REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Service Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ORGANIZATION.

1. REPORT DATE *(DD-MM-YYYY)*
11-05-2011

2. REPORT TYPE
Final

3. DATES COVERED *(From - To)*
August 2010 through March 2011

4. TITLE AND SUBTITLE
Closure Plan Former High Energy Laser Systems Test Facility (HELSTF)
Construction Landfills SWMUs 38 & 39 (CCWS-75)

5a. CONTRACT NUMBER
W91ZLK-05-D-0015

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Gomes, David
Ratchford, Timothy
Rodriguez, Laurie W.

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
ARCADIS-US, Inc.
1717 West 6th Street, Suite 210
Austin, Texas 78703

8. PERFORMING ORGANIZATION REPORT NUMBER
GP08WSMR.0C75.F.05_2011

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Department of the Army
U.S. Army White Sands Missile Range
100 Headquarters Avenue
ATTN: IMWE-WSM-PW-E-EC (Benito Avalos)
White Sands Missile Range, NM 88002

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT

13. SUPPLEMENTARY NOTES

14. ABSTRACT

This Closure Plan represents a work plan for placement of an 18-inch soil cover over the former HELSTF Construction Landfills. It includes background information, a summary of conditions, a summary of historical investigation and risk assessment results supporting the corrective action. The Closure Plan includes a Post-Closure Care Plan that describes requirements for inspections and maintenance of the cap and long-term groundwater monitoring of the Regional Aquifer.

15. SUBJECT TERMS
SWMUs 38 and 39, CCWS-75, Former HELSTF Construction Landfills, Closure Plan, Post-Closure Care, Long Term Monitoring

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Benito Avalos
unclassified	unclassified	unclassified			19b. TELEPHONE NUMBER *(Include area code)* 575-678-1007

Reset

Standard Form 298 (Rev. 8/98)
Prescribed by ANSI Std. Z39.18
Adobe Professional 7.0

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

White Sands Missile Range

Closure Plan
Former High Energy Laser Systems Test Facility (HELSTF) Construction Landfills

SWMUs 38 & 39 (CCWS-75)

May 2011

ARCADIS

Dave Gomes, P.E. (New Mexico)
Senior Engineer

Timothy D. Ratchford, P.G.
Principal Scientist

Laurie W. Rodriguez, P.G.
Project Manager

Closure Plan
Former High Energy Laser Systems Test Facility (HELSTF) Construction Landfills

SWMUs 38 & 39 (CCWS-75)

Prepared for:
U.S. Army, White Sands Missile Range
Directorate of Environment and Safety
White Sands Missile Range, New Mexico

Prepared by:
ARCADIS U.S., Inc.
1717 West 6th Street
Suite 210
Austin
Texas 78703
Tel 512.451.1188
Fax 512.451.2930

Our Ref.:
GP08WSMR_0C75_F_1_05112011

Date:
May 2011

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.

Table of Contents

LIST OF ABBREVIATIONS **a**

EXECUTIVE SUMMARY **A**

1. Introduction **1**

1.1 Facility Description 1

1.2 Environmental Setting 1

1.3 Corrective Measures Objectives and Scope 1

1.4 Site Description and Operational History 2

1.5 Site Geology 3

1.6 Site Hydrogeology 4

1.7 Previous Site Investigations 4

2. Closure Plan **9**

2.1 Design Objectives 9

2.2 Design Criteria 9

2.3 Site Work 10

2.3.1 Soil Cover 10

2.3.2 Pre-Construction Activities 11

2.3.3 Site Preparation 11

2.3.4 Acquisition of Borrow Material 12

2.3.5 Placement of Fill Material 12

2.3.6 Security 12

2.4 Sampling and Analysis 12

2.5 Construction Safety Procedures 13

2.6 Waste Management Procedures 13

2.7 Construction Contingency Procedures 13

2.8 Post-Closure Care 13

2.8.1 Cap Inspections and Repairs 13

2.8.2 Groundwater Monitoring 14

2.9 Project Schedule 14

3. Project Management 15

3.1 Duties and Responsibilities 15

3.1.1 Contracting Officer's Representative 15

3.1.2 Project Manager 15

3.1.3 Quality Assurance/Quality Control (QA/QC) Manager 16

3.1.4 Task Manager 16

3.1.5 Task Coordinator 17

3.1.6 Site Health and Safety Officer 18

3.1.7 Project Chemist 18

3.2 Work Products 19

3.2.1 Progress Reports 19

3.2.2 Closure Report 19

3.2.3 Five-Year Reviews 20

3.2.4 Performance Monitoring Report 21

4. References 21

Figures

Figure 1 Site Location Map

Appendices

A RFI Table and Figures

B Geotechnical Report

C Engineering Cap Plans

D Post-Closure Care Plan

LIST OF ABBREVIATIONS

BERA	Baseline Ecological Risk Assessments
bgs	Below Ground Surface
COPC	Constituents of Potential Concern
COR	Contracting Officer's Representative
EPA	Environmental Protection Agency
gpm	Gallons per Minute
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
HELSTF	High Energy Laser Systems Test Facility
HHRA	Human Health Risk Assessment
LPCL	Lower Power Chemical Laser
LSTC	Laser Systems Test Center
MCL	Maximum Contaminant Level
NMED	New Mexico Environmental Department
NOD	Notice of Disapproval
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SLERA	Screening Level Ecological Risk Assessments
SMDC	Space and Missile Defense Command
SSL	Soil Screening Levels
SVOC	Semi-Volatile Organic Compounds
SVS	Soil Vapor Survey
SWMU	Solid Waste Management Units
TCE	Trichloroethylene
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbon
USAEHA	US Army Environmental Hygiene Agency
USEPA	United States Environmental Protection Agency
USGS	U.S. Geological Survey
VOC	Volatile Organic Compounds
WSMR	White Sands Missile Range
WTS	White Sands Technical Services

ARCADIS

EXECUTIVE SUMMARY

The purpose of this Closure Plan is to serve as a work plan for construction of an engineered cap over the Former High Energy Laser Systems Test Facility (HELSTF) Construction Landfills (SWMUs 38 & 39) and associated Post-Closure Care activities. The soil cover is intended to create positive drainage away from the cells to reduce the possibility of leachate formation. It is also a conservative approach intended to serve as an additional barrier to prevent humans and wildlife from coming into direct contact with buried materials.

The HELSTF Landfills are located northeast of the primary HELSTF operations area, in the southern portion of White Sands Missile Range (WSMR) in Otero County, New Mexico. The landfills consist of an indeterminate number of inactive cells that are referred to as Solid Waste Management Units (SWMUs) 38 and 39 in WSMR's Resource Conservation and Recovery Act (RCRA) Permit (Permit No. NM2750211235) dated December 2009. In areal extent, SWMUs 38 and 39 are approximately 6.0 acres.

The former Construction Landfills were characterized during the RCRA Facility Investigation (RFI), which consisted of three separate investigation phases performed between 1992 and 2010. Data collected during these investigations culminated in a comprehensive RFI report entitled *Revised Phase III RCRA Facility Investigation (RFI) Report – HELSTF Sites – Second Revision* that was submitted to the New Mexico Environmental Department (NMED) in August 2010 (ARCADIS, 2010). Findings from the RFI indicated that no significant release of contaminants were identified at the site. No constituents of potential concern (COPCs) were detected in the upper 10 feet of soil at SWMUs 38 and 39 above their soil screening levels (SSLs). There is also no indication that groundwater has been affected by constituents from the landfill. Findings from human health and ecological risk assessments concluded that there is no risk of adverse affects to human or ecological receptors from soils or groundwater associated with the site.

The major components of this Closure Plan include: plans for construction of an engineered cap, signs to provide notice of institutional controls, and Post-Closure Care to maintain the soil cover and provide for long-term groundwater monitoring.

The existing topography permits surface water to flow across the site and infiltrate the landfills. This water then has the potential to form leachate. Based on the soil and groundwater concentrations detected during the RFI and on the very high

evapotranspiration rate of the area, it is not expected that enough leaching would occur to cause any significant contamination of the soils or groundwater beneath the landfill. However, the proposed engineered cap is intended to create positive drainage away from the cells and minimize infiltration. As an additional measure of conservatism, it is also intended to further prevent direct human and wildlife contact with the buried materials. The proposed cap will consist of an 18-inch earthen cover.

In accordance with Provision V.B. of the Permit, the Post-Closure Care will include semi-annual inspections of the soil landfill cap, fences, and groundwater monitoring wells; as-needed maintenance of the corrective measures; and annual groundwater monitoring. The Post-Closure Care Plan is included as Appendix D to this Closure Plan.

Reporting will include preparation of a Closure Report that documents that the planned cap was constructed in accordance with this Closure Plan. Post-Closure Care activities will be documented in the facility-wide groundwater monitoring reports submitted annually to the NMED.

1. Introduction

1.1 Facility Description

The former Construction Landfills at the High Energy Laser Systems Test Facility (HELSTF) (WSMR-75) are located within the White Sands Missile Range (WSMR) near the intersection of Range Road 6 and Range Road 7 in Otero County, New Mexico.

The landfills consist of an indeterminate number of inactive cells, that are referred to as Solid Waste Management Units (SWMUs) 38 and 39 in WSMR's Resource Conservation and Recovery Act (RCRA) Permit (Permit No. NM2750211235) dated December 2009. In areal extent, SWMUs 38 and 39 are approximately 6.0 acres.

1.2 Environmental Setting

The WSMR is located in south-central New Mexico in the Tularosa Basin and covers approximately 3,200 square miles. The range is restricted to military, civilian and contract employees of the U.S. Army and other Department of Defense agencies.

The climate is relatively warm and dry. The average annual precipitation is two inches. The temperature during the winter ranges from 30 to 60 degrees Fahrenheit. During the summer temperatures can rise in excess of 100 degrees Fahrenheit.

The site has a diverse landscape with numerous mountains ranges and valleys. This provides a variety of lowland and mountain habitats for numerous plants and animals (U.S. Army 1998).

1.3 Corrective Measures Objectives and Scope

The purpose of this Closure Plan is to serve as a work plan for construction of an engineered cap over the former HELSTF Landfills. The soil cover is intended to create positive drainage away from the cells to reduce the possibility of leachate formation. It is also a conservative approach intended to serve as an additional barrier to prevent humans and wildlife from coming into direct contact with buried materials.

The scope of the Closure Plan includes the following:

- Grading to promote positive drainage of storm water;

- Construction of an 18-inch engineered cap;
- Signage marking the boundaries of the soil cover; and
- Post-closure care, including routine inspection and maintenance of the cover and long-term groundwater monitoring.

1.4 Site Description and Operational History

The HELSTF is located approximately 18.5 miles northeast of the WSMR Main Post, approximately 2.2 miles north of U.S. Highway 70 (Figure 1).

The HELSTF's primary mission is to support the testing and evaluation of high-energy laser systems, subsystems, components, and materials. Within the U.S. Army, the HELSTF has been managed by WSMR and, for the last 17 years, by the Space and Missile Defense Command (SMDC).

The HELSTF Landfills are located northeast of the Laser Systems Test Center (LSTC) building in a flat grassland area. The 1988 RCRA Facility Assessment (RFA) conducted by A.T. Kearney did not provide enough information to determine the specific locations of the landfills. However, during the visual site inspection performed during the 1988 RFA, there were two unlined trenches in use for the disposal of construction debris. Both trenches were approximately 300 feet long by 50 feet wide by reportedly 8 feet deep. One trench was oriented approximately southwest to northeast and the other trench was oriented approximately east to west. Construction debris was clearly visible in the trenches. The landfills were surrounded by a fence with a locked gate. The actual locations of the landfills were later determined during a Groundwater Quality Survey conducted by the US Army Environmental Hygiene Agency (USAEHA) during 1990 and confirmed by a geophysical survey in 1992.

Information obtained during the 1992 geophysical survey indicates that there were three separate abandoned landfill cells in the vicinity of SWMU 38 and two landfill cells in the SWMU 39 area.

Based upon a review of historical aerial photography, it is believed that the landfills were used as early as the 1960s until 1990. The landfills received construction debris from work performed in the HELSTF area, including wood, piping material, paper, and insulation. The 1988 RFA Report prepared by A.T. Kearney indicates that excavated soil from the June 12, 1986, release of chromated water at Test Cell 1 was deposited

in the construction landfill. A release report from August 23, 1988, indicates that a spill of Lower Power Chemical Laser (LPCL) oil into the soil near the LPCL Pump House was excavated and deposited in the landfill (Gallegos, 1988). It was estimated that the excavated soil contained 50 gallons of this nonhazardous substance. No drainage management controls have been utilized at the landfills. Construction debris and refuse were observed to be uncovered during the 1988 visual site inspection. A.T. Kearney also reported that there were no reported waste management procedures to segregate wastes or monitoring waste disposal during the initial operations of the unlined landfills. Closure of the landfills reportedly consisted of regrading existing soil materials to cover the landfill cells. Debris was encountered at depths of 6 to 8 feet below land surface during the advancement of borings for geotechnical purposes in August 2010.

1.5 Site Geology

The HELSTF is located near the depositional axis of the Tularosa Basin, just south of the eolian gypsum dunes of the White Sands National Monument. As a result of the basin interior setting and the proximity to the source of the eolian gypsum sand, the subsurface geology at the HELSTF consists of two distinctive geologic zones. The youngest stratigraphic zone (defined as the gypsiferous zone) is associated with the geologically recent aridification of the basin. The underlying stratigraphic zone (defined as the interbedded zone) is associated with a Pleistocene paleo-lake margin setting (ARCADIS, 2010).

Neher and Bailey (1976) defined the shallow soils in the vicinity of the HELSTF as “Yesum-Holloman and Gypsum land” consisting of 35 percent eolian deposits (Yesum), 30 percent ancestral lacustrine deposits (Holloman), and 20 percent Lake Otero gypsum crystals or evaporites (Gypsum land). Basabilvazo et al. (1994) report the occurrence of varved, gypsiferous clay and silt of lacustrine origin in this shallow zone (upper 15 to 20 feet of soil profile). Collectively, these observations indicate this zone is consistent with shallow, inactive Quaternary gypsum dunes (which surround the HELSTF) that are in turn underlain by Pleistocene Lake Otero evaporitic beds (late phase of deposition). Similar thicknesses of Lake Otero evaporites (10 to 25 feet) were observed at test holes drilled around the margin of Lake Lucero (Almendinger, 1971). The underlying Pleistocene evaporitic beds are noted to have very low infiltration rates.

1.6 Site Hydrogeology

The mean annual precipitation in the basin-bounding mountains is 26 inches per year, in contrast to an average of only 8 inches per year in the valley floor (Hibbs et al., 1997; Fryberger, 2008). A significant difference in precipitation exists between the western mountains (e.g., San Andres Mountains), which receive 14 to 16 inches per year, and the eastern mountains (e.g., Sacramento and Sierra Blanca Mountains), which receive more than 30 inches per year (Hibbs et al., 1997; Fryberger, 2008). As a result, ephemeral (intermittent) streams drain from the west into the Tularosa Basin and perennial streams drain from the north and the east with a greater contribution to basin recharge. Although precipitation records indicate the greatest rainfall during the summer monsoon (July to September), the most significant recharge occurs during long-duration, winter frontal systems in January through March (McLean, 1970). Seasonally high evaporation rates and strong winds (especially in the spring) account for the difference.

There are several perennial streams in the closed Tularosa Basin, which include Salt Creek, Lost River, Three Rivers, Tularosa Creek, and Indian Creek. Other surface water features with limited surface water transport include several springs located along the basin margins (Mound Springs, Salt Springs, Cowen Spring, Chosa Spring, Aguilar Spring, Lamitas Spring, Harkness Spring, Lewis Spring, Brazel Spring, Scholler Spring, Kitty Spring, Malpais Spring, and Alkali Spring). Salt Creek and Malpais Spring are believed to be the only surface water features sustained by groundwater discharge within the basin (Huff, 2005). Flow ranges from 250 to 450 gallons per minute (gpm) in Salt Creek and from 220 to as much as 1,500 gpm in Malpais Spring (McLean, 1970).

1.7 Previous Site Investigations

The former Construction Landfills were characterized during the RCRA Facility Investigation (RFI), which consisted of three separate investigation phases performed between 1992 and 2010. Data collected during these investigations culminated in a comprehensive RFI report entitled *Revised Phase III RCRA Facility Investigation (RFI) Report – HELSTF Sites – Second Revision* that was submitted to the New Mexico Environmental Department (NMED) in August 2010 (ARCADIS, 2010). A map showing the sampling locations and a comprehensive summary of the analytical data collected during the RFI are provided in Appendix A. Descriptions of the RFI work are provided below.

Phase I RFI

The Phase I RFI was conducted in 1992 and documented in the *Final RCRA Facility Investigation (RFI) Report, Appendix II, III and IV Sites* (ITC, 1992). As part of the Phase I RFI the following activities were performed: a geophysical survey was performed to delineate the trenches, a limited soil vapor survey (SVS) was conducted to detect releases and waste sources (samples collected 5 to 7 ft below ground surface (bgs)), six surface sediment samples were collected from drainage paths, and a background soil sample was collected. The soil and sediment samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs/pesticides, and metals.

Of the six sediment samples and the background soil sample collected, only barium and lead were detected in a sediment sample west of SWMU 39 (39SSD3B); however, the duplicate of that sample did not have detectable levels of either metal. Results of the surface sediment samples did not indicate a release to the shallow soil.

No methane was detected by the SVS, although two large areas of elevated carbon dioxide were defined, one at each of the two SWMUs (SWMUs 38 and 39) and corresponding to trenches within them.

The results of the geophysical survey indicated that three separate landfill cells operated in the area of SWMU 38 and two landfill cells in the area of SWMU 39. The estimated sizes of the landfill cells within the SWMU 38 geophysical grid were 125 feet by 40 feet, 350 feet by 110 feet, and 260 feet by 100 feet. Only the easternmost landfill cell within SWMU 39 was fully delineated during the geophysical survey and measured approximately 220 feet by 60 feet. The Phase I RFI concluded that the subsurface conditions surrounding the landfill had not been fully delineated and that releases to the subsurface were not confirmed or defined. The Phase I RFI also concluded that surface runoff is not a migration pathway of concern.

Based upon the results of Phase I RFI activities, it was concluded that additional investigation of subsurface conditions as part of a Phase II RFI was warranted. Proposed activities included: 1) an additional geophysical survey and a second SVS to complete the delineation west of SWMU 39 and to fully delineate the vapor-phase carbon dioxide; 2) completion of eight soil borings within the boundaries of the trenches to vertically define the trenches and characterize the waste to determine future groundwater monitoring parameters; and 3) installation of five monitoring wells to approximately 100 ft bgs (in the Regional Aquifer).

Phase II RFI

The Phase II RFI included conducting a geophysical survey using Ground Penetrating Radar (GPR) and implementing a more extensive soil gas survey. Soil and groundwater sampling activities were also conducted. Results of the investigation were documented in the *Phase II RCRA Facility Investigation Report, Appendix I, II, III and IV sites* (SEI, 1994). The results of the GPR geophysical survey determined the approximate boundaries of the undefined cells. Based on the GPR survey, it was estimated that the westernmost cell within SWMU 39 was 120 feet wide by 210 feet long.

Results from the Phase II soil gas survey did not indicate vapor-phase constituents in or around the identified landfill cells and did not show evidence of any significant subsurface release from the landfills.

During the Phase II RFI activities, a total of 52 soil samples were collected from one background hand-auger boring, seven newly installed monitoring wells (HMW-29 through HMW-35), and eight soil borings (SB-01 through SB-08). The sample from the background boring was analyzed for RCRA metals, and the other 51 soil samples were analyzed for VOCs, SVOCs, total petroleum hydrocarbons (TPH), PCBs/pesticides, and metals.

The only two VOCs detected in the soil samples were chloroform and acetone. Concentrations of acetone and chloroform detected in the samples were well below the 1994 regulatory action levels. TPH were detected in four samples, with the maximum detection occurring in Sample SB-04 (4 ft bgs) at 999 mg/kg. All eight RCRA metals were detected in the 51 investigation samples and the background soil sample; however, none of the detections in the investigation samples were greater than the background concentrations and none of the detections approached 1994 regulatory standards. PCBs/pesticides were not detected in any of the soil samples.

A total of seven groundwater samples were collected during Phase II RFI activities; they were analyzed for VOCs, SVOCs, TPH, PCBs/pesticides, metals (total and dissolved), and total dissolved solids (TDS). Groundwater results from the Vadose Zone Monitoring Wells HMW-31 and HMW-33 (both located to the west of the landfills) indicated detections of chromium, arsenic, selenium, 1,1-dichloroethene (1,1-DCE), and Trichloroethylene (TCE) concentrations above 1994 regulatory limits. No SVOCs were detected in the groundwater samples. The only metals detected in the regional groundwater above 1994 regulatory standards were lead (one occurrence) and

selenium. Dissolved lead was detected above its 1994 regulatory limit in groundwater from Regional Well HMW-29, but total lead was not detected in this sample. Lead was not detected above regulatory standards in soil or vadose zone water at these SWMUs. Selenium was detected above regulatory standards in regional groundwater at SWMUs 38 and 39, but selenium was not detected above regulatory standards in soil from this area.

Upon review of the Phase II RFI Report, the United States Environmental Protection Agency (USEPA) and NMED required additional monitoring of groundwater conditions at this location. The USEPA required that the source of impacts to the upper groundwater zone should be verified and the source of release should be addressed prior to evaluating remedial options. The NMED required that WSMR implement a monitoring plan and determine if any connection exists between the vadose zone water and underlying Regional Aquifer. Additionally, the NMED stated that the existing cover on the landfills were not compliant with the specifications of the New Mexico Solid Waste Management Regulations. The NMED required that the landfill covers be upgraded (Kelley, 1996). As specified by the NMED in correspondence dated June 6, 2000, the NMED stated that the units must undergo closure and Post-Closure Care under the provisions of 20 NMAC 4.1.600 (Dinwiddie, 2000).

Phase III RFI

A new regional zone monitoring well (HMW-59) was installed and sampled downgradient of the SWMUs to determine whether the regional groundwater had been impacted. In addition, seven existing wells (Regional Wells HMW-29, HMW-30, HMW-32, HMW-34, and HMW-35, and Vadose Zone Wells HMW-31 and HMW-33) were sampled for water quality parameters, dissolved ions, hexavalent chromium, RCRA metals, VOCs, SVOCs, TPH-DRO, TPH-GRO, and TOC.

During the Phase III RFI sampling activities in December 2006, the depth to vadose zone water was measured between 42.7 and 44.4 feet. Depth to water in the regional wells ranged from 73.6 to 75 feet. Chromium, selenium, chloride, fluoride, sulfate, and 1,1-DCE were detected above their respective NMED Groundwater Standards, and TCE was detected above the Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) in vadose zone water from HMW-31 and HMW-33, located to the west of the landfills. Generally, chloride, fluoride, nitrate, sulfate, and TDS were detected above the NMED Groundwater Standards in the regional groundwater wells sampled during the Phase III RFI, including in the newly installed downgradient Well HMW-59. Total and dissolved selenium were detected above the NMED Groundwater

Standard in groundwater samples from Well HMW-35, and 1,4-Dioxane was detected in groundwater from Well HMW-32 above the NMED Tapwater Standard. In addition, total and dissolved molybdenum were detected above the NMED Tapwater Standard in groundwater samples collected from Well HMW-35.

Results from the Phase III RFI were summarized in the *Phase III RFI Report for the HELSTF Sites* dated February 2008 (WTS, 2008). The NMED issued a notice of disapproval (NOD) of the report on August 27, 2008. Comments contained in the NOD focused primarily on the fact that the Phase III RFI report was not comprehensive in nature and only reported on the data collected during the Phase III investigation.

In response to the NMED's August 2008 letter, data from all three phases of the RFI were compiled and summarized into a comprehensive report entitled *Revised Phase III RFI Report for the HELSTF Area*, dated September 9, 2009 (ARCADIS, 2009). In addition to compiling and presenting all of the site characterization data, the report included human health and ecological risk assessments for the landfills. The report concluded that the SWMUs had been adequately characterized, that no significant release of constituents had occurred from the SWMUs and that they did not pose an unacceptable risk to human or ecological receptors.

On March 11, 2010, the NMED issued an NOD on the September 2009 Revised Phase III Report. In response to the NMED's March 11, 2010 letter and to comments made by the NMED during a meeting conducted on March 24, 2010, a new report was prepared to include recent (2009) groundwater monitoring data and to compare all of the RFI data to recently updated regulatory standards (soil screening levels updated in August 2009). The report, entitled *Revised Phase III RCRA Facility Investigation (RFI) Report – HELSTF Sites – Second Revision* was submitted to the NMED in August 2010 (ARCADIS, 2010).

This second revision of the report concluded that no COPCs were detected in the upper 10 feet of soil at SWMUs 38 and 39 above their SSLs. The only COPCs detected in soils above their respective NMED DAF 10 screening values were chloroform and silver. There was only one detection of chloroform at a depth of 59 ft bgs; it was not detected in shallower soils or at any other locations at these SWMUs. In addition, chloroform was not detected above the NMED Groundwater Standard in vadose zone water at SWMUs 38 and 39, and was not detected in regional groundwater in this area. Silver was detected above its DAF 10 screening value in shallow and deep soils at SWMUs 38 and 39. These detections have been delineated and there have been no silver impacts to vadose zone water or regional groundwater

in the area. Based on the data, there is no evidence to suggest that any significant release has occurred at the former HELSTF Landfills. The report concluded that groundwater contamination identified in wells located near the landfills are not associated with the landfills and originated from another nearby source, most likely the LSTC Discharge Point.

The findings of the Human Health Risk Assessment (HHRA) screening indicated no unacceptable risk to human receptors associated with the landfills and demonstrated that no additional risk assessment was warranted. The results of the Screening Level Ecological Risk Assessments (SLERA) and Baseline Ecological Risk Assessments (BERA) for direct contact and the constituents evaluated in the terrestrial food chain models indicate that adverse impacts are unlikely to occur for ecological receptors potentially exposed to constituents in soil. The report concluded that no further ecological evaluation at SWMUs 38 and 39 are warranted.

2. Closure Plan

2.1 Design Objectives

The corrective measures objective is to design and construct a 25-year life soil cover over SWMUs 38 and 39, primarily intended to promote positive drainage away from the landfill. The RFI showed that there is no evidence to suggest a significant release occurred from the landfills and demonstrated that there is no unacceptable risk to human or ecological receptors potentially exposed to constituents in the landfills. The corrective measures described in this Closure Plan therefore, represent a conservative approach.

2.2 Design Criteria

The major components of the Closure Plan include:

- An engineered cap constructed over SWMUs 38 and 39;
- Signs to provide notice of institutional controls; and
- Post-closure care to maintain the soil cover and provide for long-term groundwater monitoring.

It is expected that natural erosion, through wind and rain, will change the initial contours of the altered landscape. The depth of cover is designed to prevent exposure of the buried material and to shed water away from the cells.

The spacing and construction of the signage will be designed to capture the attention of anyone traveling in the area. The signs will notify personnel that they are not permitted to travel through the restricted area and that no digging or excavation is allowed.

The Post-Closure Care Plan is designed to prevent erosion and exposure of the buried landfill material. The Post-Closure Care Plan includes provisions for long-term groundwater monitoring to ensure the protection of the Regional Aquifer.

2.3 Site Work

The plans and specifications along with the quality assurance measures set forth in this document provide guidelines for construction of the engineered cap. The main performance criteria will be that the engineered cap is of sufficient thickness (18-inches) to maintain positive drainage and prevent exposure to buried landfill material for the duration of its life time (minimum 25 years). Cap thickness will be verified by comparison of the construction and finished grade surveys conducted throughout cap installation.

The proposed cap covers all of the landfill cells and buried waste material identified during the RFI work, and more specifically includes the landfill cells delineated by historical geophysical studies. Aerial photographs from years 1948, 1963, 1985, 2003, 2005, 2008, and 2009 were reviewed to confirm that the footprint of the planned cap includes all landfill cells and areas of waste burial.

2.3.1 Soil Cover

The existing topography permits surface water to flow across the site and infiltrate the landfills. This water then has the potential to form leachate. Based on the soil and groundwater concentrations detected during the RFI and on the very high evapotranspiration rate of the area, it is not expected that enough leaching would occur to cause any significant contamination of the soils or groundwater beneath the landfill. However, the engineered cap is intended to create positive drainage away from the cells and minimize infiltration. As an additional measure of conservatism, it is also intended to prevent direct human and wildlife contact with the buried materials. As the

individual landfill cells became full and were taken out of operation, they were reportedly covered with 2 to 3 feet of clean fill material. Geotechnical borings installed in 2010 generally encountered waste material at depths of about 6 ft bgs. The 18-inch soil cap, therefore, is an additional measure of conservatism for preventing direct human and wildlife contact with the waste materials.

The cover consists of an earthen layer. The earthen layer will be constructed with material with a minimum thickness of 18 inches. The geotechnical report included in Appendix B was developed based on borings installed in the landfill area for the purpose of ascertaining site-specific geotechnical properties. The report indicates that the area is suitable for the installation of an engineered cap. In addition, an evaluation of settlement potential for an 18 inch cap indicated that settlement should be minimal, approximately 0.6 inches.

A Licensed Land Surveyor will be on-site during key periods of construction (including initial grading and final grading following placement of the cap) to assure the cover is constructed and contoured to design specifications. A contour map will be developed providing final contours of soil cover and location of survey points.

2.3.2 Pre-Construction Activities

The following plans will be prepared and submitted prior to implementing the field work:

- Storm Water Pollution Prevention Plan; and
- Health and Safety Plan (HASP).

Although subsurface utilities are not expected in the project area, a utility survey will be conducted prior to clearing and grubbing. Any located utilities will be adequately marked and protected prior to beginning any site work.

Storm water controls will be implemented, including, but not limited to, the installation of hay bales and/or silt fencing surrounding the area, as necessary.

2.3.3 Site Preparation

The area will be cleared and grubbed. None of the vegetative matter will be incorporated into any portion of the engineered cap. Prior to beginning construction of the cap, the existing site will be prepared by regrading the existing site contours to the

pre-cap grading plan contours provided on Drawing No. C-202 in Appendix C. It is not anticipated that significant quantities of fill material will be required to achieve the pre-cap grading plan.

2.3.4 Acquisition of Borrow Material

There are five borrow pits located at WSMR that are available for use as sources of backfill material. Analytical and geotechnical samples were collected from each pit. The analytical and geotechnical sample results are provided in Appendix B. This borrow material is representative of native soil in the surrounding area and is proposed to be used pending the NMED's approval of this Work Plan.

2.3.5 Placement of Fill Material

The cover will be constructed by placing 18-inches of borrow material across the construction area. The material will be placed in 6-inch lifts and compacted after placement of each lift. The finished grade shown on Drawing No. C-203 is designed to promote positive drainage and provide a minimum slope of two percent. The final grading plan and construction details are provided in Appendix C.

2.3.6 Security

SWMUs 38 & 39 are located within the HELSTF complex. The HELSTF complex is a fenced facility with controlled access. Signs will be posted around the perimeter of the landfill at an interval of no greater than 300 feet. The signs will be written in dual languages (English and Spanish) and warn that entry is prohibited. They will provide a contact phone number and will indicate the location of the SWMUs. Because the landfills are located within the HELSTF facility's secured perimeter, no additional security measures will be employed.

2.4 Sampling and Analysis

All borrow material brought to the site will be tested for Appendix IX VOCs by USEPA Method 8260, Appendix IX SVOCs by USEPA Method 8270, and RCRA 8 Metals by Method 6010 or 7000-series methods. Analytical results from the borrow material will be compared to NMED standards prior to use as any component of the engineered cap. A minimum of one sample per borrow source will be collected.

2.5 Construction Safety Procedures

The WSMR HASP will be updated after NMED approval of this Closure Plan and prior to the installation of the engineered cap. All personnel on-site will adhere to construction safety procedures specified in the HASP.

2.6 Waste Management Procedures

There is not expected to be any waste generated during construction. Any surface debris discovered during construction will be containerized in 55-gallon drums and/or roll-off containers and properly disposed through WSMR's Waste Management Center.

2.7 Construction Contingency Procedures

Changes to the design and/or specifications may be necessary during construction due to unforeseen conditions. Regulatory notification will be made prior to implementing any substantive changes to the Closure Plan.

2.8 Post-Closure Care

In accordance with Provision V.B. of the Permit, the Post-Closure Care will include:

- Semi-annual inspections of the soil landfill cap, fences, and groundwater monitoring wells;
- As-needed maintenance of the corrective measures; and
- Annual groundwater monitoring.

Post-Closure Care activities are summarized below and described in more detail in the Post-Closure Care Plan provided in Appendix D of this report.

2.8.1 Cap Inspections and Repairs

The soil cover will be inspected semi-annually by trained personnel. The personnel will examine the cover to ensure that there are no signs of human or animal disturbance, that no solid waste has been uncovered and that water is not ponding over the landfill cells. The inspection will be documented in a logbook noting the personnel on-site and any observations.

At a minimum, the following tasks will be completed during the cap inspection:

1. Verify that the gate is closed and locked;

2. Ensure that signage remains intact and legible;

3. Confirm that the monitoring wells are locked and well covers are tight; and

4. Inspect the landfill cap for vegetation, erosion, animal activity, settlement and waste protrusion.

Repairs of the soil cover will be performed if significant erosion is noted, landfilled materials become exposed, or water begins ponding or collects over the cells. Repairs will be made within 180 days following the inspection.

2.8.2 Groundwater Monitoring

Groundwater monitoring will be performed on an annual basis. The initial groundwater monitoring event following completion of the cap will commence within 180 days after construction is completed, in conjunction with one of the two semi-annual facility-wide groundwater monitoring events. Groundwater monitoring will be conducted in accordance with the Post-Closure Care Plan provided in Appendix D.

Groundwater monitoring will be conducted until such time that the data demonstrate that the landfills pose no on-going risk to the Regional Aquifer. At that time, a report will be prepared and submitted to the NMED for their review and concurrence.

2.9 Project Schedule

Implementation of this plan is expected to take approximately 18 to 24 months. Contractor arrangements will begin immediately upon the NMED's approval of this Work Plan and are expected to take 3 to 4 months. Mobilization and site preparation are expected to take 1 to 2 months. Construction is expected to begin within 180 days after the NMED's approval of the Work Plan, and is expected to take approximately 2 to 3 months for completion. The Project Schedule is tentative and will be affected by Army funding, submission of reports, internal and regulatory review and approval of this Closure Plan.

3. Project Management

The project organization reflects the relationship between the WSMR Contract Officer's Representative and the Contractor teams assembled to plan, organize, control, and execute this project. Within the Contractor project management system, the key positions are the Program Manager, Task Manager, and Task Coordinator.

3.1 Duties and Responsibilities

3.1.1 Contracting Officer's Representative

Benito Avalos is the Contracting Officer's Representative (COR). He is an employee of the U.S. Army and functions as the point of contact between WSMR and the Contractor. For this project, COR's responsibilities include:

- Communicates with Army Environmental Command on funding issues;
- Reviews and approves work plans;
- Acquires funding; and
- Point of contact for the contractor and the NMED.

3.1.2 Project Manager

Laurie Rodriguez is the Project Manager for the Contractor. She is a senior ARCADIS representative on the project, and functions as the primary point of contact for the contractor. For this project, the Project Manager's responsibilities include:

- Overall project management;
- Total planning, organization and execution of the Closure Plan;
- Maintaining contact with the COR throughout the work;
- Directing the Task Manager in conducting a successful project;
- Providing resources to the Task Manager to accomplish project responsibilities;

- Approving uses of technical resources;
- Reviewing and approving all deliverables.

3.1.3 Quality Assurance/Quality Control (QA/QC) Manager

The QA/QC Manager for this project is responsible for the following:

- Acting for the Project Manager in her absence;
- Reviewing project progress;
- Ensuring project QC protocols and procedures are followed;
- Documenting that all quality objectives have been met;
- Assisting the Task Coordinator in evaluating alternatives to meeting project objectives; and
- Providing guidance on the allocation of resources.

3.1.4 Task Manager

The Task Manager for this project will be responsible and accountable to the Program Manager for overall direction and performance of the project including:

- Developing and executing the Closure Plan;
- Directing the Task Coordinator;
- Keeping Project Manager appropriately informed;
- Coordinating all assigned resources;
- Periodic review of progress and progress reporting;
- Resolving Work Plan issues;

- Schedule and budget tracking;
- Quality and timeliness of deliverables; and
- Work performed by subcontractors.

3.1.5 Task Coordinator

The Task Coordinator will be responsible for coordinating all site activities, including those of the on-site contractors, and all laboratory activities. These include execution of the fieldwork in accordance with appropriate sections of this Closure Plan.

Specific responsibilities include:

- Day to day execution of the Work Plan;
- Reporting project progress to the Task Manager;
- Coordinating, directing and overseeing field technical support staff;
- Providing overall direction and supervision of the site work and related activities;
- Ensuring that all staff and subcontractors meet WSMR's security requirements;
- Completing all appropriate field logs for project activities;
- Providing overall supervision of the collection, handling, and shipping of all samples;
- Monitoring sampling operations to ensure that all project site personnel are fully implementing and executing the provisions of this Work Plan;
- Understanding the quality requirements of each field task, and bringing to the attention of management, conditions which may adversely impact the quality of the data or other work product; and
- Execution of all field QC procedures.

3.1.6 Site Health and Safety Officer

The Site Health and Safety Officer will report to the Project Manager and be responsible for:

- Directing all health and safety activities on-site;
- Reporting safety-related incidents or accidents to the Task Manager;
- Temporarily suspending field activities, if health and safety of personnel are endangered;
- Maintaining health and safety equipment on-site;
- Conducting pre-work and daily health and safety meetings;
- Verifying personnel working on the site have completed medical surveillance and health and safety training; and
- Maintaining documentation of health and safety measures taken at the site, including:
  - Communication of provisions of the Site-Specific HASP;
  - Levels of protection and required upgrades;
  - Incident reporting; and
  - Upgrading or downgrading levels of protection in response to field conditions.

3.1.7 Project Chemist

As part of the project team, the project chemist will provide technical support during sample collection and analysis. The project chemist will report to the Task Coordinator and duties will include:

- Evaluating analytical data to determine usability of results;
- Verifying laboratory procedures and QA protocols;
- Immediate notification to the Task Manager of potential data problems; and

- Confirming field QC procedures to obtain representative data.

3.2 Work Products

3.2.1 Progress Reports

During implementation of the Closure Plan, progress reports will be submitted to WSMR on a quarterly basis. These progress reports shall include:

1. A description of significant activities during the reporting period;
2. Summaries of all findings including any inspection results;
3. Summaries of all contacts with representatives of the local community, public interest groups or regulatory officials during the reporting period;
4. Summaries of all problems or potential problems encountered during the reporting period;
5. Actions being taken or planned to rectify problems;
6. Changes in personnel during the reporting period;
7. Projected work for the next reporting period; and
8. Any data or test results generated during the reporting period.

3.2.2 Closure Report

Following the construction of the cover, a Closure Report will be completed and submitted for review and approval. The Closure Report will be submitted to NMED no later than 180-days following the completion of construction of the cap. The purpose of the Closure Report is to document that the project was completed in accordance with the Closure Plan. The Closure Report will include, at a minimum, the following elements:

1. Background information and project objectives;

2. Synopsis of the corrective measure, design criteria, and certification that the cap was constructed in accordance with the Closure Plan;

3. Explanation and description of any modifications to the Closure Plan and why these were necessary for the project;

4. Results of any operational testing and/or monitoring, indicating how initial operation of the corrective measure compares to the design criteria;

5. Summary of significant activities that occurred during construction. Included will be a discussion of problems encountered and how they were addressed;

6. Summary of any inspection findings, including copies of key inspection documents in the appendices; and

7. As built drawings and/or photographs.

3.2.3 Five-Year Reviews

Upon completion of the closure activities, SWMUs 38 and 39 will become part of the five-year review process implemented by the Army. Five-year reviews are conducted to provide an on-going evaluation of corrective measures implemented at WSMR to ensure that the corrective measures remain protective of human health and the environment. The next five-year review for WSMR is scheduled to occur in 2014. Therefore, the first five-year review in which SWMUs 38 and 39 will be included is the five-year review scheduled to occur in 2019. The five-year review will include, at a minimum, the following elements:

1. Purpose;

2. Synopsis of the corrective measure;

3. Review Criteria: A description of the process and criteria for determining when corrective measures, maintenance and monitoring may cease;

4. Demonstration that the corrective measures and on-going Post-Closure Care activities continue to be effective and protect human health and the environment;

5. Summary of significant activities that occurred during operations. Included will be a discussion of problems encountered and how they were addressed;

6. Summary of inspection findings; and

7. Summary of total operation and maintenance costs associated with the corrective measure.

3.2.4 Performance Monitoring Report

A summary of the groundwater monitoring data will be included in the facility-wide groundwater monitoring report submitted annually to the NMED. The report will include, at a minimum the following elements:

1. Introduction;

2. Scope of the groundwater monitoring program;

3. Post-Closure Care Inspections and Maintenance;

4. Groundwater Monitoring Results; and

5. Groundwater Chemical Analytical Data.

4. References

Almendinger, R.J., and F.B. Titus. 1973. Regional Hydrology and Evaporative Discharge As Present-Day Source of Gypsum at White Sands National Monument, New Mexico. New Mexico Bureau of Mines and Mineral Resources. Open File Report 55. 26 p.

ARCADIS, 2009. Revised Phase III RCRA Facility Investigation Report, HELSTF Sites, September 2009.

ARCADIS 2010. Revised Phase III RCRA Facility Investigation Report, HELSTF Sites, Second Revision, August 2010.

A.T. Kearney, Inc. 1988. RCRA Facility Assessment PR/VSI Report. White Sands Missile Range, White Sands, New Mexico. Alexandria, Virginia.

Basabilvazo, G.T., R.G. Myers, and E.L. Nickerson. 1994. Geohydrology of the High Energy Laser System Test Facility Site, White Sands Missile Range, Tularosa Basin, South-Central New Mexico. U.S. Geological Survey Water Resources Investigations Report 93-4192. 59 pp.

Dinwiddie, R.S. 2000. [New Mexico Environment Department] Correspondence to Mr. Thomas A. Ladd. RE: 1999 Annual Unit Audit, Director, Environment and Safety Directorate, WSMR, NM 88002. 06 June.

Fryberger, S.G. 2008. Geological Overview of White Sands National Monument, National Park Service website (http://www.nature.nps.gov/geology/parks/whsa/geows/index.htm). Accessed on December 12, 2008.

Gallegos, R.L. 1988. [Environmental Office] Internal Memorandum to File. RE: Pollution Incident Report [n.d.].

Hibbs, B.J., J.B. Ashworth, R.N. Boghici, M.E. Hayes, B.J. Creel, A.T. Hanson, B.A. Samani, and J.F. Kennedy. 1997. Trans-boundary aquifers of the El Paso/Ciudad Juarez/Las Cruces region. Report prepared by the Texas Water Development Board and New Mexico Water Resources Research Institute for the U.S. Environmental Protection Agency, Region 6 under Contract X 996343-01-0 and X 996350-01-0.

Huff, Glenn F. 2005. Simulation of Groundwater Flow in the Basin-Fill Aquifer of the Tularosa Basin, South-Central New Mexico, Predevelopment through 2040. Scientific Investigations Report 2004-5197. United States Geological Survey. Washington, D.C.

