U.S. Department of Energy
Livermore Site Office, Livermore, California 94551

Lawrence Livermore National Laboratory
Lawrence Livermore National Security, LLC, Livermore, California 94551

LLNL-AR-432791


# Remedial Action Completion Report for the Building 850/Pit 7 Complex Operable Unit Lawrence Livermore National Laboratory Site 300


*Authors:*

V. Dibley
L. Ferry
M. Taffet
Z. Demir
V. Madrid
K. Moffitt
R. Ruiz


**May 2010**


Environmental Restoration Department

This work performed under the auspices of the U. S. Department of Energy by Livermore National Laboratory under Contract DE-AC52-07NA27344.

LLNL-AR-432791

# Remedial Action Completion Report for the Building 850/Pit 7 Complex Operable Unit Lawrence Livermore National Laboratory Site 300

*Authors:*

V. Dibley
L. Ferry
M. Taffet
Z. Demir
V. Madrid
K. Moffitt
R. Ruiz

May 2010

# Table of Contents

**1. Introduction** .......... **1**
**1.1. Site Description** .......... **1**
1.1.1. Building 850 Firing Table Area Site Description .......... 2
1.1.2. Pit 7 Complex Area Site Description .......... 2
**1.2. OU History** .......... **2**
1.2.1. Building 850 Firing Table Area Site History .......... 2
1.2.2. Pit 7 Complex Area Site History .......... 3
**1.3. Remedial Investigation Results** .......... **4**
1.3.1. Building 850 Firing Table Area Remedial Investigation Results .......... 4
1.3.1.1. Building 850 Firing Table Area Nature and Extent of Contamination .. 4
1.3.1.2. Building 850 Firing Table Area Contaminants of Concern .......... 4
1.3.1.3. Building 850 Firing Table Area Summary of Human Health Risks .......... 4
1.3.1.4. Building 850 Firing Table Area Summary of Ecological Hazards .......... 4
1.3.2. Pit 7 Complex Area Remedial Investigation Results .......... 5
1.3.2.1. Pit 7 Complex Area Nature and Extent of Contamination .......... 5
1.3.2.2. Pit 7 Complex Area Contaminants of Concern .......... 5
1.3.2.3. Pit 7 Complex Area Summary of Human Health Risks .......... 5
1.3.2.4. Pit 7 Complex Area Summary of Ecological Hazards .......... 6

**2. Operable Unit Background** .......... **6**
**2.1. Remedial Action Objectives** .......... **6**
2.1.1. Site-Wide ROD RAOs .......... 6
2.1.2. Building 850 EE/CA RAOs .......... 7
**2.2. Operable Unit 5 Selected Remedies** .......... **8**
2.2.1. Building 850 Firing Table Area Selected Remedy .......... 8
2.2.2. Pit 7 Complex Area Selected Remedy .......... 9
**2.3. Cleanup Standards** .......... **9**
**2.4. Remedial Design** .......... **10**
2.4.1. Building 850 Firing Table Area Remedial Design .......... 10
2.4.2. Pit 7 Complex Area Remedial Design .......... 11

**3. Construction Activities** .......... **12**
**3.1. Building 850 Firing Table Removal Action Implementation** .......... **12**
**3.2. Pit 7 Complex Remedial Action Implementation** .......... **14**
3.2.1. Ground Water Extraction and Treatment Remedial Action Implementation .......... 14
3.2.2. Pit 7 Complex Drainage Diversion System Remedial Action Implementation.. 16

**4. Performance Standards and Construction Quality Control** .......... **18**

**5. Ongoing Activities** .......... **18**

**5.1. Monitoring** ........ **18**
**5.2. Risk and Hazard Management** ........ **19**
**5.3. Inspection/Operations and Maintenance** ........ **19**
5.3.1. Building 850 CAMU I&M ........ 20
5.3.2. Pit 7-Source Ground Water Extraction and Treatment System O&M ........ 20
5.3.3. Pit 7 Drainage Diversion System I&M ........ 20
5.3.4. Pit 7 Complex Landfill Cap I&M ........ 20
**5.4. Five-Year Reviews** ........ **20**
**6. Project Costs** ........ **20**
**7. Acronyms** ........ **21**
**8. References** ........ **23**

# List of Figures

Figure 1. Location of LLNL Site 300.
Figure 2. Map of Site 300 showing operable units with ground water plume outlines and water-supply wells.
Figure 3. Map of the Building 850 area of OU5 showing cultural features, topography, monitor wells, springs, and contaminants of concern in ground water above cleanup standards.
Figure 4. Map of the Pit 7 Complex of OU5 showing cultural features, topography, monitor and extraction wells, drainage diversion system, ground water treatment system, and contaminants of concern in ground water above cleanup standards.

# List of Tables

Table 1. Building 850/Pit 7 Complex OU chronology.
Table 2. Cleanup standards for Building 850/Pit 7 Complex Operable Unit 5 ground and surface water contaminants of concern.
Table 3. Building 850 Soil Removal Action Implementation Timeline.
Table 4. Pit 7-Source (Complex) Ground Water Extraction and Treatment System Implementation Timeline.
Table 5. Pit 7 Complex Drainage Diversion System Remedial Action Implementation Timeline.
Table 6. Operable Unit (OU) 5 Five-Year Review Schedule.
Table 7. Operable Unit 5 Remedial Action Estimated and Actual Construction Costs.

# Appendices

Appendix A. Building 850 Soil Removal Action As-Built Variations from Design Specifications.

Appendix B. Building 850 Soil Removal Action Engineering Test Data and Construction Quality Assurance Field Sheets.

Appendix C. Building 850 Corrective Action Management Unit As-Built Drawings.

Appendix D. Building 850 Soil Removal Action Verification Sampling and Analysis Result Reports.

Appendix E. Building 850 Soil Removal Action Material and Product Description Sheets.

Appendix F. Pit 7-Source Ground Water Extraction and Treatment System As-Built Variations from Design Specifications.

Appendix G. Pit 7 Complex Ground Water Extraction and Treatment System As-Built Drawings.

Appendix H. Pit 7 Complex Drainage Diversion System As-Built Drawings.

Appendix I. Pit 7 Complex Drainage Diversion System As-Built Variations from Design Specifications.

Appendix J. Photographic evidence of OU 5 Remedial/Removal Action Implementation.

# 1. Introduction

This Remedial Action Completion Report (RACR) has been prepared to demonstrate remedial action completion of the Building 850/Pit 7 Complex Operable Unit (OU) of the Lawrence Livermore National Laboratory (LLNL) Site 300. LLNL Site 300 covers 11 square miles and is located in the Altamont Hills west of Tracy, California (Figure 1). The site is a restricted-access experimental testing facility where the United States (U.S.) Department of Energy (DOE) conducts research, development, and testing of high explosives and integrated non-nuclear weapons components. This work includes formulating, processing, machining, assembling, and detonating explosives.

During past Site 300 operations, surface spills and piping leaks, leaching from unlined landfills and pits, high-explosive test detonations, and disposal of waste fluids in lagoons and dry wells (sumps) resulted in contaminant releases to soil, bedrock, surface water, and ground water. Site 300 was placed on the National Priorities List (NPL) in 1990 (U.S. Environmental Protection Agency [EPA] Superfund Site Identification No. CA 2890090002). In June 1992, the U.S. EPA, the California Department of Toxic Substances Control (DTSC) and Regional Water Quality Control Board (RWQCB), and DOE signed a Federal Facility Agreement (FFA) for cleanup of the LLNL Site 300 Experimental Test Facility.

An Interim Site-Wide Record of Decision (ROD) was signed in 2001 that selected interim remedial actions for Operable Units 2 through 8 (U.S. DOE, 2001). The Pit 7 Complex portion of OU 5 was not included in the Interim Site-Wide ROD. An Amendment to the Interim Site Wide ROD (U.S. DOE, 2007) for the Pit 7 Complex was signed in January 2007. A Final Site-Wide ROD was signed in 2008 that selected cleanup standards and finalized the remedial actions for OU 5 (U.S. DOE, 2008). Remediation of the contaminated soil at Building 850 was conducted as a non-time-critical removal action as documented in the Engineering Evaluation/Cost Analysis (EE/CA) for Polychlorinated biphenyl- (PCB-), Dioxin, and Furan-contaminated Soil at the Building 850 Firing Table (Dibley et al., 2008a), and the Action Memorandum for the Removal Action at the Building 850 Firing Table (Dibley et al., 2008b). All remedial actions identified in the Site-Wide RODs and Building 850 Action Memorandum for the Building 850/Pit 7 Complex OU have been implemented as discussed below.

The following sections describe the site (Section 1.1), OU history (Section 1.2), and remedial investigation results (Section 1.3).

## 1.1. Site Description

Site 300 has been divided into nine OUs based on the nature and extent of contamination to effectively manage site cleanup. The Building 850/Pit 7 Complex OU is the fifth (OU 5) of nine OUs (Figure 2). A description of OUs 1 through 9 is presented in the Site-Wide ROD. OU 5 is divided into two areas: (1) the Building 850 Firing Table area, and (2) the Pit 7 Complex area.

### 1.1.1. Building 850 Firing Table Area Site Description

The Building 850 Firing Table area covers approximately 1 square mile in the northwestern portion of Site 300 and includes the firing table contaminant release site and areas of associated soil and ground water contamination (Figure 2). Topography, springs, monitor well locations, ground water contamination in excess of cleanup standards, and cultural features in the Building 850 Firing Table area are shown on Figure 3. In addition to the firing table and underlying bunker, two outdoor storage areas (the upper and lower Corporation Yards) existed until 2008. A mound of contaminated sand, designated the Building 850 sand pile, also existed until 2008 immediately northeast of the firing table. This sand pile consisted of material previously used in firing table operations. The Building 850 Firing Table is situated at the bottom of a steep, east-facing topographic depression. Doall Ravine, immediately east of the Building 850 area, is an incised valley that contains an ephemeral stream channel that runs southeast and then trends east-northeast. Further to the east, Doall Ravine joins Elk Ravine, a broad northwest-southeast trending valley.

### 1.1.2. Pit 7 Complex Area Site Description

The Pit 7 Complex area is located in the northwest portion of Site 300 (Figure 2) and consists of the Pit 3, 4, 5, and 7 Landfills. Topography, springs, monitor well locations, and cultural features in the Pit 7 Complex are shown on Figure 4. The Pit 7 Complex is located within a broad northwest-southeast trending valley. The longitudinal axes of Pits 3, 4, 5, and 7 are parallel to the valley axis. A shallow ephemeral drainage channel occupies the east side of this valley and extends from the Pit 7 Complex to the southeast to a point several hundred feet (ft) east of Building 850. Storm water generally runs off slopes and rapidly infiltrates alluvium and colluvium. Water flows in the channel on the west side of the Pit 7 Complex valley during and after high intensity storms. Otherwise, surface water is not present in the area. Elevation ranges from about 1,700 ft above mean sea level (msl) at the ridge top to the west of the Pit 7 Complex to about 1,300 ft above msl in the valley bottom.

## 1.2. OU History

A chronology of important events for the OU is shown in Table 1. A detailed construction chronology is presented in Section 4.

### 1.2.1. Building 850 Firing Table Area Site History

The Building 850 Firing Table was constructed in 1958 and was the first concrete-reinforced bunker at Site 300. The firing table was used to test and develop detonators for prototypical nuclear weapons and armor-piercing projectiles. Diagnostic operations included high-speed photography. No experiments were conducted with fissile materials such as enriched uranium or plutonium. The Building 850 bunker is located directly adjacent to the firing table and the rear of the building abuts the elevated firing table. The front (east side) of Building 850 is at normal ground surface. The firing table and the roof of Building 850 was covered with up to 5 ft of pea gravel used to absorb shot blasts and minimize impact to bunker occupants. The Building 850 Firing Table was routinely rinsed down with 1 to 2 inches of water after each experiment to reduce dust and prevent hazardous material from being re-suspended in the air. From 1962 to

1972, a large volume of sand, the Building 850 sandpile, was stockpiled near Building 850 and was periodically used during large experiments.

Over 95% of the approximately 22,670 curies (Ci) of tritium shipped to Site 300 were used in hydrodynamic experiments at the Building 850 Firing Table (Buddemeier, 1985). The vast majority of tritium was used between 1963 and 1978, primarily in gaseous form ($^3H_2$), although some solid lithium tritide was also used. In addition to tritium, the test assemblies contained high explosives and occasionally depleted uranium. Some of the explosives and test assemblies contained small quantities of barium, beryllium, copper, lead, and vanadium and utilized a variety of materials including wood-frame structures, tent poles, aluminum, plastic, burlap bags, metal cable, 10-ton rebar-reinforced concrete blocks, lead bricks, copper cylinders, and metal silos. Prior to PCBs becoming regulated substances, an estimated 1,000 capacitors were destroyed on the Building 850 Firing Table. The capacitors were used to provide a sudden burst of electrical energy during 10 to 20 experiments (50 to 100 capacitors per experiment) conducted from 1964 to 1967.

From 1959 to 1988, gravel and experimental debris from the Building 850 Firing Table was routinely disposed in the Pit 7 Complex landfills.

Activities at Building 850 and the firing table ceased and the building was closed in 2008.

### 1.2.2. Pit 7 Complex Area Site History

DOE/LLNL used the Pit 7 Complex landfills to dispose firing table debris and gravel. These pits were constructed by excavating topsoil and alluvial materials to an average depth of 15 to 20 ft (Taffet et al., 1989). The pits were filled incrementally from southeast to northwest with the exception of Pit 5, which was filled from northwest to southeast (Simmons, 1992). The majority of the waste material in the pits came from the firing tables at Buildings 850 and 851, where aboveground detonations were conducted. DOE/LLNL typically removed gravel and experimental debris from the firing tables and deposited them in the pits after the gravels became too compacted to deaden the shock produced during detonations. The shock generated by explosives shots pulverizes the gravel into smaller size fractions. The resulting fine-grained material is denser and more compact than the original gravel and poorly attenuates the vibration caused by the explosives test. The waste placed in the pits included wood, plastic, material and debris from tent structures, pea gravel, and exploded test assemblies, some of which contained tritium and depleted uranium.

The debris disposed in the Pit 7 Complex contains the majority of the tritium residue disposed in Site 300 landfills (Buddemeier, 1985). Metals, including depleted uranium, were also used in explosive tests. Depleted uranium is natural uranium from which most of the uranium-235 isotope has been removed, leaving the less radioactive uranium-238 as the dominant remaining isotope.

In 1992, an engineered cap was constructed over the Pit 7 Landfill (referred to as the Pit 7 Cap) in compliance with Resource Conservation and Recovery Act (RCRA) requirements. The design included interceptor trenches and surface water drainage channels, a top vegetative layer to prevent erosion, a biotic barrier layer to minimize animal burrowing, and a clay layer of very low permeability to prevent infiltration of precipitation and shallow subsurface interflow that could result in leaching of contaminants. The Pit 7 cap also covers 100% of Pit 4 and approximately 25–30% of Pit 3. More complete information on the cap design is presented in

Volume II, Closure and Post-Closure Plans, Landfill Pits 1 and 7 (Rogers/Pacific Corporation, 1990). The original compacted native soil cover on most of Pit 3 and all of Pit 5 remains intact.

## 1.3. Remedial Investigation Results

### 1.3.1. Building 850 Firing Table Area Remedial Investigation Results

#### *1.3.1.1. Building 850 Firing Table Area Nature and Extent of Contamination*

Details of the nature and extent of contamination in the Building 850 Firing Table area are discussed in Chapter 11, Section 11-4 of the Site-Wide Remedial Investigation report (Webster-Scholten, 1994), Chapter 2 of the Addendum to the Site-Wide Remedial Investigation for the Building 850/Pit 7 Complex (Taffet et al., 1996), the Ground Water Tritium Plume Characterization Summary report (Ziagos and Reber-Cox, 1998), Chapter 1 of the Site-Wide Feasibility Study (Ferry et al., 1999), and the EE/CA for PCB-, Dioxin-, and Furan-Contaminated Soil at the Building 850 Firing Table.

The results of the ground water monitoring and risk and hazard management activities are described in the Semi-annual Site 300 Compliance Monitoring Reports.

#### *1.3.1.2. Building 850 Firing Table Area Contaminants of Concern*

Contaminants of concern (COCs) have been identified for impacted environmental media in the Building 850 Firing Table area:

- Surface soil: Polychlorinated biphenyls (PCBs), high melting explosive (HMX), dioxins, furans, depleted uranium, beryllium, cadmium, and copper.
- Subsurface soil: Tritium and uranium.
- Surface water (Well 8 Spring): Tritium.
- Ground water: Tritium, depleted uranium, nitrate, and perchlorate.

#### *1.3.1.3. Building 850 Firing Table Area Summary of Human Health Risks*

The baseline risk assessment performed for the Building 850 Firing Table area estimated an excess cancer risk of $5 \times 10^{-4}$ (five in ten thousand) for onsite workers from inhaling/ingesting resuspended particulates and direct dermal contact with surface soil contaminated with PCBs and an excess cancer risk of $1 \times 10^{-4}$ (one in ten thousand) was estimated for onsite workers from inhaling/ingesting resuspended particulates and direct dermal contact with surface soil contaminated with chlorinated dibenzo-p-dioxins (CDDs) and dibenzofurans (CDFs).

The baseline risk assessment also estimated an excess cancer risk of $1 \text{ x } 10^{-3}$ (one in one thousand) for onsite workers from inhaling/ingesting tritium in surface water at Well 8 Spring.

There was no unacceptable risk or hazard identified for offsite residents, associated with tritium and uranium in subsurface soil/rock, or associated with tritium, uranium, nitrate, and perchlorate in ground water in the Building 850 Firing Table area.

#### *1.3.1.4. Building 850 Firing Table Area Summary of Ecological Hazards*

The baseline ecological assessment determined a risk from copper, zinc, cadmium and PCBs/CDDs/CDFs existed for ground squirrels, deer and kit fox at Building 850. Individual adult ground squirrels and individual adult and juvenile deer are at risk from ingestion of cadmium. The combined oral and inhalation pathway Hazard Quotient (HQ) exceeded 1 for these species, which was driven by the oral pathway. Individual ground squirrels, deer and kit fox were determined to be at risk from PCBs/CDDs/CDFs due to the capacity of these contaminants to bioaccumulate in the environment. Kit foxes have never been observed in any ecological surveys at Site 300 or by Site 300 personnel working at the site. Risk for this sensitive species was evaluated due to the presence of potential habitat at Site 300.

No unacceptable hazard to ecological receptors for surface water in Well 8 Spring has been identified.

A preliminary exposure analysis for the Western Burrowing Owl to estimate hazard to cadmium and PCBs was completed in 2004 and reported in the First Semester 2004 Compliance Monitoring Report (Dibley et al., 2004). Results suggest cadmium is unlikely to pose a hazard to burrowing owls nesting in the vicinity of Building 850. However, concentrations of PCBs in the soil at Building 850 may pose a hazard to burrowing owls nesting in the area, as the HQ exceeds 1.

### 1.3.2. Pit 7 Complex Area Remedial Investigation Results

#### *1.3.2.1. Pit 7 Complex Area Nature and Extent of Contamination*

Details of the nature and extent of contamination in the Pit 7 Complex area are discussed in Chapter 11, Section 11-4 of the Site-Wide Remedial Investigation Report, Chapter 2 of the Site-Wide Remedial Investigation Addendum, and the Ground Water Tritium Plume Characterization Summary report. The Building 850 EE/CA and the Remedial Investigation/Feasibility Study for the Pit 7 Complex (Taffet et al., 2008) screened and evaluated remedial alternatives.

The results of the ground water monitoring and risk and hazard management activities will be reported in the Semi-annual Site 300 Compliance Monitoring Reports beginning in the First Semester of 2010.

#### *1.3.2.2. Pit 7 Complex Area Contaminants of Concern*

Contaminants of concern (COCs) have been identified for impacted environmental media in the Pit 7 Complex area:

- Surface soil: None.
- Subsurface soil: Tritium and uranium.
- Surface water: None.
- Ground water: Volatile organic compounds (VOCs), tritium, uranium, nitrate, and perchlorate.

#### *1.3.2.3. Pit 7 Complex Area Summary of Human Health Risks*

The Pit 7 Complex risk assessment estimated an excess cancer risk of $4 \times 10^{-6}$ (four in one million) for onsite workers inhaling tritiated water evaporating from subsurface soil in the vicinity of the Pit 3 Landfill.

In 2007, the risk to onsite workers for inhalation of tritium vapors from the Pit 3 Landfill was recalculated, accounting for tritium decay that occurred between 1992 and 2007, for the Pit 7

Complex Remedial Design Document (Taffet et al., 2008). An excess cancer risk of 8 x $10^{-7}$ was estimated for a worker spending 8 hours a day, 5 days a week for 25 years at the Pit 3 Landfill. There is no longer an unacceptable risk to onsite worker health posed by contaminants in the Pit 7 Complex area. No unacceptable risk was identified for offsite residents.

There was no unacceptable risk or hazard identified for offsite residents, associated with tritium and uranium in subsurface soil/rock, or associated with VOCs, tritium, uranium, nitrate, and perchlorate in ground water in the Pit 7 Complex area.

#### *1.3.2.4. Pit 7 Complex Area Summary of Ecological Hazards*

No unacceptable hazard to ecological receptors has been identified.

# 2. Operable Unit Background

This section summarizes the Remedial Action Objectives (RAOs) applicable to the OU (Section 2.1), the selected remedies (Section 2.2), the OU cleanup standards (Section 2.3), and the remedial design (Section 2.4).

## 2.1. Remedial Action Objectives

The Remedial Action Objectives (RAOs) applicable to the Building 850/Pit 7 Complex OU were presented in the Final Site-Wide ROD and the Building 850 EE/CA.

### 2.1.1. Site-Wide ROD RAOs

The Site-Wide ROD RAOs applicable to the Building 850/Pit 7 Complex OU are:

For Human Health Protection:

- Restore ground water at Building 850 and the Pit 7 Complex containing contaminant concentrations above cleanup standards.
- Prevent human ingestion of ground water at Building 850 and the Pit 7 Complex containing contaminant concentrations (single carcinogen) above cleanup standards.
- Prevent human incidental ingestion and direct dermal contact with contaminants in Building 850 surface soil that pose an excess cancer risk greater than $10^{-6}$ or hazard index greater than 1, a cumulative cancer risk (all carcinogens) in excess of $10^{-4}$, or a cumulative hazard index (all noncarcinogens) greater than 1.
- Prevent human inhalation of tritium volatilizing from subsurface soil at the Pit 7 Complex to air that pose an excess cancer risk greater than $10^{-6}$ or hazard index greater than 1, a cumulative excess cancer risk (all carcinogens) in excess of $10^{-4}$, or a cumulative hazard index (all noncarcinogens) greater than 1.
- Prevent human inhalation of tritium volatilizing from surface water at Building 850 (Well 8 Spring) to air that pose an excess cancer risk greater than $10^{-6}$ or hazard index greater than 1, a cumulative excess cancer risk (all carcinogens) in excess of $10^{-4}$, or a cumulative hazard index (all noncarcinogens) greater than 1.
- Prevent human inhalation of contaminants bound to resuspended surface soil particles at Building 850 that pose an excess cancer risk greater than $10^{-6}$ or hazard index greater

than 1, a cumulative excess cancer risk (all carcinogens) in excess of $10^{-4}$, or a cumulative hazard index (all noncarcinogens) greater than 1.

- Prevent human exposure to contaminants in media of concern at Building 850 and the Pit 7 Complex that pose a cumulative excess cancer risk (all carcinogens) greater than $10^{-4}$ and/or a cumulative hazard index greater than one (all noncarcinogens).

For Environmental Protection:

- Restore water quality at Building 850 and the Pit 7 Complex to ground water cleanup standards within a reasonable timeframe and prevent plume migration to the extent technically practicable. Maintain existing water quality that complies with ground water cleanup standards to the extent technically practicable. This will apply to both individual and multiple constituents that have additive toxicology or carcinogenic effects.
- Ensure ecological receptors important at the individual level of ecological organization (listed threatened or endangered, State of California species of special concern) do not reside in areas at Building 850 where relevant hazard indices exceed 1.
- Ensure existing contaminant conditions at Building 850 and the Pit 7 Complex do not change so as to threaten wildlife populations and vegetation communities.

There is no remedial action objective for human health protection/Applicable or Relevant and Appropriate Requirements (ARARs) compliance for ingestion of surface waters (i.e., water from Site 300 springs) because there is not a complete exposure pathway for ingestion of surface waters for humans at Site 300. Humans do not drink water from Site 300 springs. In addition, the springs in which contaminants are detected do not produce a sufficient quantity of water to be used as a water-supply (greater than 200 gallons per day). Cleanup standards for ground water and surface water in the Building 850/Pit 7 Complex OU 5 are discussed in Section 2.3.

### 2.1.2. Building 850 EE/CA RAOs

Additional RAOs for the cleanup of PCB, dioxin and furan-contaminated soil at Building 850 as presented in the Building 850 EE/CA are:

1. Mitigate risk to onsite workers by remediating Building 850 soil and sandpile materials that contain PCB concentrations in excess of U.S. EPA Region 9 industrial soil Preliminary Remediation Goal (PRG) of 0.74 milligrams per kilogram (mg/kg) and dioxin and furan compounds in excess of the U.S. EPA Region 9 industrial soil PRG of $1.6 \times 10^{-5}$ mg/kg for 2,3,7,8-tetrachloro-di-benzodioxin (TCDD).
2. Mitigate potential hazard to burrowing owls associated with the PCB-, dioxin-, and furan-contaminated soil. The U.S. EPA Region 9 industrial soil PRG soil cleanup levels for PCBs, dioxins, and furans are sufficiently low to protect ecological receptors.

The U.S. EPA Region 9 industrial soil PRGs for PCBs, and for 2,3,7,8-TCDD to represent dioxin and furan compounds, were selected as the cleanup standards for contaminated surface soil at Building 850 in the Interim Site-Wide Record of Decision (DOE, 2001).

## 2.2. Operable Unit 5 Selected Remedies

### 2.2.1. Building 850 Firing Table Area Selected Remedy

The implemented remedies for the Building 850 Firing Table area were selected in the Interim Site-Wide ROD, Final Site-Wide ROD, and the Action Memorandum for the Removal Action at the Building 850 Firing Table.

These remedies include:

- No Further Action for HMX, beryllium, cadmium, copper, and uranium in surface soil (selected in the Interim Site-Wide ROD).
- No Further Action for tritium and depleted uranium in subsurface soil/rock (selected in the Interim Site-Wide ROD).
- Monitored Natural Attenuation (MNA) to reduce tritium activities in ground water and surface water to cleanup standards (selected in the Interim and Final Site-Wide RODs).
- Monitoring ground water and surface water to evaluate the effectiveness of the remedy in achieving cleanup standards (selected in the Interim and Final Site-Wide RODs).
- Institutional/land use controls to prevent human exposure to contamination and to protect the integrity of the remedy (selected in the Interim and Final Site-Wide RODs and Building 850 Action Memorandum).
- Excavation, and onsite solidification and consolidation of contaminated soil and sandpile (selected in the Building 850 Action Memorandum).

Active remediation measures for tritium, uranium and nitrate in ground water were not included in the remedy because:

- The source of tritium in the vadose zone was rapidly decreasing in mass, and tritium in ground water will naturally attenuate to meet the cleanup standard in a reasonable timeframe time without migrating offsite.
- Uranium activities in ground water were below the cleanup standard and its extent is limited.
- Data do not indicate the presence of a significant source of nitrate in the Building 850 Firing Table area, and the extent of nitrate with concentrations exceeding the cleanup standard is limited and does not pose a threat to human health or the environment.

Based on the recent identification of perchlorate in ground water, DOE will conduct an *in situ* bioremediation treatability study for perchlorate in ground water and discuss possible remedial measures with the regulatory agencies. Public input will be solicited prior to the selection of any remedial action for perchlorate in ground water. The selected remedy will be documented in an Amendment to the Site–Wide ROD.

The only Building 850 Firing Table area remedy component that required construction was the excavation and onsite solidification and consolidation of contaminated soil and the sandpile. The implementation of this remedy is described in Section 3.1.

### 2.2.2. Pit 7 Complex Area Selected Remedy

The implemented remedies for the Pit 7 Complex area were selected in the Amendment to the Amendment to the Interim Site-Wide ROD for the Pit 7 Complex and the 2008 Site-Wide ROD.

These remedies include:

- Monitoring ground water and surface water to determine if the cleanup is adequately protecting human health and the environment and to evaluate the effectiveness of the remedy in achieving cleanup standards.
- Risk and hazard management, including institutional/land use controls, to prevent human exposure to contamination and to protect the integrity of the remedy.
- MNA to reduce tritium activities in ground water and surface water to cleanup standards.
- Extracting and treating ground water to reduce uranium, perchlorate, nitrate, and VOC concentrations in ground water to meet cleanup standards.
- Installing an engineered drainage diversion system to hydraulically isolate the contaminant sources in the landfills and underlying bedrock from subsurface water, thereby preventing infiltration of rainwater runoff that can result in ground water rising into Pits 3, 4, 5, and 7 and releasing contaminants.
- Inspecting the Pit 3, 4, 5, and 7 Landfill covers periodically for damage that could compromise integrity and repair any damage found.

Active remediation measures for tritium in ground water were not included in the remedy because tritium in ground water will naturally attenuate to meet the cleanup standard in a reasonable timeframe time without migrating offsite.

Two Pit 7 Complex area remedy components required construction: 1) extraction and treatment of ground water and 2) installation of a drainage diversion system. Implementation of these remedial actions is described in Sections 3.2.1 and 3.2.2.

## 2.3. Cleanup Standards

The cleanup standards selected in the Site-Wide Final ROD (DOE, 2008) for ground water and surface water at OU 5 are Federal Maximum Contaminant Levels (MCLs) unless California State MCLs are more stringent. The cleanup standards for the Building 850 Firing Table area soil were selected in the 2001 Interim ROD and presented in the Building 850 Action Memorandum. The cleanup standards for OU 5 COCs are presented in Table 2.

As presented in the Site-Wide ROD, DOE will prepare a technical and economic feasibility analysis as part of the Five-Year Review after ground water contaminant concentrations have been reduced to MCLs. This analysis will be used to determine the technical and economic feasibility of continuing remediation to further reduce contaminant concentrations below MCLs, in accordance with State Water Resources Control Board Resolution 92-49. A range of values will be considered down to water quality numeric limits or background. The technical and economic feasibility analyses will be reviewed and approved by the RWQCB, DTSC, and EPA. If DOE and the regulatory agencies then agree that it is technically and economically feasible, remediation would continue. If it is reasonable to conduct the feasibility analysis sooner than at the Five-Year Review (e.g., contaminant concentrations are reduced below MCLs soon after a Five-Year Review has been completed), DOE will discuss accelerating the feasibility analysis with the regulatory agencies. Any changes to ground water cleanup standards will be proposed to the community and take effect through a ROD amendment.

## 2.4. Remedial Design

### 2.4.1. Building 850 Firing Table Area Remedial Design

The wellfield to monitor tritium, uranium, and nitrate in Building 850 area ground water was in place and approved by the regulatory agencies prior to the Remedial Design. Ground water monitoring wellfields are described and updated in the Site-Wide Compliance Monitoring Reports.

Excavation of PCB-, dioxin-, and furan-contaminated soils to meet U.S. EPA Region 9 industrial soil PRGs soil cleanup levels and offsite disposal was selected in the 2001 Interim ROD. A Remedial Design was completed in 2004 for the excavation and offsite disposal of contaminated soil in the OU. In 2001, the estimated cost to excavate and dispose of the contaminated soil and sandpile was approximately $1.4 million (M). By the time the Interim Remedial Design Report for Building 850 was prepared, the estimated volume of contaminated soil increased as well as the cost of excavation, transportation, and disposal, increasing the total cost estimate to $4.8 M. DOE scheduled the activity to be completed in fiscal year (FY) 2006. As the planning for the FY 2006 activity proceeded, the cost estimates for the excavation, transportation, and disposal of contaminated soil increased to over $8M. As a result, the interim remedy identified for the contaminated soil at the Building 850 Firing Table in 2001 was no longer considered economically practicable. In addition, more cost-effective technologies were identified that were capable of addressing the PCBs, dioxins, and furans in an equally protective manner.

In 2006, DOE, the U.S. EPA, DTSC, and the RWQCB agreed to conduct remediation of PCB-, dioxin-, and furan-contaminated soil at the Building 850 Firing Table as a Non-Time Critical Removal Action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Additional sampling and analysis of the sandpile was performed in 2006 showed that the current maximum tritium activities were not a threat to ground water. However, PCBs were detected in the sandpile at concentrations of up to 50.4 milligrams per kilogram (mg/kg). Based on these data, DOE requested that the sandpile be included in this removal action. The three regulatory agencies agreed. A Final EE/CA was submitted in February 2008.

A public meeting was held on March 6, 2008 and the Building 850 Action Memorandum was submitted in April 2008. The Building 850 Removal Action design was approved by the regulatory agencies in May 2008. The design included the excavation of contaminated soil, verification sampling and analysis, soil solidification, and consolidation in a Corrective Action Management Unit, drainage system enhancements and slope stability analysis, slope restoration, and ongoing inspection and maintenance.

The specific design details of the Building 850 Soil Removal Action were presented in the Building 850 EE/CA and the construction subcontractor's 100% design submittal (SCS Engineers, 2009). Variances from the original design are presented in Appendix A.

### 2.4.2. Pit 7 Complex Area Remedial Design

The wellfield to monitor tritium, uranium, nitrate, VOCs, and perchlorate in Pit 7 Complex area ground water was in place and approved by the regulatory agencies prior to the Remedial Design. Ground water monitoring wellfields are described and updated in the Site-Wide Compliance Monitoring Reports.

The Remedial Design Document for the Pit 7 Complex was completed in 2008 and presented the design for the Pit 7 Hydraulic Drainage Diversion System and the Pit 7-Source ground water extraction and treatment system.

The Drainage Diversion System was designed to prevent further releases of COCs from the pits and underlying bedrock to ground water. When the rainfall increased to above normal levels, such as during El Niño years, the pit waste and underlying bedrock were often inundated and residual contamination came into contact with shallow subsurface ground water. This system was designed to divert a significant volume of water during intense, El Niño-type rainfall events. The water from the western hillslope is diverted and discharged to the watershed north of the Pit 7 watershed and will not recharge the hydrostratigraphic units (HSUs) in the Pit 7 watershed, which is hydraulically isolated from the watershed to the north. The water diverted from the eastern hillslope stays within the watershed but is discharged south of the landfills at a distance of about 270 ft south of Pit 5 and about 450 ft southeast of Pit 7. Because the alluvial channel fill and weathered bedrock HSU (Qal/WBR) is highly permeable compared to the underlying bedrock, this infiltrating water will quickly recharge the Qal/WBR HSU and flow downgradient (south). Any short-term water table rises would occur further downgradient at distances that will not affect the landfills or underlying contaminated bedrock. Because water is diverted prior to entering the pits, it is devoid of contaminants and therefore will not adversely impact the water quality for downstream users, springs, or wetlands. The diversion system was also designed to minimize the creation of wetlands, by discharging to areas where infiltration is fairly rapid, and does not significantly alter the regional recharge conditions in the Pit 7 Complex or the overall ground water basins. There are four components that comprise the drainage diversion system (Figure 4):

1. A subsurface drainage network on the western hillslope.
2. Upgraded riprap at the end of the existing north-flowing concrete channel for the Pit 7 landfill cap.
3. A vegetated surface water diversion swale along the base of the eastern hillslope along the paved road (Route 4), including several culverts under Route 4 and dirt fire trails.
4. An upgraded surface water-settling basin at the south end of the existing south-flowing concrete channel for the Pit 7 landfill cap.

The Pit 7-Source extraction and treatment system was designed to remove uranium, VOCs, perchlorate, and nitrate from ground water in the vicinity of the Pit 7 Complex (see Figure 4). The wellfield configuration was designed to target the highest depleted uranium concentrations in the Qal/WBR HSU and capture ground water containing uranium, perchlorate, and VOCs in excess of cleanup standards in both the Qal/WBR and Neroly bedrock ($Tnbs_0$) HSUs. Currently, local nitrate concentrations proximal to the landfills are below the cleanup standard. However, nitrate is removed from extracted ground water as part of the treatment process. Aqueous-phase granular activated carbon (GAC) is used to remove VOCs present in extracted ground water, and ion-exchange resins are used to remove uranium, nitrate, and perchlorate. The treatment facility effluent is monitored for compliance with effluent discharge limits and then discharged to an infiltration trench. Because there is currently no viable technology available to treat tritiated ground water, the treated water containing only tritium is reintroduced to the subsurface through the infiltration trench.

The design details of the Pit 7 Drainage Diversion System and Pit 7-Source ground water extraction and treatment system were presented in the Remedial Design Document for the Pit 7 Complex (Taffet et al., 2008) and the Drainage Diversion System construction subcontractor's 100% design submittal (SCS Engineers, 2009). Variances from the original design for the Pit 7-Source ground water extraction and treatment system and the Pit 7 Drainage Diversion System are presented in Appendices G and I, respectively.

# 3. Construction Activities

This section provides a description of the remedial action implementation and construction activities for the Building 850 Firing Table Soil Removal Action, the Pit 7-Source ground water extraction and treatment system, and the Pit 7 Complex Drainage Diversion System.

## 3.1. Building 850 Firing Table Removal Action Implementation

The Building 850 Removal Action field implementation began in May 2009. Before beginning full-scale activities, a soil solidification test fill demonstration was conducted from May 11 through 14, 2009 to verify the performance of the soil-cement mix design and lift thickness in meeting or exceeding parameters for unconfined compressive strength, density, mixing, cement application, and compaction. A report summarizing the test fill demonstration process, test results, and recommendations was submitted to the regulatory agencies (Appendix D). Design changes resulting from the test fill demonstration included reducing lift thickness from 18 to 12 inches and eliminating volume increase (swell) testing (Appendix A, Table A-1). The regulatory agencies concurred with these test fill demonstration report recommendations.

On June 8, 2009, soil excavation commenced in the Upper Corporation Yard (Phase 1) within the footprint of the area where the excavated soil would be solidified and consolidated to create the CAMU (Figure 3). Phase 1 also included some adjacent areas outside the CAMU footprint. Following verification that contaminated soil with concentrations exceeding soil cleanup standards had been excavated in this area, the underlying non-engineered clean fill was excavated to a maximum depth of 25 feet (ft). The excavated clean fill was staged in the Lower Corporation Yard for use in constructing the outer shell of the CAMU. At the conclusion of fill excavation, a several foot thick layer of engineered clean fill was compacted to provide a competent base for the CAMU. Excavation of contaminated soil on the hillslopes commenced and proceeded until contaminated soil had been excavated from the Phase 2-7 hillslope areas to meet soil cleanup standards. As the soil was excavated, it was placed in staging areas within the areas of contamination prior to solidification.

To construct the CAMU, the contaminated soil was laid down in 12-inch lifts within the subgrade excavation in the Upper Corporation Yard, mixed with 5% Portland cement and water, and compacted. Once the original grade was reached, lay down and solidification of 12-inch thick lifts of soil continued with the outer 5 ft of soil being mixed with 10% Portland cement. The edges of the CAMU slopes generally consist of a minimum 3 ft thickness of clean fill containing 10% cement. Several layers were a minimum 1 ft thickness of clean soil. The top of the CAMU consists of a 5 ft thickness of soil mixed with 10% Portland cement and is composed of at least 1 ft of clean fill, underlain by 4 ft of contaminated soil.

In total, 27,592 cubic yards ($yd^3$) of PCB-, dioxin-, and furan-contaminated soil were excavated from the Building 850 Upper Corporation Yard and hillslopes surrounding the Building 850 firing table. The EE/CA report estimated that 15,544 $yd^3$ of contaminated soil would be removed. However, additional contamination was discovered both vertically and laterally during verification sampling and analysis. Soil samples were collected for PCB and dioxin/furan analysis following soil excavations in accordance with the approved Sampling and Analysis Plan. Some modifications to the original Sampling and Analysis Plan were needed due to the additional volume and extent of contaminated soil encountered during excavation and occurrence of bedrock at the bases of excavations. These modifications were discussed with and approved by the regulatory agencies. All sampling locations and the lateral and vertical extents of all excavations were located using a Global Positioning System (GPS), and final excavation depths were verified by GPS and field measurements.

Two Verification Sampling and Analysis Reports (VSARs) for the excavation Phase 1 and Phase 2-7 were submitted to the U.S. EPA, the California DTSC, and the RWQCB on June 25, 2009 and January 20, 2010, respectively (Appendix D). EPA, DTSC, and the RWQCB concurred that soil excavation to meet PCB, dioxin, and furan cleanup standards had been achieved as specified in the 2001 Interim ROD and the Building 850 Action Memorandum (DOE, 2008). The VSARs, which describe soil excavation activities and sampling and analysis activities and results in more detail, are provided in Appendix D.

As soil excavation was completed in each excavation phase area, slope restoration measures were implemented to limit erosion and control sediment runoff from the hillslopes, such as hydroseeding to promote the re-establishment of vegetation and the placement of fiber rolls to reduce sediment transport. Drainage features were also enhanced and/or constructed on and around the CAMU that provide for erosion control and reduce sediment discharge.

As stated above, at project completion in January 2010, 27,592 $yd^3$ of soil were solidified and compacted (in-place) in the CAMU. Of this total, 21,007 $yd^3$ of soil (all contaminated) were solidified with 5% Portland cement and 6,586 $yd^3$ (contaminated and clean) were solidified with 10% Portland cement. The difference in soil volume excavated and solidified and the volume of solidified soil in-place is due to compaction (20-25%). Approximately 4,000 $yd^3$ of excess clean fill remaining in the Lower Corporation Yard were compacted, stabilized, and hydroseeded to prevent erosion.

The solidified soil and engineered fill met or exceeded performance criteria for unconfined compressive strength, density, mixing, cement application, and compaction. Variances from the original design are presented in Appendix A. The Engineering Test Data and Construction Quality Assurance (CQA) Field Sheets are presented in Appendix B. As-Built drawings for the Building 850 CAMU are presented in Appendix C. The excavation verification sampling and analysis reports are presented in Appendix D. The Building 850 Removal Action Material and Product Description Sheets are presented in Appendix E.

The timeline for the remedy implementation is presented in Table 3.

## 3.2. Pit 7 Complex Remedial Action Implementation

### 3.2.1. Ground Water Extraction and Treatment Remedial Action Implementation

Construction of the Pit 7-Source ground water extraction and treatment system was initiated October 1, 2007. However, due to conflicts and delays with the Pit 7 Complex Drainage Diversion System construction that was occurring simultaneously, the construction of the treatment system was stopped.

Construction of the extraction and treatment system resumed in April 2008, following completion of the Drainage Diversion System. Testing and verification of the Pit 7-Source system was conducted in January 2009 to ensure that all mechanical, electronic/electrical, and chemical components of the facility and wellfield were operating to meet remediation and monitoring requirements. However, the testing and verification process was stopped prior to completion due to failure of the compressor and the data acquisition system. Evaluation of the data collected during testing and verification and subsequent data indicated additional issues.

A facility assessment was planned to evaluate system performance to address the issues identified during the testing and verification process and to meet remediation and monitoring requirements. However, the facility assessment and design modifications were delayed due to a significant diversion of resources required to meet the LLNL Livermore Site treatment system restart deliverables. This delay was reported to and the higher prioritization of the Livermore Site work was concurred with by the regulatory agencies. The Pit 7-Source system assessment was initiated in October 2009 following restart of the Livermore Site facilities. The results of this assessment were used to design modifications to the system to meet remediation and monitoring requirements.

Issues identified during the initial facility testing and verification, the subsequent facility assessment, and the solutions/system modifications designed to address these issues are described in Appendix F.

Three existing monitor wells, NC7-25, NC7-63, and NC7-64, were converted to extraction wells and three wells were drilled to serve as extraction wells (W-PIT7-2305, W-PIT7-2306, and W-PIT7-2307). Existing monitor well W-PIT7-1918 was planned to be converted to an extraction well as part of the original wellfield design. However, the well was later found to be unsuitable for use as an extraction well because did not yield sufficient water, and the small (2-inch) well casing would not allow for the deployment of the required extraction and monitoring equipment. This well will continue to be for ground water monitoring.

Six wells were connected to the treatment facility to extract uranium, VOCs, nitrate, and perchlorate from ground water in the Pit 7 Complex area. Five of the extraction wells are completed in the Quaternary alluvium/Weathered bedrock (Qal/WBR) HSU (NC7-63, NC7-64, W-PIT7-2305, W-PIT7-2306, and W-PIT7-2307) and one extraction well (NC7-25) is completed in the $Tnbs_0$ bedrock HSU. The $Tnbs_0$ HSU well NC7-25 will only be pumped when ground water elevations in the overlying Qal/WBR HSU are sufficiently low to avoid pulling depleted uranium and other contaminants in the Qal/WBR HSU into the $Tnbs_0$ HSU. These conditions are most likely to occur in late summer/early fall towards the end of the dry season. In order to be able to continue monitor contaminant concentrations in well NC7-25 until pumping from this well begins, the pump in this well will not be deployed until the hydrologic conditions previously discussed are met.

As discussed in the Remedial Design for the Pit 7 Complex, ground water extraction and treatment is being conducted using a phased approach because the Pit 7 Complex Drainage Diversion System affects the local hydrologic conditions by reducing ground water recharge in the vicinity of the Pit 7 Complex. As a result, the extent of saturation and volume of ground water available for pumping will likely be reduced in the area of ground water extraction. Once the effects of the drainage diversion system on hydrologic conditions and the capture zones for the existing extraction wells have been evaluated, it is currently planned to install three additional extraction wells.

Extracted ground water is filtered to remove suspended particulates prior to entering the treatment media. Water from the extraction wells is piped to a batch tank in the treatment facility enclosure.

The treatment facility influent from the batch tank is piped to three ion-exchange resin canisters for the removal of uranium. The water is then piped through three ion-exchange canisters containing Sybron SR-7™, a nitrate-selective resin ion-exchange resin that is also effective in removing perchlorate. Ground water that has been treated to remove uranium, nitrate, and perchlorate is then piped through three aqueous-phase GAC canisters to remove VOCs.

Water between the GAC, uranium ion-exchange, and nitrate/perchlorate ion exchange resins will be monitored for breakthrough to prevent the discharge of water above the facility effluent limitations. The facility effluent will also be monitored to ensure effluent discharge limitations specified in the Site-Wide ROD (DOE, 2008) are met prior to discharge to the infiltration trench.

An infiltration trench was constructed southeast of the landfills by which the treated water is discharged into the unsaturated part of the shallow Qal/WBR HSU. During construction, the length of the infiltration trench was increased from 80 ft to 100 ft long. This modification will increase its capacity and allow for more flexibility if additional extraction wells are needed to optimize cleanup in the future. An aboveground pipeline was constructed to connect the treatment facility to the infiltration trench.

A horizontal pipe with 0.5-in diameter holes every 2 inches was placed along the entire length of the trench to convey water into the trench. The trench was backfilled with a 7 ft thickness of drain rock. A layer of high-density polyethylene (HDPE) was placed above the drain rock to: (1) prevent overlying native fill soil from entering the drain rock, (2) reduce the potential for tritium-bearing water vapor to evaporate to ambient air at ground surface, and (3) prevent surface runoff from entering the infiltration trench. The upper 3 feet of the trench above the HDPE layer was backfilled with compacted native soil to grade. Two piezometers (W-PIT7-2419 and W-PIT7-2420) were installed in the trench and equipped with dedicated pressure transducers to record water levels within the trench to ensure that overfilling of the trench does not occur that could create an upward water pressure resulting in a potential breach in the integrity of the HDPE membrane.

Construction/modification of the Pit 7-Source system was completed in March 2010. The ground water extraction and treatment system started operating on March 16, 2010. Startup compliance sampling of the system effluent was conducted on March 18 and samples were submitted to the analytical laboratory for VOC, uranium, nitrate, and perchlorate analyses. VOC, nitrate, and perchlorate concentrations in the samples were below the method detection limit and effluent limitations, and uranium activities were below the effluent limitation.

Appendix F summarizes the Pit 7-Source ground water extraction and treatment system configuration and presents variances from the original design. As-Built drawing for the Pit 7-Source ground water extraction and treatment system are presented in Appendix G.

The timeline for the remedy implementation is presented in Table 4.

### 3.2.2. Pit 7 Complex Drainage Diversion System Remedial Action Implementation

Due to an extended CERCLA document pathway and the need to complete portions of the construction prior to the beginning of the rainy season, construction of the Pit 7 Complex Drainage Diversion System occurred concurrently with the Remedial Design. The regulatory agencies agreed to review the Drainage Diversion System 65% design and upon comment resolution, approve the construction to begin prior to the submittal of the final Remedial Design document. In September 2007, the U.S. EPA, the California DTSC, and the RWQCB approved the Drainage Diversion System design, and approved the start of construction. Construction of the Pit 7 Drainage Diversion System began in October 2007.

Because most rain water infiltration occurs on the hillslope west of the landfills due to the presence of colluvium and weathered bedrock, a surface and subsurface drainage network was constructed on the western hillslope to collect and divert shallow ground water and surface water. As shown in Figure 3 and as-built Sheet C-1 in Appendix H, the drainage diversion trench system on the western hillslope includes of an upper and lower trench network. The upper and lower trench networks were installed approximately 80 to 150 ft apart and roughly parallel to the slope contours to capture surface water and shallow subsurface water on this hillslope. Because this upper trench is located directly downhill of the bedrock-colluvium contact, it was designed to primarily capture surface water flow that predominates at this location on the hillslope. The upper trench network was installed to a depth of approximately 3 ft and the sides and bottom were lined with an impermeable geofabric (As-Built Sheet C-4, Appendix H).

Because the lower trench network is located where colluvium is present on the hillslope, it was designed to capture both surface water flow and shallow subsurface water flow in the colluvium. The lower trench network was installed to a depth of up to 8 feet. A portion of the uphill side of these trenches was lined with a permeable geofabric to capture subsurface colluvial flow. The bottom and downhill side was lined with an impermeable geofabric. A perforated HDPE pipe was installed approximately 1-inch above the base of all the trenches and surrounded by drain rock to the top of each trench. Bedding was placed below the pipe to ensure the pipe is not damaged during settling. The trenches were filled to the top with drain rock. The upslope side of each trench has a 3-ft wide, 6- to 12-inch thick apron of drain rock underlain by impermeable fabric to convey surface water into the trench. There is a 1.5-ft high mound on the downslope side of each trench to impede any surface flow that is not captured by the trench. The lower trench network As-Built drawings are shown in sheet C-4 in Appendix H.

Four trenches containing solid pipe were installed perpendicular to the slope contours to convey the captured water to the pre-existing concrete drainage channel at the western perimeter of the Pit 7 Landfill cap (As-Built Sheet C-1 in Appendix H). This drainage channel collects and directs surface water runoff to the north where it discharges to riprap that dissipates water energy/velocity, preventing erosion. The riprap was rebuilt to provide additional protection against erosion and to facilitate maintenance (As-Built Sheet C-5, Appendix H.)

Because the hillslope east of the Pit 7 Complex mainly consists of unweathered bedrock with minimal infiltration capacity, rainwater tends to move downslope as surface runoff/sheet flow. Therefore, a surface water diversion swale was installed along the paved road that runs at the base of the eastern hillslope to collect and convey surface water runoff from the slope before it enters valley fill alluvium and underlying weathered bedrock (Figure 3 and As-Built sheet C-2, Appendix H). The base of the diversion swale was lined with impermeable geofabric and filled with a perforated pipe surrounded by drain rock. The fabric was lapped and buried to reduce deterioration by the elements and to convey upslope surface water. Compacted native soil was installed within the swale and covered with a grass-blend hydroseed and erosion control blankets. As shown in As-Built sheet C-7 (Appendix H), the swale is trapezoidal in cross-section in some reaches and a V-ditch in cross-section in other reaches of the channel. Four corrugated metal pipe culverts were installed to convey the water in the swale beneath dirt fire trails (As-Built Sheets C-3 and C-6, Appendix H), and one culvert was installed to accommodate a pipeline from the Pit 7-Source ground water treatment system (As-Built Sheet C-7, Appendix H.). Water is routed through a corrugated metal pipe culvert under Route 4 to the new settling basin located at the southern end of the pre-existing south-flowing concrete-lined drainage channel (As-Built Sheet C-6, Appendix H.)

Prior to construction of the drainage diversion system, riprap was present at the southern end of Pit 7 to dissipate energy of water from the pre-existing concrete drainage channel installed as part of the Pit 7 Landfill engineered cap design. A new settling basin was constructed and the pre-existing riprap was rebuilt to dissipate water energy, prevent erosion damage, reduce sedimentation, and enable rapid infiltration to prevent wetland formation (As-Built Sheets C-8 and S-3, Appendix H.)

Thirteen monitoring wells (K7-01, K7-06, NC7-16, NC7-17, NC7-21, NC7-22, NC7-24, NC7-34, NC7-48, NC7-51, NC7-53, W-PIT7-1718, and W-PIT7-1724) were equipped with dedicated pressure transducer to monitor water levels. Water level data from these wells will be used to monitor responses of the piezometric surface to rainfall recharge, and evaluate the effectiveness of the Drainage Diversion System in preventing water level rises into the pit waste.

Restoration measures were implemented in areas impacted by construction of the Drainage Diversion System to limit erosion and control sediment runoff, such as hydroseeding to promote the re-establishment of vegetation, and the placement of fiber rolls to reduce sediment transport.

Construction of the Pit 7 Drainage Diversion System began in October 2007 and was completed in March 2008. As-built drawings for the Pit 7 Complex Drainage Diversion System are presented in Appendix H. Appendix I presents variances from the original design.

The timeline for the remedy implementation is presented in Table 5.

# 4. Performance Standards and Construction Quality Control

As described in Section 3, the Building 850 Removal Action solidified soil and engineered fill met or exceeded performance criteria for unconfined compressive strength, density, mixing, cement application, and compaction. The results of the field and laboratory performance tests performed for the Building 850 Soil Removal Action Construction are presented in Appendix B (Engineering Test Data and Construction Quality Assurance (CQA) Field Sheets). The excavation verification sampling and analysis reports are presented in Appendix D. The Building 850 Soil Removal Action was designed and constructed to meet the RAOs for the selected soil remedy for Building 850.

The Pit 7-Source ground water extraction and treatment system and Pit 7 Complex Drainage Diversion System were designed and constructed to meet the RAOs for the selected remedy for the Pit 7 Complex.

Photographic evidence of Remedial/Removal Action completion is presented in Appendix J. Appendix J includes photographs of the completed Building 850 Removal Action/CAMU, Pit 7 Drainage Diversion System, and Pit 7-Source ground water extraction and treatment system.

# 5. Ongoing Activities

The ongoing activities in the Building 850 Firing Table/Pit 7 Complex OU include:

- Monitoring ground water and surface water to determine if the cleanup is adequately protecting human health and the environment and to evaluate the effectiveness of the remedy in achieving cleanup standards.
- Risk and hazard management, including institutional/land use controls, to prevent human exposure to contamination and to protect the integrity of the remedy.
- Inspection and maintenance of the Building 850 CAMU and associated drainage features.
- Operation and maintenance of the Pit 7-Source ground water extraction and treatment system until cleanup standards are met.
- Inspection and maintenance of the drainage diversion system at the Pit 7 Complex.
- Inspection and maintenance of the Pit 3, 4, 5, and 7 Landfill covers.
- Five-Year Review reporting.

These activities are discussed in the sections below.

