for all new monitoring wells, semiannually for wells with increasing trends and VOC source area wells, or annually for wells with consistent VOC detections, by EPA Method SW8260B

1,4-dioxane semiannually for wells with increasing trends and wells located in source areas, and annually for wells with consistent (stable trend) 1,4-dioxane detections, by EPA Method SW 8270C SIM

RDX annually for select wells, by EPA Method SW8330.

CAM 17 Metals (total and/or dissolved) were analyzed annually until the 2010 GMP optimization, when metals analyses were limited to wells with one or more detections above the MCL and to wells where groundwater was shallower than 25 feet bgs. It is proposed that metals analysis be removed from the groundwater analytical program at this time. The rationale for removing metals from the analytical program is as follows:

- The recently submitted draft Human Health and Ecological Risk Assessment found no significant human health risks or ecological risks due to metals in groundwater.
- The Dynamic Site Investigation and Summary Remedial Investigation Report (Tetra Tech, 2010a) found no evidence for metals contamination at Laborde Canyon other than small surficial releases of cadmium, lead, and zinc in Area J, Area K, and the WDA.

VOCs have been analyzed annually in storm water samples collected during the first quarter of each year since 2008. With the exception of three low-level methylene chloride detections, VOCs have not been detected in the storm water samples. Furthermore, no shallow VOC source areas that could come into contact with surface runoff are known to be present at the Site. For these reasons, it is proposed that VOC analysis of storm water samples be removed from the groundwater analytical program at this time.

General mineral analyses will be performed on selected wells to determine cation and anion geochemistry for the aquifer. General minerals analysis will not be performed on new monitoring wells for a minimum of six months after installation to allow the aquifer to stabilize. The following suite of general mineral analyses will be performed during selected groundwater sampling events:

Total Dissolved Solids (TDS) by EPA Method E160.1;

Chloride, nitrate (as nitrogen), and sulfate by EPA Method E300.0;

Carbonate and bicarbonate (as calcium carbonate) by EPA Method E310.1;

Calcium, manganese, potassium, and sodium by EPA Method SW6010.

Table 4-7 summarizes the proposed monitoring well sampling schedule and frequency.

Table 4-7 Monitoring Well Sampling Schedule and Frequency

4th Quarter 2010 to 3rd Quarter 2011 Monitoring Program

Monitoring Well	Classification	VOCs (EPA SW8260B)				Perchlorate (EPA E332.0)				Total Metals (EPA 6010B/7470A)				1,4-Dioxane (EPA SW8270C SIM)				RDX (EPA SW8330)			
		2010	2011			2010	2011			2010	2011			2010	2011			2010	2011		
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Surface Water Locations																					
WS-1	-					●		●													
WS-2	-					●		●													
WS-3	-					●		●													
Storm Water Locations																					
SW-01	-		●				●														
SW-02	-		●				●														
SW-03	-		●				●														
SW-04	-		●				●														
SW-05	-		●				●														
SW-06	-		●				●														
SW-07	-		●				●														
Private Production Wells and Springs																					
PPW1	-							●													
PPW2	-							●													
PPW3	-							●													
PPW4	-							●													
PPW5	-							●													
PPW6	-							●													
PPW7	-							●													
Monitoring Wells																					
TT-MW2-1	H					●		●													
TT-MW2-2	R																				
TT-MW2-3	R																				
TT-MW2-4S	H					●		●				●									
TT-MW2-4D	R																				
TT-MW2-5	H			●		●		●						●		●					
TT-MW2-6S	H			●		●		●						●		●					
TT-MW2-6D	V					●		●				●									
TT-MW2-7	H					●		●								●					
TT-MW2-7D	V					●		●				●									
TT-MW2-8	H					●		●								●					
TT-MW2-9S	I			●		●		●						●		●					
TT-MW2-9D	V					●		●								●					
TT-MW2-10	H					●		●													
TT-MW2-11	H	●		●		●		●													
TT-MW2-12	H					●		●													
TT-MW2-13	H					●		●												●	
TT-MW2-14	H			●		●		●													
TT-MW2-16	B							●													
TT-MW2-17S	H			●		●		●													
TT-MW2-17D	V			●		●		●													
TT-MW2-18	V					●		●													
TT-MW-19S	I					●		●													
TT-MW-19D	V					●		●													
TT-MW-20S	G					●		●													
TT-MW-20D	R																				
TT-MW2-21	I	●		●		●		●				●				●					
TT-MW2-22	I	●		●		●		●				●		●		●					
TT-MW2-23	R																				
TT-MW2-24	H	●		●		●		●						●		●				●	