ITC, 1992. Final RCRA Facility Investigation (RFI) Report, Appendix II, III and IV Sites, White Sands Missile Range, New Mexico. Houston (Texas): ITC.

Kelley, E. 1996. [New Mexico Environment Department] Correspondence to Thomas A. Ladd. RE: WSMR RFI Phase II Rpt. Notice of Deficiency (NOD), Director, Directorate of the Environment & Safety, WSMR, NM 88002. 04 September.

McLean, J.S. 1970. Saline groundwater resources of the Tularosa Basin, New Mexico. Office of Saline Water Research and Development Progress Report No. 561, 128 p.

Neher, R.E., and O.F. Bailey. 1976. Soil survey of White Sands Missile Range, New Mexico, parts of Otero, Lincoln, Dona Ana, Sierra, and Socorro Counties. U.S. Department of Agriculture, Soil Conservation Service, 64 pp.

Sverdrup Environmental, Inc. (SEI). 1994. Phase II RCRA Facility Investigation Report, Appendix I, II, III and IV sites. White Sands Missile Range, New Mexico. St. Louis, Missouri.

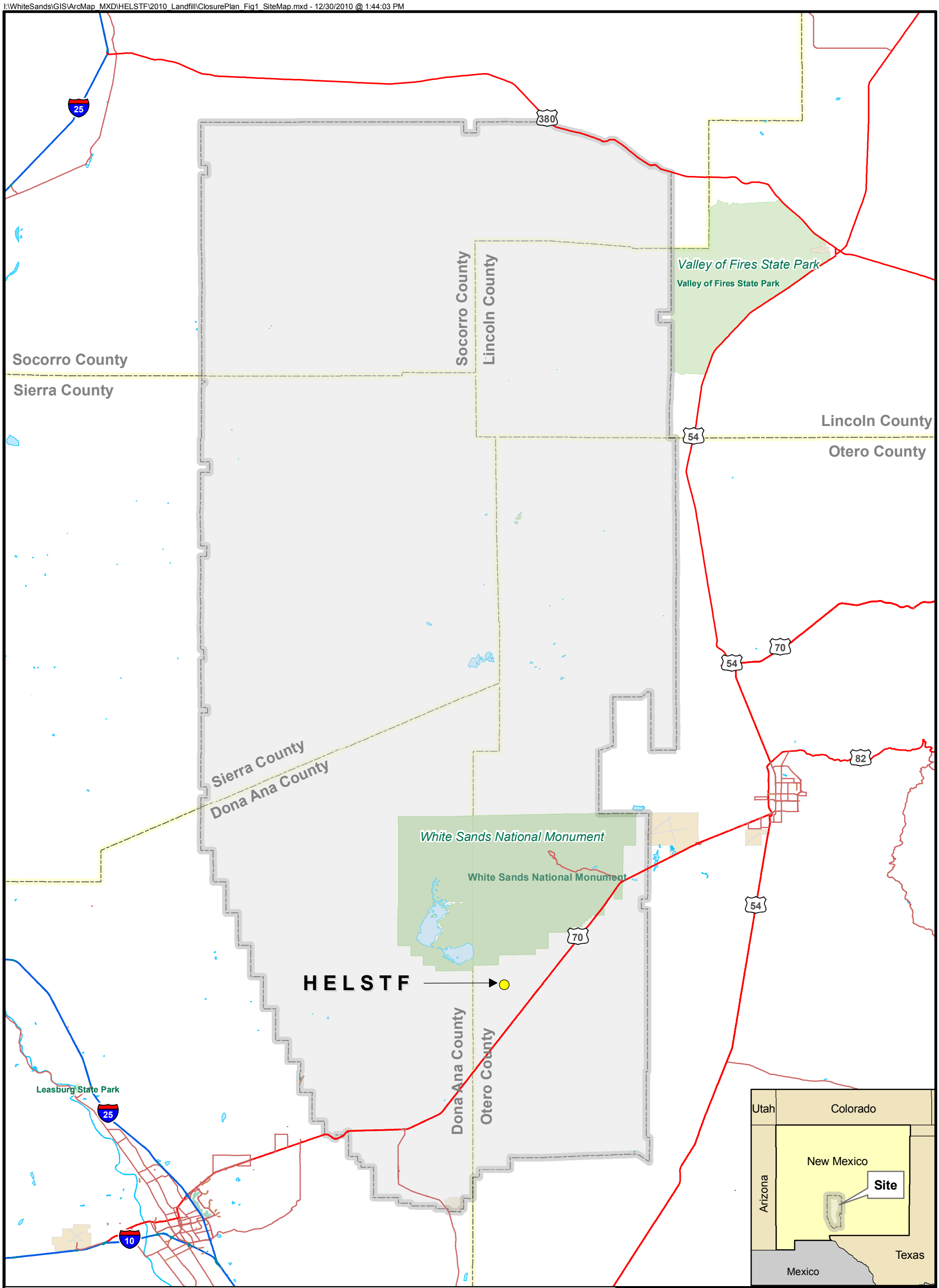
U.S. Army, 1998. Range-Wide Environmental Impact Statement. White Sands Missile Range, New Mexico.

White Sands Technical Services (WTS). 2008. Phase III RFI Report – HELSTF Sites, February 2008.

ARCADIS

Figures

I:\WhiteSands\GIS\ArcMap_MXD\HELSTF\2010_Landfill\ClosurePlan_Fig1_SiteMap.mxd - 12/30/2010 @ 1:44:03 PM



Legend

- County Boundary
- White Sands Missile Range Boundary
- Water Body
- National Park or Forest
- State Park or Forest
- Limited Access
- Highway
- Major Road
- Minor Road

N

0 8 16 Miles

WHITE SANDS MISSILE RANGE
NEW MEXICO

CLOSURE PLAN FOR HELSTF LANDFILLS

SITE LOCATION MAP

ARCADIS

FIGURE
1

Appendices

Appendix A

RFI Table and Figures

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	38SSD1 0 04/04/92	38SSD2 0 04/04/92	38SSD3 0 04/04/92	39SSD1 0 04/04/92	39SSD2 0 04/04/92	39SSD3 0 04/04/92	HMW-29 18 11/03/93	HMW-29 38 11/03/93
Metals												
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	***<53***	***<55***	***<55***	***<54***	***<43***	***<47 [<20]***	*4.39*	*12.6*
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	<110	<110	<110	<110	<87	<93 [81]	123 J	50 J
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	<2.6	<2.7	<2.7	<2.7	<2.2	<2.3 [<0.98]	<1.59 J	<1.2 J
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	- -	- -	- -	- -	- -	- -	<7.94	6.2
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	<26	<27	<27	<27	<22	<23 [20]	4.1 J	5.86 J
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	<0.1	<0.1	<0.09	<0.08	<0.09	<0.1 [<0.06]	<0.0274	<0.024
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	*<53*	*<55*	*<55*	*<54*	*<43*	*<47 [<20]*	<3.43 J	<2.99 J
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	<5.3	<5.5	<5.5	<5.4	<4.3	<4.7 [<2]	*21*	13
Other												
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	- -	- -	- -	- -	- -
Polychlorinated Biphenyls												
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.034*	*<0.034*	*<0.034*	*<0.034*	*<0.034*	*<0.034 [<0.034]*	*<0.216936*	*<0.189426*
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.034*	*<0.034*	*<0.034*	*<0.034*	*<0.034*	*<0.034 [<0.034]*	*<0.216936*	*<0.189426*
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	<0.034	<0.034	<0.034	<0.034	<0.034	<0.034 [<0.034]	<0.216936	<0.189426
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	<0.034	<0.034	<0.034	<0.034	<0.034	<0.034 [<0.034]	<0.216936	<0.189426
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	<0.034	<0.034	<0.034	<0.034	<0.034	<0.034 [<0.034]	<0.216936	<0.189426
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	<0.034	<0.034	<0.034	<0.034	<0.034	<0.034 [<0.034]	<0.216936	<0.189426
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	<0.034	<0.034	<0.034	<0.034	<0.034	<0.034 [<0.034]	<0.216936	<0.189426
Pesticides/Herbicides												
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	<0.034	<0.034	<0.034	<0.034	<0.034	<0.034 [<0.034]	<0.161184	<0.140744
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067 [<0.0067]	<0.01011264	<0.00883024
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067 [<0.0067]	<0.00367632	<0.00321012
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067 [<0.0067]	<0.01104	<0.00964
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034 [<0.0034]	<0.00367632	<0.00321012
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034 [<0.0034]	<0.00276	<0.00241
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034 [<0.0034]	<0.00552	<0.00482
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	<0.067	<0.067	<0.067	<0.067	<0.067	<0.067 [<0.067]	<0.2208	<0.1928
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	<0.034	<0.034	<0.034	<0.034	<0.034	<0.034 [<0.034]	<0.0129168	<0.0112788
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034 [<0.0034]	<0.00828	<0.00723
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067 [<0.0067]	<0.00184368	<0.00160988
Endosulfan I	959-98-8	- -	- -	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034 [<0.0034]	<0.0129168	<0.0112788
Endosulfan II	33213-65-9	- -	- -	mg/kg	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067 [<0.0067]	<0.00367632	<0.00321012
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067 [<0.0067]	<0.06072	<0.05302
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067 [<0.0067]	<0.00552	<0.00482
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067	<0.0067 [<0.0067]	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034 [<0.0034]	<0.00367632	<0.00321012
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034 [<0.0034]	<0.00276	<0.00241
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034 [<0.0034]	<0.0763416	<0.0666606
Semivolatile Organic Compounds												
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.00686 J	<0.00599
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	- -	- -	- -	- -	- -	- -	*<2.19705*	*<1.91575*
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	<0.00686 J	<0.00599
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	<0.453	<0.395
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	- -	- -	- -	- -	- -	- -	<0.453	<0.395
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	*<1.7*	*<1.7*	*<1.7*	*<1.7*	*<1.7*	*<1.7 [<1.7]*	*<2.19705*	*<1.91575*
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	*<1.7*	*<1.7*	*<1.7*	*<1.7*	*<1.7*	*<1.7 [<1.7]*	*<2.19705*	*<1.91575*

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	38SSD1 0 04/04/92	38SSD2 0 04/04/92	38SSD3 0 04/04/92	39SSD1 0 04/04/92	39SSD2 0 04/04/92	39SSD3 0 04/04/92	HMW-29 18 11/03/93	HMW-29 38 11/03/93
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	- -	- -	- -	- -	- -	- -	<0.453	<0.395
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	- -	- -	- -	- -	- -	- -	<0.453	<0.395
2-Nitroaniline	88-74-4	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	<2.19705	<1.91575
2-Nitrophenol	88-75-5	- -	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	*<0.66*	*<0.66*	*<0.66*	*<0.66*	*<0.66*	*<0.66 [<0.66]*	*<0.453*	*<0.395*
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
3-Nitroaniline	99-09-2	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	<2.19705	<1.91575
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	<0.66	<0.66	<0.66	<0.66	<0.66	<0.66 [<0.66]	<0.453	<0.395
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	- -	- -	- -	- -	- -	- -	<0.453	<0.395
4-Nitrophenol	100-02-7	- -	- -	mg/kg	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7 [<1.7]	<2.19705	<1.91575
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Acenaphthylene	208-96-8	- -	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	- -	- -
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	***<1.7***	***<1.7***	***<1.7***	***<1.7***	***<1.7***	***<1.7 [<1.7]***	*<2.19705*	*<1.91575*
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7 [<1.7]	<2.19705	<1.91575
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	- -	- -	- -	- -	- -	- -	<0.453	<0.395
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Dibenzofuran	132-64-9	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	<0.453	<0.395
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	- -	- -	- -	- -	- -	- -	<1.370325	<1.194875
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.00686 J	<0.00599
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33*	*<0.33 [<0.33]*	*<0.453*	*<0.395*
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	- -	- -	- -	- -	- -	- -	<0.453	<0.395
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	*<1.7*	*<1.7*	*<1.7*	*<1.7*	*<1.7*	*<1.7 [<1.7]*	*<2.19705*	*<1.91575*
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	- -	- -	- -	- -	- -	- -	<2.19705	<1.91575
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33 [<0.33]	<0.453	<0.395

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	38SSD1 0 04/04/92	38SSD2 0 04/04/92	38SSD3 0 04/04/92	39SSD1 0 04/04/92	39SSD2 0 04/04/92	39SSD3 0 04/04/92	HMW-29 18 11/03/93	HMW-29 38 11/03/93
TPHs												
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	<41.10975	<35.84625
Volatile Organic Compounds												
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005 [<0.005]*	*<0.00686 J*	*<0.00599*
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	*<0.00686 J*	<0.00599
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02 [<0.02]*	*<0.00686 J*	*<0.00599*
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005 [<0.005]*	*<0.00686 J*	*<0.00599*
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02*	*<0.02 [<0.02]*	*<0.01372 J*	*<0.01198*
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 [<0.1]	<0.02744 J	<0.02396
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 [<0.01]	<0.01372 J	<0.01198
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05 [<0.05]	<0.02744 J	<0.02396
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	- -	- -	- -	- -	- -	- -	<0.0211416	<0.0184606
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1 [<0.1]	0.0325 J	<0.02396
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.2*	*<0.2*	*<0.2*	*<0.2*	*<0.2*	*<0.2 [<0.2]*	*<0.00686 J*	*<0.00599*
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1 [<0.1]*	*<0.01372 J*	*<0.01198*
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	- -	- -	- -	- -	- -	- -	*<0.00686 J*	*<0.00599*
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.01372 J	<0.01198
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 [<0.01]	<0.01372 J	<0.01198
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02 [<0.02]	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005 [<0.005]*	*<0.00686 J*	*<0.00599*
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 [<0.01]	<0.01372 J	<0.01198
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005 [<0.005]*	*<0.00686 J*	*<0.00599*
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 [<0.01]	<0.01372 J	<0.01198
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	- -	- -	- -	- -	- -	- -	<0.00686 J	<0.00599
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02 [<0.02]	<0.00686 J	<0.00599
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	- -	- -
Ethanol	64-17-5	- -	- -	mg/kg	<1	<1	<1	<1	<1	<1 [<1]	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02 [<0.02]	<0.00686 J	<0.00599
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Iodomethane	74-88-4	- -	- -	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02 [<0.02]	<0.01372 J	<0.01198
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05 [<0.05]	<0.02744 J	<0.02396
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005*	*<0.005 [<0.005]*	*<0.00686 J*	*<0.00599*
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	- -	- -	- -	- -	- -	- -	<0.00686 J	<0.00599
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 [<0.01]	<0.02744 J	<0.02396
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01*	*<0.01 [<0.01]*	*<0.01372 J*	*<0.01198*
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005 [<0.005]	<0.00686 J	<0.00599

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: / Sample Depth (ft): / Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	HMW-29 58 11/03/93	HMW-29 78 11/03/93	HMW-31 19 11/03/93	HMW-31 39 11/04/93	HMW-33 19 11/04/93	HMW-33 39 11/05/93	HMW-34 19 11/08/93	HMW-34 39 11/08/93
Metals												
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	*3.57*	*24.4*	*4.11*	*12.5*	*5.97*	*15*	*6.26 J*	*20.8 J*
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	52.1 J	204 J	112 J	99.3 J	89.5 J	87.7 J	102 J	25 J
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	<1.03 J	<1.16 J	<1.19 J	<1.19	<1.22	<1.2	<1.27	<1.2
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	<5.15	21.6	6	14.9 J	7.63 J	16 J	<5.5	14 J
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	5.07 J	15.7	4.23 J	7.58 J	5.21 J	15.4 J	4.97	8.13 J
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	<0.0207	<0.0233 J	<0.0238 J	<0.0231 J	<0.0245 J	<0.024 J	<0.0253	<0.241
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	<2.58 J	<2.91 J	<2.98 J	<2.89 J	<3.06 J	<3 J	*10.6 J*	6.33 J
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	<5.15	*44*	*18.9*	<5.95 J	<6.1 J	<6.02 J	7.89 J	<6.02 J
Other												
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	- -	- -	- -	- -	- -
Polychlorinated Biphenyls												
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.163488 J*	*<0.183924*	*<0.187854*	*<0.183138*	*<0.193356 J*	*<0.190212*	*<0.199644*	*<0.190212 J*
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.163488 J*	*<0.183924*	*<0.187854*	*<0.183138*	*<0.193356 J*	*<0.190212*	*<0.199644*	*<0.190212 J*
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	<0.163488 J	<0.183924	<0.187854	<0.183138	<0.193356 J	<0.190212	<0.199644	<0.190212 J
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	<0.163488 J	<0.183924	<0.187854	<0.183138	<0.193356 J	<0.190212	<0.199644	<0.190212 J
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	<0.163488 J	<0.183924	<0.187854	<0.183138	<0.193356 J	<0.190212	<0.199644	<0.190212 J
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	<0.163488 J	<0.183924	<0.187854	<0.183138	<0.193356 J	<0.190212	<0.199644	<0.190212 J
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	<0.163488 J	<0.183924	<0.187854	<0.183138	<0.193356 J	<0.190212	<0.199644	<0.190212 J
Pesticides/Herbicides												
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	<0.121472 J	<0.136656	<0.139576	<0.136072	<0.143664 J	<0.141328	<0.148336	<0.141328 J
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	<0.00762112 J	<0.00857376	<0.00875696	<0.00853712	<0.00901344 J	<0.00886688	<0.00930656	<0.00886688 J
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	<0.00277056 J	<0.00311688	<0.00318348	<0.00310356	<0.00327672 J	<0.00322344	<0.00338328	<0.00322344 J
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	<0.00832 J	<0.00936	<0.00956	<0.00932	<0.00984 J	<0.00968	<0.01016	<0.00968 J
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	<0.00277056 J	<0.00311688	<0.00318348	<0.00310356	<0.00327672 J	<0.00322344	<0.00338328	<0.00322344 J
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	<0.00208 J	<0.00234	<0.00239	<0.00233	<0.00246 J	<0.00242	<0.00254	<0.00242 J
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	<0.00416 J	<0.00468	<0.00478	<0.00466	<0.00492 J	<0.00484	<0.00508	<0.00484 J
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	<0.1664 J	<0.1872	<0.1912	<0.1864	<0.1968 J	<0.1936	<0.2032	<0.1936 J
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	<0.0097344 J	<0.0109512	<0.0111852	<0.0109044	<0.0115128 J	<0.0113256	<0.0118872	<0.0113256 J
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	<0.00624 J	<0.00702	<0.00717	<0.00699	<0.00738 J	<0.00726	<0.00762	<0.00726 J
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	<0.00138944 J	<0.00156312	<0.00159652	<0.00155644	<0.00164328 J	<0.00161656	<0.00169672	<0.00161656 J
Endosulfan I	959-98-8	- -	- -	mg/kg	<0.0097344 J	<0.0109512	<0.0111852	<0.0109044	<0.0115128 J	<0.0113256	<0.0118872	<0.0113256 J
Endosulfan II	33213-65-9	- -	- -	mg/kg	<0.00277056 J	<0.00311688	<0.00318348	<0.00310356	<0.00327672 J	<0.00322344	<0.00338328	<0.00322344 J
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	<0.04576 J	<0.05148	<0.05258	<0.05126	<0.05412 J	<0.05324	<0.05588	<0.05324 J
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	<0.00416 J	<0.00468	<0.00478	<0.00466	<0.00492 J	<0.00484	<0.00508	<0.00484 J
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	<0.00277056 J	<0.00311688	<0.00318348	<0.00310356	<0.00327672 J	<0.00322344	<0.00338328	<0.00322344 J
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	<0.00208 J	<0.00234	<0.00239	<0.00233	<0.00246 J	<0.00242	<0.00254	<0.00242 J
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	<0.0575328 J	<0.0647244	<0.0661074	<0.0644478	<0.0680436 J	<0.0669372	<0.0702564	<0.0669372 J
Semivolatile Organic Compounds												
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	R	*<1.86725*	*<1.90605*	*<1.8527*	*<1.9594*	*<1.92545*	*<2.02245*	*<1.92545*
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	R	*<1.86725*	*<1.90605*	*<1.8527*	*<1.9594*	*<1.92545*	*<2.02245*	*<1.92545*
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	R	*<1.86725*	*<1.90605*	*<1.8527*	*<1.9594*	*<1.92545*	*<2.02245*	*<1.92545*

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	HMW-29 58 11/03/93	HMW-29 78 11/03/93	HMW-31 19 11/03/93	HMW-31 39 11/04/93	HMW-33 19 11/04/93	HMW-33 39 11/05/93	HMW-34 19 11/08/93	HMW-34 39 11/08/93
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
2-Nitroaniline	88-74-4	- -	- -	mg/kg	R	<1.86725	<1.90605	<1.8527	<1.9594	<1.92545	<2.02245	<1.92545
2-Nitrophenol	88-75-5	- -	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
3-Nitroaniline	99-09-2	- -	- -	mg/kg	R	<1.86725	<1.90605	<1.8527	<1.9594	<1.92545	<2.02245	<1.92545
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
4-Nitrophenol	100-02-7	- -	- -	mg/kg	R	<1.86725	<1.90605	<1.8527	<1.9594	<1.92545	<2.02245	<1.92545
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Acenaphthylene	208-96-8	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	R	*<1.86725*	*<1.90605*	*<1.8527*	*<1.9594*	*<1.92545*	*<2.02245*	*<1.92545*
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	R	<1.86725	<1.90605	<1.8527	<1.9594	<1.92545	<2.02245	<1.92545
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Dibenzofuran	132-64-9	- -	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	R	<1.164625	<1.188825	<1.15555	<1.2221	<1.200925	<1.261425	<1.200925
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	R	*<0.385*	*<0.393*	*<0.382*	*<0.404*	*<0.397*	*<0.417*	*<0.397*
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	R	*<1.86725*	*<1.90605*	*<1.8527*	*<1.9594*	*<1.92545*	*<2.02245*	*<1.92545*
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	R	<1.86725	<1.90605	<1.8527	<1.9594	<1.92545	<2.02245	<1.92545
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	R	<0.385	<0.393	<0.382	<0.404	<0.397	<0.417	<0.397

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	HMW-29 58 11/03/93	HMW-29 78 11/03/93	HMW-31 19 11/03/93	HMW-31 39 11/04/93	HMW-33 19 11/04/93	HMW-33 39 11/05/93	HMW-34 19 11/08/93	HMW-34 39 11/08/93
TPHs												
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	<30.94575	<34.93875	<35.66475	<34.6665	<36.663	<36.02775	<37.84275	<36.02775
Volatile Organic Compounds												
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.00517 J*	*<0.00583*	*<0.00595*	*<0.00579 J*	*<0.00613 J*	*<0.00601*	*<0.00632*	*<0.00602*
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.00517 J*	*<0.00583*	*<0.00595*	*<0.00579 J*	*<0.00613 J*	*<0.00601*	*<0.00632*	*<0.00602*
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.00517 J*	*<0.00583*	*<0.00595*	*<0.00579 J*	*<0.00613 J*	*<0.00601*	*<0.00632*	*<0.00602*
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.01034 J*	*<0.01166*	*<0.0119*	*<0.01158 J*	*<0.01226 J*	*<0.01202*	*<0.01264*	*<0.01204*
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.02068 J	<0.02332	<0.0238	<0.02316 J	<0.02452 J	<0.02404	<0.02528	<0.02408
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.01034 J	<0.01166	<0.0119	<0.01158 J	<0.01226 J	<0.01202	<0.01264	<0.01204
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.02068 J	<0.02332	<0.0238	<0.02316 J	<0.02452 J	<0.02404	<0.02528	<0.02408
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	<0.0159328 J	<0.0179244	<0.0183074	<0.0178478	<0.0188436 J	<0.0185372	<0.0194564	<0.0185372 J
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.02068 J	<0.02332	<0.0238	0.0202 J	<0.02452 J	0.108	<0.02528	<0.02408
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.00517 J*	*<0.00583*	*<0.00595*	*<0.00579 J*	*<0.00613 J*	*<0.00601*	*<0.00632*	*<0.00602*
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.01034 J*	*<0.01166*	*<0.0119*	*<0.01158 J*	*<0.01226 J*	*<0.01202*	*<0.01264*	*<0.01204*
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	*<0.00517 J*	*<0.00583*	*<0.00595*	*<0.00579 J*	*<0.00613 J*	*<0.00601*	*<0.00632*	*<0.00602*
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.01034 J	<0.01166	<0.0119	<0.01158 J	<0.01226 J	<0.01202	<0.01264	<0.01204
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.01034 J	<0.01166	<0.0119	<0.01158 J	<0.01226 J	<0.01202	<0.01264	<0.01204
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.00517 J*	*<0.00583*	*<0.00595*	*<0.00579 J*	*<0.00613 J*	*<0.00601*	*<0.00632*	*<0.00602*
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.01034 J	<0.01166	<0.0119	<0.01158 J	<0.01226 J	<0.01202	<0.01264	<0.01204
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*<0.00517 J*	*<0.00583*	*<0.00595*	*<0.00579 J*	*<0.00613 J*	*<0.00601*	*<0.00632*	*<0.00602*
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.01034 J	<0.01166	<0.0119	<0.01158 J	<0.01226 J	<0.01202	<0.01264	<0.01204
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Ethanol	64-17-5	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Iodomethane	74-88-4	- -	- -	mg/kg	<0.01034 J	<0.01166	<0.0119	<0.01158 J	<0.01226 J	<0.01202	<0.01264	<0.01204
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.02068 J	<0.02332	<0.0238	<0.02316 J	<0.02452 J	<0.02404	<0.02528	<0.02408
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.00517 J*	*<0.00583*	*<0.00595*	*<0.00579 J*	*<0.00613 J*	*<0.00601*	*<0.00632*	*<0.00602*
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.02068 J	<0.02332	<0.0238	<0.02316 J	<0.02452 J	<0.02404	<0.02528	<0.02408
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.01034 J*	*<0.01166*	*<0.0119*	*<0.01158 J*	*<0.01226 J*	*<0.01202*	*<0.01264*	*<0.01204*
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.00517 J	<0.00583	<0.00595	<0.00579 J	<0.00613 J	<0.00601	<0.00632	<0.00602

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	HMW-34 59 11/08/93	HMW-34 79 11/08/93	HMW-35 19 11/15/93	HMW-35 39 11/15/93	HMW-35 59 11/15/93	HMW-35 79 11/15/93	HMW-32 59 11/17/93	HMW-32 79 11/17/93
Metals												
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	*6.75 J*	*5.5 J*	*8.11*	*35.8*	*3.06*	*2.87*	*28.2*	*14.3*
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	94 J	37.2 J	98.6	78.4	78.4	65.4	154	116
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	<1.04	<1.14	<1.19	<1.1	<1.01	<1.12	<1.28	<1.19
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	5.5 J	<5.68 J	7.12	14.4	<5.05	<5.62	29.4	22.6
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	8.95 J	6.63 J	3.84	4.36	4.03	7.32	25.2	15
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	<0.0208	<0.0228	<0.238	<0.0221	<0.0201	<0.0225	<0.0255	<0.0238
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	4.4 J	4.49 J	<2.97	3.04	<2.51	<2.82	<3.19	<2.98
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	<5.21 J	<5.68 J	9.66	8.07	<5.05	<5.62	<6.41	*17.9*
Other												
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	- -	- -	- -	- -	- -
Polychlorinated Biphenyls												
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.164274*	*<0.179994 J*	*<0.187854*	*<0.174492*	*<0.158772*	*<0.178422*	*<0.202002 J*	*<0.18864*
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.164274*	*<0.179994 J*	*<0.187854*	*<0.174492*	*<0.158772*	*<0.178422*	*<0.202002 J*	*<0.18864*
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	<0.164274	<0.179994 J	<0.187854	<0.174492	<0.158772	<0.178422	<0.202002 J	<0.18864
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	<0.164274	<0.179994 J	<0.187854	<0.174492	<0.158772	<0.178422	<0.202002 J	<0.18864
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	<0.164274	<0.179994 J	<0.187854	<0.174492	<0.158772	<0.178422	<0.202002 J	<0.18864
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	<0.164274	<0.179994 J	<0.187854	<0.174492	<0.158772	<0.178422	<0.202002 J	<0.18864
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	<0.164274	<0.179994 J	<0.187854	<0.174492	<0.158772	<0.178422	<0.202002 J	<0.18864
Pesticides/Herbicides												
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	<0.122056	<0.133736 J	<0.139576	<0.129648	<0.117968	<0.132568	<0.150088 J	<0.14016
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	<0.00765776	<0.00839056 J	<0.00875696	<0.00813408	<0.00740128	<0.00831728	<0.00941648 J	<0.0087936
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	<0.00278388	<0.00305028 J	<0.00318348	<0.00295704	<0.00269064	<0.00302364	<0.00342324 J	<0.0031968
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	<0.00836	<0.00916 J	<0.00956	<0.00888	<0.00808	<0.00908	<0.01028 J	<0.0096
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	<0.00278388	<0.00305028 J	<0.00318348	<0.00295704	<0.00269064 J	<0.00302364	<0.00342324 J	<0.0031968
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	<0.00209	<0.00229 J	<0.00239	<0.00222	<0.00202	<0.00227	<0.00257 J	<0.0024
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	<0.00418	<0.00458 J	<0.00478	<0.00444	<0.00404	<0.00454	<0.00514 J	<0.0048
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	<0.1672	<0.1832 J	<0.1912	<0.1776	<0.1616	<0.1816	<0.2056 J	<0.192
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	<0.0097812	<0.0107172 J	<0.0111852	<0.0103896	<0.0094536	<0.0106236	<0.0120276 J	<0.011232
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	<0.00627	<0.00687 J	<0.00717	<0.00666	<0.00606	<0.00681	<0.00771 J	<0.0072
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	<0.00139612	<0.00152972 J	<0.00159652	<0.00148296	<0.00134936	<0.00151636	<0.00171676 J	<0.0016032
Endosulfan I	959-98-8	- -	- -	mg/kg	<0.0097812	<0.0107172 J	<0.0111852	<0.0103896	<0.0094536	<0.0106236	<0.0120276 J	<0.011232
Endosulfan II	33213-65-9	- -	- -	mg/kg	<0.00278388	<0.00305028 J	<0.00318348	<0.00295704	<0.00269064	<0.00302364	<0.00342324 J	<0.0031968
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	<0.04598	<0.05038 J	<0.05258	<0.04884	<0.04444	<0.04994	<0.05654 J	<0.0528
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	<0.00418	<0.00458 J	<0.00478	<0.00444	<0.00404	<0.00454	<0.00514 J	<0.0048
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	<0.00278388	<0.00305028 J	<0.00318348	<0.00295704	<0.00269064	<0.00302364	<0.00342324 J	<0.0031968
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	<0.00209	<0.00229 J	<0.00239	<0.00222	<0.00202	<0.00227	<0.00257 J	<0.0024
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	<0.0578094	<0.0633414 J	<0.0661074	<0.0614052	<0.0558732	<0.0627882	<0.0710862 J	<0.066384
Semivolatile Organic Compounds												
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.332	<0.00564	<0.00638	<0.00596
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	R	*<1.82845*	*<1.9012*	*<1.77025*	*<1.6102*	*<1.8042*	*<2.04185*	*<1.90605*
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	*<0.332*	<0.00564	<0.00638	<0.00596
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	R	*<1.82845*	*<1.9012*	*<1.77025*	*<1.6102*	*<1.8042*	*<2.04185*	*<1.90605*
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	R	*<1.82845*	*<1.9012*	*<1.77025*	*<1.6102*	*<1.8042*	*<2.04185*	*<1.90605*

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: / Sample Depth (ft): / Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	HMW-34 59 11/08/93	HMW-34 79 11/08/93	HMW-35 19 11/15/93	HMW-35 39 11/15/93	HMW-35 59 11/15/93	HMW-35 79 11/15/93	HMW-32 59 11/17/93	HMW-32 79 11/17/93
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
2-Nitroaniline	88-74-4	- -	- -	mg/kg	R	<1.82845	<1.9012	<1.77025	<1.6102	<1.8042	<2.04185	<1.90605
2-Nitrophenol	88-75-5	- -	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
3-Nitroaniline	99-09-2	- -	- -	mg/kg	R	<1.82845	<1.9012	<1.77025	<1.6102	<1.8042	<2.04185	<1.90605
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
4-Nitrophenol	100-02-7	- -	- -	mg/kg	R	<1.82845	<1.9012	<1.77025	<1.6102	<1.8042	<2.04185	<1.90605
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Acenaphthylene	208-96-8	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	R	*<1.82845*	*<1.9012*	*<1.77025*	*<1.6102*	*<1.8042*	*<2.04185*	*<1.90605*
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	R	<1.82845	<1.9012	<1.77025	<1.6102	<1.8042	<2.04185	<1.90605
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Dibenzofuran	132-64-9	- -	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	R	<1.140425	<1.1858	<1.104125	<1.0043	<1.1253	<1.273525	<1.188825
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.332	<0.00564	<0.00638	<0.00596
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	R	*<0.377*	*<0.392*	*<0.365*	*<0.332*	*<0.372*	*<0.421*	*<0.393*
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	R	*<1.82845*	*<1.9012*	*<1.77025*	*<1.6102*	*<1.8042*	*<2.04185*	*<1.90605*
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	R	<1.82845	<1.9012	<1.77025	<1.6102	<1.8042	<2.04185	<1.90605
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	R	<0.377	<0.392	<0.365	<0.332	<0.372	<0.421	<0.393

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	HMW-34 59 11/08/93	HMW-34 79 11/08/93	HMW-35 19 11/15/93	HMW-35 39 11/15/93	HMW-35 59 11/15/93	HMW-35 79 11/15/93	HMW-32 59 11/17/93	HMW-32 79 11/17/93
TPHs												
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	<31.218	<34.21275	<35.574	<33.12375	<30.129	<33.759	<38.20575	<35.66475
Volatile Organic Compounds												
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.00521 J*	*<0.00571*	*<0.00594*	*<0.00552*	*<0.00502*	*<0.00564*	*<0.00638*	*<0.00596*
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.00521 J*	*<0.00571*	*<0.00594*	*<0.00552*	*<0.00502*	*<0.00564*	*<0.00638*	*<0.00596*
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.00521 J*	*<0.00571*	*<0.00594*	*<0.00552*	*<0.00502*	*<0.00564*	*<0.00638*	*<0.00596*
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.01042 J*	*<0.01142*	*<0.01188*	*<0.01104*	*<0.01004*	*<0.01128*	*<0.01276*	*<0.01192*
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.02084 J	<0.02284	<0.02376	<0.02208	<0.02008	<0.02256	<0.02552	<0.02384
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.01042 J	<0.01142	<0.01188	<0.01104	<0.01004	<0.01128	<0.01276	<0.01192
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.02084 J	<0.02284	<0.02376	<0.02208	<0.02008	<0.02256	<0.02552	<0.02384
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	<0.0160094	<0.0175414 J	<0.0183074	<0.0170052	<0.0154732	<0.0173882	<0.0196862 J	<0.018384
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.02084 J	<0.02284	<0.02376	<0.02208	<0.02008	<0.02256	<0.02552	<0.02384
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.00521 J*	*<0.00571*	*<0.00594*	*<0.00552*	*<0.00502*	*<0.00564*	*<0.00638*	*<0.00596*
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.01042 J*	*<0.01142*	*<0.01188*	*<0.01104*	*<0.01004*	*<0.01128*	*<0.01276*	*<0.01192*
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	*<0.00521 J*	*<0.00571*	*<0.00594*	*<0.00552*	*<0.00502*	*<0.00564*	*<0.00638*	*<0.00596*
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.0104 J	<0.01142	<0.01188	<0.01104	<0.01004	<0.01128	<0.01276	<0.01192
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.01042 J	<0.01142	<0.01188	<0.01104	<0.01004	<0.01128	<0.01276	<0.01192
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.00521 J*	*<0.00571*	*<0.00594*	*<0.00552*	*<0.00502*	*<0.00564*	*<0.00638*	*<0.00596*
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.01042 J	<0.01142	<0.01188	<0.01104	<0.01004	<0.01128	<0.01276	<0.01192
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*0.0067 J*	*<0.00571*	*<0.00594*	*<0.00552*	*<0.00502*	*<0.00564*	*<0.00638*	*<0.00596*
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.01042 J	<0.01142	<0.01188	<0.01104	<0.01004	<0.01128	<0.01276	<0.01192
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Ethanol	64-17-5	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Iodomethane	74-88-4	- -	- -	mg/kg	<0.01042 J	<0.01142	<0.01188	<0.01104	<0.01004	<0.01128	<0.01276	<0.01192
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.02084 J	<0.02284	<0.02376	<0.02208	<0.02008	<0.02256	<0.02552	<0.02384
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.00521 J*	*<0.00571*	*<0.00594*	*<0.00552*	*<0.00502*	*<0.00564*	*<0.00638*	*<0.00596*
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.02084 J	<0.02284	<0.02376	<0.02208	<0.02008	<0.02256	<0.02552	<0.02384
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.01042 J*	*<0.01142*	*<0.01188*	*<0.01104*	*<0.01004*	*<0.01128*	*<0.01276*	*<0.01192*
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.00521 J	<0.00571	<0.00594	<0.00552	<0.00502	<0.00564	<0.00638	<0.00596

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	HMW-30 98 11/20/93	WMU 38-39 SB-0 4 12/01/93	SWMU 38-39 SB-01 8 12/01/93	SWMU 38-39 SB-01 14 12/01/93	SWMU 38-39 SB-01 19 12/01/93	SWMU 38-39 SB-02 6 12/01/93
Metals										
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	*3.2*	*<3*	*<3.03*	*<3.24*	*<3.19*	*<3.01*
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	193	51.7	56.9	57.1	148	44.6
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	<1.15	<6.01	<6.05	<6.48	<6.38	<6.02
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	10.9	<30	<30.3	<32.4	<31.9	<30.1
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	10.1	3.58	<3.03	<3.24	4.44	<3.01
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	0.0276	<0.024	<0.0242	<0.0259	<0.0255	<0.0241
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	<2.87	<3	<3.03	<3.24	<3.19	<3.01
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	<5.75	*<30*	*<30.3*	*<32.4*	*<31.9*	*<30.1*
Other										
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	- -	- -	- -
Polychlorinated Biphenyls										
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.181566 J*	*<0.190212*	*<0.190998*	*<0.205146*	*<0.201216*	*<0.190212*
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.181566 J*	*<0.190212*	*<0.190998*	*<0.205146*	*<0.201216*	*<0.190212*
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	<0.181566 J	<0.190212	<0.190998	<0.205146	<0.201216	<0.190212
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	<0.181566 J	<0.190212	<0.190998	<0.205146	<0.201216	<0.190212
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	<0.181566 J	<0.190212	<0.190998	<0.205146	<0.201216	<0.190212
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	<0.181566 J	<0.190212	<0.190998	<0.205146	<0.201216	<0.190212
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	<0.181566 J	<0.190212	<0.190998	<0.205146	<0.201216	<0.190212
Pesticides/Herbicides										
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	<0.134904 J	<0.141328	<0.141912	<0.152424	<0.149504	<0.141328
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	<0.00846384 J	<0.00886688	<0.00890352	<0.00956304	<0.00937984	<0.00886688
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	<0.00307692 J	<0.00322344	<0.00323676	<0.00347652	<0.00340992	<0.00322344
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	<0.00924 J	<0.00968	<0.00972	<0.01044	<0.01024	<0.00968
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	<0.00307692 J	<0.00322344	<0.00323676	<0.00347652	<0.00340992	<0.00322344
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	<0.00231 J	<0.00242	<0.00243	<0.00261	<0.00256	<0.00242
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	<0.00462 J	<0.00484	<0.00486	<0.00522	<0.00512	<0.00484
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	<0.1848 J	<0.1936	<0.1944	<0.2088	<0.2048	<0.1936
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	<0.0108108 J	<0.0113256	<0.0113724	<0.0122148	<0.0119808	<0.0113256
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	<0.00693 J	<0.00726	<0.00729	<0.00783	<0.00768	<0.00726
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	<0.00154308 J	<0.00161656	<0.00162324	<0.00174348	<0.00171008	<0.00161656
Endosulfan I	959-98-8	- -	- -	mg/kg	<0.0108108 J	<0.0113256	<0.0113724	<0.0122148	<0.0119808	<0.0113256
Endosulfan II	33213-65-9	- -	- -	mg/kg	<0.00307692 J	<0.00322344	<0.00323676	<0.00347652	<0.00340992	<0.00322344
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	<0.05082 J	<0.05324	<0.05346	<0.05742	<0.05632	<0.05324
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	<0.00462 J	<0.00484	<0.00486	<0.00522	<0.00512	<0.00484
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	<0.00307692 J	<0.00322344	<0.00323676	<0.00347652	<0.00340992	<0.00322344
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	<0.00231 J	<0.00242	<0.00243	<0.00261	<0.00256	<0.00242
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	<0.0638946 J	<0.0669372	<0.0672138	<0.0721926	<0.0708096	<0.0669372
Semivolatile Organic Compounds										
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	*<1.83815*	*<1.92545*	*<1.94*	*<2.0758*	*<2.04185*	*<1.9303 [<1.93]*
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	*<1.83815*	*<1.92545*	*<1.94*	*<2.0758*	*<2.04185*	*<1.9303 [<1.93]*
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	*<1.83815*	*<1.92545*	*<1.94*	*<2.0758*	*<2.04185*	*<1.9303 [<1.93]*

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	HMW-30 98 11/20/93	WMU 38-39 SB-(4 12/01/93	SWMU 38-39 SB-01 8 12/01/93	SWMU 38-39 SB-01 14 12/01/93	SWMU 38-39 SB-01 19 12/01/93	SWMU 38-39 SB-02 6 12/01/93
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
2-Nitroaniline	88-74-4	- -	- -	mg/kg	<1.83815	<1.92545	<1.94	<2.0758	<2.04185	<1.9303 [<1.93]
2-Nitrophenol	88-75-5	- -	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
3-Nitroaniline	99-09-2	- -	- -	mg/kg	<1.83815	<1.92545	<1.94	<2.0758	<2.04185	<1.9303 [<1.93]
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
4-Nitrophenol	100-02-7	- -	- -	mg/kg	<1.83815	<1.92545	<1.94	<2.0758	<2.04185	<1.9303 [<1.93]
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Acenaphthylene	208-96-8	- -	- -	mg/kg	- -	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	*<1.83815*	***<1.92545***	***<1.94***	*<2.0758*	*<2.04185*	***<1.9303 [<1.93]***
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	<1.83815	<1.92545	<1.94	<2.0758	<2.04185	<1.9303 [<1.93]
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Dibenzofuran	132-64-9	- -	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	<1.146475	<1.200925	<1.21	<1.2947	<1.273525	<1.20395 [<1.21]
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	- -	- -	- -	- -	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	*<0.379*	*<0.397*	*<0.4*	*<0.428*	*<0.421*	*<0.398 [<0.399]*
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.00604]
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	*<1.83815*	*<1.92545*	*<1.94*	*<2.0758*	*<2.04185*	*<1.9303 [<1.93]*
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	<1.83815	<1.92545	<1.94	<2.0758	<2.04185	<1.9303 [<1.93]
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	<0.379	<0.397	<0.4	<0.428	<0.421	<0.398 [<0.399]