## 5.1. Monitoring

Ground water and surface water samples will continue to be collected from monitor wells and springs in the OU and analyzed for chemical and radiological contaminants of concern and ground water elevations will continue to be measured per the Site-Wide Compliance Monitoring Plan (CMP) requirements (Dibley et al., 2009). The results of the CMP monitoring will be reported in the semiannual Compliance Monitoring Reports.

Monitoring will continue two years after cleanup standards have been met.

## 5.2. Risk and Hazard Management

The goals of risk management, including institutional/land use controls, are to prevent or limit exposure to contaminants, protect the integrity of the remedy, and ensure future property use is consistent with the current industrial land use.

The following institutional/land use controls that were identified in the 2008 Site-Wide ROD for OU 5 will continue after remedy implementation:

- Prevent water-supply use/consumption of contaminated groundwater until ground water cleanup standards are met.
- Maintain land use restriction in the vicinity of Well 8 Spring until annual risk re-evaluation indicates that the risk is less than $10^{-6}$.
- Prohibit transfer of lands with unmitigated contamination that could cause potential harm under residential or unrestricted land use.
- Maintain the integrity of the Pit 7 Complex landfill covers, the drainage diversion system, and the Building 850 CAMU as long as the waste remains in place.
- Control construction and other ground-breaking activities on the Building 850 CAMU and Pit 7 Complex landfills to prevent cap/cover damage and/or inadvertent exposure to waste as long as the waste remains in place.
- Maintain access restrictions to prevent inadvertent exposure of onsite workers to the pit waste as long as the waste in the Pit 7 Complex Landfills remain in place.

It is assumed that Site 300 will remain under the control of DOE and that the access restrictions to the site (fencing, security patrols) currently in place will continue. All remedies would be re-evaluated if transfer of ownership or change in land use is anticipated. DOE will meet its commitments in the Site 300 FFA, Sections 28 (Transfer of Real Property) and 37 (Facility Closure), regarding its cleanup obligations if property ownership and/or land use changes in the future.

To ensure that human health is protected, access to Site 300 will continue to be restricted and all personnel working onsite will be briefed on areas of contamination and possible hazards. Site 300 is enclosed within a security fence, posted with signs noting the restricted access, and manned by a full-time security force to prevent unauthorized intrusion.

No excavation shall occur within areas of contamination or at landfills except for approved remedial actions. Activities in landfill areas will be restricted to those that will not expose landfill material or compromise the integrity and protectiveness of landfill caps. No activity inconsistent with this use restriction may commence without the prior written concurrence of the FFA signatories. Risk and hazard monitoring results conducted during the year will be submitted to the U.S. EPA and State regulatory agencies in the Annual Site 300 Site-Wide Compliance Monitoring Reports.

## 5.3. Inspection/Operations and Maintenance

Inspections and maintenance (I&M) and operations and maintenance (O&M) programs have been implemented for the Building 850 CAMU, Pit 7 Drainage Diversion System, Pit 7 Complex landfill caps, and the Pit 7-Source ground water extraction and treatment system. The

Building 850 and Pit 7 Drainage Diversion System I&M Plans and the Pit 7-Source ground water extraction and treatment system O&M Plan will be periodically reviewed and updated to reflect any needed changes to the programs.

#### 5.3.1. Building 850 CAMU I&M

The Building 850 CAMU I&M Plan was prepared by the Building 850 Removal Action construction subcontractor and reviewed by the regulatory agencies in March 2010 (SCS Engineers, 2010). The Building 850 CAMU is inspected and maintained per the requirements of the Plan. The results of the inspections and maintenance performed will be included in the Annual Compliance Monitoring Reports.

#### 5.3.2. Pit 7-Source Ground Water Extraction and Treatment System O&M

The Pit 7-Source ground water extraction and treatment system O&M Plan was included in the Pit 7 Complex RD. The Pit 7-Source system is operated and maintained per the requirements of the O&M Plan. Maintenance performed at the Pit 7-Source system will be included in the Annual Compliance Monitoring Reports.

#### 5.3.3. Pit 7 Drainage Diversion System I&M

The Pit 7 Drainage Diversion System I&M Plan was prepared by the Pit 7 Drainage Diversion System construction subcontractor and included in the Pit 7 Complex RD. The Pit 7 Drainage Diversion System is inspected and maintained per the requirements of the I&M Plan. The results of the inspections and maintenance performed will be reported in the Annual Compliance Monitoring Reports.

#### 5.3.4. Pit 7 Complex Landfill Cap I&M

The Pit 7 Complex landfill cap I&M procedures are included in the Site-Wide CMP. The results of the inspections and maintenance performed will be reported in the Annual Compliance Monitoring Reports.

### 5.4. Five-Year Reviews

The completion of this RACR is the trigger for the Five-Year Review process. Therefore, the first draft Five-Year Review for OU 5 will be submitted in June 2015 per the schedule presented in Table 6.

# 6. Project Costs

Estimated and actual project costs for construction of the Building 850 Soil Removal Action, Pit 7-Source ground water extraction and treatment system, and the Pit 7 Complex Drainage Diversion System are summarized in Table 7.

# 7. Acronyms

| | |
|---|---|
| ARARs | Applicable or Relevant and Appropriate Requirements |
| CAMU | Corrective Action Management Unit |
| CDDs | Chlorinated dibenzo-p-dioxins |
| CDFs | Chlorinated dibenzofurans |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| Ci | Curies |
| CMP | Compliance Monitoring Plan |
| COCs | Contaminants of Concern |
| DOE | Department of Energy |
| DTSC | (California) Department of Toxic Substances Control |
| EE/CA | Engineering Evaluation/Cost Analysis |
| EPA | Environmental Protection Agency |
| FFA | Federal Facility Agreement |
| ft | Feet |
| $ft^2$ | Square feet |
| FY | Fiscal year |
| GAC | Granular activated carbon |
| gpd | Gallons per day |
| HMX | High Melting Explosive |
| HQ | Hazard quotient |
| HSU | Hydrostratigraphic unit |
| I&M | Inspections and Maintenance |
| LLNL | Lawrence Livermore National Laboratory |
| MCL | Maximum Contaminant Level |
| mg/kg | Milligrams per kilogram |
| mg/L | Milligrams per liter |
| MNA | Monitored natural attenuation |
| msl | Mean sea level |
| NCP | National Contingency Plan |
| NEPA | National Environmental Policy Act |
| NFA | No further Action |
| NPL | National Priorities List |
| O&M | Operations and Maintenance |
| OU | Operable Unit |
| PCBs | Polychlorinated biphenyls |
| pCi/L | PicoCuries per liter |
| PRG | Preliminary Remediation Goal (EPA) |

| | |
|---|---|
| Qal/WBR | Quaternary alluvium and weathered bedrock |
| RACR | Remedial Action Completion Report |
| RAOs | Remedial Action Objectives |
| RCRA | Resource Conservation and Recovery Act |
| RD | Remedial Design |
| ROD | Record of Decision |
| RWQCB | (California) Regional Water Quality Control Board |
| TCE | Trichloroethylene |
| TCDD | 2,3,7,8-tetrachloro-di-benzodioxin |
| $Tnbs_0$ | Tertiary Neroly Silty Sandstone |
| VOCs | Volatile organic compounds |
| U.S. | United States |
| $yd^3$ | Cubic yards |
| µg/L | micrograms per liter |

# 8. References


Buddemeier, R.W., M.R. Ruggieri, D.W. Carpenter, and D.T. Young (1985), *Tritium in Groundwater at Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCID-20600).

Dibley, V., R. Blake, T. Carlsen, S. Chamberlain, W. Daily, Z. Demir, M. Denton, R. Goodrich, S. Gregory, V. Madrid, M. Taffet, J. Valett (2004), *First Semester 2004 Compliance Monitoring Report, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-206769-04).

Dibley, V., L. Ferry, M. Taffet, G. Carli, and E. Friedrich (2008a), *Engineering Evaluation/Cost Analysis for PCB-, Dioxin, and Furan-contaminated Soil at the Building 850 Firing Table, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-233862).

Dibley, V., L. Ferry, M. Taffet (2008b), *Action Memorandum for the Removal Action at the Building 850 Firing Table, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (LLNL-AR-403206).

Dibley, V., L. Ferry, S. Gregory, L. Hall, V. Madrid, L. Martello, E. N. Shiroma, M. Taffet, K.S. Wells (2009), *Compliance Monitoring Plan/Contingency Plan Environmental Restoration at Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (LLNL-AR-411239).

Ferry, L., R. Ferry, W. Isherwood, R. Woodward, T. Carlsen, Z. Demir, R. Qadir, and M. Dresen (1999), *Final Site-Wide Feasibility Study for Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-132609).

Rogers/Pacific Corporation (1990), *Closure and Post-Closure Plans Volume II, Landfill Pits 1 and 7*, prepared for Lawrence Livermore National Laboratory, Livermore, Calif. (EPA ID No. 2890090002).

SCS Engineers (2009), *Excavation and Remediation Plan (100% Submittal) Building 850 Soil Remediation, Lawrence Livermore National Laboratory Site 300 LLNL Subcontract No. B575171*, SCS Engineers, Pleasanton, Calif.

SCS Engineers (2010), Inspection and Maintenance Plan, Building 850 Containment Embankment, *Lawrence Livermore National Laboratory Site 300 LLNL Subcontract No. B575171*, SCS Engineers, Pleasanton, Calif.

Simmons, L. (1992) personal communications with Michael Wade, Laurene Green, Jack Gardner, and Gwen Caviness, Weiss Associates, and Dave Carpenter, Michael Taffet, and Neil Crow, LLNL.

Taffet, M.J. and A.L. Lamarre (1989), *Remedial Investigation of Landfill Pit 7 Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCID-21764).

Taffet, M.J., L.K. Green-Horner, L.C. Hall, T.M. Carlsen, and J.A. Oberdorfer (1996), *Addendum to the Site-Wide Remedial Investigation Report*, *Lawrence Livermore National Laboratory Site 300*, *Building 850/Pit 7 Complex Operable Unit*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR108131 Add. 1).

Taffet, M.J., L.C. Hall, T.M. Carlsen, R.J. Woodward, and J.A. Oberdorfer (1997), *Draft Engineering Evaluation/Cost Analysis for the Building 850/Pits 3 and 5 Operable Unit, Livermore National Laboratory Site 300, Lawrence Livermore National* Laboratory, Livermore, Calif. (UCRL-AR-126368DR).

Taffet, M., V. Dibley, L. Ferry, Daily, Z. Demir, V. Madrid, S. Martins, J. Valett, and S. Bilir (2004), *Interim Remedial Design for the Building 850 Operable Unit at Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-201835).

Taffet, M.J., L., Ferry, V. Madrid, T. Carlsen, Z. Demir, J. Valett, M. Dresen, W. Daily, S. Coleman, and V. Dibley (2005), *Final Remedial Investigation/Feasibility Study for the Pit 7 Complex at Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-202492).

Taffet, M., V. Dibley, L., Ferry, W. Daily, and Z. Demir, (2008), *Interim Remedial Design Document for the Pit 7 Complex at Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-234697).

U.S. DOE (2001), *Interim Site-Wide Record of Decision for Lawrence Livermore National Laboratory, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-138470).

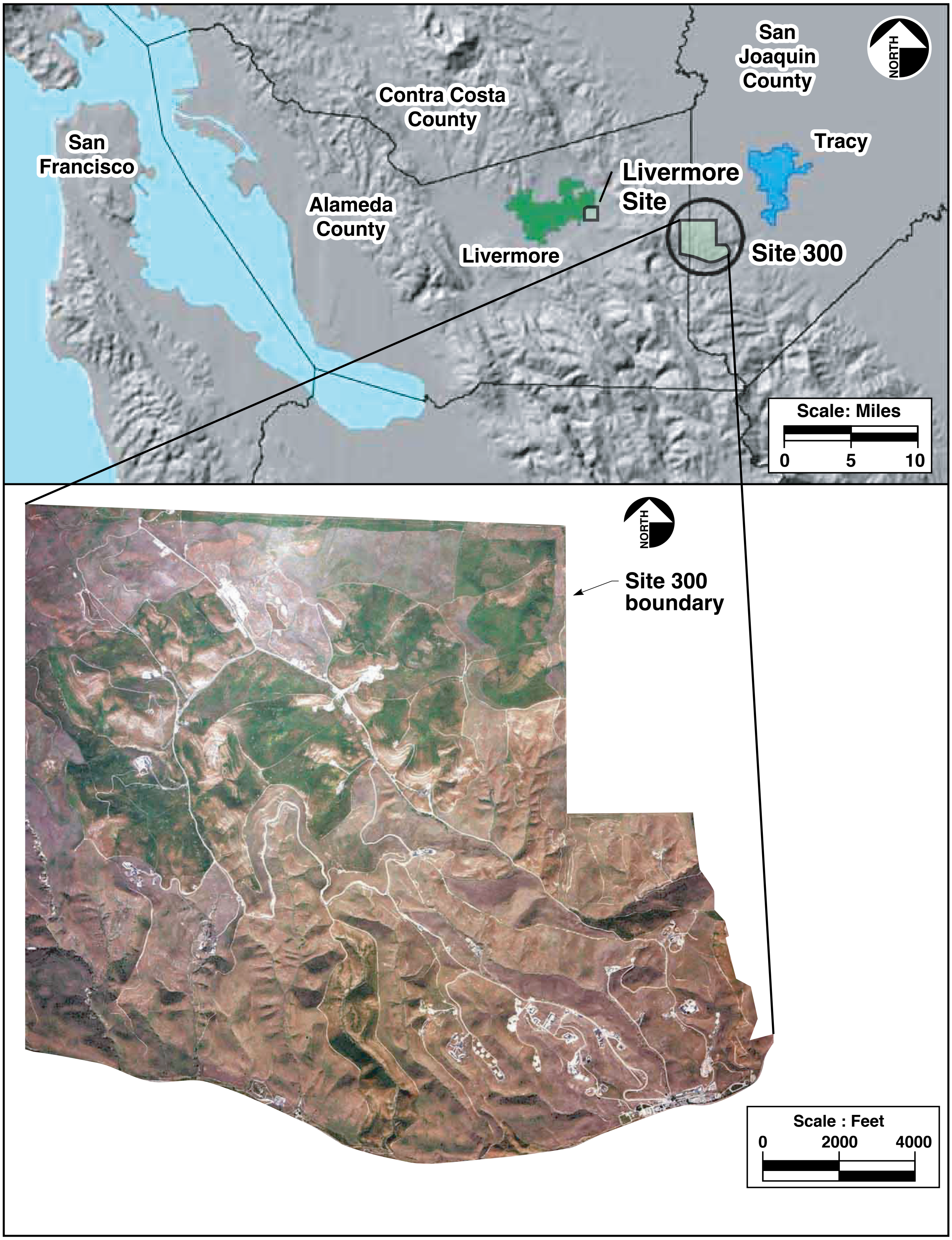
U.S. DOE (2007), *Amendment to the Interim Site-Wide Record of Decision for the Pit 7 Complex at Lawrence Livermore National Laboratory Site 300,* Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-222569).

U.S. DOE (2008), *Site-Wide Record of Decision for Lawrence Livermore National Laboratory, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-236665).

Webster-Scholten, C.P., Ed. (1994), *Final Site-Wide Remedial Investigation Report*, *Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-108131).

Ziagos, J., and E. Reber-Cox (1998), *Ground Water Tritium Plume Characterization Summary Report for the Building 850/Pits 3&5 Operable Unit*, *Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif.

# Figures




ERD-S3R-07-0076

**Figure 1. Location of LLNL Site 300.**


**Figure 2. Map of Site 300 showing operable units with ground water plume outlines and water-supply wells.**

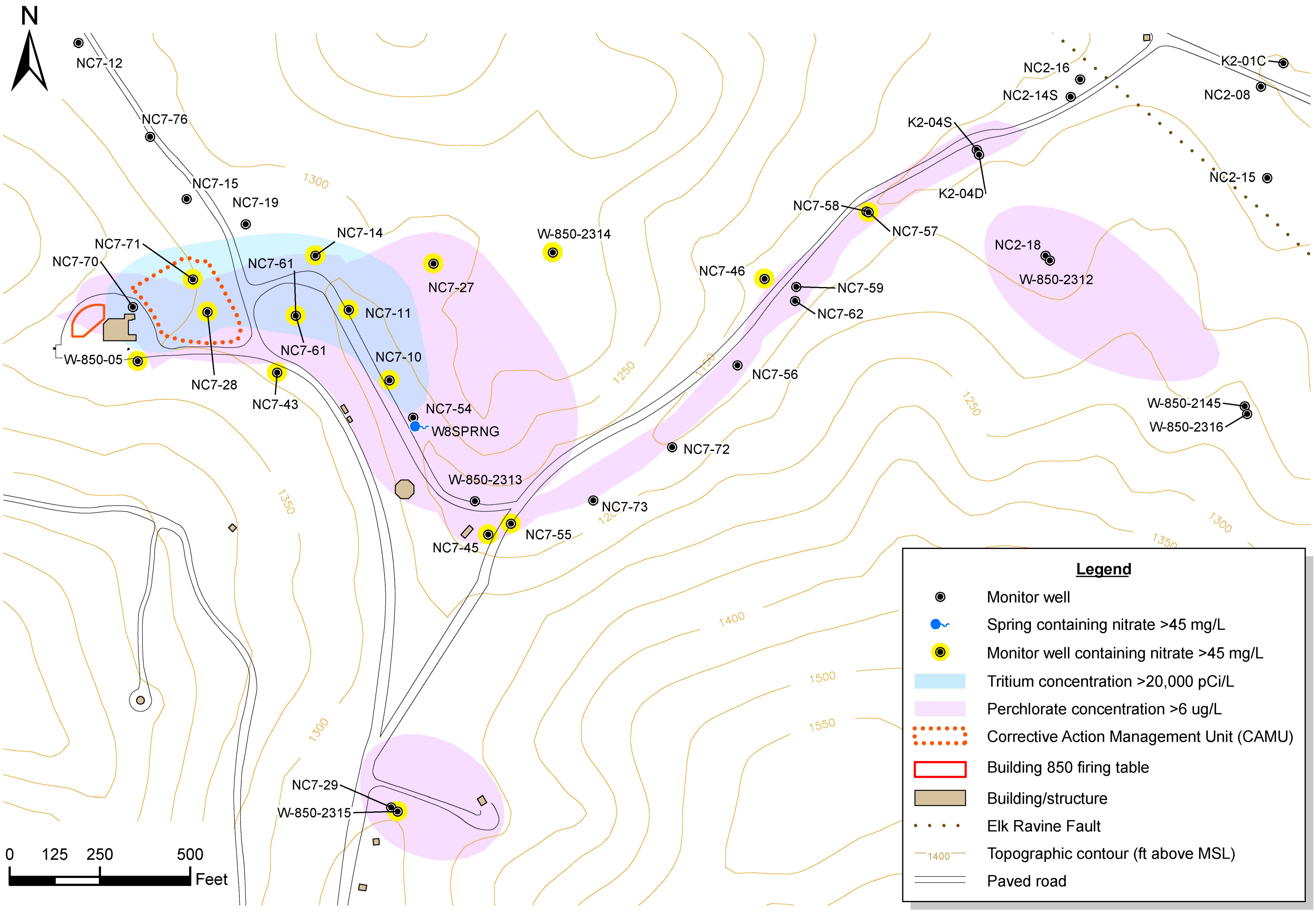



**Figure 3. Map of the Building 850 area of OU5 showing cultural features, topography, monitor wells, springs, and contaminants of concern in ground water above cleanup standards.**

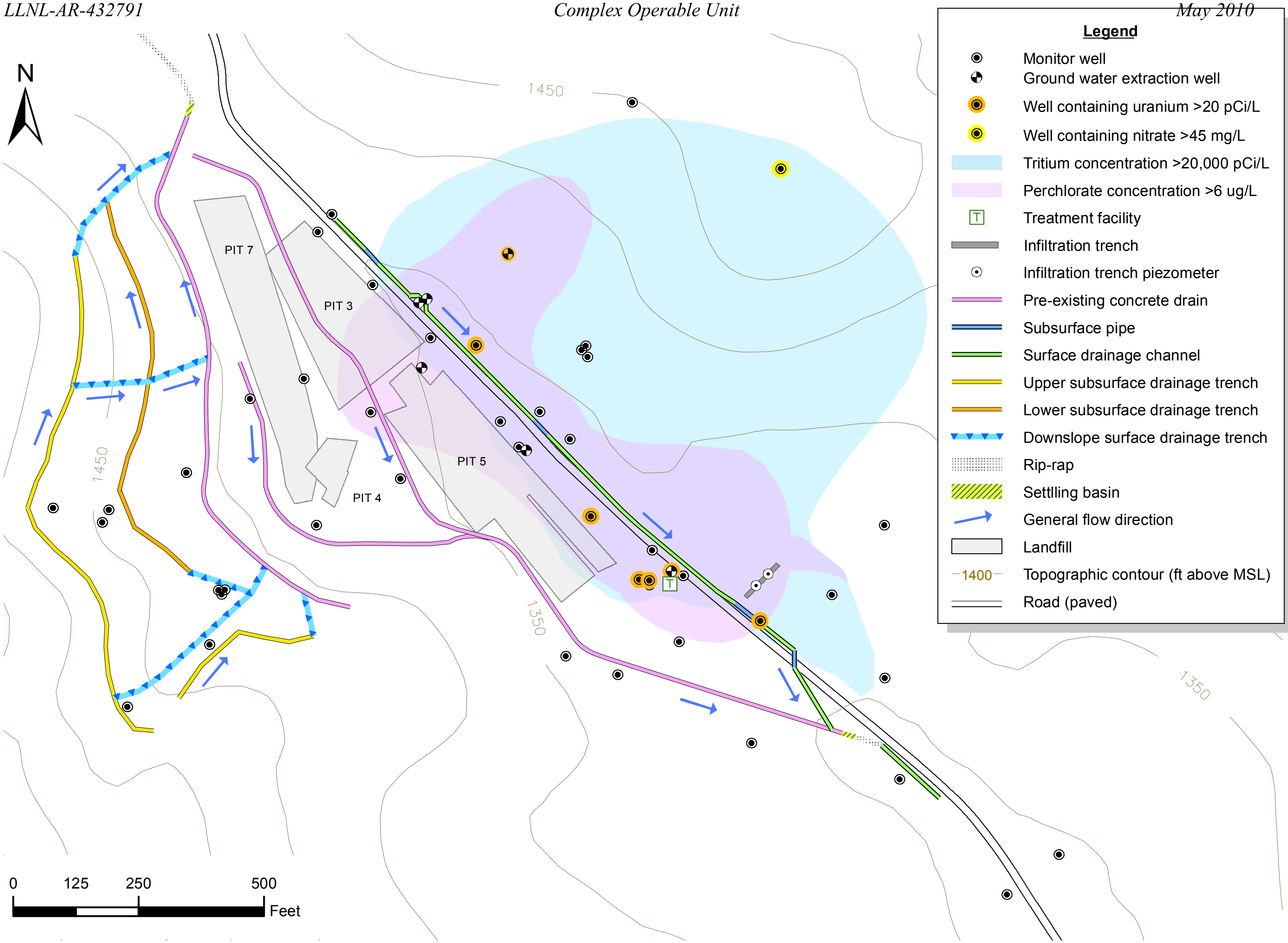



**Figure 4. Map of the Pit 7 Complex of OU5 showing cultural features, topography, monitor and extraction wells, drainage diversion system, ground water treatment system, and contaminants of concern in ground water above cleanup standards.**

# Tables

**Table 1. The Building 850/Pit 7 Complex OU chronology.**

| Date | Activity |
|---|---|
| 1958 | Building 850 was constructed and hydrodynamic experiments began on the overlying firing table. |
| 1958-1967 | Pit 3 Landfill received firing table debris. |
| 1962-1972 | A large volume of sand, termed the "sandpile," was stockpiled near Building 850 and was periodically used during large experiments. |
| 1964-1967 | An estimated 1,000 polychlorinated biphenyl- (PCB) bearing capacitors were destroyed on the Building 850 Firing Table. |
| 1968-1974 | Pit 4 Landfill received firing table debris. |
| 1968-1979 | Pit 5 Landfill received firing table debris. |
| 1978-1988 | Pit 7 Landfill received firing table debris. |
| 1981 | Trichloroethylene was detected in an onsite water-supply well and remedial investigations began at Site 300. First monitor wells installed in Operable Unit (OU) 5. |
| 1988-1994 | Five former water-supply wells were sealed and abandoned in the Building 850/ Pit 7/East Firing Area. |
| 1990 | Site 300 placed on the U.S. Environmental Protection Agency's National Priority List. |
| 1992 | Site 300 Federal Facility Agreement signed by the U.S. Department of Energy (DOE) and regulatory agencies. |
| 1992 | Capping and closure of the unlined Pit 4 and 7 Landfills. |
| 1994 | The Site-Wide Remedial Investigation report (Webster-Scholten et al., 1994) for Site 300 was issued. |
| 1996 | An addendum to the Site-Wide Remedial Investigation report (Taffet et al., 1996) for Site 300 was issued for the Building 850 Firing Table/Pit 7 Complex OU. |
| 1997 | Submitted the Building 850/Pits 3 and 5 OU Engineering Evaluation/Cost Assessment (Taffet et al., 1997). |
| 1998 | PCB-contaminated firing table debris removed at Building 850. |

**Table 1. The Building 850/Pit 7 Complex OU chronology (continued.)**

| Date | Activity |
|---|---|
| **1999** | **Regulatory agencies required evaluations of perchlorate and nitrate in ground water. Subsequently added as contaminants of concern at Site 300.** |
| **2001** | **Site 300 Interim Site-Wide Record of Decision (U.S. DOE, 2001) was signed.** |
| **2003** | **Installed permeable reactive barrier downgradient of the Pit 7 Complex as part of an *in situ* treatability study.** |
| **2004** | **The Interim Remedial Design (Taffet et al., 2004) document for the Building 850 Firing Table area was issued.** |
| **2005** | **Submitted Final Remedial Investigation/Feasibility Study (Taffet et al., 2005) for the Pit 7 Complex.** |
| **2007** | **Final Amendment to the Interim Site-Wide Record of Decision (U.S. DOE, 2007) for the Pit 7 Complex was signed.** |
| **2008** | **The Engineering Evaluation/Cost Analysis for PCB-, Dioxin-, and Furan-contaminated Soil at the Building 850 Firing Table (Dibley et al., 2008a) was issued.** |
| **2008** | **The Interim Remedial Design document for the Pit 7 Complex (Taffet et al., 2008) was issued.** |
| **2008** | **Completed construction of the Pit 7 Complex Drainage Diversion System.** |
| **2008** | **Completed the Building 850 PCB-contaminated soil Action Memorandum (Dibley et al., 2008b).** |
| **2008** | **Site-Wide Final Record of Decision was signed.** |
| **2009-2010** | **Excavated PCB- and dioxin/furan-contaminated soil and constructed the Building 850 Corrective Action Management Unit.** |
| **2010** | **Startup of Pit 7-Source ground water extraction and treatment system.** |

**Notes:**

**DOE =** **U.S. Department of Energy.**

**OU =** **Operable Unit.**

**PCB =** **Polychlorinated biphenyl.**

**Table 2. Cleanup standards for Building 850/Pit 7 Complex Operable Unit 5 ground and surface water contaminants of concern.**

| Contaminants of concern | Cleanup standard |
|---|---|
| **Volatile Organic Compound (Pit 7 Complex only):** | |
| 1,1-Dichloroethylene | 6 µg/L[a] |
| Trichloroethylene | 5 µg/L[b] |
| **Radionuclides:** | |
| Tritium | 20,000 pCi/L[b] |
| Uranium | 20 pCi/L[a] |
| **Other:** | |
| Nitrate (as $NO_3$) | 45 mg/L[b] |
| Perchlorate | 6 µg/L[a] |

**Notes:**

mg/L = Milligrams per liter.

pCi/L = PicoCuries per liter.

µg/L = Micrograms per liter.

[a] State MCL.

[b] State and Federal MCL.

**Table 3. Building 850 Soil Removal Action Implementation Timeline.**

| Activity | Completion Date |
|---|---|
| **Submitted Final Building 850 Soil Removal Action Engineering Evaluation/ Cost Analysis (EE/CA.)** | **February 20, 2008** |
| **Held Public Workshop for the EE/CA.** | **March 6, 2008** |
| **Submitted Building 850 Soil Removal Action Memo.** | **April 30, 2008** |
| **Submitted 65% Design for the Building 850 Soil Removal Action.** | **January 30, 2009** |
| **Submitted 95% Design for the Building 850 Soil Removal Action.** | **February 24, 2009** |
| **Received the Biological Opinion from the U.S. Fish and Wildlife Service.** | **April 9, 2009** |
| **The U.S. Department of Energy (DOE) signed the National Environmental Policy Act Supplemental Analysis for Cleanup of Contaminated Soil at the Building 850 Firing Table.** | **April 16, 2009** |
| **Held a telephone conference call with the regulatory agencies to discuss DOE/Lawrence Livermore National Laboratory (LLNL) responses to regulatory comments on the 95% design. During this call, the regulatory agencies agreed that DOE/LLNL could proceed with the Building 850 Soil Removal Action construction.** | **April 23, 2009** |
| **Regulatory agencies concurred with 100% Design for the Building 850 Soil Removal Action. The U.S. Environmental Protection Agency concurred with the designation of a Corrective Action Management Unit for the Building 850 Soil Removal Action.** | **April 24, 2009** |
| **Performed test fill demonstration of the soil solidification and consolidation process.** | **May 11-14, 2009** |
| **The Department of Toxic Substances Control Remedial Project Manager and a representative for the U.S. Environmental Protection Agency observed the test fill demonstration.** | **May 14, 2009** |
| **Began excavation of contaminated soil.** | **June 8, 2009** |
| **Submittal of Verification Sampling and Analysis Report for the Phase 1 excavation area.** | **June 25, 2009** |
| **Submittal of Test Fill Demonstration Report to the regulatory agencies.** | **July 8, 2009** |

**Table 3. Building 850 Soil Removal Action Implementation Timeline (continued.)**

| Activity | Completion Date |
|---|---|
| Regulatory tour of construction site. | October 1, 2009 |
| Completed construction of the Corrective Action Management Unit (CAMU) drainage control features within the navigable waterway. | October 12, 2009 |
| Completed construction of the remaining CAMU drainage control features. | November 16, 2009 |
| Completed excavation and solidification of contaminated soil and CAMU construction. | December 4, 2009 |
| Completed slope restoration. | December 17, 2009 |
| Submitted of Verification Sampling and Analysis Report for the Phase 2 through 7 excavation areas. | January 20, 2010 |
| Construction Completion. | January 28, 2010 |

**Notes:**

CAMU = Corrective Action Management Unit.

DOE/LLNL = U.S. Department of Energy/Lawrence Livermore National Laboratory.

EE/CA = Engineering Evaluation/Cost Analysis.

**Table 4. Pit 7-Source (Complex) Ground Water Extraction and Treatment Remedial Action Implementation Timeline.**

| Activity | Completion Date |
|---|---|
| Submitted Final Amendment to the Interim Record of Decision. | January 26, 2007 |
| Received the Biological Opinion from the U.S. Fish and Wildlife Service. | July 12, 2007 |
| Following an Environmental Assessment, the U.S. Department of Energy (DOE) signed the National Environmental Policy Act Finding of No Significant Action for Environmental Remediation at the Pit 7 Complex at Lawrence Livermore National Laboratory (LLNL) Site 300. | January 29, 2007 |
| Held a telephone conference call with the regulatory agencies to discuss the written responses to regulatory comments on the design capacity of the ion-exchange resins for uranium treatment. During this call, the regulatory agencies agreed that DOE/LLNL could proceed with construction of the ground water extraction and treatment system. | September 4, 2007 |
| Submitted Draft Remedial Design (RD) for the Pit 7 Complex. | September 24, 2007 |
| Initiated construction of the Pit 7-Source ground water extraction and treatment system. | October 1, 2007 |
| Treatment system construction halted due to conflicts with Pit 7 Complex Drainage Diversion System construction. | December, 2007 |
| Submitted Final RD for the Pit 7 Complex. | April 10, 2008 |
| Construction of Pit 7-Source ground water extraction and treatment system reinitiated following completion of Pit 7 Complex Drainage Diversion System. | April 2008 |
| Conducted Testing and Verification of Pit 7-Source extraction and treatment system to ensure that all mechanical, electronic/electrical, and chemical components of the facility and wellfield were operating to meet remediation and monitoring requirements. Identified issues and need for further assessment and possible facility modifications[a]. | January 2009 |
| Conducted assessment and design modifications of the Pit 7-Source ground water extraction and treatment system. | October 1, 2009 – January 15, 2010 |
| Initiated modification construction for the Pit 7-Source ground water extraction and treatment system. | January 18, 2010 |
| Startup and commenced Testing and Verification of Pit 7-Source extraction and treatment system. | March 16, 2010 |
| Construction Completion. | March, 2010 |

Notes appear on the following page:

**Table 4. Pit 7-Source (Complex) Ground Water Extraction and Treatment Remedial Action Implementation Timeline (continued.)**

**Notes:**

**DOE =** **U.S. Department of Energy.**

**LLNL =** **Lawrence Livermore National Laboratory.**

**RD =** **Remedial Design.**

[a] **With regulatory concurrence, the facility assessment and design modifications were delayed due to a significant diversion of resources required to meet the LLNL Livermore Site treatment system restart deliverables.**

**Table 5. Pit 7 Complex Drainage Diversion System Remedial Action Implementation Timeline.**

| Activity | Completion Date |
|---|---|
| Submitted Final Amendment to the Interim Record of Decision. | January 26, 2007 |
| Received the Biological Opinion from the U.S. Fish and Wildlife Service. | July 12, 2007 |
| Regulatory agencies agreed that the construction of the Drainage Diversion System could proceed prior to completion of the Remedial Design, if the Department of Energy/Lawrence Livermore National Laboratory (DOE/LLNL) submits the Title II design for regulatory review and comment. | July 26, 2007 |
| Following an Environmental Assessment, the U.S. Department of Energy signed the National Environmental Policy Act Finding of No Significant Action for Environmental Remediation at the Pit 7 Complex at LLNL Site 300. | January 29, 2007 |
| DOE/LLNL submitted Title II 65% design to the regulatory agencies. | August 3, 2007 |
| In a telephone conference call with the regulatory agencies, the DOE/LLNL responses to regulatory comments on Title II design were discussed. | August 29, 2007 |
| In a telephone conference call, the regulatory agencies agreed that DOE/LLNL could proceed with construction of the drainage diversion. | September 4, 2007 |
| Submitted Draft Remedial Design. | September 24, 2007 |
| Initiated construction of the Pit 7 Complex Drainage Diversion System. | October 1, 2007 |
| Power poles were moved on the east side of the Pit 7 Complex. | December 15, 2007 |
| Construction of the Pit 7 Drainage Diversion System and site restoration was completed. | March 14, 2008 |
| DOE/LLNL submitted Final Remedial Design to the regulatory agencies. | April 10, 2008 |
| The final walkthrough of the Pit 7 Drainage Diversion System by the construction contractor and LLNL staff to verify construction completion was conducted. | April 16, 2008 |

**Notes:**

DOE/LLNL = U.S. Department of Energy/Lawrence Livermore National Laboratory.

**Table 6. Operable Unit (OU) 5 Five-Year Review Schedule.**

| Document | Submittal Date |
|---|---|
| Draft OU 5 Five-Year Review | June 26, 2015 |
| Draft Final OU 5 Five-Year Review | November 13, 2015 |
| Final OU 5 Five-Year Review | December 14, 2015 |

**Table 7. Operable Unit 5 Remedial Action Estimated and Actual Construction Costs.**

| Remedial Action | Construction Cost Estimate (in thousands) | Construction Cost Actual (in thousands) |
|---|---|---|
| Building 850 Soil Removal Action | \$2,042[a] | \$4,876[b] |
| Pit 7-Source Ground Water Extraction and Treatment System | \$505[c] | \$735[d] |
| Pit 7 Complex Drainage Diversion System | \$1,441[c] | \$1,496 |

**Notes:**

[a] Estimated cost for the Building 850 Removal Action construction was presented in the Action Memorandum.

[b] Cost increase due to: (1) additional regulatory requirement to submit 95% and 100% design for review and written comment responses for the 65% and 95% design, (2) the discovery and remediation of an additional 12K $yd^3$ of contaminated soil (original estimated 16K $yd^3$ vs. actual 28K $yd^3$ of soil excavated and remediated), (3) additional excavation of clean fill under the footprint of the Corrective Action Management Unit, and (4) the subsequent schedule extension into the rainy season resulting in rain and shot delay costs.

[c] Estimated costs for the Pit 7-Source and Drainage Diversion System were presented in the Pit 7 Complex Remedial Design.

[d] Cost increase due to facility assessment/modifications made to address issues identified during initial system testing and verification and subsequent monitoring.

# Appendix A

# Building 850 Soil Removal Action As-Built Variations from Design Specifications

## Table A-1. Building 850 Removal Action As-Built Variations from Design Specifications.

| Description of Change | Justification |
|---|---|
| **The Corrective Action Management Unit (CAMU) was not built to the design elevation (1,320 ft above mean sea level [msl]) and width as shown on the 100% design drawings (Sheets 6 through 11). It was constructed to a maximum elevation of 1,314 ft above msl.** | **Because the Upper Corporation Yard was excavated to a maximum depth of 25 ft below ground surface (bgs), despite the increase in soil excavation volume from 15,544 $yd^3$ (planned) to 27,592 $yd^3$ (actual), the CAMU did not reach the design elevation and concurrent width.** |
| **The CAMU design specified at least a 3 ft thick outer shell of clean soil solidified with 10% Portland cement (Sheets 7 through 11). This requirement has been adhered to in the construction of the CAMU, except for a few lifts that were constructed of a minimum thickness of 1 ft of clean fill and 10% Portland cement. The top of the CAMU is composed of at least a 1 ft thick layer of clean fill solidified with 10% Portland cement underlain by 4 ft of PCB-bearing soil solidified with 10% Portland cement.** | **Because of concerns that additional capacity might be required, the regulatory agencies agreed at the August 20, 2009 Remedial Project Manager's meeting that the outer 3 ft of the CAMU composed of clean fill solidified with 10% Portland cement could be reduced so that only the outer 1 ft of the CAMU would need to be composed of clean fill. In actuality, only a few lifts were constructed with an outer layer of only 1 ft of clean fill.** |
| **Excavated non-engineered fill from below the Upper Corporation Yard was stockpiled in the Lower Corporation for constructing the outer clean shell on the CAMU. At the conclusion of construction, an estimated 4,000 $yd^3$ of clean fill remained in the Lower Corporation Yard and were graded, re-compacted, and hydroseeded.** | **During the design phase of the project, the borrow area for clean fill had not yet been determined. Once excavation began, the need to excavate up to 25 ft of the non-engineered fill was identified. The fill was stockpiled in the Lower Corporation Yard and the unused clean fill remaining was stabilized where it was stockpiled.** |
| **The Upper Corporation Yard was excavated to a final depth of a maximum 25 ft below ground surface [bgs] (as-built drawings 7 through 11), rather than a maximum depth of 10 ft bgs as shown on 100% design sheets 7 through 11.** | **Because non-engineered fill extended to a maximum depth of 25 ft, excavation extended to this depth. A portion of this clean fill was re-compacted to provide a stable platform upon which the contaminated soil was solidified and consolidated.** |
| **The volume of soil to be excavated and solidified increased from 15,544 $yd^3$ (extent of excavation depicted on Sheet 4 of 100% design) to 27,592 $yd^3$ (Sheet 24 of as-built drawings) and the lateral and vertical extent of excavation increased.** | **Verification sampling and analytical results indicated that additional soil required excavation to achieve cleanup standards.** |

**Table A-1. Building 850 Removal Action As-Built Variations from Design Specifications (continued.)**

| Description of Change | Justification |
|---|---|
| The drainage channel on the north side of the Well Access Road on the CAMU was lined with rock (100% design Sheet 15 and as-built drawing Sheet 15). | The channel was lined with rock to better constrain the flow of runoff and reduce the potential for erosion. |
| The soil solidification lift thickness was reduced from a maximum 18 inches, originally specified in Section 2230, Part 3.2, Item 12 of the 100% design specifications, to a maximum 12 inches. | The test fill demonstration revealed that the 90% compaction design specification could not be achieved at the bottom of the18-inch thick lifts but this compaction was always met or exceeded at a 12-inch depth. |
| Eliminated volume-increase testing during full-scale solidification. This "swell testing" was originally specified in Section 2230, Part 3.3, Item F of the 100% design specifications. | Test fill demonstration results indicate that none of the soil-cement samples increased in volume (swelled). |

# Appendix B

# Building 850 Soil Removal Action Engineering Test Data and Construction Quality Assurance Field Sheets

CONSOLIDATED ENGINEERING
LABORATORIES
"Partners in Quality"

May 28, 2009

Mr. Steve Ellis
Lawrence Livermore National Laboratory
P.O. Box 808; L-651
Livermore, California 94551-0808

Subject: LLNL B-850 Soil Remediation
B850-S300
Livermore, CA
CEL Project #10-01251-LAW & 10-01252-LAW

**EARTHWORK AND LABORATORY TESTING SUMMARY**
**May 5, 2009 thru May 21, 2009**

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from May 5, 2009 thru May 21, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some low density tests were measured as presented by these test results. We recommend that we confirm with the Project Engineer, SCS Engineers, to resolve the low density results observed in these tests. It is the responsibility of SCS to review and approve these test results.

Respectfully submitted,
**CONSOLIDATED ENGINEERING LABORATORIES**

Michael Wissink
Project Manager

Eric J. Swenson, PE, GE
Principal Geotechnical Engineer

Enclosures: Daily Field Reports
Moisture/Density Curves
Sand Cone Testing
Moisture Content Summary
Break Log Summary

Distribution: 1 to Addressee

MW/EJS: pmf
R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\May Summary (Steve Ellis).doc

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| Report #: | Date: 5-5-09 |
| Project Name: R-850 SOILS REMEDEATION | Project Number: LAW 1251 |
| | Page ____ of ____ |
| Field Rep: [signature] | Project Manager: |

Scope of Work: ☐ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☐ Full Time ☐ Part Time

Contractor: CEDRUDO SERV.

Contractor Representative: SCS / GRIFFIN

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | N/A | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☑ Nuclear Type: TROXLER 3440 ☐ Tube ☑ Sand Cone

Fill Source: ☑ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | SCS | |

Fill Location:

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|---|
| A | 050509-01 | | 130.0 | 10.5 | ☑ 90% | ☐ Opt. + 2% |
| B | 050509-02 | FINE COURSE SAND | 129.0 | 10% | ☐ 95% | ☐ Opt. + 2% to 5% |
| C | 050509-03 | DARK BRN SAND CLAY W/AGG | 122.5 | 12% | ☐ Other: | ☐ Other: |
| | | | | | | |
| | | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | UPPER COURT YARD | SG | 111.3 | 18.6 | 93.8 | A | 72 | |
| 2 | SAND HILL | SG | 117.8 | 2.3 | 115.1 | B | 89 | |
| 3 | 1' CUT N. SIDE | SG | 82.5 | 11.8 | 73.6 | C | 60 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

IN PLACE DENSITY TEST ON UNDISTURBED SOIL W/ SAND CONE TEST



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 5-5-09 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Report #: | | Date: 5-11-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1251 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: SCS / GRIFFITH

Conditions: ☒ Sunny ☐ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☐ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: TEST PADS 3 TOT.

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|---|
| A | 050509-01 | | | | ☒ 90% | ☐ Opt. + 2% |
| B | " " -02 | FINE COURSE SAND | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| C | " " -03 | DRK BRN SAND CLAY W/ROCK | | | ☐ Other: | ☐ Other: |
| | | | | | | |
| | | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | W. SIDE SAND HILL PAD | SG | 106.8 | 3.3 | 103.3 | B | 80 | |
| 2 | E. SIDE SAND HILL PAD | SG | 114.2 | 7.2 | 106.5 | B | 83 | |
| 3 | W. " 1' CUT PAD | SG | 95 | 9.4 | 86.6 | C | 71 | |
| 4 | E. " 1' CUT PAD | SG | 107 | 9.5 | 98.4 | C | 80 | |
| 5 | W. " UPPER COURTYARD PAD | SG | 113.1 | 16.9 | 96.7 | A | 74 | |
| 6 | E. " " " " " | SG | 101.6 | 19.1 | 85.3 | A | 66 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:
SCS NEEDED COMP. TEST ON TEST PADS PRIOR TO MIXING OF CEMENT. FOR THEIR DATA



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: ________ | Reviewed By: ____________ | Date: ________ |

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | | Report #: | Date: 5-12-09 |
| Project Name: B-850 soil REMED. | | Project Number: LAW1251 | Page ___ of ___ |
| Field Rep: Tony Phillips | | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CEMRUDO

Contractor Representative: SCS / GRIFFIN

Conditions: ☒ Sunny ☐ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | REX | 1 |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☒ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: SAND HILL TEST PAD 10% CEMENT

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A 051209-01 | FINE/COARSE SAND W/ | | | ☒ 90% | ☐ Opt. + 2% |
| | 10% CEMENT | 131.5 | 10% | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | -6" CUT SAND HILL PAD | -6" SG | 126.5 | 7.3 | 117.8 | | 90 | P |
| 2 | SG. SAND HILL PAD | SG | 135.0 | 7.8 | 125.2 | | 95 | P |
| 3 | -12" CUT SAND HILL PAD | -12" SG | 108.0 | 7.9 | 100.0 | | 76 | F |
| 4 | RT #3 | | 127.2 | 7.9 | 117.8 | | 90 | P |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:
GRIFFIN MIXED 10% CEMENT INTO 10'X45' TEST BED FROM SAND HILL. + COMP. W/ REX IN ONE 18" LIFT. SCS USED DOZER TO CUT 1' + 6" FROM S.G. FOR TESTING. SAND CONE TEST WAS TAKEN @ S.G.



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: Tony Phillips | Date: | Reviewed By: | Date: |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Project Name: B-850 SOIL REMEDIATION | Report #: | Date: 5-13-09 |
| Field Rep: Tony Phillips | Project Number: LAW1251 | Page ___ of ___ |
| | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other
Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CEARDDO
Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☐ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A ~~050509-01~~ | | | | ☒ 90% | ☐ Opt. + 2% |
| A 0512-09-01 | FINE/COARSE SAND | 131.5 | 10.7% | ☐ 95% | ☐ Opt. + 2% to 5% |
| B 051309-01 | DRK BRN SAND CLAY w/ AGG | 118.5 | 14.5 | ☐ Other: | ☐ Other: |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | SAND HILL TEST BED | | | | | | | |
| 1 | -12" CUT w/ 5% CEMENT | -12" SG | 118.9 | 7.8 | 110.2 | A | 84 | F |
| 2 | -6" CUT " " | -6" SG | 134.9 | 8.0 | 124.9 | A | 95 | P |
| 3 | SG " " | SG | 133.3 | 9.8 | 121.4 | A | 92 | P |
| | 1' CUT TEST BED | | | | | | | |
| 4 | 12" CUT w/ 5% CEMENT | -12" SG | 112.9 | 14.5 | 98.6 | B | 83 | F |
| 5 | 6" CUT " " | -6" SG | 125.2 | 14.6 | 109.2 | | 92 | P |
| 6 | SG " " | SG | 128.5 | 14.1 | 112.6 | | 95 | P |
| 7 | 12" CUT w/ 10% CEMENT | -12" SG | 117.4 | 15.6 | 101.5 | | 85 | F |
| 8 | 6" CUT " " | -6" SG | 124.0 | 12.9 | 109.8 | | 93 | P |
| 9 | SG " " | SG | 126.9 | 14.0 | 111.3 | | 94 | P |

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: __________ Date: __________ Reviewed By: __________ Date: __________

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | | Date: 5-14-09 |
| Project Name: R-850 Soil Remediation | Project Number: LAW1251 | | Page ___ of ___ |
| Field Rep: Tony Phillips | Project Manager: | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Scope of Work: | ☑ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: ☑ Full Time | ☐ Part Time |

| | | | | | |
|---|---|---|---|---|---|
| Contractor: CERRADO | Conditions: | ☑ Sunny | ☐ Windy | ☑ Hot | ☐ Mild |
| Contractor Representative: SES / GRIFFIN | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | REX | 1 | Density Testing Equipment | ☑ Nuclear | Type: TROXLER |
| Moving | SPREADER | 1 | | ☐ Tube | |
| Water | WATER TRUCK | 1 | | ☑ Sand Cone | |
| Support | MIXER | 1 | Fill Source | ☑ Native | |
| | | | | ☐ Import | |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: UPPER YARD TEST BED ~~TEST PAD~~

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A= 051409-01 | BRN CLY SAND W/AGG | | | ☑ 90% | ☐ Opt. + 2% |
| | PLUS 10% CEMENT | 117.0 | 15% | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | UPPER TEST PAD 15% CEM. | -12" SG | 114.9 | 17.6 | 97.7 | A | 84 | F |
| 2 | \| \| | -6" SG | 121.0 | 14.3 | 105.8 | \| | 90 | P |
| 3 | \| \| | SG | 125.6 | 13.9 | 108.3 | \| | 93 | P |
| 4 | UPPER TESTPAD 10% CEM | -12" SG | 113.0 | 15.1 | 98.1 | \| | 84 | F |
| 5 | \| \| \| | -6" SG | 119.5 | 14.3 | 104.5 | \| | 89 | F |
| 6 | \| \| \| | SG | 128.7 | 13.1 | 113.7 | \| | 97 | P |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

UPPER TEST PAD 10'x90'x18" MIXED W/ 10% CEMENT @ 1ST 45' ON E. SIDE OF PAD & 15% CEMENT ON W. SIDE OF PAD. PLACE 1'x3' PAN UNDER ~~SPRA~~ SPREADER TAR TO SCALE CEMENT FOR 10% & 15% CEMENT MIX

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 5/14/09 | Reviewed By: ______ | Date: ______ |

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Report #: | | Date: 5-18-09 |
| Project Name: B-350 SOIL REMEDIATION | Project Number: 2AW1251 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: CERMUDO SERV

Contractor Representative: ANDY BELL

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| NOTE: | | | | ☐ 90% | ☐ Opt. + 2% |
| | RETEST SAND HILL | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | IN PLACE DENSITIES | | | ☐ Other: | ☐ Other: |
| | PER LENARD W/SES | | | | |
| | SOIL ENGR. | | | | |
| | & @ SECTOR | | | | |
| | A-1 OFF RT. 4 & | | | | |
| | DO ALL RD. | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail | DEPTH |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SAND HILL W. SIDE | SG | 109.3 | 2.7 | 106.4 | | | | 6" |
| 2 | " " CTR. PILE | " | 110.5 | 2.3 | 108.1 | | | | 6" |
| 3 | " " N. SIDE | " | 118.4 | 5.1 | 112.7 | | | | 6" |
| 4 | " " N. SIDE | " | 115.5 | 4.5 | 110.5 | | | | 4" |
| 5 | " " N.W. SIDE | " | 112.8 | 4.4 | 108.1 | | | | 6" |
| 6 | " " N.W. SIDE | " | 112.1 | 4.2 | 107.5 | | | | 4" |
| 7 | SECTOR A-1 ±40' N. DO ALL RD | SG | 118.8 | 8.2 | 109.7 | | | | 6" |
| 8 | " " ±8' E RT. 4 | " | 95.0 | 8.6 | 87.5 | | | | 6" |

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: ______ | Reviewed By: ______ | Date: ______ |
|---|---|---|---|

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 5-20-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1251 | Page ___ of ___ | |
| Field Rep: Tom Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other — Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO SERV

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☐ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| NOTE: | INSITU TEST. | | | ☐ 90% | ☐ Opt. + 2% |
| | IN PLACE DENSITIES | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | TEST IN SECTOR A-2 | | | ☐ Other: | ☐ Other: |
| | TOT. OF 5 DENSITY TEST | | | | |
| | + 1 SAND CONE TEST | | | | |
| | + 1 MOISTURE BURN OUT | | | | |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | SECTOR A-2 | SG | 78.7 | 7.6 | 73.2 | | | |
| 2 | \|\| | \| | 65.2 | 7.7 | 60.5 | | | |
| 3 | \|\| | \| | 73.4 | 6.5 | 69.0 | | | |
| 4 | \|\| | \| | 73.7 | 7.4 | 68.6 | | | |
| 5 | \|\| | \| | 69.2 | 7.4 | 64.5 | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

DEPTH
8"
|



☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: ______ | Date: ______ | Reviewed By: ______ | Date: ______ |

LABORATORY COMPACTION

PROJEC T NAME: LLNL Site 300 BLDG 850 PROJECT NO.: LAW1252

BORING NO.: ______ SAMPLE NO.: ____ DEPTH: ______ DATE SAMPLED: __________ BY: ____

DATE TESTED: ______________ BY: ________ DATE CHECKED: ____________ BY: ____

CLASSIFICATION: Olive Brn ~~coarse sand~~ Clayey coarse Sand SOIL TYPE NO.: ____

upper court yard / on site #050509-01

MAXIMUM DRY DENSITY = 120.0 pcf

OPTIMUM WATER CONTENT = 10.5 %

| | | | | | | |
|---|---|---|---|---|---|---|
| SOIL(WET) + MOLD, lb. | | | | | | |
| MOLD, lb. | | | | | | |
| SOIL(WET), lb. | | | | | | |
| WET DENSITY, pcf | | | | | | |
| WET SOIL, gm. | | | | | | |
| DRY SOIL, gm. | | | | | | |
| LOSS, gm. | | | | | | |
| % MOISTURE | | | | | | |
| DRY DENSITY, pcf | | | | | | |

ASTM D 1557

☐ MOIST / DRY ☐

☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 5, BLOWS/LAYER: 56

AASHTO T-99

☐ MOIST / DRY ☐

☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25

☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25

☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 56

(OVERSIZE CORRECTION)

CALCULATIONS:

= ______ = ______ %

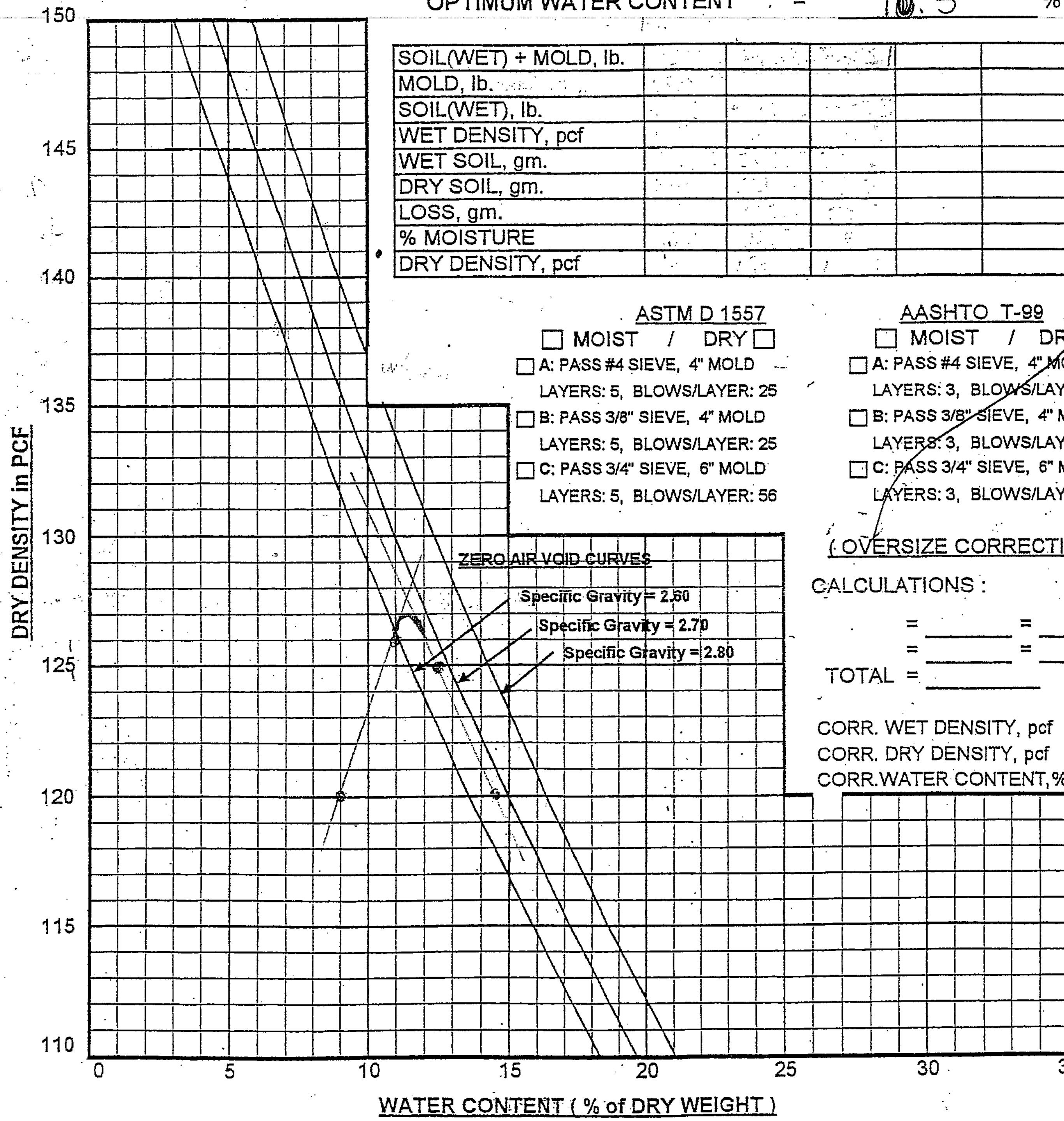
= ______ = ______ %

TOTAL = ______

CORR. WET DENSITY, pcf ____

CORR. DRY DENSITY, pcf ____

CORR. WATER CONTENT, % ____




REVISED 02/98

LABORATORY COMPACTION

PROJEC T NAME: LLNL Site 300 BLDG 850 PROJECT NO. : LAW 1252

BORING NO. : ______ SAMPLE NO. : ____ DEPTH : ______ DATE SAMPLED : __________ BY : ____

DATE TESTED : ______________ BY : ________ DATE CHECKED : ______________ BY : ____

CLASSIFICATION : Olive Gray coarse sand #050509-02 SOIL TYPE NO. : ____
Sand pile / on site

MAXIMUM DRY DENSITY = 129.0 pcf

OPTIMUM WATER CONTENT = 10.0 %

| | | | | | | |
|---|---|---|---|---|---|---|
| SOIL(WET) + MOLD, lb. | | | | | | |
| MOLD, lb. | | | | | | |
| SOIL(WET), lb. | | | | | | |
| WET DENSITY, pcf | | | | | | |
| WET SOIL, gm. | | | | | | |
| DRY SOIL, gm. | | | | | | |
| LOSS, gm. | | | | | | |
| % MOISTURE | | | | | | |
| DRY DENSITY, pcf | | | | | | |

ASTM D 1557

☐ MOIST / DRY ☐

☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 5, BLOWS/LAYER: 56

~~AASHTO T-99~~

~~☐ MOIST / DRY ☐~~

~~☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25~~

~~☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25~~

~~☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 56~~

( OVERSIZE CORRECTION )

CALCULATIONS :

= ______ = ______ %

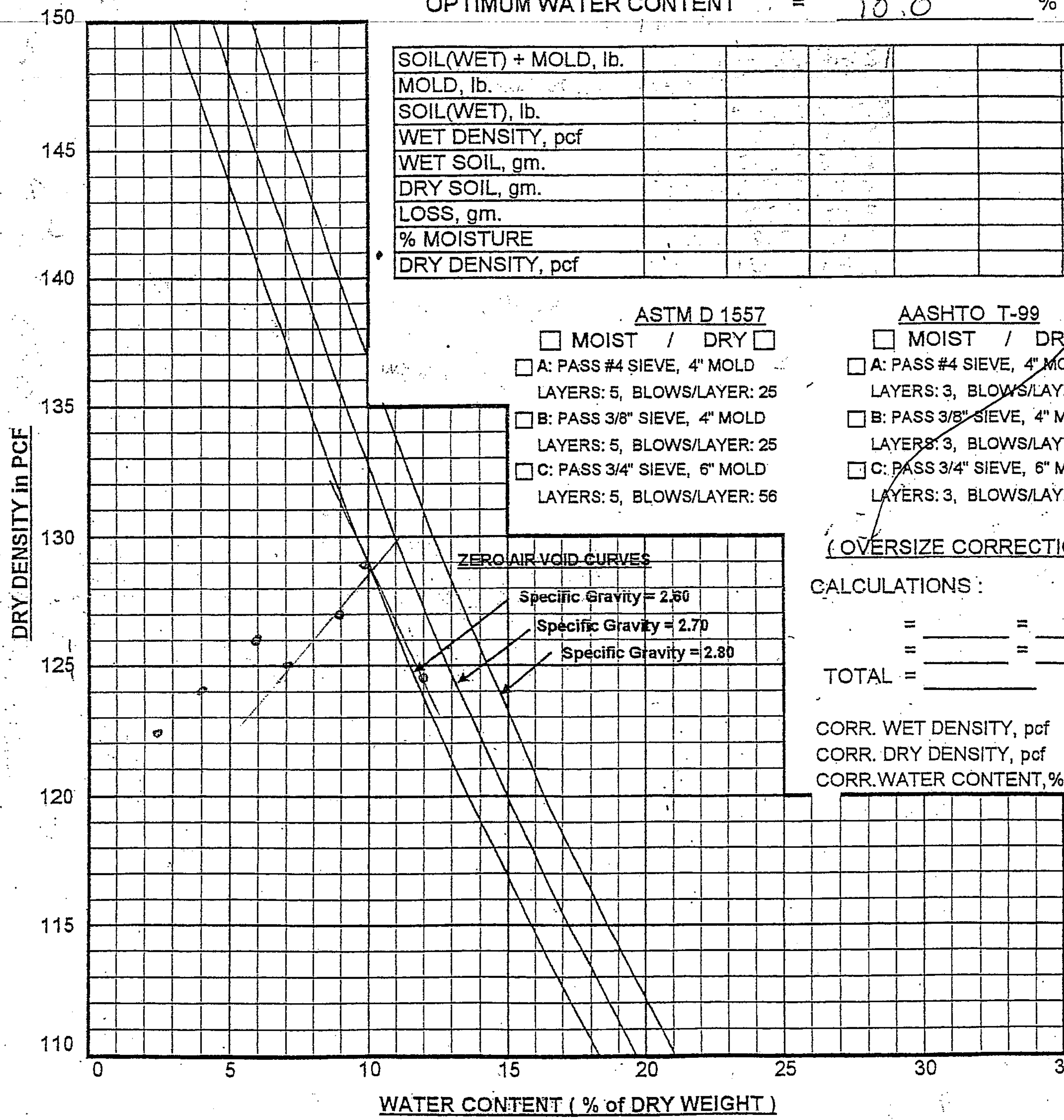
= ______ = ______ %

TOTAL = ______

CORR. WET DENSITY, pcf ____

CORR. DRY DENSITY, pcf ____

CORR. WATER CONTENT, % ____




REVISED 02/98

# LABORATORY COMPACTION

PROJECT NAME: LLNL Site 300 BLDG 880 PROJECT NO.: LAW 1252

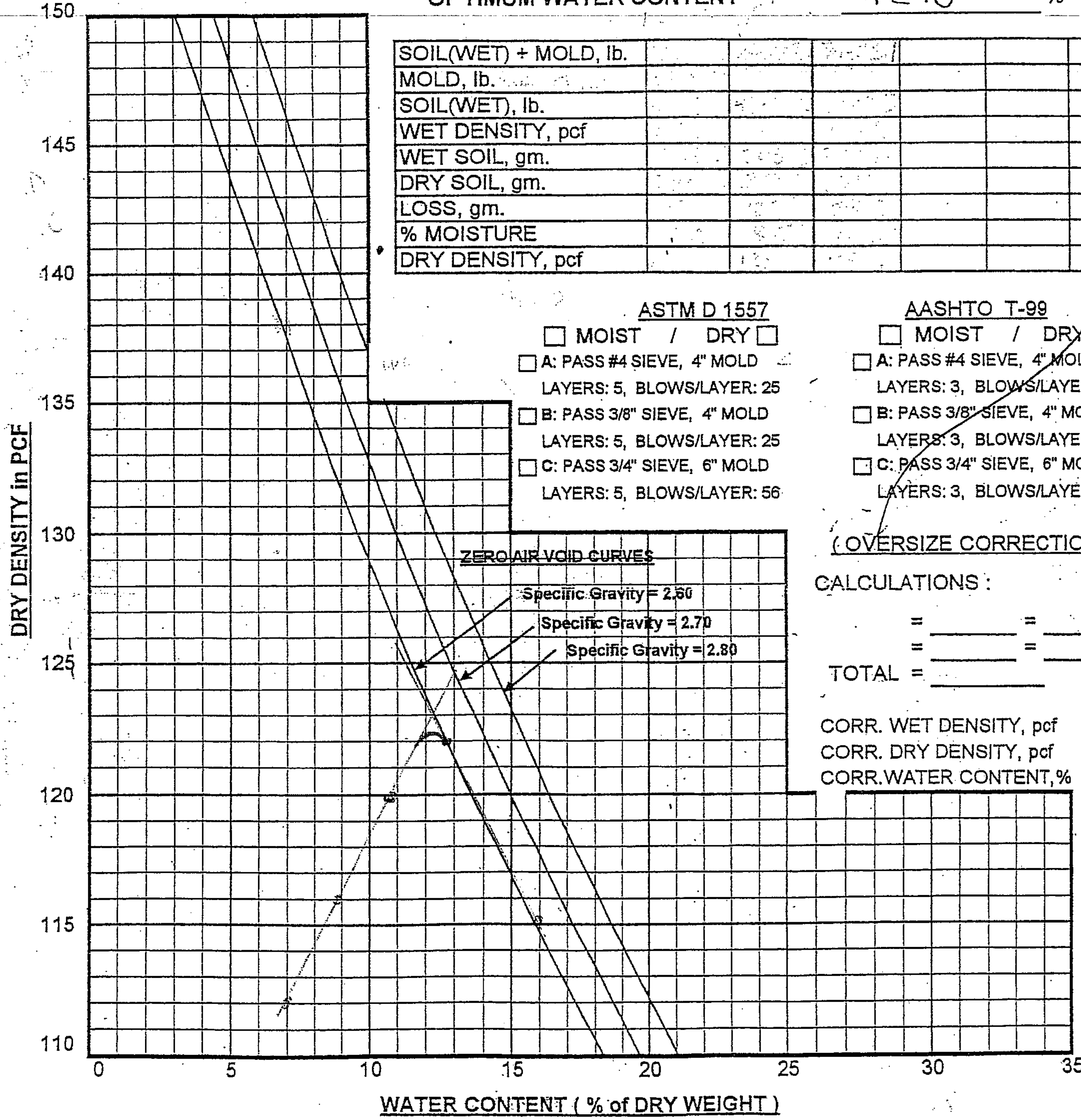
BORING NO.: ______ SAMPLE NO.: ______ DEPTH: ______ DATE SAMPLED: ______ BY: ______

DATE TESTED: ______ BY: ______ DATE CHECKED: ______ BY: ______

CLASSIFICATION: DK Brn Sandy lean CL, 1' cut #050509-03 SOIL TYPE NO.: ______
1' Cut / on site

MAXIMUM DRY DENSITY = 122.5 pcf

OPTIMUM WATER CONTENT = 12.0 %




| | | | | | | |
|---|---|---|---|---|---|---|
| SOIL(WET) + MOLD, lb. | | | | | | |
| MOLD, lb. | | | | | | |
| SOIL(WET), lb. | | | | | | |
| WET DENSITY, pcf | | | | | | |
| WET SOIL, gm. | | | | | | |
| DRY SOIL, gm. | | | | | | |
| LOSS, gm. | | | | | | |
| % MOISTURE | | | | | | |
| DRY DENSITY, pcf | | | | | | |

**ASTM D 1557**

☐ MOIST / DRY ☐

☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 5, BLOWS/LAYER: 56

**AASHTO T-99**

☐ MOIST / DRY ☐

☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25

☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25

☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 56

( OVERSIZE CORRECTION )

CALCULATIONS:

= ______ = ______ %

= ______ = ______ %

TOTAL = ______

CORR. WET DENSITY, pcf ______

CORR. DRY DENSITY, pcf ______

CORR. WATER CONTENT, % ______

REVISED 02/98

PROJEC T NAME: LLNL Site 300 BLDG 850 PROJECT NO. : LAW 1252

BORING NO. : ______ SAMPLE NO. : ______ DEPTH : ______ DATE SAMPLED : ______ BY : ______

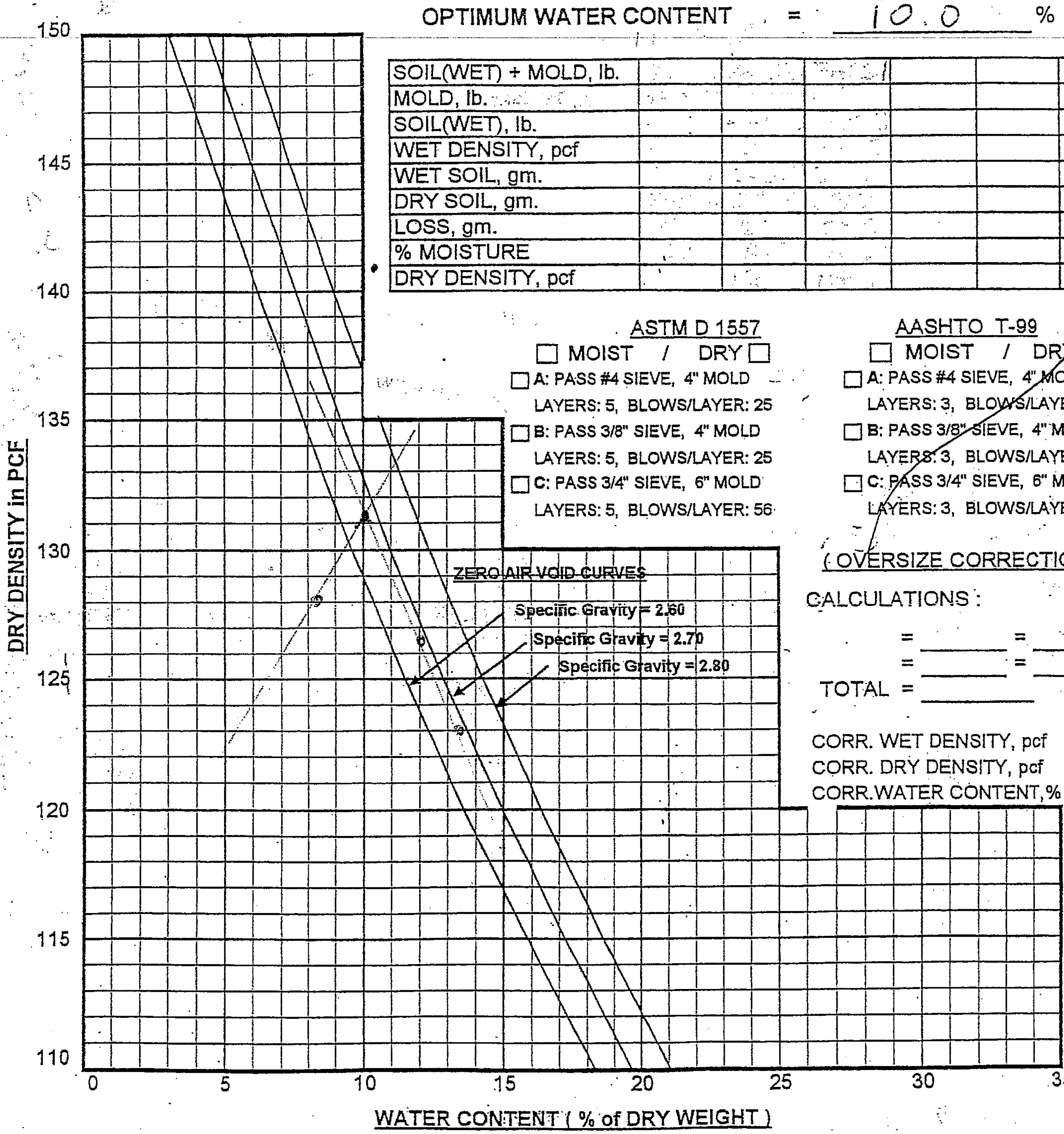
DATE TESTED : ______ BY : ______ DATE CHECKED : ______ BY : ______

CLASSIFICATION : Fine to coarse Sand #051209-01 SOIL TYPE NO. : ______

Sand Pile Test bed 10% Cement

MAXIMUM DRY DENSITY = 131.5 pcf

OPTIMUM WATER CONTENT = 10.0 %




| | | | | | | |
|---|---|---|---|---|---|---|
| SOIL(WET) + MOLD, lb. | | | | | | |
| MOLD, lb. | | | | | | |
| SOIL(WET), lb. | | | | | | |
| WET DENSITY, pcf | | | | | | |
| WET SOIL, gm. | | | | | | |
| DRY SOIL, gm. | | | | | | |
| LOSS, gm. | | | | | | |
| % MOISTURE | | | | | | |
| DRY DENSITY, pcf | | | | | | |

ASTM D 1557

☐ MOIST / DRY ☐

☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 5, BLOWS/LAYER: 56

~~AASHTO T-99~~

~~☐ MOIST / DRY ☐~~

~~☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25~~

~~☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25~~

~~☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 56~~

( OVERSIZE CORRECTION )

CALCULATIONS :

= ______ = ______ %

= ______ = ______ %

TOTAL = ______

CORR. WET DENSITY, pcf ______

CORR. DRY DENSITY, pcf ______

CORR.WATER CONTENT,% ______

REVISED 02/98

LABORATORY COMPACTION

PROJECT NAME: LLNL Site 300 BLDG 850 PROJECT NO.: LAW 1252

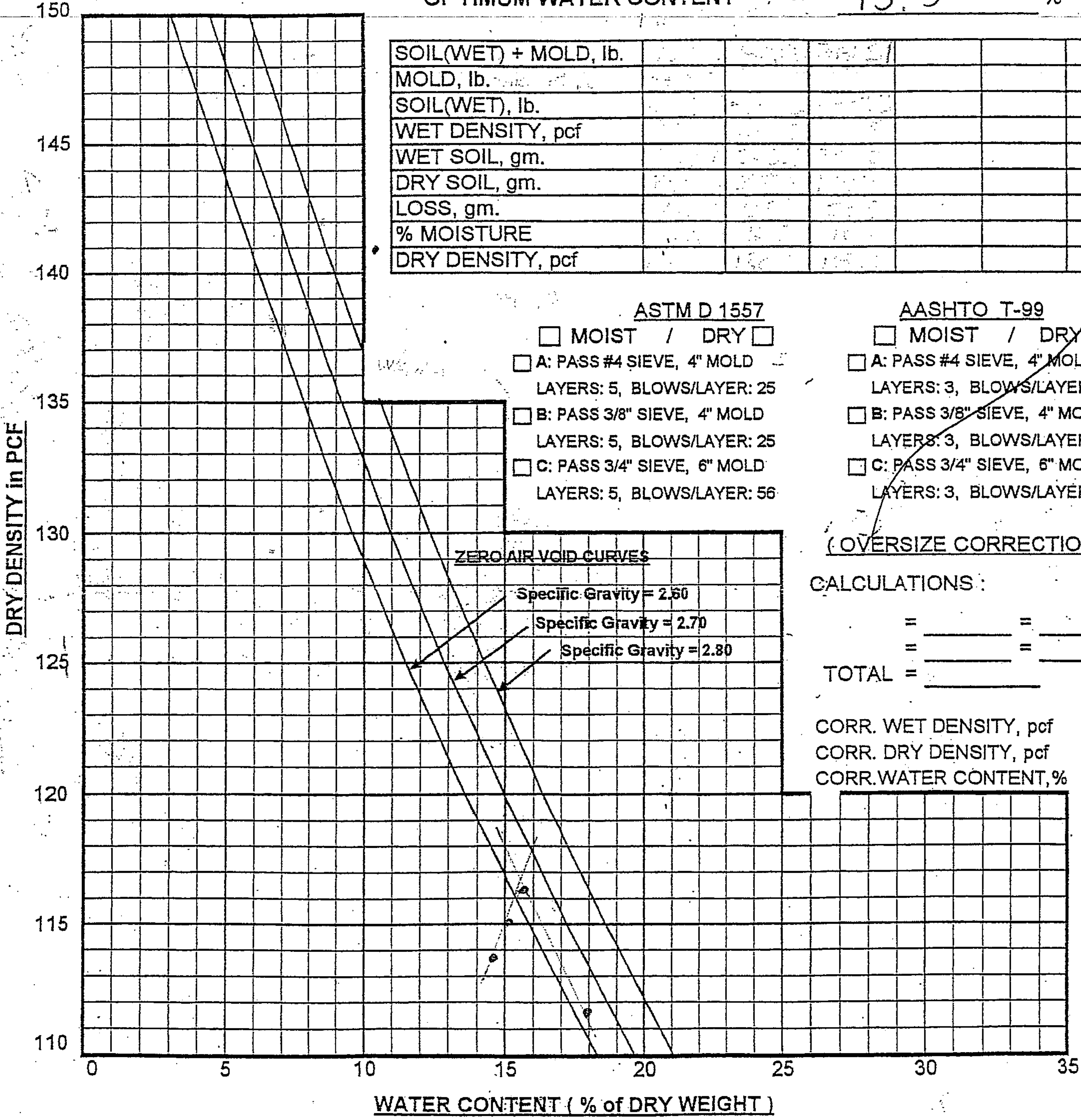
BORING NO.: ______ SAMPLE NO.: ______ DEPTH: ______ DATE SAMPLED: ______ BY: ______

DATE TESTED: 5/13/09 BY: RU DATE CHECKED: ______ BY: ______

CLASSIFICATION: DK Brn Sandy CL w/agg plus 5% cement 1' cut /on site #051309-01 SOIL TYPE NO.: ______

MAXIMUM DRY DENSITY = 116.5 pcf

OPTIMUM WATER CONTENT = 15.5 %




| | | | | | | |
|---|---|---|---|---|---|---|
| SOIL(WET) + MOLD, lb. | | | | | | |
| MOLD, lb. | | | | | | |
| SOIL(WET), lb. | | | | | | |
| WET DENSITY, pcf | | | | | | |
| WET SOIL, gm. | | | | | | |
| DRY SOIL, gm. | | | | | | |
| LOSS, gm. | | | | | | |
| % MOISTURE | | | | | | |
| DRY DENSITY, pcf | | | | | | |

ASTM D 1557

☐ MOIST / DRY ☐

☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 5, BLOWS/LAYER: 25

☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 5, BLOWS/LAYER: 56

AASHTO T-99

☐ MOIST / DRY ☐

☐ A: PASS #4 SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25

☐ B: PASS 3/8" SIEVE, 4" MOLD LAYERS: 3, BLOWS/LAYER: 25

☐ C: PASS 3/4" SIEVE, 6" MOLD LAYERS: 3, BLOWS/LAYER: 56

( OVERSIZE CORRECTION )

CALCULATIONS:

= ______ = ______ %

= ______ = ______ %

TOTAL = ______

CORR. WET DENSITY, pcf

CORR. DRY DENSITY, pcf 118.5

CORR. WATER CONTENT, % 14.5

REVISED 02/98

CONSOLIDATED ENGINEERING
L A B O R A T O R I E S

| | | | |
|---|---|---|---|
| DATE: | 5-5-09 | INSPECTOR: | Tony Phillips |
| PROJECT #: | LAW 1252 | PROJECT NAME: | ~~8-50~~ B-850 Soil Rem |
| COMPACTION SPEC: | 90 % | TEST LOCATION: | 1' CUT |
| MOISTURE SPEC: | 1-4 | | |

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6529.1 | g | |
| B | WT of cone, jar, sand - After | 3248.5 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 3280.6 | g | A - B |
| E | WT of sand in hole | 1700.6 | g | D - C |
| F | Density of sand | 90.5 | pcf | |
| G | Volume of hole | 0.0414 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | | lbs | |
| I | WT of TARE | | lbs | |
| J | Net WT of soil | 1570.6 / 3.462 | lbs | H - I |
| **K** | **WT Density** | 83.6 | **pcf** | **J ÷ G** |
| L | Soil + TARE (Wet) | 1020.9 | lbs | |
| M | TARE | 367.2 | lbs | Pan C |
| N | Soil + TARE (Dry) | 907.1 963.3 | lbs | |
| O | WT of Water | 113.3 57.6 | lbs | L - N |
| P | WT of Soil | 540.4 596.1 | lbs | N - M |
| **Q** | **Moisture Content** | (~~.096~~) 9.6 | **%** | **O ÷ P** (x100) |
| | Optimum Moisture Content | 12.0 | % | |
| **R** | **Dry Density** | 76.3 | **pcf** | **K ÷ (I + Q)** |
| S | Lab Maximum (Lab No. 050509-03) | 122.5 | pcf | |
| **T** | **Percent Compaction** | 62% | **%** | **R ÷ S** |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

CONSOLIDATED ENGINEERING
LABORATORIES

| | | | |
|---|---|---|---|
| DATE: | 5-5-09 | INSPECTOR: | Tony Phillips |
| PROJECT #: | LAW 1252 | PROJECT NAME: | B-850 Soil Remed. |
| COMPACTION SPEC: | 90% | TEST LOCATION: | Sand Hill |
| MOISTURE SPEC: | 1-4 | | |

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6877.5 | g | |
| B | WT of cone, jar, sand - After | 4133.2 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2744.3 | g | A - B |
| E | WT of sand in hole | 1164.3 | g | D - C |
| F | Density of sand | 90.5 | pcf | |
| G | Volume of hole | 0.0283 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | ~~1500g~~ ~~/ 3.306~~ | lbs | |
| I | WT of TARE | N/A | lbs | |
| J | Net WT of soil | 1500g / 3.306 | lbs | H - I |
| **K** | **WT Density** | 116.9 | **pcf** | **J ÷ G** |
| L | Soil + TARE (Wet) | 1176.1 | lbs | |
| M | TARE | 364.8 | lbs | Pan B |
| N | Soil + TARE (Dry) | 1167.2 | lbs | |
| O | WT of Water | 8.9 | lbs | L - N |
| P | WT of Soil | 802.4 | lbs | N - M |
| **Q** | **Moisture Content** | 1.1 | **%** | **O ÷ P** |
| | Optimum Moisture Content | 10.0 | % | |
| **R** | **Dry Density** | 115.6 | **pcf** | **K ÷ (I + Q)** |
| S | Lab Maximum (Lab No. 050509-02) | 129.0 | pcf | |
| **T** | **Percent Compaction** | 90% | **%** | **R ÷ S** |

Weight = WT  Pounds = lbs  Grams = G  Pounds per Cubic Feet = pcf
Cubic Feet = cf  Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

# CONSOLIDATED ENGINEERING LABORATORIES

DATE: 5-5-09
PROJECT #: ~~B-85~~ LAW 12~~5E~~ 52
COMPACTION SPEC: 90%
MOISTURE SPEC: 1 TO 4
INSPECTOR: Tony Phillips
PROJECT NAME: B-850 Soil REMEDA.
TEST LOCATION: UPPER COURT YARD

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6987.3 | g | |
| B | WT of cone, jar, sand - After | 4198.9 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2788.4 | g | A - B |
| E | WT of sand in hole | 1208.4 / 2.664 | g | D - C |
| F | Density of sand | 90.5 | pcf | |
| G | Volume of hole | ~~[illegible]~~ 0.0294 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | ~~[illegible]~~ | lbs | |
| I | WT of TARE | | lbs | |
| J | Net WT of soil | 1491.3/3.287 | lbs | H - I |
| K | **WT Density** | 111.8 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 1376.7 | lbs | |
| M | TARE | 366.2 | lbs | Pan A |
| N | Soil + TARE (Dry) | ~~[illegible]~~ 1234.5 | lbs | |
| O | WT of Water | ~~[illegible]~~ 142.2 | lbs | L - N |
| P | WT of Soil | ~~[illegible]~~ 868.3 | lbs | N - M |
| Q | **Moisture Content** | 16.4 | % | O ÷ P |
| | Optimum Moisture Content | 10.5 | % | |
| R | **Dry Density** | 96.0 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. 050509-01) | 130.0 | pcf | |
| T | **Percent Compaction** | ~~[illegible]~~ 74% | % | R ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 5-12-09
PROJECT #: LAW125R
COMPACTION SPEC: 90%
MOISTURE SPEC: 1-4 to opt.

INSPECTOR: Tony Phillips
PROJECT NAME: B-850
TEST LOCATION: SAND HILL 10% CEMENT
TEST BED

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6980.4 | g | |
| B | WT of cone, jar, sand - After | 4220.8 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2759.6 | g | A - B |
| E | WT of sand in hole | 1179.6 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | .0290 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | | lbs | |
| I | WT of TARE | | lbs | |
| J | Net WT of soil | 1679.8g / 3.70 | lbs | H - I |
| K | **WT Density** | 127.6 | **pcf** | **J ÷ G** |
| L | Soil + TARE (Wet) | 1378.0 | lbs | |
| M | TARE | 364.8 | lbs | |
| N | Soil + TARE (Dry) | 1308.2 | lbs | |
| O | WT of Water | 69.8 | lbs | L - N |
| P | WT of Soil | 943.4 | lbs | N - M |
| Q | **Moisture Content** | 7.4 | **%** | **O ÷ P** |
| | Optimum Moisture Content | 10.0 | % | |
| R | **Dry Density** | 118.8 | **pcf** | **K ÷ (I + Q)** |
| S | Lab Maximum (Lab No. 051209-01) | 131.5 | pcf | |
| T | **Percent Compaction** | 90 | **%** | **R ÷ S** |

Weight = WT  Pounds = lbs  Grams = G  Pounds per Cubic Feet = pcf
Cubic Feet = cf  Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 5-13-09

PROJECT #:

COMPACTION SPEC:

MOISTURE SPEC:

INSPECTOR:

PROJECT NAME:

TEST LOCATION: SAND Hill 5% TEST BED CEMENT

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6990.6 | g | |
| B | WT of cone, jar, sand - After | 3930.8 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 3059.8 | g | A - B |
| E | WT of sand in hole | 1479.8 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 16.515 / .0364 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | | lbs | |
| I | WT of TARE | | lbs | |
| J | Net WT of soil | 2062.8 4.547 | lbs | H - I |
| K | **WT Density** | 124.9 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 608.2 | lbs | |
| M | TARE | 138.7 | lbs | |
| N | Soil + TARE (Dry) | 568.4 | lbs | |
| O | WT of Water | 39.8 | lbs | L - N |
| P | WT of Soil | 429.7 | lbs | N - M |
| Q | **Moisture Content** | 9.3 | % | O ÷ P |
| | Optimum Moisture Content | 10.0 | % | |
| R | **Dry Density** | 114.3 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. 051209-01) | 131.5 | pcf | |
| T | **Percent Compaction** | 87 | % | R ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 5-13-09
PROJECT #:
COMPACTION SPEC:
MOISTURE SPEC:

INSPECTOR:
PROJECT NAME:
TEST LOCATION: 1' OUT 5% CEMENT TEST BED #1

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 7091.5 | g | |
| B | WT of cone, jar, sand - After | 4242.2 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2849.3 | g | A - B |
| E | WT of sand in hole | 1269.3 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 14.166 / 0.0312 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | 1658.3 / 3.655 | lbs | H - I |
| K | **WT Density** | 117.1 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 497.2 | lbs | |
| M | TARE | 109.3 | lbs | |
| N | Soil + TARE (Dry) | 451.0 | lbs | |
| O | WT of Water | 46.2 | lbs | L - N |
| P | WT of Soil | 341.7 | lbs | N - M |
| Q | **Moisture Content** | 13.5 | % | O ÷ P |
| | Optimum Moisture Content | 14.5 | % | |
| R | **Dry Density** | 103.2 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. 051309-01) | 118.5 | pcf | |
| T | **Percent Compaction** | 87% | % | R ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

CONSOLIDATED ENGINEERING
LABORATORIES

| | | | |
|---|---|---|---|
| DATE: | 5-20-09 | INSPECTOR: | Tony Phillips |
| PROJECT #: | 2AW 1252 | PROJECT NAME: | B-850 |
| COMPACTION SPEC: | | TEST LOCATION: | SECTOR A-2 |
| MOISTURE SPEC: | | | |

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6989.6 | g | |
| B | WT of cone, jar, sand - After | 3730.8 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 3258.8 | g | A - B |
| E | WT of sand in hole | 1678.8 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | .0413 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | 962.8/2,123 | lbs | H - I |
| **K** | **WT Density** | 51.4 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 1099.9 | lbs | |
| M | TARE | 137.2 | lbs | |
| N | Soil + TARE (Dry) | 1054.3 | lbs | |
| O | WT of Water | 45.6 | lbs | L - N |
| P | WT of Soil | 917.1 | lbs | N - M |
| **Q** | **Moisture Content** | 5.0 | % | O ÷ P |
| | Optimum Moisture Content | | % | |
| **R** | **Dry Density** | 49.0 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. #050509-03) | 122.5 | pcf | |
| **T** | **Percent Compaction** | 40% | % | R ÷ S |

* insitu testing only

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

MOISTURE CONTENT

| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | **Moisture Content** |
|---|---|---|---|---|---|---|---|
| 5/11/2009 | hand mix sand pile pad | 139.0o | 715.0o | 693.00 | 22.0o | 554.0o | 4.00% |
| 5/11/2009 | hand mix upper court yard pad | 110.4o | 406.1o | 373.0o | 33.1o | 262.6o | 12.60% |
| 5/11/2009 | hand mix 1' cut pad | 137.0o | 708.0o | 653.00 | 55.0o | 516.0o | 10.70% |
| | | | | | | | |
| 5/12/2009 | for nuke gauge - sand pile @ 10% SG | 138.4o | 804.5o | 756.4o | 48.1o | 618.0o | 7.80% |
| 5/12/2009 | for nuke gauge - sand pile @ 10% 6" | 137.1o | 633.1o | 599.2o | 33.9o | 462.1o | 7.30% |
| 5/12/2009 | for nuke gauge - sand pile @ 10% 12" | 110.6o | 839.1o | 785.9o | 53.2o | 675.3o | 7.90% |
| | | | | | | | |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% SG | 367.4o | 913.6o | 846.2o | 67.4o | 478.8o | 14.10% |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% 6" | 365.1o | 890.2o | 823.3o | 66.9o | 458.2o | 14.60% |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% 12" | 368.9o | 937.2o | 865.3o | 71.9o | 496.4o | 14.50% |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% SG | 366.2o | 977.6o | 902.6o | 75.0o | 536.4o | 14.00% |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% 6" | 110.8o | 633.2o | 573.4o | 59.8o | 462.6o | 12.90% |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% 12" | 137.5o | 721.7o | 642.7o | 79.0o | 505.2o | 15.60% |
| 5/13/2009 | for nuke gauge - sand pile @ 5% SG | 138.2o | 546.8o | 510.2o | 36.6o | 372.0o | 9.80% |
| 5/13/2009 | for nuke gauge - sand pile @ 5% 6" | 138.4o | 542.7o | 512.7o | 30.0o | 374.3o | 8.00% |
| 5/13/2009 | for nuke gauge - sand pile @ 5% 12" | 137.3o | 431.6o | 410.2o | 21.4o | 272.9o | 7.80% |
| 5/13/2009 | sand pile @ 5% | 367.9o | 819.2o | 778.3o | 40.9o | 410.4o | 10.00% |
| | | | | | | | |
| 5/14/2009 | for nuke gauge - upper court @ 10% SG | 136.6o | 538.0o | 491.4o | 46.6o | 354.8o | 13.10% |
| 5/14/2009 | for nuke gauge - upper court @ 10% 6" | 137.1o | 478.4o | 435.8o | 42.6o | 298.7o | 14.30% |
| 5/14/2009 | for nuke gauge - upper court @ 10% 12" | 138.7o | 500.0o | 452.6o | 47.4o | 313.9o | 15.10% |
| 5/14/2009 | for nuke gauge - upper court @ 15% SG | 138.5o | 579.9o | 519.5o | 60.4o | 381.0o | 15.90% |
| 5/14/2009 | for nuke gauge - upper court @ 15% 6" | 138.1o | 479.3o | 436.7o | 42.6o | 298.6o | 14.30% |
| 5/14/2009 | for nuke gauge - upper court @ 15% 12" | 138.0o | 585.7o | 518.7o | 67.0o | 380.7o | 17.60% |
| | | | | | | | |
| 5/20/2009 | for nuke gauge - area A2 insitu test #1 | 110.7o | 628.8o | 599.1o | 29.8o | 488.4o | 6.00% |

Break Log - all samples 4 in. diam.  *Test stopped due to limit of machine  **100psi min.**

| Sample Date time molded | Sample # | Break Date time | Sample Location/Ele. | unit wt. wet | Max Load | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 5/12/2009 2pm | #1a | 5/15/2009 1pm | sand pile 10% | 144.70 | 548 | **40** | 7.80% |
| 5/12/2009 2pm | #1b | 5/19/09 12pm | sand pile 10% | 144.70 | 829 | **70** | 7.80% |
| 5/12/2009 2pm | #1c | 5/26/09 8am | sand pile 10% | 144.70 | 814 | **60** | 7.80% |
| 5/12/2009 2pm | #1d | | sand pile 10% | 144.70 | | | 7.80% |
| | | | | | | | |
| 5/13/09 9:30am | #2a | 5/16/09 7:30am | sand pile 5% | 134.10 | 2048 | **160** | 10.00% |
| 5/13/09 9:30am | #2b | 5/20/09 8am | sand pile 5% | 134.10 | 3659 | **290** | 10.00% |
| 5/13/09 9:30am | #2c | | sand pile 5% | 134.10 | | | 10.00% |
| | | | | | | | |
| 5/13/09 10:30am | #3a | 5/16/09 8am | 1' cut 5% | 126.90 | 3980 | **320** | 14.10% |
| 5/13/09 10:30am | #3b | 5/20/09 8:30am | 1' cut 5% | 126.90 | 5104 | **410*** | 14.10% |
| 5/13/09 10:30am | #3c | | 1' cut 5% | 126.90 | | | 14.10% |
| | | | | | | | |
| 5/13/09 11am | #4a | 5/16/09 8:15am | 1' cut 10% | 125.50 | 3915 | **310** | 14.00% |
| 5/13/09 11am | #4b | 5/20/09 9am | 1' cut 10% | 125.50 | 5104 | **410*** | 14.00% |
| 5/13/09 11am | #4c | | 1' cut 10% | 125.50 | | | 14.00% |
| | | | | | | | |
| 5/14/09 12pm | #5a | 5/18/09 8am | upper yard 10% | 124.10 | 5160 | **410** | 13.10% |
| 5/14/09 12pm | #5b | 5/21/09 8am | upper yard 10% | 124.10 | 5104 | **410*** | 13.10% |
| 5/14/09 12pm | #5c | | upper yard 10% | 124.10 | | | 13.10% |
| | | | | | | | |
| 5/14/09 1pm | #6a | 5/18/09 8:30am | upper yard 15% | 123.30 | 4892 | **390** | 15.90% |
| 5/14/09 1pm | #6b | 5/21/09 8:30am | upper yard 15% | 123.30 | 5104 | **410*** | 15.90% |
| 5/14/09 1pm | #6c | | upper yard 15% | 123.30 | | | 15.90% |
| | | | | | | | |
| **Cement mixed by hand** | | | | | | | |
| 5/18/09 12:30pm | #7a | 5/21/09 9am | upper yard 10% | 124.10 | 5104 | **410*** | 12.50% |
| 5/18/09 12:30pm | #7b | 5/26/09 8:30am | upper yard 10% | 124.10 | 5104 | **410*** | 12.50% |
| 5/18/09 12:30pm | #7c | | upper yard 10% | 124.10 | | | 12.50% |
| | | | | | | | |
| 5/18/09 2:30pm | #8a | 5/21/09 9:30am | sand pile 5% | 134.10 | 1179 | **90** | 5.10% |
| 5/18/09 2:30pm | #8b | 5/26/09 9am | sand pile 5% | 134.10 | 1430 | **110** | 5.10% |
| 5/18/09 2:30pm | #8c | | sand pile 5% | 134.10 | | | 5.10% |
| | | | | | | | |
| 5/18/09 1:30pm | #9a | 5/21/09 10am | 1' cut 5% | 125.50 | 3300 | **260** | 10.70% |
| 5/18/09 1:30pm | #9b | 5/26/09 9:15am | 1' cut 5% | 125.50 | 4605 | **370** | 10.70% |
| 5/18/09 1:30pm | #9c | | 1' cut 5% | 125.50 | | | 10.70% |

CONSOLIDATED ENGINEERING
LABORATORIES
*"Partners in Quality"*

July 9, 2009

Mr. Steve Ellis
Lawrence Livermore National Laboratory
P.O. Box 808; L-651
Livermore, California 94551-0808

Subject: LLNL B-850 Soil Remediation
B850-S300
Livermore, California
CEL Project #10-01251-LAW & 10-01252-LAW (May 2009)
CEL Project #10-01256-LAW & 10-01257-LAW (June 2009)

**EARTHWORK AND LABORATORY TESTING SUMMARY**
**May 26, 2009 thru June 30, 2009**

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from May 26, 2009 thru June 30, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some low density tests were measured as presented by these test results. We refer these results to the Project Engineer with SCS Engineers, to resolve the low density results observed in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Respectfully submitted,
**CONSOLIDATED ENGINEERING LABORATORIES**

Michael Wissink
Project Manager

Eric J. Swenson, PE, GE
Principal Geotechnical Engineer

Enclosures: Daily Field Reports
Moisture/Density Curves
Sand Cone Testing
Moisture Content Summary
Break Log Summary

Distribution: 1 to Addressee

MW/EJS: pmf
R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\June Summary (Steve Ellis).doc

T. Phillips

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

Job Name & Address: B-850 SOIL REMEDIATION

Date: 5-26-09 TO 5-28-09

Time: 0700

Cel No. LAW/1251

General Contractor: CERAVDO

☒ Work Approved ☐ Work in Violation

☐ Do not proceed with work ☐ Make necessary corrections

Subcontractor: SCS / GRIFFIN

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ GRADING | ☐ | ☐ |

COMMENTS: 5-26-09

SCS = STARTED EXCAVATION HOT SPOTS. ONE 18'X21'X 3' HOLE EXCAVATED @ GPS LOCATION # 4002 BEHIND B-850. FOUND 4'X 4' SECTION OF ROCK/BED ROCK -2' GRADE @ S.W. & N.E. CORNER OF EXCAVATION.

CREW DEMO. TEST BED'S IN SECTOR A-X.

5-27-09

CEL = TOOK 6 INSITU TEST USING TROXLER & SAND CONE IN SECTOR A-3. TEST LOCATION TAKEN FROM CONSTRUCTION AREAS & SURVEY POINTS DRAWING'S FROM SCS ENGINEERS GPS POINTS

SCS = CREW CONTINUES TO DEMO TEST BEDS @ SECTOR A-X. CREW ALSO EXCAVATED HOTSPOTS @ SECTOR A-4 GPS LOC. 4000 & 4001 BOTH HOT SPOTS 20'X20'X 1' IN 1' CUT AREA. ALSO @ SECTOR A-X SAND PILE GPS LOC. 4004 20'X 20'X 2' & @ SECTOR B-2 GPS LOC. 4003 20'X20'X 2' AREAS.

5-28-09

SCS = CONTINUES TO DEMO TEST BEDS IN SECTOR A-X, & DEMO & REMOVE SAND PILE DOWN TO CLAY SUB GRADE. CREW ALSO CHIPPED OUT/DEMO CONC BASE FROM AROUND MONITORING WELL'S # W850-2417, W850-2416, NC7-28, NC7-09. ERD ON SITE FOR MOCK UP/DRESS DOWN W/ HAZMATE EQUIP.

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION | Date: 6-8-09 TO 6-11-09 | Time: 0700 | Cel No. LAW 1256 |
| General Contractor: CERRUDO SERV. | ☒ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ GRADING | ☐ | ☐ |

COMMENTS:

6-8-09

SCS = CONTINUES TO EXCAVATE 2' CUT IN SECTOR A-X, & LOCATED 12 K HIGH VOLT. LINE IN ~~SECT~~ SECTOR A-X ± 2' BELOW GRADE RUNNING N. TO S. CREW STOCK PILE SPOILS IN SECTOR C-1.

6-9-09

CREW CONTINUES EXCAVATION OF 2' CUT IN SECTOR A-X. ALEX W/ SCS USED GPS FOR CUT DEPTH VARIFICATION & LOCATION OF PRE & POST EXCAVATION OF 2' CUT IN SECTOR A-X

6-10-09 (SEE ATTACHED SHEET)

SCS CONTINUES EXCAVATION OF 2' CUT IN SECTOR A-X & STOCK PILE SPOILS IN SECTOR C-1. CREW ~~ALSO~~ ALSO LOCATED 12K HIGH VOLTAGE LINE ± 2' BELOW GRADE RUNNING E. TO W.

6-11-09

SCS CONTINUES EXCAVATION OF 2' CUT IN SECTOR A-X & STOCK PILE SPOILS @ SECTOR C-1 LLNL > ERD (ENVIRONMENTAL RESTORATION DEPT.) TOOK 13 COMPOSITE SOIL SAMPLES + 13 PCB SOIL SAMPLES USING GPS FOR LOCATIONS OF SAMPLES IN SECTOR A-X. QUESTIONABLE METHOD OF SOIL SAMPLING ON SAMPLE # 26

# DEPTH VARIFICATION CHART
DATE 6-9-09

| SECTION LOC | GPS LOC. | | PRE ELEV. | POST ELEV | | CUT DEPTH | |
|---|---|---|---|---|---|---|---|
| ax-depthverfy-1 | 426522.7 | 1695975 | 1297.031 | 1294.902 | post | 2.129 | |
| ax-depthverfy-2 | 426543.6 | 1695984 | 1296.294 | 1294.151 | post | 2.143 | |
| ax-depthverfy-3 | 426563.7 | 1695973 | 1297.866 | 1294.481 | post | 3.385 | |
| ax-depthverfy-4 | 426585.4 | 1695960 | 1299.5 | 1296.083 | post | 3.417 | |
| ax-depthverfy-5 | 426612.1 | 1695942 | 1300.021 | 1295.08 | post | 4.941 | |
| ax-depthverfy-6 | 426629.4 | 1695929 | 1300.179 | 1298.607 | post | 1.572 | sandstone |
| ax-depthverfy-7 | 426640.9 | 1695950 | 1295.991 | 1294.634 | post | 1.357 | sandstone |
| ax-depthverfy-8 | 426642.8 | 1695967 | 1292.069 | 1290.989 | post | 1.08 | sandstone |
| ax-depthverfy-9 | 426621 | 1695979 | 1289.527 | 1287.807 | post | 1.72 | sandstone |
| ax-depthverfy-10 | 426597.8 | 1695995 | 1289.152 | 1286.552 | post | 2.6 | |
| ax-depthverfy-11 | 426564.5 | 1696007 | 1291.051 | 1287.877 | post | 3.174 | |
| ax-depthverfy-12 | 426539.1 | 1696029 | 1287.605 | 1285.17 | post | 2.435 | |
| ax-depthverfy-13 | 426526.1 | 1696055 | 1281.341 | 1280.231 | post | 1.11 | sandstone |
| ax-depthverfy-14 | 426547.6 | 1696051 | 1277.694 | 1276.262 | post | 1.432 | sandstone |
| ax-depthverfy-15 | 426575.3 | 1696047 | 1274.697 | 1273.373 | post | 1.324 | sandstone |
| ax-depthverfy-16 | 426603.8 | 1696035 | 1276.687 | 1274.528 | post | 2.159 | |

CEL PR004 Rev 0

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION | Date: 6-15-09 TO 6-18-09 | Time: 0700 | Cel No. LAW1256 |
| General Contractor: CERRUDO | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS ENG. | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING | ☐ | ☐ |

COMMENTS: 6-15-09

SCS = FINISHED EXCAVATION OF 2' CUT IN SECTOR A-X & STARTED EXCAVATION OF 1' CUT IN SECTOR A-2 ON SOUTH HILLSIDE. & STOCK PILE SPOILS @ SECTOR C-1.

6-16-09

SCS = CONTINUES TO EXCAVATE 1' CUT IN SECTOR A-2. URANIUM FOUND IN SECTOR A-2 @ TOP OF HILLSIDE BETWEEN 1047 & 1048 LOC. ON PLAN DRAWING (CONSTRUCTION & SURVEY POINTS) TRUE GPS LOC. TO COME ON LATER REPORT. CREW SURVIED & FLAGGED LOCATIONS FOR SOIL PCB TEST LOCATIONS FOR ERD TEAM.

~~6-16-09~~ 6-17-09

SCS = STARTED 1' CUT EXCAVATION ON NORTH HILLSIDE SLOPE IN SECTOR A-3, & STARTED OVER EXCAVATION IN SECTOR A-X TO 3' CUT @ PCB TEST SAMPLES #51, 65, 64 & 22.

6-18-09

SCS = CONTINUE'S 1' & 2' CUT EXCAVATION IN SECTOR A-X IN V-DITCH ON SOUTH & EAST SIDE OF A-X & AT SECTOR A-1 AROUND MAN HOLE SAMPLE LOCATION #57

ERD = LLNL ERD TEAM ON SITE TO COLLECT PCB SOIL SAMPLES (13 = TOT.) FROM SECTOR A-2. SOIL SAMPLES # 62, 45, 42, 43, & 44 WERE RELOCATED DUE TO SANDSTONE & ROCK. IN SECTOR A-X + A-1 ERD TEAM RESAMPLED PCB TEST SAMPLES # 49, 26, & ~~57~~ 57 AFTER OVER EXCAVATION IN THOSE AREAS WAS COMPLETED.

CEL FR004 Rev 0

T. Phillips

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

1 OF 2

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION | Date: 6-22-09 TO 6-24-09 | Time: 0700 | Cel No. LAW1256 |
| General Contractor: CERRUDO SERV. | ☒ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS ENGINEERING | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING | | ☐ |

COMMENTS:

6-22-09

SCS = CONTINUES TO OVER EXCAVATE 1' & 2' CUT IN SECTOR A-X, & STARTED 1' CUT ON S. HILLSIDE OF SECTOR A-3.

6-23-09

LLNL ERD TEAM = FOUND ± 4 PCB TEST SAMPLES ARE BAD, (HAVE HIGHER COUNTS OF PCB'S THAN ALOWED, AS PER SPEC.) IN SECTOR A-2.

SCS = CONTINUES 1' CUT EXCAVATION IN SECTOR A-3 ON S. HILLSIDE & CHECKED DEPTH OF CUT W/ GPS UNIT. CREW FOUND 1 = HOT SPOT BETWEEN SECTOR A-3 & A-4 OUTSIDE OF 1' CUT AREA @ TOP OF N. HILLSIDE, & MARKED DEPLETED URANIUM THAT RAN +60,000 ON THE METER & +4 ON THE R.E.M. METER W/ RED PAINT.

6-24-09

SCS = CONTINUES 1' CUT EXCAVATION IN SECTOR A-3 & A-4, CREW ALSO STARTED 1' OVER EXCAVATION IN SECTOR A-1 @ A7.4, DO ALL RD, & ACCESS RD TO B-850, & UNEARTHED 2" TRANSITE PIPE 1 = DIRECT BURIAL ELEC. CABLE & 2" STEEL CONDUIT PIPE, ± 2' BELOW ORIGIONAL GRADE. CREW ALSO BUSTED A WHAT APPEARS AS AN 1'X1' CONC. DUCT BANK, ALL @ COMMUNICATION VAULT.

I. Phillips

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

2 OF 2

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION. | Date: 6-25-09 | Time: 0700 | Cel No. LAW1256 |
| General Contractor: ~~CUAA~~ CERRUDO | ☒ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADEING. | ☐ | ☐ |

COMMENTS: 6-25-09

LLNL ERD TEAM TOOK 13 SOIL SAMPLES FOR PCB TESTING & COMPOSITE TESTING IN SECTOR A-3

SCS = CONTINUES 1' CUT EXCAVATION IN SECTOR A-4. CREW ALSO IN PROCESS OF GROOMING ~~A~~ SECTOR A-X FOR LAY-OUT OF GRID FOR PIT/BOWL TO BE EXCAVATED, ON MONDAY. CREW SURVEY SECTOR A-X

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 5-27-08 | |
| Project Name: J-850 SOIL REMEDIATION | Project Number: LAW 1251 | Page ___ of ___ | |
| Field Rep: TONY | Project Manager: CAL [illegible] | | |

| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☐ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: CERRUDO | Conditions: | ☒ Sunny | ☐ Windy | ☒ Hot | ☐ Mild |
| Contractor Representative: SCS ENGR. | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | N/A | | Density Testing Equipment | ☒ Nuclear | Type: TROXLER |
| Moving | | | | ☐ Tube | |
| | | | | ☒ Sand Cone | |
| Water | | | Fill Source | ☒ Native | |
| Support | | | | ☐ Import | |

| Plan | Engineer | Date | Fill Location: SECTOR A-3 |
|---|---|---|---|
| Civil | | | |
| Structural | | | |
| Geotech | | | |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| | ~~NO CURVE ON MATERIAL~~ | | | ☐ 90% | ☐ Opt. + 2% |
| 250509-03 | 1'6OT DRK BRN | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | SANDY LEAN CLAY | 122.5 | 12.0 | ☐ Other: | ☐ Other: |
| | | | | | CORRECT DRY DEN. |
| | | | | CORRECT MOIST | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | ~~Curve #~~ | Percent Compaction | ~~Pass/Fail~~ % OF COMP |
|---|---|---|---|---|---|---|---|---|
| 1 | APPROX. GPS LOC. 5018 | FG | 103.3 | 6.9 | 96.7 | 2.1 | 101.1 | 82 |
| 2 | 5020 | | 76.6 | 12.1 | 68.3 | 6.7 | 71.7 | 59 |
| 3 | 5023 | | 78.4 | 5.7 | 74.2 | 4.3 | 75.1 | 61 |
| 4 | 1033 | | 94.1 | 6.5 | 88.4 | 7.3 | 91.0 | 74 |
| 5 | 1031 | | 77.1 | 10.1 | 70.0 | 5.0 | 73.4 | 60 |
| 6 | 5026 | | 73.2 | 6.0 | 69.1 | 2.5 | 71.4 | 58 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:
INSITU TEST OF IN PLACE NATIVE MATERIAL IN SECTOR A-3. All TEST LOC.'S TAKEN FROM CONST. AREAS & SURVEY POINTS DRAWING'S FROM SCS. ENGINEERING + ARE APPROXIMATE GPS SURVEY POINTS.
SAND CONE TEST ON #1 ~~TEST~~ INSITU TEST LOCATION.