Proposed 4th Quarter 2011 to 3rd Quarter Monitoring Program

Monitoring Well	Classification	VOCs (EPA SW8260B)				Perchlorate (EPA E332.0)				Total Metals (EPA 6010B/7470A)				1,4-Dioxane (EPA SW8270C SIM)				RDX (EPA SW8330)			
		2011	2012			2011	2012			2011	2012			2011	2012			2011	2012		
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
Surface Water Locations																					
WS-1	-					●		●													
WS-2	-					●		●													
WS-3	-					●		●													
Storm Water Locations																					
SW-01	-						●														
SW-02	-						●														
SW-03	-						●														
SW-04	-						●														
SW-05	-						●														
SW-06	-						●														
SW-07	-						●														
Private Production Wells and Springs																					
PPW1	-							●													
PPW2	-							●													
PPW3	-							●													
PPW4	-							●													
PPW5	-							●													
PPW6	-							●													
PPW7	-							●													
Monitoring Wells																					
TT-MW2-1	H					●		●													
TT-MW2-2	R																				
TT-MW2-3	R																				
TT-MW2-4S	H					●		●													
TT-MW2-4D	R																				
TT-MW2-5	H			●		●		●						●		●					
TT-MW2-6S	H			●		●		●						●		●					
TT-MW2-6D	V					●		●													
TT-MW2-7	H					●		●						●		●					
TT-MW2-7D	V					●		●													
TT-MW2-8	H					●		●						●		●					
TT-MW2-9S	I	●		●		●		●						●		●					
TT-MW2-9D	V					●		●								●					
TT-MW2-10	H					●		●													
TT-MW2-11	H			●		●		●													
TT-MW2-12	H					●		●													
TT-MW2-13	H					●		●												●	
TT-MW2-14	H			●		●		●													
TT-MW2-16	B							●													
TT-MW2-17S	H			●		●		●													
TT-MW2-17D	V			●		●		●													
TT-MW2-18	V					●		●													
TT-MW-19S	I					●		●													
TT-MW-19D	V					●		●													
TT-MW-20S	G					●		●													
TT-MW-20D	R																				
TT-MW2-21	I	●		●		●		●								●					
TT-MW2-22	I	●		●		●		●						●		●					
TT-MW2-23	R																				
TT-MW2-24	H	●		●		●		●						●		●				●	

Notes:

EPA - United States Environmental Protection Agency
VOCs - Volatile organic compounds
RDX - Hexahydro-1,3,5-trinitro-1,3,5-triazine
Highlighting indicates change in sampling frequency.

G - Guard well
H - Horizontal extent well
I - Increasing contaminant trend well
R - Redundant well
V - Vertical distribution well

Table 4-7 Monitoring Well Sampling Schedule and Frequency (continued)

Monitoring Well	Classification	4th Quarter 2010 to 3rd Quarter 2011 Monitoring Program																				Classification	Proposed 4th Quarter 2011 to 3rd Quarter Monitoring Program																			
		VOCs (EPA SW8260B)				Perchlorate (EPA E332.0)				Total Metals (EPA 6010B/7470A)				1,4-Dioxane (EPA SW8270C SIM)				RDX (EPA SW8330)					VOCs (EPA SW8260B)				Perchlorate (EPA E332.0)				Total Metals (EPA 6010B/7470A)				1,4-Dioxane (EPA SW8270C SIM)				RDX (EPA SW8330)			
		2010	2011			2010	2011			2010	2011			2010	2011			2010	2011				2011	2012			2011	2012			2011	2012			2011	2012			2011	2012		
		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q		4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
TT-MW2-25	H			●		●		●								●						H			●		●		●								●					
TT-MW2-26	I			●		●		●				●				●						I			●		●		●								●					
TT-MW2-27	H			●		●		●				●				●						I			●		●		●								●					
TT-MW2-28	H	●		●		●		●				●										H					●		●													
TT-MW2-29A	B							●				●										B							●													
TT-MW2-29B	B							●				●										B							●													
TT-MW2-29C	I					●		●														B							●													
TT-MW2-30A	V			●		●		●				●										V			●		●		●													
TT-MW2-30B	V					●		●														V					●		●													
TT-MW2-30C	V					●		●														V					●		●													
TT-MW2-31A	V					●		●														V					●		●													
TT-MW2-31B	R																					R																				
TT-MW2-32	V			●		●		●				●										V			●		●		●													
TT-MW2-33A	H					●		●														H					●		●													
TT-MW2-33B	R																					R																				
TT-MW2-33C	R																					R																				
TT-MW2-34A	H					●		●														H					●		●													
TT-MW2-34B	R																					R																				
TT-MW2-34C	R																					R																				
TT-MW2-35A	V					●		●				●										V					●		●													
TT-MW2-35B	R																					R																				
TT-MW2-36A	H					●		●				●										H					●		●													
TT-MW2-36B	R																					R																				
TT-MW2-36C	R																					R																				
TT-MW2-37A	I			●		●		●				●				●						I	●		●		●		●						●		●					
TT-MW2-37B	V			●		●		●				●				●						V			●		●		●								●					
TT-MW2-38A	H					●		●														I					●		●													
TT-MW2-38B	V					●		●				●										V					●		●													
TT-MW2-38C	V					●		●				●										V					●		●													
TT-MW2-39	H					●		●				●										H					●		●													
TT-MW2-40A	H			●		●		●														H			●		●		●													
TT-MW2-40B	V			●		●		●														V			●		●		●													
TT-MW2-40C	R																					R																				
TT-MW2-41A	H					●		●														H					●		●								●					
TT-MW2-42A	G					●		●				●										G					●		●								●					
TT-MW2-43	R																					R																				
Piezometers (Not Sampled)																																										
TT-MW2-41B	-																					-																				
TT-MW2-42B	-																					-																				
TT-PZ2-1	-																					-																				
TT-PZ2-2	-																					-																				
TT-PZ2-3	-																					-																				
TT-PZ2-4	-																					-																				
Extraction Wells (Not Sampled)																																										
TT-EW2-1	-																					-																				
TT-EW2-2	-																					-																				
TT-EW2-3	-																					-																				
TT-EW2-4	-																					-																				
Totals	-	9	9	21	1	54	9	62	1	3	2	21	1	8	2	15	1	3	2	3	1	-	13	2	20	1	53	9	62	1	3	2	1	1	11	2	17	1	3	2	3	1
		40				**126**				**27**				**26**				**9**					**36**				**125**				**7**				**31**				**9**			

Notes:

EPA - United States Environmental Protection Agency
VOCs - Volatile organic compounds
RDX - Hexahydro-1,3,5-trinitro-1,3,5-triazine
Highlighting indicates change in sampling frequency

G - Guard well
H - Horizontal extent well
I - Increasing contaminant trend well
R - Redundant well
V - Vertical distribution well

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