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	HMW-30 98 11/20/93	WMU 38-39 SB-(4 12/01/93	SWMU 38-39 SB-01 8 12/01/93	SWMU 38-39 SB-01 14 12/01/93	SWMU 38-39 SB-01 19 12/01/93	SWMU 38-39 SB-02 6 12/01/93
TPHs										
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	<34.39425	<36.02775	<36.3	<38.841	<38.20575	<36.1185
Volatile Organic Compounds										
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.00575*	*<0.00601*	*<0.00605*	*<0.00648*	*<0.00638*	*<0.00602 [<0.00604]*
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.00575*	*<0.00601*	*<0.00605*	*<0.00648*	*<0.00638*	*<0.00602 [<0.00604]*
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.00575*	*<0.00601*	*<0.00605*	*<0.00648*	*<0.00638*	*<0.00602 [<0.00604]*
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.0115*	*<0.01202*	*<0.0121*	*<0.01296*	*<0.01276*	*<0.01204 [<0.0121]*
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.023	<0.02404	<0.0242	<0.02592	<0.02552	<0.02408 [<0.0242]
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.0115	<0.01202	<0.0121	<0.01296	<0.01276	<0.01204 [<0.0121]
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.023	<0.02404	<0.0242	<0.02592	<0.02552	<0.02408 [<0.0242]
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	<0.0176946 J	<0.0185372	<0.0186138	<0.0199926	<0.0196096	<0.0185372
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.023	<0.02404	<0.0242	<0.02592	<0.02552	<0.02408 [<0.0242]
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.00575*	*<0.00601*	*<0.00605*	*<0.00648*	*<0.00638*	*<0.00602 [<0.00604]*
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.0115*	*<0.01202*	*<0.0121*	*<0.01296*	*<0.01276*	*<0.01204 [<0.0121]*
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	*<0.00575*	*<0.00601*	*<0.00605*	*<0.00648*	*<0.00638*	*<0.00602 [<0.00604]*
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.0115	<0.01202	<0.0121	<0.01296	<0.01276	<0.01204 [<0.0121]
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.0115	<0.01202	<0.0121	<0.01296	<0.01276	<0.01204 [<0.00604]
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	- -	- -	- -	- -	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.00575*	*<0.00601*	*<0.00605*	*<0.00648*	*<0.00638*	*<0.00602 [<0.00604]*
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.0115	<0.01202	<0.0121	<0.01296	<0.01276	<0.01204 [<0.0121]
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*<0.00575*	*<0.00601*	*<0.00605*	*<0.00648*	*<0.00638*	*<0.00602 [<0.00604]*
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.0115	<0.01202	<0.0121	<0.01296	<0.01276	<0.01204 [<0.0121]
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	- -	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Ethanol	64-17-5	- -	- -	mg/kg	- -	- -	- -	- -	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Iodomethane	74-88-4	- -	- -	mg/kg	<0.0115	<0.01202	<0.0121	<0.01296	<0.01276	<0.01204 [<0.0121]
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.023	<0.02404	<0.0242	<0.02592	<0.02552	<0.02408 [<0.0242]
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.00575*	*<0.00601*	*<0.00605*	*<0.00648*	*<0.00638*	*<0.00602 [<0.00604]*
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.023	<0.02404	<0.0242	<0.02592	<0.02552	<0.02408 [<0.0242]
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.0115*	*<0.01202*	*<0.0121*	*<0.01296*	*<0.01276*	*<0.01204 [<0.0121]*
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.00575	<0.00601	<0.00605	<0.00648	<0.00638	<0.00602 [<0.00604]

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-02 9 12/01/93	SWMU 38-39 SB-02 14 12/01/93	SWMU 38-39 SB-02 19 12/01/93	SWMU 38-39 SB-03 4 12/01/93	SWMU 38-39 SB-03 8 12/01/93
Metals									
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	***17.3***	*13.4*	*17.5*	***13.3***	***13.4***
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	75.3	88.6	164	56.8	144
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	<6.17	<6.33	<6.2	<6.09	<5.97
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	<30.9	<31.6	<31	<30.4	<29.9
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	<3.09	<3.16	4.65	<3.04	3.24
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	<0.0247	<0.0253	<0.0248	<0.0244	<0.0239
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	4.51	<3.16	7.46	5.97	5.15
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	*<30.9*	*<31.6*	*<31*	*<30.4*	*<29.9*
Other									
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	- -	- -
Polychlorinated Biphenyls									
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.194928*	*<0.199644*	*<0.195714*	*<0.19257*	*<0.18864*
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.194928*	*<0.199644*	*<0.195714*	*<0.19257*	*<0.18864*
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	<0.194928	<0.199644	<0.195714	<0.19257	<0.18864
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	<0.194928	<0.199644	<0.195714	<0.19257	<0.18864
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	<0.194928	<0.199644	<0.195714	<0.19257	<0.18864
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	<0.194928	<0.199644	<0.195714	<0.19257	<0.18864
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	<0.194928	<0.199644	<0.195714	<0.19257	<0.18864
Pesticides/Herbicides									
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	<0.144832	<0.148336	<0.145416	<0.14308	<0.14016
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	<0.00908672	<0.00930656	<0.00912336	<0.0089768	<0.0087936
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	<0.00330336	<0.00338328	<0.00331668	<0.0032634	<0.0031968
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	<0.00992	<0.01016	<0.00996	<0.0098	<0.0096
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	<0.00330336	<0.00338328	<0.00331668	<0.0032634	<0.0031968
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	<0.00248	<0.00254	<0.00249	<0.00245	<0.0024
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	<0.00496	<0.00508	<0.00498	<0.0049	<0.0048
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	<0.1984	<0.2032	<0.1992	<0.196	<0.192
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	<0.0116064	<0.0118872	<0.0116532	<0.011466	<0.011232
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	<0.00744	<0.00762	<0.00747	<0.00735	<0.0072
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	<0.00165664	<0.00169672	<0.00166332	<0.0016366	<0.0016032
Endosulfan I	959-98-8	- -	- -	mg/kg	<0.0116064	<0.0118872	<0.0116532	<0.011466	<0.011232
Endosulfan II	33213-65-9	- -	- -	mg/kg	<0.00330336	<0.00338328	<0.00331668	<0.0032634	<0.0031968
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	<0.05456	<0.05588	<0.05478	<0.0539	<0.0528
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	<0.00496	<0.00508	<0.00498	<0.0049	<0.0048
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	- -	- -	- -	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	<0.00330336	<0.00338328	<0.00331668	<0.0032634	<0.0031968
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	<0.00248	<0.00254	<0.00249	<0.00245	<0.0024
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	<0.0685968	<0.0702564	<0.0688734	<0.067767	<0.066384
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	*<1.97395*	*<2.0273*	*<1.98365*	*<1.9497*	*<1.9109 [<1.91]*
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	*<1.97395*	*<2.0273*	*<1.98365*	*<1.9497*	*<1.9109 [<1.91]*
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	*<1.97395*	*<2.0273*	*<1.98365*	*<1.9497*	*<1.9109 [<1.91]*

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-02 9 12/01/93	SWMU 38-39 SB-02 14 12/01/93	SWMU 38-39 SB-02 19 12/01/93	SWMU 38-39 SB-03 4 12/01/93	SWMU 38-39 SB-03 8 12/01/93
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
2-Nitroaniline	88-74-4	- -	- -	mg/kg	<1.97395	<2.0273	<1.98365	<1.9497	<1.9109 [<1.91]
2-Nitrophenol	88-75-5	- -	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
3-Nitroaniline	99-09-2	- -	- -	mg/kg	<1.97395	<2.0273	<1.98365	<1.9497	<1.9109 [<1.91]
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
4-Nitrophenol	100-02-7	- -	- -	mg/kg	<1.97395	<2.0273	<1.98365	<1.9497	<1.9109 [<1.91]
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Acenaphthylene	208-96-8	- -	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	***<1.97395***	*<2.0273*	*<1.98365*	***<1.9497***	***<1.9109 [<1.91]***
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	<1.97395	<2.0273	<1.98365	<1.9497	<1.9109 [<1.91]
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Dibenzofuran	132-64-9	- -	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	<1.231175	<1.26445	<1.237225	<1.21605	<1.19185 [<1.19]
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	- -	- -	- -	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	*<0.407*	*<0.418*	*<0.409*	*<0.402*	*<0.394 [<0.394]*
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.00597]
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	*<1.97395*	*<2.0273*	*<1.98365*	*<1.9497*	*<1.9109 [<1.91]*
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	<1.97395	<2.0273	<1.98365	<1.9497	<1.9109 [<1.91]
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	<0.407	<0.418	<0.409	<0.402	<0.394 [<0.394]

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-02 9 12/01/93	SWMU 38-39 SB-02 14 12/01/93	SWMU 38-39 SB-02 19 12/01/93	SWMU 38-39 SB-03 4 12/01/93	SWMU 38-39 SB-03 8 12/01/93
TPHs									
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	<36.93525	<37.9335	<37.11675	<36.4815	<35.7555
Volatile Organic Compounds									
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.00617*	*<0.00633*	*<0.0062 J*	*<0.00609*	*<0.00597 [<0.00597]*
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.00617*	*<0.00633*	*<0.0062 J*	*<0.00609*	*<0.00597 [<0.00597]*
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.00617*	*<0.00633*	*<0.0062 J*	*<0.00609*	*<0.00597 [<0.00597]*
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.01234*	*<0.01266*	*<0.0124 J*	*<0.01218*	*<0.01194 [<0.0119]*
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.02468	<0.02532	<0.0248 J	<0.02436	<0.02388 [<0.0239]
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.01234	<0.01266	<0.0124 J	<0.01218	<0.01194 [<0.0119]
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.02468	<0.02532	<0.0248 J	<0.02436	<0.02388 [<0.0239]
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	<0.0189968	<0.0194564	<0.0190734	<0.018767	<0.018384
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.02468	<0.02532	<0.0248 J	0.0342	<0.02388 [<0.0239]
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.00617*	*<0.00633*	*<0.0062 J*	*<0.00609*	*<0.00597 [<0.00597]*
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.01234*	*<0.01266*	*<0.0124 J*	*<0.01218*	*<0.01194 [<0.0119]*
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	*<0.00617*	*<0.00633*	*<0.0062 J*	*<0.00609*	*<0.00597 [<0.00597]*
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.01234	<0.01266	<0.0124 J	<0.01218	<0.01194 [<0.0119]
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.01234	<0.01266	<0.0124 J	<0.01218	<0.01194 [<0.00597]
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	- -	- -	- -	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.00617*	*<0.00633*	*<0.0062 J*	*<0.00609*	*<0.00597 [<0.00597]*
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.01234	<0.01266	<0.0124 J	<0.01218	<0.01194 [<0.0119]
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*<0.00617*	*<0.00633*	*<0.0062 J*	*<0.00609*	*<0.00597 [<0.00597]*
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.01234	<0.01266	<0.0124 J	<0.01218	<0.01194 [<0.0119]
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	<0.00617	<0.00633	<0.0062	<0.00609	<0.00597 [<0.00597]
Ethanol	64-17-5	- -	- -	mg/kg	- -	- -	- -	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Iodomethane	74-88-4	- -	- -	mg/kg	<0.01234	<0.01266	<0.0124 J	<0.01218	<0.01194 [<0.0119]
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.02468	<0.02532	<0.0248 J	<0.02436	<0.02388 [<0.0239]
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.00617*	*<0.00633*	*<0.0062 J*	*<0.00609*	*<0.00597 [<0.00597]*
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.02468	<0.02532	<0.0248 J	<0.02436	<0.02388 [<0.0239]
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.01234*	*<0.01266*	*<0.0124 J*	*<0.01218*	*<0.01194 [<0.0119]*
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.00617	<0.00633	<0.0062 J	<0.00609	<0.00597 [<0.00597]

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-03 20 12/01/93	SWMU 38-39 SB-03 27 12/01/93	SWMU 38-39 SB-04 4 12/01/93	SWMU 38-39 SB-04 12 12/01/93	SWMU 38-39 SB-04 15 12/01/93
Metals									
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	*14*	*12*	***11.6***	*11.2*	*13*
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	131	33.3	64.7	<30	139
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	<6.14	<6.17	<5.99	<6.01	<6.54
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	<30.7	<30.9	<29.9	<30	<32.7
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	3.83	<3.09	4.87	<3	<3.27
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	<0.0246	<0.0247	<0.024	<0.024	<0.0262
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	7	4.33	6.8	8.46	<3.27
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	*<30.7*	*<30.9*	*<29.9*	*<30*	*<32.7*
Other									
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	- -	- -
Polychlorinated Biphenyls									
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.194142*	*<0.194928 J*	*<0.189426*	*<0.190212*	*<0.206718*
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.194142*	*<0.194928 J*	*<0.189426*	*<0.190212*	*<0.206718*
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	<0.194142	<0.194928 J	<0.189426	<0.190212	<0.206718
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	<0.194142	<0.194928 J	<0.189426	<0.190212	<0.206718
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	<0.194142	<0.194928 J	<0.189426	<0.190212	<0.206718
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	<0.194142	<0.194928 J	<0.189426	<0.190212	<0.206718
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	<0.194142	<0.194928 J	<0.189426	<0.190212	<0.206718
Pesticides/Herbicides									
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	<0.144248	<0.144832 J	<0.140744	<0.141328	<0.153592
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	<0.00905008	<0.00908672 J	<0.00883024	<0.00886688	<0.00963632
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	<0.00329004	<0.00330336 J	<0.00321012	<0.00322344	<0.00350316
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	<0.00988	<0.00992 J	<0.00964	<0.00968	<0.01052
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	<0.00329004	<0.00330336 J	<0.00321012	<0.00322344	<0.00350316
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	<0.00247	<0.00248 J	<0.00241	<0.00242	<0.00263
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	<0.00494	<0.00496 J	<0.00482	<0.00484	<0.00526
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	<0.1976	<0.1984 J	<0.1928	<0.1936	<0.2104
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	<0.0115596	<0.0116064 J	<0.0112788	<0.0113256	<0.0123084
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	<0.00741	<0.00744 J	<0.00723	<0.00726	<0.00789
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	<0.00164996	<0.00165664 J	<0.00160988	<0.00161656	<0.00175684
Endosulfan I	959-98-8	- -	- -	mg/kg	<0.0115596	<0.0116064 J	<0.0112788	<0.0113256	<0.0123084
Endosulfan II	33213-65-9	- -	- -	mg/kg	<0.00329004	<0.00330336 J	<0.00321012	<0.00322344	<0.00350316
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	<0.05434	<0.05456 J	<0.05302	<0.05324	<0.05786
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	<0.00494	<0.00496 J	<0.00482	<0.00484	<0.00526
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	- -	- -	- -	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	<0.00329004	<0.00330336 J	<0.00321012	<0.00322344	<0.00350316
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	<0.00247	<0.00248 J	<0.00241	<0.00242	<0.00263
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	<0.0683202	<0.0685968 J	<0.0666606	<0.0669372	<0.0727458
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.00614	<0.407	<0.00599	<0.00601 [<0.00603]	<0.00654
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	*<1.96425*	*<1.97395*	*<1.91575*	*<1.92545 [<1.93]*	*<2.0952*
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	<0.00614	*<0.407*	<0.00599	<0.00601 [<0.00603]	<0.00654
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	*<1.96425*	*<1.97395*	*<1.91575*	*<1.92545 [<1.93]*	*<2.0952*
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	*<1.96425*	*<1.97395*	*<1.91575*	*<1.92545 [<1.93]*	*<2.0952*

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-03 20 12/01/93	SWMU 38-39 SB-03 27 12/01/93	SWMU 38-39 SB-04 4 12/01/93	SWMU 38-39 SB-04 12 12/01/93	SWMU 38-39 SB-04 15 12/01/93
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
2-Nitroaniline	88-74-4	- -	- -	mg/kg	<1.96425	<1.97395	<1.91575	<1.92545 [<1.93]	<2.0952
2-Nitrophenol	88-75-5	- -	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
3-Nitroaniline	99-09-2	- -	- -	mg/kg	<1.96425	<1.97395	<1.91575	<1.92545 [<1.93]	<2.0952
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
4-Nitrophenol	100-02-7	- -	- -	mg/kg	<1.96425	<1.97395	<1.91575	<1.92545 [<1.93]	<2.0952
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Acenaphthylene	208-96-8	- -	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	*<1.96425*	*<1.97395*	***<1.91575***	*<1.92545 [<1.93]*	*<2.0952*
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	<1.96425	<1.97395	<1.91575	<1.92545 [<1.93]	<2.0952
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	<0.405	<0.407	0.438	<0.397 [<0.398]	<0.432
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Dibenzofuran	132-64-9	- -	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	<1.225125	<1.231175	<1.194875	<1.200925 [<1.21]	<1.3068
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.00614	<0.407	<0.00599	<0.00601 [<0.00603]	<0.00654
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	- -	- -	- -	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	*<0.405*	*<0.407*	*<0.395*	*<0.397 [<0.398]*	*<0.432*
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.00603]	<0.432
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	*<1.96425*	*<1.97395*	*<1.91575*	*<1.92545 [<1.93]*	*<2.0952*
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	<1.96425	<1.97395	<1.91575	<1.92545 [<1.93]	<2.0952
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	<0.405	<0.407	<0.395	<0.397 [<0.398]	<0.432

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-03 20 12/01/93	SWMU 38-39 SB-03 27 12/01/93	SWMU 38-39 SB-04 4 12/01/93	SWMU 38-39 SB-04 12 12/01/93	SWMU 38-39 SB-04 15 12/01/93
TPHs									
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	<36.75375	<36.93525	999	43.3 J	<39.204
Volatile Organic Compounds									
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.00614*	*<0.00617*	*<0.00599*	*<0.00601 [<0.00603]*	*<0.00654*
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601	<0.00654
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.00614*	*<0.00617*	*<0.00599*	*<0.00601 [<0.00603]*	*<0.00654*
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.00614*	*<0.00617*	*<0.00599*	*<0.00601 [<0.00603]*	*<0.00654*
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.01228*	*<0.0123*	*<0.01198*	*<0.01202 [<0.0121]*	*<0.01308*
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.02456	<0.0247	<0.02396	<0.02404 [<0.0241]	<0.02616
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.01228	<0.0123	<0.01198	<0.01202 [<0.0121]	<0.01308
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.02456	<0.0247	<0.02396	<0.02404 [<0.0241]	<0.02616
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	<0.0189202	<0.0189968 J	<0.0184606	<0.0185372	<0.0201458
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.02456	<0.0247	<0.02396	<0.02404 [<0.0241]	<0.02616
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.00614*	*<0.00617*	*<0.00599*	*<0.00601 [<0.00603]*	*<0.00654*
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.01228*	*<0.0123*	*<0.01198*	*<0.01202 [<0.0121]*	*<0.01308*
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	*<0.00614*	*<0.00617*	*<0.00599*	*<0.00601 [<0.00603]*	*<0.00654*
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.01228	<0.0123	<0.01198	<0.01202 [<0.0121]	<0.01308
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.01228	<0.00617	<0.01198	<0.01202 [<0.00603]	<0.01308
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	- -	- -	- -	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.00614*	*<0.00617*	*<0.00599*	*<0.00601 [<0.00603]*	*<0.00654*
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.01228	<0.0123	<0.01198	<0.01202 [<0.0121]	<0.01308
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*<0.00614*	*<0.00617*	*<0.00599*	*<0.00601 [<0.00603]*	*<0.00654*
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.01228	<0.0123	<0.01198	<0.01202 [<0.0121]	<0.01308
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Ethanol	64-17-5	- -	- -	mg/kg	- -	- -	- -	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Iodomethane	74-88-4	- -	- -	mg/kg	<0.01228	<0.0123	<0.01198	<0.01202 [<0.0121]	<0.01308
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.02456	<0.0247	<0.02396	<0.02404 [<0.0241]	<0.02616
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.00614*	*<0.00617*	*<0.00599*	*<0.00601 [<0.00603]*	*<0.00654*
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	<0.00614	- -	<0.00599	<0.00601	<0.00654
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.02456	<0.0247	<0.02396	<0.02404 [<0.0241]	<0.02616
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.01228*	*<0.0123*	*<0.01198*	*<0.01202 [<0.0121]*	*<0.01308*
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.00614	<0.00617	<0.00599	<0.00601 [<0.00603]	<0.00654

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-04 19 12/01/93	SWMU 38-39 SB-05 4 12/02/93	SWMU 38-39 SB-05 8 12/02/93	SWMU 38-39 SB-05 14 12/02/93	SWMU 38-39 SB-05 19 12/02/93
Metals									
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	*7.69*	***17.5***	***12.7***	*11.1*	*6.19*
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	151	<30.8	56.4	50	89
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	<6.04	<6.16	<6.55	<6.25	<6.45
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	<30.2	<30.8	<32.8	<31.2	<32.2
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	3.09	<3.08	<3.28	<3.12	<3.22
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	<0.0242	<0.0246	<0.0262	<0.025	<0.0258
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	<3.02	<3.08	<3.28	6.59	<3.22
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	*<30.2*	*<30.8*	*<32.8*	*<31.2*	*<32.2*
Other									
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	- -	- -
Polychlorinated Biphenyls									
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.190998*	*<0.194928*	*<0.206718*	*<0.197286*	*<0.203574*
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.190998*	*<0.194928*	*<0.206718*	*<0.197286*	*<0.203574*
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	<0.190998	<0.194928	<0.206718	<0.197286	<0.203574
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	<0.190998	<0.194928	<0.206718	<0.197286	<0.203574
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	<0.190998	<0.194928	<0.206718	<0.197286	<0.203574
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	<0.190998	<0.194928	<0.206718	<0.197286	<0.203574
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	<0.190998	<0.194928	<0.206718	<0.197286	<0.203574
Pesticides/Herbicides									
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	<0.141912	<0.144832	<0.153592	<0.146584	<0.151256
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	<0.00890352	<0.00908672	<0.00963632	<0.00919664	<0.00948976
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	<0.00323676	<0.00330336	<0.00350316	<0.00334332	<0.00344988
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	<0.00972	<0.00992	<0.01052	<0.01004	<0.01036
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	<0.00323676	<0.00330336	<0.00350316	<0.00334332	<0.00344988
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	<0.00243	<0.00248	<0.00263	<0.00251	<0.00259
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	<0.00486	<0.00496	<0.00526	<0.00502	<0.00518
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	<0.1944	<0.1984	<0.2104	<0.2008	<0.2072
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	<0.0113724	<0.0116064	<0.0123084	<0.0117468	<0.0121212
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	<0.00729	<0.00744	<0.00789	<0.00753	<0.00777
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	<0.00162324	<0.00165664	<0.00175684	<0.00167668	<0.00173012
Endosulfan I	959-98-8	- -	- -	mg/kg	<0.0113724	<0.0116064	<0.0123084	<0.0117468	<0.0121212
Endosulfan II	33213-65-9	- -	- -	mg/kg	<0.00323676	<0.00330336	<0.00350316	<0.00334332	<0.00344988
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	<0.05346	<0.05456	<0.05786	<0.05522	<0.05698
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	<0.00486	<0.00496	<0.00526	<0.00502	<0.00518
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	- -	- -	- -	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	<0.00323676	<0.00330336	<0.00350316	<0.00334332	<0.00344988
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	<0.00243	<0.00248	<0.00263	<0.00251	<0.00259
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	<0.0672138	<0.0685968	<0.0727458	<0.0694266	<0.0716394
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	*<1.9303*	*<1.9691*	*<2.0952 [<2.08]*	*<1.9982*	*<2.0661*
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	*<1.9303*	*<1.9691*	*<2.0952 [<2.08]*	*<1.9982*	*<2.0661*
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	*<1.9303*	*<1.9691*	*<2.0952 [<2.08]*	*<1.9982*	*<2.0661*

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-04 19 12/01/93	SWMU 38-39 SB-05 4 12/02/93	SWMU 38-39 SB-05 8 12/02/93	SWMU 38-39 SB-05 14 12/02/93	SWMU 38-39 SB-05 19 12/02/93
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
2-Nitroaniline	88-74-4	- -	- -	mg/kg	<1.9303	<1.9691	<2.0952 [<2.08]	<1.9982	<2.0661
2-Nitrophenol	88-75-5	- -	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
3-Nitroaniline	99-09-2	- -	- -	mg/kg	<1.9303	<1.9691	<2.0952 [<2.08]	<1.9982	<2.0661
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
4-Nitrophenol	100-02-7	- -	- -	mg/kg	<1.9303	<1.9691	<2.0952 [<2.08]	<1.9982	<2.0661
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Acenaphthylene	208-96-8	- -	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	*<1.9303*	***<1.9691***	***<2.0952 [<2.08]***	*<1.9982*	*<2.0661*
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	<1.9303	<1.9691	<2.0952 [<2.08]	<1.9982	<2.0661
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Dibenzofuran	132-64-9	- -	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	<1.20395	<1.22815	<1.3068 [<1.3]	<1.2463	<1.28865
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	- -	- -	- -	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	*<0.398*	*<0.406*	*<0.432 [<0.43]*	*<0.412*	*<0.426*
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	<0.398	<0.406	<0.432 [<0.00651]	<0.412	<0.426
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	*<1.9303*	*<1.9691*	*<2.0952 [<2.08]*	*<1.9982*	*<2.0661*
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	<1.9303	<1.9691	<2.0952 [<2.08]	<1.9982	<2.0661
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	<0.398	<0.406	<0.432 [<0.43]	<0.412	<0.426

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-04 19 12/01/93	SWMU 38-39 SB-05 4 12/02/93	SWMU 38-39 SB-05 8 12/02/93	SWMU 38-39 SB-05 14 12/02/93	SWMU 38-39 SB-05 19 12/02/93
TPHs									
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	<36.1185	<36.8445	<39.204	40	<38.6595
Volatile Organic Compounds									
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.00604*	*<0.00616*	*<0.00655 [<0.00651]*	*<0.00625*	*<0.00645*
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.00604*	*<0.00616*	*<0.00655 [<0.00651]*	*<0.00625*	*<0.00645*
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.00604*	*<0.00616*	*<0.00655 [<0.00651]*	*<0.00625*	*<0.00645*
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.01208*	*<0.01232*	*<0.0131 [<0.013]*	*<0.0125*	*<0.0129*
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.02416	<0.02464	<0.0262 [<0.026]	<0.025	<0.0258
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.01208	<0.01232	<0.0131 [<0.013]	<0.0125	<0.0129
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.02416	<0.02464	<0.0262 [<0.026]	<0.025	<0.0258
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	<0.0186138	<0.0189968	<0.0201458	<0.0192266	<0.0198394
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.02416	<0.02464	<0.0262 [<0.026]	<0.025	<0.0258
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.00604*	*<0.00616*	*<0.00655 [<0.00651]*	*<0.00625*	*<0.00645*
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.01208*	*<0.01232*	*<0.0131 [<0.013]*	*<0.0125*	*<0.0129*
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	*<0.00604*	*<0.00616*	*<0.00655 [<0.00651]*	*<0.00625*	*<0.00645*
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.01208	<0.01232	<0.0131 [<0.013]	<0.0125	<0.0129
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.01208	<0.01232	<0.0131 [<0.00651]	<0.0125	<0.0129
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	- -	- -	- -	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.00604*	*<0.00616*	*<0.00655 [<0.00651]*	*<0.00625*	*<0.00645*
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.01208	<0.01232	<0.0131 [<0.013]	<0.0125	<0.0129
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*<0.00604*	*<0.00616*	*<0.00655 [<0.00651]*	*<0.00625*	*<0.00645*
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.01208	<0.01232	<0.0131 [<0.013]	<0.0125	<0.0129
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Ethanol	64-17-5	- -	- -	mg/kg	- -	- -	- -	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Iodomethane	74-88-4	- -	- -	mg/kg	<0.01208	<0.01232	<0.0131 [<0.013]	<0.0125	<0.0129
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.02416	<0.02464	<0.0262 [<0.026]	<0.025	<0.0258
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.00604*	*<0.00616*	*<0.00655 [<0.00651]*	*<0.00625*	*<0.00645*
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	<0.00604	<0.00616	<0.00655	<0.00625	<0.00645
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.02416	<0.02464	<0.0262 [<0.026]	<0.025	<0.0258
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.01208*	*<0.01232*	*<0.0131 [<0.013]*	*<0.0125*	*<0.0129*
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.00604	<0.00616	<0.00655 [<0.00651]	<0.00625	<0.00645

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-06 4 12/02/93	SWMU 38-39 SB-06 9 12/02/93	SWMU 38-39 SB-06 14 12/02/93	SWMU 38-39 SB-06 19 12/02/93	SWMU 38-39 SB-07 4 12/02/93
Metals									
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	***14***	***9.5***	*10*	*10.2*	***9.29***
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	<30.9	42.4	<32.7	104	<30.2
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	<6.17	<6.42	<6.54	<6.38	<6.03
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	<30.9	<32.1	<32.7	<31.9	<30.2
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	<3.09	<3.21	<3.27	3.28	<3.02
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	<0.0247	<0.0257	<0.0267	<0.0255	<0.0241
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	*11.4*	5.39	<3.27	<3.19	<3.02
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	*<30.9*	*<32.1*	*<32.7*	*<31.9*	*<30.2*
Other									
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	- -	- -
Polychlorinated Biphenyls									
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.194928*	*<0.202788*	*<0.206718*	*<0.202002*	*<0.190212*
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.194928*	*<0.202788*	*<0.206718*	*<0.202002*	*<0.190212*
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	<0.194928	<0.202788	<0.206718	<0.202002	<0.190212
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	<0.194928	<0.202788	<0.206718	<0.202002	<0.190212
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	<0.194928	<0.202788	<0.206718	<0.202002	<0.190212
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	<0.194928	<0.202788	<0.206718	<0.202002	<0.190212
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	<0.194928	<0.202788	<0.206718	<0.202002	<0.190212
Pesticides/Herbicides									
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	<0.144832	<0.150672	<0.153592	<0.150088	<0.141328
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	<0.00908672	<0.00945312	<0.00963632	<0.00941648	<0.00886688
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	<0.00330336	<0.00343656	<0.00350316	<0.00342324	<0.00322344
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	<0.00992	<0.01032	<0.01052	<0.01028	<0.00968
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	<0.00330336	<0.00343656	<0.00350316	<0.00342324	<0.00322344
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	<0.00248	<0.00258	<0.00263	<0.00257	<0.00242
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	<0.00496	<0.00516	<0.00526	<0.00514	<0.00484
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	<0.1984	<0.2064	<0.2104	<0.2056	<0.1936
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	<0.0116064	<0.0120744	<0.0123084	<0.0120276	<0.0113256
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	<0.00744	<0.00774	<0.00789	<0.00771	<0.00726
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	<0.00165664	<0.00172344	<0.00175684	<0.00171676	<0.00161656
Endosulfan I	959-98-8	- -	- -	mg/kg	<0.0116064	<0.0120744	<0.0123084	<0.0120276	<0.0113256
Endosulfan II	33213-65-9	- -	- -	mg/kg	<0.00330336	<0.00343656	<0.00350316	<0.00342324	<0.00322344
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	<0.05456	<0.05676	<0.05786	<0.05654	<0.05324
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	<0.00496	<0.00516	<0.00526	<0.00514	<0.00484
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	- -	- -	- -	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	<0.00330336	<0.00343656	<0.00350316	<0.00342324	<0.00322344
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	<0.00248	<0.00258	<0.00263	<0.00257	<0.00242
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	<0.0685968	<0.0713628	<0.0727458	<0.0710862	<0.0669372
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	*<1.97395*	*<2.0564*	*<2.0952*	*<2.04185*	*<1.9303*
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	*<1.97395*	*<2.0564*	*<2.0952*	*<2.04185*	*<1.9303*
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	*<1.97395*	*<2.0564*	*<2.0952*	*<2.04185*	*<1.9303*

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-06 4 12/02/93	SWMU 38-39 SB-06 9 12/02/93	SWMU 38-39 SB-06 14 12/02/93	SWMU 38-39 SB-06 19 12/02/93	SWMU 38-39 SB-07 4 12/02/93
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
2-Nitroaniline	88-74-4	- -	- -	mg/kg	<1.97395	<2.0564	<2.0952	<2.04185	<1.9303
2-Nitrophenol	88-75-5	- -	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
3-Nitroaniline	99-09-2	- -	- -	mg/kg	<1.97395	<2.0564	<2.0952	<2.04185	<1.9303
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
4-Nitrophenol	100-02-7	- -	- -	mg/kg	<1.97395	<2.0564	<2.0952	<2.04185	<1.9303
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Acenaphthylene	208-96-8	- -	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	***<1.97395***	***<2.0564***	*<2.0952*	*<2.04185*	***<1.9303***
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	<1.97395	<2.0564	<2.0952	<2.04185	<1.9303
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Dibenzofuran	132-64-9	- -	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	<1.231175	<1.2826	<1.3068	<1.273525	<1.20395
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	- -	- -	- -	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	*<0.407*	*<0.424*	*<0.432*	*<0.421*	*<0.398*
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	*<1.97395*	*<2.0564*	*<2.0952*	*<2.04185*	*<1.9303*
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	<1.97395	<2.0564	<2.0952	<2.04185	<1.9303
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	<0.407	<0.424	<0.432	<0.421	<0.398

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-06 4 12/02/93	SWMU 38-39 SB-06 9 12/02/93	SWMU 38-39 SB-06 14 12/02/93	SWMU 38-39 SB-06 19 12/02/93	SWMU 38-39 SB-07 4 12/02/93
TPHs									
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	<36.93525	<38.478	<39.204	<38.20575	<36.1185
Volatile Organic Compounds									
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.00617*	*<0.00642*	*<0.00654*	*<0.00638*	*<0.00603*
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.00617*	*<0.00642*	*<0.00654*	*<0.00638*	*<0.00603*
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.00617*	*<0.00642*	*<0.00654*	*<0.00638*	*<0.00603*
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.01234*	*<0.01284*	*<0.01308*	*<0.01276*	*<0.01206*
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.02468	<0.02568	<0.02616	<0.02552	<0.02412
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.01234	<0.01284	<0.01308	<0.01276	<0.01206
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.02468	<0.02568	<0.02616	<0.02552	<0.02412
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	<0.0189968	<0.0197628	<0.0201458	<0.0196862	<0.0185372
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.02468	<0.02568	<0.02616	<0.02552	<0.02412
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.00617*	*<0.00642*	*<0.00654*	*<0.00638*	*<0.00603*
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.01234*	*<0.01284*	*<0.01308*	*<0.01276*	*<0.01206*
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	*<0.00617*	*<0.00642*	*<0.00654*	*<0.00638*	*<0.00603*
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.01234	<0.01284	<0.01308	<0.01276	<0.01206
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.01234	<0.01284	<0.01308	<0.01276	<0.01206
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	- -	- -	- -	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.00617*	*<0.00642*	*<0.00654*	*<0.00638*	*<0.00603*
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.01234	<0.01284	<0.01308	<0.01276	<0.01206
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*<0.00617*	*<0.00642*	*<0.00654*	*<0.00638*	*<0.00603*
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.01234	<0.01284	<0.01308	<0.01276	<0.01206
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Ethanol	64-17-5	- -	- -	mg/kg	- -	- -	- -	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Iodomethane	74-88-4	- -	- -	mg/kg	<0.01234	<0.01284	<0.01308	<0.01276	<0.01206
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.02468	<0.02568	<0.02616	<0.02552	<0.02412
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.00617*	*<0.00642*	*<0.00654*	*<0.00638*	*<0.00603*
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.02468	<0.02568	<0.02616	<0.02552	<0.02412
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.01234*	*<0.01284*	*<0.01308*	*<0.01276*	*<0.01206*
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.00617	<0.00642	<0.00654	<0.00638	<0.00603

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-07 9 12/02/93	SWMU 38-39 SB-07 14 12/02/93	SWMU 38-39 SB-07 19 12/02/93	SWMU 38-39 SB-08 3 12/02/93	SWMU 38-39 SB-08 4 12/02/93
Metals									
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	- -	*11.6*	*7.55*	- -	*<2.88*
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	- -	65.6	110	- -	75.8
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	- -	<6.28	<6.37	- -	<5.77
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	- -	<31.4	<31.8	- -	<28.8
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	- -	<3.14	3.07	- -	7.75
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	- -	<0.0251	<0.0255	- -	0.0265
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	- -	<3.14	<3.18	- -	<2.88
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	- -	*<31.4*	*<31.8*	- -	*32.9*
Other									
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	- -	- -
Polychlorinated Biphenyls									
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.1965*	*<0.198072*	*<0.201216*	*<0.190998*	*<0.182352*
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	*<0.1965*	*<0.198072*	*<0.201216*	*<0.190998*	*<0.182352*
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	<0.1965	<0.198072	<0.201216	<0.190998	<0.182352
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	<0.1965	<0.198072	<0.201216	<0.190998	<0.182352
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	<0.1965	<0.198072	<0.201216	<0.190998	<0.182352
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	<0.1965	<0.198072	<0.201216	<0.190998	<0.182352
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	<0.1965	<0.198072	<0.201216	<0.190998	<0.182352
Pesticides/Herbicides									
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	<0.146	<0.147168	<0.149504	<0.141912	<0.135488
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	<0.00916	<0.00923328	<0.00937984	<0.00890352	<0.00850048
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	<0.00333	<0.00335664	<0.00340992	<0.00323676	<0.00309024
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	<0.01	<0.01008	<0.01024	<0.00972	<0.00928
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	<0.00333	<0.00335664	<0.00340992	<0.00323676	<0.00309024
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	<0.0025	<0.00252	<0.00256	<0.00243	<0.00232
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	<0.005	<0.00504	<0.00512	<0.00486	<0.00464
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	<0.2	<0.2016	<0.2048	<0.1944	<0.1856
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	<0.0117	<0.0117936	<0.0119808	<0.0113724	<0.0108576
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	<0.0075	<0.00756	<0.00768	<0.00729	<0.00696
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	<0.00167	<0.00168336	<0.00171008	<0.00162324	<0.00154976
Endosulfan I	959-98-8	- -	- -	mg/kg	<0.0117	<0.0117936	<0.0119808	<0.0113724	<0.0108576
Endosulfan II	33213-65-9	- -	- -	mg/kg	<0.00333	<0.00335664	<0.00340992	<0.00323676	<0.00309024
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	<0.055	<0.05544	<0.05632	<0.05346	<0.05104
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	<0.005	<0.00504	<0.00512	<0.00486	<0.00464
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	- -	- -	- -	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	<0.00333	<0.00335664	<0.00340992	<0.00323676	<0.00309024
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	<0.0025	<0.00252	<0.00256	<0.00243	<0.00232
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	<0.06915	<0.0697032	<0.0708096	<0.0672138	<0.0641712
Semivolatile Organic Compounds									
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	*<1.9885*	*<2.0079*	*<2.037*	- -	*<1.84785*
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	*<1.9885*	*<2.0079*	*<2.037*	- -	*<1.84785*
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	*<1.9885*	*<2.0079*	*<2.037*	- -	*<1.84785*

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-07 9 12/02/93	SWMU 38-39 SB-07 14 12/02/93	SWMU 38-39 SB-07 19 12/02/93	SWMU 38-39 SB-08 3 12/02/93	SWMU 38-39 SB-08 4 12/02/93
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
2-Nitroaniline	88-74-4	- -	- -	mg/kg	<1.9885	<2.0079	<2.037	- -	<1.84785
2-Nitrophenol	88-75-5	- -	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
3-Nitroaniline	99-09-2	- -	- -	mg/kg	<1.9885	<2.0079	<2.037	- -	<1.84785
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
4-Nitrophenol	100-02-7	- -	- -	mg/kg	<1.9885	<2.0079	<2.037	- -	<1.84785
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Acenaphthylene	208-96-8	- -	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	***<1.9885***	*<2.0079*	*<2.037*	- -	***<1.84785***
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	<1.9885	<2.0079	<2.037	- -	<1.84785
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	<0.41	0.465	<0.42	- -	<0.381
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Dibenzofuran	132-64-9	- -	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	<1.24025	<1.25235	<1.2705	- -	<1.152525
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	- -	- -	- -	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	*<0.41*	*<0.414*	*<0.42*	- -	*<0.381*
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	*<1.9885*	*<2.0079*	*<2.037*	- -	*<1.84785*
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	<0.41	<0.414	<0.42	- -	<0.381
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	<1.9885	<2.0079	<2.037	- -	<1.84785
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	<0.41	<0.414	<0.42	- -	<0.381

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-07 9 12/02/93	SWMU 38-39 SB-07 14 12/02/93	SWMU 38-39 SB-07 19 12/02/93	SWMU 38-39 SB-08 3 12/02/93	SWMU 38-39 SB-08 4 12/02/93
TPHs									
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	<37.2075	<37.5705	<38.115	- -	98
Volatile Organic Compounds									
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.00621*	*<0.00628*	*<0.00637*	- -	*<0.00577*
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.00621*	*<0.00628*	*<0.00637*	- -	*<0.00577*
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.00621*	*<0.00628*	*<0.00637*	- -	*<0.00577*
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.01242*	*<0.01256*	*<0.01274*	- -	*<0.01154*
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.02484	<0.02512	<0.02548	- -	<0.02308
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.01242	<0.01256	<0.01274	- -	<0.01154
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.02484	<0.02512	<0.02548	- -	<0.02308
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	<0.01915	<0.0193032	<0.0196096	<0.0186138	<0.0177712
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.02484	0.0681 J	<0.02548	- -	<0.02308
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.00621*	*<0.00628*	*<0.00637*	- -	*<0.00577*
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.01242*	*<0.01256*	*<0.01274*	- -	*<0.01154*
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	*<0.00621*	*<0.00628*	*<0.00637*	- -	*<0.00577*
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.01242	<0.01256	<0.01274	- -	<0.01154
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.01242	<0.01256	<0.01274	- -	<0.01154
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	- -	- -	- -	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.00621*	*<0.00628*	*<0.00637*	- -	*<0.00577*
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.01242	<0.01256	<0.01274	- -	<0.01154
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*<0.00621*	*<0.00628*	*<0.00637*	- -	*<0.00577*
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.01242	<0.01256	<0.01274	- -	<0.01154
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Ethanol	64-17-5	- -	- -	mg/kg	- -	- -	- -	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Iodomethane	74-88-4	- -	- -	mg/kg	<0.01242	<0.01256	<0.01274	- -	<0.01154
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.02484	<0.02512	<0.02548	- -	<0.02308
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.00621*	*<0.00628*	*<0.00637*	- -	*<0.00577*
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.02484	<0.02512	<0.02548	- -	<0.02308
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.01242*	*<0.01256*	*<0.01274*	- -	*<0.01154*
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.00621	<0.00628	<0.00637	- -	<0.00577