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 5/28/08 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

B-583085

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Report #: | | Date: 6-1-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1R56 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CEARUDO

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☒ Windy ☐ Hot ☒ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | N/A | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☒ Nuclear Type: TROXLER 3440 ☐ Tube ☒ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: TEST LOC. IN SECTOR A-4

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| | N/A INSITU TESTING | | | ☐ 90% | ☐ Opt. + 2% |
| | ON IN PLACE MATERIAL | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | ONLY IN SECTOR A-4 | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location NORTHERN | EASTERN | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 426653.9 | 1695638 | 1369.02 | 84.2 | 6.8 | 78.8 | N/A | N/A | N/A |
| 2 | 426698.2 | 1695818 | 1316.57 | 68.3 | 2.4 | 66.6 | \| | \| | \| |
| 3 | 426708.4 | 1695972 | 1285.21 | 73.2 | 3.6 | 70.6 | \| | \| | \| |
| 4 | 426705.5 | 1696006 | 1266.77 | 81.5 | 2.5 | 79.5 | \| | \| | \| |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Comment/ Sketch: SAND CONE TEST TAKEN @ #4. SCS CREW CONTINUES TO EXCAVATE (DEMO) SANDHILL & STARTED EXCAVATION ON 3' CUT IN SECTOR A-X & STOCK PILE SPOIL'S BEHIND B-850 OVER SECTOR C-1. TEST LOC.'S & ELEVATION TAKEN FROM GPS. SAMPLES TAKEN FOR BURN OUT'S & MOISTURE CORRECTION USED



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 6-1 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

B-583005

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 6-2-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1256 | Page ______ of ______ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERAUDO

Contractor Representative: ANDY BELL

Conditions: ☐ Sunny ☒ Windy ☐ Hot ☒ Mild ☒ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | N/A | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☒ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: INSITU TESTING IN SECTOR A-X

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| | N/A INSITU TESTING | | | ☐ 90% | ☐ Opt. + 2% |
| | ONLY IN SECTOR A-X | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | & SAND CONE @ TEST | | | ☐ Other: | ☐ Other: |
| | #6 | | | | |
| | | | | | |

| Test # | Location NORTHERN | Location EASTERN | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 426435.6 | 1695887 | 1298.19 | 111.2 | 8.3 | 103.2 | | | |
| 2 | 426477.8 | 1695936 | 1298.60 | 122.0 | 11.1 | 100.8 | | | |
| 3 | 426531.4 | 1695898 | 1298.54 | 109.0 | 17.1 | 93.0 | | | |
| 4 | 426519.9 | 1695984 | 1296.79 | 120.6 | 10.0 | 109.6 | | | |
| 5 | 426594.4 | 1695992 | 1290.33 | 86.2 | 2.8 | 83.8 | | | |
| 6 | 426571.4 | 1696050 | 1274.15 | 89.8 | 5.1 | 85.4 | | | |
| 7 | 426505.3 | 1696039 | 1290.58 | 91.9 | 2.6 | 89.5 | | | |
| 8 | 426456.9 | 1696001 | 1296.20 | 92.7 | 5.4 | 87.9 | | | |
| 9 | 426412.2 | 1696060 | 1293.12 | 115.4 | 9.8 | 105.1 | | | |
| 10 | 426405.9 | 1695930 | 1298.40 | 104.8 | 4.1 | 100.6 | | | |
| 11 | 426641.3 | 1695948 | 1296.98 | 81.9 | 2.2 | 80.1 | | | |

Comment/Sketch:

CREW (SCS) CONTINUES TO EXCAVATE SECTOR A-X, 2' OUT SECTION & LOCATED COMMUNICATION LINE @ EAST SIDE OF SECTOR A-X ON HILLSIDE JUST WEST OF RT. #4 ROAD.
MOISTURE BURN OUT SAMPLE TAKEN & USED MOISTURE CORRECTION

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 6-2 Reviewed By: ____________ Date: ____________

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

B-583005

# DAILY FIELD REPORT

| | |
|---|---|
| Report #: | Date: 6-3-09 |
| Project Name: B-830 SOIL REMEDIATION | Project Number: LAW 1256 |
| Page ______ of ______ | |
| Field Rep: TONY PHILLIPS | Project Manager: |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERAUDO

Contractor Representative: ANDY BELL

Conditions: ☐ Sunny ☒ Windy ☐ Hot ☒ Mild ☒ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | IN SITU/IN PLACE | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☒ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: IN SITU TESTING IN SECTOR B-1 & SAND CONE

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| | N/A | | | ☐ 90% | ☐ Opt. + 2% |
| | MOISTURE SAMPLES TAKEN | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | & MOISTURE CORRECTION'S | | | ☐ Other: | ☐ Other: |
| | USED. GPS FOR TEST LOCATIONS | | | | |
| | & ELEVATIONS | | | | |

| Test # | Location NORTHEAN | Location EASTERN | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 426603.3 | 1695798 | 1319.0 | 98.6 | 1.4 | 97.2 | | | |
| 2 | 426581.6 | 1695738 | 1328.2 | 92.2 | 0.7 | 91.5 | | | |
| 3 | 426466.0 | 1695520 | 1349.6 | 89.2 | 1.3 | 88.0 | | | |
| 4 | 426411.8 | 1695499 | 1339.8 | 84.8 | 2.8 | 82.4 | | | |
| 5 | 426379.8 | 1695555 | 1337.0 | 84.2 | 2.1 | 82.4 | | | |
| 6 | 426300.5 | 1695705 | 1338.4 | 81.8 | 3.4 | 79.1 | | | |
| 7 | 426317.0 | 1695829 | 1327.3 | 103.2 | 1.2 | 101.9 | | | |
| 8 | 426313.1 | 1695895 | 1321.7 | 63.2 | 3.9 | 60.8 | | | |
| 9 | 426345.3 | 1696037 | 1304.7 | 80.4 | 1.7 | 79.0 | | | |
| | | | | | | | | | |

Comment/ Sketch: SAND CONE TEST ON NUKE TEST #9. SOIL SAMPLE'S TAKEN FOR BURN OUT'S & MOISTURE CORRECTION & CORRECTION'S USED.
SCS CREW CONTINUE TO EXCAVATE 2' CUT FROM SECTOR A-X & STOCK PILE SPOIL'S @ SECTOR C-1. SEWER LINE NOT FOUND A LOWER THAN THE 2' CUT @ S.E. CORNER OF A-X. 2 = 2" CONDUIT 1 = COMM LINE & 1 = POWER(ELEC) LINE, LOC. ~ 18" BELOW GRADE @ SOUTH SIDE OF A-X BETWEEN V-DITCH & AC. ROAD. ALSO 2-2" TRANSITE PIPES LOC. @ SAME AREA @ 2' BELOW GRADE.



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 6-3 | Reviewed By: ______ | Date: ______ |

Geosphere Con... ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

B-583005

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 6-4-09 |
| Project Name: B-830 Soil REMEDIATION | Project Number: LAW 1256 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: RANDY BELL

Conditions: ☑ Sunny ☑ Windy ☐ Hot ☑ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

SAND CONE TEST @ A-1.

SCS = CONTINUES TO EXCAVATE 2' CUT IN SECTOR A-X & STOCK PILE SPOILS IN SECTOR C-1



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 6-4 | Reviewed By: | Date: |

Geosphere Con. ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

#B-583005

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | | Report #: | Date: 5/26-28/09 |
| Project Name: LLNL Site 300 B-850 Soil R. | | Project Number: LAW 1252 | Page ___ of ___ |
| Field Rep: Robert Uribe | | Project Manager: Cal Dickerman | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

5/26/09 Tue

- Break sand pile @10%. 8Am 60 psi - Fail
- hand mix upper court yard @10%. 8:30 410 psi - Pass
- hand mix sand pile @ 5%. 9 Am 110 psi - pass
- hand mix 1' cut @ 5%. 9:15 370 psi - pass
- soils work obs. 97° F
- office work Sunny

5/27/09 Wed

- Nuke test for in-situ, undisturbed soil in area A3
- 6 moist cont. (see Table)
- 1 sand cone (see Table one) 96° F Sunny

5/28/09 Thurs.

- Completed lab tests from day before
- Reports

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 5/28/09 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | | ~~Report #:~~ B-583205 | Date: 6/1-4/09 |
| Project Name: LLNL Site 300 B851 Spill | | Project Number: LAW 1257 | Page ____ of ____ |
| Field Rep: Robert Uribe | | Project Manager: Cal Dickerman | |
| Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench | ☐ Other | Hours Charged: | ☑ Full Time ☐ Part Time |
| Contractor: Cesnudo | Conditions: | ☐ Sunny ☐ Cloudy ☐ Windy ☐ Rain | ☐ Hot ☐ Cold ☐ Mild ☐ Fog |
| Contractor Representative: Andy Bell | | | |

Comment/ Sketch:

$\boxed{6/1/09}$ Mon
- Nuke tests in A4
- 4 moist. cont.
- Sand cone

overcast 72°F

$\boxed{6/2/09}$ Tue
- Nuke tests in Ax
- moist cont.
- Sand cone

Sunny 77.5°F

$\boxed{6/3/09}$ Wed
- Nuke tests in B1
- moist. cont.
- sand cone

Partly Cloudy 79.5°F

$\boxed{6/4/09}$ Thu
- moist. Cont.
- Sand cone
- reports

Sunny 71°F

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 6/4/09 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report#: B-S83205 | Date: 6/8-11/09 | |
| Project Name: LLNL Site 300 B851 Soil Rem | Project Number: LAW 1257 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other — Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

6/8/09 Mon

- Sand cone
- Reports

Sunny 70° F

6/9/09 Tue

- Break sand pile 10% cement 110 psi
- Report

Windy Sunny 70° F

6/10/09 Wed

- Break sand pile 5% cement 290 psi
  1' cut 5% cement 390 psi
  1' cut 10% cement 410 psi
- Report

Partly sunny 65° F

6/11/09 Thu

- Break upper court yard 10% cement 410 psi
  upper court yard 15% cement 410 psi
- Report

Sunny 60° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 6/11/09 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| Report #: B58300S | Date: 6/15-18/09 |
| Project Name: LLNL Site 300 B850 Soil Rem. | Project Number: LAW 1257 |
| Page ______ of ______ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

6/15/09 Mon

Break mix upper courtyard 10% cement 410 psi.
mix sand pile 5%. 230 psi
mix 1' cut 5%. 390 psi
Overcast 75° F

6/16/09 Tue

Lab work
Reports

Sunny 80° F

6/17/09 Wed

Curve from Ax area

Sunny 85° F

6/18/09 Thu

Curve
Reports

Sunny 91° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 6/18/09 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| Report #: B-583005 | Date: 6/29,30 - 7/1/09 |
| Project Name: LLNL Site 300 B851 Soil K | Project Number: LAW 1257, LAW 1261 Page ____ of ____ |
| Field Rep: | Project Manager: Cal Dickerman |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerendo

Contractor Representative: Andy Bell

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

6/29/09 Mon #LAW 1257
Nuke tests in area Ax -2'
6 moist cont.
sand cone
soil sample for curve
Sunny 100° F

6/30/09 Tue #LAW 1257
Complete curve + moist cont.
soil sample for curve
Sunny 90° F

7/1/09 Wed #LAW 1261
Curve
Reports

Sunny 90° F



☑ This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 7/1/09 Reviewed By: ____________ Date: ____________

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 5/27/09 | |
| Project Name: LLNL Site 300 B-850 Soil R. | Project Number: LAW 1252 | Page 1 of 2 | |
| Field Rep: Robert Uribe | Project Manager: Mike Wissink | | |

| Scope of Work: | ☐ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☐ Full Time | ☐ Part Time area |
|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contractor: | Cerrudo | Conditions: | ☒ Sunny 96° | ☐ Windy | ☒ Hot | ☐ Mild |
| Contractor Representative: | Andy Bell | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | | |
|---|---|---|---|---|
| Compaction | insitu | | Density Testing Equipment | ☐ Nuclear Type: |
| Moving | | | | ☐ Tube |
| | | | | ☒ Sand Cone |
| Water | | | Fill Source | ☒ Native on site |
| Support | | | | ☐ Import |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: In-situ Area A3

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 050509-03 | 1' cut DK Brn sandy lean CL | 122.5 | 12.0 | ☐ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Test #1 area | SG | 87.5 | 3.2 | 84.8 | 050509-03 | 69 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | 789.6 | | | | |
| | | | | 21.1 | | | | |
| | | | | 650.5 | | | | |
| | | | | 3.2% | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | 84.8 | | | | |

Comment/ Sketch:

Test taken near Nuke test site #1
undisturbed ~~site~~ soil

69%

#B-583005



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 5/27/09 | Reviewed By: | Date: |
|---|---|---|---|

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 5/27/09
PROJECT #: LAW 1252
COMPACTION SPEC:
MOISTURE SPEC:
INSPECTOR: R. Uribe
PROJECT NAME: LLNL site 300B-850 soil Re
TEST LOCATION: Test #1 area
in-situ undisturbed soil

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6828.1 | g | |
| B | WT of cone, jar, sand - After | 4175.4 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2652.7 | g | A - B |
| E | WT of sand in hole | 1072.7 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | ~~.0835~~ 0.0264 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | 1048.4/2.311 | lbs | H - I |
| K | **WT Density** | 87.5 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 810.7 | lbs | |
| M | TARE | 139.1 | lbs | |
| N | Soil + TARE (Dry) | 789.6 | lbs | |
| O | WT of Water | 21.1 | lbs | L - N |
| P | WT of Soil | 650.5 | lbs | N - M |
| Q | **Moisture Content** | 3.2% | % | O ÷ P |
| | Optimum Moisture Content | 12.0 | % | |
| R | **Dry Density** | 84.8 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. 050509-03) | 122.5 | pcf | |
| T | **Percent Compaction** | 69% | % | R ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

MOISTURE CONTENT LLNL site 300 B-850 soil remediation Consolidated Eng. Lab.

| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | **Moisture Content** |
|---|---|---|---|---|---|---|---|
| 5/11/2009 | hand mix sand pile pad | 139.0o | 715.0o | 693.00 | 22.0o | 554.0o | 4.00% |
| 5/11/2009 | hand mix upper court yard pad | 110.4o | 406.1o | 373.0o | 33.1o | 262.6o | 12.60% |
| 5/11/2009 | hand mix 1' cut pad | 137.0o | 708.0o | 653.00 | 55.0o | 516.0o | 10.70% |
| | | | | | | | |
| 5/12/2009 | for nuke gauge - sand pile @ 10% SG | 138.4o | 804.5o | 756.4o | 48.1o | 618.0o | 7.80% |
| 5/12/2009 | for nuke gauge - sand pile @ 10% 6" | 137.1o | 633.1o | 599.2o | 33.9o | 462.1o | 7.30% |
| 5/12/2009 | for nuke gauge - sand pile @ 10% 12" | 110.6o | 839.1o | 785.9o | 53.2o | 675.3o | 7.90% |
| | | | | | | | |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% SG | 367.4o | 913.6o | 846.2o | 67.4o | 478.8o | 14.10% |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% 6" | 365.1o | 890.2o | 823.3o | 66.9o | 458.2o | 14.60% |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% 12" | 368.9o | 937.2o | 865.3o | 71.9o | 496.4o | 14.50% |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% SG | 366.2o | 977.6o | 902.6o | 75.0o | 536.4o | 14.00% |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% 6" | 110.8o | 633.2o | 573.4o | 59.8o | 462.6o | 12.90% |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% 12" | 137.5o | 721.7o | 642.7o | 79.0o | 505.2o | 15.60% |
| 5/13/2009 | for nuke gauge - sand pile @ 5% SG | 138.2o | 546.8o | 510.2o | 36.6o | 372.0o | 9.80% |
| 5/13/2009 | for nuke gauge - sand pile @ 5% 6" | 138.4o | 542.7o | 512.7o | 30.0o | 374.3o | 8.00% |
| 5/13/2009 | for nuke gauge - sand pile @ 5% 12" | 137.3o | 431.6o | 410.2o | 21.4o | 272.9o | 7.80% |
| 5/13/2009 | sand pile @ 5% | 367.9o | 819.2o | 778.3o | 40.9o | 410.4o | 10.00% |
| | | | | | | | |
| 5/14/2009 | for nuke gauge - upper court @ 10% SG | 136.6o | 538.0o | 491.4o | 46.6o | 354.8o | 13.10% |
| 5/14/2009 | for nuke gauge - upper court @ 10% 6" | 137.1o | 478.4o | 435.8o | 42.6o | 298.7o | 14.30% |
| 5/14/2009 | for nuke gauge - upper court @ 10% 12" | 138.7o | 500.0o | 452.6o | 47.4o | 313.9o | 15.10% |
| 5/14/2009 | for nuke gauge - upper court @ 15% SG | 138.5o | 579.9o | 519.5o | 60.4o | 381.0o | 15.90% |
| 5/14/2009 | for nuke gauge - upper court @ 15% 6" | 138.1o | 479.3o | 436.7o | 42.6o | 298.6o | 14.30% |
| 5/14/2009 | for nuke gauge - upper court @ 15% 12" | 138.0o | 585.7o | 518.7o | 67.0o | 380.7o | 17.60% |
| | | | | | | | |
| 5/20/2009 | for nuke gauge - area A2 insitu test #1 | 110.7o | 628.8o | 599.1o | 29.8o | 488.4o | 6.00% |
| | | | | | | | |
| 5/27/2009 | for nuke gauge - area A3 insitu test #1 | 109.4o | 648.0o | 636.9o | 11.1o | 527.5o | 2.10% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #2 | 110.7o | 566.8o | 538.3o | 28.5o | 427.6o | 6.70% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #3 | 137.2o | 567.4o | 549.8o | 17.6o | 412.6o | 4.30% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #4 | 136.7o | 641.8o | 625.6o | 16.2o | 488.9o | 3.30% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #5 | 137.5o | 494.6o | 477.5o | 17.1o | 340.0o | 5.00% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #6 | 138.2o | 529.1o | 519.5o | 9.6o | 381.3o | 2.50% |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: #B 583005 | | Date: 6/1/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1257 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☑ Mild ☑ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | insitu | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☐ Nuclear Type: ☐ Tube ☑ Sand Cone

Fill Source: ☑ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: 1' cut area A4

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 050509-03 | 1' cut dk brn sandy CL | 122.5 | 12.0 | ☐ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | insitu | insitu |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Adj. to test #6 w/Nuke 6/1/09 | SG | 78.8 | 1.9 | 77.3 | 050509-3 | 63 | N/A |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

Test for insitu den. and moist. cont. near test #6 with Nuke gauge on 6/1/09

Overcast 72°F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 6/1/09 | Reviewed By: | Date: |

CONSOLIDATED ENGINEERING
LABORATORIES

| | | | |
|---|---|---|---|
| DATE: | 6/1/09 | INSPECTOR: | Robert Uribe |
| PROJECT #: | LAW 1257 | PROJECT NAME: | LLNL Site 300 B-850 Soil R |
| COMPACTION SPEC: | insitu | TEST LOCATION: | 1' cut area A4 |
| MOISTURE SPEC: | insitu | #B-583005 overcast @72°F | |

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6922.7 | g | |
| B | WT of cone, jar, sand - After | 3837.4 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 3085.3 | g | A - B |
| E | WT of sand in hole | 1505.3 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | .0370 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | 1322.3/2.915 | lbs | H - I |
| K | **WT Density** | 78.8 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 906.0 | lbs | |
| M | TARE #2 | 138.3 | lbs | |
| N | Soil + TARE (Dry) | 891.8 | lbs | |
| O | WT of Water | 14.2 | lbs | L - N |
| P | WT of Soil | 753.5 | lbs | N - M |
| Q | **Moisture Content** | 1.9 % | % | O ÷ P |
| | Optimum Moisture Content | 12.0 | % | |
| R | **Dry Density** | 77.3 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. #050509-03) | 122.5 | pcf | Dry |
| T | **Percent Compaction** | 63% | % | R ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: B-583005 | | Date: 6/2/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1257 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: [x] Mass Grading [ ] Pavement [ ] Utility Trench [ ] Other

Hours Charged: [x] Full Time [ ] Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: [x] Sunny [ ] Windy [ ] Hot [x] Mild [ ] Cloudy [ ] Rain [ ] Cold [ ] Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | insitu | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: [ ] Nuclear Type: [ ] Tube [x] Sand Cone

Fill Source: [x] Native [ ] Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: Area Ax

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| | N/A | | | [ ] 90% | [ ] Opt. + 2% |
| | | | | [ ] 95% | [ ] Opt. + 2% to 5% |
| | | | | [ ] Other: | [ ] Other: |
| | | | | None | None |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| | Area Ax, near Nuke #6 | SG | 96.8 | 3.3 | 93.7 | N/A | N/A | N/A |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

insitu readings only, no compaction testing, undisturbed SG on slope near Nuke test #6 on 6/2/09

Sunny 77.5°F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

[x] **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

[ ] **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 6/2/09 | Reviewed By: | Date: |

CONSOLIDATED ENGINEERING LABORATORIES #B-583005

DATE: 6/2/09
PROJECT #: LAW 1257
COMPACTION SPEC: None
MOISTURE SPEC: None
INSPECTOR: Robert Uribe
PROJECT NAME: LLNL Site 300 B850 soil R.
TEST LOCATION: Area Ax

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6822.7 | g | |
| B | WT of cone, jar, sand - After | 4086.4 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2736.3 | g | A - B |
| E | WT of sand in hole | 1156.3 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | .0285 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | 1251.4/2.759 | lbs | H - I |
| K | **WT Density** | 96.8 | **pcf** | **J ÷ G** |
| L | Soil + TARE (Wet) | 752.4 | lbs | |
| M | TARE #7 | 137.6 | lbs | |
| N | Soil + TARE (Dry) | 732.9 | lbs | |
| O | WT of Water | 19.5 | lbs | L - N |
| P | WT of Soil | 595.3 | lbs | N - M |
| Q | **Moisture Content** | 3.3% | % | O ÷ P |
| | Optimum Moisture Content | N/A | % | |
| R | **Dry Density** | 93.7 | **pcf** | **K ÷ (I + Q)** |
| S | Lab Maximum (Lab No. N/A) | N/A | pcf | |
| T | **Percent Compaction** | N/A | % | R ÷ S |

Weight = WT Pounds = lbs Grams = G Pounds per Cubic Feet = pcf
Cubic Feet = cf Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: R-S83005 | Date: 6/3/09 | |
| Project Name: LLNL Site 300 B850 soil R. | Project Number: LAW 1257 | Page ______ of ______ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |
| Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
| Contractor: Cerrudo | Conditions: ☒ Sunny Partly | ☐ Windy | ☐ Hot ☒ Mild |
| Contractor Representative: Andy Bell | ☐ Cloudy | ☐ Rain | ☐ Cold ☐ Fog |

| Equipment | Type | Number | Density Testing Equipment | |
|---|---|---|---|---|
| Compaction | insitu | | ☐ Nuclear | Type: |
| Moving | | | ☐ Tube | |
| Water | | | ☒ Sand Cone | |
| Support | | | Fill Source: ☒ Native | |
| | | | ☐ Import | |

| Plan | Engineer | Date | Fill Location: Area B, |
|---|---|---|---|
| Civil | | | |
| Structural | | | |
| Geotech | | | |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| — | — | — | — | ☐ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | None | None |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | 2' W of Nuke test #9 | SG | 78.3 | 2.3 | 76.5 | — | — | — |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

insitu testing of area B, 2' west of Nuke test #9 on 6/3/09, ~~for~~ no compaction requirements, undisturbed soil

Partly Cloudy 79.5° F



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 6/3/09 | Reviewed By: ______ | Date: ______ |

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 6/3/09
INSPECTOR: Robert Uribe
PROJECT #: LAW 1257
PROJECT NAME: LLNL Site 300 B850 soil R
COMPACTION SPEC: None
TEST LOCATION: Area B, 2' west of
MOISTURE SPEC: None
Nuke test #9 on 6/3/09 Partly Cloudy 79.5° F

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6724.1 | g | |
| B | WT of cone, jar, sand - After | 3844.0 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2880.1 | g | A - B |
| E | WT of sand in hole | 1300.1 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 0.0320 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | 1136.6/2.506 | lbs | H - I |
| **K** | **WT Density** | 78.3 | **pcf** | **J ÷ G** |
| L | Soil + TARE (Wet) | 991.3 | lbs | |
| M | TARE | #7 138.0 | lbs | |
| N | Soil + TARE (Dry) | 971.8 | lbs | |
| O | WT of Water | 19.5 | lbs | L - N |
| P | WT of Soil | 833.8 | lbs | N - M |
| **Q** | **Moisture Content** | 2.3% | % | **O ÷ P** |
| | Optimum Moisture Content | N/A | % | |
| **R** | **Dry Density** | 76.5 | **pcf** | **K ÷ (I + Q)** |
| S | Lab Maximum (Lab No. N/A) | N/A | pcf | |
| **T** | **Percent Compaction** | N/A | % | **R ÷ S** |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

Geosphere Cons[ult]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | | Report #: B-583005 | Date: 6/4/09 |
| Project Name: LLNL Site 300 B850 Soil R. | | Project Number: LAW 1257 | Page ____ of ____ |
| Field Rep: Robert Uribe | | Project Manager: Cal Dickerman | |

| Scope of Work: | ☑ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☑ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contractor: Cerrudo | Conditions: | ☑ Sunny | ☐ Windy | ☐ Hot | ☑ Mild |
| Contractor Representative: Andy Bell | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | insitu | | Density Testing Equipment | ☐ Nuclear | Type: |
| | | | | ☐ Tube | |
| Moving | | | | ☑ Sand Cone | |
| Water | | | Fill Source | ☑ Native | |
| Support | | | | ☐ Import | |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: Area $A_1$

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| — | — | — | — | ☐ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | None | None |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | 20'E and 10'N of Nuke test #1 | SG | 123.3 | 1.7 | 121.2 | — | — | — |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

insitu test of undisturbed soil adjacent to excavated area in $A_1$, sand cone test was near Nuke test #1 on 5/18/09, no compaction requirements, rocky sandy soil

Sunny 71°F



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 6/4/09 | Reviewed By: | Date: |
|---|---|---|---|

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 6/4/09
PROJECT #: CAW 1257
COMPACTION SPEC: None
MOISTURE SPEC: None

INSPECTOR: Robert Uribe
PROJECT NAME: LLNL Site 300 B850 Soil R.
TEST LOCATION: Area A, 20' east and 10' North of Nuke test #1 on 5/18/09

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6806.4 | g | |
| B | WT of cone, jar, sand - After | 4314.1 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2492.3 | g | A - B |
| E | WT of sand in hole | 912.3 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 0.0224 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | 1253.2 / 2.763 | lbs | H - I |
| K | **WT Density** | 123.3 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 1392.0 | lbs | |
| M | TARE #13 | 138.8 | lbs | |
| N | Soil + TARE (Dry) | 1371.3 | lbs | |
| O | WT of Water | 20.7 | lbs | L - N |
| P | WT of Soil | 1232.5 | lbs | N - M |
| Q | **Moisture Content** | 1.7 % | % | O ÷ P |
| | Optimum Moisture Content | N/A | % | |
| R | **Dry Density** | 121.2 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. N/A) | N/A | pcf | |
| T | **Percent Compaction** | N/A | % | R ÷ S |

Weight = WT    Pounds = lbs    Grams = G    Pounds per Cubic Feet = pcf
Cubic Feet = cf    Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 • San Ramon, California 94583 • TEL: (925) 314-7100 • FAX: (925) 855-7140

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 5/12/2009 2pm | #1a | 5/15/2009 1pm | sand pile 10% | 144.70 | 548 | **40** | 7.80% |
| 5/12/2009 2pm | #1b | 5/19/09 12pm | sand pile 10% | 144.70 | 829 | **70** | 7.80% |
| 5/12/2009 2pm | #1c | 5/26/09 8am | sand pile 10% | 144.70 | 814 | **60** | 7.80% |
| 5/12/2009 2pm | #1d | 6/9/09 8am | sand pile 10% | 144.70 | 1407 | **110** | 7.80% |
| | | | | | | | |
| 5/13/09 9:30am | #2a | 5/16/09 7:30am | sand pile 5% | 134.10 | 2048 | **160** | 10.00% |
| 5/13/09 9:30am | #2b | 5/20/09 8am | sand pile 5% | 134.10 | 3659 | **290** | 10.00% |
| 5/13/09 9:30am | #2c | 6/10/2009 8am | sand pile 5% | 134.10 | 3717 | **290** | 10.00% |
| | | | | | | | |
| 5/13/09 10:30am | #3a | 5/16/09 8am | 1' cut 5% | 126.90 | 3980 | **320** | 14.10% |
| 5/13/09 10:30am | #3b | 5/20/09 8:30am | 1' cut 5% | 126.90 | 5104 | **410*** | 14.10% |
| 5/13/09 10:30am | #3c | 6/10/09 8:30am | 1' cut 5% | 126.90 | 4976 | **390** | 14.10% |
| | | | | | | | |
| 5/13/09 11am | #4a | 5/16/09 8:15am | 1' cut 10% | 125.50 | 3915 | **310** | 14.00% |
| 5/13/09 11am | #4b | 5/20/09 9am | 1' cut 10% | 125.50 | 5104 | **410*** | 14.00% |
| 5/13/09 11am | #4c | 6/10/09 9am | 1' cut 10% | 125.50 | 5104 | **410*** | 14.00% |
| | | | | | | | |
| 5/14/09 12pm | #5a | 5/18/09 8am | upper yard 10% | 124.10 | 5160 | **410** | 13.10% |
| 5/14/09 12pm | #5b | 5/21/09 8am | upper yard 10% | 124.10 | 5104 | **410*** | 13.10% |
| 5/14/09 12pm | #5c | 6/11/09 8am | upper yard 10% | 124.10 | 5104 | **410*** | 13.10% |
| | | | | | | | |
| 5/14/09 1pm | #6a | 5/18/09 8:30am | upper yard 15% | 123.30 | 4892 | **390** | 15.90% |
| 5/14/09 1pm | #6b | 5/21/09 8:30am | upper yard 15% | 123.30 | 5104 | **410*** | 15.90% |
| 5/14/09 1pm | #6c | 6/11/09 9am | upper yard 15% | 123.30 | 5104 | **410*** | 15.90% |
| | | | | | | | |
| | | | **Cement mixed by hand** | | | | |
| 5/18/09 12:30pm | #7a | 5/21/09 9am | upper yard 10% | 124.10 | 5104 | **410*** | 12.50% |
| 5/18/09 12:30pm | #7b | 5/26/09 8:30am | upper yard 10% | 124.10 | 5104 | **410*** | 12.50% |
| 5/18/09 12:30pm | #7c | | upper yard 10% | 124.10 | | | 12.50% |
| | | | | | | | |
| 5/18/09 2:30pm | #8a | 5/21/09 9:30am | sand pile 5% | 134.10 | 1179 | **90** | 5.10% |
| 5/18/09 2:30pm | #8b | 5/26/09 9am | sand pile 5% | 134.10 | 1430 | **110** | 5.10% |
| 5/18/09 2:30pm | #8c | | sand pile 5% | 134.10 | | | 5.10% |
| | | | | | | | |
| 5/18/09 1:30pm | #9a | 5/21/09 10am | 1' cut 5% | 125.50 | 3300 | **260** | 10.70% |
| 5/18/09 1:30pm | #9b | 5/26/09 9:15am | 1' cut 5% | 125.50 | 4605 | **370** | 10.70% |
| 5/18/09 1:30pm | #9c | | 1' cut 5% | 125.50 | | | 10.70% |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 6/29/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1257 | Page ____ of ____ | |
| Field Rep: Robert Uhibe | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | insitu | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☐ Nuclear Type: ☐ Tube ☑ Sand Cone

Fill Source: ☑ Native in site ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: Area Ax -2' adj. to Nuke test #1

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| — | — | — | — | ☐ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | None | None |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | adj. to Nuke test #1 6/29/09 | -2' | | 6.3 | 77.3 | — | N/A | N/A |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

insitu sand cone in area Ax @ -2' in depth, sub grade was subexed approx. -2' and exposed to elements for over a week

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 6/29/09 | Reviewed By: | Date: |

# COMPACTION TEST

Test Procedure ASTM D 1557-91

Project Name: LLNL Site 300 B850 Soil Remediation
Project No.: LAW 1257
Location: area Ax
Sample No.: 061709-01
Visual Sample Description: Reddish Brn sandy CL w/ agg

876>3/8" ToT=18098

MOLD VOLUME (CU.FT) 0.033333

Tested By: R. Uribe Date: 06/17/09
Calculated By: R. Uribe Date: 06/17/09
Checked By: Date:
Depth (ft):

Compaction Method: [x] ASTM D1557-91 [ ] ASTM D698
Preparation Method: [x] Moist field [ ] Dry

| Trail No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Comp. Soil + Mold (gm.) | 6438.6 | 6598.8 | 6603.3 | 6569.9 | | |
| Wt. of Mold (gm.) | 4596.4 | 4596.4 | 4596.4 | 4596.4 | | |
| Net Wt. of Soil (gm.) | 1842.2 | 2002.4 | 2006.9 | 1973.5 | | |
| Container No. | | | | | | |
| Wt. of Container (gm.) | 138.4 | 109.6 | 137.5 | 138.6 | | |
| Wet Wt. of Soil + Cont. (gm.) | 473.6 | 457.6 | 481.4 | 333.1 | | |
| Dry Wt. of Soil + Cont. (gm.) | 444.6 | 415.5 | 434.3 | 302.2 | | |
| Moisture Content (%) | 9.47 | 13.76 | 15.87 | 18.89 | | |
| Wet Density (pcf) | 121.84 | 132.44 | 132.73 | 130.52 | | |
| Dry Density (pcf) | 111.30 | 116.41 | 114.55 | 109.79 | | |

Maximum Dry Density (pcf) 126.0 Optimum Moisture Content (%) 11.0

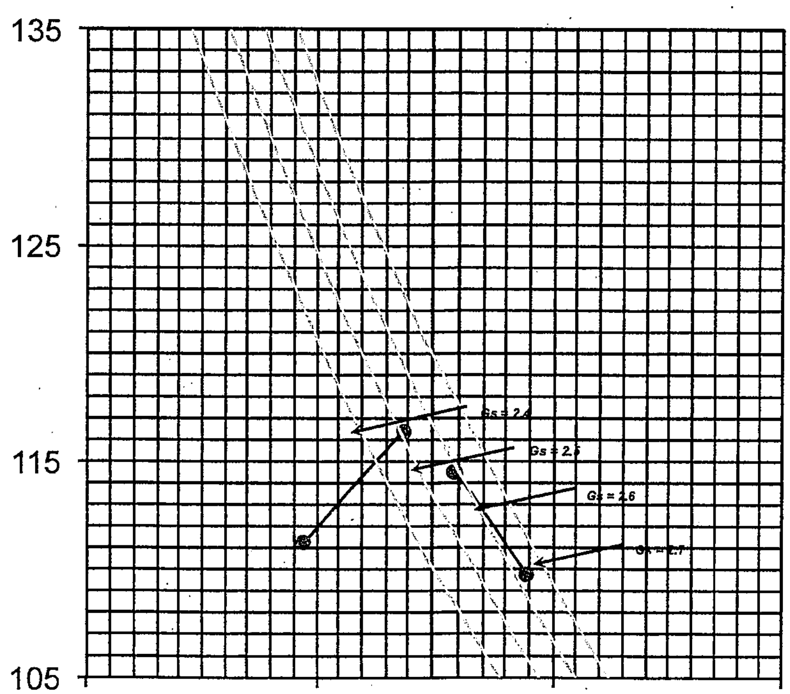
Assumed Specific Gravity = 2.65

## PROCEDURE USED

*Procedure A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold: 4-in. (101.6 mm) diameter
Layers: 5 (Five)
Blows per layer: 25 (twenty-five)
May be used if No.4 retained < 20%

[X] *Procedure B*
Soil Passing 3/8-in. (9.5 mm) Sieve
Mold: 4-in. (101.6 mm) diameter
Layers: 5 (Five)
Blows per layer: 25 (twenty-five)
Use if + No.4 > 20% and - 3/8-in. < 20%

[ ] *Procedure C*
Soil Passing 3/4-in. (19.0 mm) Sieve
Mold: 6-in. (152.4 mm) diameter
Layers: 5 (Five)
Blows per layer: 56 (fifty-six)
Use if + 3/8-in. >20% and + 3/4-in. <30%



# COMPACTION TEST

Test Procedure ASTM D 1557-91

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | LLNL Site 300 B850 Soil Remediation | Tested By : | R. Uribe | Date: | 06/29/09 |
| Project No. : | LAW 1257 | Calculated By : | R. Uribe | Date: | 06/29/09 |
| Location: | Stock pile @ Ax -2' | Checked By : | | Date: | |
| Sample No. : | 062909-01 | Depth (ft) : | | | |

Visual Sample Description: Brn sandy silt

876>3/8" ToT=18098

MOLD VOLUME (CU.FT) 0.033333

Compaction Method: [x] ASTM D1557-91 [ ] ASTM D698

Preparation Method: [x] Moist field [ ] Dry

| Trail No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Comp. Soil + Mold (gm.) | 6433 | 6528.3 | 6539 | 6507.2 | | |
| Wt. of Mold (gm.) | 4596.4 | 4596.4 | 4596.4 | 4596.4 | | |
| Net Wt. of Soil (gm.) | 1836.6 | 1931.9 | 1942.6 | 1910.8 | | |
| Container No. | | | | | | |
| Wt. of Container (gm.) | 139 | 138.8 | 138.5 | 110.7 | | |
| Wet Wt. of Soil + Cont. (gm.) | 582.2 | 606.9 | 566.3 | 457.5 | | |
| Dry Wt. of Soil + Cont. (gm.) | 522.1 | 538 | 495.8 | 394.2 | | |
| Moisture Content (%) | 15.69 | 17.26 | 19.73 | 22.33 | | |
| Wet Density (pcf) | 121.47 | 127.77 | 128.48 | 126.38 | | |
| Dry Density (pcf) | 105.00 | 108.97 | 107.31 | 103.31 | | |

Maximum Dry Density (pcf) 126.0 Optimum Moisture Content (%) 11.5

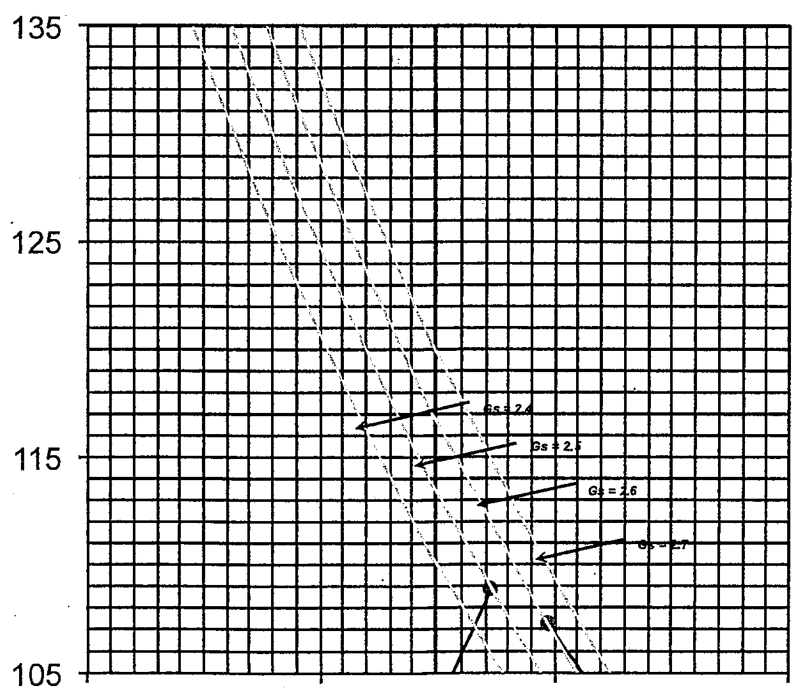
Assumed Specific Gravity = 2.65

## PROCEDURE USED

*Procedure A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if No.4 retained < 20%

[X] *Procedure B*
Soil Passing 3/8-in. (9.5 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + No.4 > 20% and - 3/8-in. < 20%

[ ] *Procedure C*
Soil Passing 3/4-in. (19.0 mm) Sieve
Mold : 6-in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8-in. >20% and + 3/4-in. <30%



# COMPACTION TEST

Test Procedure ASTM D 1557-91

Project Name: LLNL Site 300 B850 Soil Remediation
Project No. : LAW 1257
Location: Stock pile@ Ax
Sample No. : 063009-01
Visual Sample Description: Reddish Brn sandy CL w/ agg

Tested By : R. Uribe Date: 06/30/09
Calculated By : R. Uribe Date: 07/01/09
Checked By : Date:
Depth (ft) :

876>3/8" ToT=18098

Compaction Method
[x] ASTM D1557-91
[ ] ASTM D698

Preparation Method
[x] Moist field
[ ] Dry

MOLD VOLUME (CU.FT) 0.033333

| Trail No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Comp. Soil + Mold (gm.) | 6433.1 | 6509 | 6557.8 | 6559 | | |
| Wt. of Mold (gm.) | 4596.4 | 4596.4 | 4596.4 | 4596.4 | | |
| Net Wt. of Soil (gm.) | 1836.7 | 1912.6 | 1961.4 | 1962.6 | | |
| Container No. | | | | | | |
| Wt. of Container (gm.) | 110.8 | 138.2 | 138.2 | 139.3 | | |
| Wet Wt. of Soil + Cont. (gm.) | 395.6 | 397.1 | 410.1 | 480 | | |
| Dry Wt. of Soil + Cont. (gm.) | 365.8 | 365.7 | 371.4 | 426.3 | | |
| Moisture Content (%) | 11.69 | 13.80 | 16.60 | 18.71 | | |
| Wet Density (pcf) | 121.48 | 126.50 | 129.72 | 129.80 | | |
| Dry Density (pcf) | 108.77 | 111.15 | 111.26 | 109.34 | | |

Maximum Dry Density (pcf) 112.0 Optimum Moisture Content (%) 15.5

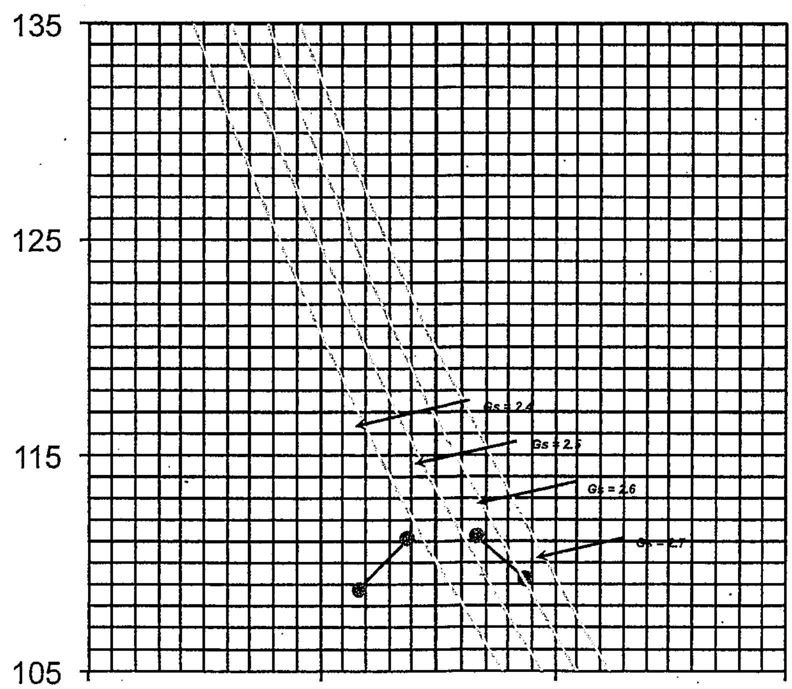
Assumed Specific Gravity = 2.65

## PROCEDURE USED

*Procedure A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if No.4 retained < 20%

[X] *Procedure B*
Soil Passing 3/8-in. (9.5 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + No.4 > 20% and - 3/8-in. < 20%

[ ] *Procedure C*
Soil Passing 3/4-in. (19.0 mm) Sieve
Mold : 6-in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8-in. >20% and + 3/4-in. <30%




*EBERHART / UNITED CONSULTANTS, INC.*

REV. 2-07-05mddc1a

CONSOLIDATED ENGINEERING
L A B O R A T O R I E S

| | | | |
|---|---|---|---|
| DATE: | 6/29/09 | INSPECTOR: | Robert Uribe |
| PROJECT #: | LAW 1257 | PROJECT NAME: | LLNL Site 300 B850 Soil R |
| COMPACTION SPEC: | N/A | TEST LOCATION: | Ax -2' adj. to Nuke tes |
| MOISTURE SPEC: | N/A | | #1 on 6/29/09 |

## SAND CONE TESTING

| | | | |
|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6733.8 | g |
| B | WT of cone, jar, sand - After | 3799.1 | g |
| C | WT of sand in cone | 1580 | g |
| D | WT of sand used | 2934.7 | g A - B |
| E | WT of sand in hole | 1354.7 | g D - C |
| F | Density of sand | 89.6 | pcf |
| G | Volume of hole | 15.1 / .0333 | cf E ÷ F |
| H | Gross WT of excavated soil + TARE | | lbs |
| I | WT of TARE | | lbs |
| J | Net WT of soil | 1245.6 / 2.746 | lbs H - I |
| K | **WT Density** | 82.5 | pcf J ÷ G |
| L | Soil + TARE (Wet) #5 | 1380.4 | lbs |
| M | TARE | 136.5 | lbs |
| N | Soil + TARE (Dry) | 1307.1 | lbs |
| O | WT of Water | 73.3 | lbs L - N |
| P | WT of Soil | 1170.6 | lbs N - M |
| Q | **Moisture Content** | 6.3 | % O ÷ P |
| | Optimum Moisture Content | N/A | % |
| R | **Dry Density** | | pcf K ÷ (I + Q) |
| S | Lab Maximum (Lab No. N/A) | N/A | pcf |
| T | Percent Compaction | N/A | % R ÷ S |

Nuke
101.7 / 11.2

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

MOISTURE CONTENT

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | Moisture Content |
|---|---|---|---|---|---|---|---|
| 5/11/2009 | hand mix sand pile pad | 139.0o | 715.0o | 693.00 | 22.0o | 554.0o | 4.00% |
| 5/11/2009 | hand mix upper court yard pad | 110.4o | 406.1o | 373.0o | 33.1o | 262.6o | 12.60% |
| 5/11/2009 | hand mix 1' cut pad | 137.0o | 708.0o | 653.00 | 55.0o | 516.0o | 10.70% |
| | | | | | | | |
| 5/12/2009 | for nuke gauge - sand pile @ 10% SG | 138.4o | 804.5o | 756.4o | 48.1o | 618.0o | 7.80% |
| 5/12/2009 | for nuke gauge - sand pile @ 10% 6" | 137.1o | 633.1o | 599.2o | 33.9o | 462.1o | 7.30% |
| 5/12/2009 | for nuke gauge - sand pile @ 10% 12" | 110.6o | 839.1o | 785.9o | 53.2o | 675.3o | 7.90% |
| | | | | | | | |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% SG | 367.4o | 913.6o | 846.2o | 67.4o | 478.8o | 14.10% |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% 6" | 365.1o | 890.2o | 823.3o | 66.9o | 458.2o | 14.60% |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% 12" | 368.9o | 937.2o | 865.3o | 71.9o | 496.4o | 14.50% |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% SG | 366.2o | 977.6o | 902.6o | 75.0o | 536.4o | 14.00% |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% 6" | 110.8o | 633.2o | 573.4o | 59.8o | 462.6o | 12.90% |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% 12" | 137.5o | 721.7o | 642.7o | 79.0o | 505.2o | 15.60% |
| 5/13/2009 | for nuke gauge - sand pile @ 5% SG | 138.2o | 546.8o | 510.2o | 36.6o | 372.0o | 9.80% |
| 5/13/2009 | for nuke gauge - sand pile @ 5% 6" | 138.4o | 542.7o | 512.7o | 30.0o | 374.3o | 8.00% |
| 5/13/2009 | for nuke gauge - sand pile @ 5% 12" | 137.3o | 431.6o | 410.2o | 21.4o | 272.9o | 7.80% |
| 5/13/2009 | sand pile @ 5% | 367.9o | 819.2o | 778.3o | 40.9o | 410.4o | 10.00% |
| | | | | | | | |
| 5/14/2009 | for nuke gauge - upper court @ 10% SG | 136.6o | 538.0o | 491.4o | 46.6o | 354.8o | 13.10% |
| 5/14/2009 | for nuke gauge - upper court @ 10% 6" | 137.1o | 478.4o | 435.8o | 42.6o | 298.7o | 14.30% |
| 5/14/2009 | for nuke gauge - upper court @ 10% 12" | 138.7o | 500.0o | 452.6o | 47.4o | 313.9o | 15.10% |
| 5/14/2009 | for nuke gauge - upper court @ 15% SG | 138.5o | 579.9o | 519.5o | 60.4o | 381.0o | 15.90% |
| 5/14/2009 | for nuke gauge - upper court @ 15% 6" | 138.1o | 479.3o | 436.7o | 42.6o | 298.6o | 14.30% |
| 5/14/2009 | for nuke gauge - upper court @ 15% 12" | 138.0o | 585.7o | 518.7o | 67.0o | 380.7o | 17.60% |
| | | | | | | | |
| 5/20/2009 | for nuke gauge - area A2 insitu test #1 | 110.7o | 628.8o | 599.1o | 29.8o | 488.4o | 6.00% |
| | | | | | | | |
| 5/27/2009 | for nuke gauge - area A3 insitu test #1 | 109.4o | 648.0o | 636.9o | 11.1o | 527.5o | 2.10% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #2 | 110.7o | 566.8o | 538.3o | 28.5o | 427.6o | 6.70% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #3 | 137.2o | 567.4o | 549.8o | 17.6o | 412.6o | 4.30% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #4 | 136.7o | 641.8o | 625.6o | 16.2o | 488.9o | 3.30% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #5 | 137.5o | 494.6o | 477.5o | 17.1o | 340.0o | 5.00% |
| 5/27/2009 | for nuke gauge - area A3 insitu test #6 | 138.2o | 529.1o | 519.5o | 9.6o | 381.3o | 2.50% |
| | | | | | | | |
| 6/1/2009 | for nuke gauge - area A4 insitu test #1 | 136.7o | 645.7o | 613.5o | 32.2o | 476.8o | 6.80% |
| 6/1/2009 | for nuke gauge - area A4 insitu test #2 | 109.3o | 614.1o | 602.1o | 12.0o | 492.8o | 2.40% |
| 6/1/2009 | for nuke gauge - area A4 insitu test #3 | 138.1o | 676.3o | 657.6o | 18.7o | 519.5o | 3.60% |
| 6/1/2009 | for nuke gauge - area A4 insitu test #4 | 139.0o | 872.4o | 854.6o | 17.8o | 715.6o | 2.50% |
| | | | | | | | |
| 6/2/2009 | for nuke gauge - area Ax insitu test #1 | 138.7o | 567.1o | 534.4o | 32.7o | 395.7o | 8.30% |
| 6/2/2009 | for nuke gauge - area Ax insitu test #3 | 109.1o | 663.3o | 582.5o | 80.8o | 473.4o | 17.10% |
| 6/2/2009 | for nuke gauge - area Ax insitu test #5 | 137.1o | 713.0o | 697.1o | 15.9o | 560.0o | 2.80% |
| 6/2/2009 | for nuke gauge - area Ax insitu test #7 | 136.4o | 822.9o | 805.6o | 17.3o | 669.2o | 2.60% |
| 6/2/2009 | for nuke gauge - area Ax insitu test #9 | 138.2o | 762.8o | 707.0o | 55.8 | 568.8o | 9.80% |
| 6/2/2009 | for nuke gauge - area Ax insitu test #11 | 137.5o | 610.6o | 600.6o | 10.0o | 463.1o | 2.20% |
| | | | | | | | |
| | | | | | | | |

Difference of moisture content with oven and nuke gauge

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Moisture content with oven burn-out | Moisture content with nuke gauge | Points Difference with nuke gauge |
|---|---|---|---|---|
| 5/11/2009 | hand mix sand pile pad | 4.00% | 5.30% | 1.30 |
| 5/11/2009 | hand mix upper court yard pad | 12.60% | 18.00% | 5.40 |
| 5/11/2009 | hand mix 1' cut pad | 10.70% | 9.50% | -1.20 |
| | | | | |
| 5/12/2009 | for nuke gauge - sand pile @ 10% SG | 7.80% | 8.80% | 1.00 |
| 5/12/2009 | for nuke gauge - sand pile @ 10% 6" | 7.30% | 13.30% | 6.00 |
| 5/12/2009 | for nuke gauge - sand pile @ 10% 12" | 7.90% | 21.60% | 13.70 |
| | | | | |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% SG | 14.10% | 16.40% | 2.30 |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% 6" | 14.60% | 18.60% | 4.00 |
| 5/13/2009 | for nuke gauge - 1' cut @ 5% 12" | 14.50% | 17.80% | 3.30 |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% SG | 14.00% | 16.10% | 2.10 |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% 6" | 12.90% | 16.20% | 3.30 |
| 5/13/2009 | for nuke gauge - 1' cut @ 10% 12" | 15.60% | 19.80% | 4.20 |
| 5/13/2009 | for nuke gauge - sand pile @ 5% SG | 9.80% | 10.10% | 0.30 |
| 5/13/2009 | for nuke gauge - sand pile @ 5% 6" | 8.00% | 11.60% | 3.60 |
| 5/13/2009 | for nuke gauge - sand pile @ 5% 12" | 7.80% | 11.10% | 3.3 |
| | | | | |
| 5/14/2009 | for nuke gauge - upper court @ 10% SG | 13.10% | 14.10% | 1.00 |
| 5/14/2009 | for nuke gauge - upper court @ 10% 6" | 14.30% | 17.10% | 2.8 |
| 5/14/2009 | for nuke gauge - upper court @ 10% 12" | 15.10% | 15.50% | 0.40 |
| 5/14/2009 | for nuke gauge - upper court @ 15% SG | 15.90% | 17.30% | 1.40 |
| 5/14/2009 | for nuke gauge - upper court @ 15% 6" | 14.30% | 18.90% | 4.60 |
| 5/14/2009 | for nuke gauge - upper court @ 15% 12" | 17.60% | 19.40% | 1.8 |
| | | | | |
| 5/20/2009 | for nuke gauge - area A2 insitu test #1 | 6.00% | 7.60% | 1.60 |
| | | | | |
| 5/27/2009 | for nuke gauge - area A3 insitu test #1 | 2.10% | 6.90% | 4.8 |
| 5/27/2009 | for nuke gauge - area A3 insitu test #2 | 6.70% | 12.10% | 5.40 |
| 5/27/2009 | for nuke gauge - area A3 insitu test #3 | 4.30% | 5.70% | 1.40 |
| 5/27/2009 | for nuke gauge - area A3 insitu test #4 | 3.30% | 6.50% | 3.20 |
| 5/27/2009 | for nuke gauge - area A3 insitu test #5 | 5.00% | 10.10% | 5.1 |
| 5/27/2009 | for nuke gauge - area A3 insitu test #6 | 2.50% | 6.00% | 3.50 |
| | | | | |
| 6/1/2009 | for nuke gauge - area A4 insitu test #1 | 6.80% | 9.60% | 2.80 |
| 6/1/2009 | for nuke gauge - area A4 insitu test #2 | 2.40% | 5.50% | 3.10 |
| 6/1/2009 | for nuke gauge - area A4 insitu test #3 | 3.60% | 4.90% | 1.30 |
| 6/1/2009 | for nuke gauge - area A4 insitu test #4 | 2.50% | 10.00% | 7.5 |
| | | | | |
| 6/2/2009 | for nuke gauge - area Ax insitu test #1 | 8.30% | 11.50% | 3.20 |
| 6/2/2009 | for nuke gauge - area Ax insitu test #3 | 17.10% | 19.00% | 1.90 |
| 6/2/2009 | for nuke gauge - area Ax insitu test #5 | 2.80% | 5.40% | 2.6 |
| 6/2/2009 | for nuke gauge - area Ax insitu test #7 | 2.60% | 7.80% | 5.20 |
| 6/2/2009 | for nuke gauge - area Ax insitu test #9 | 9.80% | 10.10% | 0.30 |
| 6/2/2009 | for nuke gauge - area Ax insitu test #11 | 2.20% | 3.00% | 0.80 |
| | | | | |
| | | | | |
| | | | | |

MOISTURE CONTENT

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | **Moisture Content** |
|---|---|---|---|---|---|---|---|
| 6/3/2009 | for nuke gauge - area B1 insitu test #1 | 368.6o | 1250.6o | 1238.1o | 12.5o | 869.5o | 1.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #2 | 366.2o | 1283.7o | 1277.7o | 6.0o | 911.5o | 0.70% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #3 | 365.7o | 1006.7o | 998.2o | 8.5o | 630.3o | 1.30% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #4 | 367.9o | 1266.7o | 1241.9o | 24.8o | 874.0o | 2.80% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #5 | 367.2o | 888.8o | 877.9o | 10.9o | 510.7o | 2.10% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #6 | 138.7o | 743.4o | 723.5o | 19.9o | 584.8o | 3.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #7 | 110.8o | 661.1o | 654.5o | 6.6o | 543.7o | 1.20% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #8 | 137.2o | 594.6o | 577.6o | 17.0o | 440.4o | 3.90% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #9 | 138.4o | 633.3o | 624.9o | 8.4o | 486.5o | 1.70% |

Difference of moisture content with oven and nuke gauge

# CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Moisture content with oven burn-out | Moisture content with nuke gauge | Points Difference with nuke gauge |
|---|---|---|---|---|
| 6/3/2009 | for nuke gauge - area B1 insitu test #1 | 1.40% | 4.50% | 3.10 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #2 | 0.70% | 2.50% | 1.80 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #3 | 1.30% | 3.40% | 2.10 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #4 | 2.80% | 4.80% | 2.00 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #5 | 2.10% | 5.60% | 3.50 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #6 | 3.40% | 6.10% | 2.70 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #7 | 1.20% | 4.60% | 3.40 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #8 | 3.90% | 6.60% | 2.70 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #9 | 1.70% | 5.60% | 3.90 |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel. 925/ 314.7100 ~ Fax. 925/ 855.7140

MOISTURE CONTENT

# CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | Moisture Content |
|---|---|---|---|---|---|---|---|
| 6/3/2009 | for nuke gauge - area B1 insitu test #1 | 368.6o | 1250.6o | 1238.1o | 12.5o | 869.5o | 1.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #2 | 366.2o | 1283.7o | 1277.7o | 6.0o | 911.5o | 0.70% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #3 | 365.7o | 1006.7o | 998.2o | 8.5o | 630.3o | 1.30% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #4 | 367.9o | 1266.7o | 1241.9o | 24.8o | 874.0o | 2.80% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #5 | 367.2o | 888.8o | 877.9o | 10.9o | 510.7o | 2.10% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #6 | 138.7o | 743.4o | 723.5o | 19.9o | 584.8o | 3.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #7 | 110.8o | 661.1o | 654.5o | 6.6o | 543.7o | 1.20% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #8 | 137.2o | 594.6o | 577.6o | 17.0o | 440.4o | 3.90% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #9 | 138.4o | 633.3o | 624.9o | 8.4o | 486.5o | 1.70% |
| | | | | | | | |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #1 | 138.3o | 796.0o | 746.9o | 49.1o | 608.6o | 8.10% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #2 | 110.9o | 705.0o | 635.7o | 69.3o | 524.8o | 13.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #3 | 109.4o | 477.3o | 453.4o | 23.9o | 344.0o | 6.90% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #4 | 137.2o | 816.6o | 790.7o | 25.9o | 653.5o | 4.00% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #5 | 137.5o | 659.6o | 607.0o | 52.6 | 469.5o | 11.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #6 | 137.0o | 731.8o | 700.5o | 31.3 | 563.5o | 5.60% |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

Difference of moisture content with oven and nuke gauge

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Moisture content with oven burn-out | Moisture content with nuke gauge | Points Difference with nuke gauge |
|---|---|---|---|---|
| 6/3/2009 | for nuke gauge - area B1 insitu test #1 | 1.40% | 4.50% | 3.10 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #2 | 0.70% | 2.50% | 1.80 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #3 | 1.30% | 3.40% | 2.10 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #4 | 2.80% | 4.80% | 2.00 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #5 | 2.10% | 5.60% | 3.50 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #6 | 3.40% | 6.10% | 2.70 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #7 | 1.20% | 4.60% | 3.40 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #8 | 3.90% | 6.60% | 2.70 |
| 6/3/2009 | for nuke gauge - area B1 insitu test #9 | 1.70% | 5.60% | 3.90 |
| | | | | |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #1 | 8.10% | 11.20% | 3.10 |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #2 | 13.20% | 14.40% | 1.20 |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #3 | 6.90% | 10.60% | 3.70 |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #4 | 4.00% | 8.60% | 4.60 |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #5 | 12.20% | 12.90% | 0.70 |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #6 | 5.60% | 10.20% | 4.6 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel. 925/ 314.7100 ~ Fax. 925/ 855.7140

Break Log
*Test stopped due to limit of machine
**100psi min.**

## CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 5/12/2009 2pm | #1a | 5/15/2009 1pm | sand pile 10% | 144.70 | 548 | 40 | 7.80% |
| 5/12/2009 2pm | #1b | 5/19/09 12pm | sand pile 10% | 144.70 | 829 | 70 | 7.80% |
| 5/12/2009 2pm | #1c | 5/26/09 8am | sand pile 10% | 144.70 | 814 | 60 | 7.80% |
| 5/12/2009 2pm | #1d | 6/9/09 8am | sand pile 10% | 144.70 | 1407 | **110** | 7.80% |
| | | | | | | | |
| 5/13/09 9:30am | #2a | 5/16/09 7:30am | sand pile 5% | 134.10 | 2048 | **160** | 10.00% |
| 5/13/09 9:30am | #2b | 5/20/09 8am | sand pile 5% | 134.10 | 3659 | **290** | 10.00% |
| 5/13/09 9:30am | #2c | 6/10/2009 8am | sand pile 5% | 134.10 | 3717 | **290** | 10.00% |
| | | | | | | | |
| 5/13/09 10:30am | #3a | 5/16/09 8am | 1' cut 5% | 126.90 | 3980 | **320** | 14.10% |
| 5/13/09 10:30am | #3b | 5/20/09 8:30am | 1' cut 5% | 126.90 | 5104 | **410*** | 14.10% |
| 5/13/09 10:30am | #3c | 6/10/09 8:30am | 1' cut 5% | 126.90 | 4976 | **390** | 14.10% |
| | | | | | | | |
| 5/13/09 11am | #4a | 5/16/09 8:15am | 1' cut 10% | 125.50 | 3915 | **310** | 14.00% |
| 5/13/09 11am | #4b | 5/20/09 9am | 1' cut 10% | 125.50 | 5104 | **410*** | 14.00% |
| 5/13/09 11am | #4c | 6/10/09 9am | 1' cut 10% | 125.50 | 5104 | **410*** | 14.00% |
| | | | | | | | |
| 5/14/09 12pm | #5a | 5/18/09 8am | upper yard 10% | 124.10 | 5160 | **410** | 13.10% |
| 5/14/09 12pm | #5b | 5/21/09 8am | upper yard 10% | 124.10 | 5104 | **410*** | 13.10% |
| 5/14/09 12pm | #5c | 6/11/09 8am | upper yard 10% | 124.10 | 5104 | **410*** | 13.10% |
| | | | | | | | |
| 5/14/09 1pm | #6a | 5/18/09 8:30am | upper yard 15% | 123.30 | 4892 | **390** | 15.90% |
| 5/14/09 1pm | #6b | 5/21/09 8:30am | upper yard 15% | 123.30 | 5104 | **410*** | 15.90% |
| 5/14/09 1pm | #6c | 6/11/09 9am | upper yard 15% | 123.30 | 5104 | **410*** | 15.90% |
| | | | | | | | |
| | | | **Cement mixed by hand** | | | | |
| 5/18/09 12:30pm | #7a | 5/21/09 9am | upper yard 10% | 124.10 | 5104 | **410*** | 12.50% |
| 5/18/09 12:30pm | #7b | 5/26/09 8:30am | upper yard 10% | 124.10 | 5104 | **410*** | 12.50% |
| 5/18/09 12:30pm | #7c | 6/15/09 8:30am | upper yard 10% | 124.10 | 5104 | **410*** | 12.50% |
| | | | | | | | |
| 5/18/09 2:30pm | #8a | 5/21/09 9:30am | sand pile 5% | 134.10 | 1179 | 90 | 5.10% |
| 5/18/09 2:30pm | #8b | 5/26/09 9am | sand pile 5% | 134.10 | 1430 | **110** | 5.10% |
| 5/18/09 2:30pm | #8c | 6/15/09 9am | sand pile 5% | 134.10 | 2896 | **230** | 5.10% |
| | | | | | | | |
| 5/18/09 1:30pm | #9a | 5/21/09 10am | 1' cut 5% | 125.50 | 3300 | **260** | 10.70% |
| 5/18/09 1:30pm | #9b | 5/26/09 9:15am | 1' cut 5% | 125.50 | 4605 | **370** | 10.70% |
| 5/18/09 1:30pm | #9c | 6/15/09 9:30am | 1' cut 5% | 125.50 | 4969 | **390** | 10.70% |

CONSOLIDATED ENGINEERING
LABORATORIES
"Partners in Quality"

August 12, 2009

Mr. Steve Ellis
Lawrence Livermore National Laboratory
P.O. Box 808; L-651
Livermore, California 94551-0808

Subject: LLNL B-850 Soil Remediation
B850-S300
Livermore, CA
CEL Project #10-01260-LAW & 10-01262-LAW

**EARTHWORK AND LABORATORY TESTING SUMMARY**
**July 1, 2009 thru July 31, 2009**

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from July 1st thru July 31, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Respectfully submitted,
**CONSOLIDATED ENGINEERING LABORATORIES**

Michael Wissink
Project Manager

Eric J. Swenson, PE, GE
Principal Geotechnical Engineer

Enclosures: Daily Field Reports
Moisture/Density Curves
Sand Cone Testing
Moisture Content Summary
Break Log Summary

Distribution: 1 to Addressee

MW/EJS: pmf
R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\July Summary (Steve Ellis).doc

CEL FR004 Rev 0

**Consolidated Engineering Laboratories**
534 23rd Avenue
Oakland, CA 94606-5307

**PROJECT NARRATIVE REPORT**

Building Permit #

Job Name & Address: B-850 SOIL REMEDIATION

Date: 6-29-09 TO 7-1-09

Time: 0700

Cel No. LAW 1256

General Contractor: CERRUDO SERVICES

Subcontractor: SCS ENGINEERING

☐ Work Approved ☐ Do not proceed with work

☐ Work in Violation ☐ Make necessary corrections

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☒ EXCAVATION | |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING | | ☐ |

COMMENTS:

6-29-09

INSITU & SAND CONE TESTING, MOISTURE BURN ~~OU~~OUTS, & CURVE TAKEN OF CLEAN SOIL IN SECTOR A-X. TOT. OF 6 INSITU TEST TAKEN AS PER SOIL ENGINEER.

SCS = STARTED PIT EXCAVATION IN SECTOR A-X @ SAND PILE TO APPROXIMATE DEPTH OF ±18' FOLLOWING SAND STONE TO THAT DEPTH, AS PER LENARD LONG (SOIL ENGINEER W/ SCS ENGINEERING) CREW EXCAVATED DEPTH ON VERBILE FROM ENGINEER.

6-30-09

LLNL = ERD TEAM ON SITE TO TAKE PCB SOIL SAMPLES FROM SECTOR A-4. TEST SAMPLES #1, 2, 4, 23, 24, 7 MOVED DUE TO SAND STONE.

SCS = CONTINUES TO EXCAVATE PIT IN SECTOR A-X TO A DEPTH OF 10', & THEN SCS WILL RE-EVALUATE PIT TO SEE IF ANOTHER 10' IS NEED TO BE EXCAVATED.

SOIL SAMPLE TAKEN DUE TO SOIL COMPOSITION CHANGE DURING EXCAVATION, IN PIT.

7-1-09

SCS = CREW CONTINUES 10' EXCAVATION OF CLEAN SOIL ~~IN~~ FOR PIT IN SECTOR A-X

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

Job Name & Address: B-850 SOIL REMEDIATION

Date: 7-6-09 | Time: 0700 | Cel No. 10-01260-LAW

General Contractor: CERAUDO SERVICES

Subcontractor: SCS ENGINEERING

☐ Work Approved ☐ Work in Violation ☐ Do not proceed with work ☐ Make necessary corrections

TYPE OF INSPECTION: ☐ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS EXCAVATION | | ☐ |

COMMENTS: 7-6-09

0730 = SCS CONTINUES EXCAVATION OF 10' CUT ON PIT @ SECTOR A-X.
1500 = 1-LOADER, 1-EXCAVATOR, & 1-GROUND CREW STARTED 5' OVER EXCAVATION OF PIT IN SECTOR A-X WEST SIDE.
1530 = 1-MORE LOADER HELPS REMOVE SPOIL FROM 5' OVER-EX & PLACE SPOILS ON E. SIDE OF PIT.
VARIFIED 10' DEPTH OF CUT USING LASER LEVEL W/SCS FROM/USING ASPHALT ON E. SIDE OF B-850 AS FINISHED GRADE
1600 = CREW STOPPED WORK ON PIT
1630 = JOBSITE CLEAN UP

CEL FR004 Rev 0

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION | Date: 7-7-09 | Time: 0700 | Cel No. |
| General Contractor: CERRUDO | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☐ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS EXCAVATION | | ☐ |

COMMENTS: 7-7-09

0730 HRS = 1-EXCAVATOR & 1-GROUND CREW CONTINUE 5' OVER EXCAVATION OF PIT @ SECTOR A-X
1-DOZER, 2-LOADER'S, & 1-GROUND CREW BUILD DIRT ROAD CROSSING OVER RT. #4 FROM A-X TO A-1 @ LOWER CORP. YARD.
SOIL COMPOSITION CHANGED @ ±12' BELOW SUB-GRADE. SOIL SAMPLE TAKEN
0900 HRS = 3-LLNL EAD MEN ONSITE TO TAKE PCB SOIL SAMPLES OUTSIDE SILT (CRITTER) FENCE.
1015 HRS = 1-DOZER IN PIT. EXCAVATOR MOVED OVER TO MONITORING WELL'S W-850-2417, W-850-2416 & NC7-28 & EXCAVATED AROUND WELL'S 5' BELOW FINISH GRADE. WELL # 2417 IS SCHEDULE 80 W/NO SLEEVE. WELL # 2416 HAS STEEL SLEEVE, & WELL # 28 HAS PLASTIC SLEEVE.
1500 HRS = CREW STARTED STOCK PILE OF SPOILS FROM 5' OVER EXCAVATION @ LOWER CORP YARD
1630 HRS = CREW SHUT DOWN & CLEAN UP JOB SITE

CEL PR004 Rev 0

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION | Date: 7-8-09 | Time: 0700 | Cel No. |
| General Contractor: CERRUDO | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☐ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS EXCAVATION | ☐ | ☐ |

COMMENTS: 7-8-09

0730 HRS = 1-EXCAVATOR, 1-DOZER, 2 LOADERS, & 2 GROUND CREW'S, CONTINUES TO CUT 5' OVER-EX IN PIT @ SECTOR A-X & SCRAPE SANDSTONE WALLS FREE OF DIRT TO EXPOSE ROCK ON N. & S. SIDE OF PIT & STEP IN SANDSTONE.

0845 = UNITED RENTS ON SITE TO PICK UP TRENCH PLATES.

1500 HRS = DINO W/SCS HAD EXCAVATOR POT HOLE ±17' BELOW 5' OVER EXCAVATION LEVEL. GPS READING OF ELEVATION 1265 TO ~~LOCATE~~ LOCATE BED ROCK BED ROCK OR GROUND WATER WAS NOT ENCOUNTERED @ THIS DEPTH ALTHOUGH NATIVE SOIL WAS. SOIL COMPOSITION CHANGED @ 1275' ELEV. & SOIL SAMPLE WAS TAKEN

1630 HRS = JOB SITE SHUT DOWN & CLEAN UP.

CEL FR004 Rev 0

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION | Date: 7-9-09 | Time: 0700 | Cel No. LAW1260 |
| General Contractor: CERRUDO | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☐ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS EXCAVATION | | ☐ |

COMMENTS: 7-9-09

0730 HRS = 1-EXCAVATOR, 1-DOZER, 2-LOADERS, 2=GROUND CREW @ SECTOR A-X TO CUT 5' OVER-EX & STOCK PILE SPOILS IN LOWER CORP YARD.

0830 = 1 MAN IN SECTOR A-3 & A4 TO TAKE GPS READING OF POST EXCAVATION DEPTHS IN 1' CUT AREA'S

1630 = CREW SHUT DOWN, & CLEAN UP JOB SITE

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| Job Name & Address: | Date: | Time: | Cel No. |
|---|---|---|---|
| B-850 SOIL REMEDIATION | 7-13-09 7-14-09 | 0700 | LAW1260 |

General Contractor: ~~CERRADO~~ CERRUDO SERV.

Subcontractor: SCS ENGINEERING

☐ Work Approved ☐ Work in Violation ☐ Do not proceed with work ☐ Make necessary corrections

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING / EXCAVATION | | |

COMMENTS:

7-13-09

0730 = 1 EXCAVATOR, 1 DOZER, 2 LOADERS, 2 GROUND CREW.
CONTINUES TO OFF HAUL SPOILS FROM 5' OVER EXCAVATION FROM PIT IN SECTOR A-X TO LOWER CORP YARD.

0900 = LLNL ERD TEAM 3 MEN ON SITE TO TAKE PCB SOIL SAMPLES OUT SIDE OF SILT/CRITTER FENCE

0915 = HYDRAULIC HOSE BROKE ON EXCAVATOR OIL CONTAINED

1045 = ERD TEAM LEFT SITE

1115 = HERTZ RENTS MECH. ON SITE TO FIX EXCAVATOR

1115 = LOADERS STOPPED

1145 = EXCAVATOR FIXED & IN USE

1330 = CREW STARTED 10' OVER EXCAVATION

1630 = CLEAN UP JOB SITE

7-14-09

0730 = 1 EXCAVATOR, 1 DOZER, 2 LOADERS, 2 GROUND CREW,
CONTINUE 10' OVER EXCAVATION OF PIT IN SECTOR A-X TO A TOTAL DEPTH OF ±25' BELOW AC FINISH GRADE @ ELEV 1300 TO FINISH CUT @ 1275 PER SCS GPS READINGS.
CREW MOVING SPOILS TO LOWER CORP YARD

1645 = CLEAN UP JOB SITE.

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| Job Name & Address: B-850 SOIL REMEDIATION | Date: 7-15-09 7-16-09 | Time: 0700 | Cel No. LAW1260 |
|---|---|---|---|
| General Contractor: ~~GERARD~~ CERRUDO SERV. | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS ENGINEERING | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING / EXCAVATION | | |

COMMENTS: 7-15-09

0730 = 1 EXCAVATOR, 1 DOZER, 2 LOADERS, 2 GROUND CREW, CONTINUES ADDITIONAL 10' OVER EXCAVATION OF PIT IN SECTOR A-X & OFF HAUL SPOILS TO LOWER CORP YARD.

1645 = CLEAN UP JOB SITE

7-16-09

0730 = 1=EXCAVATOR, 1=DOZER, 2=LOADERS, 2=GROUND CREW

CONTINUES ADDITIONAL 10' OVER EXCAVATION ON PIT IN SECTOR A-X.

HERTZ RENTS DELIVERED 86" BOMAG SHEEPS ~~CON~~ FOOT COMPACTOR.

ROCKO & BILL W/ LLNL ON SITE TO SWIPE BOMAG & TO DO SAFETY INSPECTION OF JOB SITE.

1= MAN W/ SCS TO VARIFY DEPTH OF FINIAL EXCAVATION, OF ± 25' BELOW A.C. FSG

3= MEN FROM LLNL ERD TEAM TO COLLECT PCB SOIL SAMPLES OUT SIDE SILT FENCE.

1000= 1 BOMAG TO COMPACT BOTTOM OF PIT @ SUBGRADE. SUBGRADE SCARIFIED @ ± 6"-8" IN DEPTH & MOISTURE CONDITION PRIOR TO COMPACTION.

1130 = COMPACTION TEST & SOIL SAMPLES TAKEN FOR MOISTURE CORRECTION, SEE TABLE #1 FOR TEST RESULTS.

1300 = 1 EXCAVATOR TO HOG OUT/EXCAVATE OUT WET MUDDY BRN SILTY CLAY FROM E OF MONITORING WATER WELL TO E. SIDE WALL OF PIT. CREW PLACED 1st ± 6" LIFT OVER COMPACTED SUBGRADE

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 7-16-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1260 | Page ___ of ___ | |
| Field Rep: TOM PHILLIPS | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other
Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERAUDO / SES
Contractor Representative: ANDY / DINO
Conditions: ☒ Sunny ☐ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | BOMAG | 1 |
| Moving | LOADER | 1 |
| Water | CREW MEN (FIRE HOSE) | 2 |
| Support | DOZER | 1 |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☒ ~~Sand Cone~~
Fill Source: ☒ Native ☐ Import
Fill Location: SUB GRADE (BTM) OF PIT IN SECTOR A-X

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG | |

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|---|
| A = | 070809-1 | LT BRN SANDY SILT | 113.5 | 16.5 | ☒ 90% | ☐ Opt. + 2% |
| B = | 071409-01 | MIX BRN SANDY SILT w/AGG | 119.5 | 12.5 | ☐ 95% | ☒ Opt. + 2% to 5% |
| C = | 063009-01 | BRN SANDY SILT | 112.0 | 15.5 | ☐ Other: | ☐ Other: |
| | | | | | | |
| | | | | | | |

| | Test # | Location NORTH | Location EASTINGS | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|---|---|
| SUB-GRADE | 1 | 4264594 | 1695881 | 1274.8 | 119.2 | 12.8 | 105.7 | A | 93 | P |
| | 2 | 4264648 | 1695921 | 1275.0 | 117.9 | 14.7 | 102.8 | A | 91 | P |
| | 3 | 4264859 | 1695921 | 1274.8 | 120.8 | 18.9 | 101.6 | A | 90 | P |
| | 4 | 4265164 | 1695959 | 1274.5 | 122.4 | 20.1 | 101.9 | A | 90 | P |

Comment/ Sketch:

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 7-16-09 Reviewed By: ________ Date: ________

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 7-20 TO 7-23-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1260 | Page 1 of 5 |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other
Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO / SCS ENG.
Contractor Representative: ANDY / DINO

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

7-20-09

SCS CREW STARTED MOISTURE CONDITIONING OF CLEAN ENGINEERED FILL + BACK FILLING IN ± 6" TO 8" LIFTS OVER SUB GRADE @ BOTTOM OF PIT IN SECTOR A-X, USING EXCAVATOR, LOADER + DOZER TO SPREAD MATERIAL IN LIFTS + COMPACTING SOIL W/ 86" BOMAG.
COMPACTION TEST TAKEN @ 12" LIFT ±. LOCATION + ELEVATION OF TEST RECORDED USING GPS SUPPLIED BY SCS ENG.

7-21-09

SCS CREW CONTINUES BACKFILL + MOISTURE CONDITION OF CLEAN SOIL IN ± 6"-8" LIFTS + COMPACT W/ BOMAG COMPACTION TEST TAKEN EVERY ± 12".
SAFETY INSP BY LLNL DONE TODAY. NO SAFETY ISSUES FOUND.

7-22-09

SCS CREW FINISHED BACK FILL OF CLEAN SOIL IN BOTTOM OF PIT @ SECTOR A-X OF 5' ENGINEERED FILL ALL COMPACTION TEST ARE @ 90 +. SEE TABLE ONE FOR GPS LOCATIONS + ELEVATIONS.
SCS CREW STARTED 2' EXCAVATION OF SECTOR B-1 ON N. HILLSIDE SLOPE, PUSHING SPOILS DOWN HILLSIDE.

7-23-09

SCS CREW CONTINUES TO EXCAVATE 2' CUT IN SECTOR B-1 + ~~2~~ 1' CUT @ TRANSIONAL SPACE BETWEEN A-3 + A-4 SECTORS DIRTY SPOILS ARE BEING PLACED ON OLD SAND PILE AREA TO BUILD RAMP/ROADWAY TO PIT IN SECTOR A-X.



☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: ______ | Date: ______ | Reviewed By: ______ | Date: ______ |

Geosphere Con[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

Report #:
Date: 7-20-09

Project Name: B-850 SOIL REMEDIATION
Project Number: LAW 1260
Page ____ of ____

Field Rep: Tony Phillips
Project Manager:

Scope of Work: ☐ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other
Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CORRADO / SCS ENG.
Contractor Representative: ANDY / DINO

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | BOMAG | 1 |
| Moving | LOADER | 1 |
| Water | FIRE HOSE | 2 |
| Support | DOZER | 1 |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ~~☒ Sand Cone~~

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG | |

Fill Location: 1ST & 2ND LIFTS OF 1' FILLS OF COMPACTION IN PIT OF SECTOR A-X

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A=063009-01 | BRN SANDY SILT | 112.0 | 15.5 | ☒ 90% | ☐ Opt. + 2% |
| B=071409-01 | MIX BRN SANDY SILT w/AGG | ~~119.5~~ | ~~12.5~~ | ☐ 95% | ☒ Opt. + 2% to 5% |
| ~~C=071409-01~~ | | 114.5 | 14.5 | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| | Test # | Location | | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|---|---|
| 1ST LIFT | 1 | 426453.9 | 1695920 | 1275.7 | 117.9 | 13.0 | 104.3 | B | 91 | P |
| | 2 | 426473.4 | 1695911 | 1275.9 | 116.7 | 12.5 | 103.4 | \| | 91 | P |
| | 3 | 426480.3 | 1695932 | 1276.0 | 117.0 | 14.0 | 102.6 | | 90 | P |
| | 4 | 426516.8 | 1695954 | 1275.1 | 119.4 | 13.6 | 105.1 | | 92 | P |
| 2ND LIFT | 5 | 426454.1 | 1695898 | 1276.8 | 121.9 | 18.6 | 102.8 | | 90 | P |
| | 6 | 426464.8 | 1695940 | 1277.1 | 120.9 | 14.7 | 105.4 | | 92 | P |
| | 7 | 426494.8 | 1695929 | 1276.6 | 122.1 | 15.2 | 106.0 | | 93 | P |
| S.G. E. OF M.W. | 8 | 426522.3 | 1696012 | 1270.2 | 121.4 | 17.3 | 103.5 | A | 92 | P |
| 3RD LIFT | 9 | 426459.2 | 1695912 | 1277.3 | 121.2 | 16.7 | 104.3 | B | 91 | P |
| | 10 | 426479.3 | 1695901 | 1277.8 | 119.2 | 15.7 | 103.0 | B | 90 | P |

Comment/ Sketch:



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 7-20-09 Reviewed By: ____ Date: ____

Geosphere Cons nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# AILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 7-21-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1260 | Page ____ of ____ | |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other — Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO / SCC ENG.
Contractor Representative: ANDY / DINO

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | BOMAG | 1 |
| Moving | LOADER | 1 |
| Water | HOSE | 8 |
| Support | DOZER | 1 |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☒ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG | |

Fill Location: 3RD, 4TH + 5TH LIFTS IN BOTTOM OF PIT IN SECTOR A-X

MW = MONITORING WELLS

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A = 071409-01 | MIX BRN SANDY SILT W/ AGG | 114.5 | 14.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☒ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| | Test # | Location NORTH | Location EASTINGS | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|---|---|
| 3RD LIFT | 1 | 426511.8 | 1695945 | 1276.4 | 123.5 | 18.6 | 104.1 | A | 91 | P |
| 1ST LIFT E OF MW | 2 | 426523.4 | 1696002 | 1272.0 | 123.5 | 18.7 | 104.0 | | 91 | P |
| | 3 | 426451.5 | 1695888 | 1278.6 | 122.1 | 18.5 | 103.0 | | 90 | P |
| 4TH LIFT | 4 | 426460.2 | 1695945 | 1278.6 | 124.2 | 20.6 | 103.0 | | 90 | P |
| | 5 | 426476.8 | 1695895 | 1279.1 | 123.9 | 20.7 | 102.6 | | 90 | P |
| | 6 | 426515 | 1695950 | 1277.5 | 121.9 | 18.8 | 102.6 | | 90 | P |
| 2ND LIFT E. OF MW | 7 | 426524.1 | 1696011 | 1272.6 | 123.8 | 19.4 | 103.6 | | 91 | P |
| 5TH LIFT | 8 | 426472.4 | 1695892 | 1280.3 | 126.5 | 18.0 | 107.2 | | 94 | P |
| | 9 | 426473.2 | 1695917 | 1280.0 | 122.5 | 17.4 | 104.3 | | 91 | P |
| | 10 | 426462.8 | 1695939 | 1279.9 | 123.7 | 18.1 | 104.7 | | 91 | P |

Comment/ Sketch:

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 7-21-09 | Reviewed By: ____ | Date: ____ |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 7-22-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1260 | Page ____ of ____ | |
| Field Rep: Tom Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO / SCS ENG.

Contractor Representative: ANDY / DINEO

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | BOMAG | 1 |
| Moving | LOADER | 1 |
| Water | WATER HOSE | 2 |
| Support | DOZER / EXCAVATOR | 1-1 |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☒ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG | |

Fill Location: 5TH LIFT N. OF M.W. @ 3RD, 4TH & 5TH LIFT E. OF M.W.
MW = MONITORING WELLS

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A = 071409-01 | MIX BRN SANDY SILT W/AGG | 114.5 | 14.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☒ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| | Test # | Location NORTH | Location EASTING | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|---|---|
| 5' LIFT | 1 | 426511.1 | 1695953 | 1278.8 | 123.1 | 19.1 | 103.1 | A | 90 | P |
| 3' LIFT | 2 | 426543.2 | 1696000 | 1274.1 | 125.5 | 18.6 | 105.7 | A | 92 | P |
| 4' LIFT | 3 | 426521.2 | 1696004 | 1274.5 | 124.3 | 19.5 | 104.0 | A | 91 | P |
| 5' LIFT | 4 | 426532.1 | 1696009 | 1275.5 | 123.7 | 17.2 | 105.5 | A | 92 | P |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Comment/ Sketch:



☐ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: ______ | Date: ______ | Reviewed By: ______ | Date: ______ |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 7-27 & 7-28-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1260 | Page 1 of ____ | |
| Field Rep: Tony Phillips | Project Manager: | | |
| Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
| Contractor: CERAUDO / SCS | Conditions: ☒ Sunny ☐ Cloudy | ☒ Windy ☐ Rain | ☒ Hot ☐ Cold ☐ Mild ☐ Fog |
| Contractor Representative: ANDY / DINO | | | |

Comment/ Sketch:

7-27-09

SCS CREW CONTINUES TO BRING CONTAMINATED SOIL FROM STOCK PILE TO BUILD RAMP TO PIT IN SECTOR A-X, & BACK FILL OVER COMPACTED SUBGRADE @ ELEVATION 1280. BACK FILL LIFT OF ±12" TO AN ELEVATION OF 1281 & MOISTURE CONDITION SOIL AS IT IS PLACED.

7-28-09

0900 = GRIFFIN SOIL STARTED SPREADING OF 5% CEMENT @ A WEIGHT OF 20.4# PER CUBIC YARD ON W. ~~SIDE~~ SIDE OF MONITORING WELLS & MIX CEMENT & CONTAMINATE SOIL TO A DEPTH OF 12"

0950 = TOOK SOIL SAMPLE FOR PROCTOR & SAMPLE FOR TEST CYLINDERS.

1040 = ~~DENSITY~~ DENSITY TEST TAKEN W/MOISTURE BURN OUT.

1145 = CHECK SPREAD RATE @ 19.7# P.C.YD. N OF M.W. & MIXED 12" DEPTH. GRIFFIN STARTED MIXING & REMIXING OF CEMENT TREATED SOIL.

1310 = DENSITY & MOISTURE SAMPLE TAKEN

1500 = SCS PLACED 2ND LIFT ±14" IN DEPTH PER DINO SCS (SUPERINTENDENT)

1600 = GRIFFIN SPREAD CEMENT WT. 17.9# ON S. SIDE OF M.W. MIXED & COMPACTED CEMENT TREATED SOIL.

1630 = SCS PLACED ± 3" OF SOIL OVER TOP OF CEMENT TREATED SOIL.



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: ______ | Reviewed By: ______ | Date: ______ |
|---|---|---|---|

Geosphere Con[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 7-28-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1260 | Page ___ of ___ | |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☐ Full Time ☐ Part Time

Contractor: CERAUDO / SCS ENGR.
Contractor Representative: ANDY / DINO

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | REX | 1 |
| Moving | LOADER | 2 |
| Water | WATER TRK / MIXER | 2 / 1 |
| Support | DOZER / EXCAVATOR | 1 / 1 |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☐ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG | |

Fill Location: PIT IN SECTOR A-X 1ST LIFT OF CONTAMINATED SOIL.

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A = 072809-01 | | 115.5 | 15.0 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☒ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail | WET DENSITY COMP |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ±80' W. OF MW | 1281' | 125.2 | 14.8 | 109.1 | A | ~~93~~ 94 | | 93 |
| 2 | ±12' N. OF MW | 1281 | 124.1 | 19.7 | 103.7 | A | ~~93~~ 90 | | 93 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Comment/ Sketch: M.W. = MONITORING WELLS: MAX WET DENSITY = 133.5

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: ______ Reviewed By: ______ Date: ______

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 7-29-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1260 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

7-29-09

0730 = ~~GRIFF~~ GRIFFIN SOIL CONTINUES TO PLACE/SPREAD CEMENT WT 17.5# PER CYD + MIX TO A DEPTH OF ± 14"

08~~00~~ = SOIL SAMPLE TAKEN FOR TEST CYL.

0930 = DENSITY TEST + MOISTURE SAMPLE TAKEN @ ELEV 1282

0945 = SCS BACK FILL 3RD LIFT OF ± 14" @ ELEV. 1283

1100 = GRIFFIN SPRD CEMENT OVER 3RD LIFT CEMENT WT. 18.4#

1140 = SOIL SAMPLE TAKEN FOR TEST CYL.

1200 = DENSITY + MOISTURE SAMPLE TAKEN

1350 = DENSITY + MOISTURE SAMPLE TAKEN

1400 = SAND CONE TAKEN ON 3RD LIFT ELEV. 1283

1430 = SCS PLACED 4TH LIFT @ ± 14"

1545 = GRIFFIN SPREAD CEMENT OVER FIRST HALF OF 4TH LIFT ON N. SIDE OF M.W. @ A WT. OF 18.0# CYD. + STARTED MIXING + REMIXING.

1630 = GRIFFIN STARTED COMPACTION OF MIXED 4TH LIFT.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: T. Phillips | Date: | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: | | Date: 7-29-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: 2AW1260 | Page ____ of - | |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERAUDO / SCS ENGR.

Contractor Representative: ANDY / DINO

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | REX | 1 |
| Moving | LOADER | 2 |
| Water | WATER TRK / MIXER | 2 / 1 |
| Support | DOZER / EXCAVATOR | 1 / 1 |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☒ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG | |

Fill Location: PIT IN SECTOR A-X FILL ELEVATION = 1282 & 1283. 2ND & 3RD LIFTS

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A = 072809-01 | | 115.5 | 15.0 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☒ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail | WET DENSITIE COMP. |
|---|---|---|---|---|---|---|---|---|---|
| | 2ND LIFT | | | | | | | | |
| 1 | ±40' W OF MW | 1282 | 120.8 | 16.7 | 103.5 | A | 90 | | 90 |
| ~~2~~ | 3RD LIFT | | | | | | | | |
| 2 | ±40' N.E. OF MW | 1283 | 124.4 | 21.1 | 103.6 | A | 90 | | 93 |
| 3 | ±~~20~~' E OF MW | 1283 | 123.7 | 19.2 | 103.8 | A | 90 | | 93 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Comment/ Sketch: MW = MONITORING WELLS: WET DENSITIE MAX = 133.5

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: Tony Phillips | Date: ____ | Reviewed By: ____ | Date: ____ |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 7-30-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: 2AW1260 | Page ____ of ____ | |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

GRIFFIN SOIL CONTINUES TO SPREAD 5% CEMENT OVER ±14" LIFT OF SOIL & MIX & REMIX TO A DEPTH OF ±14" ON 4TH LIFT ELEV 1284' @ SOUTH SIDE OF MONITORING WELLS. CEMENT WT. 16.5# CYD

TOOK MOISTURE SAMPLES W/ DENSITY TEST TOT. 2 ON 4TH LIFT. @ 0915 HRS TOOK SOIL SAMPLES FOR CYL. BRK TEST. AFTER COMPACTION TEST PASS, SCS CREW PLACED/BACK FILLED PIT WITH ANOTHER ±14" LIFT FOR THE 5TH LIFT ELEV. 1285

GRIFFIN SPREAD 5% CEMENT, WT. 19.4# CYD. & MIXED & REMIXED & COMPACTED W/ REX. I TOOK 3 DENSITY TEST W/ MOISTURE BURNOUT SAMPLES & @ 1300 HRS SOIL SAMPLES TAKEN FOR CYL. BREAKS.

SCS PLACED/BACKFILL PIT IN SECTOR A-X 6TH LIFT OF ±14" CONTAMINATED SOIL.



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: ____ | Reviewed By: ____ | Date: ____ |
|---|---|---|---|

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 7-30-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1260 | Page ______ of ______ | |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERMUDO / SCS ENGR.

Contractor Representative: ANDY / DINO

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | REX | 1 |
| Moving | LOADER | 2 |
| Water | WATER TRK / MIXER | 2/1 |
| Support | DOZER / EXCAV. | 1/1 |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☐ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG | |

Fill Location: PIT IN SECTOR A-X ELEVATION 1284 + 1285 4TH + 5TH LIFTS

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A= 072809-01 | | 115.5 | 15.0 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☒ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail | WET DENSITY COMP. |
|---|---|---|---|---|---|---|---|---|---|
| | 4TH LIFT | | | | | | | | |
| 1 | 7'E OF PIT W. WALL | 1284 | 121.0 | 17.0 | 103.4 | A | 90 | | 91 |
| 2 | ±15' N. OF MW | 1284 | 123.3 | 18.2 | 104.3 | A | 90 | | 92 |
| | 5TH LIFT | | | | | | | | |
| 3 | ±20' E. OF MW | 1285 | 121.8 | 17.8 | 103.4 | A | 90 | | 91 |
| 4 | ±10' S OF M.W | 1285 | 122.8 | 20.1 | 102.2 | A | 89 | | 92 |
| 5 | ±30' SE OF M.W | 1285 | 121.9 | 16.4 | 104.7 | A | 91 | | 91 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Comment/ Sketch: MW = MONITORING WELLS; WET DENSITY MAX = 133.5
SOIL ENGR OKED 89% COMPACTION ON TEST #4

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: ________ Reviewed By: ________ Date: ________

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | ~~Report~~#: B-583005 | Date: 7/6-9/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1261 | Page ___ of ___ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

7/6/09 mon

soil sample for Curve

~~Reports~~

Sunny 77° F

---

7/7/09 Tue

Curve

soil sample for Curves

Sunny 79° F

---

7/8/09 Wed

Curve

soil sample for Curve

sunny 80° f

---

7/9/09 Thu

Curve

~~Reports~~

Sunny 78° f

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 7/9/09 | Reviewed By: ___ | Date: ___ |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | ~~Report #:~~ B583005 | Date: 7/13-16/09 | |
| Project Name: LLNL Site 300 B850 Soil Rem | Project Number: LAW 1261 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☒ Sunny ☐ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

$\boxed{7/13/09}$ Mon

- soil sample for curve
- Reports

Sunny 95° F

---

$\boxed{7/14/09}$ Tue

- Curve (Hold)
- soil sample for curve

Sunny 100° F

---

$\boxed{7/15/09}$ Wed

- curve

Sunny 98° F

---

$\boxed{7/16/09}$ Thu

- Compaction test @ base of pit
- moist cont.

Sunny 103° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 7/16/09 | Reviewed By: ____ | Date: ____ |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | | ~~Report #:~~ B58300S | Date: 7/20-23/09 |
| Project Name: LLNL Site 300 B850 Soil Rem. | | Project Number: LAW 1261 | Page ____ of ____ |
| Field Rep: Robert Uribe | | Project Manager: Cal Dickerman | |
| Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench | ☐ Other | Hours Charged: ☑ Full Time ☐ Part Time | |
| Contractor: Cerrudo | Conditions: | ☑ Sunny ☐ Windy | ☑ Hot ☐ Mild |
| Contractor Representative: Andy Bell | | ☐ Cloudy ☐ Rain | ☐ Cold ☐ Fog |

Comment/ Sketch:

7/20/09 Mon
- Compaction insp
- moist cont.

Sunny 95° F

7/21/09 Tue
- Compaction insp
- moist cont.
- sand cone

Sunny 90° F

7/22/09 Wed
- compaction insp
- sand cone

Sunny 90° F

7/23/09 Thu
- moist cont.
- Reports

Sunny 90° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 7/23/09 | Reviewed By: | Date: |

Geosphere Con[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| ~~Report #:~~ B 583005 | | Date: 7/21/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1261 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: ☒ Full Time | ☐ Part Time |

| | | | | | |
|---|---|---|---|---|---|
| Contractor: Cerrudo | Conditions: | ☒ Sunny | ☐ Windy | ☒ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | sheepsfoot roller | 1 | Density Testing Equipment | ☐ Nuclear | Type: |
| Moving | | | | ☐ Tube | |
| | | | | ☒ Sand Cone | |
| Water | hose | | Fill Source | ☒ ~~Native~~ on site | |
| Support | | | | ☐ Import | |

| Plan | Engineer | Date | Fill Location: Area Ax −22′ FAC of existing adj. surface |
|---|---|---|---|
| Civil | | | |
| Structural | | | |
| Geotech | | | |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 071409-01 | Mix Brn sandy silt w/ agg sandstone | 114.5 | 14.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☒ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | adj. to test w/Nuke #1 on 7/21/09 | −22′ FAC | 122.4 | 16.5 | 105.1 | 071409-01 | 92 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch: see Tony P. Table 1 dated 7/21/09 for exact location of test.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 7/21/09 | Reviewed By: | Date: |

CONSOLIDATED ENGINEERING
L A B O R A T O R I E S

DATE: 7/21/09 INSPECTOR: R. Uribe

PROJECT #: LLNL Site 300 B850 Soil R. PROJECT NAME: LAW 1261

COMPACTION SPEC: 90 TEST LOCATION:

MOISTURE SPEC:

# SAND CONE TESTING

#1

D 119.0

m 19.5

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6766.5 | g | |
| B | WT of cone, jar, sand - After | 3547.5 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 3219.0 | g | A - B |
| E | WT of sand in hole | 1639.0 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 18.3 / 0.0403 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | | lbs | |
| I | WT of TARE | | lbs | |
| J | Net WT of soil | 2238.1 / 4.934 | lbs | H - I |
| K | **WT Density** | 122.4 | pcf | J ÷ G |
| L | Soil + TARE (Wet) #8 | 1291.1 | lbs | |
| M | TARE | 137.3 | lbs | |
| N | Soil + TARE (Dry) | 1127.3 | lbs | |
| O | WT of Water | 163.8 | lbs | L - N |
| P | WT of Soil | 990.0 | lbs | N - M |
| Q | **Moisture Content** | 16.5 | % | O ÷ P |
| | Optimum Moisture Content | 14.5 | % | |
| R | **Dry Density** | 105.1 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. 071409-01) | 114.5 | pcf | |
| T | **Percent Compaction** | 92 | % | R ÷ S |

Weight = WT Pounds = lbs Grams = G Pounds per Cubic Feet = pcf
Cubic Feet = cf Conversion Grams ÷ 453.6 = lbs.

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| ~~Report~~ #: B 583005 | | Date: 7/22/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1261 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Diekarman | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: | Cerrudo | Conditions: | ☒ Sunny | ☐ Windy | ☒ Hot | ☐ Mild |
| Contractor Representative: | Andy Bell | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | Sheeps foot roller | 1 | Density Testing Equipment | ☐ Nuclear | Type: |
| Moving | | | | ☐ Tube | |
| | | | | ☒ Sand Cone | |
| Water | hose | | Fill Source | ☒ ~~Native~~ on site | |
| Support | | | | ☐ Import | |

| Plan | Engineer | Date | Fill Location: Area Ax -20' FAC of existing adj. surface |
|---|---|---|---|
| Civil | | | |
| Structural | | | |
| Geotech | | | |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 07140901 | Mix Brn sandy silt w/sandstone | 114.5 | 14.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☒ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | adj. to Nuke test # | -20' FAC | 121.0 | 17.5 | 103.0 | 07140901 | 90 | |
| | on 7/22/09 | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:
See Tony P. Table 1 dated 7/22/09 for exact location of test



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/of conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 7/22/09 | Reviewed By: ________ | Date: ________ |

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 7/22/09
PROJECT #: LAW 1261
COMPACTION SPEC: 90%
MOISTURE SPEC: above opt.

INSPECTOR: Robert Uribe
PROJECT NAME: LLNL Site 300 B850 Soil R.
TEST LOCATION:

## SAND CONE TESTING

wet 122.6
% M 21.5

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6793.8 | g | |
| B | WT of cone, jar, sand - After | 3561.8 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 3232.0 | g | A - B |
| E | WT of sand in hole | 1652.0 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 18.437 / 0.0406 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | 2228.0 / 4.911 | lbs | H - I |
| **K** | **WT Density** | 121.0 | **pcf** | **J ÷ G** |
| L | Soil + TARE (Wet) | 1241.4 | lbs | |
| M | TARE | 138.9 | lbs | |
| N | Soil + TARE (Dry) | 1076.8 | lbs | |
| O | WT of Water | 164.6 | lbs | L - N |
| P | WT of Soil | 937.9 | lbs | N - M |
| **Q** | **Moisture Content** | 17.5 | **%** | **O ÷ P** |
| | Optimum Moisture Content | 14.5 | % | |
| **R** | **Dry Density** | 103.0 | **pcf** | **K ÷ (I + Q)** |
| S | Lab Maximum (Lab No. 071409-01) | 114.5 | pcf | |
| **T** | **Percent Compaction** | 90 | **%** | **R ÷ S** |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| ~~Report #:~~ B 58300 S | | Date: 7/27-30/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1261 | Page ___ of ___ | |
| Field Rep: | Project Manager: Cal Dickerman | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☒ Full Time ☐ Part Time |
| Contractor: Gerrudo | | | Conditions: | ☒ Sunny | ☐ Windy | ☒ Hot ☐ Mild |
| Contractor Representative: Andy Bell | | | | ☐ Cloudy | ☐ Rain | ☐ Cold ☐ Fog |

Comment/ Sketch:

7/27/09 Mon

- Reports
- Labwork

Sunny 100° F

7/28/09 Tue

- compaction — curve #072809-01
- moist cont. — molds #10a @ 10:50; 10b @ 11AM
- 9:50AM sample

Sunny 92° F

7/29/09 Wed

- compaction / sand cone — molds #11a @ 9:10; #11b @ 9:20
- moist cont. — molds #12a @ 12:40; #12b @ 12:50pm
- sample @ 8:10AM and @ 11:40AM

Sunny 90° F

7/30/09 Thur

- compaction / moist cont.
- Samples @ 9:15 AM and @ 1pm
- molds @ #13a 10:15AM, #13b 10:25 AM
- molds @ #14a 2pm, #14b 2:10pm

Sunny 85° F



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 7/30/09 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# [illegible]AILY FIELD REPORT

| | | | |
|---|---|---|---|
| | ~~Report~~ #: B 583005 | Date: 7/29/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1261 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☒ Full Time ☐ Part Time |

| | | | |
|---|---|---|---|
| Contractor: Cerrudo | Conditions: | ☒ Sunny ☐ Windy | ☒ Hot ☐ Mild |
| Contractor Representative: Andy Bell | | ☐ Cloudy ☐ Rain | ☐ Cold ☐ Fog |

| Equipment | Type | Number | | |
|---|---|---|---|---|
| Compaction | Rex | 1 | Density Testing Equipment | ☐ Nuclear Type: |
| Moving | | | | ☐ Tube |
| | | | | ☒ Sand Cone |
| Water | | | Fill Source | ☒ Native on site |
| Support | | | | ☐ Import |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: Area Ax, east of monitoring wells

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 07280901 | Brn sandy silt w/SS plus 5% Cement | 115.5 | 15.0 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☒ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | adj. to Nuke test # 3 | 1283' | 123.1 | 18.5 | 103.9 | 072809-01 | 90 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:
Sand cone Test adj to Nuke test #3 dated 7/29/09

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 7/29/09 | Reviewed By: ________ | Date: ________ |

CONSOLIDATED ENGINEERING
LABORATORIES

| | | | |
|---|---|---|---|
| DATE: | 7/29/09 | INSPECTOR: | Robert Uribe |
| PROJECT #: | LAW 1261 | PROJECT NAME: | LLNL Site 300 B850 Soil R. |
| COMPACTION SPEC: | 90% | TEST LOCATION: | Ax |
| MOISTURE SPEC: | above opt. | | adj. to Nuke test #3 dated 7/29/09 |

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6773.8 | g | |
| B | WT of cone, jar, sand - After | 4031.0 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2742.8 | g | A - B |
| E | WT of sand in hole | 1162.8 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 13.0 / 0.0286 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | | lbs | |
| I | WT of TARE | | lbs | |
| J | Net WT of soil | 1596.5 / 3.520 | lbs | H - I |
| K | **WT Density** | 123.1 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 947.4 | lbs | |
| M | TARE #4 | 138.8 | lbs | |
| N | Soil + TARE (Dry) | 820.9 | lbs | |
| O | WT of Water | 126.5 | lbs | L - N |
| P | WT of Soil | 682.1 | lbs | N - M |
| Q | **Moisture Content** | 18.5 | % | O ÷ P |
| | Optimum Moisture Content | 15.0 | % | |
| R | **Dry Density** | 103.9 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. 072809-01) | 115.5 | pcf | |
| T | **Percent Compaction** | 90% | % | R ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

MOISTURE CONTENT

# CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | Moisture Content |
|---|---|---|---|---|---|---|---|
| 6/3/2009 | for nuke gauge - area B1 insitu test #1 | 368.6o | 1250.6o | 1238.1o | 12.5o | 869.5o | 1.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #2 | 366.2o | 1283.7o | 1277.7o | 6.0o | 911.5o | 0.70% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #3 | 365.7o | 1006.7o | 998.2o | 8.5o | 630.3o | 1.30% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #4 | 367.9o | 1266.7o | 1241.9o | 24.8o | 874.0o | 2.80% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #5 | 367.2o | 888.8o | 877.9o | 10.9o | 510.7o | 2.10% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #6 | 138.7o | 743.4o | 723.5o | 19.9o | 584.8o | 3.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #7 | 110.8o | 661.1o | 654.5o | 6.6o | 543.7o | 1.20% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #8 | 137.2o | 594.6o | 577.6o | 17.0o | 440.4o | 3.90% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #9 | 138.4o | 633.3o | 624.9o | 8.4o | 486.5o | 1.70% |
| | | | | | | | |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #1 | 138.3o | 796.0o | 746.9o | 49.1o | 608.6o | 8.10% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #2 | 110.9o | 705.0o | 635.7o | 69.3o | 524.8o | 13.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #3 | 109.4o | 477.3o | 453.4o | 23.9o | 344.0o | 6.90% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #4 | 137.2o | 816.6o | 790.7o | 25.9o | 653.5o | 4.00% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #5 | 137.5o | 659.6o | 607.0o | 52.6 | 469.5o | 11.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #6 | 137.0o | 731.8o | 700.5o | 31.3 | 563.5o | 5.60% |
| | | | | | | | |
| 7/16/2009 | for nuke gauge- area Ax -25' test #1 | 137.1o | 755.0o | 683.6o | 71.4o | 546.5o | 13.10% |
| 7/16/2009 | for nuke gauge- area Ax -25' test #2 | 137.2o | 499.9o | 453.5o | 46.4o | 316.3o | 14.70% |
| | | | | | | | |
| 7/20/2009 | for nuke gauge - area Ax -24' test #1 | 138.5o | 915.5o | 825.9o | 89.6o | 687.4o | 13.00% |
| 7/20/2009 | for nuke gauge - area Ax -24' test #3 | 139.2o | 1003.0o | 896.7o | 106.3o | 757.5o | 14.00% |
| | | | | | | | |
| 7/28/2009 | for nuke gauge - area Ax - lift 1test #1 | 137.2o | 892.4o | 794.8o | 97.6o | 657.6o | 14.80% |
| 7/28/2009 | for nuke gauge - area Ax - lift 1test #2 | 138.5o | 1155.3o | 988.3o | 167.0o | 849.8o | 19.70% |
| | | | | | | | |
| 7/29/2009 | for nuke gauge - area Ax - lift 2 test #1 | 137.3o | 486.8o | 436.8o | 50.0o | 299.5o | 16.70% |
| 7/29/2009 | for nuke gauge - area Ax - lift 2 test #2 | 138.9 | 698.5o | 601.0o | 97.5o | 462.1o | 21.10% |
| 7/29/2009 | for nuke gauge - area Ax - lift 3 test #3 | 138.6o | 965.3o | 832.1o | 133.2o | 693.5o | 19.20% |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

CONSOLIDATED ENGINEERING
LABORATORIES
"Partners in Quality"

September 17, 2009

Mr. Steve Ellis
Lawrence Livermore National Laboratory
P.O. Box 808; L-651
Livermore, California 94551-0808

Subject: LLNL B-850 Soil Remediation
B850-S300
Livermore, CA
CEL Project #10-01264-LAW & 10-01265-LAW

**EARTHWORK AND LABORATORY TESTING SUMMARY**
**August 1, 2009 thru August 31, 2009**

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from August 1, 2009 thru August 31, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some density tests were measured below 90% as presented by these test results. We recommend that you confir with the Project Engineer, SCS Engineers, to resolve the low density results observed in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Respectfully submitted,
**CONSOLIDATED ENGINEERING LABORATORIES**

Michael Wissink
Project Manager

Eric J. Swenson, PE, GE
Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
ERIC J. SWENSON
No. 2474
Exp. 12/2010
GEOTECHNICAL
STATE OF CALIFORNIA

Enclosures: Daily Field Reports
Moisture/Density Curves
Sand Cone Testing
Moisture Content Summary
Break Log Summary

Distribution: 1 to Addressee

MW/EJS: pmf
R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\August Summary (Steve Ellis).doc

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| Job Name & Address: B-850 SOIL REMEDIATION | Date: 8-3-09 | Time: 0700 | Cel No. LAW 1264 |
|---|---|---|---|
| General Contractor: ~~CERRUDO~~ CERRUDO SERV | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS ENGINEERING | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☒ SOIL SOLIDIFICATION | |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING / EXCAVATION | | |

COMMENTS: 8-3-09

0730 = GRIFFIN SPREAD 5% CEMENT OVER LIFT #6
WT = 18.0# + STARTED MIX & REMIX OF LIFT.
0900 = TOOK SOIL SAMPLE OF CYL. BRK TEST.
1000 = 1ST DENSITY TEST OF LIFT #6 ELEV. 1286.
1030 = 2ND DENSITY TEST OF LIFT #6 ELEV. 1286
1300 = 3RD DENSITY TEST OF LIFT #6 ELEV. 1286
1315 = SCS STARTED PLACEMENT OF LIFT #7 ELEV. 1287
1445 = GRIFFIN SPREAD 5% CEMENT OVER HALF OF LIFT #7
ON S. SIDE ~~MON~~ MONITORING WELLS, MIX & REMIX
1600 = TOOK SOIL SAMPLE FOR CYL. BRK.
1640 = 4TH DENSITY TEST ON LIFT #7.
1700 = SCS CREW PLACED SMALL LIFT OF CONTAMINATED
SOIL OVER MIX & COMPACTED SOIL TO PROTECT IT.