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-08 9 12/02/93	SWMU 38-39 SB-08 14 12/02/93	SWMU 38-39 SB-08 19 12/02/93	3839HA01 0 01/07/94
Metals								
Arsenic	7440-38-2	3.9 {NMED ResSoil09}	0.131	mg/kg	*<3.02*	*<3.14*	*<3.08*	*2.8*
Barium	7440-39-3	15,600 {NMED ResSoil09}	3,010	mg/kg	57.1	59.5	134	194
Cadmium	7440-43-9	77.9 {NMED ResSoil09}	13.7	mg/kg	<6.04	<6.27	<6.16	5.81
Chromium	7440-47-3	219 {NMED ResSoil09}	- -	mg/kg	<30.2	<31.4	<30.8	<26.4
Lead	7439-92-1	400 {NMED ResSoil09}	- -	mg/kg	<3.02	<3.14	<3.08	14.9
Mercury	7439-97-6	7.71 {NMED ResSoil09}	0.293	mg/kg	0.0278	0.0288	<0.0247	0.0528 J
Selenium	7782-49-2	391 {NMED ResSoil09}	9.65	mg/kg	<3.02	<3.14	<3.08	<2.64
Silver	7440-22-4	391 {NMED ResSoil09}	15.7	mg/kg	*38.6*	*33.1*	*47.5*	*<26.4 J*
Other								
Percent Moisture	MOIST	- -	- -	%	- -	- -	- -	5.4
Polychlorinated Biphenyls								
Aroclor 1221	11104-28-2	1.76 {NMED ResSoil09}	0.0107	mg/kg	- -	*<0.198072*	*<0.194928*	- -
Aroclor 1232	11141-16-5	1.76 {NMED ResSoil09}	0.0107	mg/kg	- -	*<0.198072*	*<0.194928*	- -
Aroclor 1242	53469-21-9	2.22 {NMED ResSoil09}	0.226	mg/kg	- -	<0.198072	<0.194928	- -
Aroclor 1254	11097-69-1	1.12 {NMED ResSoil09}	0.382	mg/kg	- -	<0.198072	<0.194928	- -
Aroclor 1260	11096-82-5	2.22 {NMED ResSoil09}	1.04	mg/kg	- -	<0.198072	<0.194928	- -
Aroclor-1016	12674-11-2	3.93 {NMED ResSoil09}	1.04	mg/kg	- -	<0.198072	<0.194928	- -
Aroclor-1248	12672-29-6	2.22 {NMED ResSoil09}	0.222	mg/kg	- -	<0.198072	<0.194928	- -
Pesticides/Herbicides								
1,1,1-Trichloro-2,2-bis (P-Methoxyphenyl)-Ethane (Methoxychlor)	72-43-5	310 {EPA ResSoil09}	- -	mg/kg	- -	<0.147168	<0.144832	- -
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethane (DDD)	72-54-8	20.3 {NMED ResSoil09}	6.41	mg/kg	- -	<0.00923328	<0.00908672	- -
1,1-Dichloro-2,2-bis(4'-chlorophenyl)ethylene (DDE)	72-55-9	14.3 {NMED ResSoil09}	4.52	mg/kg	- -	<0.00335664	<0.00330336	- -
1,1,1-Trichloro-2,2-bis-(4'-chlorophenyl)ethane (DDT)	50-29-3	17.2 {NMED ResSoil09}	6.53	mg/kg	- -	<0.01008	<0.00992	- -
Aldrin	309-00-2	0.284 {NMED ResSoil09}	0.0621	mg/kg	- -	<0.00335664	<0.00330336	- -
1a,2b,3a,4b,5a,6b-Hexachlorocyclohexane	319-84-6	0.772 {NMED ResSoil09}	0.00559	mg/kg	- -	<0.00252	<0.00248	- -
1,2,3,4,5,6-Hexachlorocyclohexane	319-85-7	2.7 {NMED ResSoil09}	0.0196	mg/kg	- -	<0.00504	<0.00496	- -
Camphechlor (Toxaphene)	8001-35-2	4.42 {NMED ResSoil09}	0.911	mg/kg	- -	<0.2016	<0.1984	- -
Chlordane	57-74-9	16.2 {NMED ResSoil09}	2.5	mg/kg	- -	<0.0117936	<0.0116064	- -
1a,2a,3b,4a,5b,6b-Hexachlorocyclohexane	319-86-8	- -	- -	mg/kg	- -	<0.00756	<0.00744	- -
Dieldrin	60-57-1	0.304 {NMED ResSoil09}	0.00675	mg/kg	- -	<0.00168336	<0.00165664	- -
Endosulfan I	959-98-8	- -	- -	mg/kg	- -	<0.0117936	<0.0116064	- -
Endosulfan II	33213-65-9	- -	- -	mg/kg	- -	<0.00335664	<0.00330336	- -
Endosulfan Sulfate	1031-07-8	- -	- -	mg/kg	- -	<0.05544	<0.05456	- -
Endrin	72-20-8	18.3 {NMED ResSoil09}	1.76	mg/kg	- -	<0.00504	<0.00496	- -
Endrin Aldehyde	7421-93-4	- -	- -	mg/kg	- -	- -	- -	- -
G-BHC (Lindane)	58-89-9	5.17 {NMED ResSoil09}	0.032	mg/kg	- -	<0.00335664	<0.00330336	- -
Heptachlor	76-44-8	1.08 {NMED ResSoil09}	0.118	mg/kg	- -	<0.00252	<0.00248	- -
Heptachlor Epoxide	1024-57-3	0.53 {EPA ResSoil09}	- -	mg/kg	- -	<0.0697032	<0.0685968	- -
Semivolatile Organic Compounds								
1,2,4-Trichlorobenzene	120-82-1	143 {NMED ResSoil09}	0.102	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
1,2-Benzphenanthracene (Chrysene)	218-01-9	621 {NMED ResSoil09}	326	mg/kg	<0.399	<0.414	<0.407	- -
1,2-Dichlorobenzene	95-50-1	3,010 {NMED ResSoil09}	3.13	mg/kg	<0.00604	<0.00627	<0.00616	- -
1,2-Diphenylhydrazine	122-66-7	6.08 {NMED ResSoil09}	0.0453	mg/kg	*<1.93515*	*<2.0079*	*<1.97395*	- -
1,4-Dichlorobenzene	106-46-7	32.2 {NMED ResSoil09}	0.0357	mg/kg	<0.00604	<0.00627	<0.00616	- -
1-Chloronaphthalene	90-13-1	- -	- -	mg/kg	<0.399	<0.414	<0.407	- -
2,4,5-Trichlorophenol	95-95-4	6,110 {NMED ResSoil09}	71.3	mg/kg	<0.399	<0.414	<0.407	- -
2,4,6-Trichlorophenol	88-06-2	61 {NMED ResSoil09}	0.713	mg/kg	<0.399	<0.414	<0.407	- -
2,4-Dichlorophenol	120-83-2	183 {NMED ResSoil09}	1.37	mg/kg	<0.399	<0.414	<0.407	- -
2,4-Dimethylphenol	105-67-9	1,220 {NMED ResSoil09}	9.12	mg/kg	<0.399	<0.414	<0.407	- -
2,4-Dinitrophenol	51-28-5	122 {NMED ResSoil09}	0.525	mg/kg	*<1.93515*	*<2.0079*	*<1.97395*	- -
2,4-Dinitrotoluene	121-14-2	15.7 {NMED ResSoil09}	0.0156	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
2,6-Dinitrotoluene	606-20-2	61.2 {NMED ResSoil09}	0.267	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
2-Chloronaphthalene (b-)	91-58-7	6,260 {NMED ResSoil09}	135	mg/kg	<0.399	<0.414	<0.407	- -
2-Chlorophenol	95-57-8	391 {NMED ResSoil09}	1.53	mg/kg	<0.399	<0.414	<0.407	- -
2-Methyl-4,6-Dinitrophenol (4,6-Dinitro-o-cresol)	534-52-1	6.11 {NMED ResSoil09}	0.0393	mg/kg	*<1.93515*	*<2.0079*	*<1.97395*	- -

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-08 9 12/02/93	SWMU 38-39 SB-08 14 12/02/93	SWMU 38-39 SB-08 19 12/02/93	3839HA01 0 01/07/94
2-Methylnaphthalene	91-57-6	310 {EPA ResSoil09}	- -	mg/kg	<0.399	<0.414	<0.407	- -
2-Methylphenol (o-cresol)	95-48-7	3,100 {EPA ResSoil09}	- -	mg/kg	<0.399	<0.414	<0.407	- -
2-Nitroaniline	88-74-4	- -	- -	mg/kg	<1.93515	<2.0079	<1.97395	- -
2-Nitrophenol	88-75-5	- -	- -	mg/kg	<0.399	<0.414	<0.407	- -
3,3-Dichlorobenzidine	91-94-1	10.8 {NMED ResSoil09}	0.17	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
3,5,5-Trimethyl-2-Cyclohexene-1-One (Isophorone)	78-59-1	5,120 {NMED ResSoil09}	1.85	mg/kg	<0.399	<0.414	<0.407	- -
3-Nitroaniline	99-09-2	- -	- -	mg/kg	<1.93515	<2.0079	<1.97395	- -
4-Bromophenyl Phenyl Ether	101-55-3	- -	- -	mg/kg	<0.399	<0.414	<0.407	- -
4-Chloro-3-Methylphenol	59-50-7	- -	- -	mg/kg	<0.399	<0.414	<0.407	- -
4-Chlorophenyl Phenyl Ether	7005-72-3	- -	- -	mg/kg	<0.399	<0.414	<0.407	- -
4-Methyl Phenol (p-cresol)	106-44-5	310 {EPA ResSoil09}	- -	mg/kg	<0.399	<0.414	<0.407	- -
4-Nitrophenol	100-02-7	- -	- -	mg/kg	<1.93515	<2.0079	<1.97395	- -
Acenaphthene	83-32-9	3,440 {NMED ResSoil09}	205	mg/kg	<0.399	<0.414	<0.407	- -
Acenaphthylene	208-96-8	- -	- -	mg/kg	<0.399	<0.414	<0.407	- -
Anthracene	120-12-7	17,200 {NMED ResSoil09}	3,370	mg/kg	<0.399	<0.414	<0.407	- -
Benzidine	92-87-5	0.0211 {NMED ResSoil09}	0.000125	mg/kg	***<1.93515***	*<2.0079*	*<1.97395*	- -
Benzo(a)Anthracene	56-55-3	6.21 {NMED ResSoil09}	3.2	mg/kg	<0.399	<0.414	<0.407	- -
Benzo(a)Pyrene	50-32-8	0.621 {NMED ResSoil09}	1.09	mg/kg	<0.399	<0.414	<0.407	- -
Benzo(b)Fluoranthene	205-99-2	6.21 {NMED ResSoil09}	11.1	mg/kg	<0.399	<0.414	<0.407	- -
Benzo(g,h,i)Perylene	191-24-2	- -	- -	mg/kg	<0.399	<0.414	<0.407	- -
Benzo(k)Fluoranthene	207-08-9	62.1 {NMED ResSoil09}	109	mg/kg	<0.399	<0.414	<0.407	- -
Benzoic Acid	65-85-0	240,000 {EPA ResSoil09}	- -	mg/kg	<1.93515	<2.0079	<1.97395	- -
Benzyl Alcohol	100-51-6	6,100 {EPA ResSoil09}	- -	mg/kg	<0.399	<0.414	<0.407	- -
Benzyl Butyl Phthalate (Butyl Benzyl Phthalate)	85-68-7	2,600 {EPA ResSoil09}	- -	mg/kg	<0.399	<0.414	<0.407	- -
Bis (2-Chloroethoxy) Methane	111-91-1	180 {EPA ResSoil09}	- -	mg/kg	<0.399	<0.414	<0.407	- -
Bis(2-Chloroethyl) Ether	111-44-4	2.56 {NMED ResSoil09}	0.000233	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
Bis(2-Chloroisopropyl)Ether	39638-32-9	- -	0.0256	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
Bis(2-Ethylhexyl)Phthalate (Di[2-ethylhexyl] phthalate)	117-81-7	347 {NMED ResSoil09}	119	mg/kg	<0.399	<0.414	<0.407	- -
Dibenz(a,h)Anthracene	53-70-3	0.621 {NMED ResSoil09}	3.62	mg/kg	<0.399	<0.414	<0.407	- -
Dibenzofuran	132-64-9	- -	- -	mg/kg	<0.399	<0.414	<0.407	- -
Diethyl Phthalate	84-66-2	48,900 {NMED ResSoil09}	106	mg/kg	<0.399	<0.414	<0.407	- -
Dimethyl Phthalate	131-11-3	611,000 {NMED ResSoil09}	836	mg/kg	<0.399	<0.414	<0.407	- -
Di-n-Butyl Phthalate	84-74-2	6,110 {NMED ResSoil09}	86.3	mg/kg	<0.399	<0.414	<0.407	- -
Di-n-Octyl Phthalate	117-84-0	- -	- -	mg/kg	<0.399	<0.414	<0.407	- -
Diphenylamine	122-39-4	1,500 {EPA ResSoil09}	- -	mg/kg	<1.206975	<1.25235	<1.231175	- -
Fluoranthene	206-44-0	2,290 {NMED ResSoil09}	1,550	mg/kg	<0.399	<0.414	<0.407	- -
Fluorene	86-73-7	2,290 {NMED ResSoil09}	250	mg/kg	<0.399	<0.414	<0.407	- -
Hexachloro-1,3-Butadiene	87-68-3	61.1 {NMED ResSoil09}	0.147	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
Hexachlorobenzene	118-74-1	3.04 {NMED ResSoil09}	0.0221	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
Hexachlorocyclopentadiene	77-47-4	367 {NMED ResSoil09}	6.13	mg/kg	<0.399	<0.414	<0.407	- -
Hexachloroethane	67-72-1	61.1 {NMED ResSoil09}	0.193	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
Indeno(1,2,3-cd)Pyrene	193-39-5	6.21 {NMED ResSoil09}	37	mg/kg	<0.399	<0.414	<0.407	- -
m-Dichlorobenzene	541-73-1	- -	- -	mg/kg	<0.00604	<0.00627	<0.00616	- -
Methanamine, N-Methyl-N-Nitroso	62-75-9	0.954 {NMED ResSoil09}	0.0000304	mg/kg	- -	- -	- -	- -
Naphthalene	91-20-3	45 {NMED ResSoil09}	0.0419	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
Nitrobenzene	98-95-3	49.4 {NMED ResSoil09}	0.0686	mg/kg	*<0.399*	*<0.414*	*<0.407*	- -
N-Nitrosodi-N-Propylamine	621-64-7	0.69 {EPA ResSoil09}	- -	mg/kg	<0.399	<0.414	<0.407	- -
N-Nitrosodiphenylamine	86-30-6	993 {NMED ResSoil09}	12.9	mg/kg	<0.399	<0.414	<0.407	- -
p-Chloroaniline	106-47-8	24 {EPA ResSoil09}	- -	mg/kg	<0.399	<0.414	<0.407	- -
Pentachlorophenol	87-86-5	29.8 {NMED ResSoil09}	0.294	mg/kg	*<1.93515*	*<2.0079*	*<1.97395*	- -
Phenanthrene	85-01-8	1,830 {NMED ResSoil09}	834	mg/kg	<0.399	<0.414	<0.407	- -
Phenol	108-95-2	18,300 {NMED ResSoil09}	63	mg/kg	<0.399	<0.414	<0.407	- -
p-Nitroaniline	100-01-6	240 {EPA ResSoil09}	- -	mg/kg	<1.93515	<2.0079	<1.97395	- -
Pyrene	129-00-0	1,720 {NMED ResSoil09}	1,120	mg/kg	<0.399	<0.414	<0.407	- -

(See Notes Page for Qualifiers and Acronyms)

ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39

Location ID: Sample Depth (ft): Date Collected:	CAS	Soil Screening Level for Residential Soil	DAF 10	Units	SWMU 38-39 SB-08 9 12/02/93	SWMU 38-39 SB-08 14 12/02/93	SWMU 38-39 SB-08 19 12/02/93	3839HA01 0 01/07/94
TPHs								
Total Petroleum Hydrocarbons	TPH	- -	- -	mg/kg	<36.20925	<37.5705	<36.93525	- -
Volatile Organic Compounds								
1,1,1-Trichloroethane	71-55-6	21,800 {NMED ResSoil09}	29.8	mg/kg	<0.00604	<0.00627	<0.00616	- -
1,1,2,2-Tetrachloroethane	79-34-5	7.98 {NMED ResSoil09}	0.00225	mg/kg	*<0.00604*	*<0.00627*	*<0.00616*	- -
1,1,2-Trichloroethane	79-00-5	17.2 {NMED ResSoil09}	0.00674	mg/kg	<0.00604	<0.00627	<0.00616	- -
1,1-Dichloroethane	75-34-3	62.9 {NMED ResSoil09}	0.0609	mg/kg	<0.00604	<0.00627	<0.00616	- -
1,1-Dichloroethylene	75-35-4	618 {NMED ResSoil09}	1.19	mg/kg	<0.00604	<0.00627	<0.00616	- -
1,2,3-Trichloropropane	96-18-4	0.915 {NMED ResSoil09}	0.000356	mg/kg	*<0.00604*	*<0.00627*	*<0.00616*	- -
1,2-Dichloroethane	107-06-2	7.74 {NMED ResSoil09}	0.00365	mg/kg	*<0.00604*	*<0.00627*	*<0.00616*	- -
1,2-Dichloropropane	78-87-5	14.7 {NMED ResSoil09}	0.0111	mg/kg	<0.00604	<0.00627	<0.00616	- -
1,4 Dichloro-2-Butene	764-41-0	0.046 {NMED ResSoil09}	0.0000817	mg/kg	*<0.01208*	*<0.01254*	*<0.01232*	- -
2-Butanone	78-93-3	39,600 {NMED ResSoil09}	12.7	mg/kg	<0.02416	<0.02508	<0.02464	- -
2-Chloroethyl Vinyl Ether	110-75-8	- -	- -	mg/kg	<0.01208	<0.01254	<0.01232	- -
4-Methyl-2-Pentanone(MIBK)	108-10-1	5,950 {NMED ResSoil09}	3.79	mg/kg	<0.02416	<0.02508	<0.02464	- -
Acetaldehyde	75-07-0	280 {NMED ResSoil09}	0.033	mg/kg	- -	<0.0193032	<0.0189968	- -
Acetone	67-64-1	67,500 {NMED ResSoil09}	38.4	mg/kg	<0.02416	<0.02508	<0.02464	- -
Acrolein	107-02-8	0.646 {NMED ResSoil09}	0.0000741	mg/kg	*<0.00604*	*<0.00627*	*<0.00616*	- -
Acrylonitrile	107-13-1	5.97 {NMED ResSoil09}	0.000819	mg/kg	*<0.01208*	*<0.01254*	*<0.01232*	- -
Benzene	71-43-2	15.5 {NMED ResSoil09}	0.0185	mg/kg	<0.00604	<0.00627	<0.00616	- -
Bromodichloromethane	75-27-4	5.25 {NMED ResSoil09}	0.00276	mg/kg	*<0.00604*	*<0.00627*	*<0.00616*	- -
Bromomethane	74-83-9	22.3 {NMED ResSoil09}	0.0194	mg/kg	<0.01208	<0.01254	<0.01232	- -
Carbon Disulfide	75-15-0	1,940 {NMED ResSoil09}	2.52	mg/kg	<0.00604	<0.00627	<0.00616	- -
Carbon Tetrachloride	56-23-5	4.38 {NMED ResSoil09}	0.00739	mg/kg	<0.00604	<0.00627	<0.00616	- -
CFC-11 (Trichlorofluoromethane)	75-69-4	2,010 {NMED ResSoil09}	9.01	mg/kg	<0.01208	<0.01254	<0.01232	- -
CFC-12 (Dichlorodifluoromethane)	75-71-8	481 {NMED ResSoil09}	7.23	mg/kg	- -	- -	- -	- -
Chlorobenzene	108-90-7	508 {NMED ResSoil09}	0.538	mg/kg	<0.00604	<0.00627	<0.00616	- -
Chlorodibromomethane (Dibromochloromethane)	124-48-1	11.9 {NMED ResSoil09}	0.00338	mg/kg	*<0.00604*	*<0.00627*	*<0.00616*	- -
Chloroethane (Ethylchloride)	75-00-3	43,600 {NMED ResSoil09}	54.2	mg/kg	<0.01208	<0.01254	<0.01232	- -
Chloroform	67-66-3	5.72 {NMED ResSoil09}	0.00468	mg/kg	*<0.00604*	*<0.00627*	*<0.00616*	- -
Chloromethane	74-87-3	35.6 {NMED ResSoil09}	0.0418	mg/kg	<0.01208	<0.01254	<0.01232	- -
cis-1,2-Dichloroethene	156-59-2	782 {NMED ResSoil09}	0.943	mg/kg	<0.00604	<0.00627	<0.00616	- -
cis-1,3-Dichloropropene	10061-01-5	- -	- -	mg/kg	<0.00604	<0.00627	<0.00616	- -
Dibromomethane (Methylene Dibromide)	74-95-3	782 {NMED ResSoil09}	0.777	mg/kg	<0.00604	<0.00627	<0.00616	- -
Dichloromethane (Methylene Chloride)	75-09-2	199 {NMED ResSoil09}	0.107	mg/kg	<0.00604	<0.00627	<0.00616	- -
Ethanol	64-17-5	- -	- -	mg/kg	- -	- -	- -	- -
Ethyl Methacrylate	97-63-2	7,040 {NMED ResSoil09}	6.7	mg/kg	<0.00604	<0.00627	<0.00616	- -
Ethylbenzene	100-41-4	69.7 {NMED ResSoil09}	0.146	mg/kg	<0.00604	<0.00627	<0.00616	- -
Iodomethane	74-88-4	- -	- -	mg/kg	<0.01208	<0.01254	<0.01232	- -
Methyl N-Butyl Ketone	591-78-6	- -	- -	mg/kg	<0.02416	<0.02508	<0.02464	- -
Methylbenzene (Toluene)	108-88-3	5,570 {NMED ResSoil09}	13.8	mg/kg	<0.00604	<0.00627	<0.00616	- -
Styrene (Monomer)	100-42-5	8,970 {NMED ResSoil09}	15.6	mg/kg	<0.00604	<0.00627	<0.00616	- -
Tetrachloroethene	127-18-4	6.99 {NMED ResSoil09}	0.00449	mg/kg	*<0.00604*	*<0.00627*	*<0.00616*	- -
Trans-1,2-Dichloroethene	156-60-5	273 {NMED ResSoil09}	0.301	mg/kg	<0.00604	<0.00627	<0.00616	- -
Trans-1,3-Dichloropropene	10061-02-6	- -	- -	mg/kg	<0.00604	<0.00627	<0.00616	- -
Tribromomethane (Bromoform)	75-25-2	616 {NMED ResSoil09}	6.04	mg/kg	<0.00604	<0.00627	<0.00616	- -
Trichloroethylene	79-01-6	45.7 {NMED ResSoil09}	0.053	mg/kg	<0.00604	<0.00627	<0.00616	- -
Vinyl Acetate	108-05-4	3,650 {NMED ResSoil09}	0.763	mg/kg	<0.02416	<0.02508	<0.02464	- -
Vinyl Chloride	75-01-4	0.865 {NMED ResSoil09}	0.00288	mg/kg	*<0.01208*	*<0.01254*	*<0.01232*	- -
Xylenes (total xylenes)	1330-20-7	1,090 {NMED ResSoil09}	1.76	mg/kg	<0.00604	<0.00627	<0.00616	- -

(See Notes Page for Qualifiers and Acronyms)

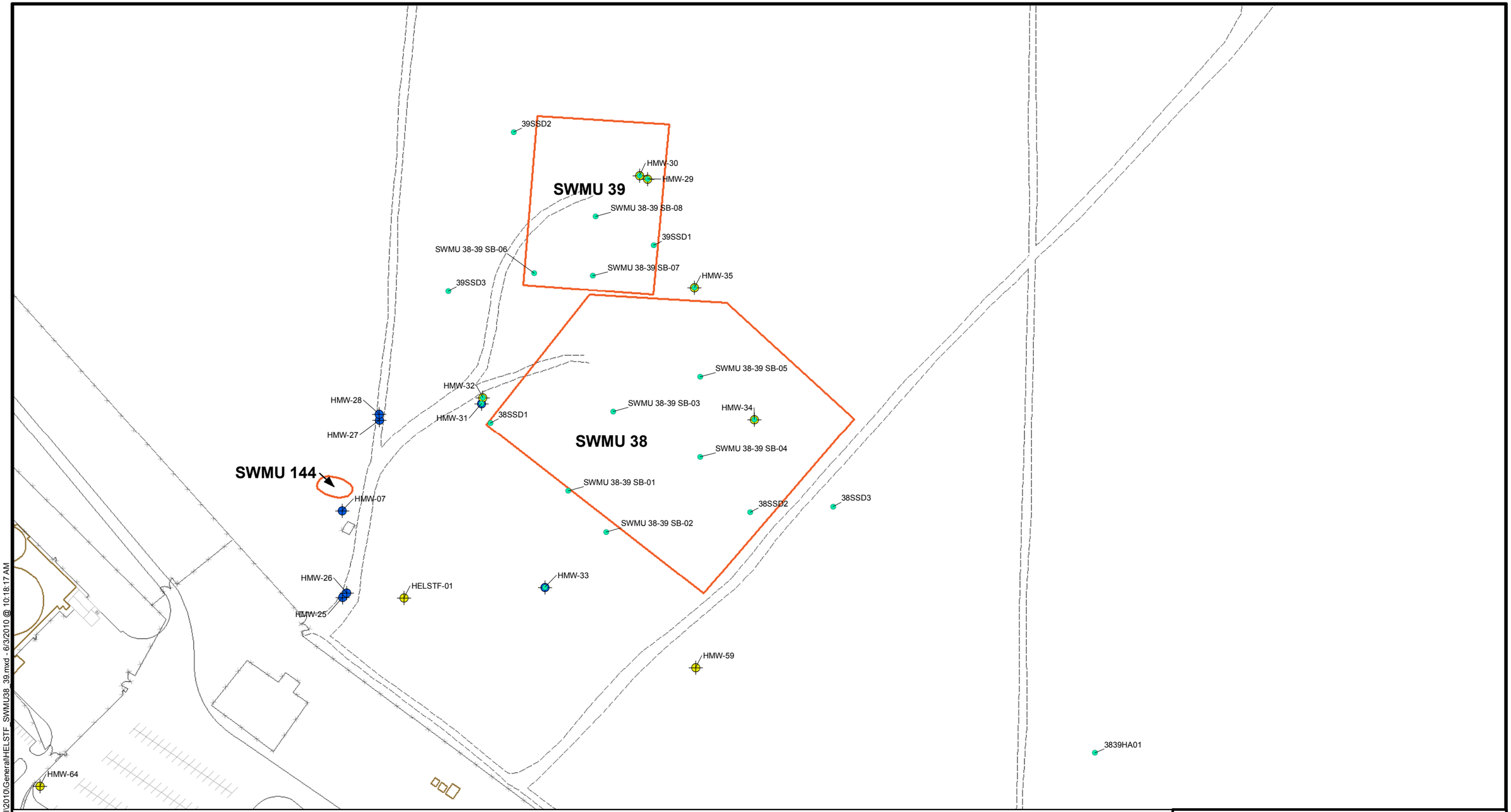
ARCADIS

Table 6-10
Summary of Soil Sample Analytical Results
SWMUs 38 and 39
Notes

Lab Qualifiers	**Definition**
U	Constituent was not detected at the sample quantitation limit shown.
UJ	Estimated value below detection limit.

Analyte Abbreviation	**Full Name**
>C10-C28	Diesel Range Organics (>C10-C28) in the carbon 10 (C10) to carbon 28 (C28) range.

Acronym/Note	**Description**
All data reported before 2009 were collected by others and the data were provided to ARCADIS by White Sands Missile Range.	
--	The sample was not tested for this constituent and/or no data were available.
U	Laboratory report flag indicating that the constituent was not detected at the sample quantitation limit shown.
1.7	Yellow highlight indicates that the reported result exceeds the published SSLs. If the result is preceded by "<", the constituent was not detected, but the reported sample quantitation limit exceeds the SSL.
1.9	Italics indicates that the reported result exceeds the NMED DAF 20 screening value. If the result is preceded by "<", constituent was not detected, but the reported sample quantitation limit exceeds the DAF 20 value.
[<0.005]	Brackets indicate that the result shown is from a duplicate field sample.
CAS	Chemical Abstract Service.
DAF 20	NMED Dilution Attenuation Factor from Table A-1, December 2009 Update to Technical Background Document for Development of Soil Screening Levels, Revision 5.0. NMED Hazardous Waste Bureau and Ground Water Quality Bureau, Voluntary Remediation Program. August 2009. DAF 20 indicates a Dilution Attenuation Factor of 20 was used.
EPA	United States Environmental Protection Agency.
EPA ResSoil09	USEPA Residential Screening Level from *USEPA Regional Screening Levels* (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index/htm). 2009.
mg/kg	Milligram per kilogram.
NMED	New Mexico Environment Department.
NMED ResSoil09	NMED Residential Soil Screening Level from Table A-1, December 2009 Update to Technical Background Document for Development of Soil Screening Levels, Revision 5.0. NMED Hazardous Waste Bureau and Ground Water Quality Bureau, Voluntary Remediation Program. August 2009.
SSL	Soil Screening Level



LEGEND

- SOIL SAMPLE LOCATIONS - SWMUS 38 AND 39
- WELLS SCREENED IN THE REGIONAL AQUIFER
- WELLS SCREENED IN THE VADOSE ZONE
- SITE FEATURES
- BUILDING
- POND/LAGOON
- FENCE
- RAIL ROAD
- PAVED ROAD
- DIRT ROAD
- SWMU BOUNDARY

SOURCE:
BASE MAP PROVIDED BY ZIA AND RECTIFIED TO DECEMBER 2008 SATELLITE IMAGE.

N

0 170 340 Feet

WHITE SANDS MISSILE RANGE
NEW MEXICO
REVISED PHASE III RCRA FACILITY INVESTIGATION (RFI) REPORT – HELSTF SITE – SECOND REVISION (AUGUST, 2010)

SWMUS 38 AND 39
HELSTF LANDFILLS

ARCADIS

FIGURE
6.10-1

I:\WhiteSands\GIS\ArcMap_MXD\HELSTF\RFI\2010\General\HELSTF_SWMU38_39.mxd - 6/3/2010 @ 10:18:17 AM

Appendix B

Geotechnical Report

ARCADIS MALCOLM PIRNIE
Infrastructure · Water · Environment · Buildings

Imagine the result

Geotechnical Investigation for the Former High Energy Laser Systems Test Facility (HELSTF) Landfills, CCWS-75; SWMU 38 and SWMU 39

White Sands Missile Range, New Mexico

March 2011

ARCADIS

Scott Manning, PE
Senior Engineer

Geotechnical Investigation for the Former High Energy Laser Systems Test Facility (HELSTF) Landfills, CCWS-75; SWMU 38 and SWMU 39

White Sands Missile Range
New Mexico

Prepared for:
U.S. Army, White Sands Missile Range
Directorate of Environment and Safety
White Sands Missile Range, New Mexico

Prepared by:
ARCADIS U.S., Inc.
1210 Premier Drive
Suite 200
Chattanooga
Tennessee 37421
Tel 423.756.7193
Fax 423.756.7197

Our Ref.:
GP08WSMR.OC76

Date:
March 2011

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.

Table of Contents

1. Introduction **1**

2. Project Information **1**

3. Subsurface Exploration **1**

4. Existing Site and Subsurface Conditions **2**

4.1 Area and Site Geology 2

4.2 General Site Stratigraphy 2

5. Laboratory Testing **3**

6. Design Parameters **4**

7. Settlement **5**

8. Site Grading and Landfill Cap **6**

9. Qualifications of This Report **6**

Tables

Table 1. Laboratory Test Results 3

Figures

1 Boring Location Plan

2 Cross Section A

3 Cross Section B

Appendices

A Boring Logs

B Laboratory Test Results

C Borrow Pit Results

1. Introduction

ARCADIS has conducted a geotechnical investigation for the proposed landfill caps at White Sands Missile Range (WSMR) near Las Cruces, New Mexico. The proposed sites for the landfill caps at SWMU 38 and SWMU 39 were investigated.

The purpose of the geotechnical investigation is to characterize the subsurface conditions and determine foundation design parameters. The investigation included site reconnaissance; field investigation, including 13 borings; performing soil sampling; and laboratory tests. This report includes documentation of the field activities, boring logs and determination of settlement for construction.

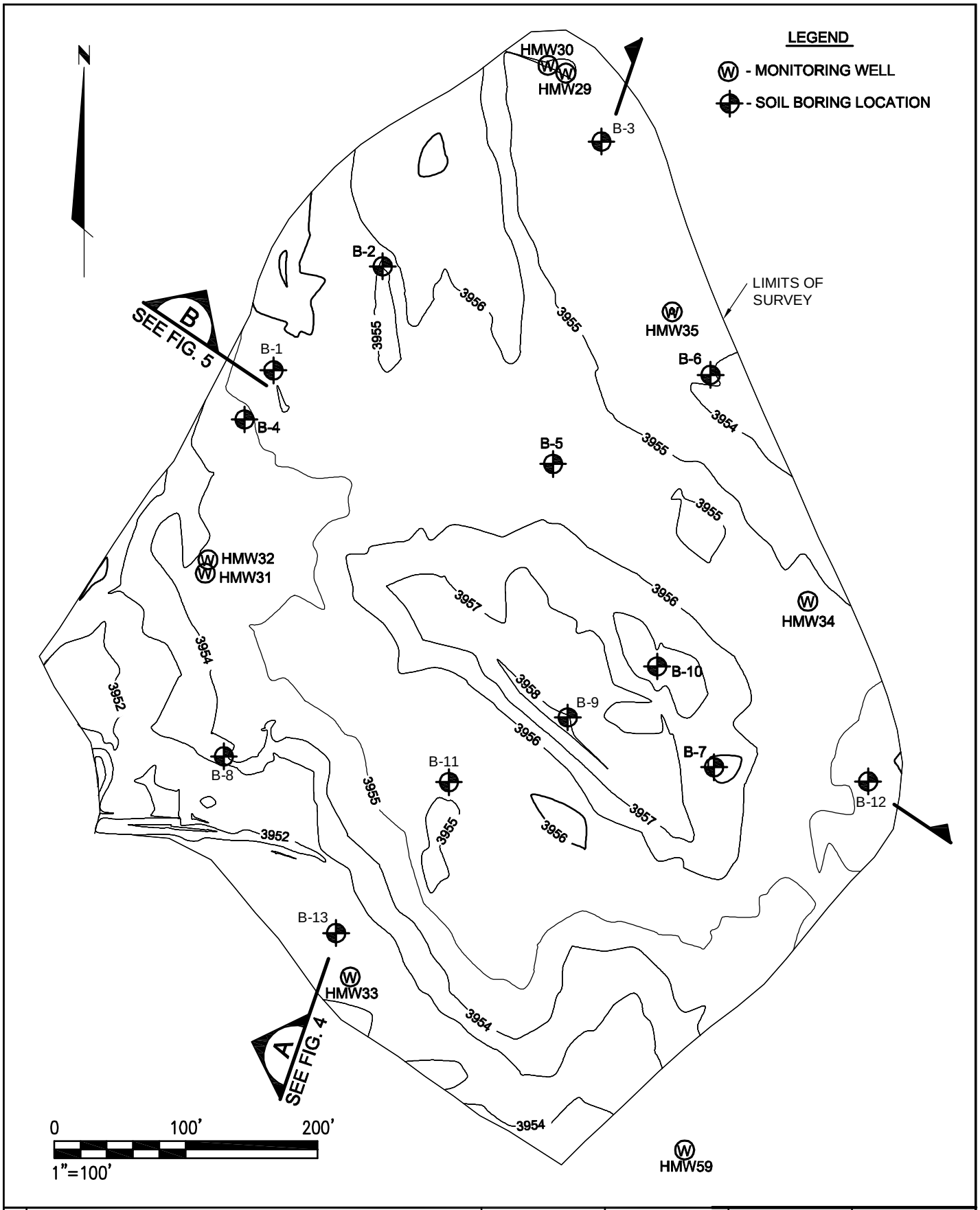
2. Project Information

White Sands Proving Ground, renamed White Sands Missile Range in 1958, was established in July 1945 and is located in the Tularosa Basin with western and northwestern areas extending into Jornada del Muerto Basin. The range is located in Dona Ana, Socorro, Lincoln, Otero and Sierra counties, New Mexico. The main post area is located approximately 27 miles east-northeast of Las Cruces. White Sands Missile Range is the largest land area military installation in the U.S., comprised of nearly 3,200 square miles. The installation is approximately 99 miles long and 25 to 40 miles wide.

3. Subsurface Exploration

The geotechnical investigation consisted of drilling 13 borings (designated B-1 through B-13). These borings were drilled at the approximate locations shown in Figure 1. The borings were drilled to 25 feet below ground surface. The borings were advanced with a hollow stem auger. Ring samples were collected at selected locations and depths. Samples and n-values were collected by dropping a 140-pound hammer 30 inches and counting the blows required to drive the sampler the middle 12 inches.

Detailed subsurface conditions are shown on the boring logs provided in Appendix A. These records represent interpretation of the field conditions based on the geotechnical engineer's field logs and examination of the soil samples. The standard penetration testing (SPT) blow count n-values are also noted on the boring logs. The observations of no groundwater in the borings represent measurements made at the time of investigation. The lines designating the interfaces between various strata represent approximate boundaries only, as transitions between materials may be gradual or erratic.



ARCADIS www.arcadis-us.com	PROJECT MANAGER: PROJECT NAME	DEPARTMENT MANAGER: DEPT MANAGER	LEAD DESIGN PROF.: S. MANNING	CHECKED BY: S. MANNING
	SHEET TITLE: BORING LOCATION PLAN SWMU 38 & 39 CONSTRUCTION LANDFILLS		TASK/PHASE NUMBER: HSFT.DP001	DRAWN BY: JRC
			PROJECT NUMBER: GP08WSMR	FIG. 1

copyright © 2010

4. Existing Site and Subsurface Conditions

4.1 Area and Site Geology

White Sands Missile Range lies within the Mexican Highland Section of the Basin and Range Province, characterized by a series of tilted fault blocks forming longitudinal, asymmetric ridges or mountains and broad intervening basins. The major portion of the range lies within the Tularosa Basin, bound on the west by the Organ, San Augustine, and San Andres mountains. The eastern limit of the Tularosa Basin lies outside of the Range, and is formed from north to south by the Jicarilla, Sierra Blanca, and Sacramento mountains.

The Tularosa Basin contains thick sequences of Tertiary and Quaternary age alluvial and bolson fill deposits. These sediments, more than 5,000 feet thick in some areas, consist mainly of silt, sand, gypsum, and clay weathered from the surrounding mountain ranges. The average elevation of the basin floor is 4,000 feet above mean sea level and surface features consist of flat sandy areas, sand dunes, basalt flows, and dry lakebeds. The average elevation of the mountain ranges from 5,700 feet at San Augustine Pass to more than 9,000 feet at Salinas Peak, the highest elevation at White Sands.

The nature of the bolson fill deposits varies both laterally and vertically throughout the Main Post Area. Coarse grained, poorly sorted sediments deposited near mountain fronts grade into fine grained, well sorted sediments toward the center of the basin.

4.2 General Site Stratigraphy

The soils located in B-1 through B-13 display many of the characteristics of sands, silts and clays originating from the Organ Mountains. Borings show fine silty sands from the top of ground to approximately 4 feet deep. Sandy silt with gypsum is encountered in the borings from depths of 4 feet to a depth of approximately 18 feet. In borings B-2, B-3, B-5 through B-7 and borings B-9 and B-10, medium stiff clay is encountered from depth approximately 18 feet to the bottom of the boring.

Borings B-2 and B-10 encountered significant zones of construction debris consisting of wood, plastic and metals from 6 to 15 feet deep.

Borings B-1, B-4, B-8, B-12 and B-13 encounter fine sands and clayey sands from approximate depth of 18 feet to the bottom of the boring. These borings are located in the west and southwest area of the site.

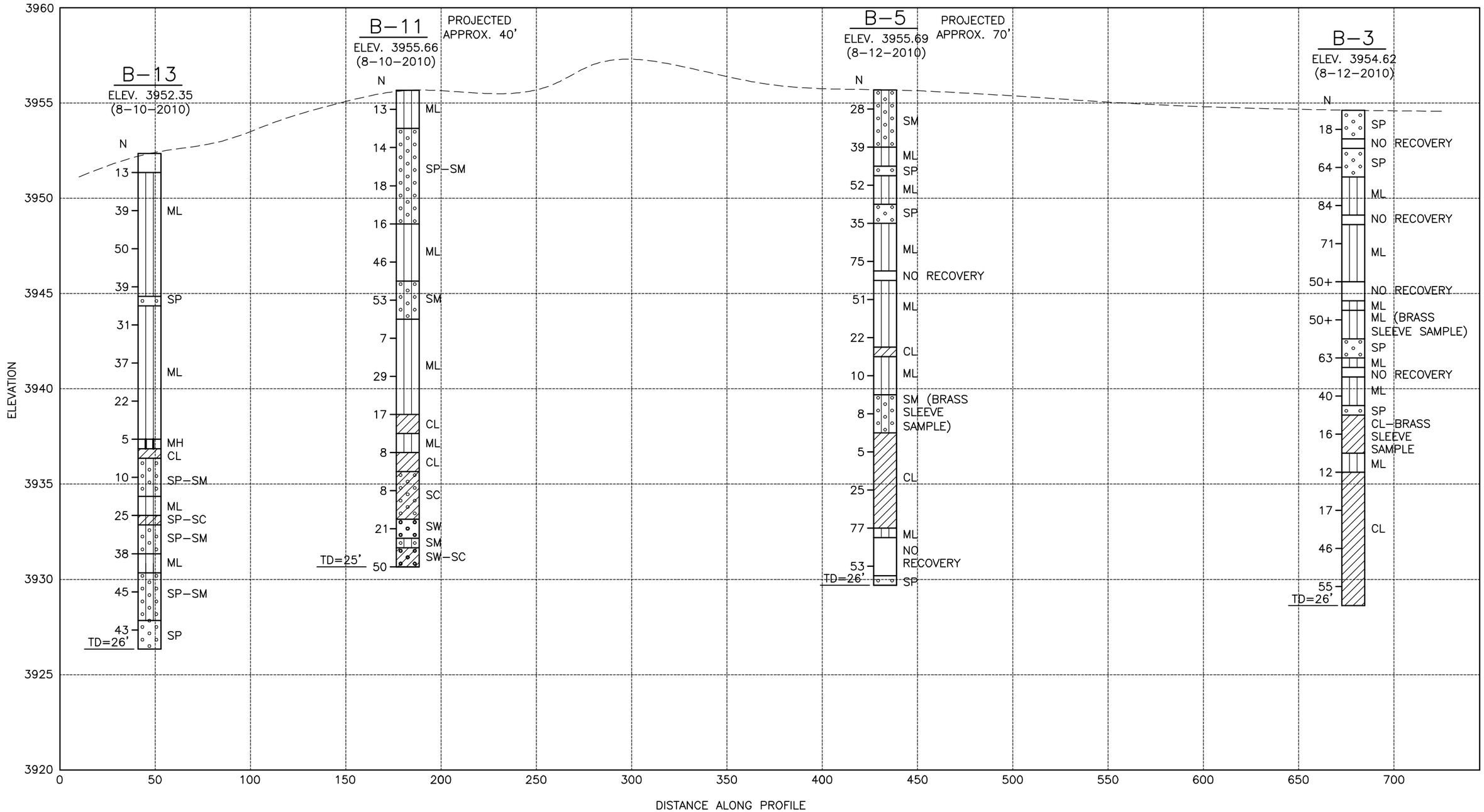
Cross sections of the site were examined to determine potential differential settlement. The cross sections were chosen to represent as much boring data as possible and to show any changes in stratigraphy across the site. Cross section A includes borings B-3, B-5, B-11 and B-13. Cross Section B includes borings B-1, B-5, B-10 and B-11. These sections and the associated boring logs are shown in figures 2 and 3.

5. Laboratory Testing

To accurately classify samples according to the Unified Soil Classification System (USCS), Atterberg limits were performed on six samples. Particle size analysis tests were performed on 40 samples, and unit weight analysis was performed on six samples. Natural moisture content was measured on all 46 samples. The results of the testing for borings in cross sections A and B are provided in Table 1.