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| Job Name & Address: B-850 SOIL REMEDIATION | Date: 8-4-09 | Time: 0700 | Cel No. LAW 1267 |
|---|---|---|---|
| General Contractor: ~~CERAUDO~~ CERRUDO SERV. | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS ENGINEERING | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☒ SOIL SOLIDIFICATION | |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING / EXCAVATION | | |

COMMENTS: 8-4-09

0730 = GRIFFIN SPREAD CEMENT 5% OVER 2ND HALF OF LIFT #7
ELEV. 1287 ON N. SIDE OF MONITORING WELL WT. OF CEMENT 18#
CREW MIX & REMIX SOIL
0800 = TOOK SAND CONE TEST
0830 = NEW MIXER DELIVERED TO SITE
0845 = CHECK CEMENT WT. 17.0#
0920 = AFTER REMIX TOOK SOIL SAMPLE FOR NEW CURVE &
CYL. BREAKS
0945 = TOOK DENSITY TEST @ ELEV. 1287 + MOISTURE BURN OUT
1030 = SCS PLACED LIFT #8 @ ELEV. 1288 ±12" LIFT
1215 = GRIFFIN SPREAD CEMENT WT 16#, MIX + REMIX & COMPACT
1400 = TOOK DENSITY TEST @ 1288 ELEV.
1430 = GRIFFIN CONTINUES TO PLACE CEMENT OVER LIFT #8 WT. 19.5#
1600 = TOOK DENSITY TEST @ ELEV. 1288
1630 = SCS ~~PLACED~~ PLACED 12" LIFT FOR LIFT #9 ELEV 1289

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| Job Name & Address: B-850 SOIL REMEDIATION | Date: 8-5-09 | Time: 0700 | Cel No. LAW 1264 |
|---|---|---|---|
| General Contractor: ~~CERRUDO~~ CERRUDO SERV. | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS ENGINEERING | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☒ SOIL SOLIDIFICATION | |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING / EXCAVATION | | |

COMMENTS: 8-5-09

0730 = SCS RELOCATES CRZ

1100 = SCS STARTED RE-EXCAVATION OF S.E. EMBANKMENT ON W. SIDE OF R7.4 @ V-DITCH & OFF HAUL SPOILS TO STOCK PILE @ LOWER CORP YARD.

1130 = GRIFFIN STARTED SPREAD 5% CEMENT WT. 17.0# OVER LIFT #9 ELEV. ±1289, MIX & REMIX & COMPACT

1200 = SOIL SAMPLE TAKEN FOR CYL. MOLD & BREAK.

1220 = DENSITY TEST TAKEN ELEV. 1289 W/ MOISTURE SAMPLE

1230 = CHECK CEMENT WT. 16.4#

1500 = DENSITY TEST ELEV. 1289

1530 = SCS PLACED LIFT #10 ±12" LIFT FOR ±ELEV. 1290

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION | Date: 8-6-09 | Time: 0700 | Cel No. LAW1264 |
| General Contractor: ~~CERAUDO~~ CERRUDO SERV. | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS ENGINEERING | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☒ SOIL SOLIDIFICATION | |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING / EXCAVATION | | |

COMMENTS: 8-6-09

0810 = GRIFFIN SPREAD CEMENT WT. 16.4#, MIX + REMIX & COMPACT ±18" LIFT @ ELEV. 1290 10TH LIFT

0900 = TOOK SOIL SAMPLE FOR CURVE + TEST CYL'S

0985 = DENSITY TEST TAKEN ELEV ±1290

1010 = CEMENT WT. 17#

1145 = DENSITY TEST TAKEN ELEV. ±1290

SCS STARTED COMPACTION OF NEW V-DITCH WEST OF RT. #4 RD.

1330 = DENSITY TEST TAKEN @ V-DITCH -4' AC GRADE

1430 = ~~D~~ SCS CONTINUES TO BACKFILL V-DITCH + COMPACT EMBANKMENT @ V-DITCH, + PLACE BACKFILL IN PIT FOR LIFT #11 ±12" LIFT @ ELEV. ±1291.

DENSITY TEST TAKEN - 3' AC GRADE.

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION | Date: 8-10-09 | Time: 0700 | Cel No. LTW1264 |
| General Contractor: CERRUDO / ANDY | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS / JASON | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☒ SOIL SOLIDIFICATION | |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ MASS GRADING | | ☐ |

COMMENTS: 8-10-09

0730 = TOOK DENSITY TEST ON EMBANKMENT @ V-DITCH
0830 = GRIFFIN SPREAD CEMENT WT. 16#, MIX & REMIX
0915 = START COMPACTION OF LIFT #11, ELEV. 1291 ±
TOOK SOIL SAMPLE FOR CYL BREAK & CURVE.
0925 = DENSITY TEST TAKEN ELEV. 1291
1015 = DENSITY TEST TAKEN @ V-DITCH
1115 = CEMENT WT. 16.5#
1245 = DENSITY TEST TAKEN @ V-DITCH
1430 = DENSITY TEST TAKEN @ ELEV ± 1291
1500 = SCS BACK FILL LIFT #12 ELEV ± 1292
1545 = SPREAD CEMENT WT 16#
1600 = START MIX & REMIX & COMPACTION OF LIFT #12 ONLY HALF OF LIFT ON SOUTH SIDE OF MONITORING WELLS
1645 = DENSITY TEST TAKEN @ ELEV. ± 1292

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| Job Name & Address: | Date: | Time: | Cel No. |
|---|---|---|---|
| R-850 SOIL REMEDIATION | 8-11-09 | 0700 | LAW1264 |

General Contractor: CERAUDO

Subcontractor: SCS ENGR. / GRIFFIN

☒ Work Approved ☐ Work in Violation ☐ Do not proceed with work ☐ Make necessary corrections

TYPE OF INSPECTION: ☐ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☒ MASS GRADING | |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ SOIL SOLIDIFICATION | | ☐ |

COMMENTS: 8-11-09

SCS CONTINUES TO PLACE/BACKFILL CLEAN SOIL IN V-DITCH/EMBANKMENT IN ±6" LIFTS & COMPACT USING BOMAG.

GRIFFIN CONTINUES SOIL SOLIDIFICATION IN PIT ON LIFT #12 ELEV. ±1292

0800 = DENSITY TEST TAKEN @ V-DITCH E-SIDE PIT.

1000 = DENSITY TEST TAKEN @ V-DITCH

GRIFFIN STARTED OF 5% CEMENT OVER 2ND HALF OF LIFT #12 ELEV 1292 ON N. SIDE OF MONITORING WELLS.

1010 = CEMENT WT. 17#

1020 = MIX & REMIX OF SOIL & CEMENT.

1045 = SOIL SAMPLE TAKEN FOR CYL. BREAKS.

1115 = COMPACTION OF LIFT #12 STARTS

1130 = DENSITY TEST TAKEN LIFT #12

1230 = DENSITY TEST TAKEN LIFT #12

1400 = SAND CONE TEST TAKEN

1420 = SCS START BACKFILL OF LIFT #13 ELEV. ± 1293 IN PIT.

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| Job Name & Address: B-850 SOIL REMEDIATION | Date: 8-12-09 | Time: 0700 | Cel No. LAW 1264 |
|---|---|---|---|
| General Contractor: CERROIDO | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS / GRIFFIN | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☒ MASS GRADING | |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ SOIL SOLIDIFICATION | | ☐ |

COMMENTS: 8-12-09

SCS = CONTINUES BACK FILL & COMPACTION OF V-DITCH/EMBANKMENT ON E. SIDE OF PIT @ TIE IN OF CONTAMINATED SOIL & CLEAN SOIL, BOTH SOLIDIFIED @ SAME TIME & COMPACTED AS ONE.

GRIFFIN = STARTS SOIL SOLIDIFICATION OF SOIL @ TIE IN

0800 = SPREAD CEMENT 5% WT. 17#, MIX & REMIX & COMPACT USING REX. LIFT #1

0900 = DENSITY TEST TAKEN @ TIE IN ELEV. ±1288 WITH MOISTURE SAMPLE.

1000 = SPREAD CEMENT WT. 16#

1010 = MIX & REMIX & COMPACT LIFT #2 @ TIE IN

1130 = DENSITY TEST TAKEN ON LIFT #2 ELEV. ±1289

1310 = GRIFFIN STARTED SPREAD OF 5% CEMENT OVER LIFT #13 ON SOUTH SIDE OF MONITORING WELLS ONLY @ ELEV. ±1293.

1320 = CEMENT WT 17#

1330 = MIX, REMIX & COMPACTION OF LIFT #13 S. SIDE MONITORING WELLS ONLY.

1345 = SOIL SAMPLE TAKEN FOR CYL. BREAKS

1410 = DENSITY TEST TAKEN OF LIFT #13 ELEV ±1293.

CEL FR004 Rev 0

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: 8-850 SOIL REMEDIATION | Date: 8-13-09 | Time: 0700 | Cel No. LAB 1264 |
| General Contractor: CEARUDO | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS ENGR. | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☒ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ EXCAVATION | ☒ COMPACTION | ☐ |

COMMENTS: 8-13-09

0730 = SCS CONTINUES TO EXCAVATE V-DITCH / EMBANKMENT & RECOMPACT V-DITCH IN ± 6" LIFTS TO TIE INTO SOLIDIFIED CONTAMINATED SOIL

1030 = DENSITY TEST TAKEN @ V-DITCH

1145 = DENSITY TEST TAKEN @ V-DITCH

1300 = CREW CONTINUES TO EXCAVATE V-DITCH / @ N.E. ~~SIDE~~ SIDE OF A-X PIT @ RT. #4

1600 LLNL SHUT DOWN JOB DUE TO FIRE

CEL FR004 Rev 0

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 SOIL REMEDIATION | Date: ~~8-17-09~~ 8-17 TO 8-18-09 | Time: 0700 | Cel No. LAW 1964 |
| General Contractor: GERARDO / ANDY BELL | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS ENGR / GRIFFIN SOIL | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☐ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ SOIL SOLIDIFICATION | | ☐ |

COMMENTS: 8-17-09

SCS = CONTINUES EXCAVATION, BACKFILL, & COMPACTION OF N.E. V-DITCH @ RT. #4. GRIFFIN SOIL'S NOT ON SITE.

8-18-09

SCS = CONTINUE'S SOIL BACKFILL IN ~~E. SIDE~~ E. SIDE TIE IN @ 12" LIFTS & @ NE SIDE OF DIT @ V-DITCH & RT #4

0730 = GRIFFIN = SPRD 5% CEMENT OVER ±12" LIFT #3 @ ELV. ±1290 WT. 19#

0800 = MIX & REMIX

0810 = TOOK SOIL SAMPLE FOR CYL BRK

0820 = CREW START COMPACTION OF LIFT

0835 = DENSITY TEST OF 3RD LIFT

0845 = START PLACEMENT OF SOIL FOR 4TH LIFT @ E SIDE TIE IN ELEV ±1291

0850 = DENSITY TEST @ N.E. V-DITCH

0900 = BACKFILL LIFT #4 @ E. SIDE TIE IN. CONTINUES

1000 = MIX & REMIX & COMPACTION OF LIFT #4

1030 = DENSITY @ N.E. V-DITCH

1130 = DENSITY @ E. SIDE TIE IN

1140 = PLACEMENT OF 5TH LIFT @ ELEV 1292

1230 = DENSITY @ N.E. V-DITCH

1245 = SPREAD CEMENT OVER LIFT #5 WT 18.4#

1300 = MIX, REMIX & COMPACT 5TH LIFT ELEV. 1292 @ TIE IN.

1330 = SCS CONTINUES TO BACKFILL & COMPACT N.E. V-DITCH.

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-850 Soil Remediation | Date: 8-19-09 | Time: 0700 | Cel No. LAW 1264 |
| General Contractor: Cerrudo Serv. | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS Engr. / Griffin Soil | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☐ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ Soil Solidification | | ☐ |

COMMENTS: 8-19-09

0800 = Density Test @ Tie in Elev. 1292
0830 = Placement of Lift #6 @ E. Side Tie in Elev. ±1293
0845 = Start Excavation of Stock Pile ~~#~~ Embankment @ South V-Ditch.
0920 = Spread Cement 5% WT. 18.4 on Lift #6 @ Tie in
0935 = Density Test @ V-Ditch N.E.
0940 = Mix, Remix & Compaction of Lift #6
1035 = Density Test of Lift #6 Elev 1293 @ Tie in
1045 = Density Test @ ~~#~~ N.E. V-Ditch
1050 = Placement of Lift #7 Elev ±1294 @ Tie in.
1200 = Spread Cement of Lift #7 WT. 17.6#
1230 = Mix, Remix & Compaction of Lift #7
1335 = Sand Cone @ Tie in Lift #7
1410 = Density Test @ V-Ditch N.E. Side
1445 = Placement of Lift #8 @ Tie in Elev. ± 1294
GPS Correction to Elev. ±1293
1600 = Spread Cement 5% Lift #8 WT. 17.8#
Only Two Passes Done on Lift #8 @ E. Side Tie in
1630 = Mix, Remix & Compaction of Treated Soil in Two Passes only

CEL FR004 Rev 0

Consolidated Engineering Laboratories
534 23rd Avenue
Oakland, CA 94606-5307

PROJECT NARRATIVE REPORT

Building Permit #

| | | | |
|---|---|---|---|
| Job Name & Address: B-830 Soil ~~Solidification~~ Remediation | Date: 8-20-09 | Time: 0700 | Cel No. LAW1264 |
| General Contractor: CEARUDO | ☐ Work Approved | ☐ Do not proceed with work | |
| Subcontractor: SCS / GRIFFIN | ☐ Work in Violation | ☐ Make necessary corrections | |

TYPE OF INSPECTION: ☐ ROUGH ☐ PARTIAL ☐ COMPLETE

| | | | | | |
|---|---|---|---|---|---|
| ☐ BUILDING | ☐ STRUCTURAL | ☐ CONCRETE | ☐ STEEL DECK | ☐ FORMWORK | ☐ |
| ☐ UNDERGROUND | ☐ FOOTING | ☐ MASONRY | ☐ BOLT INSP. | ☐ FIREPROOFING | ☐ |
| ☐ ELECTRICAL | ☐ FOUNDATION | ☐ COLUMNS | ☐ WELD INSP. | ☐ WATERPROOFING | ☐ |
| ☐ PLUMBING | ☐ FRAMING | ☐ STEEL | ☐ REIN. STEEL | ☐ | ☐ |
| ☐ MECHANICAL | ☐ REFRIG. | ☐ DRYWALL | ☐ ROOFING | ☐ | ☐ |
| ☐ HEAT VENT. | ☐ GAS PIPING | ☐ SEWER | ☒ Soil Solidification | ☐ | ☐ |

COMMENTS: 8-20-09

0730 = GRIFFIN START TO SPREAD 5% CEMENT
OVER SOIL @ E. SIDE TIE IN & N. HALF OF PIT @
ELEV. ±1293. WT. OF CEMENT 17# LIFT 13
0745 = MIX & REMIX CEMENT & SOIL
0810 = GRIFFIN MIXER BROKE DOWN
0840 = REMIX START W/ SPARE MIXER
0900 = CLY BREAK SAMPLE TAKEN
0930 = DENSITY TAKEN @ E. SIDE TIE IN
1000 = CHECK WT. OF CEMENT 17.4#
1015 = MIX & REMIX CONTINUES N. SIDE
MONITORING WELLS
1215 = DENSITY TEST TAKEN
SCS STARTED REMOVEL OF STOCK PILE
FROM A-4 TO A-X & CONTINUE TO BACK
FILL N.E. V-DITCH & MOVE STOCK PILE
FROM C-1 AREA TO A-X

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Project Name: RSSC SOIL REMEDIATION | Report #: | Date: 8-24 TO 8-25-09 |
| Field Rep: Tony Phillips | Project Number: LAW 1864 | Page ____ of ____ |
| | Project Manager: | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☑ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: CERRUDO / SLSENGR.

Contractor Representative: ANDY BELL

Conditions: ☑ Sunny ☑ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

8-24-09

0730 = SCS - PLACEMENT OF BACK FILL ±12" IN PIT OF A-X
0915 = GRIFFIN SPREAD 5% CEMENT OVER LIFT. CEMENT WT. 19.5# ON SOUTH SIDE OF PIT.
0930 = START MIX & REMIX OF CONTAMINATED SOIL & CEMENT.
1010 = COMPACTION STARTED ON LIFT EL. 1294± @ LIFT 14
1020 = CHECK CEMENT WT. 17.3#
1100 = TOOK SOIL SAMPLE FOR CYL. BREAK
1110 = DENSITY TEST. TAKEN ON LIFT
1245 = SPREAD CEMENT ON N. SIDE OF PIT. CEMENT WT. 16.8#
1300 = MIX & REMIX
1415 = START COMPACTION OF N. SIDE LIFT. EL. 1294±
1615 = DENSITY TEST. TAKEN ON LIFT.
1630 = SCS PLACED 2" TO 4" OF SOIL OVER LIFT #14 TO COVER TREATED SOIL.

8-25-09

0730 = SCS PLACED ±12" SOIL OVER PIT AREA @ SECTOR A-X NO GPS READING ON LIFT. APPROXIMATE ELEVATION ±1295 LIFT #15
0930 = GRIFFIN SPREAD CEMENT OVER LIFT. CEMENT WT. 19.2#
0950 = MIX AROUND MONITORING WELLS & SCS PLACED MIX SOIL BETWEEN MONITORING WELLS & COMPACTED USING TURTLE BACK VIBERA PLATE & JUMPING JACK
1050 = TOOK SOIL SAMPLE FOR CYL. BREAK
1110 = DENSITY TEST. WITH MOISTURE SAMPLE.
1330 = DENSITY TEST
1500 = SPREAD CEMENT ON NORTH SIDE OF PIT CEMENT WT. 18.0#
1515 = MIX & REMIX & COMPACTION OF LIFT #15 EL. ±1295
1540 = SOIL SAMPLE TAKEN FOR CYL. BREAK
1630 = DENSITY TAKEN
1645 = 2" TO 4" COVER PLACED OVER TREATED SOIL.

SCS CONTINUES TO BACK FILL & COMPACT W/ BOMAG 84" @ E. SIDE V-DITCH.

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 8-26 TO 8-27 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: 2AW 1864 | Page ____ of ____ |
| Field Rep: Tom Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERAUDO

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

8-26-09

0730 = SCS PLACED BACKFILL & GRADED ~~FOR~~ FOR ±12" LIFT IN PIT @ SECTOR A-X FOR LIFT #16 @ ELEV. ±1296

0900 = START BACKFILL W/ CLEAN SOIL @ S.E. V-DITCH IN ±6" LIFTS & COMPACT W/ 84" ROMAG

1030 = SCS SENT GRIFFIN HOME DUE TO LACK OF TIME NEEDED TO SOLIDIFY LIFT #16 IN PIT. TEST TAKEN IN ONE FOOT LIFTS @ S.E. V-DITCH) 3 TEST TAKEN.

8-27-09

0730 = SCS CONTINUES TO BACKFILL PIT IN SECTOR A-X FOR LIFT #16 ELEV. 1296. (NO GPS READING OF ELEVATION)

0830 = GRIFFIN START SPREAD OF 5% CEMENT OVER LIFT #16 CEMENT WT 18.0#

0815 = MIX & REMIX LIFT

0900 = SOIL SAMPLE FOR CYL. BREAKS

0935 = DENSITY TEST ON LIFT

0945 = SPREAD 10% CEMENT WT. 34# @ TIEIN/SHELL E. SIDE OF PIT ±9' WIDE EL. ±1293 APPROXIMATE.

1000 = MIX & REMIX OF 10% TREATED SOIL

1020 = SOIL SAMPLE TAKEN OF 10% TREATED SOIL FOR CURVE & CYL. BREAK.

1035 = DENSITY TEST ON 10% TREATED SOIL

1300 = DENSITY TEST @ MONITORING WELLS

1315 = SPREAD 5% CEMENT ON SOUTH SIDE OF MONITORING WELLS LIFT #16 CEMENT WT 16.7#

1330 = MIX & REMIX TREATED SOIL

1450 = DENSITY TAKEN LIFT #16 WITH MOISTURE SAMPLE

1515 = SAND CONE TAKEN ON LIFT #16

1630 = ELEVATION CORRECTION BASED ON SCS ENGR. GPS IS - LIFT #16 1293 & @ TIE IN E. SIDE SHELL - 1288



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 8-27-09 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Cons[ult]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 8-31-09 |
| Project Name: B-850 Soil Remediation | Project Number: LAW1964 | Page ___ of ___ |
| Field Rep: Tom Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other | Hours Charged: ☒ Full Time ☐ Part Time

| | | | | | |
|---|---|---|---|---|---|
| Contractor: ~~[illegible]~~ CERRUDO | Conditions: | ☒ Sunny | ☒ Windy | ☒ Hot | ☐ Mild |
| Contractor Representative: ANDY BELL | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

Comment/ Sketch: 8-31-09

0800 = MET W/ ALLEN ESLICK OF GRIFFIN SOIL + LENARD LONG SOIL ENGR W/ SCS ENGR. + THEY STATED + AGREED TO DROP THE WIEGHT OF CEMENT PER YARD FROM 16# + TO 13# ON A 12" FLUFF LIFT. EVEN THOUGH THE LIFTS ~~B~~EING PLACED TO BE SOLIDIFIED ARE + VERY IN DEPTH + ARE INCONSISTANT TO A 12" LIFT OF FLUFF. LIFT RANGE VARY FROM 8" TO 16" IN PLACES. THAT WAY THE 16# TO 18" PER ~~LIFT~~ YARD PER LIFT OF CEMENT W/ 115# DRY DENSITY WAS USED.

0810 = SCS START EXCAVATION OF 2' CUT IN SECTION B-1 S. SIDE HILL SLOPE. BRING SPOILS FROM C-1 TO A-X STAGGING AREA + PLACED IN PIT FOR LIFT #17.

1100 = SPREAD CEMENT ON N SIDE OF MONITORING WELLS ON LIFT #17 CMT. WT 18#

1130 = MIX + REMIX. CHECK CMT. WT. 18#

1210 = SOIL SAMPLE TAKEN FOR CYL. BREAK.

1240 = DENSITY TEST TAKEN

1500 = CONTINUE PLACEMENT OF LIFT #17 ON S. SIDE MONITORING WELLS

1530 = START BACKFILL OF ~~[illegible]~~ V-DITCH SOUTH SIDE OF PIT + @ TIRE IN E. SIDE OF PIT.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 8-3 & 8-4-09 | |
| Project Name: B-350 SOIL REMEDIATION | Project Number: LA41 12.64 | Page ____ of ____ | |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO
Contractor Representative: ANDY
Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | REX | 1 |
| Moving | LOADER | 2 |
| Water | WATER TRK | 2 |
| Support | DOZER EXCAVATOR / MIXER | 1 |

Density Testing Equipment: ☒ Nuclear Type: TROXLER; ☐ Tube; ☒ Sand Cone DATE 8-4-09
Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG | |

Fill Location: BACKFILL PIT IN SECTOR A-X. 6TH LIFT ELEV. ± 1286 ~~&~~ ~~2ND~~ AND 1ST HALF OF 7TH LIFT ELEVATION ± 1287

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|---|
| A = | 072809-01 | | 115.5 | 15.0 | ☒ 90% | ☐ Opt. + 2% |
| B = | 080409-01 | BRN SANDY SILT W/AGG PLUS 5% CEMENT | 111.5 | 17.0 | ☐ 95% | ☒ Opt. + 2% to 5% |
| | | | | | ☐ Other: | ☐ Other: |

MW = MONITORING WELLS. WET DENSITY = 133.5 & 131.5

| | Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail | WET DENSITY COMP. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 6TH LIFT | | | | | | | | |
| 8-3-09 | 1 | ± 45' N.N.W. OF MW | 1286 | 123.0 | 18.6 | 103.7 | A | 90 | | 92 |
| | 2 | 30' S.W. OF MW | 1286 | 124.7 | 17.9 | 105.8 | A | 92 | | 93 |
| | 3 | 27' W. OF MW | 1286 | 122.4 | 18.0 | 103.7 | A | 90 | | 92 |
| | | 7TH LIFT | ~~1287~~ | | | | | | | |
| | 4 | ± 20' E OF MW | 1287 | 121.9 | 20.4 | 101.2 | A | 88 | | 91 |
| | | 7TH LIFT | | | | | | | | |
| 8-4-09 | 1 | ± 60' N. OF MW | 1287 | 121.4 | 22.7 | 98.9 | B | 89 | | 92 |
| | 2 | ± 74' W/SW MW 8TH LIFT | 1288 | 122.9 | 18.0 | 104.2 | B | 93 | | 93 |
| | 3 | ± 33' E.NE OF MW | 1288 | 121.0 | 20.6 | 100.3 | B | 90 | | 92 |

Comment/ Sketch:
BACKFILL PIT IN 14" LIFT & MIX W/ 5% CEMENT TO A DEPTH OF 14" ± TWICE & COMPACT TO 90% COMPACTION W/ 70,000# REX, USING WET DENSITY FOR COMPACTION INSTEAD OF DRY DENSITY. AS PER SPEC. & LENARD LONG GEOTECH OF RECORD. PER LENARD LONG, ANY THING ABOVE 88 DRY DENSITY COMPACTION IS ACCEPTABLE.



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 8-4-09 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 8-5 & 8-6-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1264 | Page ___ of ___ | |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☐ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY

Conditions: ☑ Sunny ☑ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | REX | 1 |
| Moving | LOADER / DOZER | 2 / 1 |
| Water | WATER TRK | 2 |
| Support | EXCAVATOR / MIXER | 1 / 1 |

Density Testing Equipment: ☑ Nuclear Type: TROXLER ☐ Tube ☐ Sand Cone

Fill Source: ☑ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG | |

Fill Location: PIT @ SECTOR A-X LIFT 9 + 10 ELEVATION 1289 + 1290 ±.

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|---|
| A = | 080409-01 | BRN SANDY SILT W/AGG | | | ☑ 90% | ☐ Opt. + 2% |
| | | PLUS 5% CEMENT | 111.5 | 17.0 | ☐ 95% | ☑ Opt. + 2% to 5% |
| | | WET DENSITY = | 131.5 | | ☐ Other: | ☐ Other: |
| B = | 070709-01 | RED BRN SILT W/SAND | 115.5 | 15.0 | | |
| C | 071409-01 | MIX BRN SANDY SILT W/SANDSTONE | 114.5 | 14.5 | | |

| | Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail | WET DENSITY COMP |
|---|---|---|---|---|---|---|---|---|---|---|
| | | LIFT #9 | | | | | | | | |
| 8-5 | 1 | ±50' N. OF MW | 1289 | 122.9 | 19.8 | 102.6 | A | 92 | | 93 |
| 8-5 | 2 | ±4' S.W. OF MW | 1289 | 121.6 | 18.4 | 102.7 | A | 92 | | 92 |
| | | LIFT #10 | | | | | | | | |
| 8-6 | 1 | ±30' S. OF MW | 1290 | 122.4 | 19.5 | 102.4 | A | 92 | | 93 |
| 8-6 | 2 | ±90' W. NW OF MW | 1290 | 122.3 | 20.1 | 101.8 | A | 91 | | 93 |
| | 3 | 10' W OF AT. #4 @ AC. | -4' FGAC | 122.1 | 15.8 | 105.4 | B | 91 | | |
| | 4 | 8' W OF AT. #4 @ AC | -3' FGAC | 126.1 | 21.1 | 104.0 | C | 91 | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Comment/ Sketch:

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor Identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: ____ | Reviewed By: ____ | Date: ____ |
|---|---|---|---|

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | | Date: 8-10-09 |
| Project Name: RSSD SOIL REMEDIATION | Project Number: LAW 1264 | | Page ____ of ____ |
| Field Rep: Troy Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☐ Full Time ☐ Part Time

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: | CERRUDO | Conditions: | ☒ Sunny | ☒ Windy | ☒ Hot | ☐ Mild |
| Contractor Representative: | ANDY | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | REX / BOMAG | | Density Testing Equipment | ☒ Nuclear | Type: TROXLER |
| Moving | LOADER | | | ☐ Tube | |
| Water | WATERTRK / HOSES | | | ☐ Sand Cone | |
| Support | MIXER / DOZER | | Fill Source | ☒ Native | |
| | | | | ☐ Import | |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG SES | |

Fill Location: SECTOR A-X IN PIT & @ V-DITCH E-OF PIT & W. OF RT#4

WET DENSITY

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture | |
|---|---|---|---|---|---|---|---|
| A = | 071409-01 | MIX BRN SANDY SILT W/ SANDSTONE | 119.5 | 14.5 | ☒ 90% | ☐ Opt. + 2% | |
| | | | | | ☐ 95% | ☒ Opt. + 2% to 5% | |
| B = | 081009-01 | BRN SANDY SILT W/SS PLUS 5% CEMENT | 105.5 | 19.0 | ☐ Other: | ☐ Other: | 125.5 |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 12' W OF RT#4 V-DITCH | -2' FG | 125.6 | 16.2 | 108.0 | A | 94 | | |
| 2 | ±30' S OF MW | 1291 | 120.8 | 18.9 | 101.6 | B | 95 | | 96 |
| 3 | ±6' W OF RT#4 V-DITCH | -1' FG | 121.6 | 17.6 | 103.4 | A | 90 | | |
| 4 | ±16' W OF RT#4 V-DITCH | FG | 123.4 | 18.4 | 104.2 | A | 91 | | |
| 5 | ±60' NW OF MW | 1291 | 115.5 | 20.0 | 96.3 | B | 90 | | 92 |
| 6 | ±75' W OF MW | 1292 | 117.5 | 19.9 | 98.0 | B | 92 | | 94 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Comment/ Sketch:
MW = MONITORING WELLS

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Con... ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: | | Date: 8-11 & 8-12-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: 1AW 1264 | Page ___ of ___ | |
| Field Rep: [signature] | Project Manager: | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other
Hours Charged: ☑ Full Time ☐ Part Time

Contractor: CENTRADO
Contractor Representative: ANDY BELL

Conditions: ☑ Sunny ☑ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☑ Nuclear Type: TROXLER ☐ Tube ☑ Sand Cone

Fill Source: ☑ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG SEC | |

Fill Location: V-DITCH W. OF RT #4 @ TIE IN / PIT IN SECTOR A-X

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A= 071409-01 | MIX BRN SANDY SILT w/ | | | ☐ 90% | ☐ Opt. + 2% |
| | SANDSTONE | 114.5 | 14.5 | ☐ 95% | ☐ Opt. + 2% to 5% |
| B= 081009-01 | BRN SANDY SILT w/ SAND- | | | ☐ Other: | ☐ Other: |
| | STONE PLUS 5% CEMENT | 105.5 | 19.0 | 125.5 | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | 8-11-09 | | | | | | | |
| 1 | ± 12' W of RT #4 V-DITCH | FG | 122.9 | 18.4 | 103.8 | A | 91 | |
| 2 | ± 15' W of RT #4 V-DITCH | +1' FG | 123.7 | 16.0 | 106.6 | A | 93 | ✓ |
| 3 | ± 70' W of MW | 1292 | 117.8 | 21.9 | 96.6 | B | 92 | 94 ~~125.9~~ |
| 4 | ± 20' N. of MW | 1292 | 120.4 | 20.7 | 99.8 | B | 93 | 96 ~~125.5~~ |
| | | | | | | | | |
| | 8-12-09 | | | | | | | |
| 1 | 1ST LIFT @ E. SIDE TIE IN | ±1288 | 121.0 | 20.7 | 100.2 | ~~B~~ A | 88 | 92 |
| 2 | LIFT 2 E. SIDE TIE IN | ±1289 | 115.9 | 18.6 | 97.7 | B | 93 | 92 |
| 3 | ± 45' S of MW | ±1293 | 118.5 | 21.6 | 97.5 | B | 92 | 94 |
| | | | | | | | | |

WET DENSITY COMP.

Comment/ Sketch: MW = MONITORING WELLS / FG = FINISH GRADE = TOP OF ASPHALT @ RT. #4 ROAD WAY.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Con[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 8-13-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW126 | Page ____ of ____ |
| Field Rep: Jay Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERARDO

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | BOMAG | 1 |
| Moving | LOADER | 2 |
| Water | HOSE | 1 |
| Support | EXCAVATION | 1 |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☐ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | LENARD LONG SCS | |

Fill Location: V-DITCH W. OF RT. #4

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A= 071409-01 | MIX BRN SANDY SILT | | | ☒ 90% | ☐ Opt. + 2% |
| | W/ SANDSTONE | 114.5 | 14.5 | ☐ 95% | ☒ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 24'W OF RT#4 @ TIEIN | ±1' FG | 122.1 | 15.0 | 106.1 | A | 93 | |
| 2 | ±9' W OF RT#4 @ TIEIN | ±18" FG | 123.4 | 19.9 | 103.0 | A | 90 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch: FG = TOP OF AC @ RT. #4 ROADWAY

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: ______ Reviewed By: ______ Date: ______

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 8-18 TO 8-20-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1264 | Page ____ of ____ | |
| Field Rep: TONY PHILLIPS | Project Manager: | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☑ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY BELL

Conditions: ☑ Sunny ☑ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|---|
| (A) | 071409-01 | MIX BRN SAND SILT W SANDSTONE | 114.5 | 14.5 | ☑ 90% | ☐ Opt. + 2% |
| | | | | | ☐ 95% | ☑ Opt. + 2% to 5% |
| 125.5 (B) = | 081009-01 | BRN SAND SILT W/SS | | | ☐ Other: | ☐ Other: |
| | | PLUS 5% CMT | 105.5 | 19.0 | | |
| 131.5 (C) | 080409-01 | BRN SDY SLT W/SS + 5% CMT | 111.5 | 17.5 | | |
| | | | | | | |
| 133.5 (D) | 072809-01 | BRN SDY SLT W/SS + 5% CMT ~~TBR~~ | | | | |
| | | | 115.5 | 15% | | |

| | Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|---|
| | DATE: 8-18-09 | | | | | | | | |
| 3RD LIFT | 1 | E. SIDE TIE IN | ±1290 | 118.8 | 18.0 | 107 | B | 95 | |
| | 2 | N.E. V-DITCH @ RT. 4 | +1' FG/AC | 124.7 | 21.0 | 103.1 | A | 90 | |
| | 3 | " " " " | +2' FG/AC | 121.3 | 14.5 | 105.7 | A | 93 | |
| 4TH LIFT | 4 | E. SIDE TIE IN | ±1291 | 122.3 | 18.3 | 103.4 | D | 90 | |
| | 5 | N.E. V-DITCH @ RT 4 | +3' FG/AC | 120.1 | 14.0 | 105.3 | A | 92 | |
| | DATE: 8-19-09 | | | | | | | | |
| 5TH LIFT | 1 | @ TIE IN ~~N.E. V-DITCH~~ | ±1292 | 116.2 | 18.4 | 98.1 | B | 93 | |
| | 2 | N.E. V-DITCH RT #4 | +4' FG/AC | 122.0 | 16.3 | 104.9 | A | 92 | |
| 6TH LIFT | 3 | @ TIE IN | ±1293 | 119.7 | 20.2 | 99.6 | B | 94 | |
| | 4 | N.E. V-DITCH | +5' FG/AC | 117.9 | 14.9 | 102.7 | A | 90 | |
| | 5 | N.E. V-DITCH | +6' FG | 120.6 | 17.8 | 103.0 | A | 90 | |
| | DATE: 8-20-09 | | | | | | | | |
| 7TH LIFT | 1 | E. SIDE TIE IN | ±1293 | 118.8 | 17.8 | 100.8 | C | 90 | |
| 7TH LIFT | 2 | 12' N. OF MONITORING WELLS | ±1293 | 119.4 | 18.6 | 100.7 | C | 90 | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 8-20-09 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Project Name: R-550 Soil Remediation | Report #: | Date: 8-31 To 9-3-09 |
| Field Rep: [signature] | Project Number: LAW1868 | Page ___ of ___ |
| | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 131.5 A = 030409-01 | BAN SOIL SLT W/SS PLUS 5% CEMENT | 111.5 | 17.5 | ☒ 90% | ☐ Opt. + 2% |
| B = 071409-01 | MIX BAN SOIL SLT W/SS | 114.5 | 14.5 | ☐ 95% | ☒ Opt. + 2% to 5% |
| C = 081009-01 | BAN SOILSILT W/SS PLUS 5% CMT. | 105.5 | 19.0 | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| | 8-31-09 #10-0264-UAW | | | | | | | |
| 1 | ±96' W.N.W. OF M.W. | LIFT 17 | 120.8 | 17.5 | 102.8 | A | 92 | |
| | 9-01-09 | | | | | | | |
| 1 | S. V-DITCH | -2' FG | 124.5 | 18.9 | 104.7 | B | 92 | |
| 2 | ±60' W.S.W. OF M.W. | LIFT 17 | 124.7 | 21.7 | 102.5 | A | 92 | |
| 3 | S. V-DITCH | -1' FG | 125.7 | 19.7 | 105.0 | B | 92 | |
| 4 | E. SHELL E TIEIN | 2ND LIFT | 119.5 | 18.5 | 100.8 | A | 90 | |
| | 9-02-09 | | | | | | | |
| 1 | ±30' N OF M.W. | LIFT 18 | 120.8 | 19.0 | 101.5 | A | 91 | |
| 2 | @ M.W. (CENTER) | LIFT 18 | 115.5 | 18.4 | 97.6 | C | 92 | |
| 3 | ±40' S. OF M.W. | LIFT 18 | 119.9 | 21.2 | 98.9 | C | 94 | |
| | 9-3-09 | | | | | | | |
| 1 | S. V-DITCH | -1' FG | 119.6 | 16.7 | 102.7 | B | 90 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



☒ This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: ______ Reviewed By: ______ Date: ______

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Report #: B 583005 | | Date: 8/3-6/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1265 | Page ____ of ____ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☐ Hot ☑ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

8/3/09 Mon
- Breaks #10a 280 psi
  - #11a 160 psi
  - #12a 240 psi
  - #13a 410 max
  - #14a 410 max
  - #14a Dup. 410 max
- 2 soil samples for Cylinders #15 @ 9am, #16 @ 4pm

Sunny 85° F

8/4/09 Tue
- Break #10b 370 psi
- Sand cone 91% [illegible] 90%
- Moist cont.
- Sample for Cylinders #17 @ 9:15 Am

Sunny 85° F

8/5/09 Wed
- Breaks #12b 410 psi max
  - #11b 160 psi
- moist cont.
- Sample for cyl. #18 @ 12 pm

Sunny 80° F

8/6/09 Thu
- Breaks #13b 410 psi max
  - #14b 410 psi max
  - #15a 250 psi
  - #16a 360 psi
  - #17a 330 psi
- moist cont.
- Soil sample for Cyl. #19 @ 9Am

Sunny 70° F



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 8/6/09 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: B 583005 | | Date: 8/10-13/09 | |
| Project Name: LLNL Site 300 B850 Soil R | Project Number: LAW 1265 | Page ___ of ___ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerimelo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

8/10/09 Mon

- Break #15b @ 7days 380 psi
  - #16b @ 7days 410 psi Max
  - #18a @ 5days 340 psi
  - #19a @ 4days 350 psi
- Sample @ 9:15AM for Cylinders
- Curve # 081009-01 125.5/19.0
- moist cont.

Sunny 95° F

8/11/09 Tue

- Break #17b @ 7days 410 psi Max
- Sample @ 10:45Am for Cyl.
- moist cont.
- Sand cone 93% compaction

Sunny 95° F

8/12/09 Wed

- Break #18b @ 7days 410 psi Max
- moist cont.
- Sample @ 1:45 pm for Cyl.

Sunny 90° F

8/13/09 Thu

- Break #19b @ 7days 410 psi max
  - #20a @ 3days 310 psi
  - #21a @ 2days 300 psi

Sunny 82° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 8/13/09 | Reviewed By: ______ | Date: ______ |

Geosphere Con.  ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: B 583005 | Date: 8/17-20/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1265 | Page ______ of ______ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other
Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cersudo
Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

8/17/09 Mon

- Break #20b @ 7days 410 psi max
  #22a @ 5 days 410 psi max
- compaction tests in V ditch area
- Moist cont.

Sunny 85° F

8/18/09 Tue

- Break #21b @ 7 days 380 psi
- Sample for Cyl. @ 8:10 Am #23a 8:40 Am, #23b 9am, 23c 9:10 Am
- moist cont.

Sunny 85° F

8/19/09 Wed

- Break #22b @ 7days 410 psi max
- Sand cone in tie-in area

Sunny 85° F

8/20/09 Thu

- Break #23a @ 2 days 280 psi
  #23b @ 2 days 320 psi - Duplicate
- Sample for Cyl. @ 9 Am #24a 9:40 AM, #24b 10 AM
- moist cont.
- compaction insp @ V ditch

Sunny 85° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 8/20/09 | Reviewed By: ______ | Date: ______ |

10-0265LAW

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | | Report #: B-583005 | Date: 8/24-27/09 |
| Project Name: LLNL Site 300 B850 Soil R. | | Project Number: LAW 1265 | Page 10 of 26 10-0265LAW |
| Field Rep: Robert Uribe | | Project Manager: Cal Dickerman | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Scope of Work: | ☑ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☑ Full Time | ☐ Part Time |
| Contractor: Corindo | | | | Conditions: | ☑ Sunny | ☐ Windy | ☑ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | | | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

Comment/ Sketch:

8/24/09 Mon

- Break #24a @ 4days 410 psi max
- Sample @ 11AM for Cyl.
- Compaction

Sunny 80°F

8/25/09 -Tue

- Break #23c @ 7 days 410 psi max
- Sample @ 10:50Am for Cyl.
- Sample @ 3:30 pm for Cyl.
- Moist Cont.

Sunny 80°F

8/26/09 Wed

Reports / lab work

Sunny 85°F

8/27/09 ~~Wed~~ Thu

- Break #24b @ 7days 410psi max
  #25a @ 3 days 330psi
  #26a @ 2 days 330 psi
  #27a @ 2days 240 psi
- Sample @ 9AM for Cyl. and @ 10:20Am for 10%
- Moist Cont.
- Curve sample #082709-01
- Sand Cone

Sunny 90°F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 8/27/09 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: B 583223 | | Date: 8/31/09 | |
| Project Name: LLNL Site 300 B850 Soil [illegible] | Project Number: LAN 1245 | Page ____ of ____ | |
| Field Rep: Robert [illegible] | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Coronado

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

8/31/09 mon

Break #25b @ 7days 410 psi max
#28a @ 4days 260 psi
#29a @ 4days 280 psi

Sample @ 12:10pm, molded - #30a 12:50pm
#30b 1:10pm

Sunny 85°F



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 8/31/09 | Reviewed By: | Date: |

# COMPACTION TEST

Test Procedure ASTM D 1557-91

Project Name: LLNL Site 300 B850 Soil Remediation
Project No. : LAW 1261
Location: area Ax -10ft.
Sample No. : 070609-01
Visual Sample Description: Brn gravelly sandy Silt

Tested By : R. Uribe  Date: 07/07/09
Calculated By : R. Uribe  Date: 07/08/09
Checked By :  Date:
Depth (ft) :

876>3/8" ToT=18098

Compaction Method: [x] ASTM D1557-91 [ ] ASTM D698

Preparation Method: [x] Moist field [ ] Dry

MOLD VOLUME (CU.FT) 0.033333

| Trail No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Comp. Soil + Mold (gm.) | 6448.3 | 6553.3 | 6569.3 | 6535.1 | | |
| Wt. of Mold (gm.) | 4596.4 | 4596.4 | 4596.4 | 4596.4 | | |
| Net Wt. of Soil (gm.) | 1851.9 | 1956.9 | 1972.9 | 1938.7 | | |
| Container No. | | | | | | |
| Wt. of Container (gm.) | 110.3 | 138.2 | 139.1 | 138.4 | | |
| Wet Wt. of Soil + Cont. (gm.) | 451.3 | 665.5 | 474.9 | 493.7 | | |
| Dry Wt. of Soil + Cont. (gm.) | 409.9 | 590.1 | 423 | 432.9 | | |
| Moisture Content (%) | 13.82 | 16.69 | 18.28 | 20.65 | | |
| Wet Density (pcf) | 122.48 | 129.43 | 130.48 | 128.22 | | |
| Dry Density (pcf) | 107.61 | 110.92 | 110.32 | 106.28 | | |

Maximum Dry Density (pcf) 124.0  Optimum Moisture Content (%) 12.0

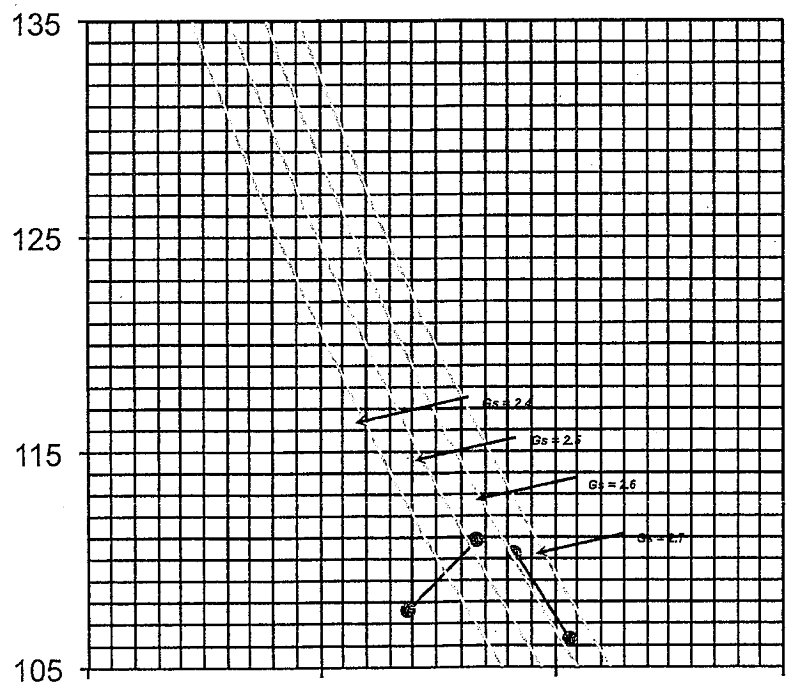
Assumed Specific Gravity = 2.65

## PROCEDURE USED

*Procedure A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if No.4 retained < 20%

[X] *Procedure B*
Soil Passing 3/8-in. (9.5 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + No.4 > 20% and - 3/8-in. < 20%

[ ] *Procedure C*
Soil Passing 3/4-in. (19.0 mm) Sieve
Mold : 6-in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8-in. >20% and + 3/4-in. <30%



# COMPACTION TEST

Test Procedure ASTM D 1557-91

Project Name: LLNL Site 300 B850 Soil Remediation
Project No. : LAW 1261
Location: area Ax -20ft.
Sample No. : 070709-01
Visual Sample Description: reddish brn Silt with sand

876>3/8" ToT=18098

MOLD VOLUME (CU.FT) 0.033333

Tested By : R. Uribe Date: 07/08/09
Calculated By : R. Uribe Date: 07/09/09
Checked By : Date:
Depth (ft) :

Compaction Method [x] ASTM D1557-91 [ ] ASTM D698
Preparation Method [x] Moist field [ ] Dry

| Trail No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Comp. Soil + Mold (gm.) | 6556.6 | 6603.7 | 6603.8 | | | |
| Wt. of Mold (gm.) | 4596.4 | 4596.4 | 4596.4 | | | |
| Net Wt. of Soil (gm.) | 1960.2 | 2007.3 | 2007.4 | 0 | | |
| Container No. | | | | | | |
| Wt. of Container (gm.) | 138.1 | 138.1 | 138.9 | | | |
| Wet Wt. of Soil + Cont. (gm.) | 346.9 | 592 | 582.4 | | | |
| Dry Wt. of Soil + Cont. (gm.) | 322 | 532.5 | 517.8 | | | |
| Moisture Content (%) | 13.54 | 15.09 | 17.05 | #DIV/0! | | |
| Wet Density (pcf) | 129.64 | 132.76 | 132.77 | 0.00 | | |
| Dry Density (pcf) | 114.18 | 115.36 | 113.43 | #DIV/0! | | |

Maximum Dry Density (pcf) 115.5 Optimum Moisture Content (%) 15.0

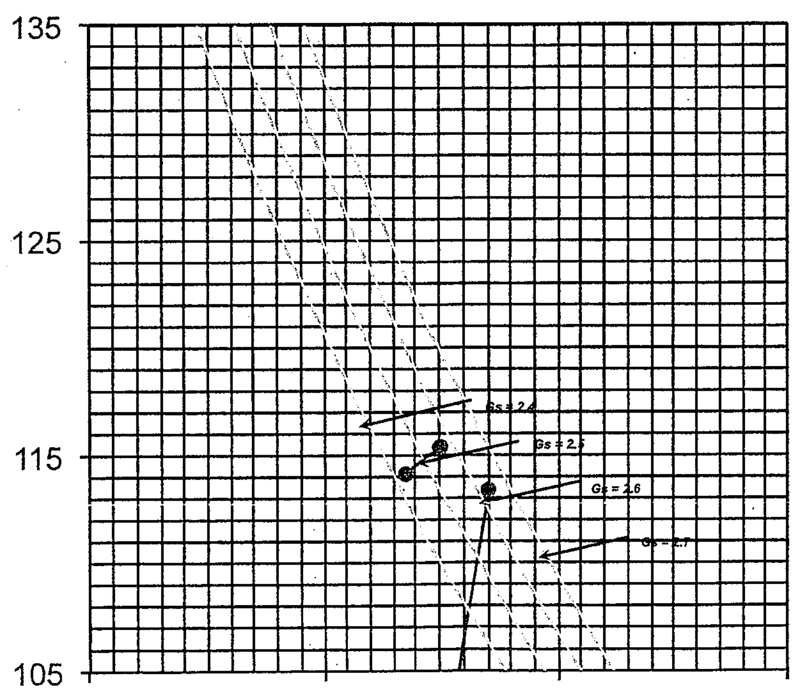
Assumed Specific Gravity = 2.65

## PROCEDURE USED

[ ] *Procedure A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if No.4 retained < 20%

[X] *Procedure B*
Soil Passing 3/8-in. (9.5 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + No.4 > 20% and - 3/8-in. < 20%

[ ] *Procedure C*
Soil Passing 3/4-in. (19.0 mm) Sieve
Mold : 6-in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8-in. >20% and + 3/4-in. <30%



# COMPACTION TEST

Test Procedure ASTM D 1557-91

Project Name: LLNL Site 300 B850 Soil Remediation
Project No. : LAW 1261
Location: area Ax -25ft.
Sample No. : 070809-01
Visual Sample Description: Lt. brn sandy Silt

876>3/8" ToT=18098

MOLD VOLUME (CU.FT) 0.033333

Tested By : R. Uribe — Date: 07/09/09
Calculated By : R. Uribe — Date: 07/09/09
Checked By : — Date:
Depth (ft) :

Compaction Method: [x] ASTM D1557-91 [ ] ASTM D698
Preparation Method: [x] Moist field [ ] Dry

| Trail No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Comp. Soil + Mold (gm.) | 6480 | 6540.5 | 6595.4 | 6553.9 | | |
| Wt. of Mold (gm.) | 4596.4 | 4596.4 | 4596.4 | 4596.4 | | |
| Net Wt. of Soil (gm.) | 1883.6 | 1944.1 | 1999 | 1957.5 | | |
| Container No. | | | | | | |
| Wt. of Container (gm.) | 110.7 | 138.3 | 137.8 | 138.7 | | |
| Wet Wt. of Soil + Cont. (gm.) | 358.9 | 426.8 | 552.3 | 435.4 | | |
| Dry Wt. of Soil + Cont. (gm.) | 331.8 | 389.8 | 490.2 | 388.6 | | |
| Moisture Content (%) | 12.26 | 14.71 | 17.62 | 18.73 | | |
| Wet Density (pcf) | 124.58 | 128.58 | 132.21 | 129.47 | | |
| Dry Density (pcf) | 110.98 | 112.09 | 112.40 | 109.04 | | |

Maximum Dry Density (pcf) 113.5 — Optimum Moisture Content (%) 16.5

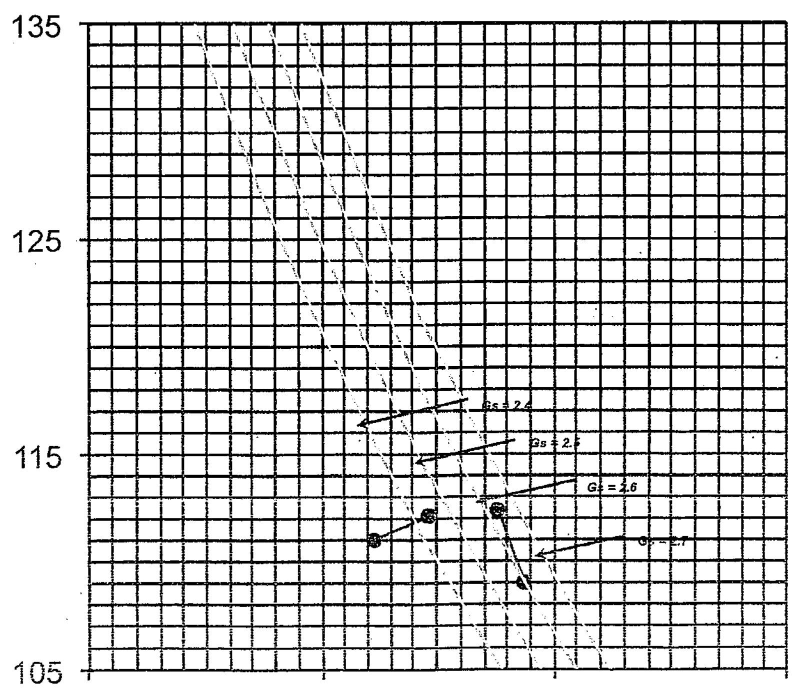
Assumed Specific Gravity = 2.65

## PROCEDURE USED

[ ] *Procedure A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if No.4 retained < 20%

[X] *Procedure B*
Soil Passing 3/8-in. (9.5 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + No.4 > 20% and - 3/8-in. < 20%

[ ] *Procedure C*
Soil Passing 3/4-in. (19.0 mm) Sieve
Mold : 6-in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8-in. >20% and + 3/4-in. <30%



# COMPACTION TEST

Test Procedure ASTM D 1557-91

| | | | | | |
|---|---|---|---|---|---|
| Project Name: | LLNL Site 300 B850 Soil Remediation | Tested By : | R. Uribe | Date: | 07/15/09 |
| Project No. : | LAW 1261 | Calculated By : | R. Uribe | Date: | 07/15/09 |
| Location: | stock pile Ax | Checked By : | | Date: | |
| Sample No.: | 071409-01 | Depth (ft) : | | | |

Visual Sample Description: mix brn sandy Silt with agg.