Table 1. Laboratory Test Results

Boring	Depth	Material Description	Sieve Analysis with Hydrometer		Moisture Content (%)	Atterberg Limits (LL/PL/PI)	Unit Weight (pcf)
			% Passing #40 Sieve	% Passing #200 Sieve			
B-1	4.0-6.0	SM	96.3	41.5	22.6		
B-1	14.0-16.0	ML	96.4	70.5	21.6		
B-1	19.0-21.0	CL	84.6	60.6	35.4		
B-3	4.0-6.0	ML	97.6	69.5	28.5		
B-3	10.0-10.5	SM			28.0	NP/NP/NP	60.0
B-3	10.5-11.0	ML			11.3	32/32/NP	79.0
B-3	14.0-16.0	ML	98.3	65.8	28.4		
B-3	19.0-21.0	CL	78.1	51.0	26.2		
B-5	1.0-3.0	SM	92.5	35.4	23.6		
B-5	9.0-11.0	ML	99.2	75.3	33.7		
B-5	16.0-16.5	SM			31.0	NP/NP/NP	84.0
B-5	18.0-20.0	CL	96.9	70.2	36.3		
B-10	4.0-6.0	SM-ML	97.7	73.9	31.2		
B-10	15.0-17.0	ML	99.3	69.1	31.9		
B-10	18.0-20.0	CL	97.1	77.2	41.7		



copyright © 2011

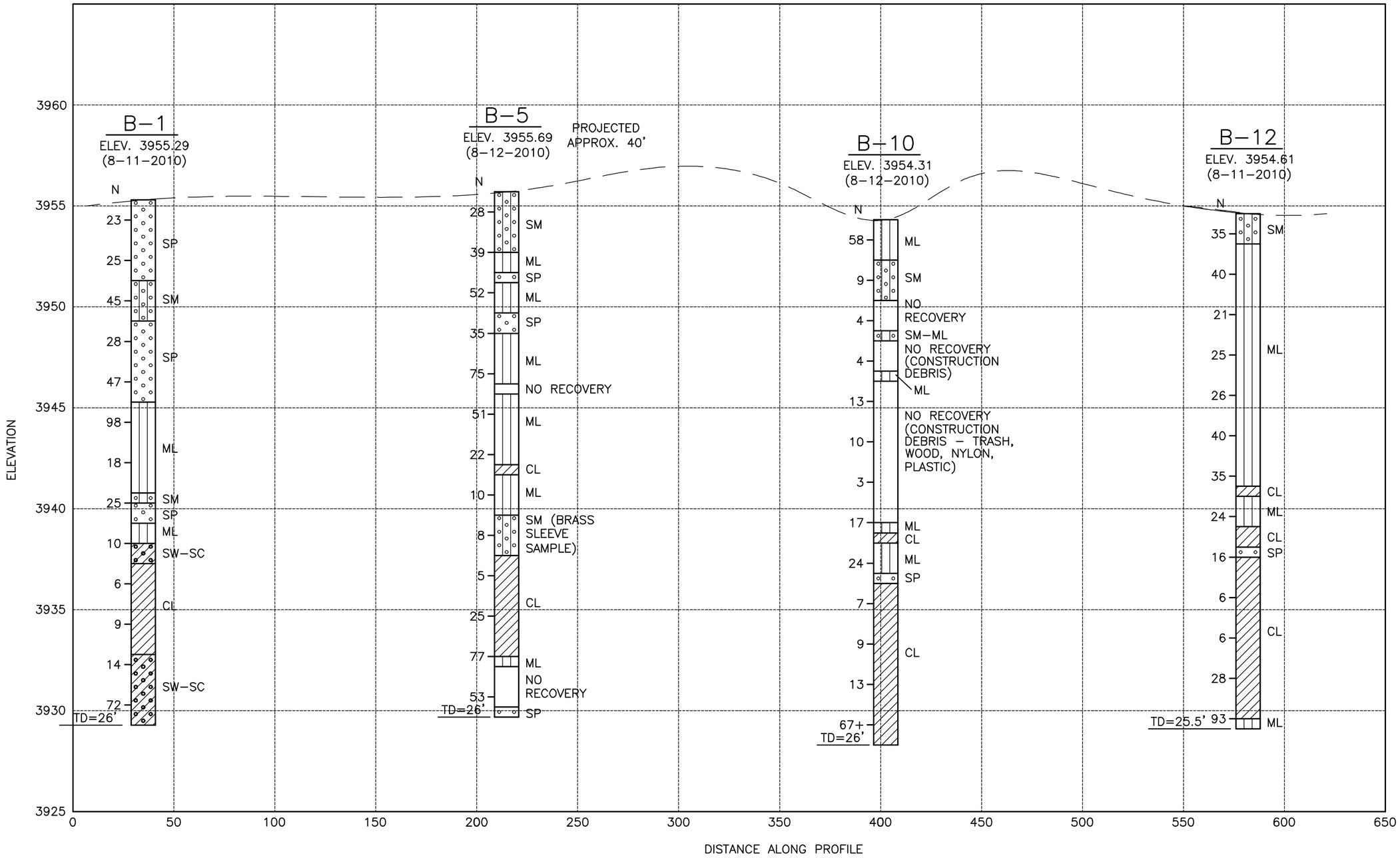
REV. ISSUED DATE DESCRIPTION

KEYPLAN

PROJECT TITLE

SWMU 38 & 39 CONSTRUCTION LANDFILLS
U.S. ARMY WHITE SANDS MISSILE RANGE
WHITE SANDS, NEW MEXICO

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED
P. ZIMMERMAN	B. BORNEMAN	S. MANNING	S. MANNING
SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
SECTION A		HSFT.DP001	JRC
		PROJECT NUMBER	
		GP08WSMR	FIG. 2



copyright © 2011

REV. ISSUED DATE DESCRIPTION

KEYPLAN

PROJECT TITLE

SWMU 38 & 39 CONSTRUCTION LANDFILLS
U.S. ARMY WHITE SANDS MISSILE RANGE
WHITE SANDS, NEW MEXICO

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED
P. ZIMMERMAN	B. BORNEMAN	S. MANNING	S. MANNING
SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
SECTION B		HSFT.DP001	JRC
		PROJECT NUMBER	
		GP08WSMR	FIG. 3

Table 1. Laboratory Test Results

Boring	Depth	Material Description	Sieve Analysis with Hydrometer		Moisture Content (%)	Atterberg Limits (LL/PL/PI)	Unit Weight (pcf)
			% Passing #40 Sieve	% Passing #200 Sieve			
B-10	26.0-26.5	CL			13.6	38/25/13	83.4
B-11	0.0-2.0	ML	95.0	62.7	24.1		
B-11	8.0-10.0	ML	97.7	85.4	34.5		
B-11	17.0-18.0	CL	97.4	63.6	23.7		
B-12	4.0-6.0	ML	98.0	65.3	32.4		
B-12	14.0-16.0	CL	98.1	78.2	37.7		
B-12	19.0-21.0	CL	93.8	68.3	34.3		
B-13	0.0-2.0	ML	97.2	73.8	17.3		
B-13	9.0-10.0	ML	93.7	69.2	21.7		
B-13	16.0-18.0	SP-SM	94.6	68.2	33.8		

Three unconfined compression test samples were taken from B-3, B-5 and B-6.One sample of clay was taken from B-7 at a depth of 25.5 to 26.0 feet for permeability testing. The average permeability (k) was determined to be 6.71E-06 cm/s from the laboratory test. This permeability is representative of the overconsolidated clays found near the bottom depths of the borings. Detailed laboratory test results are provided in Appendix B.

6. Design Parameters

The site stratigraphy at SWMU 38 and SWMU 39 consists primarily of silty sands, with some significant zones of construction debris fill. Laboratory testing and field boring data are used to assign parameters to these material layers. The boring log for B-10 shows the greatest concentration of construction debris and is representative of areas where settlement will have the greatest effect on the landfill cap.

The soils in Boring B-10 are classified as a silty sand from the top of ground to a depth of approximately 4 feet. A significant zone of construction debris is found from a depth of 4 feet to 15 feet. Silty sand and sandy clay is found from this depth to the bottom of

the boring. These material layers are used to estimate settlement for areas with a high concentration of construction debris.

Unit weights are used to calculate effective vertical stresses, and are assumed from laboratory tests. The silty sands on site typically have a unit weight of 120 pounds per cubic foot (lb/ft^3), while the construction debris is typically found to have a unit weight of 75 lb/ft^3. Final vertical stress is calculated by estimating the additional load of the clay landfill cap, which will be 18 inches thick with a typical clay unit weight of 115 lb/ft^3.

Calculations were performed to estimate this settlement of the material using the compressibility of solid waste. A modified compression index (Cc') is assumed for the construction waste found in the site, based on consolidation results from a study of five different landfills by Landva and Clark in 1990. Those tests show Cc' values typically range between 0.17 and 0.36, with the more resilient materials represented by the lower values.

The construction debris at White Sands Missile Range has been in place for some time, and consists of resilient materials such as wood, plastic and metal, therefore a Cc' value of 0.17 has been assumed. Silty sands typically have a Cc' of 0.05, and this is used in the calculation.

7. Settlement

Placement of an 18-inch-thick clay landfill cap will result in a small amount of immediate settlement in areas with a high concentration of construction waste fill due to the non-cohesiveness and relatively large void ratio in the material. The settlement equation is as follows:

$$\Delta H = Cc' * H_0 * \log(\sigma_1/\sigma_0)$$

Where,

ΔH = change in layer height (cumulative settlement)
H_0 = initial layer height
σ_0 = initial vertical stress
σ_1 = final vertical stress

Using the design parameters discussed above, the calculation shows a settlement of 0.9 inch.

This amount of settlement should be expected in the areas with construction waste. Areas without a high concentration of construction waste will display similar settlement due to the non-cohesion of the silts and sands near the ground surface.

8. Site Grading and Landfill Cap

Samples of soil were taken from five possible borrow pit locations on the site. Laboratory tests were performed on these samples for grain size analysis, permeability and optimum compaction. Detailed laboratory test data is provided in Appendix B. The soils found in the borrow pits are classified and silty sands and sandy silts. These soils are generally unsuitable for use as landfill cap material due to higher permeability and difficulty of compaction.

Preferred cap material should consist of low-plasticity inorganic clay, which includes silty clays and sandy clays. The clay should have an Atterberg liquid limit of less than 50, and should place above the A-line on an Atterberg plasticity index chart. Optimum moisture content of the clay during placement should be between 15 and 25 percent. The clay should have a permeability of k=E-05.

There are five borrow pits located at WSMR that are available for use as sources of cap material. Analytical and geotechnical samples were collected from each pit. The geotechnical results are provided in Appendix C. This borrow material is representative of native soil in the surrounding area and is proposed to be used unless pending approval by the New Mexico Environment Department. The cap material will be placed in 6-inch lifts and compacted until the 18-inch cap thickness is attained.

9. Qualifications of This Report

Our evaluation of foundation design and construction conditions is based on our understanding of the site and project information and the data obtained during our field exploration. The general subsurface conditions used are based on interpolation of the subsurface data between the borings. The design recommendations in this report have been developed on the basis of the previously described project characteristics and subsurface conditions. If project criteria or locations change, ARCADIS should be notified to determine if the recommendations should be modified. The findings of such a review will be presented in a supplemental report.

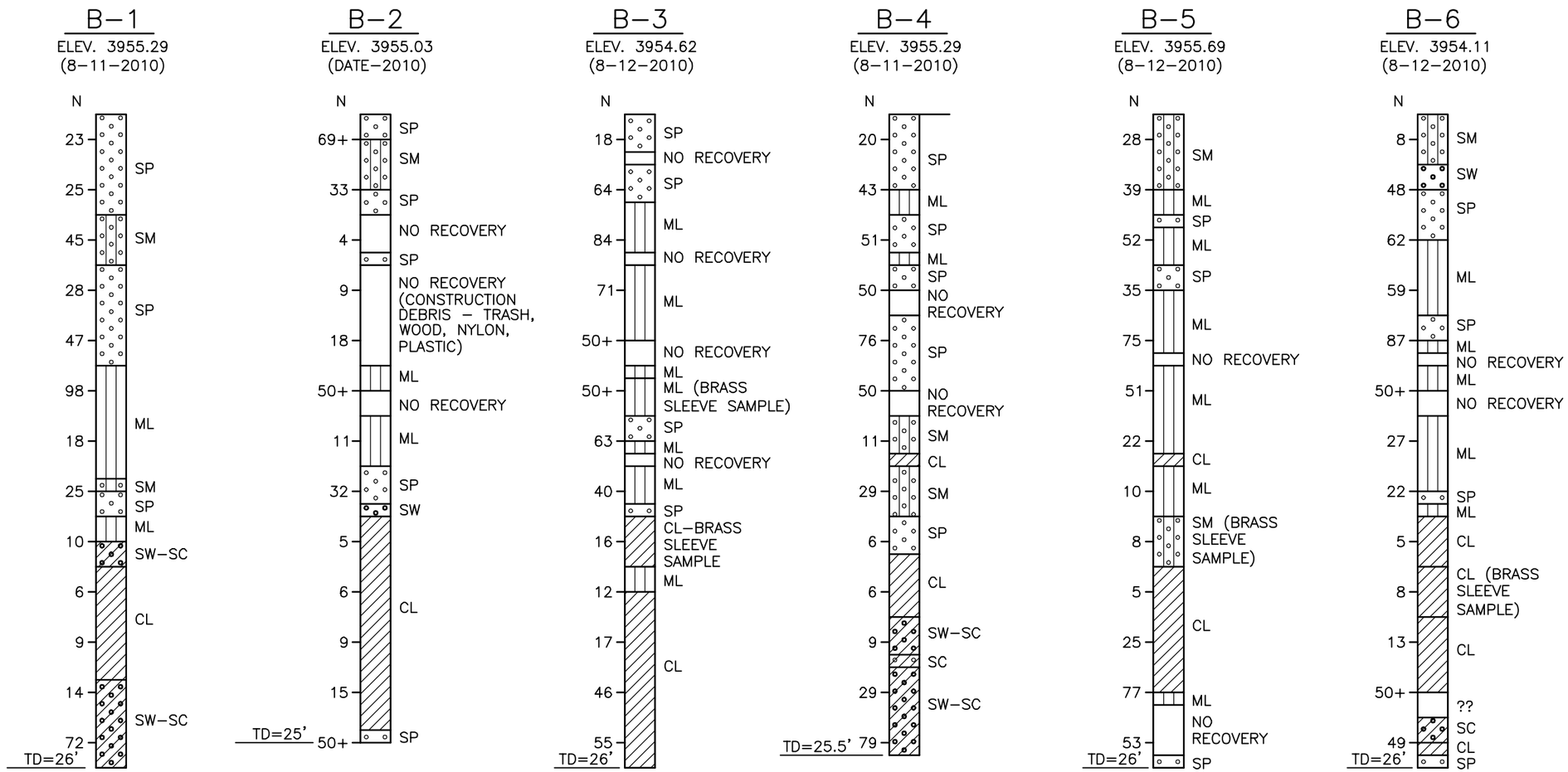
Regardless of the thoroughness of a subsurface exploration, there is the possibility that conditions between borings will differ from those at the boring locations, that conditions are not as anticipated by the designers, or that the construction process has altered the soil conditions.

The nature and extent of variations between the borings may not become evident until construction is underway. If such variations appear evident, it will be necessary to re-evaluate the recommendations of this report after on-site observations have been made.

ARCADIS

Appendix A

Boring Logs



SYMBOL DESCRIPTIONS

SW – SAND; WELL–GRADED, GRAVELLY SANDS

SP – SAND; POORLY–GRADED, GRAVELLY SANDS

SM – SILTY SAND; SAND–SILT MIXTURES

SC – CLAYEY SAND; SAND–CLAY MIXTURE

ML – SILT & VERY FINE SAND, SILTY OR CLAYEY FINE SAND OR CLAYEY SILT WITH SLIGHT PLASTICITY

CL – LEAN CLAY; SANDY CLAY, SILTY CLAY OF LOW TO MEDIUM PLASTICITY

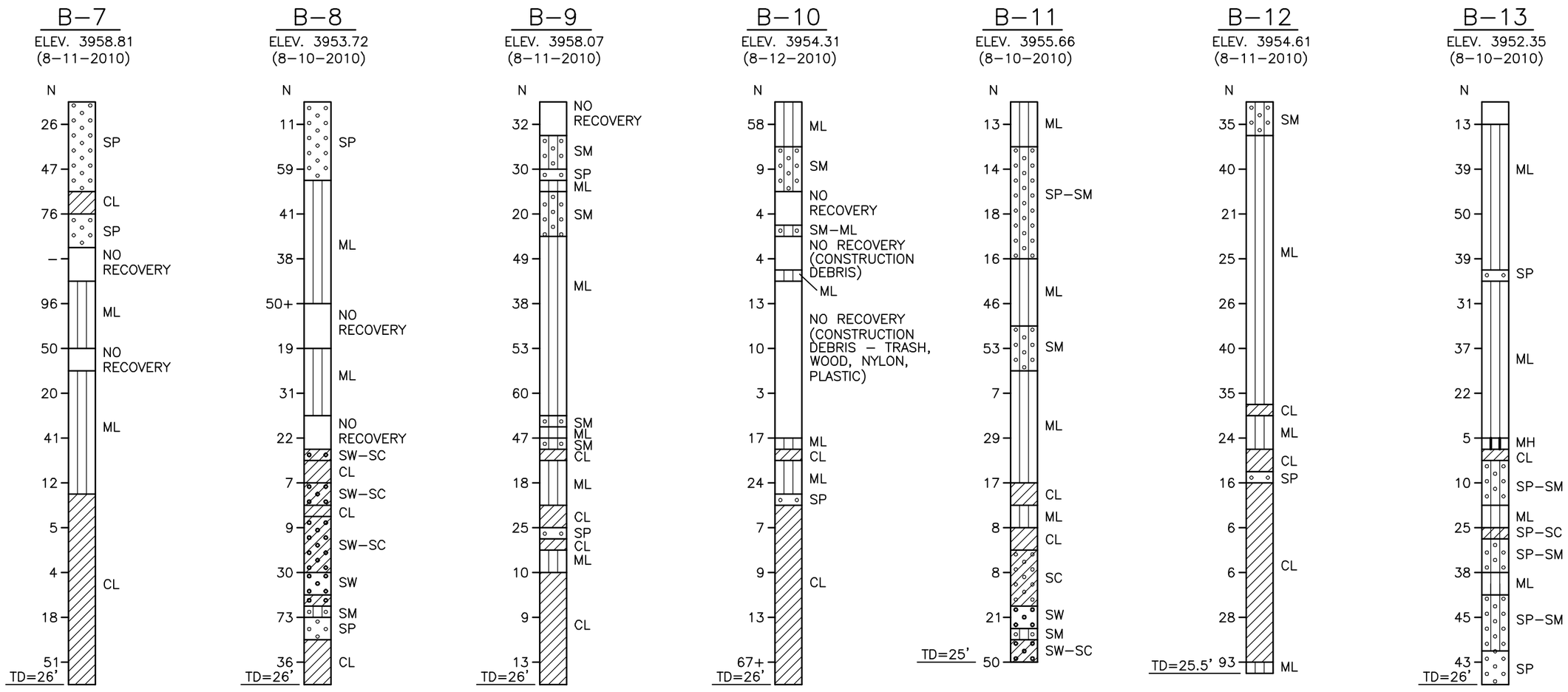
copyright © 2011

REV. ISSUED DATE DESCRIPTION

KEYPLAN

PROJECT TITLE
SWMU 38 & 39 CONSTRUCTION LANDFILLS
U.S. ARMY WHITE SANDS MISSILE RANGE
WHITE SANDS, NEW MEXICO

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED
P. ZIMMERMAN	B. BORNEMAN	S. MANNING	S. MANNING
SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
BORING LOGS SHEET 1 OF 2		HSFT.DP001	JRC
		PROJECT NUMBER	DRAWING NUMBER
		GP08WSMR	1



SYMBOL DESCRIPTIONS

SW – SAND; WELL–GRADED, GRAVELLY SANDS

SP – SAND; POORLY–GRADED, GRAVELLY SANDS

SM – SILTY SAND; SAND–SILT MIXTURES

SC – CLAYEY SAND; SAND–CLAY MIXTURE

ML – SILT & VERY FINE SAND, SILTY OR CLAYEY FINE SAND OR CLAYEY SILT WITH SLIGHT PLASTICITY

CL – LEAN CLAY; SANDY CLAY, SILTY CLAY OF LOW TO MEDIUM PLASTICITY

N – INDICATES NUMBER OF BLOW COUNTS

copyright © 2011

REV. ISSUED DATE DESCRIPTION

KEYPLAN

PROJECT TITLE
SWMU 38 & 39 CONSTRUCTION LANDFILLS
U.S. ARMY WHITE SANDS MISSILE RANGE
WHITE SANDS, NEW MEXICO

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED
P. ZIMMERMAN	B. BORNEMAN	S. MANNING	S. MANNING
SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
BORING LOGS SHEET 2 OF 2		HSFT.DP001	JRC
		PROJECT NUMBER	DRAWING NUMBER
		GP08WSMR	2

ARCADIS

Appendix B

Laboratory Test Results

Boring	Depth	Material Description	Sieve Analysis with Hydrometer		Moisture Content (%)	Atterberg Limits (LL/PL/PI)	Unit Weight (pcf)	UC Compression (psi)
			% Passing #40 Sieve	% Passing #200 Sieve				
B-1	4.0-6.0	SM	96.3	41.5	22.6			
B-1	14.0-16.0	ML	96.4	70.5	21.6			
B-1	19.0-21.0	CL	84.6	60.6	35.4			
B-2	1.0-3.0	SM	94.9	64.4	20.5			
B-2	10.0-11.0	ML	91.9	71.1	30.6			
B-2	16.0-18.0	CL	97.7	73.9	30.6			
B-3	4.0-6.0	ML	97.6	69.5	28.5			
B-3	10.0-10.5	SM			28.0	NP/NP/NP	60.0	
B-3	10.5-11.0	ML			11.3	32/32/NP	79.0	
B-3	14.0-16.0	ML	98.3	65.8	28.4			
B-3	19.0-21.0	CL	78.1	51.0	26.2			
B-4	4.0-6.0	SP	97.3	41.8	24.2			
B-4	14.0-16.0	SM	94.1	53.3	31.7			
B-4	19.0-21.0	SW-SC	85.6	56.8	29.5			
B-5	1.0-3.0	SM	92.5	35.4	23.6			
B-5	9.0-11.0	ML	99.2	75.3	33.7			
B-5	16.0-16.5	SM			31.0	NP/NP/NP	84.0	
B-5	18.0-20.0	CL	96.9	70.2	36.3			
B-6	0.0-2.0	SM	94.2	42.6	25.8			
B-6	9.0-11.0	ML	96.3	77.3	35.4			
B-6	16.0-18.0	CL	97.9	74.4	34.1			
B-6	18.5-19.0	CL			34.0	46/26/23	93.0	5994
B-7	5.0-6.0	SP	98.9	65.7	26.8			
B-7	14.0-16.0	ML	98.7	67.9	31.1			
B-7	19.0-21.0	CL	90.3	63.0	31.3			
B-7	24.0-24.5	CL			13.9	45/24/21	115.0	
B-8	4.0-6.0	ML	98.8	78.2	33.2			
B-8	15.0-16.0	SW-SC	97.2	61.6	30.3			
B-8	19.0-21.0	SW-SC	91.3	48.9	27.4			
B-9	1.5-3.0	SM	92.6	50.6	22.7			
B-9	4.0-6.0	SM	94.0	38.8	23.6			
B-9	9.0-11.0	ML	96.4	74.0	28.4			
B-9	16.0-18.0	ML	95.8	70.3	30.3			
B-10	4.0-6.0	SM-ML	97.7	73.9	31.2			
B-10	15.0-17.0	ML	99.3	69.1	31.9			
B-10	18.0-20.0	CL	97.1	77.2	41.7			
B-10	26.0-26.5	CL			13.6	38/25/13	83.4	
B-11	0.0-2.0	ML	95.0	62.7	24.1			
B-11	8.0-10.0	ML	97.7	85.4	34.5			
B-11	17.0-18.0	CL	97.4	63.6	23.7			
B-12	4.0-6.0	ML	98.0	65.3	32.4			
B-12	14.0-16.0	CL	98.1	78.2	37.7			
B-12	19.0-21.0	CL	93.8	68.3	34.3			
B-13	0.0-2.0	ML	97.2	73.8	17.3			
B-13	9.0-10.0	ML	93.7	69.2	21.7			
B-13	16.0-18.0	SP-SM	94.6	68.2	33.8			

LOG OF BORING NO. B-3

CLIENT
HELSTF

SITE
,

PROJECT
HELSTF Construction Landfill

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
		5									
		10				6		28	60		
		15									
		20									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽	▼
WL	▼	▼
WL		

Terracon

BORING STARTED			
BORING COMPLETED			
RIG		DRILLER	
LOGGED	JJI	JOB #	68101065

LOG OF BORING NO. B-5

CLIENT
HELSTF

SITE
,

PROJECT
HELSTF Construction Landfill

GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
		5									
		10									
		15									
						6		31	84		
		20									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽	▼
WL	▼	▼
WL		

Terracon

BORING STARTED			
BORING COMPLETED			
RIG		DRILLER	
LOGGED	JJI	JOB #	68101065

LOG OF BORING NO. B-6

CLIENT
HELSTF

SITE
,

PROJECT
HELSTF Construction Landfill

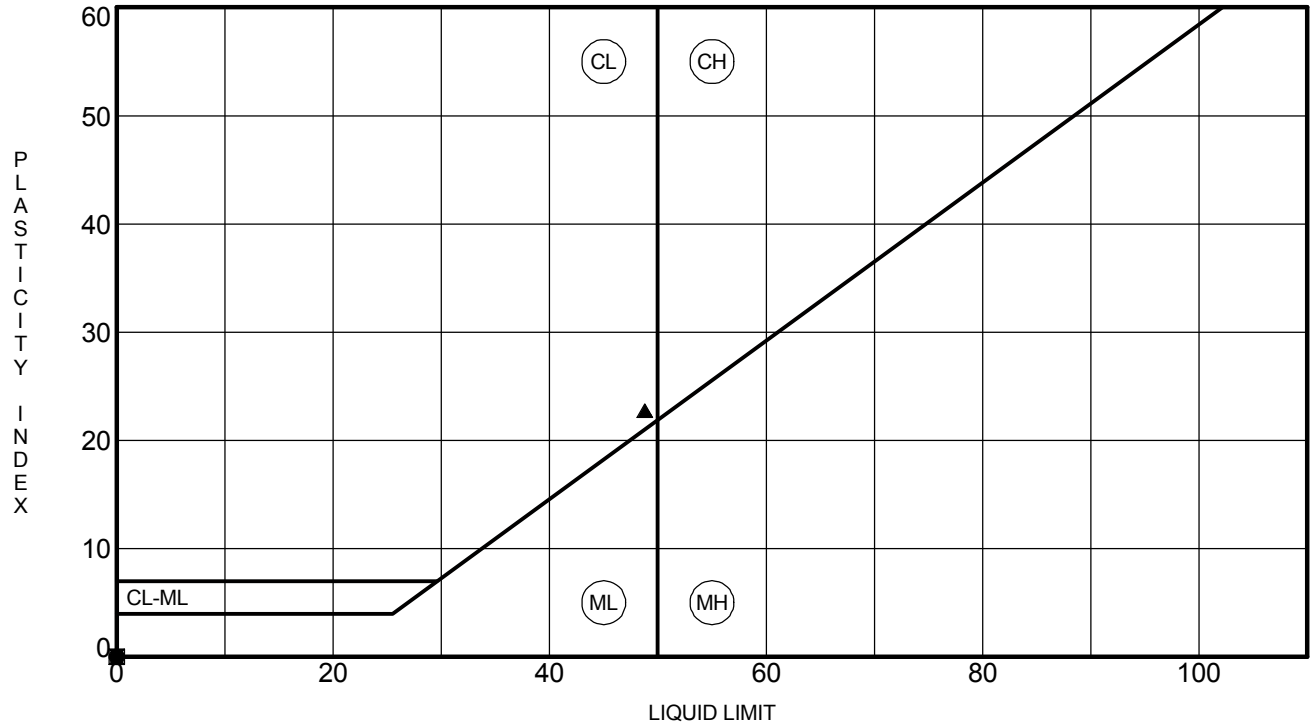
GRAPHIC LOG	DESCRIPTION	DEPTH, ft.	USCS SYMBOL	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY, in.	SAMPLES SPT - N BLOWS / ft.	TESTS WATER CONTENT, %	TESTS DRY UNIT WT pcf	TESTS UNCONFINED STRENGTH, psf	
		5									
		10									
		15									
						6		34	93	5994	
		20									

The stratification lines represent the approximate boundary lines between soil and rock types: in-situ, the transition may be gradual.

WATER LEVEL OBSERVATIONS, ft		
WL	▽	▼
WL	▼	▼
WL		

Terracon

BORING STARTED			
BORING COMPLETED			
RIG		DRILLER	
LOGGED	JJI	JOB #	68101065



	Specimen Identification		LL	PL	PI	%Fines	Classification
●	**B-3**	**10.0ft**	**NP**	**NP**	**NP**		
⧗	**B-5**	**16.0ft**	**NP**	**NP**	**NP**		
▲	**B-6**	**18.5ft**	**49**	**26**	**23**		

Terracon

ATTERBERG LIMITS RESULTS

Project: HELSTF Construction Landfill
Site: ,
Job #: 68101065
Date: 9-22-10

PRELIMINARY

amec

PROJECT: HELSTF Construction Landfill

CLIENT: Terracon Misc. Laboratory Testing
MATERIAL:
SAMPLE SOURCE: B-7 @ 25.5'-26.0'

PROJECT NO: 1041900771
LAB NO: 1453
DATE SAMPLED: 9/9/2010
SAMPLED BY: Client

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (ASTM D 5084)

SAMPLE PREPARATION: Sample remolded to as received moisture content and density. Sample saturated to greater than 95 percent and conditioned to a 20 psi confining pressure.
METHOD OF COMPACTION: n/a

TESTING METHOD: Method C: Falling Head Rising Tailwater

FIELD MOISTURE (%):	22.1	LAB MOISTURE (%):	22.1
INITIAL DIAMETER (cm):	4.917	FINAL DIAMETER (cm):	4.699
INITIAL LENGTH (cm):	5.080	FINAL LENGTH (cm):	5.461
INITIAL MOISTURE CONTENT (%):	22.0	FINAL MOISTURE CONTENT (%):	27.8

CONSOLIDATED? (Y/N):	Y	FINAL CONFINING PRESSURE (psi):	20
CELL PRESSURE (psi):	90		
BACKPRESSURE (psi):	70		

INITIAL DRY BULK DENSITY (lb/ft^3):	96.4
ASTM D 1557 COMPACTION (%):	---
FINAL DRY BULK DENSITY (lb/ft^3):	98.2
FINAL B PARAMETER READING:	0.96
FINAL BACKPRESSURE (psi):	70

AVERAGE K_{sat} * (cm/s): 6.71E-06 **AVERAGE K_{sat} * (ft/day): 1.90E-02**

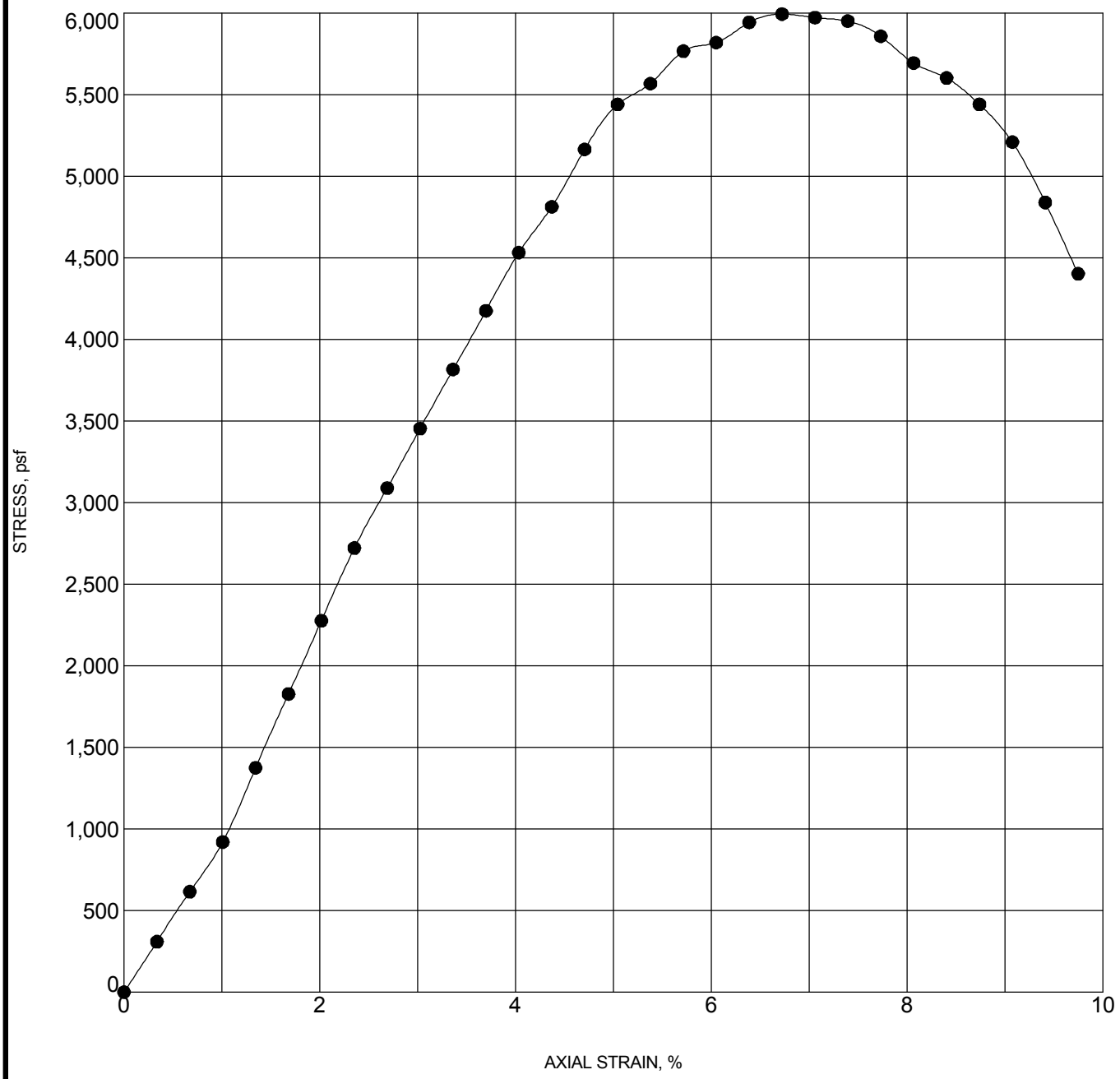
MAXIMUM GRADIENT USED: 4.54
MINIMUM GRADIENT USED: 2.27

PRELIMINARY

*Corrected to 20°C

Note: All final sample dimensions are subject to sample deformation caused by exsolution of air in pore water.

Remarks: As received dry density and moisture content of tube sample is 95.7 pcf and 22.1 percent respectively.



Specimen Identification			Classification	γ_d, pcf	WC,%
●	**B-6**	**18.5ft**		**93**	**34**

Terracon

UNCONFINED COMPRESSION TEST

Project: HELSTF Construction Landfill
Site: ,
Job #: 68101065
Date: 9-22-10

ARCADIS

Appendix C

Borrow Pit Results

GEO-TEST

June 18, 2008

WTS
P.O. Box 363, Bldg. 126, 3rd Floor
WSMR, New Mexico 88002

Job No.:4-80611
Lab No.: 08-289

PROJECT: Zia Test Soil

SUBJECT: Sieve Analysis, Sampled by Client on 06/17/08.

LOCATION: Zia #1

MATERIAL:

SIEVE ANALYSIS

Sieve Size	% Passing
1/2"	100
3/8"	100
No 4	95
No. 10	83
No. 40	53
No. 80	35
No. 200	16.9

Submitted By:

GEO-TEST, INC.

Dennis Parrack
Engineering Technician

cc: Addressee
DP/aw

Sieve-1

GEO-TEST, INC.
204 RICHARDS LANE
ANTA FE,
IEW MEXICO
7507
505) 471-1101
AX (505) 471-2245

528 CALLE ALAMEDA NE
ALBUQUERQUE,
IEW MEXICO
7113
505) 857-0933
AX (505) 857-0803

805-A LAS VEGAS CT.
AS CRUCES,
IEW MEXICO
8007
575) 526-6260
AX (575) 523-1660

GEO-TEST

June 18, 2008

WTS
P.O. Box 363, Bldg. 126, 3rd Floor
WSMR, New Mexico 88002

Job No.:4-80611
Lab No.: 08-290

PROJECT: Zia Test Soil

SUBJECT: Sieve Analysis, Sampled by Client on 06/17/08.

LOCATION: Zia #2

MATERIAL:

SIEVE ANALYSIS

Sieve Size	% Passing
3/8"	100
No 4	99
No. 10	93
No. 40	54
No. 80	31
No. 200	15.7

Submitted By:

GEO-TEST, INC.

Dennis Parrack
Engineering Technician

cc: Addressee
DP/aw

Sieve-1

:EO-TEST, INC.
204 RICHARDS LANE
ANTA FE,
IEW MEXICO
7507
306) 471-1101
AX (505) 471-2245

528 CALLE ALAMEDA NE
LBUQUERQUE,
IEW MEXICO
7113
305) 857-0933
AX (505) 857-0803

805-A LAS VEGAS CT.
AS CRUCES,
IEW MEXICO
8007
575) 526-6260
AX (575) 523-1660

EO-TEST

June 18, 2008

WTS
P.O. Box 363, Bldg. 126, 3rd Floor
WSMR, New Mexico 88002

Job No.:4-80611
Lab No.: 08-291

PROJECT: Zia Test Soil

SUBJECT: Sieve Analysis, Sampled by Client on 06/17/08.

LOCATION: Zia #3

MATERIAL:

SIEVE ANALYSIS

Sieve Size	% Passing
1"	100
3/4"	90
1/2"	82
3/8"	72
No 4	55
No. 10	41
No. 40	22
No. 80	13
No. 200	6.6

Submitted By:

GEO-TEST, INC.

Dennis Parrack
Engineering Technician

cc: Addressee
DP/aw

Sieve-1

EO-TEST, INC.
204 RICHARDS LANE
ANTA FE,
IEW MEXICO
7507
505) 471-1101
AX (505) 471-2245

528 CALLE ALAMEDA NE
LBUQUERQUE,
IEW MEXICO
7113
505) 857-0933
AX (505) 857-0803

805-A LAS VEGAS CT.
AS CRUCES,
IEW MEXICO
8007
575) 526-6260
AX (575) 523-1660

GEO-TEST

June 18, 2008

WTS
P.O. Box 363, Bldg. 126, 3rd Floor
WSMR, New Mexico 88002

Job No.:4-80611
Lab No.: 08-292

PROJECT: Zia Test Soil

SUBJECT: Sieve Analysis, Sampled by Client on 06/17/08.

LOCATION: Zia #4

MATERIAL:

SIEVE ANALYSIS

Sieve Size	% Passing
3/8"	100
No 4	100
No. 10	100
No. 40	92
No. 80	79
No. 200	52.4

Submitted By:

GEO-TEST, INC.

Dennis Parrack
Engineering Technician

cc: Addressee
DP/aw

Sieve-1

GEO-TEST, INC.
204 RICHARDS LANE
ANTA FE,
IEW MEXICO
7507
505) 471-1101
AX (505) 471-2245

528 CALLE ALAMEDA NE
LBUQUERQUE,
IEW MEXICO
7113.
505) 857-0933
AX (505) 857-0803

805-A LAS VEGAS CT.
AS CRUCES,
IEW MEXICO
8007
575) 526-6260
AX (575) 523-1660

GEO-TEST

June 18, 2008

WTS
P.O. Box 363, Bldg. 126, 3rd Floor
WSMR, New Mexico 88002

Job No.:4-80611
Lab No.: 08-293

PROJECT: Zia Test Soil

SUBJECT: Sieve Analysis, Sampled by Client on 06/17/08.

LOCATION: Zia #5

MATERIAL:

SIEVE ANALYSIS

Sieve Size	% Passing
3/8"	100
No 4	100
No. 10	100
No. 40	87
No. 80	70
No. 200	49.0

Submitted By:

GEO-TEST, INC.

Dennis Parrack
Engineering Technician

cc: Addressee
DP/aw

Sieve-1

GEO-TEST, INC.
204 RICHARDS LANE
ANTA FE.
IEW MEXICO
7507
505) 471-1101
AX (505) 471-2245

528 CALLE ALAMEDA NE
LBUQUERQUE.
IEW MEXICO
7113.
505) 857-0933
AX (505) 857-0803

805-A LAS VEGAS CT.
AS CRUCES.
IEW MEXICO
8007
575) 526-6260
AX (575) 523-1660

EO-TEST

FAX TRANSMITTAL

TO: Bradley

COMPANY: WTS

FAX NO: 575-678-6096

FROM: Aretha GEO-TEST, INC.

DATE: 6-18-08

TOTAL PAGES INCLUDING THIS SHEET: 6

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL (505)526-6260.

MESSAGE:

The documents accompanying this facsimile transmission contain confidential, privileged or proprietary information that either constitutes the property of Geo-Test, Inc. or, if the property of another, represents information that is within Geo-Test's care, custody and control. The information is intended to be for the use of the individual or entity named on the transmission sheet. If you are not the intended recipient, be aware that any disclosure, copying or use of the contents of this telecopied information is prohibited. If you have received this telecopy in error, please notify us by telephone so that we may arrange for the retrieval of the original documents. Thank you for your cooperation.

Visit our website at http:members/aol.com/geotestinc
Las Cruces Office at lascrucesgeo@aol.com
Charlie Miller At cm2geo@aol.com
Albuquerque Office at: geotestabq@aol.com
Santa Fe Office: santafegeo@aol.com

D-TEST, INC.
4 RICHARDS LANE
ITA FE.
V MEXICO
07
5) 471-1101
(505) 471-2245

3 CALLE ALAMEDA NE
UQUERQUE,
V MEXICO
13
5) 857-0933
(505) 857-0803

5-A LAS VEGAS CT.
CRUCES
V MEXICO
07
5) 526-6260
(505) 523-1660

June 24, 2008

WTS
PO Box 363, Bldg. 126, 3rd Floor
WSMR, NM 88002

Job No.: 4-80611
Lab No.: 08-291

PROJECT: Zia Test Soil

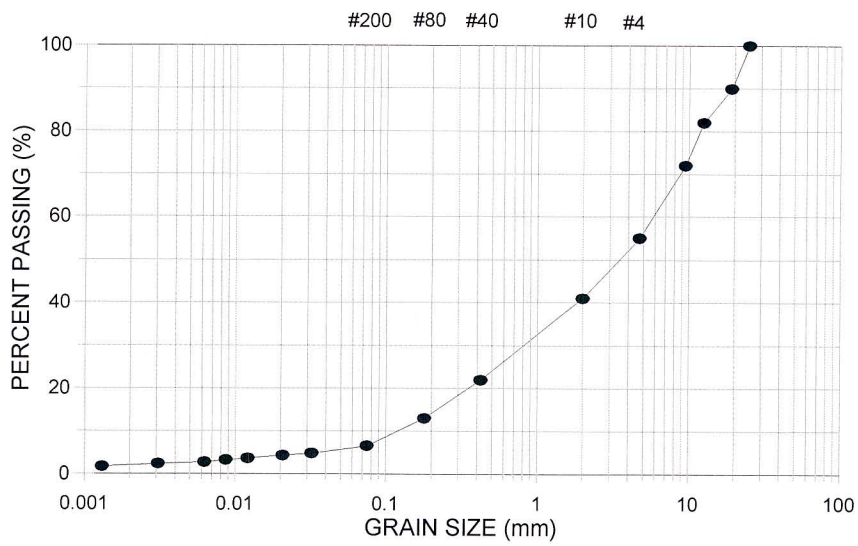
SAMPLE LOCATION: Delivered by Client on 06/17/08, Zia 3

SAMPLE: Slightly Silty Sand with Gravels, Bown (SM-SP)

GRAIN SIZE ANALYSIS (ASTM D-422)

Sieve Size	Particle Dia. (mm)	Percent Passing
1"	25.000	100
3/4"	19.000	90
1/2"	12.500	82
3/8"	9.500	72
No. 4	4.750	55
No. 10	2.0000	41
No. 40	0.4250	22
No. 80	0.1800	13
No.200	0.0750	6.6
	0.0324	4.8
	0.0207	4.4
	0.0122	3.7
	0.0087	3.3
	0.0063	2.9
	0.0031	2.4
	0.0013	1.8

GRADATION ANALYSIS



ASTM D-422

Respectfully Submitted:
GEO-TEST, INC.

Tim Byres, SET

June 24, 2008

WTS
PO Box 363, Bldg. 126, 3rd Floor
WSMR, NM 88002

Job No.: 4-80611
Lab No.: 08-293

PROJECT: Zia Test Soil

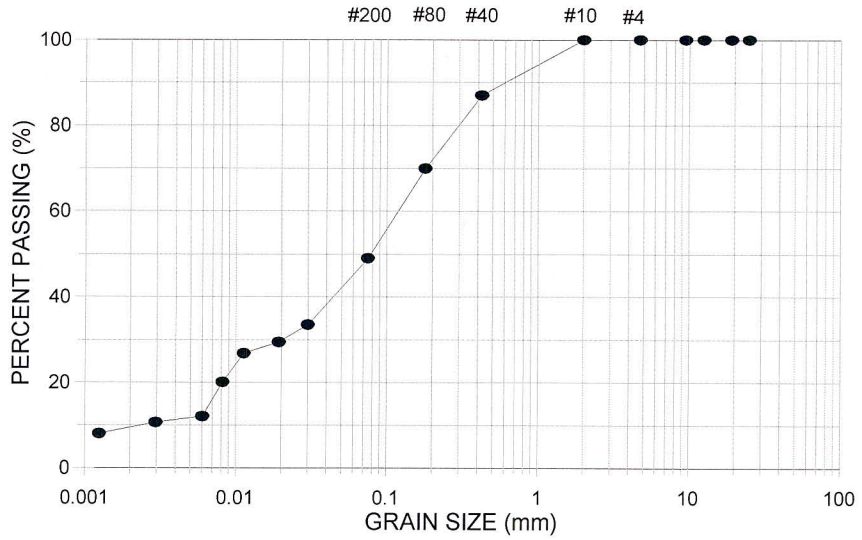
SAMPLE LOCATION: Delivered by Client on 06/17/08, Zia 5

SAMPLE: Silty Sand, Fine Grained, Light Bown (SM)

GRAIN SIZE ANALYSIS (ASTM D-422)

Sieve Size	Particle Dia. (mm)	Percent Passing
1"	25.000	100
3/4"	19.000	100
1/2"	12.500	100
3/8"	9.500	100
No. 4	4.750	100
No. 10	2.0000	100
No. 40	0.4250	87
No. 80	0.1800	70
No.200	0.0750	49.0
	0.0300	33.5
	0.0194	29.5
	0.0113	26.8
	0.0082	20.1
	0.0060	12.1
	0.0030	10.7
	0.0013	8.0

GRADATION ANALYSIS



ASTM D-422

Respectfully Submitted:
GEO-TEST, INC.

Tim Byres, SET

June 24, 2008

WTS
PO Box 363, Bldg. 126, 3rd Floor
WSMR, NM 88002

Job No.: 4-80611
Lab No.: 08-292

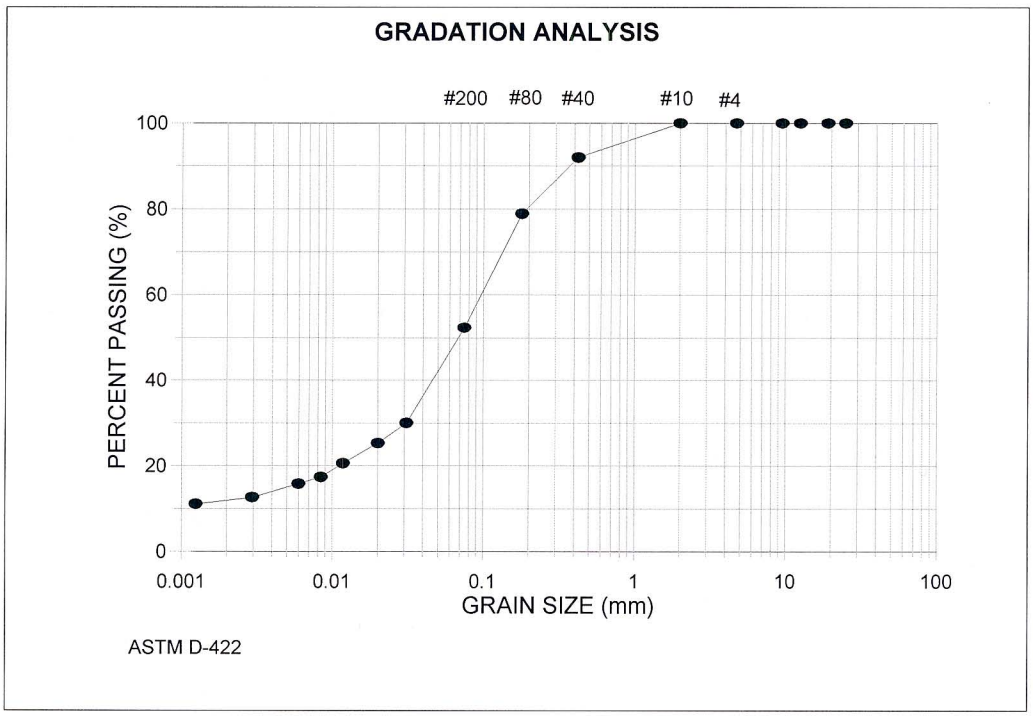
PROJECT: Zia Test Soil

SAMPLE LOCATION: Delivered by Client on 06/17/08, Zia 4

SAMPLE: Sandy Silt, Light Bown (ML)

GRAIN SIZE ANALYSIS (ASTM D-422)

Sieve Size	Particle Dia. (mm)	Percent Passing
1"	25.000	100
3/4"	19.000	100
1/2"	12.500	100
3/8"	9.500	100
No. 4	4.750	100
No. 10	2.0000	100
No. 40	0.4250	92
No. 80	0.1800	79
No.200	0.0750	52.4
	0.0312	30.1
	0.0201	25.3
	0.0118	20.6
	0.0084	17.4
	0.0060	15.8
	0.0030	12.7
	0.0012	11.1



Respectfully Submitted:
GEO-TEST, INC.

Tim Byres, SET

Appendix C

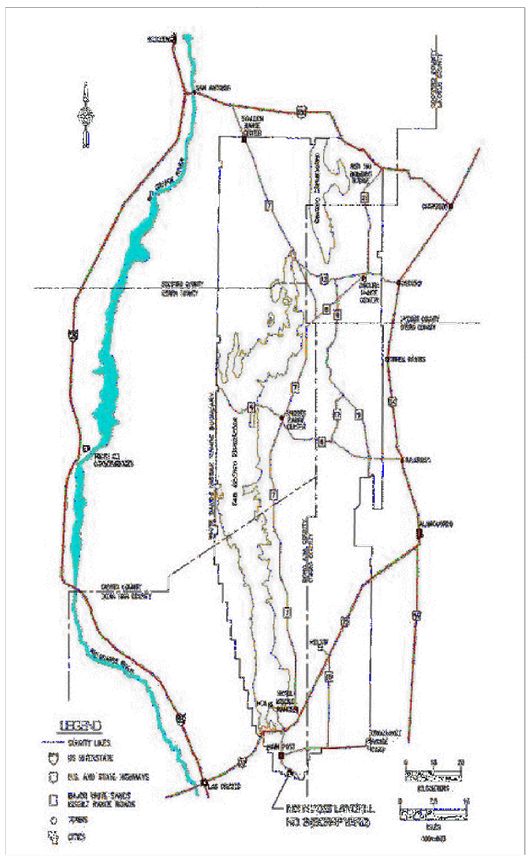
Engineering Cap Plans

CONSTRUCTION DRAWINGS FOR:
ENGINEERED CAP
FORMER HELSTF CONSTRUCTION LANDFILLS (SWMUs 38 AND 39)

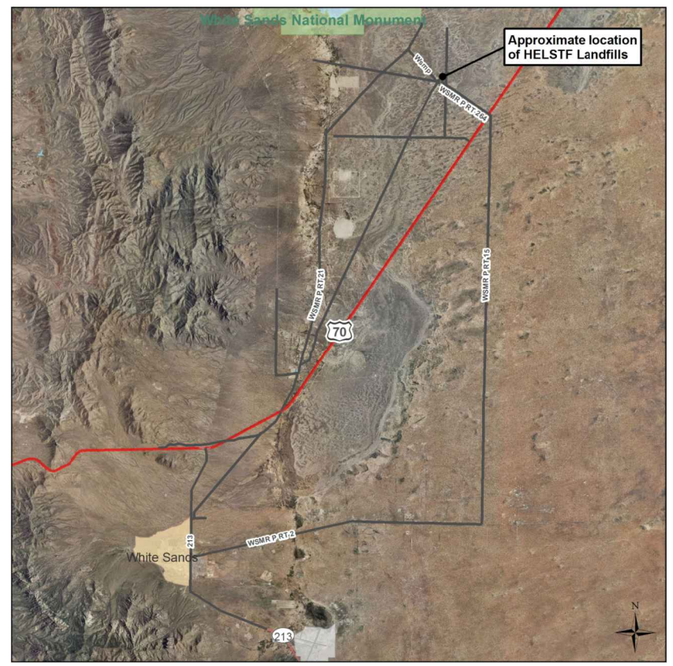
WHITE SANDS MISSILE RANGE
WHITE SANDS, NEW MEXICO

LEGEND

ELEV	ELEVATION
N	NORTHING
E	EASTING
STA.	STATION
XXXX.S	EXISTING GROUND CONTOUR
XXXX.XX	PROPOSED GROUND CONTOUR
	TIE-DOWN SLOPE CONTOUR
Ⓦ	EXISTING MONITOR WELL
⊕	SOIL BORING



PROJECT VICINITY MAP



PROJECT LOCATION MAP

DRAWING NUMBER	TITLE
G-101	COVER SHEET
G-102	LANDFILL LOCATON MAP
C-201	EXISTING CONDITIONS
C-202	PRE-CAP GRADING PLAN
C-203	FINAL CAP GRADING PLAN
C-301	PROFILES (1 OF 2)
C-302	PROFILES (2 OF 2)
C-401	DETAILS

NOTE: POINTS ARE IN THE NEW MEXICO CENTRAL STATE PLANE COORDINATE SYSTEM
HORIZONTAL - NORTH AMERICAN DATUM 1983 (NAD 83)
VERTICAL - NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88)

SURVEY CONTROL POINTS:

CX0330 H1V1 NAV88 LAT N323755.90889 LON W1061958.33765 STAB D DESIGNATION: MAR
CX1487 H4V1 NAV88 LAT N32801.72866 LON W1061951.50062 STAB D DESIGNATION: MAR SITE RADIO MAST
CX1489 H4V1 NAV88 LAT N32800.63433 LON W1061953.55476 STAB D DESIGNATION: R 250
CX1488 H4V1 NAV88 LAT N32802.18766 LON W1061952.08039 STAB D DESIGNATION R251

WHITE SANDS MISSLE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

COVER SHEET

ARCADIS

FIGURE
G-101

DB:(S.MEN) LD:(Opt) PIC:(Opt) PM:(DRE) TM:(Opt) LYR:(Opt)ON=*;OFF=REF*
PLOTTED: ---- BY: MEN_SOTHON

LEGEND

- LANDFILL CELL BOUNDARIES
- SITE FEATURES
- BUILDING
- POND/LAGOON
- FENCE
- RAIL ROAD
- PAVED ROAD
- DIRT ROAD

NOTES:
1. BASE MAP PROVIDED BY ZIA AND RECTIFIED TO DECEMBER 2008 SATELLITE IMAGE.
2. SHADED AREAS ARE AREAS OF HISTORICAL LANDFILL CELLS OR TRENCHES IDENTIFIED BY GEOPHYSICAL STUDIES AND CONFIRMED BY REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS.

N

0 350 700 Feet

GRAPHIC SCALE

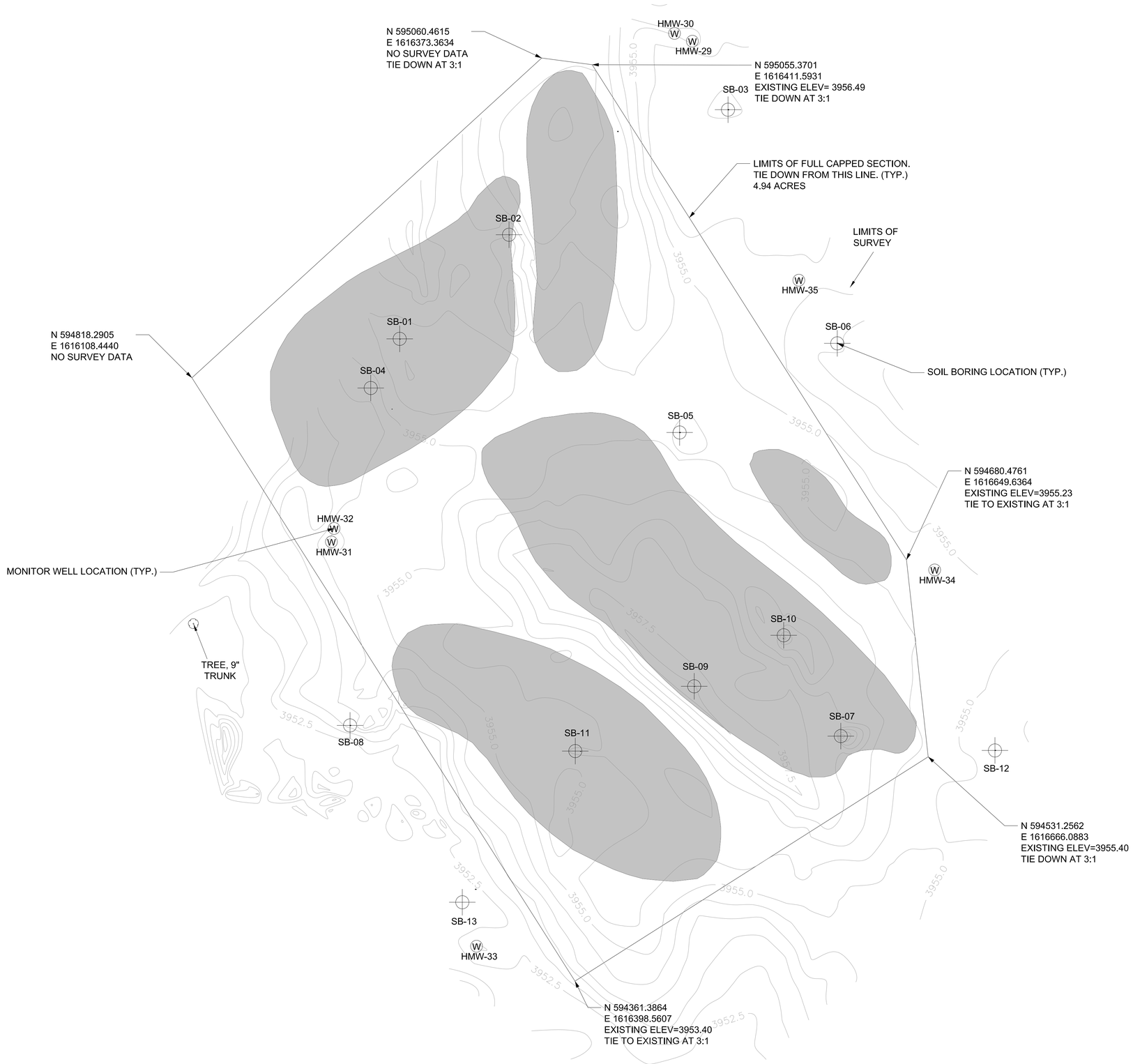
WHITE SANDS MISSILE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

LANDFILL LOCATION MAP

ARCADIS

FIGURE
G-102

I:\WhiteSands\GIS\ArcMap_MXD\HELSTF\2010_Landfill\FigG-102 Landfill Location Map.mxd - 4/26/2011 @ 8:44:50 AM



LEGEND

ELEV	ELEVATION
N	NORTHING
E	EASTING
STA.	STATION
XXXX.S	EXISTING GROUND CONTOUR
XXXX.XX	PROPOSED GROUND CONTOUR
	TIE-DOWN SLOPE CONTOUR
W	EXISTING MONITOR WELL
	SOIL BORING

Note:
Shaded areas are areas of historical landfill cells or trenches identified by geophysical studies and confirmed by review of historical aerial photographs

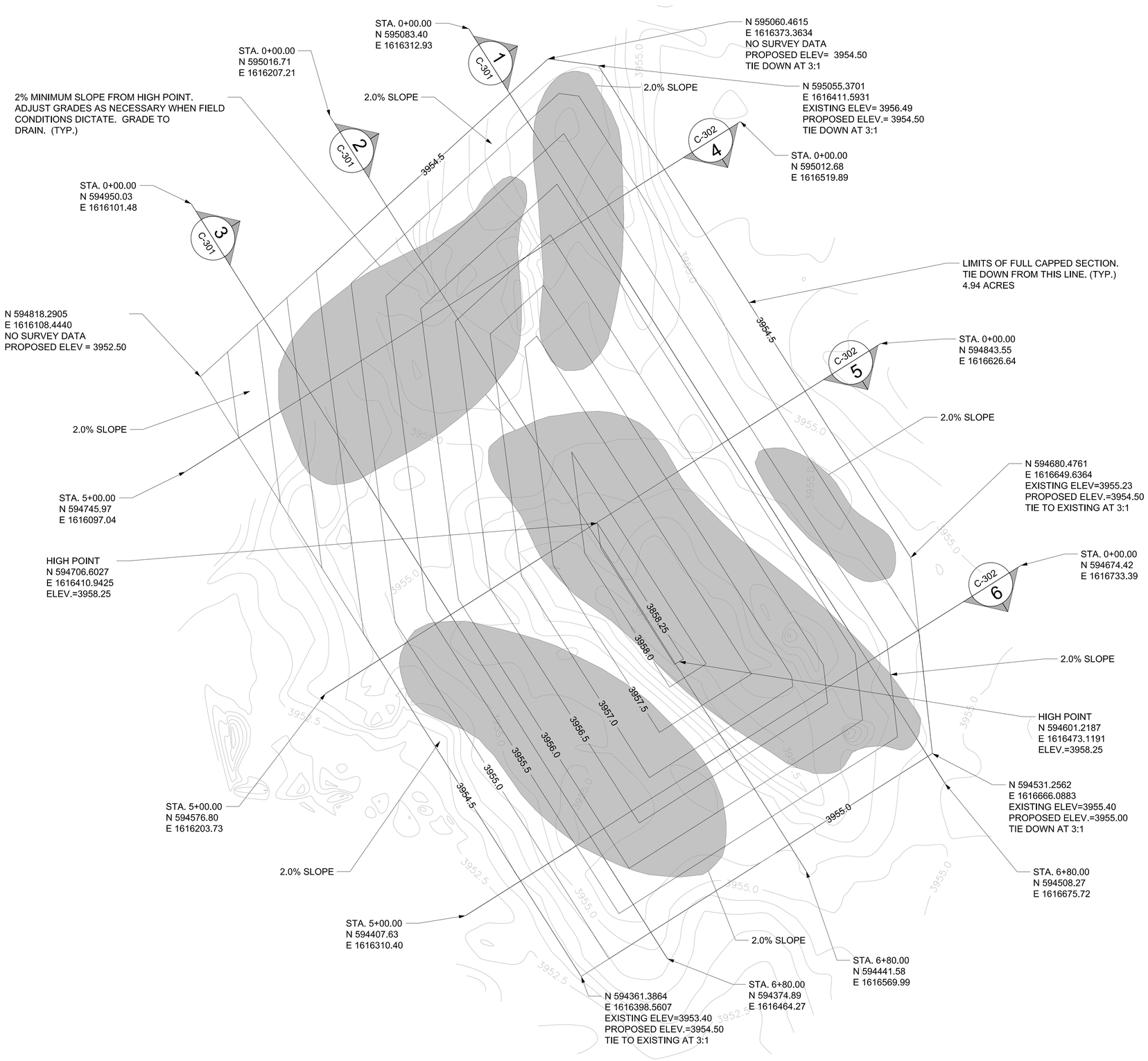
WHITE SANDS MISSLE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

EXISTING CONDITIONS

ARCADIS

FIGURE
C-201

DB:(S. MEN) LD:(Opt) PIC:(Opt) PM:(DRE) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
PLOTTED: ---- BY: MEN, SOTHON



N

0 40′ 80′

SCALE: 1"=40′

1. ALL ELEVATIONS ON THIS PLAN REFLECT FINAL GRADED SURFACES BEFORE CAP AND DO NOT REFLECT FINAL CAP ELEVATIONS. FIELD ADJUSTMENTS MAY BE REQUIRED TO LIMIT FILL REQUIREMENTS AND WILL BE APPROVED BY THE ENGINEER OF RECORD IF DESIGN SLOPE VALUES OF 2% MINIMUM CAN BE MAINTAINED. REFER TO DETAIL SHEET FOR CAP THICKNESS DIMENSIONS.
2. FOR LOW POINTS NOT SHOWN ON THIS PLAN AND ENCOUNTERED IN THE FIELD: FILL LOW POINT TO SURROUNDING GRADES AND SLOPE AT MINIMUM 2% TO DRAIN OFF OF CAP AREA.
3. GRADE TIE DOWN FROM CAP LIMIT LINE TO EXISTING GROUND PER DETAILS.

LEGEND

ELEV	ELEVATION
N	NORTHING
E	EASTING
STA.	STATION
XXXX.S	EXISTING GROUND CONTOUR
XXXX.XX	PROPOSED GROUND CONTOUR
	TIE-DOWN SLOPE CONTOUR

Note:
Shaded areas are areas of historical landfill cells or trenches identified by geophysical studies and confirmed by review of historical aerial photographs

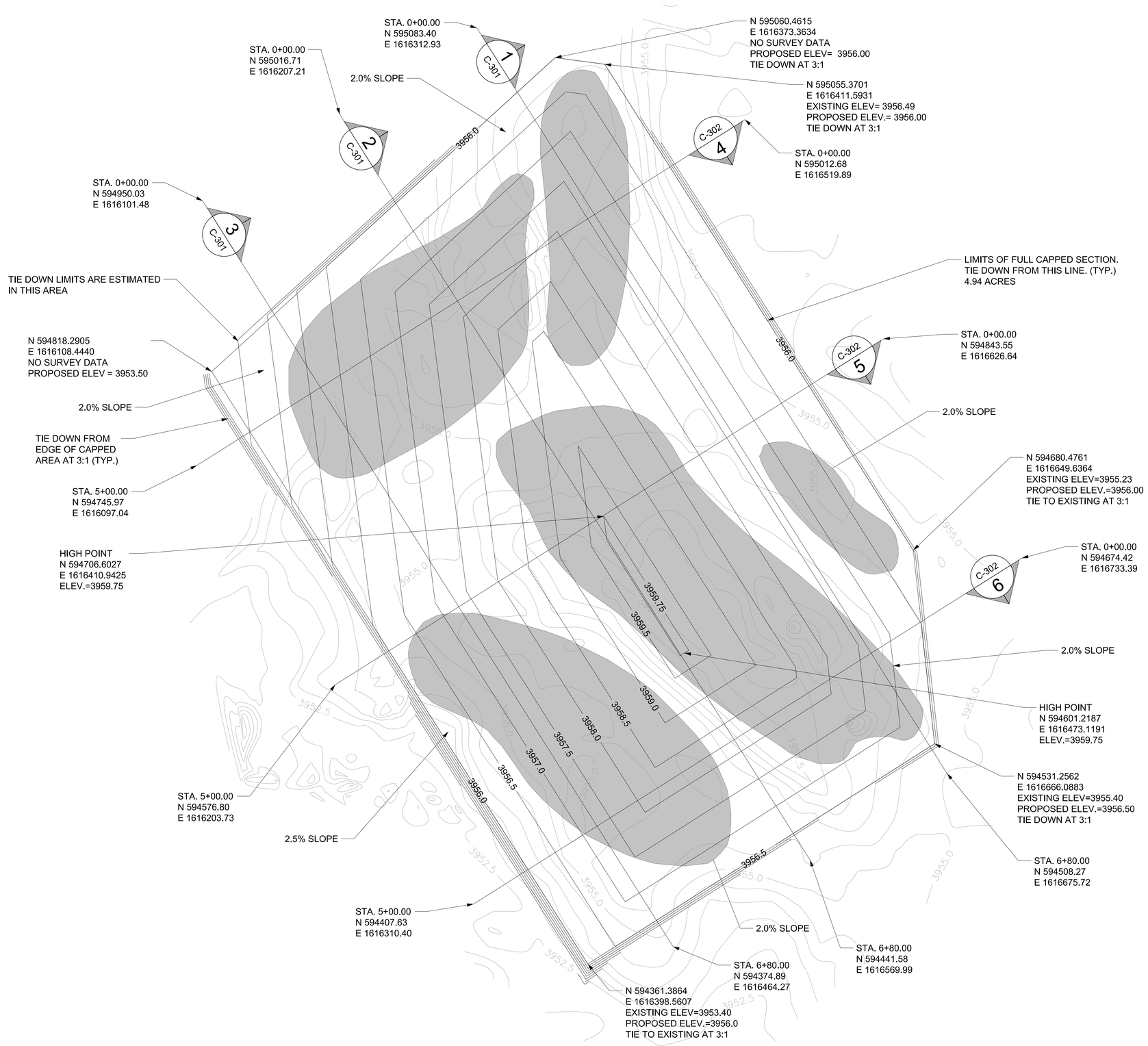
WHITE SANDS MISSLE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

PRE-CAP GRADING PLAN

ARCADIS

FIGURE
C-202

DB:(S. MEN) LD:(Opt) PIC:(Opt) PM:(DRE) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
PLOTTED: ---- BY: MEN, SOTHON



LEGEND

ELEV	ELEVATION
N	NORTHING
E	EASTING
STA.	STATION
XXXX.S	EXISTING GROUND CONTOUR
XXXX.XX	PROPOSED GROUND CONTOUR
	TIE-DOWN SLOPE CONTOUR

Note:
Shaded areas are areas of historical landfill cells or trenches identified by geophysical studies and confirmed by review of historical aerial photographs

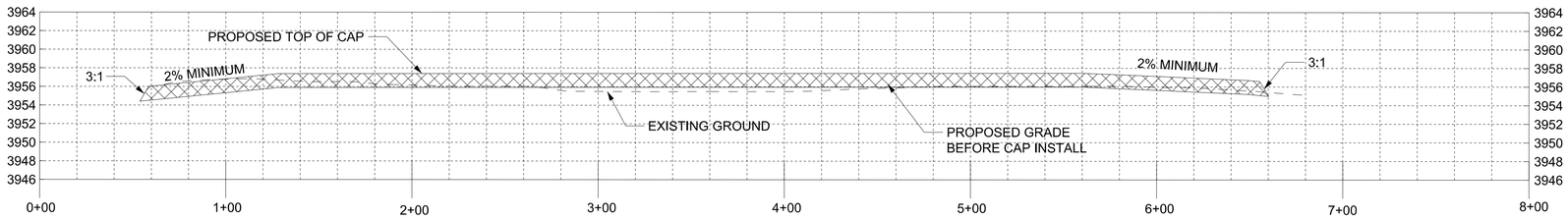
WHITE SANDS MISSLE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

FINAL-CAP GRADING PLAN

ARCADIS

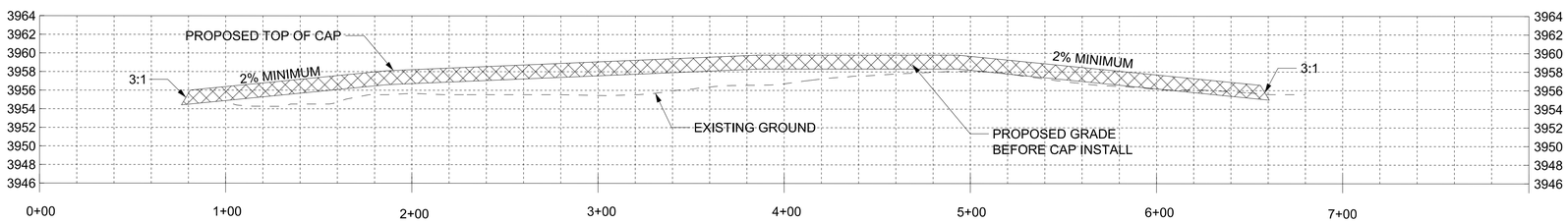
FIGURE
C-203

DB:(S. MEN) LD:(Opt) PIC:(Opt) PM:(DRE) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
PLOTTED: ---- BY: MEN, SOTHON



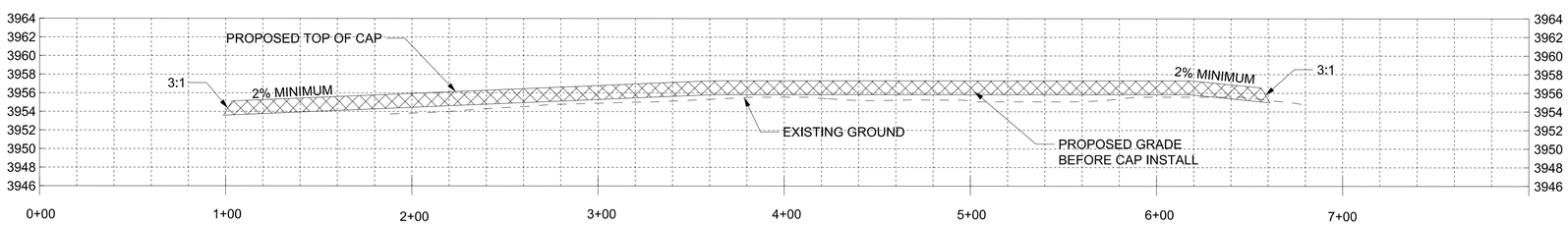
VERTICAL EXAGGERATION =5:1

CROSS SECTION 1



VERTICAL EXAGGERATION =5:1

CROSS SECTION 2



VERTICAL EXAGGERATION =5:1

CROSS SECTION 3

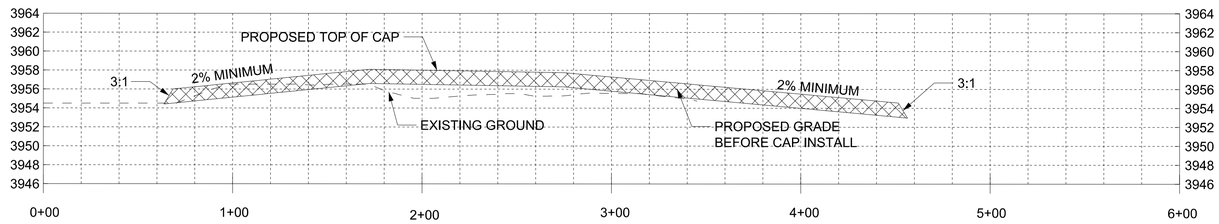
WHITE SANDS MISSLE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

PROFILES (1 OF 2)

ARCADIS

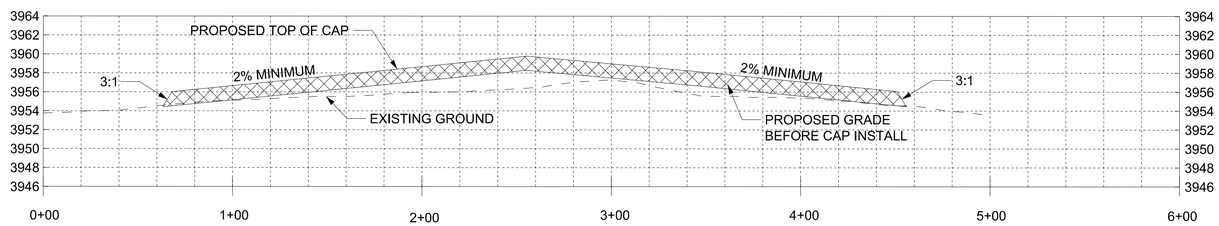
FIGURE
C-301

DB:(S. MEN) LD:(Opt) PIC:(Opt) PM:(DRE) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
PLOTTED: ---- BY: MEN, SOTHON



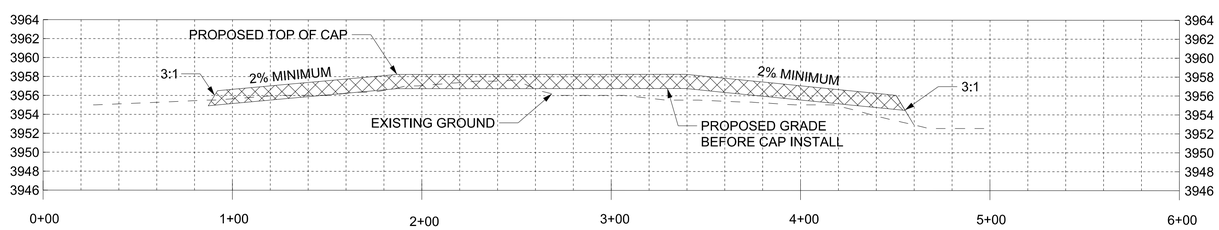
VERTICAL EXAGGERATION =5:1

CROSS SECTION 4



VERTICAL EXAGGERATION =5:1

CROSS SECTION 5



VERTICAL EXAGGERATION =5:1

CROSS SECTION 6

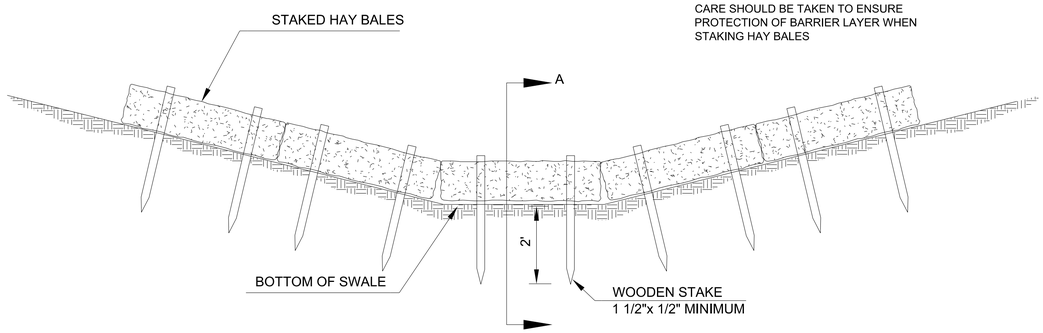
WHITE SANDS MISSLE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

PROFILES (2 OF 2)

ARCADIS

FIGURE
C-302

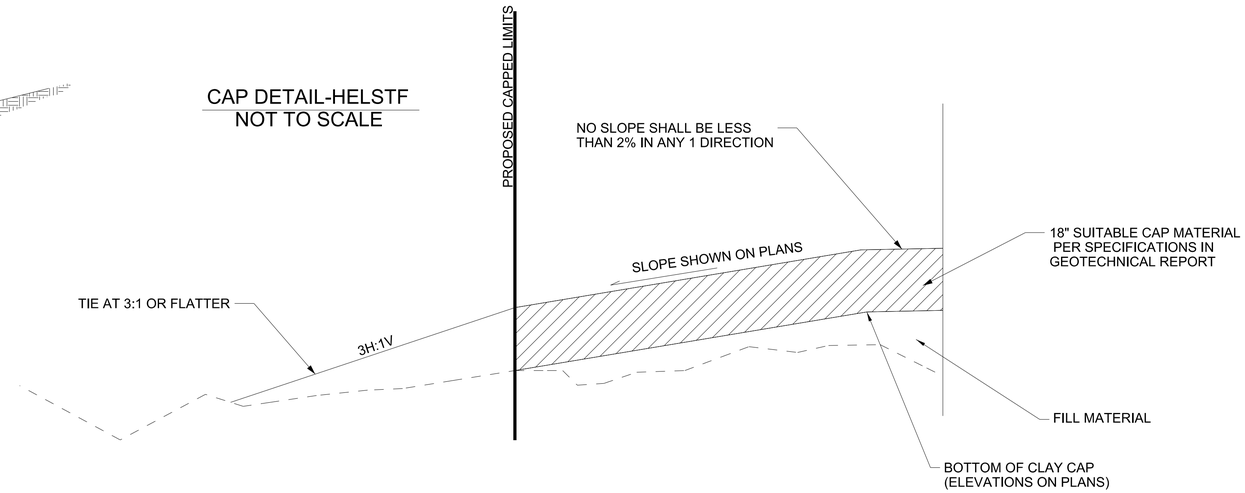
DB:(S. MEN) LD:(Opt) PIC:(Opt) PM:(DRE) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
PLOTTED: ---- BY: MEN, SOTHON



ELEVATION

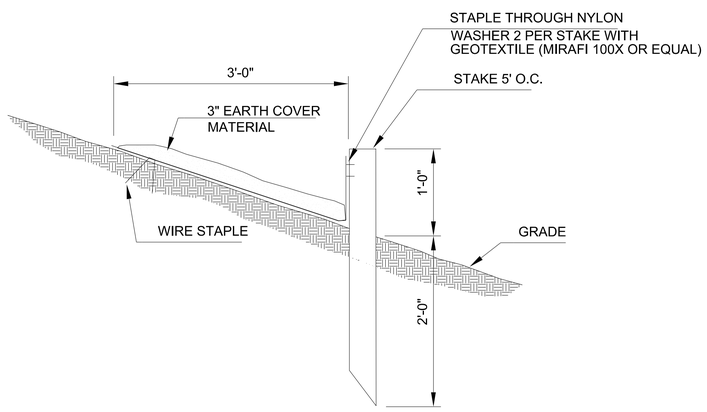
HAYBALE SILTATION CONTROL (IF NECESSARY)

NOT TO SCALE



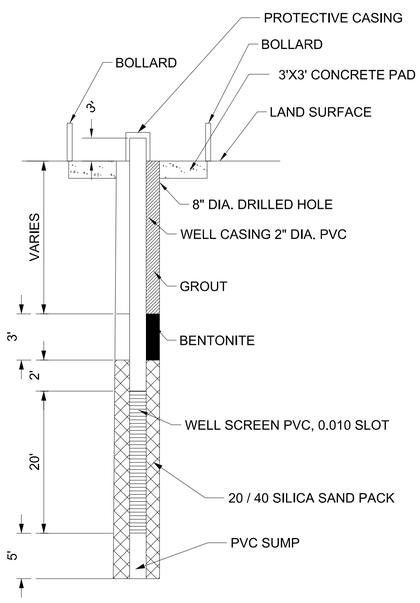
CAP DETAIL-HELSTF

NOT TO SCALE



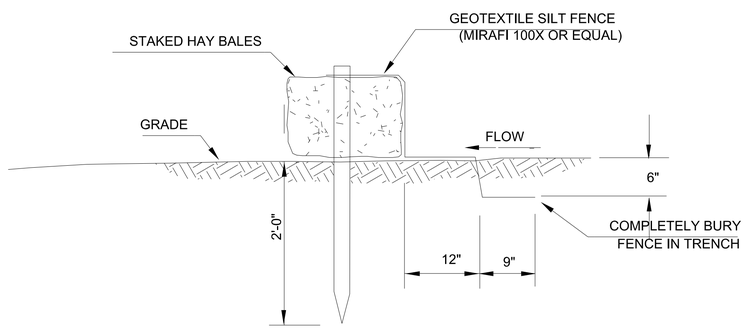
SILTATION FENCE DETAIL (IF NECESSARY)

NOT TO SCALE



TYPICAL NEW MONITOR WELL CONSTRUCTION

NOT TO SCALE



SECTION A-A

NOT TO SCALE

WHITE SANDS MISSLE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

DETAILS

ARCADIS

FIGURE
C-401

DB:(S. MEN) LD:(Opt) PIC:(Opt) PM:(DRE) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
PLOTTED: ---- BY: MEN, SOTHON

Appendix D

Post-Closure Care Plan

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

White Sands Missile Range

Post-Closure Care Plan for the Former High Energy Laser Systems Test Facility (HELSTF) Landfills

SWMUs 38 & 39 (CCWS-75)

May 2011

ARCADIS

Dave Gomes, P.E. (New Mexico)
Senior Engineer

Timothy D. Ratchford, P.G.
Principal Scientist

Laurie W. Rodriguez, P.G.
Project Manager

Post-Closure Care Plan for the Former High Energy Laser Systems Test Facility (HELSTF) Landfills

SWMUs 38 & 39 (CCWS-75)

Prepared for:
U.S. Army, White Sands Missile Range
Directorate of Environment and Safety
White Sands Missile Range, New Mexico

Prepared by:
ARCADIS U.S., Inc.
1717 West 6th Street
Suite 210
Austin
Texas 78703
Tel 512 451 1188
Fax 512 451 2930

Our Ref.:
GP08WSMR_0C75_F_1_05-13-2011

Date:
May 2011

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.

Table of Contents

1. Introduction 1

2. Background Information 2

3. Cap Inspections and Maintenance 2

4. Long-Term Groundwater Monitoring 3

4.1 Monitoring Well Selection 3

4.2 Tiered Sampling Approach 4

4.3 Sampling Procedures 5

4.4 Fluid Level Measurement 6

4.5 Well Purging 8

4.5.1 Micropurge Technique 8

4.5.2 Traditional Well Purging Technique 10

4.6 Sample Collection and Field Measurements 12

4.6.1 Field Parameter Data 12

4.6.1.1 pH Meter Calibration 12

4.6.1.2 Specific Conductance Meter Calibration 14

4.6.1.3 Flow-Through Cell Calibration 15

4.6.1.4 Turbidimeter Calibration 15

4.6.2 Groundwater Sample Collection 16

4.6.2.1 Micropurge Sample Collection Technique 17

4.6.2.2 Traditional Sample Collection Technique 17

4.7 Collection of Quality Assurance/Quality Control (QA/QC) Samples 18

5. Sample Custody Procedures 19

6. Analytical Procedures 20

7. Data Reduction, Validation, and Reporting 21

7.1 Validation of Field Data Package 22

7.2 Validation of Analytical Data Package 22

7.3 Recordkeeping and Reporting 26

8. Reporting **27**

9. References **28**

Tables

1 Well Construction Information

2 Parameter Sets and Reportable Constituent Lists

3 Groundwater Analytical Program Parameter List, Laboratory Methods, and Sample Collection and Preservation Requirements

Figures

1 Site Location Map

2 Landfill Location Map

3 Monitoring Well Location Map

4 Monitoring Well Construction Diagram

Attachments

A Typical Forms

B Graphs Supporting Rationale for Tiered Sampling Approach

1. Introduction

This document presents the Post-Closure Care Plan for the former High Energy Laser Systems Test Facility (HELSTF) Construction Landfills, Solid Waste Management Units (SWMUs) 38 and 39 at White Sands Missile Range (WSMR) located in Otero County, New Mexico (Figures 1 and 2). The Post-Closure Care Plan details inspection and maintenance of the cap and long-term groundwater monitoring to be conducted during the 25-year post-closure period that begins after construction of the cap is completed.

The following tasks will be performed during the post-closure care period:

- Maintain this Post-Closure Care Plan at the WSMR facility;
- Perform cap inspections, and identify the need for and implement repairs;
- Perform long-term groundwater monitoring and evaluate groundwater monitoring data; and
- Prepare reports to document the post-closure care activities.

In addition to this introduction, the Post-Closure Care Plan includes the following sections:

- Background Information;
- Cap Inspections and Maintenance;
- Groundwater Monitoring Program;
- Sampling Procedures;
- Sample Custody Procedures;
- Analytical Procedures;
- Data Reduction, Validation, and Reporting;

- Schedule of Compliance; and
- Supportive Tables, Figures, and Attachments.

The overall purpose of this Post-Closure Care Plan is to describe the post-closure care activities in a single document that will provide sufficient detail for planning and execution of field activities and laboratory analyses.

2. Background Information

The former HELSTF Construction Landfills are located within the WSMR at the intersection of Range Road 6 and Range Road 7 in Otero County, New Mexico (Figure 2). The former landfills consist of an indeterminate number of inactive cells, SWMU-38 and SWMU-39. In areal extent, SWMUs 38 and 39 are approximately 6.0 acres. A more detailed description of the Landfills and their operational history is provided in the Closure Plan.

Table 1 provides well construction information for those wells that currently comprise the groundwater monitoring network at the former HELSTF Construction Landfills. Table 2 summarizes the proposed analytical testing for the Long-Term Groundwater Monitoring Program. The Tier 1 Parameter Set shown on Table 2 is the primary parameter set that will be analyzed on a routine basis. If the constituent from the Tier 1 Parameter Set is detected at concentrations above the established threshold limit, as described in Section 4.2, samples will be analyzed for the Tier 2 Parameter Set. Sample collection and analytical methods are summarized on Table 3.

3. Cap Inspections and Maintenance

The cap will be inspected semi-annually by trained personnel. The personnel will examine the cover to ensure that there are no signs of human or animal disturbance, that no solid waste has been uncovered and that water is not ponding over the cap. A Cap Inspection form (Attachment A-1) will be used to document the inspector's observations.

At a minimum, the following tasks will be completed during the semi-annual cap inspection:

1. Verify that the gate is closed and locked;

2. Ensure that signage remains intact and legible;

3. Confirm that the monitoring wells are locked and well covers are tight; and

4. Inspect the landfill cap for traffic, vegetation, erosion, animal activity, settlement and waste protrusion.

Repairs of the soil cover will be performed if significant erosion is noted, landfilled materials become exposed, or water begins ponding or collecting over the cells. Repairs will be made within 180 days following the inspection.

4. Long-Term Groundwater Monitoring

Long-term groundwater monitoring will consist of annual groundwater monitoring and sampling from four monitoring wells. The sampling and reporting details are described below.

4.1 Monitoring Well Selection

During the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), a number of monitoring wells were installed and sampled in the vicinity of the former landfills. There are currently six monitoring wells completed in the Regional Aquifer (HMW-08, HMW-29, HMW-30, HMW-32, HMW-34, HMW-35, and HMW-59) in or immediately around SWMUs 38 and 39 (Figure 3). Of these wells, HMW-08 (up-gradient well), HMW-35 (down-gradient well), and HMW-59 (down-gradient well) will be included in the post-closure groundwater monitoring program. A new monitor well will be installed approximately 250 feet northeast of HMW-59 and will serve as an additional down-gradient well to be included in the Post-Closure Care groundwater monitoring program. The well will be installed according to the requirements described in Appendix 6.2 of the permit (RCRA Permit No. NM2750211235). A diagram showing typical monitoring well construction is provided as Figure 4. The other regional monitoring wells (HMW-29, HMW-30, HMW-32 and HMW-34) and one well (HMW-31) completed in the vadose zone will be plugged prior to construction of the cover. Another vadose zone well, HMW-33, will be retained to potentially monitor groundwater conditions at the HELSTF Laser Systems Test Center Wastewater Discharge Point (SWMU 144), located west of the former HELSTF Landfills. A map showing well locations at the landfills is provided as Figure 3.

4.2 Tiered Sampling Approach

As described in the Closure Plan, findings from the RFI indicate that no significant release of constituents has occurred from SWMUs 38 and 39. Groundwater data collected from the site show that no constituents associated with these SWMUs have been detected in groundwater at concentrations above regulatory standards. Based on these findings, the Long-Term Groundwater Monitoring Program described in this Work Plan consists of a tiered approach, whereby the first tier sampling would include testing for an indicator parameter (Total Dissolved Solids [TDS]) only. In the event that TDS exceeds the defined threshold value, a second tier of analysis would be performed and would include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), the RCRA 8 metals and a list of geochemical parameters, as described in Table 2. The rationale for this approach is described below.

The pervasive geochemistry of all groundwater beneath the HELSTF is dominated by sulfate as the major anionic species. The release of fluids from leaking surface facilities (such as the leaking water lines and sanitary sewer lines), as described in the Revised Phase III RFI Report [ARCADIS, 2010]), appear to contribute elevated levels of chloride, which is not an unusual circumstance associated with these conditions. Generally, an increase of chloride by approximately five fold causes an approximate two fold increase in dissolved sulfate concentrations. This increase in sulfate concentration is due to dissolution and is not intrinsic to the fluids associated with the elevated chlorides. This is a process well documented in the literature (Tanji, 1969).

The relationship between the concentration of dissolved ions and Contaminants of Potential Concern (COPCs) associated with the landfills is of key importance with regards to monitoring for the potential impact of a release from the landfills. Based on a detailed evaluation of the groundwater data from areas within the HELSTF where regional groundwater is impacted with COPCs, there is a very distinctive relationship between TDS, chloride and sulfate concentrations and the primary groundwater contaminants. The relationships between TDS, chloride and sulfate and trichloroethene (TCE) are illustrated on Attachments B-1 through B-3. The relationship between TDS, chloride and sulfate and chromium is illustrated on Attachments B-4 through B-6.

These figures clearly demonstrate that surface releases that reach the regional groundwater system cause a direct increase in TDS and chloride concentrations and an indirect increase (due to solubilization discussed above) of sulfate.

In the case of both TCE and chromium, the correlations are very strong and show that elevated TCE and chromium concentrations are always accompanied by elevated TDS, chloride and sulfate concentrations. However, there can be instances of increased TDS, chloride, or sulfate without an increase of TCE or chromium. Below a TDS concentration of approximately 13,500 milligrams per liter (mg/L), and respective chloride and sulfate concentrations of 2,000 and 3,400 mg/L, there are no historical detections of TCE or chromium.

Based upon these relationships, it is reasonable to use TDS as an indicator parameter to monitoring for potential impact of surface releases in the Regional Aquifer beneath the former HELSTF Landfills. There may be some false positives (i.e. instances where elevated TDS is not associated with the presence of COPCs). However the historical data from the HELSTF Area impacted with COPCs suggests that contamination is always accompanied by an elevated TDS value greater than 13,500 mg/L; and therefore this TDS value is a reliable indicator of contamination.

Based on the rationale described above, during each annual groundwater monitoring event, samples will initially be tested for TDS. If TDS exceeds 13,500 mg/L, a Tier 2 analysis will be triggered and the samples will be tested for VOCs, SVOCs, the RCRA 8 metals and the major ions, as summarized on Table 2. The testing will be conducted in such a way that the Tier 2 analysis will be done within the appropriate holding times, as required by the analytical methods described in Section 6 of this Work Plan. If the holding times of the initial samples have expired, then the wells will be re-sampled and the resulting sample analyzed for the Tier 2 parameters.

4.3 Sampling Procedures

This section outlines specific procedures to be followed during long-term groundwater monitoring at the HELSTF Construction Landfills. These procedures have been developed to obtain representative groundwater samples from the site and to verify the integrity of the samples collected. During each annual groundwater sampling event, fluid level measurements, total depth measurements, and groundwater field measurements (pH, specific conductance, temperature, and turbidity) shall be collected from each monitor well sampled. Calibration of field equipment, such as pH and specific conductance meters, and turbidimeters, shall be performed in accordance with the manufacturer's recommended procedures and the general procedures described in this section.

Well sampling procedures shall be accomplished at each well in accordance with the NMED's Position Paper entitled *Use of Low-Flow and Other Non-Traditional Sampling Techniques for RCRA* (NMED, 2001). In general, the wells will be purged and sampled using low-flow sampling techniques. The micropurge technique involves monitoring selected groundwater quality parameters as measured by a flow-through cell until they stabilize (indicating the presence of groundwater from the surrounding formation) prior to collecting samples. As described in the Position Paper, alternative purge and sample techniques may be employed if the wells do not produce adequate yield to support low-flow sampling.

All field information obtained during each sampling event shall be recorded in a field logbook, water sampling logs, and/or entered into an electronic data storage device for subsequent retrieval of the data. The following information shall be documented for each well: the well identification number, total well depth, elevation of top of casing, water level, water color, well evacuation procedures and equipment, date, time, sample identification numbers, field measurements (pH, specific conductance, etc.) and sample collection methods, name of collector, field observations, calculations of standing water volume in the well, and total well volume evacuated. An example of a typical water sampling log is presented as Form A-2 of Attachment A. Field instrument calibration will be recorded on a field instrument calibration log (Form A-3 of Attachment A). The field information shall be retained on site during the life of the monitoring program.

4.4 Fluid Level Measurement

The depth to water and total depth for each well shall be measured on the same day and prior to purging any well. Static water levels shall be measured and recorded in all wells prior to initiating any sampling activities.

Upon arrival at the well site, the well cap shall be removed and the water level allowed to stabilize under atmospheric pressure. Plastic sheeting, or an equivalent protective measure, shall be placed around the well to protect the cleaned sampling equipment from the surrounding environment. The Monitor Well Inspection Checklist presented as Form A-4 in Attachment A must be completed for all monitor wells sampled during each scheduled sampling event. Any structural damage to the well must be noted and repairs effected within the next reporting period.

The water-level measuring device shall be slowly lowered down the center of the casing when obtaining the depth of water from the top of casing reading. The distance

from the top of the well casing to the water surface within any given well shall be measured to the nearest 0.01 foot by employing an appropriate measuring device (typically an electronic sensor). Prior to lowering the water-level measuring device into a given well, the device shall be rinsed with a laboratory-grade, phosphate-free detergent (or other suitable cleaning agent demonstrated to be environmentally sound), then rinsed with laboratory-grade, purified water and dried with a clean cloth. This measurement, including the measurement technique, shall be recorded in the bound field logbook, water sampling log, and/or electronic data device. Groundwater elevations relative to mean sea level shall subsequently be determined by subtracting the depth to water distance from the top of the casing mean sea level elevation.

Following the measurement of the depth of water, all wells shall be checked for light non-aqueous phase liquids (LNAPLs). This shall be accomplished using one or more of the following techniques:

- To check for the presence of floating immiscible fluids (LNAPL), an electronic hydrocarbon probe shall be lowered to the top of the fluid column in the well, then slowly inserted into the liquids within the well. If a floating immiscible fluid is present in the well and the electronic hydrocarbon probe can detect this fluid, the thickness of the floating immiscible layer shall be recorded.

- Alternate methods for the detection of potential floating immiscible fluids include the use of weighted string or the use of a bailer. A weighted string or yarn shall be immersed into the upper portion of the fluids within a well. The string or yarn shall be retracted from the well and visually inspected for the presence of immiscible fluids.

- A dedicated Teflon® or disposable bailer may also be used to detect the presence of immiscible fluids by lowering the bailer into the well for collection of the upper portion of the fluid column. This fluid shall be extracted and visually observed for floating immiscible fluids which can then be measured directly.

The information obtained from the above procedures shall be recorded in the bound field logbook, water sampling log, and/or electronic data device. If dedicated or new/disposable equipment is not used, any equipment entering a well shall be cleaned with a laboratory-grade, phosphate-free detergent and rinsed with purified water before utilization.

Field observations will be recorded in a bound field logbook, water sampling log, and/or electronic data storage device. Total depth measurements for wells with in-well dedicated equipment shall be performed during each monitoring event. Comparison of historical total depth measurements to the current total depth of the well shall determine if sediment has accumulated at the bottom of the well. If 10 percent of the screened interval is blocked by sediments, the well shall be redeveloped prior to the next required sampling event.

4.5 Well Purging

Well purging may be accomplished using one of two methods: traditional or micropurge techniques. The preferred method is micropurge or low-flow purge and sampling. However, alternate well purging techniques will be employed if a well is purged dry or does not provide sufficient yield for micropurging. Details on the two techniques are presented below.

4.5.1 Micropurge Technique

Micropurge (also referred to as “low-flow” purging) consists of purging a monitor well at a very low discharge rate with a submersible pump located within the screened interval of the well. The method is based on the theory that groundwater flow-through the screen interval is horizontal, laminar, and representative of groundwater from the surrounding permeable zone being monitored. Additionally, the theory suggests that there is little interaction between the water flowing through the screened interval and the stagnant water present in the well casing above the screen.

The low-flow purging rates, generally 0.1 to 0.5 liter per minute (L/min), shall be lower than the recharge rate of the well. This prevents the mixing of the stagnant water in the well casing above the screen with formation water within the screened interval. The low-flow purging consists of evacuating the standing water in the pump and in the pump discharge line, rather than a predetermined number of well volumes.

After measuring the static water level, the volume required to purge the standing water from the pump and pump discharge line shall be calculated using the following formula:

$$RPV = (DTTOP - DTW)(TV) + (BV)$$

where:

RPV = required purge volume (cubic foot [ft^3]);

DTTOP = depth to top of pump (ft);

DTW = depth to water in well (ft);

TV = tubing volume (ft^3/ft); and

BV = bladder or pump volume (ft^3).

All depths shall be measured from the top of casing. The pump volume shall be obtained from the manufacturer and the tubing volume shall be calculated from the following formula:

$TV = Pi\ r^2\ h$

where:

TV = inner diameter tubing volume (ft^3/ft);

Pi = 3.14;

r = internal tubing radius (in ft); and

h = height of water column inside tubing (ft).

To convert the RPV and TV to gallons, the following formulas shall be used:

- Bladder or pump volume (in gallons) = (BV; 7.48 gallons per cubic foot [gal/ft3]); and
- Tubing volume (in gallons per foot) = (TV; 7.48 gal/ft3).

To convert the gallons to liters, multiply by 3.78 liters per gallon.

With the water-level meter positioned at the top of the water column, turn on the pump and adjust the discharge setting so that the flow rate is between 0.1 and 0.5 L/min. The depth to water shall be checked continuously during the purging process. The flow rate shall be adjusted, if necessary, so that the water level drawdown is minimal. If

significant drawdown occurs with respect to the depth of water prior to beginning purge activities, low-flow sampling procedures shall be abandoned and the well purged according to traditional well purging technique (Section 4.4.2).

A flow-through cell (YSI 600XL Multiprobe Transmitter or equivalent) attached to the pump discharge line shall be used to record measurements of the following groundwater field parameters: temperature, pH and specific conductivity. These data shall be collected and recorded at periodic intervals (typically 3 or 5 minutes) prior to sampling and recorded on a Field Parameters form (Form A-5 of Attachment A). In wells where the required purge volumes are low, it might be difficult to collect the replicate field parameter measurements before the required purge volume has been discharged. In such cases, an attempt shall be made to complete as many replicate field parameter measurements as possible.

Purging shall continue until the field parameters stabilize to within 10 percent of the mean of three consecutive meter readings taken at least 3 minutes apart or three well volumes have been removed, regardless of field parameter stabilization. If the recharge rate of the well is incapable of sustaining a purge rate of 0.1 L/min and the well is purged dry, then traditional sampling techniques shall be employed. The well shall be allowed to recharge to a level that facilitates the collection of the required sample volume. Purged groundwater shall be managed in accordance with regulatory requirements.

4.5.2 Traditional Well Purging Technique

Three casing volumes of water shall be removed from each well prior to sampling, unless the well recharges slowly and will not yield three volumes of water in a reasonable amount of time (4 to 6 hours). Wells that recharge slowly shall be purged of at least one full static water well volume. This will ensure that recharge to the well will not be excessively agitated, potentially resulting in an accelerated loss of VOCs, if present. The wells shall be sampled immediately following purging and/or when sufficient water for sampling has recharged into the well.

The well purging process shall be performed using a bailer, a peristaltic pump, or a submersible centrifugal pump. The bailers used for purging and/or sampling of the wells may be disposable or non-disposable type with materials of construction including polyvinyl chloride (PVC), high-density polyethylene, constructed and/or coated with Teflon®, or stainless steel. If a non-disposable bailer is used and a dedicated bailer is not available, the non-disposable bailer shall be decontaminated

using a phosphate-free detergent and rinsed with deionized water before utilization in a given well.

The peristaltic pump requires flexible tubing in the pump head in order for the pump to work. Tygon tubing is appropriate for this application and shall be replaced prior to initiating sampling activities at a particular well. Suction tubing and discharge hose materials of construction may be clear PVC, Teflon®, or other materials deemed appropriate. Clean, previously unused tubing shall be used for each well and disposed of after sample collection.

The materials of construction for submersible centrifugal pumps shall be stainless steel with Teflon® internals. The pump shall be thoroughly cleaned prior to use and decontaminated with a phosphate-free detergent and rinsed with deionized water before utilization in a given well. Discharge hose materials may be clear PVC, Teflon®, or other materials deemed appropriate. A clean, previously unused piece of tubing shall be used for each well and disposed after sample collection.

The volume of water in each well shall be determined by multiplying the height of the static water column in the well (i.e., total depth of the well minus the depth to water measured from top of casing) by the appropriate factor listed below:

For 2-inch diameter wells, multiply column of water height by 0.163 gallon per foot; and

For 4-inch diameter wells, multiply column of water height by 0.653 gallon per foot.

The volume of water purged from a given well shall be determined by directly measuring the amount of purged water discharged into a container of known volume or by measuring the time of pumping with a pump discharging at a known rate. The flow rate of a pump shall be determined by measuring the time required to fill a container of known volume. The time necessary to pump the required amount of water from a given well with a pump shall be calculated by the following formula:

$$T = \frac{V}{R}$$

where:

T = Time (minutes)

V = Volume of water to be purged (gallons)

R = Rate of flow (gallons per minute)

The volume of well water purged from each well shall be recorded in the bound field logbook, water sampling log, and/or electronic data storage device. Purged groundwater shall be managed in accordance with regulatory requirements.

4.6 Sample Collection and Field Measurements

Once the well has been purged, groundwater samples shall be collected for analysis. The sample collection efforts are dependent upon the purge technique and shall continue after the appropriate well volumes have been removed, allowance for recharge, if necessary, or the parameter readings from the flow-through cell stabilize.

4.6.1 Field Parameter Data

Measurement of pH, temperature, specific conductance, and turbidity shall be performed in the field before and/or after sample collection for all wells sampled during a particular sampling episode. For wells that are micropurged, the field parameters will be measured and recorded during the purging activities. For wells that are purged and sampled using traditional methods, the groundwater samples collected for field analyses shall be placed in disposable cups or pre-cleaned containers. The calibration of field instruments and measurement of pH, specific conductance, and turbidity shall be performed as described in the following sections. The Field Parameters form (Attachment A-5) shall be utilized to record field parameter data.

4.6.1.1 pH Meter Calibration

The pH meter shall be calibrated in accordance with the manufacturer's recommended procedures and/or the general procedures listed in this section.

The pH of groundwater in the field shall be measured by using a portable pH meter that employs a combination electrode. Prior to initiating a sampling event, the electrode shall be inspected to ensure that the probe is clean, intact, and filled with the appropriate volume of electrolyte solution. The pH meter shall be calibrated at the beginning of each day. Three pH buffers will be utilized for calibration and verification. The instrument calibration will be verified using one buffer solution at midday and at the end of each sampling day. If the buffer pH is measured at >0.2 standard unit (s.u.)

different than the true value, the instrument will be recalibrated and previous measurements verified. The pH meter shall be calibrated with pH buffers within ranges historically measured across the site. Only two calibration points shall be used. A third buffer will be used to verify the calibration.

In general, the procedures described below shall be followed for calibration and field measurement of pH and temperature.

- To calibrate the instrument for pH, place the probe in the 7.0 s.u. buffer solution;
- Stir buffer solution slightly by moving the probe, keeping probe away from sides and bottom of container, in a circular motion until reading remains constant and equilibration to solution temperature occurs;
- Adjust reading to 7.0 s.u.;
- Remove the probe from the 7.0 s.u. buffer solution and rinse with deionized water. Place the probe in either the 4.0 s.u. buffer solution or the 10.0 s.u. buffer solution, depending on the pH range required for measurement. The instrument shall be adjusted to read approximately 4.0 or 10.0 s.u., to ±0.1 of the true value of buffer solution, as appropriate. Remove the probe and rinse with deionized water;
- Verify calibration by placing the probe into the 4.0 or 10.0 s.u. buffer solution, whichever was not used as the second point of calibration. Record the value. If the value is >0.2 s.u. different than the true value, corrective action (instrument recalibration or maintenance) must be performed;
- Rinse pH probe with deionized water after removal from buffer solution;
- Once calibrated, place the probe in the sample and read and record the pH and temperature of the sample after reading is stable; and
- Finally, rinse the pH probe with deionized water prior to using the device again. Store in pH 7.0 s.u. buffer solution between measurements or in accordance with manufacturer's directions.

The temperature of the sample, calibration of the pH meter, and the pH measurement of the sample shall be recorded in the field logbook, water sampling log, field instrument calibration log, and/or electronic data storage device.

4.6.1.2 Specific Conductance Meter Calibration

The specific conductance meter shall be calibrated in accordance with the manufacturer's recommended procedures and the guidelines listed below.

A flow-through cell/multiprobe transmitter or portable meter shall be utilized in the field to measure specific conductance. Upon arrival at the site, the instrument shall be inspected for possible damage that might have occurred during transportation. The calibration and measurement of specific conductance must be performed as follows:

- Rinse the conductivity probe with laboratory-grade water or the standard calibration solution and discard rinsate;
- Immerse the conductivity probe in the standard calibration solution of similar conductance to expected field samples. Gently shake the probe to dislodge air bubbles;
- Set the instrument to correctly read the true value of the specific conductance standard;
- After calibration, remove the probe and thoroughly rinse with deionized water;
- Calibration will be verified utilizing a second standard; and
- Immerse the conductivity probe into the sample to be measured and read the value directly from the instrument. Rinse the probe with deionized water between measurements.

The specific conductance meter shall also be calibrated at the beginning of each sampling day. Calibration verification checks shall be recorded at midday and at the end of each sampling day. The specific conductance instrument shall be calibrated with a standard solution in the same order of magnitude as the specific conductance expected to be observed in site samples. Historical data should be utilized to determine appropriate calibration solutions. All field data shall be recorded in a field logbook,

water sampling log, field instrument calibration log, and/or electronic data storage device.

4.6.1.3 Flow-Through Cell Calibration

The flow-through cell/multiprobe transmitter is pre-calibrated by the equipment provider. Field calibration checks of the flow-through cell/multiprobe transmitter shall be performed at the beginning of each sampling day. Appropriate calibration verification standards will be utilized to verify continuing calibration of the flow-through cell.

4.6.1.4 Turbidimeter Calibration

A nephelometer/turbidimeter is used to determine the turbidity of liquids relative to an established scale of light absorption at a specific wavelength. Results are reported in nephelometric turbidity units. The instrument will be operated, maintained, and calibrated in accordance with the manufacturer's recommendations.

Calibration and Operation:

1. Rinse the sample cell three times with organic-free or deionized water;

2. Fill the cell to the fill line with organic-free or deionized water and then cap the cell;

3. Use a non-abrasive lint-free paper or cloth (preferably lens paper) to wipe off excess water and streaks;

4. Open the cover and insert the cell (arrow to the front) into the unit and close the cover;

5. Adjust the reading to zero; and

6. Using commercially available turbidity standards, repeat Steps 3, 4, and 5 to calibrate the instrument in accordance with manufacturer's directions. Record all findings (note anomalies).

Procedures:

1. Collect a sample and fill the cell to the fill line and replace the cap on the cell;

2. Wipe off excess water and streaks with non-abrasive lint-free paper or cloth (lens paper);

3. Place the cell in chamber and close the cover;

4. Press “READ”. Record the reading;

5. Rinse the cell with organic-free or analyte-free water; and

6. For the next sample, repeat Steps 1 through 5.

Operational Check:

1. Calibration will be verified at midday and at the completion of sampling for the day.

4.6.2 Groundwater Sample Collection

Samples shall be collected and containerized according to the volatility of the target analytes. Samples shall be collected in the following order:

1. VOCs;

2. SVOCs;

3. Metals;

4. Major water quality cations and anions; and

5. Miscellaneous.

Note that for any sampling event, all or only a subset of the parameters listed above may be analyzed. As such, the above order of parameter collection shall be followed, as applicable, during a given sampling event. Sample collection, preservation, and holding time requirements are presented in Table 3. All samples shall be appropriately sealed, labeled, and placed in wet ice within an insulated ice chest for shipping to the laboratory for analysis under chain-of-custody.

4.6.2.1 Micropurge Sample Collection Technique

Samples obtained utilizing low-flow or modified low-flow techniques shall be collected after the required purge volume has been removed or field parameters have stabilized. A flow rate which is less than or equal to the purge rate (0.1 L/min to 0.5 L/min) shall be used to collect the samples. Groundwater samples shall be collected directly from the end of the discharge tube and discharged directly into the sample bottles. In order to minimize turbulence, the groundwater shall be allowed to gently flow down the inside of the sample bottle.

4.6.2.2 Traditional Sample Collection Technique

Upon completion of traditional well purging activities, groundwater samples for laboratory analysis shall be collected. Samples collected using a bailer shall be poured directly from the bailer into the sample containers. Care shall be taken in handling the bailer not to introduce any contaminants because multiple trips down the well may be required to fill all the sample containers. Upon filling all sample containers, the non-disposable bailer shall be thoroughly decontaminated, wrapped in a protective covering, and stored, as appropriate. Where disposable bailers are utilized, the bailer shall be placed into a container for later management and disposal, as appropriate.

Peristaltic pumps will not be used for the collection of VOCs, SVOCs, or samples where the pulsating action may cause problems with sample results, such as dissolved gases, unless the sampling is conducted using low-flow procedures. If low-flow procedures are not used, these samples shall be collected by another means, typically a bailer. However, peristaltic pumps may be used for the collection of metals, major cations and anions, and some biogeochemistry parameters.

When a submersible pump is used, the flow during sample collection shall be regulated to between 0.1 L/min and 0.5 L/min, similar to that required for the micropurge technique. Groundwater samples shall be collected directly from the end of the discharge tube and discharged directly into the sample bottles. In order to minimize turbulence, the groundwater shall be allowed to gently flow down the inside of the sample bottle.

4.7 Collection of Quality Assurance/Quality Control (QA/QC) Samples

QA/QC samples shall be collected during each groundwater sampling event. Field blanks and trip blanks will only be analyzed for VOCs. The QA/QC samples include:

- Equipment rinsate blank;
- Field blank;
- Trip blank; and
- Field duplicate;

Equipment rinsate blanks are collected to evaluate the efficiency of the sample collection equipment cleaning procedures. A rinsate blank is obtained by collecting deionized water which is poured through, across, or over the field sampling apparatus (bailer, pump, tubing, etc.) after completion of decontamination procedures. For example, a bailer used to sample groundwater is cleaned in accordance with procedures listed in Section 4.3, and the bailer is filled with deionized water. This deionized water is then transferred from the bailers to appropriate sample containers for subsequent analysis. The rinsate blanks shall be analyzed for the same parameters requested for the groundwater samples collected using a specific piece of equipment during a given sampling event. Rinsate blanks shall be collected at a frequency of 1 per 20 groundwater samples collected during a given sampling event. A minimum of one rinsate sample shall be collected during each sampling event, regardless of the total number of samples collected.

A field blank is composed of the appropriate containers filled in the field with laboratory-grade, deionized water and preserved in the same manner as the samples. It is analyzed for the same parameters requested for the groundwater samples collected during a given sampling event. Field blanks shall be collected at a frequency of 1 per 20 groundwater samples collected during a given sampling event. A minimum of one field blank per sampling event, regardless of the number of samples collected.

A trip blank is specific to VOC analysis (Method 8260) and is required at the frequency of one per cooler containing field samples for determination of VOCs. Therefore, trip blanks will only be analyzed in the event that a Tier 2 sampling event occurs, as described in Section 4.2. A trip blank consists of vials filled in the laboratory with

laboratory-grade water that travels unopened with the sample bottles and is returned to the laboratory with the field samples.

A field duplicate sample, prepared from the same aliquot as the original sample collected from a particular well, shall be submitted to the laboratory at a frequency of 1 per 20 groundwater samples. Both the field duplicate and the original sample are collected at the same time, in the same type of containers, preserved the same, and analyzed by the same laboratory. Field duplicate samples shall be collected and analyzed for the same parameters as the original sample. A minimum of one field duplicate shall be collected for a given sampling event, regardless of the number of samples collected.

5. Sample Custody Procedures

Samples shall be maintained in the custody of the sampling personnel until shipment or personal delivery of containers to the laboratory or lab courier is performed. Chain-of-custody forms shall be completed at the time of sample collection. For transfer of custody via commercial carrier, the chain-of-custody form shall be signed by the sampling personnel. The signed chain-of-custody form shall be placed in a sealed plastic bag inside the shipment cooler containing the properly labeled groundwater samples. A copy of the chain-of-custody form will be retained with the field records. A signed and dated custody seal shall be placed over the lid of the opening of the sample cooler to monitor if the cooler was opened during shipment prior to receipt by the laboratory. Samples requiring volatile organic analyses shall be grouped in the same cooler if possible to minimize the number of trip blanks for a given day.

If the samples are delivered in person by the sampling personnel or picked up by a laboratory employee, the chain-of-custody form shall be signed by the laboratory representative immediately upon relinquishment of the samples by the sampling personnel. One of the copies shall be retained by the sampling personnel and the remaining copies accompany the samples. The original chain-of-custody form shall be signed and returned by the laboratory with the hard copy analytical report. Forms A-6, A-7, and A-8 of Attachment A present examples of a Sample Bottle Label, Chain-of-Custody Record, and a Chain-of-Custody Seal, respectively, which may be used during sampling. Actual forms used may vary, based upon laboratory or sampling contractor modifications.

6. Analytical Procedures

An independent contract laboratory shall perform all analyses required for the groundwater monitoring program. The laboratory shall be accredited by the National Environmental Laboratory Accreditation Conference (NELAC) and the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) for all required monitoring parameters. Calibrations, instrument performance, and set-up and quality control shall be in accordance with the applicable methods and the Laboratory Quality Assurance Manual (QAM). All parameters performed shall be included in the laboratory's accreditation. All methods are USEPA-approved, as presented in *Test Methods for Evaluating Solid Wastes* (SW-846), *Methods for the Chemical Analysis of Water and Wastes, Standard Methods for the Examination of Water and Wastewater*, or Hach Corporation USEPA-approved methods. Reporting limits shall be in accordance with the applicable method and supported by method detection limit studies performed in accordance with 40 Code of Federal Regulations (CFR) Part 136 and industry standards.

Instances may occur in which interferences associated with a given sample will not permit attainment of the desired detection limits for various parameters due to matrix interferences or high analyte concentrations which require sample dilution.

Analytical reports prepared by the contract laboratory will be defined as a Level II data package and will include the information listed in this section. The Level II data packages will include:

- Fully executed chain-of-custody form;
- Cross-reference table of field samples sent to the laboratory;
- Analytical results;
- Collection, preparation, and analysis dates;
- Analytical results;
- Reporting limits;
- Dilution factors;

- Surrogate recoveries;
- Method blank data;
- Laboratory control sample (LCS);
- MSs;
- Laboratory replicates;
- Laboratory control limits;
- Explanation of data flags;
- Case narrative; and
- Laboratory sample receipt checklist that documents sample condition as well as non-conformances at the time the laboratory receives the samples.

The report-specific case narrative will present an explanation of all QC results reported outside control limits and samples analyzed at dilutions where all results are non-detect. The case narrative shall include discussions of any observations during sample preparation and analysis which could impact data quality. Laboratory reports will not include calibration information or raw data.

The laboratory will provide an electronic data deliverable in a format specified by ARCADIS that matches all data reported on the hard copy analytical report.

7. Data Reduction, Validation, and Reporting

Analytical data generated during post-closure care monitoring shall be arranged in an adequate and logical format. Data shall be provided by the laboratory as a hard copy report and in electronic format to facilitate management and reporting. Data shall be reviewed and verified by the project QA Officer utilizing standard data validation protocols and guidance criteria. Form A-9 of Attachment A presents a typical data validation checklist that may be used to summarize the quality evaluation of field and laboratory data. This checklist will note any identified deficiencies and qualifications applicable to the groundwater data.

7.1 Validation of Field Data Package

The field records and documentation shall be reviewed and evaluated for potential impact to sample integrity or analytical data quality. Field measurements shall be reviewed for instrument calibration and data usability.

The field documentation and data review shall include:

- Verification that sample rinsate blanks, field blanks, trip blanks, and field replicates were properly prepared, collected, identified, and submitted for analysis;
- Review of field instrument calibration records and results documentation;
- Review of chain-of-custody forms for proper completion, signatures of field personnel and the laboratory sample custodian, and dates;
- Review of daily logs to evaluate any conditions which might impact sample integrity or data quality;
- Review of water sampling logs for completeness and accuracy; and
- Review of well inspection forms.

7.2 Validation of Analytical Data Package

The analytical laboratory will perform appropriate reviews of all calibration, tuning, and QA/QC data utilized or generated during the analysis of the groundwater samples for all parameters of interest. This includes raw data, calculations, blank contamination, and instrument control checks. These reviews shall be performed by peer and/or supervisory personnel at the laboratory. Laboratory review of the analytical data will also be performed by the laboratory QA Manager and Project Manager in accordance with the internal laboratory procedures and prior to finalization of the analytical data report. Any anomalies, discrepancies, or observations impacting data quality shall be identified in the case narrative accompanying the analytical report.

A minimum of 20% of the groundwater monitoring data will be validated by the project QA Officer upon receipt of the data packages from the laboratory. The data verification/validation shall be performed utilizing guidance criteria set forth in the following documents:

- USEPA SW-846 Test Methods for Evaluating Solid Wastes;
- Standard Methods for the Examination of Water and Wastewater;
- USEPA Methods for the Chemical Analysis of Water and Wastes;
- 40 CFR Part 136 Method Set-up;
- USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999);
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (July 2002);
- The analytical laboratory QAM; and
- Laboratory method precision and accuracy control limits.

The data verification includes an evaluation of the analytical performance by the laboratory without regard to the sample source, field procedures, field records, or historical data trends.

The following items are included in the data review and evaluation:

- Analytical results;
- Methods of analysis and target parameters;
- Reporting limits;
- Laboratory receipt documentation;
- Holding time compliance;
- Laboratory case narrative;
- Method blank results;

- Results of LCS and LCS Duplicate (LCSD) recoveries, relative percent difference (RPD), and control limits;
- Results of MS/MSD percent recoveries, RPD, and control limits;
- Results of surrogate spike recoveries and control limits;
- Results of laboratory duplicate (as method appropriate) RPD and control limits;
- Field, equipment, and trip blank results;
- Field duplicate sample RPDs; and
- Comparison of total and dissolved metals results.

This review permits the determination that requested parameters were measured by the laboratory employing the required analytical methods, within the allowable sample holding time, achieving the project-required detection limits, and meeting the appropriate QA criteria to generate data of known and usable quality required for the HELSTF Construction Landfills post-closure groundwater monitoring program. The evaluation also establishes that the analysis of samples was accomplished in a controlled, contaminant-free environment with acceptable accuracy and precision. Further in-depth reviews may be warranted if the above items indicate significant, questionable, or severe deficiencies in the laboratory performance.

During the data verification and evaluation, samples not meeting QC criteria will be flagged with letter codes denoting data usability. The qualification coding that will be utilized includes J, U, UB, UJ, and R:

- J – The associated numerical value is an estimated quantity because quality control criteria were not completely met, there is associated blank contamination, or the value reported is below the standard parameter reporting limit and the method detection limit as statistically determined by 40 CFR Part 136 procedures (e.g., matrix spike percent recoveries, out of control limits, or laboratory duplicates exceeding allowable RPDs);
- U – The parameter was not detected. The associated numerical value is the sample reporting limit;

- UB – The parameter is considered non-detect at the reported value due to associated blank contamination;

- UJ – The parameter was not detected and the reporting limit is estimated, due to QC deficiencies or associated blank contamination; and

- R – QC information or holding time non-compliance indicates that data point is unusable (compound may or may not be present).

Laboratory QC samples include method blanks, LCS, LCSD, method duplicates (primarily inorganic and wet chemistry procedures), and MS/MSD pairs. For water samples, triple volume must be collected in the field to provide adequate sample volume to complete the MS analyses. Field personnel designate samples to be used by the laboratory to perform the matrix evaluation on MPL3-specific samples.

Field QC samples include rinsate blanks, field blanks, trip blanks, and field duplicate samples collected at the frequency specified in this Post-Closure Care Plan. Field blanks and trip blanks are analyzed for the VOCs as reported under USEPA Method 8260. Rinsate blanks are analyzed for all parameters that are required for the monitor well location at which the equipment is rinsed. Field duplicates are submitted “blind” to the laboratory. Samples requiring dissolved metals are filtered and preserved upon receipt at the laboratory.

The following project-specific criteria shall be utilized during the evaluation of laboratory and field QC samples:

- Field Duplicates: The maximum acceptable RPD is 20 percent;

- LCS and LCSD: Utilized to evaluate laboratory performance of the method. Only the method-recommended parameters are spiked into laboratory-grade water and the percent recoveries and RPDs are evaluated for compliance with established laboratory control limits. Field sample data associated with non-compliant LCS results may be qualified as estimated or may be rejected;

- Surrogates: Utilized for some organic parameters to evaluate the ability of the method to detect and quantify the compounds of interest. Surrogate spike recoveries are evaluated against laboratory-established control limits. Qualification will be based on guidance criteria set forth in the USEPA National Function Guidelines for qualification of data associated with out of control surrogate

recovery. Values outside of control limits are assessed for potential impact to data quality and the data are appropriately flagged;

- MS: Utilized to evaluate potential matrix effects on the analytical results. The MS compounds are a subset of the compounds reported by a specific method as recommended in USEPA SW-846. Percent recoveries and the RPD of the matrix spikes are evaluated for impact to data and sample results are qualified in accordance with guidance criteria and professional judgment. Analytical laboratory control limits are utilized to determine matrix effect impact to data. Data are qualified on MS recovery deficiencies based on professional judgment, laboratory information, and USEPA guidelines for qualifying data associated with matrix interference. Data qualified for matrix performance issues may be deemed estimated. MS recoveries may also be utilized for analytical batch performance under USEPA SW-846 guidance. If LCS recoveries are outside of control limits, the laboratory may demonstrate satisfactory method performance if the batch MS recoveries are acceptable; and

- Total and Dissolved Metals: Evaluated to determine that total metals concentrations are equal to or greater than dissolved metals or that dissolved metals are no greater than 10 percent above the total metals concentration.

The data validation may be documented as a checklist with deficiencies and qualifications noted.

7.3 Recordkeeping and Reporting

This Post-Closure Care Plan shall be retained at WSMR during the post-closure monitoring period for the HELSTF Construction Landfills. The Post-Closure Care Plan shall be reviewed annually and any revisions required to stay abreast of changes in USEPA methods and/or state regulatory provisions shall be reported annually in the Annual Post-Closure Groundwater Monitoring Report. If laboratories are changed during the monitoring period, documentation shall be submitted that demonstrates the laboratory is capable of performing the required tests along with QA/QC results and procedures. Records of monitor well inspections shall be kept for a minimum of 3 years after the inspection plus the duration of any enforcement action.

The groundwater data collected for the Post-Closure Care monitoring shall be submitted to NMED annually, as part of the facility-wide groundwater monitoring report. The reports shall include the following information:

- A facility map showing all monitor and recovery wells and identifying zones in which wells are screened;
- A well construction table showing well number, well depth, screen interval, zone monitored, well diameter, and screen and casing material for all wells;
- A summary of analytical data for all monitor and recovery wells for the reporting period;
- Discussion of any significant changes in the analytical data when compared to the previous reporting period;
- Water level measurements and potentiometric surface maps for each monitored zone for the reporting period;
- Discussion of the effectiveness and progress of the post-closure monitoring activities; and
- Supportive documentation such as water sampling logs, field parameter forms, data validation checklists, laboratory data reports, and other documentation as deemed necessary.

8. Reporting

A summary of the groundwater monitoring data will be included in the facility-wide groundwater monitoring report submitted annually to the NMED. The report will include, at a minimum the following elements:

- Introduction;
- Scope of the groundwater monitoring program;
- Post-Closure Care Inspections and Maintenance;
- Groundwater Monitoring Results; and
- Groundwater Chemical Analytical Data.

9. References

Tanji, Kenneth, K., 1969. Solubility of Gypsum in Aqueous Electrolytes as Affected by Ion Association and Ionic Strengths up to 0.15M and 25° C, Envrion. Sci. Tech., Vol. 3, No. 7, pp. 656-661.

ARCADIS 2010. Revised Phase III RCRA Facility Investigation Report, HELSTF Sites, Second Revision, August 2010.

ARCADIS, 2011. Closure Plan for the Former High Energy Laser Systems Test Facility (HELSTF) Landfills, SWMUs 38 & 39 (CCWS-75). March

ARCADIS

Tables

ARCADIS

Table 1. Well Construction Information
Post-Closure Care Plan for the Former High Energy Laser Systems Test Facility (HELSTF) Landfills
SWMUs 38 39 (CCWS-75)
White Sands Missile Range, New Mexico

Well ID	Area	Well Type	SWMU	Status	Zone	Top of Casing Elevation (ft msl) [1]	Stickup Height (ft)	Screen Start Depth (ft bgs)	Screen End Depth (ft bgs)	Total Depth of Well (ft bgs)	Pump Type	Casing Type	Casing Diameter	Boring Log	Well Log
HMW-29[2]	HELSTF	MW	SWMU-38-39	Active	R	3957.5162	2.43	68	78	78.37	Low Flow	PVC	4	No	Yes
HMW-30[2]	HELSTF	MW	SWMU-38-39	Active	R	3957.4595	2.52	92	107	106.71	Low Flow	PVC	4	No	Yes
HMW-31[2]	HELSTF	MW	SWMU-38-39	Active	VZ	3957.5006	2.37	35	50	50.34	Low Flow	PVC	4	No	Yes
HMW-32[2]	HELSTF	MW	SWMU-38-39	Active	R	3957.4401	2.45	74	89	89.88	Low Flow	PVC	4	No	Yes
HMW-33[3]	HELSTF	MW	SWMU-38-39	Active	VZ	3955.3788	2.34	35	50	50.67	Low Flow	PVC	4	No	Yes
HMW-34[4]	HELSTF	MW	SWMU-38-39	Active	R	3957.6249	2.18	75	90	90.59	Low Flow	PVC	4	No	Yes
HMW-35[4]	HELSTF	MW	SWMU-38-39	Active	R	3957.3528	2.42	63.5	83.5	84.58	Low Flow	PVC	4	No	Yes
HMW-59[4]	HELSTF	MW	SWMU-38-39	Active	R	3957.4392	3.47	68	78	84.26	Low Flow	NA	NA	Yes	No
HMW-08[4]	HELSTF	MW	SWMU-38-39	Active	R	3959.7569	2.48	72.2	100.2	102.2	Low Flow	PVC	2	Yes	Yes

Notes:

Well construction data source: EDMS database provided by Zia.

1. Elevations presented in table reflect the revised top of casing measurements collected during the Phase III RFI activities (December 23, 2006 through January 10, 2007).

2. Wells HMW-29, HMW-30, HMW-31, HMW-32 and HMW-34 will be plugged prior to construction of the cap and will not be used for long term monitoring

3. Well HMW-33 will not be used for long-term monitoring associated with the Post Closure Care Activities at the former HELSTF Landfills. However, it will be retained for possible future monitoring associated with the LSTC Discharge Point.

4. Wells HMW-35, HMW-59 and HMW-08 will be retained and used for Long Term Monitoring as part of the Post Closure Care activities at the former HELSTF Landfills.

Survey performed by Zia Engineering and Environmental Consultants.
Vertical measurements were collected in North American Vertical Datum 1988 (NAVD 88).

bgs	below ground surface
ft	feet
msl	mean sea level
MW	monitoring well
NA	not available
PVC	polyvinyl chloride
R	Regional aquifer
SWMU	Solid Waste Management Unit
VZ	saturated soil of the vadose zone

Table 2. Parameter Sets and Reportable Constituent Lists
Post-Closure Care Plan for the Former High Energy Laser Systems Test Facility (HELSTF) Landfills
SWMUs 38 & 39 (CCWS-75)
White Sands Missile Range, New Mexico

Parameter Sets

Field Parameters (All Wells)

	Water Level Measurements
	Total Depth Measurements
	pH
	Specific Conductivity
	Temperature
	Turbidity

Tier 1 Parameter Set

	Total Dissolved Solids

Tier 2 Parameter Set

	Volatile Organic Compounds
	Semi-volatile Organic Compounds
Total and Dissolved RCRA Metals:	Arsenic
	Barium
	Cadmium
	Chromium
	Lead
	Mercury
	Selenium
	Silver
Ions (total):	Calcium
	Magnesium
	Potassium
	Sodium
Conventional Chemistry:	Alkalinity
	Sulfate
	Chloride

ARCADIS

Table 3. Groundwater Analytical Program Parameter List, Laboratory Methods,and Sample Collection and Preservation Requirements
Post-Closure Care Plan for Former HELSTF Construction Landfills
White Sands Missile Range, New Mexico

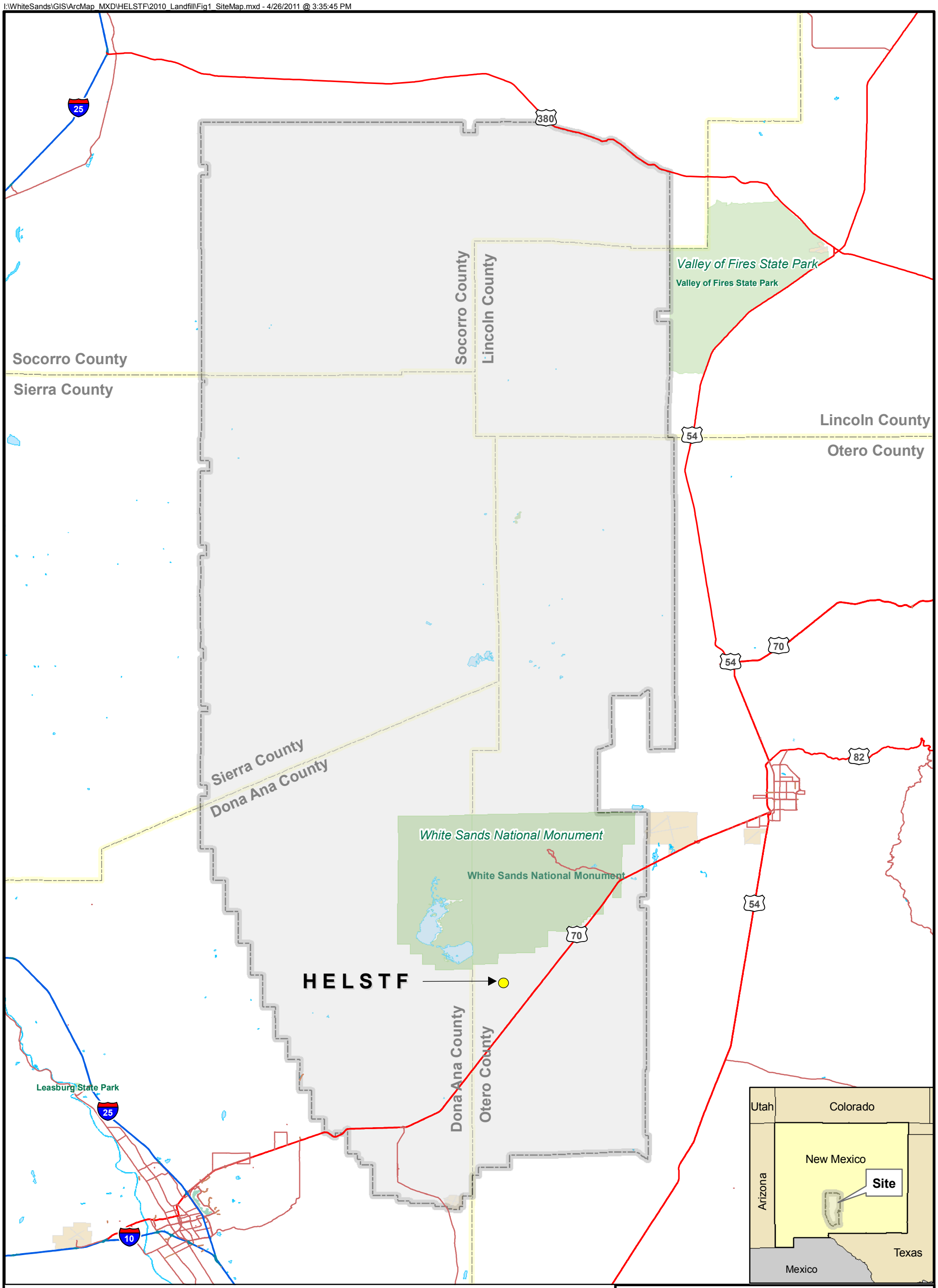
Parameter	Method[1]	Container Type[3]	Preservative[4]	Holding Time[5]
Volatile Organic Compounds	8260	3 x 40 ml glass vial: to top (no air in vial)	HCL, pH<2 Cool 4°C	14 days
Semi-Volatile Organic Compounds	8270	2 x 1-L amber G	Cool 4°C	7 days to extraction and 40 days to analysis
RCRA 8 Metals (Total)				
Arsenic	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Barium	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Cadmium	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Chromium	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Lead	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Mercury	7470	250 mL plastic	HNO_3 pH<2	28 days
Selenium	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Silver	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Ions (Total)				
Calcium	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Magnesium	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Potassium	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Sodium	6010/6020	250 mL plastic	HNO_3 pH<2	6 months
Conventional Chemistry Parameters				
Alkalinity	310.1	1 liter amber glass	Cool 4°C	28 days
Sulfate	375.4/375.	250 mL plastic	Cool 4°C	28 hours
Chloride	325.2/325.	250 mL plastic	Cool 4°C	28 hours
Total Dissolved Solids	160.1	500 mL plastic	Cool 4°C	7 days
Field-Measured Parameters				
pH	9040	4 oz plastic if shipped to lab	None	Immediately
Specific Conductance	9050	4 oz plastic if shipped to lab	None	28 days
Temperature	170.1	N/A	N/A	N/A
Turbidity	180.1	N/A	N/A	N/A
Water Level Measurements	N/A	N/A	N/A	N/A

Notes:
[1] Method - The analytical protocol(s) recommended for the parameter of interest. This number represents U.S. Environmental Protection Agency approved analytical protocols.
[2]Container - Specifies the type, size, and material of construction of the sample containers for a given analysis.
[3] Preservative - Describes the appropriate sample preservative to be placed in a given sample container for a given analysis. Preservatives for dissolved analyses are added after filtration at the laboratory.
[4] Holding Time is based on the date of collection to the initiation of sample preparation or analysis.
°C - Degrees Celsius.
HNO_3 - Nitric Acid.
H_2SO_4 - Sulfuric Acid.
mL - Milliliter.
N/A - Not Applicable.
Oz - Ounce.
µg/L - Micrograms per liter.

ARCADIS

Figures

I:\WhiteSands\GIS\ArcMap_MXD\HELSTF\2010_Landfill\Fig1_SiteMap.mxd - 4/26/2011 @ 3:35:45 PM



Legend

- County Boundary
- White Sands Missile Range Boundary
- Water Body
- National Park or Forest
- State Park or Forest
- Limited Access
- Highway
- Major Road
- Minor Road

N

0 8 16 Mile

WHITE SANDS MISSILE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

SITE LOCATION MAP

ARCADIS

FIGURE
1

LEGEND

- LANDFILL CELL BOUNDARIES
- SITE FEATURES
- BUILDING
- POND/LAGOON
- FENCE
- RAIL ROAD
- PAVED ROAD
- DIRT ROAD

NOTES:
1. BASE MAP PROVIDED BY ZIA AND RECTIFIED TO DECEMBER 2008 SATELLITE IMAGE.
2. SHADED AREAS ARE AREAS OF HISTORICAL LANDFILL CELLS OR TRENCHES IDENTIFIED BY GEOPHYSICAL STUDIES AND CONFIRMED BY REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS.

N

0 350 700 Feet

GRAPHIC SCALE

WHITE SANDS MISSILE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)

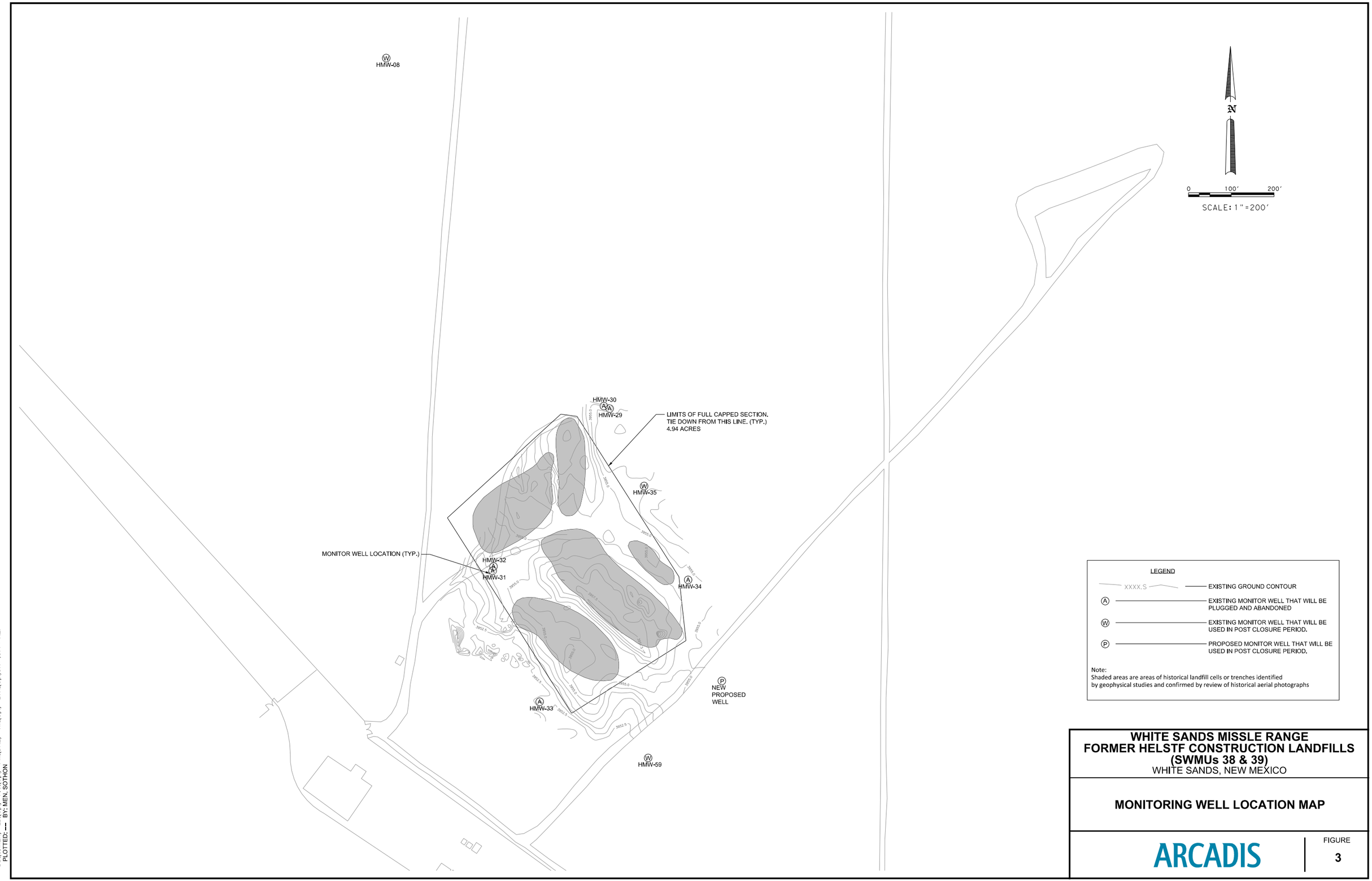
WHITE SANDS, NEW MEXICO

LANDFILL LOCATION MAP

ARCADIS

FIGURE
2

I:\WhiteSands\GIS\ArcMap_MXD\HELSTF\2010_Landfill\Fig2_HELSTF.mxd - 4/26/2011 @ 3:34:13 PM



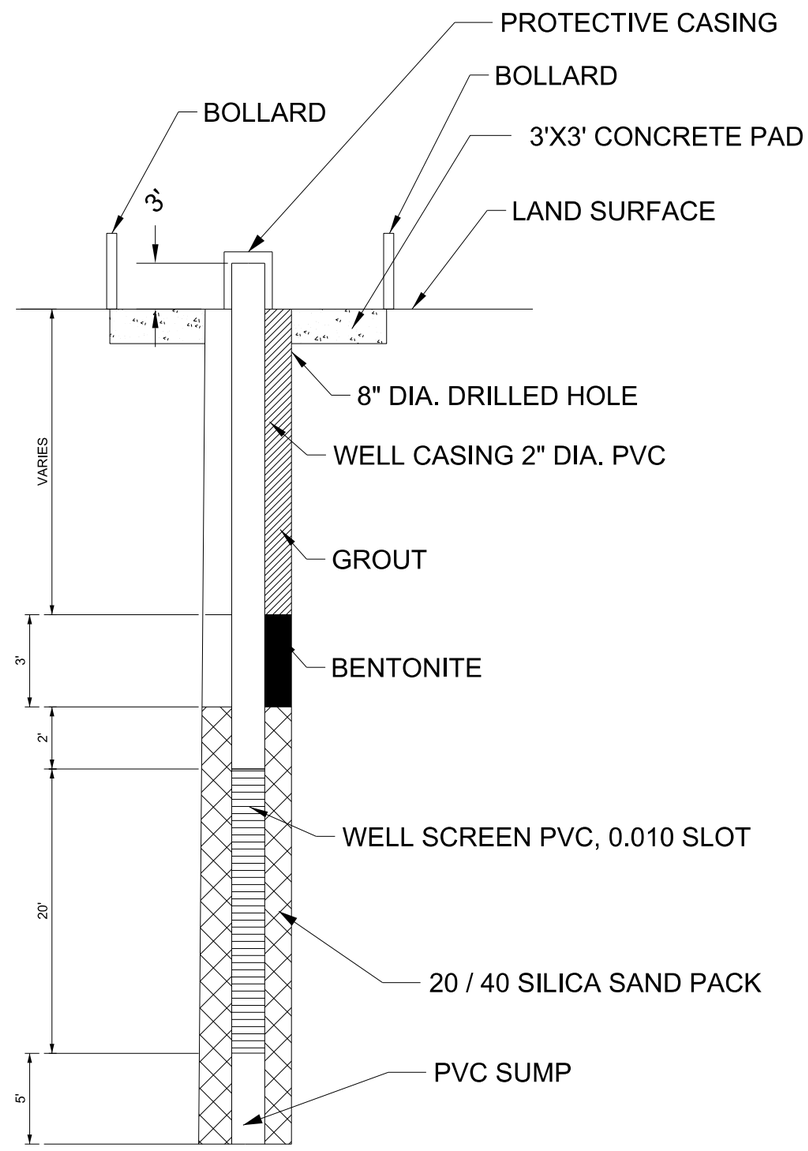
WHITE SANDS MISSLE RANGE
FORMER HELSTF CONSTRUCTION LANDFILLS
(SWMUs 38 & 39)
WHITE SANDS, NEW MEXICO

MONITORING WELL LOCATION MAP

ARCADIS

FIGURE
3

DB:(S. MEN) LD:(Opt) PIC:(Opt) PM:(DRE) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
PLOTTED: --- BY: MEN, SOTHON



TYPICAL NEW MONITOR WELL CONSTRUCTION

NOT TO SCALE

WHITE SANDS MISSILE RANGE
MAIN POST LANDFILL 3 CAP
WHITE SANDS, NEW MEXICO

MONITORING WELL CONSTRUCTION DIAGRAM

ARCADIS

FIGURE
4

DB:(S. MEN) LD:(Opt) PIC:(Opt) PM:(DRE) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
PLOTTED: --- BY: MEN, SOTHON

ARCADIS

Attachments

Attachment **A**

Typical Forms

A-1

Semi-Annual Landfill Inspection Checklist

HELSTF
SEMI-ANNUAL INSPECTION CHECKLIST

Inspector's Name: **(Print Name)**	**Signature:**
Inspection Date:	**Time:**
Inspections, Recordkeeping, and Corrective Action: Inspections, including checklist completion, must be completed each month at about the same time. Inspections are to insure that monitoring equipment, safety equipment, emergency equipment, and security controls are in proper working order to protect human health and the environment. Inspection checklists must be kept for at least three years, plus the duration of any enforcement action. Corrective action must be undertaken ASAP where the inspection reveals spills, deterioration or malfunction. Describe observation and give date and nature of any repairs.	

Inspection Item	Corrective Action Required? (Circle one)	If Yes, explain why a corrective action is needed.	What corrective action will be done?	When the corrective action was done?
1. Closed Landfill Cover				
Erosion	**Yes No**			
Animals/Vectors	**Yes No**			
Settlement/ Subsidence	**Yes No**			
Vegetation	**Yes No**			
Drainage/Run-on	**Yes No**			
Warning Signs	**Yes No**			
2. Groundwater Monitoring System				
Well Integrity (Well body, locks, concrete aprons, protection poles, etc.)	**Yes No**			
Release to Environment	**Yes No**			
Threat to Human Health	**Yes No**			

A-2 through A-8

Typical Field Forms

ARCADIS

WATER SAMPLING LOG

Project _____ Project No. _____

Site Location _____ Date: _____

Site/Well No. _____ Replicate No. _____ Code No. _____

Weather _____ Sampling Time: Begin _____ End _____

Evacuation Data

Measuring Point _____

MP Elevation (ft) _____

Land Surface Elevation (ft) _____

Sounded Well Depth (ft bmp) _____

Depth To Water (ft bmp) _____

Water Level Elevation (ft) _____

Water Column In Well (ft) _____

Casing Diameter/Type _____

Gallons In Well _____

Gallons Pumped/Bailed Prior To Sampling _____

Sample Pump Intake Setting (ft bmp) _____

Purge Time Begin: _____ End _____

Pumping Rate (gpm) _____

Evacuation Method _____

Field Parameters

Color _____

Odor _____

Appearance _____

pH (s.u.) _____

Conductivity (mS/cm) _____

Conductivity (µmhos/cm) _____

Turbidity (NTU) _____

Temperature (^{o}C/ ^{o}F) _____

Dissolved Oxygen (mg/L) _____

ORP (mV) _____

Sampling Method _____

Remarks _____

Constituents Sampled	Container Description	Number	Preservative

Sampling Personnel

Well Casing Volumes

Gal./Ft.				
1" = 0.04	1 - 1/2" = 0.09	2 - 1/2" = 0.26	3 - 1/2" = 0.50	6" = 1.47
1 - 1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

bmp	Below measuring point	ml	Milliliter	NTU	Nephelometric Turbidity Units
^{o}C/^{o}F	Degrees Celsius/Fahrenheit	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units
gpm	Gallons per minute	NA	Not Applicable	µmhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not Recorded	VOC	Volatile Organic Compounds
ppt	Parts per thousand	CS	Carbon steel	SS	Stainless steel

FIELD INSTRUMENT CALIBRATION LOG

ARCADIS

Date:

ARCADIS Project Name:

Project Number:

Field Calibration by:

Instrument Source

Type of Instrument	Manufacturer	Model Number	Time	Standard Concentration	Calibrated Reading	Remarks
pH Meter				4.00 s.u.		
				7.00 s.u.		
				10.00 s.u.		
				4.00 s.u.		
				7.00 s.u.		
				10.00 s.u.		
				4.00 s.u.		
				7.00 s.u.		
				10.00 s.u.		
Conductivity Meter				3,000 µmhos/cm		
				5,000 µmhos/cm		
				30,000 µmhos/cm		
				3,000 µmhos/cm		
				5,000 umhos/cm		
				30,000 µmhos/cm		
				3,000 µmhos/cm		
				5,000 µmhos/cm		
				30,000 µmhos/cm		
Dissolved Oxygen Calibrate to Water-Saturated Air				mm Hg		
				mm Hg		
				mm Hg		
Turbidimeter				NTU		
				NTU		
				NTU		
ORP				150 MV		
				150 MV		
				150 MV		

ARCADIS

MONITOR WELL INSPECTION CHECKLIST

Project Name: _____ Project Number: _____

Inspectors Name: _____ Inspection Date: _____

Monitor Well ID: _____ Site Location: _____

Type of Well: ☐ Flush Mounted ☐ Above Grade

A. Condition of protective casing: _____

B. Condition of concrete pads (note cracks, breaks, slope direction): _____

C. Condition of guard posts: _____

D. Is the well locked? _____

E. Is well identification number clearly marked? _____

F. Is the TOC elevation mark clearly visible on the well ? _____

G. Condition of well casing: _____

H. Condition of well cap: _____

I. Condition of surrounding grounds (i.e., overgrowth, is the well accessible, etc.): _____

J. Does water adequately drain from the well site?: _____

K. Total depth of well (properly decon tape between wells). _____

L. Depth to top of grout from protective casing - length of protective casing above concrete pad: _____

M. Comments/Recommendations: _____

ARCADIS

FIELD PARAMETER FORM

Well Identification Number:

Job Name/Number: _____ Date: _____

Water Level (TOC): _____ Total Depth: _____

OVM Reading: _____ 3 Well Volumes: _____

Start Time: _____ Total Volumes Removed: _____

Time	Water Level (ft gmp)	Temp (°F)	Spc. Cond. (µmhos/cm)	Salinity (ppt)	DO (%)	DO (mg/L)	pH (s.u.)	REDOX/ORP (mv)

Observations/Comments:

Ferrous Iron: _____ Sulfide: _____

ARCADIS	Project Name / Number:		Sample ID:
Matrix:	Collection:	Preservative:	
Analysis:			Date:
Sampler(s):			Time:

ARCADIS
Infrastructure, environment, buildings

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #

Send Results to:

Contact & Company Name:	Telephone:
Address:	Fax:
City State Zip	E-mail Address:
Project Name/Location (City, State):	Project #:
Sampler's Printed Name:	Sampler's Signature:

Preservative							
Filtered (✓)							
# of Containers							
Container Information							

PARAMETER ANALYSIS & METHOD

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix								REMARKS

Special Instructions/Comments:

☐ **Special QA/QC Instructions(✓):**

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name:	Cooler Custody Seal (✓)	Printed Name:	Printed Name:	Printed Name:	Printed Name:
☐ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements:	Sample Receipt:	Firm:	Firm/Courier:	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time:	Date/Time:	Date/Time:	Date/Time:

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by ARCADIS

CHAIN-OF-CUSTODY SEAL • CHAIN-OF-CUSTODY SEAL

ARCADIS ARCADIS

CHAIN-OF-CUSTODY SEAL • CHAIN-OF-CUSTODY SEAL

A-9

Typical Data Validation Checklists

ARCADIS

DATA VALIDATION CHECKLIST **WSMR - HELSTF XQ0X GW Sampling**

SDG #	**Sample IDs**		
MON			
Sample Date(s):			
Sample Team:			
Sample Matrix:			
Analyzing Laboratory:			
Laboratory Project Manager:			
Analyses:	USEPA Methods:		
QA Reporting Level:	ARCADIS, Level II		
ARCADIS PM:			

The analytical data were reviewed in accordance with the "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review" (July 2002), "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review" (October 1999), the analytical laboratory quality assurance (QA) control limits, method specific criteria, the Groundwater Sampling and Analysis Plan for High Energy Laser Systems Test Facility (HELSTF) Landfills (Revised date of revision), and professional judgment.

Holding times, spike and surrogate recoveries, duplicate precision, and blank contamination were evaluated electronically within the EQuIS Chemistry database utilizing the EQuIS Data Qualification Module (DQM). All other reviews were performed manually. Data verification was performed at a Level II evaluation as listed on the checklists included in this report. Only quality control (QC) data associated with target parameters were reviewed and discussed in this assessment report. MNA parameters were not manually evaluated during this data review. However, any applicable qualification associated with blank contamination or laboratory control sample performance was applied electronically to the MNA parameters by DQM. Additional review was not performed.

ARCADIS

FIELD DATA PACKAGE DOCUMENTATION

Field Sampling Logs*	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sampling dates noted					
2. Sampling team indicated					
3. Sampling identification traceable to location collected					
4. Sample location					
5. Sample depth for water					
6. Collection technique (bailer, pump, etc.)					
7. Sample container type					
8. Preservation methods					
9. Chain-of-Custody (COC) form completed					
10. Required analytical methods listed					
11. Field Water Sampling Logs completed					
12. Daily Field Logs completed and signed					
13. Number and type of field QC samples collected (blanks, replicates, splits, etc.)					
14. Field equipment calibration					
15. Field equipment decontamination					
16. Sample shipping					
17. Laboratory Task Order					

*Field Sampling Logs = Water Sampling Logs
QC = Quality Control

Comments:

All field data documentation (Water Sampling Logs and Daily Logs) was reviewed for the above referenced sampling event. Performance was acceptable, with the following exceptions and/or notes:

Field QC samples collected:

Date Collected	QC Sample ID	Associated Sampling Location	QC Type

ARCADIS

ANALYTICAL DATA PACKAGE DOCUMENTATION
GENERAL INFORMATION

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample results					
2. Parameters analyzed					
3. Method of analysis					
4. Reporting limits of analysis					
5. Master tracking list					
6. Sample collection date					
7. Laboratory sample received date					
8. Sample receipt condition					
9. Sample preparation/extraction date					
10. Sample analysis date					
11. Copy of Chain-of-Custody (COC) form signed by lab sample custodian					
12. Narrative summary of QA or sample problems provided					

QA - Quality Assurance

Comments:

All analytical data were reported by (___insert laboratory name___). Performance was acceptable, with the following exceptions and/or notes:

ARCADIS

METALS (TOTAL AND DISSOLVED)

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Holding Times					
2. Reporting Limits					
3. Blanks					
A. Method Blanks					
B. Equipment Blanks					
C. Field Blanks					
4. Laboratory Control Sample (LCS) %R					
5. LCS Duplicate (LCSD) %R					
6. LCS/LCSD RPD					
7. Matrix Spike (MS) %R					
8. MS Duplicate (MSD) %R					
9. MS/MSD RPD					
10. Laboratory Duplicate RPD (optional)					
11. Field Duplicate Comparison					
12. Total and Dissolved Metals Comparison					

%R - percent recovery RPD - relative percent difference DQM - Data Qualification Module M - Manual Review

Comments:

This section was completed for the review of Total Metals (Method 6010). Performance was acceptable, with the following exceptions and/or notes:

ARCADIS

WET CHEMISTRY

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Holding Times					
2. Reporting Limits					
3. Blanks					
A. Method Blanks					
B. Equipment Blanks					
4. Laboratory Control Sample (LCS) %R					
5. LCS Duplicate (LCSD) %R					
6. LCS/LCSD RPD					
7. Matrix Spike (MS) %R					
8. MS Duplicate (MSD) %R					
9. MS/MSD RPD					
10. Laboratory Duplicate RPD					
11. Field Duplicate Comparison					

%R - percent recovery RPD - relative percent difference DQM - Data Qualification Module M - Manual Review

Comments:

This section was completed for the review of Wet Chemistry analyses. The performance was acceptable, with the following exceptions and/or notes:

ARCADIS

VOLATILE ORGANIC COMPOUNDS

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Holding Times					
2. Reporting Limits					
3. Blanks					
A. Method Blanks					
B. Equipment Blanks					
C. Trip Blanks					
D. Field Blanks					
4. Matrix Spike (MS) %R					
5. Matrix Spike Duplicate (MSD) %R					
6. MS/MSD Precision (RPD)					
7. Laboratory Duplicate (optional)					
8. Laboratory Control Sample (LCS)					
9. LCS Duplicate (LCSD)					
10. LCS/LCSD Precision (RPD)					
11. Field Duplicate Comparison					
12. Surrogates					
13. Tentatively Identified Compounds (TICs)		M		M	

%R - percent recovery RPD - relative percent difference DQM - Data Qualification Module M - Manual Review

Comments:

This section was completed for the review of Volatile Organic Compounds (8260). The performance was acceptable, with the following exceptions and/or notes:

ARCADIS

SEMIVOLATILE ORGANIC COMPOUNDS

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Holding Times					
2. Reporting Limits					
3. Blanks					
A. Method Blanks					
B. Equipment Blanks					
4. Matrix Spike (MS) %R					
5. Matrix Spike Duplicate (MSD) %R					
6. MS/MSD Precision (RPD)					
7. Laboratory Control Sample (LCS)					
8. LCS Duplicate (LCSD)					
9. LCS/LCSD Precision (RPD)					
10. Field Duplicate Comparison					
11. Surrogates					
12. Tentatively Identified Compounds (TICs)					

%R - percent recovery RPD - relative percent difference DQM - Data Qualification Module M - Manual Review

Comments:

This section was completed for the review of Semivolatile Organic Compounds (SVOCs) (8270). The performance was acceptable, with the following notes and/or exceptions:

ARCADIS

VALIDATION CHECKLIST SUMMARY AND DATA QUALIFIERS

The following list of data qualifiers and definitions were applied in this data validation:

B - compound/analyte detected in blank or associated blank.

J - the analyte was positively identified, but the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - the analyte was not detected above the reporting limit; however, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R - the sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria, and the presence or absence of the analyte cannot be verified.

All other data satisfy validation criteria and are considered to be quantitative.

Data values presented in the attached table were qualified due to QC deficiencies. The table indicates compounds/analytes qualified based on electronic and manual validation. Refer to the associated method section of the Validation Checklist for a detailed explanation of qualification. All other data are considered quantitative.

VALIDATION PERFORMED BY: _____

SIGNATURE: _____

DATE _____

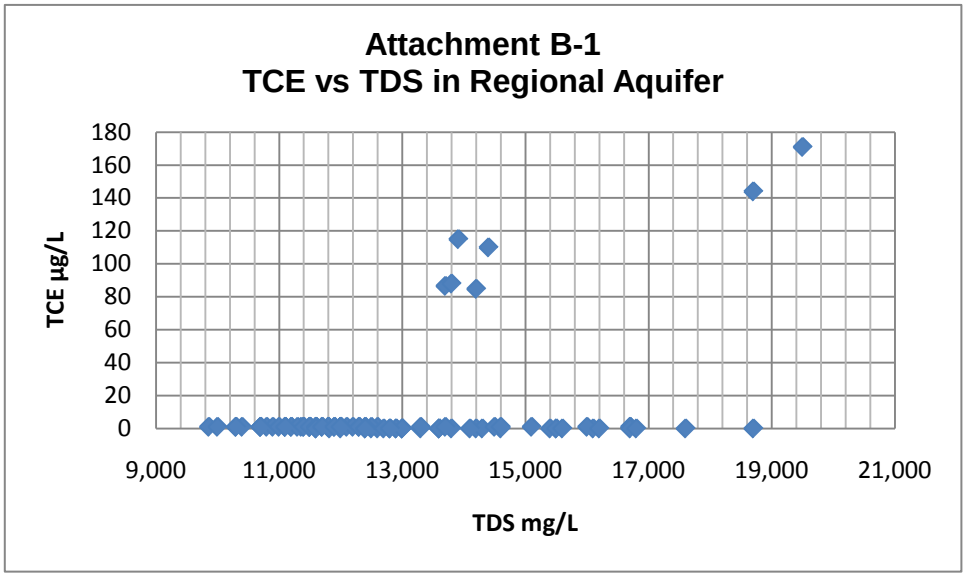
PEER REVIEW: _____

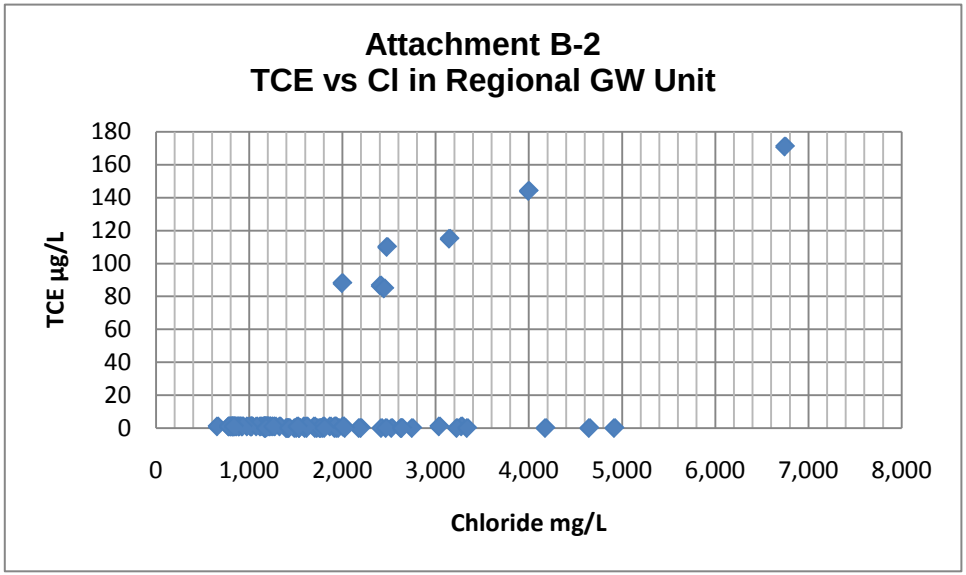
SIGNATURE: _____

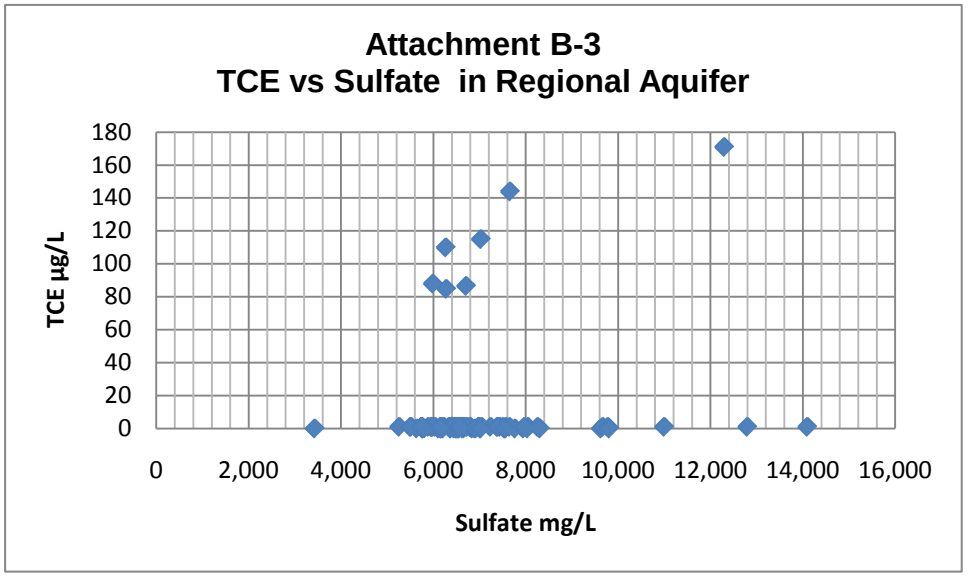
DATE: _____

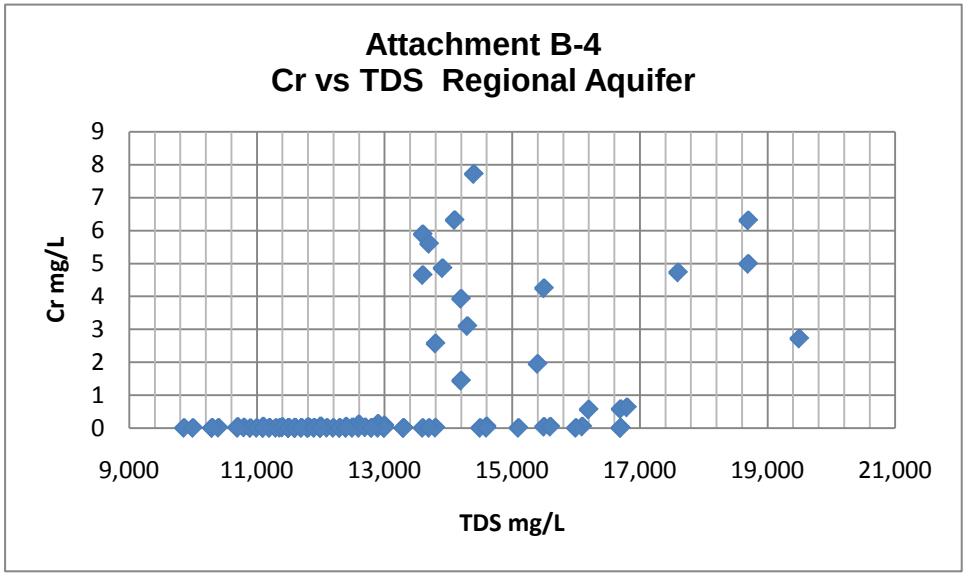
Attachment **B**

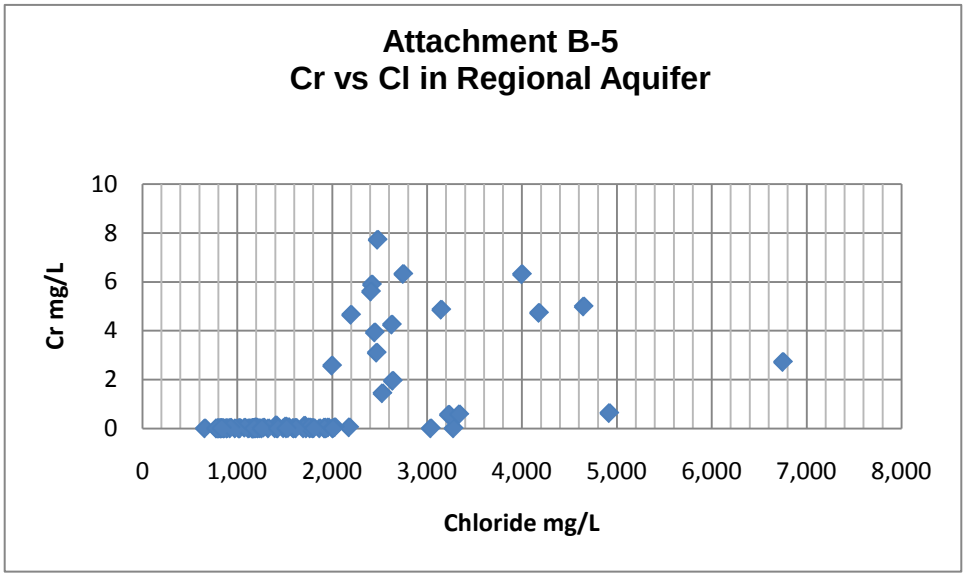
Graphs Supporting Rationale for Tiered Sampling Approach

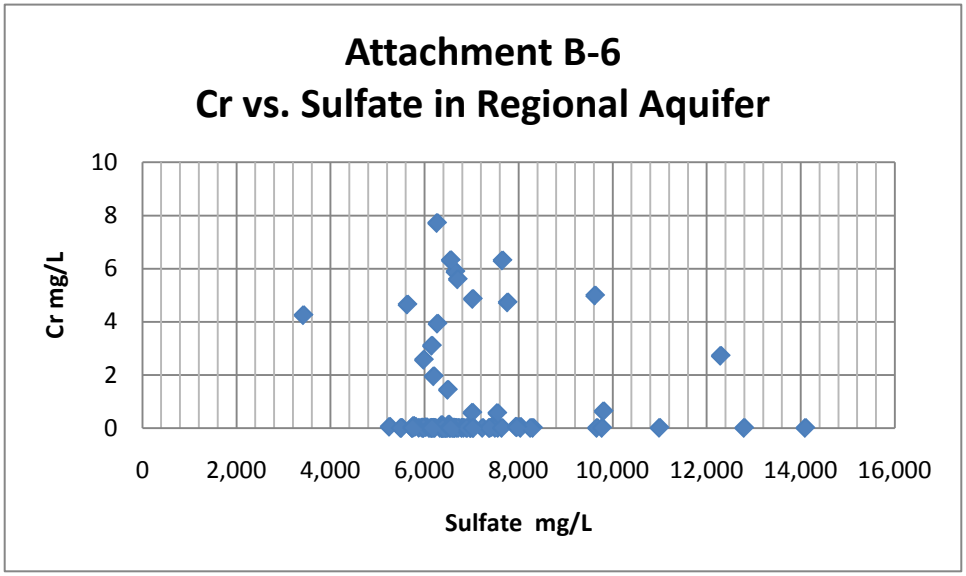

Attachment B-1
TCE vs TDS in Regional Aquifer
TCE µg/L
180
160
140
120
100
80
60
40
20
0
9,000
11,000
13,000
15,000
17,000
19,000
21,000
TDS mg/L


Attachment B-2
TCE vs Cl in Regional GW Unit
TCE µg/L
180
160
140
120
100
80
60
40
20
0
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Chloride mg/L


Attachment B-3
TCE vs Sulfate in Regional Aquifer
TCE µg/L
180
160
140
120
100
80
60
40
20
0
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Sulfate mg/L


Attachment B-4
Cr vs TDS Regional Aquifer
Cr mg/L
9
8
7
6
5
4
3
2
1
0
9,000
11,000
13,000
15,000
17,000
19,000
21,000
TDS mg/L


Attachment B-5
Cr vs Cl in Regional Aquifer
Cr mg/L
10
8
6
4
2
0
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
Chloride mg/L


Attachment B-6
Cr vs. Sulfate in Regional Aquifer
Cr mg/L
10
8
6
4
2
0
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
Sulfate mg/L