876>3/8" ToT=18098

MOLD VOLUME (CU.FT) 0.033333

Compaction Method: [x] ASTM D1557-91 [ ] ASTM D698

Preparation Method: [x] Moist field [ ] Dry

| Trail No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Comp. Soil + Mold (gm.) | 6425.5 | 6517 | 6576.6 | 6551.1 | | |
| Wt. of Mold (gm.) | 4596.4 | 4596.4 | 4596.4 | 4596.4 | | |
| Net Wt. of Soil (gm.) | 1829.1 | 1920.6 | 1980.2 | 1954.7 | | |
| Container No. | | | | | | |
| Wt. of Container (gm.) | 138.9 | 110.7 | 138.6 | 138.3 | | |
| Wet Wt. of Soil + Cont. (gm.) | 891.4 | 984.5 | 493.6 | 468.3 | | |
| Dry Wt. of Soil + Cont. (gm.) | 820.4 | 885.4 | 448.4 | 423 | | |
| Moisture Content (%) | 10.42 | 12.79 | 14.59 | 15.91 | | |
| Wet Density (pcf) | 120.97 | 127.03 | 130.97 | 129.28 | | |
| Dry Density (pcf) | 109.56 | 112.62 | 114.29 | 111.53 | | |

Maximum Dry Density (pcf) 114.5 Optimum Moisture Content (%) 14.5

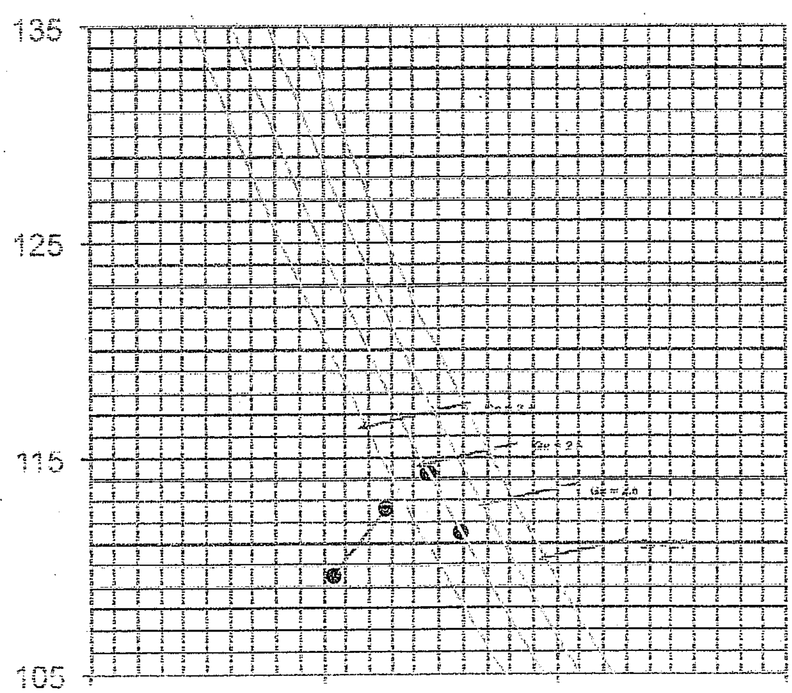
Assumed Specific Gravity = 2.65

**PROCEDURE USED**

[ ] *Procedure A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if No.4 retained < 20%

[X] *Procedure B*
Soil Passing 3/8-in. (9.5 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + No.4 > 20% and - 3/8-in. < 20%

[ ] *Procedure C*
Soil Passing 3/4-in. (19.0 mm) Sieve
Mold : 6-in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8-in. >20% and + 3/4-in. <30%




*EBERHART / UNITED CONSULTANTS, INC.*

REV. 2-07-05mddc1a

# COMPACTION TEST

Test Procedure ASTM D 1557-91

Project Name: LLNL Site 300 B850 Soil Remediation
Project No. : LAW 1261
Location: east of monit. Wells elev. 1283'
Sample No. : 072809-01
Visual Sample Description: brn sandy Silt with sandstone plus 5% cement

Tested By : R. Uribe — Date: 07/28/09
Calculated By : R. Uribe — Date: 07/28/09
Checked By : — Date:
Depth (ft) :

876>3/8" ToT=18098

Compaction Method: [x] ASTM D1557-91 [ ] ASTM D698

Preparation Method: [x] Moist field [ ] Dry

MOLD VOLUME (CU.FT) 0.033333

| Trail No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Comp. Soil + Mold (gm.) | 6522.1 | 6556.3 | 6608.4 | 6575.8 | | |
| Wt. of Mold (gm.) | 4596.4 | 4596.4 | 4596.4 | 4596.4 | | |
| Net Wt. of Soil (gm.) | 1925.7 | 1959.9 | 2012 | 1979.4 | | |
| Container No. | | | | | | |
| Wt. of Container (gm.) | 110.8 | 137.6 | 136.8 | 137.1 | | |
| Wet Wt. of Soil + Cont. (gm.) | 506.5 | 824.2 | 699 | 579.5 | | |
| Dry Wt. of Soil + Cont. (gm.) | 462.2 | 741 | 624.2 | 514.7 | | |
| Moisture Content (%) | 12.61 | 13.79 | 15.35 | 17.16 | | |
| Wet Density (pcf) | 127.36 | 129.62 | 133.07 | 130.91 | | |
| Dry Density (pcf) | 113.10 | 113.92 | 115.37 | 111.74 | | |

Maximum Dry Density (pcf) 115.5 — Optimum Moisture Content (%) 15.0

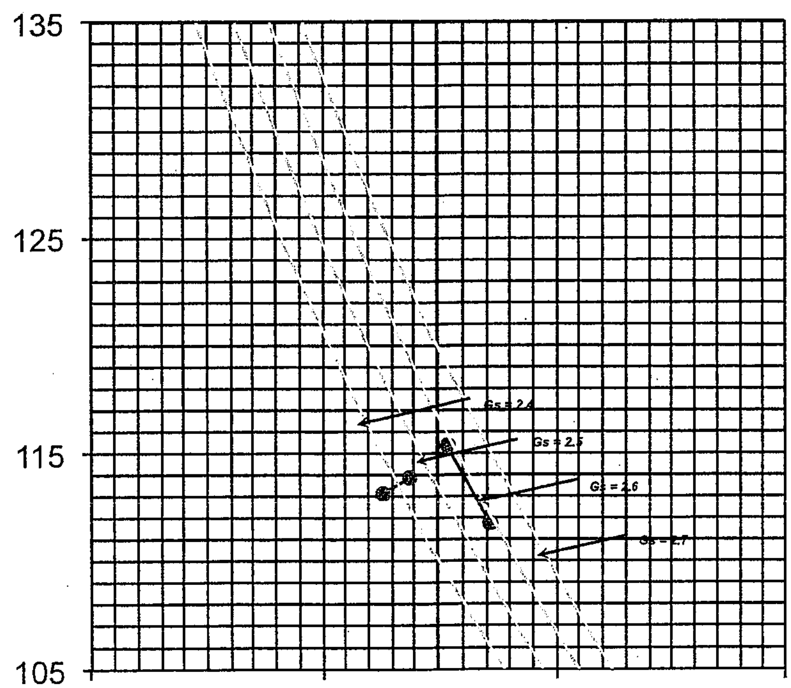
Assumed Specific Gravity = 2.65

## PROCEDURE USED

[ ] *Procedure A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if No.4 retained < 20%

[X] *Procedure B*
Soil Passing 3/8-in. (9.5 mm) Sieve
Mold : 4-in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + No.4 > 20% and - 3/8-in. < 20%

[ ] *Procedure C*
Soil Passing 3/4-in. (19.0 mm) Sieve
Mold : 6-in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8-in. >20% and + 3/4-in. <30%



# COMPACTION TEST

Test Procedure ASTM D 1557-91

Project Name: LLNL Site 300 B850 Soil Remediation
Project No.: LAW 1265
Location: Ax lift #7 elev. 1287'
Sample No.: 080409-01
Visual Sample Description: brn sandy Silt with sandstone plus 5% cement

Tested By: R. Uribe — Date: 08/04/09
Calculated By: R. Uribe — Date: 08/04/09
Checked By: — Date:
Depth (ft):

Compaction Method: [x] ASTM D1557-91 [ ] ASTM D698
Preparation Method: [x] Moist field [ ] Dry

876>3/8" ToT=18098

MOLD VOLUME (CU.FT) 0.033333

| Trail No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Wt. Comp. Soil + Mold (gm.) | 6542.3 | 6582.1 | 6519.2 | | | |
| Wt. of Mold (gm.) | 4596.4 | 4596.4 | 4596.4 | | | |
| Net Wt. of Soil (gm.) | 1945.9 | 1985.7 | 1922.8 | 0 | | |
| Container No. | | | | | | |
| Wt. of Container (gm.) | 136.6 | 137.5 | 137.3 | | | |
| Wet Wt. of Soil + Cont. (gm.) | 475.8 | 401 | 707.5 | | | |
| Dry Wt. of Soil + Cont. (gm.) | 431.5 | 360.8 | 616.5 | | | |
| Moisture Content (%) | 15.02 | 18.00 | 18.99 | #DIV/0! | | |
| Wet Density (pcf) | 128.70 | 131.33 | 127.17 | 0.00 | | |
| Dry Density (pcf) | 111.89 | 111.29 | 106.88 | #DIV/0! | | |

Maximum Dry Density (pcf) 112.5 Optimum Moisture Content (%) 15.0

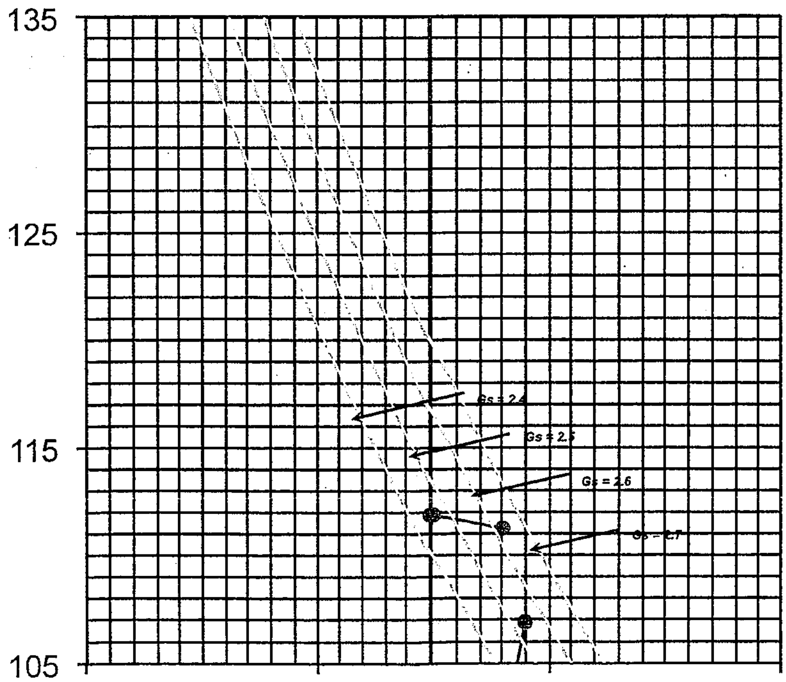
Assumed Specific Gravity = 2.65

## PROCEDURE USED

*Procedure A*
Soil Passing No. 4 (4.75 mm) Sieve
Mold: 4-in. (101.6 mm) diameter
Layers: 5 (Five)
Blows per layer: 25 (twenty-five)
May be used if No.4 retained < 20%

[X] *Procedure B*
Soil Passing 3/8-in. (9.5 mm) Sieve
Mold: 4-in. (101.6 mm) diameter
Layers: 5 (Five)
Blows per layer: 25 (twenty-five)
Use if + No.4 > 20% and - 3/8-in. < 20%

[ ] *Procedure C*
Soil Passing 3/4-in. (19.0 mm) Sieve
Mold: 6-in. (152.4 mm) diameter
Layers: 5 (Five)
Blows per layer: 56 (fifty-six)
Use if + 3/8-in. >20% and + 3/4-in. <30%




EBERHART / UNITED CONSULTANTS, INC.

REV. 2-07-05mddc1a

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 8/4/09
PROJECT #: LAW 1265
COMPACTION SPEC: 90%
MOISTURE SPEC: above opt.

INSPECTOR: Robert Uribe / Tony P.
PROJECT NAME: LLNL Site 300 B850 Soil R.
TEST LOCATION: Ax-Lift #7 south side of ~~Mo~~ Monit. Wells Elev. 1287'

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6788.1 | g | |
| B | WT of cone, jar, sand - After | 4022.4 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2765.7 | g | A - B |
| E | WT of sand in hole | 1185.7 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 13.233 / .0292 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | 1606.1 / 3.541 | lbs | H - I |
| K | **WT Density** | 121.3 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 1178.6 | lbs | |
| M | TARE #4 | 138.9 | lbs | |
| N | Soil + TARE (Dry) | 1036.6 | lbs | |
| O | WT of Water | 142.0 | lbs | L - N |
| P | WT of Soil | 897.7 | lbs | N - M |
| Q | **Moisture Content** | 15.8 | % | O ÷ P |
| | Optimum Moisture Content | 15.0 | % | |
| R | **Dry Density** | 104.7 | pcf | K ÷ (1 + Q) |
| S | Lab Maximum (Lab No. 072809-01) | 133.5 | pcf | |
| T | Percent Compaction | 91 | % | ~~R~~ K ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 • San Ramon, California 94583 • TEL: (925) 314-7100 • FAX: (925) 855-7140

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 8/11/09
PROJECT #: LAW 1265
COMPACTION SPEC: 90%
MOISTURE SPEC: above opt.

INSPECTOR: Robert Uribe
PROJECT NAME: LLNL Site 300 B850 Soil R
TEST LOCATION: Ax 60' North of M.W.
Elev. 1292'

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6746.6 | g | |
| B | WT of cone, jar, sand - After | 4166.7 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2579.9 | g | A - B |
| E | WT of sand in hole | 999.9 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 11.1596 / 0.0246 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE | — | lbs | |
| J | Net WT of soil | | lbs | H - I |
| | | 1295.6 / 2.856 | | |
| K | **WT Density** | 116.1 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 805.5 | lbs | |
| M | TARE #13 | 138.8 | lbs | |
| N | Soil + TARE (Dry) | 701.6 | lbs | |
| O | WT of Water | 103.9 | lbs | L - N |
| P | WT of Soil | 562.8 | lbs | N - M |
| Q | **Moisture Content** | 18.5 | % | O ÷ P |
| | Optimum Moisture Content | 19.0 | % | |
| R | **Dry Density** | 98.0 | pcf | K ÷ (I + Q) |
| S | Lab Maximum wet - (Lab No. 081009-01) | 125.5 | pcf | |
| T | **Percent Compaction** | 93 | % | K ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 8/19/09
PROJECT #: LAW 1265
COMPACTION SPEC: 90%
MOISTURE SPEC: above opt.
INSPECTOR: Tony P / R. Uribe
PROJECT NAME: LLNL Site 300 B850 Soil R
TEST LOCATION: Tie-in area east side
40' east of Monit. wells

## SAND CONE TESTING

| | | | |
|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6780.4 | g |
| B | WT of cone, jar, sand - After | 3951.0 | g |
| C | WT of sand in cone | 1580.0 | g |
| D | WT of sand used | 2829.4 | g A - B |
| E | WT of sand in hole | 1249.4 | g D - C |
| F | Density of sand | 89.6 | pcf |
| G | Volume of hole | 13.944 / 0.0307 | cf E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs |
| I | WT of TARE | — | lbs |
| J | Net WT of soil | 1802.3 / 3.973 | lbs H - I |
| K | **WT Density** | 129.4 | pcf J ÷ G |
| L | Soil + TARE (Wet) | 968.0 | lbs |
| M | TARE #6 | 137.2 | lbs |
| N | Soil + TARE (Dry) | 850.3 | lbs |
| O | WT of Water | 117.7 | lbs L - N |
| P | WT of Soil | 713.1 | lbs N - M |
| Q | **Moisture Content** | 16.5 | % O ÷ P |
| | Optimum Moisture Content | 15.0 | % |
| R | **Dry Density** | 111.1 | pcf K ÷ (I + Q) |
| S | Lab Maximum wet (Lab No. 072809-01) | 133.5 | pcf |
| T | Percent Compaction | 97 | % ~~R~~ K ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 8/27/09
PROJECT #: LAW 1265
COMPACTION SPEC: 90%
MOISTURE SPEC: above opt.

INSPECTOR: Tony P. / R. Uribe
PROJECT NAME: LLNL Site 300 BLDG 850 Soi
TEST LOCATION: Ax lift #16

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6818.6 | g | |
| B | WT of cone, jar, sand - After | 3795.8 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 3022.8 | g | A - B |
| E | WT of sand in hole | 1442.8 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 16.103 / 0.0355 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | | lbs | |
| I | WT of TARE | | lbs | |
| J | Net WT of soil | 2000.4 / 4.41 | lbs | H - I |
| K | **WT Density** | 124.2 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 685.8 | lbs | |
| M | TARE #4 | 139.1 | lbs | |
| N | Soil + TARE (Dry) | 612.6 | lbs | |
| O | WT of Water | 73.2 | lbs | L - N |
| P | WT of Soil | 473.5 | lbs | N - M |
| Q | **Moisture Content** | 15.5 | % | O ÷ P |
| | Optimum Moisture Content | ~~[illegible]~~ | % | |
| R | **Dry Density** | 107.5 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. 082409-01) | 131.5 | pcf | |
| T | Percent Compaction | 94 | % | ~~R~~ K ÷ S |

Weight = WT    Pounds = lbs    Grams = G    Pounds per Cubic Feet = pcf
Cubic Feet = cf    Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 ▪ San Ramon, California 94583 ▪ TEL: (925) 314-7100 ▪ FAX: (925) 855-7140

MOISTURE CONTENT

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | **Moisture Content** |
|---|---|---|---|---|---|---|---|
| 6/3/2009 | for nuke gauge - area B1 insitu test #1 | 368.6o | 1250.6o | 1238.1o | 12.5o | 869.5o | 1.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #2 | 366.2o | 1283.7o | 1277.7o | 6.0o | 911.5o | 0.70% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #3 | 365.7o | 1006.7o | 998.2o | 8.5o | 630.3o | 1.30% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #4 | 367.9o | 1266.7o | 1241.9o | 24.8o | 874.0o | 2.80% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #5 | 367.2o | 888.8o | 877.9o | 10.9o | 510.7o | 2.10% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #6 | 138.7o | 743.4o | 723.5o | 19.9o | 584.8o | 3.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #7 | 110.8o | 661.1o | 654.5o | 6.6o | 543.7o | 1.20% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #8 | 137.2o | 594.6o | 577.6o | 17.0o | 440.4o | 3.90% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #9 | 138.4o | 633.3o | 624.9o | 8.4o | 486.5o | 1.70% |
| | | | | | | | |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #1 | 138.3o | 796.0o | 746.9o | 49.1o | 608.6o | 8.10% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #2 | 110.9o | 705.0o | 635.7o | 69.3o | 524.8o | 13.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #3 | 109.4o | 477.3o | 453.4o | 23.9o | 344.0o | 6.90% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #4 | 137.2o | 816.6o | 790.7o | 25.9o | 653.5o | 4.00% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #5 | 137.5o | 659.6o | 607.0o | 52.6 | 469.5o | 11.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #6 | 137.0o | 731.8o | 700.5o | 31.3 | 563.5o | 5.60% |
| | | | | | | | |
| 7/16/2009 | for nuke gauge- area Ax -25' test #1 | 137.1o | 755.0o | 683.6o | 71.4o | 546.5o | 13.10% |
| 7/16/2009 | for nuke gauge- area Ax -25' test #2 | 137.2o | 499.9o | 453.5o | 46.4o | 316.3o | 14.70% |
| | | | | | | | |
| 7/20/2009 | for nuke gauge - area Ax -24' test #1 | 138.5o | 915.5o | 825.9o | 89.6o | 687.4o | 13.00% |
| 7/20/2009 | for nuke gauge - area Ax -24' test #3 | 139.2o | 1003.0o | 896.7o | 106.3o | 757.5o | 14.00% |
| | | | | | | | |
| 7/28/2009 | for nuke gauge - area Ax - lift 1test #1 | 137.2o | 892.4o | 794.8o | 97.6o | 657.6o | 14.80% |
| 7/28/2009 | for nuke gauge - area Ax - lift 1test #2 | 138.5o | 1155.3o | 988.3o | 167.0o | 849.8o | 19.70% |
| | | | | | | | |
| 7/29/2009 | for nuke gauge - area Ax - lift 2 test #1 | 137.3o | 486.8o | 436.8o | 50.0o | 299.5o | 16.70% |
| 7/29/2009 | for nuke gauge - area Ax - lift 2 test #2 | 138.9 | 698.5o | 601.0o | 97.5o | 462.1o | 21.10% |
| 7/29/2009 | for nuke gauge - area Ax - lift 3 test #3 | 138.6o | 965.3o | 832.1o | 133.2o | 693.5o | 19.20% |
| | | | | | | | |
| 8/4/2009 | nuke gauge - area Ax - lift 7 test #1 | 138.7 | 982.8 | 826.50 | 156.4 | 687.8 | 22.70% |
| | | | | | | | |
| 8/5/2009 | nuke gauge - area Ax - lift 9 test #1 | 138.8o | 730.6o | 632.9o | 97.7o | 493.4o | 19.80% |
| | | | | | | | |
| 8/6/2009 | nuke gauge - area Ax - lift 10 test #1 | 139.0o | 557.6o | 489.40 | 68.2o | 350.4o | 19.50% |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

# CONSOLIDATED ENGINEERING LABORATORIES



| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | Moisture Content |
|---|---|---|---|---|---|---|---|
| 6/3/2009 | for nuke gauge - area B1 insitu test #1 | 368.6o | 1250.6o | 1238.1o | 12.5o | 869.5o | 1.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #2 | 366.2o | 1283.7o | 1277.7o | 6.0o | 911.5o | 0.70% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #3 | 365.7o | 1006.7o | 998.2o | 8.5o | 630.3o | 1.30% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #4 | 367.9o | 1266.7o | 1241.9o | 24.8o | 874.0o | 2.80% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #5 | 367.2o | 888.8o | 877.9o | 10.9o | 510.7o | 2.10% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #6 | 138.7o | 743.4o | 723.5o | 19.9o | 584.8o | 3.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #7 | 110.8o | 661.1o | 654.5o | 6.6o | 543.7o | 1.20% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #8 | 137.2o | 594.6o | 577.6o | 17.0o | 440.4o | 3.90% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #9 | 138.4o | 633.3o | 624.9o | 8.4o | 486.5o | 1.70% |
| | | | | | | | |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #1 | 138.3o | 796.0o | 746.9o | 49.1o | 608.6o | 8.10% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #2 | 110.9o | 705.0o | 635.7o | 69.3o | 524.8o | 13.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #3 | 109.4o | 477.3o | 453.4o | 23.9o | 344.0o | 6.90% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #4 | 137.2o | 816.6o | 790.7o | 25.9o | 653.5o | 4.00% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #5 | 137.5o | 659.6o | 607.0o | 52.6 | 469.5o | 11.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #6 | 137.0o | 731.8o | 700.5o | 31.3 | 563.5o | 5.60% |
| | | | | | | | |
| 7/16/2009 | for nuke gauge- area Ax -25' test #1 | 137.1o | 755.0o | 683.6o | 71.4o | 546.5o | 13.10% |
| 7/16/2009 | for nuke gauge- area Ax -25' test #2 | 137.2o | 499.9o | 453.5o | 46.4o | 316.3o | 14.70% |
| | | | | | | | |
| 7/20/2009 | for nuke gauge - area Ax -24' test #1 | 138.5o | 915.5o | 825.9o | 89.6o | 687.4o | 13.00% |
| 7/20/2009 | for nuke gauge - area Ax -24' test #3 | 139.2o | 1003.0o | 896.7o | 106.3o | 757.5o | 14.00% |
| | | | | | | | |
| 7/28/2009 | for nuke gauge - area Ax - lift 1test #1 | 137.2o | 892.4o | 794.8o | 97.6o | 657.6o | 14.80% |
| 7/28/2009 | for nuke gauge - area Ax - lift 1test #2 | 138.5o | 1155.3o | 988.3o | 167.0o | 849.8o | 19.70% |
| | | | | | | | |
| 7/29/2009 | for nuke gauge - area Ax - lift 2 test #1 | 137.3o | 486.8o | 436.8o | 50.0o | 299.5o | 16.70% |
| 7/29/2009 | for nuke gauge - area Ax - lift 2 test #2 | 138.9 | 698.5o | 601.0o | 97.5o | 462.1o | 21.10% |
| 7/29/2009 | for nuke gauge - area Ax - lift 3 test #3 | 138.6o | 965.3o | 832.1o | 133.2o | 693.5o | 19.20% |
| | | | | | | | |
| 8/4/2009 | nuke gauge - area Ax - lift 7 test #1 | 138.7 | 982.8 | 826.50 | 156.4 | 687.8 | 22.70% |
| | | | | | | | |
| 8/5/2009 | nuke gauge - area Ax - lift 9 test #1 | 138.8o | 730.6o | 632.9o | 97.7o | 493.4o | 19.80% |
| | | | | | | | |
| 8/6/2009 | nuke gauge - area Ax - lift 10 test #1 | 139.0o | 557.6o | 489.40 | 68.2o | 350.4o | 19.50% |
| | | | | | | | |
| 8/10/2009 | nuke gauge - area Ax - lift 11 test #2 | 137.6 | 654.3 | 572.20 | 82.1 | 434.6o | 18.90% |
| | | | | | | | |
| 8/11/2009 | nuke gauge - area Ax - lift #12 test #4 | 137.4o | 671.6o | 579.9o | 91.7o | 442.5o | 20.70% |
| | | | | | | | |
| 8/12/2009 | nuke gauge - lift #13 test #1 | 139.0o | 591.1o | 513.6o | 77.5 | 374.6o | 20.70% |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

**CONSOLIDATED ENGINEERING LABORATORIES**



| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | Moisture Content |
|---|---|---|---|---|---|---|---|
| 6/3/2009 | for nuke gauge - area B1 insitu test #1 | 368.6o | 1250.6o | 1238.1o | 12.5o | 869.5o | 1.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #2 | 366.2o | 1283.7o | 1277.7o | 6.0o | 911.5o | 0.70% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #3 | 365.7o | 1006.7o | 998.2o | 8.5o | 630.3o | 1.30% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #4 | 367.9o | 1266.7o | 1241.9o | 24.8o | 874.0o | 2.80% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #5 | 367.2o | 888.8o | 877.9o | 10.9o | 510.7o | 2.10% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #6 | 138.7o | 743.4o | 723.5o | 19.9o | 584.8o | 3.40% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #7 | 110.8o | 661.1o | 654.5o | 6.6o | 543.7o | 1.20% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #8 | 137.2o | 594.6o | 577.6o | 17.0o | 440.4o | 3.90% |
| 6/3/2009 | for nuke gauge - area B1 insitu test #9 | 138.4o | 633.3o | 624.9o | 8.4o | 486.5o | 1.70% |
| | | | | | | | |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #1 | 138.3o | 796.0o | 746.9o | 49.1o | 608.6o | 8.10% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #2 | 110.9o | 705.0o | 635.7o | 69.3o | 524.8o | 13.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #3 | 109.4o | 477.3o | 453.4o | 23.9o | 344.0o | 6.90% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #4 | 137.2o | 816.6o | 790.7o | 25.9o | 653.5o | 4.00% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #5 | 137.5o | 659.6o | 607.0o | 52.6 | 469.5o | 11.20% |
| 6/29/2009 | for nuke gauge - area Ax -2' insitu test #6 | 137.0o | 731.8o | 700.5o | 31.3 | 563.5o | 5.60% |
| | | | | | | | |
| 7/16/2009 | for nuke gauge- area Ax -25' test #1 | 137.1o | 755.0o | 683.6o | 71.4o | 546.5o | 13.10% |
| 7/16/2009 | for nuke gauge- area Ax -25' test #2 | 137.2o | 499.9o | 453.5o | 46.4o | 316.3o | 14.70% |
| | | | | | | | |
| 7/20/2009 | for nuke gauge - area Ax -24' test #1 | 138.5o | 915.5o | 825.9o | 89.6o | 687.4o | 13.00% |
| 7/20/2009 | for nuke gauge - area Ax -24' test #3 | 139.2o | 1003.0o | 896.7o | 106.3o | 757.5o | 14.00% |
| | | | | | | | |
| 7/28/2009 | for nuke gauge - area Ax - lift 1test #1 | 137.2o | 892.4o | 794.8o | 97.6o | 657.6o | 14.80% |
| 7/28/2009 | for nuke gauge - area Ax - lift 1test #2 | 138.5o | 1155.3o | 988.3o | 167.0o | 849.8o | 19.70% |
| | | | | | | | |
| 7/29/2009 | for nuke gauge - area Ax - lift 2 test #1 | 137.3o | 486.8o | 436.8o | 50.0o | 299.5o | 16.70% |
| 7/29/2009 | for nuke gauge - area Ax - lift 2 test #2 | 138.9 | 698.5o | 601.0o | 97.5o | 462.1o | 21.10% |
| 7/29/2009 | for nuke gauge - area Ax - lift 3 test #3 | 138.6o | 965.3o | 832.1o | 133.2o | 693.5o | 19.20% |
| | | | | | | | |
| 8/4/2009 | nuke gauge - area Ax - lift 7 test #1 | 138.7 | 982.8 | 826.50 | 156.4 | 687.8 | 22.70% |
| | | | | | | | |
| 8/5/2009 | nuke gauge - area Ax - lift 9 test #1 | 138.8o | 730.6o | 632.9o | 97.7o | 493.4o | 19.80% |
| | | | | | | | |
| 8/6/2009 | nuke gauge - area Ax - lift 10 test #1 | 139.0o | 557.6o | 489.40 | 68.2o | 350.4o | 19.50% |
| | | | | | | | |
| 8/10/2009 | nuke gauge - area Ax - lift 11 test #2 | 137.6 | 654.3 | 572.20 | 82.1 | 434.6o | 18.90% |
| | | | | | | | |
| 8/11/2009 | nuke gauge - area Ax - lift 12 test #4 | 137.4o | 671.6o | 579.9o | 91.7o | 442.5o | 20.70% |
| | | | | | | | |
| 8/12/2009 | nuke gauge - lift #13 test #1 | 139.0o | 591.1o | 513.6o | 77.5 | 374.6o | 20.70% |
| | | | | | | | |
| 8/17/2009 | nuke gauge - tie-in area test #1 | 137.7o | 609.4o | 536.1o | 73.3o | 398.4o | 18.40% |
| 8/17/2009 | nuke gauge - tie-in area test #4 | 136.7o | 631.2o | 565.6o | 65.6o | 428.9o | 15.30% |
| | | | | | | | |
| 8/18/2009 | nuke gauge - tie-in area test #4 | 137.2o | 541.3o | 478.9o | 62.4o | 341.7o | 18.30% |
| | | | | | | | |
| 8/20/2009 | nuke gauge - tie-in area test #1 | 138.1 | 731.5 | 641.8o | 89.7o | 503.7o | 17.80% |

MOISTURE CONTENT

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | **Moisture Content** |
|---|---|---|---|---|---|---|---|
| 8/25/2009 | nuke guage - area Ax - lift 15 test #1 | 137.2o | 614.7o | 545.6o | 69.1o | 408.4o | 16.90% |
| | | | | | | | |
| 8/27/2009 | nuke guage - east side shell - test #2 | 137.2o | 520.6o | 453.3o | 67.3o | 316.1o | 21.30% |
| 8/27/2009 | nuke guage - area Ax - lift 16 test #4 | 137.5o | 740.7o | | | | |

COMPACTION LOCATION
SUMMARY SHEET

# CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 7/28/2009 | lift #1west of monit. Wells | | 1281 | 125.2 | 109.1 | 14.8 | **94.00** |
| 7/28/2009 | lift #1 north of monit. Wells DUPLICATE | | 1281 | 124.1 | 103.7 | 19.7 | **93.00** |
| | | | | | | | |
| 7/29/2009 | lift #2 west of monit. Wells | | 1282 | 120.8 | 103.5 | 16.7 | **90.00** |
| 7/29/2009 | lift #3 NE of monit. Wells | | 1283 | 125.4 | 103.6 | 21.1 | **94.00** |
| 7/29/2009 | lift #3 east of monit. Wells DUPLICATE | | 1283 | 123.7 | 103.8 | 19.2 | **93.00** |
| | | | | | | | |
| 7/30/2009 | lift #4 7' east of west wall of pit | | 1284 | 121 | 103.4 | 17 | **91.00** |
| 7/30/2009 | lift #4 DUPLICATE | | 1284 | 123.3 | 104.3 | 18.2 | **92.00** |
| 7/30/2009 | lift #5 east of monit wells | | 1285 | 121.8 | 103.4 | 17.8 | **91.00** |
| 7/30/2009 | lift #5 south of monit. Wells | | 1285 | 123.8 | 102.2 | 21.1 | **92.00** |
| 7/30/2009 | lift #5 SE of monit. Wells DUPLICATE | | 1285 | 121.9 | 104.7 | 16.4 | **91.00** |
| | | | | | | | |
| 8/3/2009 | lift #6 45' NW of monit. Wells | | 1286 | 123 | 103.7 | 18.6 | **92** |
| 8/3/2009 | lift #6 35' south monit. Wells DUPLICATE | | 1286 | 124.7 | 105.8 | 17.9 | **94.00** |
| 8/3/2009 | lift #6 27' west of monit. Wells | | 1286 | 122.4 | 103.7 | 18 | **92** |
| 8/3/2009 | lift #7 20' east of monit. Wells | | 1287 | 121.9 | 101.2 | 20.4 | **91.00** |
| | | | | | | | |
| 8/4/2009 | lift #7 60' north of monit. wells DUPLICATE | | 1287 | 121.4 | 98.9 | 22.7 | **92** |
| 8/4/2009 | lift #7 74' west SW of monit. Wells | | 1287 | 122.9 | 104.2 | 18 | **93.00** |
| 8/4/2009 | lift #7 33' east NE of monit. W. DUPLICATE | | 1287 | 121 | 100.3 | 20.6 | **92.00** |
| | | | | | | | |
| 8/5/2009 | lift #9 50' north of monit. Wells | | 1289 | 122.9 | 102.6 | 19.8 | **93** |
| 8/5/2009 | lift #9 40' SW of monit. Wells DUPLICATE | | 1289 | 121.6 | 102.7 | 18.4 | **92.00** |
| | | | | | | | |
| 8/6/2009 | lift #10 30' south of monit. Wells | | 1290 | 122.4 | 102.4 | 19.5 | **93.00** |
| 8/6/2009 | lift #10 90' w NW of monit. W. DUPLICATE | | 1290 | 122.3 | 101.8 | 20.1 | **93** |

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 7/28/2009 | lift #1west of monit. Wells | | 1281 | 125.2 | 109.1 | 14.8 | **94.00** |
| 7/28/2009 | lift #1 north of monit. Wells DUPLICATE | | 1281 | 124.1 | 103.7 | 19.7 | **93.00** |
| | | | | | | | |
| 7/29/2009 | lift #2 west of monit. Wells | | 1282 | 120.8 | 103.5 | 16.7 | **90.00** |
| 7/29/2009 | lift #3 NE of monit. Wells | | 1283 | 125.4 | 103.6 | 21.1 | **94.00** |
| 7/29/2009 | lift #3 east of monit. Wells DUPLICATE | | 1283 | 123.7 | 103.8 | 19.2 | **93.00** |
| | | | | | | | |
| 7/30/2009 | lift #4 7' east of west wall of pit | | 1284 | 121 | 103.4 | 17 | **91.00** |
| 7/30/2009 | lift #4 DUPLICATE | | 1284 | 123.3 | 104.3 | 18.2 | **92.00** |
| 7/30/2009 | lift #5 east of monit wells | | 1285 | 121.8 | 103.4 | 17.8 | **91.00** |
| 7/30/2009 | lift #5 south of monit. Wells | | 1285 | 123.8 | 102.2 | 21.1 | **92.00** |
| 7/30/2009 | lift #5 SE of monit. Wells DUPLICATE | | 1285 | 121.9 | 104.7 | 16.4 | **91.00** |
| | | | | | | | |
| 8/3/2009 | lift #6 45' NW of monit. Wells | | 1286 | 123 | 103.7 | 18.6 | **92** |
| 8/3/2009 | lift #6 35' south monit. Wells DUPLICATE | | 1286 | 124.7 | 105.8 | 17.9 | **94.00** |
| 8/3/2009 | lift #6 27' west of monit. Wells | | 1286 | 122.4 | 103.7 | 18 | **92** |
| 8/3/2009 | lift #7 20' east of monit. Wells | | 1287 | 121.9 | 101.2 | 20.4 | **91.00** |
| | | | | | | | |
| 8/4/2009 | lift #7 60' north of monit. wells DUPLICATE | | 1287 | 121.4 | 98.9 | 22.7 | **92** |
| 8/4/2009 | lift #7 74' west SW of monit. Wells | | 1287 | 122.9 | 104.2 | 18 | **93.00** |
| 8/4/2009 | lift #7 33' east NE of monit. W. DUPLICATE | | 1287 | 121 | 100.3 | 20.6 | **92.00** |
| | | | | | | | |
| 8/5/2009 | lift #9 50' north of monit. Wells | | 1289 | 122.9 | 102.6 | 19.8 | **93** |
| 8/5/2009 | lift #9 40' SW of monit. Wells DUPLICATE | | 1289 | 121.6 | 102.7 | 18.4 | **92.00** |
| | | | | | | | |
| 8/6/2009 | lift #10 30' south of monit. Wells | | 1290 | 122.4 | 102.4 | 19.5 | **93.00** |
| 8/6/2009 | lift #10 90' w NW of monit. W. DUPLICATE | | 1290 | 122.3 | 101.8 | 20.1 | **93** |
| | | | | | | | |
| 8/10/2009 | lift #11 30' south of monit. Wells | | 1291 | 120.8 | 101.6 | 18.9 | **96.00** |
| 8/10/2009 | lift #11 60' NW of monit. Wells DUPLICATE | | 1291 | 119.5 | 96.3 | 20 | **95.00** |
| | | | | | | | |
| 8/11/2009 | lift #12 70' west of monit. Wells | | 1292 | 117.8 | 96.6 | 21.9 | **94.00** |
| 8/11/2009 | lift #12 60' north of monit.Wells DUPLICATE | | 1292 | 120.4 | 99.8 | 20.7 | **96** |
| | | | | | | | |
| 8/12/2009 | east side tie-in | | 1288 | 121 | 100.2 | 20.7 | **92.00** |
| 8/12/2009 | east side tie-in | | 1289 | 115.9 | 97.7 | 18.6 | **92** |
| 8/12/2009 | lift #13 45' south of monit. Wells | | 1293 | 118.5 | 97.5 | 21.6 | **94.00** |

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 7/28/2009 | lift #1west of monit. Wells | | 1281 | 125.2 | 109.1 | 14.8 | **94.00** |
| 7/28/2009 | lift #1 north of monit. Wells DUPLICATE | | 1281 | 124.1 | 103.7 | 19.7 | **93.00** |
| | | | | | | | |
| 7/29/2009 | lift #2 west of monit. Wells | | 1282 | 120.8 | 103.5 | 16.7 | **90.00** |
| 7/29/2009 | lift #3 NE of monit. Wells | | 1283 | 125.4 | 103.6 | 21.1 | **94.00** |
| 7/29/2009 | lift #3 east of monit. Wells DUPLICATE | | 1283 | 123.7 | 103.8 | 19.2 | **93.00** |
| | | | | | | | |
| 7/30/2009 | lift #4 7' east of west wall of pit | | 1284 | 121 | 103.4 | 17 | **91.00** |
| 7/30/2009 | lift #4 DUPLICATE | | 1284 | 123.3 | 104.3 | 18.2 | **92.00** |
| 7/30/2009 | lift #5 east of monit wells | | 1285 | 121.8 | 103.4 | 17.8 | **91.00** |
| 7/30/2009 | lift #5 south of monit. Wells | | 1285 | 123.8 | 102.2 | 21.1 | **92.00** |
| 7/30/2009 | lift #5 SE of monit. Wells DUPLICATE | | 1285 | 121.9 | 104.7 | 16.4 | **91.00** |
| | | | | | | | |
| 8/3/2009 | lift #6 45' NW of monit. Wells | | 1286 | 123 | 103.7 | 18.6 | **92** |
| 8/3/2009 | lift #6 35' south monit. Wells DUPLICATE | | 1286 | 124.7 | 105.8 | 17.9 | **94.00** |
| 8/3/2009 | lift #6 27' west of monit. Wells | | 1286 | 122.4 | 103.7 | 18 | **92** |
| 8/3/2009 | lift #7 20' east of monit. Wells | | 1287 | 121.9 | 101.2 | 20.4 | **91.00** |
| | | | | | | | |
| 8/4/2009 | lift #7 60' north of monit. wells DUPLICATE | | 1287 | 121.4 | 98.9 | 22.7 | **92** |
| 8/4/2009 | lift #7 74' west SW of monit. Wells | | 1287 | 122.9 | 104.2 | 18 | **93.00** |
| 8/4/2009 | lift #7 33' east NE of monit. W. DUPLICATE | | 1287 | 121 | 100.3 | 20.6 | **92.00** |
| | | | | | | | |
| 8/5/2009 | lift #9 50' north of monit. Wells | | 1289 | 122.9 | 102.6 | 19.8 | **93** |
| 8/5/2009 | lift #9 40' SW of monit. Wells DUPLICATE | | 1289 | 121.6 | 102.7 | 18.4 | **92.00** |
| | | | | | | | |
| 8/6/2009 | lift #10 30' south of monit. Wells | | 1290 | 122.4 | 102.4 | 19.5 | **93.00** |
| 8/6/2009 | lift #10 90' w NW of monit. W. DUPLICATE | | 1290 | 122.3 | 101.8 | 20.1 | **93** |
| | | | | | | | |
| 8/10/2009 | lift #11 30' south of monit. Wells | | 1291 | 120.8 | 101.6 | 18.9 | **96.00** |
| 8/10/2009 | lift #11 60' NW of monit. Wells DUPLICATE | | 1291 | 119.5 | 96.3 | 20 | **95.00** |
| | | | | | | | |
| 8/11/2009 | lift #12 70' west of monit. Wells | | 1292 | 117.8 | 96.6 | 21.9 | **94.00** |
| 8/11/2009 | lift #12 60' north of monit.Wells DUPLICATE | | 1292 | 120.4 | 99.8 | 20.7 | **96** |
| | | | | | | | |
| 8/12/2009 | east side tie-in | | 1288 | 121 | 100.2 | 20.7 | **92.00** |
| 8/12/2009 | east side tie-in | | 1289 | 115.9 | 97.7 | 18.6 | **92** |
| 8/12/2009 | lift #13 45' south of monit. Wells | | 1293 | 118.5 | 97.5 | 21.6 | **94.00** |
| | | | | | | | |
| 8/18/2009 | lift #3 east side tie-in | | 1290 | 118.8 | 100.7 | 18 | **95.00** |
| 8/18/2009 | lift #4 east side tie-in | | 1291 | 122.3 | 103.4 | 18.3 | **92.00** |
| | | | | | | | |
| 8/19/2009 | lift #5 east side tie-in | | 1292 | 116.2 | 98.1 | 18.4 | **93** |
| 8/19/2009 | lift #6 east side tie-in | | 1293 | 119.7 | 99.6 | 20.2 | **95.00** |
| | | | | | | | |
| 8/20/2009 | east side tie-in | | 1293 | 118.8 | 100.8 | 17.8 | **90.00** |
| 8/20/2009 | lift #13 12' north of monit. wells | | 1293 | 119.4 | 100.7 | 18.6 | **91** |
| | | | | | | | |
| | | | | | | | |

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 8/24/2009 | lift #14 51' east of MW 11:10am | | 1294 | 116.4 | 95.6 | 21.7 | **93.00** |
| 8/24/2009 | lift #14 70' west of MW 4:15pm | | 1294 | 119.3 | 99.4 | 20 | **95.00** |
| | | | | | | | |
| 8/25/2009 | lift #15 35' east of MW 11:10am | | 1295 | 119.4 | 102.1 | 16.9 | **95.00** |
| 8/25/2009 | monit. Wells (MW) 1:30pm | | 1295 | 116.8 | 99.5 | 17.4 | **93.00** |
| 8/25/2009 | lift #15 50' north of MW 4:30pm | | 1295 | 119.5 | 101 | 18.3 | **95.00** |
| | | | | | | | |
| 8/27/2009 | lift #16 80' north of MW 9:35am | elevations based on GPS | 1293 | | | | |
| 8/27/2009 | 60' east of MW - 10% shell - 10:35am | | 1288 | | | | |
| 8/27/2009 | at MW 1pm | | 1293 | | | | |
| 8/27/2009 | lift #16 45' south MW 2:50pm | | 1293 | | | | |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: B 583005 | | Date: 8/4/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1265 | Page ___ of ___ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☐ Hot ☑ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | Rex | 1 |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☐ Nuclear Type: ☐ Tube ☑ Sand Cone

Fill Source: ☑ Native on site ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | wet |

Fill Location:

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 072809-01 | Brn sandy Silt w/SS plus 5% Cem | 133.5 | 15.0 | ☑ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☑ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ax lift #7 south side | 1287' | 121.3 | 15.8 | 104.7 | 072809-01 | 91 | |
| | of Monit. Wells | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

Compaction based on wet dens.



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 8/4/09 Reviewed By: ________ Date: ________

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: B 583205 | Date: 8/11/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: / AW 1265 | Page ___ of ___ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other
Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo
Contractor Representative: Andy Bell
Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | Rex | 1 |
| Moving | | |
| Water | Truck | 1 |
| Support | | |

Density Testing Equipment: ☐ Nuclear Type: ☐ Tube ☑ Sand Cone
Fill Source: ☑ Native on site ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location:

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 081009-01 | Brn sandy silt w/ SS | 125.5 | 19.0 | ☑ 90% | ☐ Opt. + 2% |
| | plus 5% cement | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☑ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ax - 60' north of MW | 1292' | 116.1 | 18.5 | 98.0 | 081009-01 | 93 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:
MW = monit. wells, compaction based on wet. Dens.
Leonard L. of SCS was notified of moist. below opt.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 8/11/09 Reviewed By: ______ Date: ______

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Project Name: LLNL Site 300 B850 Soil R. | Report #: B 583025 | Date: 8/19/09 | |
| Field Rep: Robert Uribe | Project Number: LAW 1265 | Page ____ of ____ | |
| | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☐ Nuclear Type: ☐ Tube ☑ Sand Cone

Fill Source: ☑ Native on site ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: Tie-in area east side Lift #7

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 072809-01 | Brn sandy silt w/ss | wet 133.5 | 15.0 | ☑ 90% | ☐ Opt. + 2% |
| | plus 5% cement | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☑ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 45' east of Monit. wells | 1294' | 129.4 | 16.5 | 111.1 | 072809-01 | 97 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

GPS corrected elevation 1293'

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 8/19/09 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | | Report #: B-58320S | Date: 8/17/09 |
| Project Name: LLNL Site 300 B850 Soil R. | | Project Number: LAW1265 | Page ____ of ____ |
| Field Rep: Robert Uribe | | Project Manager: Cal Dickerman | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | sheep foot roller w/ [illegible] | 1 |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☑ Nuclear Type: Trox ☐ Tube ☐ Sand Cone

Fill Source: ☑ Native on site ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: NE V ditch

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 071409-1 | Brn sandy silt w/SS | 131.5 | 14.5 | ☑ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☑ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 100'E and 100'N of MW 8am | -4' AC | 122.1 | 18.4 | 103.[illegible] | 071409-1 | 93 | |
| 2 | 100'E and 100'N " " 9:30 | -3.5' AC | 118.4 | 15.[illegible] | 103.0 | \| | 90 | |
| 3 | 100'E and 90'N " " 10:30 | -2.5' AC | 122.0 | 18.3 | 103.1 | \| | 93 | |
| 4 | 100'E and 95'N " " 1pm | -1.5' AC | 118.8 | 15.3 | 103.0 | \| | 90 | |
| 5 | 100'E and 100'N " " 3pm | -.5' AC | 123.0 | 17.8 | 104.4 | \| | 94 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

MW = monit. wells

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 8/17/09 | Reviewed By: ____ | Date: ____ |

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Report #: B 583225 | | Date: 8/20/09 |
| Project Name: LLNL Site 300 B850 Soil R | Project Number: 1AW 1265 | Page ______ of ______ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Scope of Work: | ☑ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: ☑ Full Time | ☐ Part Time |

| | | | | | |
|---|---|---|---|---|---|
| Contractor: Cerrudo | Conditions: | ☑ Sunny | ☐ Windy | ☑ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | Density Testing Equipment | |
|---|---|---|---|---|
| Compaction | sheeps foot roller / pnumatic | 1 | ☑ Nuclear | Type: Troxler |
| Moving | | | ☐ Tube | |
| Water | | | ☐ Sand Cone | |
| | | | Fill Source | ☑ Native on site |
| Support | | | | ☐ Import |

| Plan | Engineer | Date | Fill Location: |
|---|---|---|---|
| Civil | | | V ditch |
| Structural | | | |
| Geotech | | | |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 07140901 | Brn sandy silt w/SS | 114.5 | 14.5 | ☑ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☑ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | NE V ditch | +7' AC | 118.9 | 15.2 | 103.2 | 07140901 | 90 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

partial amount of material will be removed at a later date



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 8/20/09 | Reviewed By: ______ | Date: ______ |

Geosphere Con ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| Report #: B-583005 | Date: 8/24/09 |
| Project Name: LLNL site 300 B850 Soil R.. | Project Number: LAW 1265 |
| Page ____ of ____ | |
| Field Rep: Robert Ulibo | Project Manager: Cal Dickeiman |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other
Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo
Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☐ Hot ☑ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | sheeps-foot roller w/pneumatic | 1 |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☑ Nuclear Type: Trox; ☐ Tube; ☐ Sand Cone
Fill Source: ☑ Native on site; ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: Tie-in area ~~NE~~ NE side

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 071409-01 | Brn sandy silt w/SS | 131.5 | 14.5 | ☑ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☑ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | NE Tie-in 90'E and 100'N of MW | +8' AC | 125.8 | 17.4 | 107.2 | 071409-01 | 96 | |
| 2 | NE Tie-in 100'E and 90'N of MW | +4' AC | 117.7 | 14.6 | 102.7 | \| | 90 | [illegible] |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 8/24/09 Reviewed By: ________ Date: ________

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: B 583005 | | Date: 8/7/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1265 | Page ____ of ____ | |
| Field Rep: Robert White | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | | |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☑ Nuclear Type: ☐ Tube ☑ Sand Cone

Fill Source: ☑ Native on site ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location:

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 080409W | Brn sandy silt w/ss plus 5% Cement | 131.5 | 17.5 | ☑ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | Ax lift #16 | | 124.2 | 15.5 | 107.5 | 080409W | 94 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 8/27/09 | Reviewed By: ________ | Date: ________ |

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

## CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 7/28/2009 10:50am | 10a | 8/3/09 8am | Ax - lift #1/ 9:50am/ 5% | 125.20 | 3507 | **280** | 14.80% |
| 7/28/2009 11am | 10b | 8/4/09 9am | Ax - lift #1/ 9:50am/ 5% | 125.20 | 4641 | **370** | 14.80% |
| | | | | | | | |
| 7/29/09 9:10am | 11a | 8/3/09 8:15am | Ax - lift #2/ 8:10am/ 5% | 120.80 | 2025 | **160** | 16.70% |
| 7/29/09 9:20am | 11b | 8/5/09 10:15am | Ax - lift #2/ 8:10am/ 5% | 120.80 | 2025 | **160** | 16.70% |
| | | | | | | | |
| 7/29/09 12:40pm | 12a | 8/3/09 8:30am | Ax - lift #3/ 11:40am/ 5% | 124.40 | 3014 | **240** | 21.10% |
| 7/29/09 12:50pm | 12b | 8/5/09 10:25am | Ax - lift #3/ 11:40am/ 5% | 124.40 | 5104 | **410*** | 21.10% |
| | | | | | | | |
| 7/30/09 10:15am | 13a | 8/3/09 8:45am | Ax - lift #4/ 9:15am/ 5% | 123.30 | 5104 | **410*** | 18.20% |
| 7/30/09 10:25am | 13b | 8/6/09 8AM | Ax - lift #4/ 9:15am/ 5% | 123.30 | 5104 | **410*** | 18.20% |
| | | | | | | | |
| 7/30/09 2pm | 14a | 8/3/09 9am | Ax - lift #5/ 1pm/ 5% | 121.80 | 5104 | **410*** | 17.80% |
| 7/30/09 2:10pm | 14b | 8/3/09 9:15am | Ax - lift #5/ 1pm/ 5% DUPLICATE | 121.80 | 5104 | **410*** | 17.80% |
| 7/30/09 2:20pm | 14c | 8/6/09 8:20AM | Ax - lift #5/ 1pm/ 5% | 121.80 | 5104 | **410*** | 17.80% |
| | | | | | | | |
| 8/3/2009 10am | 15a | 8/6/09 8:40AM | Ax - lift #6/ 9am/ 5% | 123 | 3179 | **250** | 21.70% |
| 8/3/2009 10:10am | 15b | | Ax - lift #6/ 9am/ 5% | 123.00 | | | 21.70% |
| 8/3/09 5pm | 16a | 8/6/09 9AM | Ax - lift #7/ 4pm/ 5% | 121.90 | 4533 | **360** | 20.50% |
| 8/3/09 5:20pm | 16b | | Ax - lift #7/ 4pm/ 5% | 121.90 | | | 20.50% |
| | | | | | | | |
| 8/4/09 10:15am | 17a | 8/6/09 9:20AM | Ax - lift #7/ 9:15am/ 5% | 121.40 | 4171 | **330** | 15.60% |
| 8/4/09 10:25am | 17b | | Ax - lift #7/ 9:15am/ 5% | 121.40 | | | 15.60% |
| | | | | | | | |
| 8/5/09 12:45AM | 18a | | Ax - lift #9/ 12pm/ 5% | 122.90 | | | 18.00% |
| 8/5/09 1PM | 18b | | Ax - lift #9/ 12pm/ 5% | 122.90 | | | 18.00% |
| | | | | | | | |
| 8/6/09 9:45am | 19a | | Ax - lift #10/ 9am/ 5% | 122.40 | | | |
| 8/6/09 10am | 19b | | Ax - lift #10/ 9am/ 5% | 122.4 | | | |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

# CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 7/28/2009 10:50am | 10a | 8/3/09 8am | Ax - lift #1/ 9:50am/ 5% | 125.20 | 3507 | **280** | 14.80% |
| 7/28/2009 11am | 10b | 8/4/09 9am | Ax - lift #1/ 9:50am/ 5% | 125.20 | 4641 | **370** | 14.80% |
| 7/29/09 9:10am | 11a | 8/3/09 8:15am | Ax - lift #2/ 8:10am/ 5% | 120.80 | 2025 | **160** | 16.70% |
| 7/29/09 9:20am | 11b | 8/5/09 10:15am | Ax - lift #2/ 8:10am/ 5% | 120.80 | 2025 | **160** | 16.70% |
| 7/29/09 12:40pm | 12a | 8/3/09 8:30am | Ax - lift #3/ 11:40am/ 5% | 124.40 | 3014 | **240** | 21.10% |
| 7/29/09 12:50pm | 12b | 8/5/09 10:25am | Ax - lift #3/ 11:40am/ 5% | 124.40 | 5104 | **410*** | 21.10% |
| 7/30/09 10:15am | 13a | 8/3/09 8:45am | Ax - lift #4/ 9:15am/ 5% | 123.30 | 5104 | **410*** | 18.20% |
| 7/30/09 10:25am | 13b | 8/6/09 8AM | Ax - lift #4/ 9:15am/ 5% | 123.30 | 5104 | **410*** | 18.20% |
| 7/30/09 2pm | 14a | 8/3/09 9am | Ax - lift #5/ 1pm/ 5% | 121.80 | 5104 | **410*** | 17.80% |
| 7/30/09 2:10pm | 14b | 8/3/09 9:15am | Ax - lift #5/ 1pm/ 5% DUPLICATE | 121.80 | 5104 | **410*** | 17.80% |
| 7/30/09 2:20pm | 14c | 8/6/09 8:20AM | Ax - lift #5/ 1pm/ 5% | 121.80 | 5104 | **410*** | 17.80% |
| 8/3/2009 10am | 15a | 8/6/09 8:40AM | Ax - lift #6/ 9am/ 5% | 123 | 3179 | **250** | 21.70% |
| 8/3/2009 10:10am | 15b | 8/10/09 8am | Ax - lift #6/ 9am/ 5% | 123.00 | 4793 | **380** | 21.70% |
| 8/3/09 5pm | 16a | 8/6/09 9AM | Ax - lift #7/ 4pm/ 5% | 121.90 | 4533 | **360** | 20.50% |
| 8/3/09 5:20pm | 16b | 8/10/09 8:20am | Ax - lift #7/ 4pm/ 5% | 121.90 | 5104 | **410*** | 20.50% |
| 8/4/09 10:15am | 17a | 8/6/09 9:20AM | Ax - lift #7/ 9:15am/ 5% | 121.40 | 4171 | **330** | 15.60% |
| 8/4/09 10:25am | 17b | 8/11/09 8am | Ax - lift #7/ 9:15am/ 5% | 121.40 | 5104 | **410*** | 15.60% |
| 8/5/09 12:45AM | 18a | 8/10/09 8:40am | Ax - lift #9/ 12pm/ 5% | 122.90 | 4272 | **340** | 18.00% |
| 8/5/09 1PM | 18b | 8/12/09 8:30AM | Ax - lift #9/ 12pm/ 5% | 122.90 | 5104 | **410*** | 18.00% |
| 8/6/09 9:45am | 19a | 8/10/09 9am | Ax - lift #10/ 9am/ 5% | 122.40 | 4424 | **350** | 16.10% |
| 8/6/09 10am | 19b | 8/13/09 8:10am | Ax - lift #10/ 9am/ 5% | 122.4 | 5104 | **410*** | 16.10% |
| 8/10/09 9:40am | 20a | 8/13/09 8:30am | Ax - lift #11/ 9:15am/ 5% | 120.80 | 3995 | **310** | 19.40% |
| 8/10/09 10am | 20b | | Ax - lift #11/ 9:15am/ 5% | 120.80 | | | 19.40% |
| 8/11/09 11:30am | 21a | 8/13/09 9am | Ax - lift #12/ 10:45am/ 5% | 117.80 | 3761 | **300** | 18.20% |
| 8/11/09 11:50am | 21b | | Ax - lift #12/ 10:45am/ 5% | 117.80 | | | 18.20% |
| 8/12/09 2pm | 22a | | Ax - lift #13/ 1:45pm/ 5% | 118.50 | | | 17.90% |
| 8/12/09 2:20pm | 22b | | Ax - lift #13/ 1:45pm/ 5% | 118.50 | | | 17.90% |

Break Log
*Test stopped due to limit of machine
**100psi min.**

## CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 7/28/2009 10:50am | 10a | 8/3/09 8am | Ax - lift #1/ 9:50am/ 5% | 125.20 | 3507 | **280** | 14.80% |
| 7/28/2009 11am | 10b | 8/4/09 9am | Ax - lift #1/ 9:50am/ 5% | 125.20 | 4641 | **370** | 14.80% |
| | | | | | | | |
| 7/29/09 9:10am | 11a | 8/3/09 8:15am | Ax - lift #2/ 8:10am/ 5% | 120.80 | 2025 | **160** | 16.70% |
| 7/29/09 9:20am | 11b | 8/5/09 10:15am | Ax - lift #2/ 8:10am/ 5% | 120.80 | 2025 | **160** | 16.70% |
| | | | | | | | |
| 7/29/09 12:40pm | 12a | 8/3/09 8:30am | Ax - lift #3/ 11:40am/ 5% | 124.40 | 3014 | **240** | 21.10% |
| 7/29/09 12:50pm | 12b | 8/5/09 10:25am | Ax - lift #3/ 11:40am/ 5% | 124.40 | 5104 | **410*** | 21.10% |
| | | | | | | | |
| 7/30/09 10:15am | 13a | 8/3/09 8:45am | Ax - lift #4/ 9:15am/ 5% | 123.30 | 5104 | **410*** | 18.20% |
| 7/30/09 10:25am | 13b | 8/6/09 8AM | Ax - lift #4/ 9:15am/ 5% | 123.30 | 5104 | **410*** | 18.20% |
| | | | | | | | |
| 7/30/09 2pm | 14a | 8/3/09 9am | Ax - lift #5/ 1pm/ 5% | 121.80 | 5104 | **410*** | 17.80% |
| 7/30/09 2:10pm | 14b | 8/3/09 9:15am | Ax - lift #5/ 1pm/ 5% DUPLICATE | 121.80 | 5104 | **410*** | 17.80% |
| 7/30/09 2:20pm | 14c | 8/6/09 8:20AM | Ax - lift #5/ 1pm/ 5% | 121.80 | 5104 | **410*** | 17.80% |
| | | | | | | | |
| 8/3/2009 10am | 15a | 8/6/09 8:40AM | Ax - lift #6/ 9am/ 5% | 123 | 3179 | **250** | 21.70% |
| 8/3/2009 10:10am | 15b | 8/10/09 8am | Ax - lift #6/ 9am/ 5% | 123.00 | 4793 | **380** | 21.70% |
| 8/3/09 5pm | 16a | 8/6/09 9AM | Ax - lift #7/ 4pm/ 5% | 121.90 | 4533 | **360** | 20.50% |
| 8/3/09 5:20pm | 16b | 8/10/09 8:20am | Ax - lift #7/ 4pm/ 5% | 121.90 | 5104 | **410*** | 20.50% |
| | | | | | | | |
| 8/4/09 10:15am | 17a | 8/6/09 9:20AM | Ax - lift #7/ 9:15am/ 5% | 121.40 | 4171 | **330** | 15.60% |
| 8/4/09 10:25am | 17b | 8/11/09 8am | Ax - lift #7/ 9:15am/ 5% | 121.40 | 5104 | **410*** | 15.60% |
| | | | | | | | |
| 8/5/09 12:45AM | 18a | 8/10/09 8:40am | Ax - lift #9/ 12pm/ 5% | 122.90 | 4272 | **340** | 18.00% |
| 8/5/09 1PM | 18b | 8/12/09 8:30AM | Ax - lift #9/ 12pm/ 5% | 122.90 | 5104 | **410*** | 18.00% |
| | | | | | | | |
| 8/6/09 9:45am | 19a | 8/10/09 9am | Ax - lift #10/ 9am/ 5% | 122.40 | 4424 | **350** | 16.10% |
| 8/6/09 10am | 19b | 8/13/09 8:10am | Ax - lift #10/ 9am/ 5% | 122.4 | 5104 | **410*** | 16.10% |
| | | | | | | | |
| 8/10/09 9:40am | 20a | 8/13/09 8:30am | Ax - lift #11/ 9:15am/ 5% | 120.80 | 3995 | **310** | 19.40% |
| 8/10/09 10am | 20b | 8/17/09 8am | Ax - lift #11/ 9:15am/ 5% | 120.80 | 5104 | **410*** | 19.40% |
| | | | | | | | |
| 8/11/09 11:30am | 21a | 8/13/09 9am | Ax - lift #12/ 10:45am/ 5% | 117.80 | 3761 | **300** | 18.20% |
| 8/11/09 11:50am | 21b | 8/18/09 8am | Ax - lift #12/ 10:45am/ 5% | 117.80 | 4764 | **380** | 18.20% |
| | | | | | | | |
| 8/12/09 2pm | 22a | 8/17/09 8:30am | Ax - lift #13/ 1:45pm/ 5% | 118.50 | 5104 | **410*** | 17.90% |
| 8/12/09 2:20pm | 22b | 8/19/09 8am | Ax - lift #13/ 1:45pm/ 5% | 118.50 | 5104 | **410*** | 17.90% |
| | | | | | | | |
| 8/18/09 8:40am | 23a | 8/20/09 8:40am | Tie-in lift #3/ 8:10am/ 5% | 118.80 | 3507 | **280** | 17.30% |
| 8/18/09 9am | 23b | 8/20/09 9am | Tie-in lift #3/ 8:10/ 5% DUPLICATE | 118.80 | 3959 | **320** | 17.30% |
| 8/18/09 9:10am | 23c | | Tie-in lift #3/ 8:10am/ 5% | 118.80 | | | 17.30% |
| | | | | | | | |
| 8/20/09 9:40am | 24a | | tie-in lift #4/ 9am/ 5% | 118.80 | | | |
| 8/20/09 10am | 24b | | tie-in lift #4/ 9am/ 5% | 118.80 | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 7/28/2009 10:50am | 10a | 8/3/09 8am | Ax - lift #1/ 9:50am/ 5% | 125.20 | 3507 | **280** | 14.80% |
| 7/28/2009 11am | 10b | 8/4/09 9am | Ax - lift #1/ 9:50am/ 5% | 125.20 | 4641 | **370** | 14.80% |
| | | | | | | | |
| 7/29/09 9:10am | 11a | 8/3/09 8:15am | Ax - lift #2/ 8:10am/ 5% | 120.80 | 2025 | **160** | 16.70% |
| 7/29/09 9:20am | 11b | 8/5/09 10:15am | Ax - lift #2/ 8:10am/ 5% | 120.80 | 2025 | **160** | 16.70% |
| | | | | | | | |
| 7/29/09 12:40pm | 12a | 8/3/09 8:30am | Ax - lift #3/ 11:40am/ 5% | 124.40 | 3014 | **240** | 21.10% |
| 7/29/09 12:50pm | 12b | 8/5/09 10:25am | Ax - lift #3/ 11:40am/ 5% | 124.40 | 5104 | **410*** | 21.10% |
| | | | | | | | |
| 7/30/09 10:15am | 13a | 8/3/09 8:45am | Ax - lift #4/ 9:15am/ 5% | 123.30 | 5104 | **410*** | 18.20% |
| 7/30/09 10:25am | 13b | 8/6/09 8AM | Ax - lift #4/ 9:15am/ 5% | 123.30 | 5104 | **410*** | 18.20% |
| | | | | | | | |
| 7/30/09 2pm | 14a | 8/3/09 9am | Ax - lift #5/ 1pm/ 5% | 121.80 | 5104 | **410*** | 17.80% |
| 7/30/09 2:10pm | 14b | 8/3/09 9:15am | Ax - lift #5/ 1pm/ 5% DUPLICATE | 121.80 | 5104 | **410*** | 17.80% |
| 7/30/09 2:20pm | 14c | 8/6/09 8:20AM | Ax - lift #5/ 1pm/ 5% | 121.80 | 5104 | **410*** | 17.80% |
| | | | | | | | |
| 8/3/2009 10am | 15a | 8/6/09 8:40AM | Ax - lift #6/ 9am/ 5% | 123 | 3179 | **250** | 21.70% |
| 8/3/2009 10:10am | 15b | 8/10/09 8am | Ax - lift #6/ 9am/ 5% | 123.00 | 4793 | **380** | 21.70% |
| 8/3/09 5pm | 16a | 8/6/09 9AM | Ax - lift #7/ 4pm/ 5% | 121.90 | 4533 | **360** | 20.50% |
| 8/3/09 5:20pm | 16b | 8/10/09 8:20am | Ax - lift #7/ 4pm/ 5% | 121.90 | 5104 | **410*** | 20.50% |
| | | | | | | | |
| 8/4/09 10:15am | 17a | 8/6/09 9:20AM | Ax - lift #7/ 9:15am/ 5% | 121.40 | 4171 | **330** | 15.60% |
| 8/4/09 10:25am | 17b | 8/11/09 8am | Ax - lift #7/ 9:15am/ 5% | 121.40 | 5104 | **410*** | 15.60% |
| | | | | | | | |
| 8/5/09 12:45AM | 18a | 8/10/09 8:40am | Ax - lift #9/ 12pm/ 5% | 122.90 | 4272 | **340** | 18.00% |
| 8/5/09 1PM | 18b | 8/12/09 8:30AM | Ax - lift #9/ 12pm/ 5% | 122.90 | 5104 | **410*** | 18.00% |
| | | | | | | | |
| 8/6/09 9:45am | 19a | 8/10/09 9am | Ax - lift #10/ 9am/ 5% | 122.40 | 4424 | **350** | 16.10% |
| 8/6/09 10am | 19b | 8/13/09 8:10am | Ax - lift #10/ 9am/ 5% | 122.4 | 5104 | **410*** | 16.10% |
| | | | | | | | |
| 8/10/09 9:40am | 20a | 8/13/09 8:30am | Ax - lift #11/ 9:15am/ 5% | 120.80 | 3995 | **310** | 19.40% |
| 8/10/09 10am | 20b | 8/17/09 8am | Ax - lift #11/ 9:15am/ 5% | 120.80 | 5104 | **410*** | 19.40% |
| | | | | | | | |
| 8/11/09 11:30am | 21a | 8/13/09 9am | Ax - lift #12/ 10:45am/ 5% | 117.80 | 3761 | **300** | 18.20% |
| 8/11/09 11:50am | 21b | 8/18/09 8am | Ax - lift #12/ 10:45am/ 5% | 117.80 | 4764 | **380** | 18.20% |
| | | | | | | | |
| 8/12/09 2pm | 22a | 8/17/09 8:30am | Ax - lift #13/ 1:45pm/ 5% | 118.50 | 5104 | **410*** | 17.90% |
| 8/12/09 2:20pm | 22b | 8/19/09 8am | Ax - lift #13/ 1:45pm/ 5% | 118.50 | 5104 | **410*** | 17.90% |
| | | | | | | | |
| 8/18/09 8:40am | 23a | 8/20/09 8:40am | Tie-in lift #3/ 8:10am/ 5% | 118.80 | 3507 | **280** | 17.30% |
| 8/18/09 9am | 23b | 8/20/09 9am | Tie-in lift #3/ 8:10/ 5% DUPLICATE | 118.80 | 3959 | **320** | 17.30% |
| 8/18/09 9:10am | 23c | 8/25/09 8am | Tie-in lift #3/ 8:10am/ 5% | 118.80 | 5104 | **410*** | 17.30% |
| | | | | | | | |
| 8/20/09 9:40am | 24a | 8/24/09 8am | tie-in lift #4/ 9am/ 5% | 118.80 | 5104 | **410*** | 18.70% |
| 8/20/09 10am | 24b | 8/27/09 8:15am | tie-in lift #4/ 9am/ 5% | 118.80 | 5104 | **410*** | 18.70% |
| | | | | | | | |
| 8/24/09 11:30am | 25a | 8/27/09 8:30am | Ax - lift #14/ 11am/ 5% | 116.40 | 4134 | **330** | 16.60% |
| 8/24/09 11:50am | 25b | | Ax - lift #14/ 11am/ 5% | 116.4 | | | 16.60% |

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

# CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 8/25/09 11:30am | 26a | 8/27/09 8:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 3768 | **300** | 15.70% |
| 8/25/09 11:50am | 26b | | Ax - lift #15/ 10:50am/ 5% | 119.40 | | | 15.70% |
| | | | | | | | |
| 8/25/09 4:10pm | 27a | 8/27/09 9am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 3014 | **240** | 15.10% |
| 8/25/09 4:30pm | 27b | | Ax - lift #15/ 3:30pm/ 5% | 119.50 | | **0** | 15.10% |
| | | | | | | | |
| 8/27/09 9:40am | 28a | | Ax - lift #16/ 9am/ 5% | 121.50 | | | |
| 8/27/09 10am | 28b | | Ax - lift #16/ 9am/ 5% | 121.50 | | | |
| | | | | | | | |
| 8/27/09 10:40am | 29a | | east side shell/ 10:20am/ 10% | 121.00 | | | |
| 8/27/09 11am | 29b | | east side shell/ 10:20am/ 10% | 121.00 | | | |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

CONSOLIDATED ENGINEERING
LABORATORIES
*"Partners in Quality"*

October 13, 2009

Mr. Steve Ellis
Lawrence Livermore National Laboratory
P.O. Box 808; L-651
Livermore, California 94551-0808

Subject: LLNL B-850 Soil Remediation
B850-S300
Livermore, CA
CEL Project #10-01268-LAW & 10-01269-LAW

**EARTHWORK AND LABORATORY TESTING SUMMARY**
**September 1, 2009 thru September 30, 2009**

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from September 1, 2009 thru September 30, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some low moisture tests were measured as presented by these test results. We recommend that the Project Engineer, SCS Engineers, evaluate the low moisture results observed in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Respectfully submitted,
**CONSOLIDATED ENGINEERING LABORATORIES**

Michael Wissink
Project Manager

Eric J. Swenson, PE, GE
Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
ERIC J. SWENSON
No. 2474
Exp. 12/2010
GEOTECHNICAL
STATE OF CALIFORNIA

Enclosures: Daily Field Reports
Moisture/Density Curves
Sand Cone Testing
Moisture Content Summary
Break Log Summary

Distribution: 1 to Addressee

MW/EJS: pmf
R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\September Summary (Steve Ellis).doc

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 9-01-09 |
| Project Name: B-850 Soil Remediation | Project Number: 1AW1268 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other
Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CEARUDO
Contractor Representative: ANDY

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch: 9-01-09

0800 = DENSITY TEST @ V-DITCH S. SIDE
0830 = SPREAD CEMENT S. SIDE OF MONITORING WELLS. CMT. WT. 13#
0845 = MIX & REMIX OF CMT. & SOIL
0930 = COMPACT LIFT #17.
1100 = DENSITY TEST OF SOLIDIFIED SOIL
11-25 = SPRD CMT @ 10% SHELL E. SIDE. CMT WT. 34# / PASS
1140 = MIX & REMIX
1150 = SOIL SAMPLE FOR CURVE & CYL. BRK. ON 10% MIX
1230 = DENSITY TEST @ S. V-DITCH
1240 = DENSITY TEST @ 10% MIX E. SIDE SHELL.
1245 = START PLACEMENT OF LIFT #18 N. SIDE OF MONITORING WELLS
1400 = SPRD CMT. OF LIFT #18 N. SIDE M.W. CMT. WT. 14# & @ 10% @ W. SIDE SHELL. CMT. WT. 37#
1420 = MIX & REMIX OF HALF OF LIFT N. SIDE M.W.
1445 = COMPACT LIFT.
1450 = SCS CREW CONTINUES TO PLACE CLEAN SOIL OVER PAVED ACCESS ROAD TO TRANSPORT CONTAMINATED SOIL FROM A-2 STOCKPILE TO A-X PIT. & CONTINUES TO PLACE LIFT #18 ON SOUTH SIDE MONITORING WELLS.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: | Date: | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 9-02-09 TO 9-3-09 | |
| Project Name: B-850 SOIL REMEDIA. | Project Number: 2AW1268 | Page ___ of ___ | |
| Field Rep: Tony Dailey | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERAUDO

Contractor Representative: ANDY

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9-02-09

0815 = GRIFFIN SPRD CEMENT N. OF M.W. ON LIFT #18. CMT WT. 14#
0830 = MIX & REMIX
0900 = SOIL SAMPLE TAKEN FOR CYL. BREAK
1045 = SPRD. CMT ON LIFT #18 S. SIDE OF M.W. CMT WT. 14#
1100 = MIX & REMIX LIFT
1200 = SOIL SAMPLE TAKEN FOR CYL BREAK.
1300 = MOISTURE SAMPLE TAKEN
1314 = SPRD CMT 10% ON E. SIDE SHELL LIFT #3. CMT WT 37#
1400 = MIX & REMIX & COMPACT 10% LIFT
1430 = SCS START PLACEMENT OF BACK FILL FOR LIFT #19

9-3-09

0800 = BACKFILL W/ CLEAN SOIL @ S. V-DITCH, & CONTINUE 2' CUT EXCAVATION IN SECTOR B-1. ASKED FOR BACK FILL AROUND S. MONITORING WELL #NET-09 & COMPACTION SUBGRADE AROUND WELL IS ± 18" BELOW FINISH GRADE.
1030 = SPRD CEMENT 5% ON N. HALF OF N. SIDE OF M.W. CMT WT. 14#
1045 = MIX & REMIX
1100 = COMPACT LIFT
1410 = 5% CMT SPRD @ E SIDE SHELL & TIE IN CMT WT. 14.5#
1435 = MIX & REMIX & COMPACT.
1500 = SCS CREW CONTINUES BACK FILL PROCESS ON LIFT #19 & EXCAVATION OF SOIL @ 2' CUT IN SECTOR B-1 S. HILLSIDE.



☒ This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Project Name: B-850 SOIL REMEDIATION | Report #: | Date: 9-8 TO 9-10-09 | |
| Field Rep: Tony Phillips | Project Number: LAW1268 | Page ____ of ____ | |
| | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other — Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CEPARDO SERV.

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9-8-09

GRIFFIN SOIL NOT ON SITE. SCS CONTINUES TO EXCAVATE 1' CUT & 2' CUT IN SECTOR A-2 & B-1 & CUT 3 TO 1 SLOPE ON E. SIDE SHELL OF PIT & BACKFILL PIT W/ LIFT #19 & PREP ~~OUTER~~ OUTER SHELL FOR 10% CEMENT ON W. & S. SIDE OF PIT

9-9-09

SCS CONTINUES TO MOVE STOCK PILE FROM A-4 & A-2 & B-1 TO PIT @ A-X, CREW ALSO BACK FILLED ~~AND~~ AND COMPACTED ONE 6" LIFT AROUND S. MONITORING WELL # NC7-09 & EXCAVATED DOWN TO ROCK AROUND N. MONITORING WELL # NC7-71.

2 LOADS OF RIP-RAP WAS DELIVERD TO SITE SIZE ~~RAN~~ RANGE + 6" DIA. TO ± 14"

CREW SPREAD 10% CEMENT WT 29.5# FOR OUTER SHELL ON W., S. & E. SIDE OF PIT. MIX & REMIX @ 0815 HRS & SOIL SAMPLE WAS PULLED FOR CYL. BREAK, OF 10%

5% CEMENT WAS PLACED OVER ENTIRE LIFT # 19 CMT. WT. 13.5 MIX & REMIX & COMPACTION DONE W/ REX.

SCS PLACEMENT OF BACK FILL FOR LIFT # 20 OVER LIFT # 19, IN PIT SECTOR A-X, SOIL SAMPLE WAS TAKEN OF 5% FOR CYL. BREAK.

9-10-09

GRIFFIN MIX & REMIX SMALL PAD FOR BACKFILL AROUND MONITORING WELLS. SCS BACK FILLED MATERIAL AROUND WELL IN 6" LIFTS & COMPACTED. TEST TAKEN @ EVERY 12"

CREW ALSO CONTINUES EXCAVATION IN SECTOR A-2 & B-1. 1' CUT & 2' CUT & BRINGING SPOILS TO A-X FOR FILL.

GRIFFIN SPREAD 10% + 5% ON E. SIDE PIT FOR SHELL & TIE IN @ 1500 HRS & MIX & REMIX @ 1530 HRS.

10% CMT WT IS ~~40#~~ 30# & 5% CMT. WT IS 17#

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 9-14 & 9-15-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1268 | Page ____ of ____ |
| Field Rep: TONY PHILLIPS | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CEARUDO SERV.

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9-14-09

GRIFFIN SOIL NOT ON SITE. SCS CONTINUES TO EXCAVATE 2' CUT IN SECTOR ~~B-1~~ + REMOVE STOCK PILE + MOVE STOCK PILE OF SPOILS FROM SECTOR A-2 TO A-X PIT, VERIFIED ±6" CUT IN SECTOR A2-1. NO COMPACTION DONE TODAY

9-15-09

SCS CONTINUES TO PLACE LIFT #20 IN SECTOR A-X + MOVE MATERIAL (SOIL) FROM A-2 TO A-X
ALSO EXCAVATED AROUND N. MONITORING WELL # NC7-71 DOWN TO BED ROCK 4' DEEP X 30' LONG X 15' WIDE ±.
+ BACKFILL W/TREATED SOIL IN LIFTS OF ±8" + COMPACT W/ BOMAG.
UPON FURTHER INSP. OF N. MONITORING WELL # NC7-71. IT IS NOTICED THAT WELL PIPE HAS A PRE-EXISTING LEAN OF 1" FOR EVERY 2' TO THE W.NW.

1000 = GRIFFIN SPREAD CEMENT WT. 29# OVER 10% AREA ON W. & S. SIDE SHELL
1015 = MIX + REMIX + COMPACT.
1300 = SPREAD 5% CEMENT WT. 14# OVER S. + W. SIDE OF PIT.
1330 = MIX + REMIX + COMPACT.
1515 = DENSITY TEST
1530 = DENSITY TEST.
SCS CONTINUED TO PLACE SOIL IN SECTOR AX FOR LIFT. 20



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 9-17-09 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Report #: | Date: 9-16 + 9-17-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1268 | Page ___ of ___ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ~~☒ Utility Trench~~ ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERAUDO SERV

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9-16-09

0700 = SCS BACK FILL AROUND N. MONITORING WELL W/ TREATED SOIL + COMPACT W/ BOMAG. IN 8± INCH LIFTS

0900 = GRIFFIN SPREAD 10% CEMENT WT. 32# OVER E. SIDE SHELL

0910 = SPREAD 5% CEMENT WT. 20# @ TIE IN E. SIDE.

0920 = MIX + REMIX + COMPACT, 10% + 5% CEMENT. NOW EVEN "SAME GRADE" AS LIFT #20

1015 = DENSITY TEST

1100 - SPREAD 5% CEMENT WT 14# OVER 2ND HALF OF LIFT 20.

1130 = MIX + REMIX + COMPACT.

1330 = SAND CONE TEST @ 10% CEMENT E. SIDE SHELL LIFT #20

1400 = SCS PLACED ±4" OF SOIL FOR COVER OVER TREATED SOIL, IN SECTOR A-X.

1500 = JOB SHUT DOWN FOR LLNL SHOT.

9-17-09

SCS CREW FINISHED EXCAVATION OF SECTOR A-1 + VARIFIED DEPTH OF 2' CUT + CONTINUES 1' CUT TO 2' CUT IN SECTOR A-2 + SPOILS CLEAN UP W. OF B-850. CREW PLACED 4 LIFTS OF ±6" + COMPACTED W/ BOMAG EACH LIFT IN SECTOR A-1 SOUTH OF TRAILER



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 9-17-09 | Reviewed By: | Date: |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 9-21 |
| Project Name: B-850 Soil Remediation | Project Number: 1AW1268 | Page ___ of ___ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other | Hours Charged: ☒ Full Time ☐ Part Time

Contractor: Cerrudo Serv.

Contractor Representative: Andy Bell

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9-21-09

GRIFFIN SOIL = NOT ON SITE, + WON'T BE BACK FOR AT LEAST 3 WEEKS, WHILE SCS INSTALLS V-DITCHES.

SCS = CREW CONTINUES TO EXCAVATE A-1 SOUTH OF TRAILER. IT IS NOTICED THAT EDGE OF ROAD IN THIS AREA IS UNDERMINED ± 3" STEVE ELLIS IS AWARE OF THIS.

SCS = STARTED ~~BACK~~ BACK FILL OF SECTOR A-1 + CONTINUES EXCAVATION OF 2' CUT IN SECTOR B1 SOUTH SIDE SLOPE + @ SECTOR A-4 1' CUT @ RT. #4 ROADWAY.

9-22-09

SCS = CREW CONTINUES TO EXCAVATE 1' CUT IN SECTOR A-4. CREW ALSO PLACED TENCATE MIRAFI 140 NC/123/360 GEOTEXTILE IN ROCK LINED CREEK.
CREW ALSO CHIPPED CONC. BASE OUT FROM AROUND MONITORING WELLS NC7-43 + NC7-19

9-23-09

SCS = CREW CONTINUES TO EXCAVATE 1' CUT IN SECTOR A-4 + PLACE MIRAFI 140NC IN ROCK LINED CREEK W/ 2' DOWN SLOPE OVERLAP + STARTED PLACEMENT OF 6" + LARGER RIP-RAP E. SIDE OF RT. #4 ROADWAY.

9-24-09

SCS = CREW CONTINUES PLACEMENT OF RIP RAP IN ROCK LINED CREEK.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: ______ | Date: ______ | Reviewed By: ______ | Date: ______ |
|---|---|---|---|

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | | Date: 9-28 TO 10-1-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1268 + 1274 | | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other | Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRADO SERVICES
Contractor Representative: ANDY BELL
Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9-28-09

SCS = CREW STARTED EXCAVATION OF SEDIMENT TRAP & FINISHED COMPACTION OF SECTOR A-1 JUST SOUTH OF TRAILER @ RT #4 & B-850 ACCESS ROAD INTERSECTION. FURTHER EXCAVATION IN SECTOR A-4 @ N. END OF EAST V-DITCH W. SIDE OF RT. #4.

9-29-09

SCS = STARTS EXCAVATION OF V-DITCH ALONG B-850 ACCESS ROAD (SOUTH V-DITCH) & ~~E. V-D~~ EAST V-DITCH CREW ALSO STARTS INSTALLATION OF WADDLES ON S. SLOPE HILLSIDE IN SECTOR A-2. CREW CUT OUT ROAD CROSSING ON RT. #4 & ACCESS RD. TO B-850.

9-30-09

SCS = CONTINUE EXCAVATION OF S. & E. V-DITCH & INSTALL WADDLES S. SIDE SLOPE OF SECTOR A-2. CREW ALSO FIXED & EXTENDED SILT (CRITTER) FENCE IN SECTOR A-3 TO INCOMPUS NEW SECTOR A3-0 & IN SECTOR A-4 TO INCOMPUS NEW SECTOR A4-A, B, & C.

10-01-09

SCS = CONTINUE TO EXCAVATE E. SIDE V-DITCH & CLEAN UP SEDIMENT AREA @ N. END OF E. V-DITCH WATER HILLSIDES & REPAIR CRITTER FENCE & POLICE JOB SITE FOR SHOT @ 1300 HRS.



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 8-31 TO 9-3-09 |
| Project Name: B-330 SOIL REMEDIATION | Project Number: LAW1268 | Page ___ of ___ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other — Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 131.5 A = 080409-01 | BRN SDY SLT W/SS PLUS 5% CEMENT | 111.5 | 17.5 | ☒ 90% | ☐ Opt. + 2% |
| B = 071409-01 | MIX BRN SDY SLT W/SS | 114.5 | 14.5 | ☐ 95% | ☒ Opt. + 2% to 5% |
| C = 081009-01 | BRN SDY SILT W/SS PLUS 5% CMT. | 105.5 | 19.0 | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | 8-31-09 | | | | | | | |
| 1 | ±96' W.N.W. OF MW | LIFT #17 | 120.8 | 17.5 | 102.8 | A | 92 | |
| | 9-01-09 | | | | | | | |
| 1 | S. V-DITCH | -2' FG | 124.5 | 18.9 | 104.7 | B | 92 | |
| 2 | ±60' W.SW. OF M.W. | LIFT #17 | 124.7 | 21.7 | 102.5 | A | 92 | |
| 3 | S. V-DITCH | -1' FG | 125.7 | 19.7 | 105.0 | B | 92 | |
| 4 | E. SHELL @ TIE-IN | 2ND LIFT | 119.5 | 18.5 | 100.8 | A | 90 | |
| | 9-02-09 | | | | | | | |
| 1 | ±30' N OF M.W. | LIFT 18 | 120.8 | 19.0 | 101.5 | A | 91 | |
| 2 | @ M.W. (CENTER) | LIFT 18 | 115.5 | 18.4 | 97.6 | C | 92 | |
| 3 | ±40' S. OF M.W. | LIFT 18 | 119.9 | 21.2 | 98.9 | C | 94 | |
| | 9-3-09 | | | | | | | |
| 1 | S. V-DITCH | -1' FG | 119.6 | 16.7 | 102.7 | B | 90 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: Tony Phillips | Date: ______ | Reviewed By: ______ | Date: ______ |
|---|---|---|---|

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 9-9 + 9-10-09 | |
| Project Name: B-850 Soil Remediation | Project Number: LAW1868 | Page ____ of ____ | |
| Field Rep: Tom Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other — Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO
Contractor Representative: ANDY

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 126.5 A = 090109-01 | BRN SILT. SAND W/SS PLUS 10% CMT | 107.0 | 18.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☒ Opt. + 2% to 5% |
| 131.5 B = 080409-01 | BRN SANDY SILT W/SS + 5% CMT | 111.5 | 17.5 | ☐ Other: | ☐ Other: |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | 9-9-09 | | | | | | | |
| 1 | E. SIDE SHELL 10% | LIFT #4 | 120.1 | 20.1 | 100.0 | A | 93 | |
| 2 | ±80' W. SW. OF M.W. | LIFT #19 | 119.0 | 18.8 | 100.0 | B | 90 | |
| | | | | | | | | |
| | 9-10-09 | | | | | | | |
| 1 | @ CTR. M.W. | LIFT 4 | 119.5 | 18.9 | 100.5 | B | 90 | |
| 2 | " " " | LIFT 5 | 119.2 | 18.1 | 100.9 | B | 91 | |
| 3 | E. SIDE SHELL 10% | LIFT 5 | 122.4 | 22.4 | 100.0 | A | 93 | |

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | | Report #: | Date: 9-15 & 9-16-09 |
| Project Name: B-850 Soil Remediation | | Project Number: LAW 1268 | Page ____ of ____ |
| Field Rep: Tony Phillips | | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY

Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A = 090109-01 | BRN SDY SLT W/SS + 5% CMT | 105.5 | 19% | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☒ Opt. + 2% to 5% |
| B = 090109-01 | BRN SDY SLT W/SS + 10% CMT | 107.0 | 18.5% | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | 9-15-09 | | | | | | | |
| 1 | ±60' S. SW of MW | 2 FT 20 | 116.7 | 21.2 | 96.3 | A | 91 | |
| 2 | 4' N of N. MW. #NE7-71 | " | 115.9 | 21.9 | 95.1 | A | 90 | |
| | | | | | | | | |
| | 9-16-09 | | | | | | | |
| 1 | E. SIDE SHELL | LIFT 20 | 119.4 | 21.4 | 98.4 | B | 92 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



☒ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 9-16-09 Reviewed By: ____________ Date: ________

Geosphere Cons[ult]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| ~~Report #~~ B S8300S | | Date: 9/1-3/09 |
| Project Name: LLNL Site 300 B 851 Soil R. | Project Number: LAW 1269 | Page ____ of ____ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: Cerando

Contractor Representative: Andy Bell

Conditions: ☒ Sunny ☐ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

$\boxed{9/1/09}$ Tue

- Break #26b@7days 340 psi
  #27b@7days 340 psi
- Sample @ 11:50AM #31a 12:50, #31b 1:05
- Curve 090109-01 126.5 / 107.0 / 18.5

Sunny 85° F

$\boxed{9/2/09}$ Wed

- Sample @ 9AM #32a 9:40AM, #32b 10AM
  @ 12pm #33a 1:10pm, #33b 1:30pm
- moist cont.

Sunny 85° F

$\boxed{9/3/09}$ Thu

Break #29b @ 7days 410 psi max
#28b@ 7days 260 psi
#30a@ 3days 210 psi
#31a@ 2days 240 psi

Sunny 100° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 9/3/09 | Reviewed By: ____ | Date: ____ |

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: B S8300 S | Date: 9/8-10/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1269 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor:

Contractor Representative:

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9/8/09 ~~Mon~~ Tue

— Break #30b @ 8 days 220 psi
#31b @ 8 days 230 psi
#32a @ 6 days 220 psi
#33a @ 6 days 190 psi

Sunny 90° F

9/9/9 Wed

— Break #32b @ 7 days 170 psi
#33b @ 7 days 260 psi
— Sample @ 8:45 Am #34a 9:45 am, #34b 10 Am
— Sample @ 1:45 pm #35a 2:45 pm, #35b 3 pm
— moist cont.

Sunny 90° F

9/10/09 Thu

— Reports
— Labwork

Sunny 90° F



☑ This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 9/10/09 | Reviewed By: | Date: |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| ~~Report #:~~ B S8300S | | Date: 9/14-17/09 | |
| Project Name: LLNL Site 300 | Project Number: LAW 1269 | Page ___ of ___ | |
| Field Rep: Robert Unbe | Project Manager: Cal Dickerman | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☒ Sunny ☐ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9/14/09 Mon

- Break #34a @ 5days 350 psi
  #35a @ 5days 120 psi

Partly Cloudy ~~Sunny~~ 75° f

9/15/09 Tue

- Reports
- Lab works

Sunny 83° f

9/16/09 Wed

- Break #34b @ 7days 410 psi max
  #35b @ 7days 250 psi
- Sample @ 9:30AM #36a 10:30AM, #36b 11AM
- moist cont.
- sand cone 1:30 pm

Sunny 85° f

9/17/09

- Lab work
- compaction ~~test~~

Sunny 85° f

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 9/17/09 | Reviewed By: | Date: |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: B S83003 | Date: 9/21-24/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1269 | Page ____ of ____ | |
| Field Rep: | Project Manager: Cal Dickerman | | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Carruda

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9/21/09 Mon

Break #36a @ 5 days 310 psi
compaction tests in area A1

Sunny 90° F

9/22/09 Tue

slow progress due to shot @ B851

Sunny 90° F

9/23/09 Wed

Break #36b @ 7 days 410 max psi

Sunny 100° F

9/24/09 Thu

- Lab work
- Report 3

Sunny / 95° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 9/24/09 | Reviewed By: ____________ | Date: ____________ |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| ~~Report #:~~ B-583005 | | Date: 9/ |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1269 | Page ____ of ____ |
| Field Rep: | Project Manager: Cal Dickerman | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Carrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☑ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

9/28/09 | mon

— compaction on clean soil @ A1

sunny 88°F

9/29/09 | Tue

— Lab work
— observation V-ditch excavation
— no compaction

overcast 70°F

9/30/09 | wed

— Lab work
— ~~Re~~ Reports

sunny 70°F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 9/30/09 | Reviewed By: | Date: |

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 9/16/09
PROJECT #: LAW 1269
COMPACTION SPEC: 90
MOISTURE SPEC: above opt.

INSPECTOR: Tony P. / R. Uribe
PROJECT NAME: LLNL site 300 B850 Soil R.
TEST LOCATION: east side shell 10% cement

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6904.4 | g | |
| B | WT of cone, jar, sand - After | 3957.6 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 2946.8 | g | A - B |
| E | WT of sand in hole | 1366.8 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 15.254 .0336 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | | lbs | |
| I | WT of TARE | | lbs | |
| J | Net WT of soil | 1855.8 / 4.091 | lbs | H - I |
| **K** | **WT Density** | 121.7 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 973.3 | lbs | |
| M | TARE #5 | 136.5 | lbs | |
| N | Soil + TARE (Dry) | 852.7 | lbs | |
| O | WT of Water | 120.7 | lbs | L - N |
| P | WT of Soil | 716.2 | lbs | N - M |
| **Q** | **Moisture Content** | 16.8 | % | O ÷ P |
| | Optimum Moisture Content | 18.5 | % | |
| **R** | **Dry Density** | 104.2 | pcf | K ÷ (1 + Q) |
| S | Lab Maximum (Lab No. 090109-01) | 107.0 | pcf | |
| **T** | **Percent Compaction** | 97 | % | R ÷ S |

Weight = WT  Pounds = lbs  Grams = G  Pounds per Cubic Feet = pcf
Cubic Feet = cf  Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 • San Ramon, California 94583 • TEL: (925) 314-7100 • FAX: (925) 855-7140

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Location | Tare | Wet soil + tare | Dry soil + tare | Wt. of water | Wt. of soil | **Moisture Content** |
|---|---|---|---|---|---|---|---|
| 8/25/2009 | nuke guage - area Ax - lift 15 test #1 | 137.2o | 614.7o | 545.6o | 69.1o | 408.4o | 16.90% |
| | | | | | | | |
| 8/27/2009 | nuke guage - east side shell - test #2 | 137.2o | 520.6o | 453.3o | 67.3o | 316.1o | 21.30% |
| 8/27/2009 | nuke guage - area Ax - lift 16 test #4 | 137.5o | 740.7o | 659.8o | 80.9o | 522.3o | 15.50% |
| | | | | | | | |
| 9/2/2009 | nuke gauge - area Ax - lift 18 test #3 | 137.2o | 665.8 | 573.4o | 92.4o | 436.2o | 21.20% |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 8/24/2009 | lift #14 51' east of MW 11:10am | | 1294 | 116.4 | 95.6 | 21.7 | **93.00** |
| 8/24/2009 | lift #14 70' west of MW 4:15pm | | 1294 | 119.3 | 99.4 | 20 | **95.00** |
| | | | | | | | |
| 8/25/2009 | lift #15 35' east of MW 11:10am | | 1295 | 119.4 | 102.1 | 16.9 | **95.00** |
| 8/25/2009 | monit. Wells (MW) 1:30pm | | 1295 | 116.8 | 99.5 | 17.4 | **93.00** |
| 8/25/2009 | lift #15 50' north of MW 4:30pm | | 1295 | 119.5 | 101 | 18.3 | **95.00** |
| | | | | | | | |
| 8/27/2009 | lift #16 80' north of MW 9:35am | elevations based on GPS | 1293 | 121.5 | 101.8 | 19.4 | **92.00** |
| 8/27/2009 | 60' east of MW - 10% shell - 10:35am | | 1288 | 121 | 99.8 | 21.3 | **92.00** |
| 8/27/2009 | at MW 1pm | | 1293 | 121.4 | 105.4 | 15.2 | **91.00** |
| 8/27/2009 | lift #16 45' south MW 2:50pm | | 1293 | 119.9 | 103.8 | 15.5 | **90.00** |
| | | | | | | | |
| 8/31/2009 | lift #17 96' west NW of MW 12:40pm | | | 120.8 | 102.8 | 17.5 | **92.00** |
| | | | | | | | |
| 9/1/2009 | lift #17 60' west SW of MW 11am | | | 124.7 | 102.5 | 21.7 | **95.00** |
| 9/1/2009 | lift #2 east side shell 10% cement 12:40pm | | | 119.5 | 100.8 | 18.5 | **91** |
| | | | | | | | |
| 9/2/2009 | lift #18 30' north NW of MW 9:30am | | | 120.8 | 101.5 | 19 | **92.00** |
| 9/2/2009 | at Monit. Wells 10:10am | | | 115.5 | 97.6 | 18.4 | **92** |
| 9/2/2009 | lift #18 40' south of MW 1pm | | | 119.9 | 98.9 | 21.2 | **96.00** |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | Density Designation for Cement Treated. Fill in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | 90% min. |
|---|---|---|---|---|---|---|---|
| 8/24/2009 | lift #14 51' east of MW 11:10am | | 1294 | 116.4 | 95.6 | 21.7 | **93.00** |
| 8/24/2009 | lift #14 70' west of MW 4:15pm | | 1294 | 119.3 | 99.4 | 20 | **95.00** |
| | | | | | | | |
| 8/25/2009 | lift #15 35' east of MW 11:10am | | 1295 | 119.4 | 102.1 | 16.9 | **95.00** |
| 8/25/2009 | monit. Wells (MW) 1:30pm | | 1295 | 116.8 | 99.5 | 17.4 | **93.00** |
| 8/25/2009 | lift #15 50' north of MW 4:30pm | | 1295 | 119.5 | 101 | 18.3 | **95.00** |
| | | | | | | | |
| 8/27/2009 | lift #16 80' north of MW 9:35am | elevations based on GPS | 1293 | 121.5 | 101.8 | 19.4 | **92.00** |
| 8/27/2009 | 60' east of MW - 10% shell - 10:35am | | 1288 | 121 | 99.8 | 21.3 | **92.00** |
| 8/27/2009 | at MW 1pm | | 1293 | 121.4 | 105.4 | 15.2 | **91.00** |
| 8/27/2009 | lift #16 45' south MW 2:50pm | | 1293 | 119.9 | 103.8 | 15.5 | **90.00** |
| | | | | | | | |
| 8/31/2009 | lift #17 96' west NW of MW 12:40pm | | | 120.8 | 102.8 | 17.5 | **92.00** |
| | | | | | | | |
| 9/1/2009 | lift #17 60' west SW of MW 11am | | | 124.7 | 102.5 | 21.7 | **95.00** |
| 9/1/2009 | lift #2 east side shell 10% cement 12:40pm | | | 119.5 | 100.8 | 18.5 | **91** |
| | | | | | | | |
| 9/2/2009 | lift #18 30' north NW of MW 9:30am | | | 120.8 | 101.5 | 19 | **92.00** |
| 9/2/2009 | at Monit. Wells 10:10am | | | 115.5 | 97.6 | 18.4 | **92** |
| 9/2/2009 | lift #18 40' south of MW 1pm | | | 119.9 | 98.9 | 21.2 | **96.00** |
| | | | | | | | |
| 9/9/2009 | lift #4 east side shell 10% cement 9:10am | | | 120.1 | 100 | 20.1 | **95.00** |
| 9/9/2009 | lift #19 80' west SW of MW 2:25pm | | | 119 | 100.2 | 18.8 | **90** |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 8/24/2009 | lift #14 51' east of MW 11:10am | | 1294 | 116.4 | 95.6 | 21.7 | **93.00** |
| 8/24/2009 | lift #14 70' west of MW 4:15pm | | 1294 | 119.3 | 99.4 | 20 | **95.00** |
| | | | | | | | |
| 8/25/2009 | lift #15 35' east of MW 11:10am | | 1295 | 119.4 | 102.1 | 16.9 | **95.00** |
| 8/25/2009 | monit. Wells (MW) 1:30pm | | 1295 | 116.8 | 99.5 | 17.4 | **93.00** |
| 8/25/2009 | lift #15 50' north of MW 4:30pm | | 1295 | 119.5 | 101 | 18.3 | **95.00** |
| | | | | | | | |
| 8/27/2009 | lift #16 80' north of MW 9:35am | elevations based on GPS | 1293 | 121.5 | 101.8 | 19.4 | **92.00** |
| 8/27/2009 | 60' east of MW - 10% shell - 10:35am | | 1288 | 121 | 99.8 | 21.3 | **92.00** |
| 8/27/2009 | at MW 1pm | | 1293 | 121.4 | 105.4 | 15.2 | **91.00** |
| 8/27/2009 | lift #16 45' south MW 2:50pm | | 1293 | 119.9 | 103.8 | 15.5 | **90.00** |
| | | | | | | | |
| 8/31/2009 | lift #17 96' west NW of MW 12:40pm | | | 120.8 | 102.8 | 17.5 | **92.00** |
| | | | | | | | |
| 9/1/2009 | lift #17 60' west SW of MW 11am | | | 124.7 | 102.5 | 21.7 | **95.00** |
| 9/1/2009 | lift #2 east side shell 10% cement 12:40pm | | | 119.5 | 100.8 | 18.5 | **91** |
| | | | | | | | |
| 9/2/2009 | lift #18 30' north NW of MW 9:30am | | | 120.8 | 101.5 | 19 | **92.00** |
| 9/2/2009 | at Monit. Wells 10:10am | | | 115.5 | 97.6 | 18.4 | **92** |
| 9/2/2009 | lift #18 40' south of MW 1pm | | | 119.9 | 98.9 | 21.2 | **96.00** |
| | | | | | | | |
| 9/9/2009 | lift #4 east side shell 10% cement 9:10am | | | 120.1 | 100 | 20.1 | **95.00** |
| 9/9/2009 | lift #19 80' west SW of MW 2:25pm | | | 119 | 100.2 | 18.8 | **90** |
| | | | | | | | |
| 9/10/2009 | at MW lift #4 10:35am | | | 119.5 | 100.5 | 18.9 | **91.00** |
| 9/10/2009 | at MW lift #5 12:15pm | | | 119.2 | 100.9 | 18.1 | **91.00** |
| 9/10/2009 | east side shell 10% cement 4:15pm | | | 122.4 | 100 | 22.4 | **97** |
| | | | | | | | |
| 9/15/2009 | 60' south SW of MW 3:15pm | | | 116.7 | 96.3 | 21.2 | **93.00** |
| 9/15/2009 | 4' N of N monit. Well 3:30pm | | | 115.9 | 95.1 | 21.9 | **92.00** |
| | | | | | | | |
| 9/16/2009 | 41' east of MW at east side shell 10:15am | | | 119.4 | 98.4 | 21.4 | **94.00** |

Geosphere Con: ints, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| ~~Report #:~~ B 583005 | Date: 9/17/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1269 |
| Page ___ of ___ | |
| Field Rep: Robert Wilso | Project Manager: Cal Dickerson |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor:

Contractor Representative:

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☒ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | sheeps foot | 1 |
| Moving | | |
| Water | Truck w/hose | 1 |
| Support | | |

Density Testing Equipment: ☒ Nuclear Type: Trox ☐ Tube ☐ Sand Cone

Fill Source: ☒ Native on site ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: far south section of A,

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 06300901 | Brn sandy silt | ~~[illegible]~~ | ~~[illegible]~~ | ☒ 90% | ☐ Opt. + 2% |
| | | 112.0 | 15.5 | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☒ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 90'E and 5'S of NC7-09 MW | -1' FSG | 117.2 | 13.3 | 103.4 | 06300901 | 92 | |
| 2 | 95'E and 10'S " | " R FSG | 124.7 | 16.9 | 106.7 | | 95 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 9/17/09 Reviewed By: ______ Date: ______

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| ~~Report #:~~ BS83005 | | Date: 9/16/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1269 | Page ____ of ____ | |
| Field Rep: Robert Uribe / Tony P. | Project Manager: Cal Dickerman | | |

| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: Cerrudo | Conditions: | ☒ Sunny | ☐ Windy | ☒ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | Density Testing Equipment | |
|---|---|---|---|---|
| | | | | ☐ Nuclear Type: |
| Compaction | | | | ☐ Tube |
| Moving | | | | ☒ Sand Cone |
| Water | | | Fill Source | ☒ Native on site |
| Support | | | | ☐ Import |

| Plan | Engineer | Date | Fill Location: |
|---|---|---|---|
| Civil | | | east side shell |
| Structural | | | 10% Cement |
| Geotech | | | |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 090109-01 | Brn sandy silt w/SS | 107.0 | 18.5 | ☒ 90% | ☐ Opt. + 2% |
| | plus 10% Cement | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☒ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | center east side shell | | 121.7 | 16.8 | 104.2 | 090109-01 | 97 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

our inspectors notified SCS that subgrade was below opt. moist. and to increase moist. content



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 9/16/09 | Reviewed By: ____ | Date: ____ |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| ~~Report #:~~ B853005 | | Date: 9/21/09 |
| Project Name: NNLN Site 300 B850 Soil R | Project Number: LAW 1289 | Page ____ of ____ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | |

| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: Cerrudo | | Conditions: | ☒ Sunny | ☐ Windy | ☒ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| | | | Density Testing Equipment | ☒ Nuclear | Type: Trox |
| Compaction | | | | ☐ Tube | |
| Moving | | | | ☐ Sand Cone | |
| Water | | | Fill Source | ☒ Native on site | |
| Support | | | | ☐ Import | |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: Area A, far south section

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 063009-01 | Brn Sandy Silt | 112.0 | 15.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☒ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 90' E and 5' S of NC7-09 MW | -1' FSG | 123.9 | 16.9 | 106.0 | 063009-01 | 95 | |
| 2 | 100' E and 20' S " " | RFSG | 123.5 | 15.7 | 106.7 | | 95 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

NC7-09 MW = mont. well



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 9/21/09 | Reviewed By: ____ | Date: ____ |
|---|---|---|---|

Geosphere Con[illegible] [illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# [D]AILY FIELD REPORT

| | | | |
|---|---|---|---|
| | ~~Report #:~~ B 583005 | Date: 9/28/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1269 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☒ Full Time ☐ Part Time

Contractor: Cerrudo
Contractor Representative: Andy Bell

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☒ Mild ☒ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | sheeps foot | 1 |
| Moving | | |
| Water | | |
| Support | | |

Density Testing Equipment: ☒ Nuclear Type: Trox ☐ Tube ☐ Sand Cone

Fill Source: ☒ Native on site ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: south section of area A1

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 070609-01 | Brn Gravelly sandy silt | 124.0 | 12.0 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☒ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 90'E and 10'S of NC7-09 | R-FSG | 133.5 | 13.2 | 117.9 | 070609-01 | 95 | |
| 2 | 110'E and 30'S " " | \| | 133.9 | 12.8 | 118.6 | \| | 96 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:
NC7-09 = monit. well

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 9/28/09 | Reviewed By: ________ | Date: ________ |
|---|---|---|---|

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

# CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 8/25/09 11:30am | 26a | 8/27/09 8:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 3768 | **300** | 15.70% |
| 8/25/09 11:50am | 26b | 9/1/09 7:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 4323 | **340** | 15.70% |
| 8/25/09 4:10pm | 27a | 8/27/09 9am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 3014 | **240** | 15.10% |
| 8/25/09 4:30pm | 27b | 9/1/09 8am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 4258 | **340** | 15.10% |
| | | | | | | | |
| 8/27/09 9:40am | 28a | 8/31/09 8:50am | Ax - lift #16/ 9am/ 5% | 121.50 | 3229 | **260** | 17.00% |
| 8/27/09 10am | 28b | 9/3/09 10:20am | Ax - lift #16/ 9am/ 5% | 121.50 | 3264 | **260** | 17.00% |
| 8/27/09 10:40am | 29a | 8/31/09 9:10am | east side shell/ 10:20am/ 10% | 121.00 | 3486 | **280** | 21.70% |
| 8/27/09 11am | 29b | 9/3/09 10am | east side shell/ 10:20am/ 10% | 121.00 | 5104 | **410*** | 21.70% |
| | | | | | | | |
| 8/31/09 12:50pm | 30a | 9/3/09 10:40am | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2615 | **210** | 14.40% |
| 8/31/09 1:10pm | 30b | | Ax - lift #17/ 12:10pm/ 5% | 120.80 | | | 14.40% |
| | | | | | | | |
| 9/1/09 12:50pm | 31a | 9/3/09 11am | east side shell/ 11:50am/ 10# | 119.50 | 3050 | **240** | 21.20% |
| 9/1/09 1:05pm | 31b | | east side shell/ 11:50am/ 10# | 119.50 | | | 21.20% |
| | | | | | | | |
| 9/2/09 9:40am | 32a | | Ax - lift #18/ 9am/ 5% | 120.80 | | | 18.70% |
| 9/2/09 10am | 32b | | Ax - lift #18/ 9am/ 5% | 120.80 | | | 18.70% |
| 9/2/09 1:10pm | 33a | | Ax - lift #18/ 12pm/ 5% | 119.90 | | | 20.10% |
| 9/2/09 1:30pm | 33b | | Ax - lift #18/ 12pm/ 5% | 119.9 | | | 20.10% |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 8/25/09 11:30am | 26a | 8/27/09 8:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 3768 | **300** | 15.70% |
| 8/25/09 11:50am | 26b | 9/1/09 7:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 4323 | **340** | 15.70% |
| 8/25/09 4:10pm | 27a | 8/27/09 9am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 3014 | **240** | 15.10% |
| 8/25/09 4:30pm | 27b | 9/1/09 8am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 4258 | **340** | 15.10% |
| | | | | | | | |
| 8/27/09 9:40am | 28a | 8/31/09 8:50am | Ax - lift #16/ 9am/ 5% | 121.50 | 3229 | **260** | 17.00% |
| 8/27/09 10am | 28b | 9/3/09 10:20am | Ax - lift #16/ 9am/ 5% | 121.50 | 3264 | **260** | 17.00% |
| 8/27/09 10:40am | 29a | 8/31/09 9:10am | east side shell/ 10:20am/ 10% | 121.00 | 3486 | **280** | 21.70% |
| 8/27/09 11am | 29b | 9/3/09 10am | east side shell/ 10:20am/ 10% | 121.00 | 5104 | **410*** | 21.70% |
| | | | | | | | |
| 8/31/09 12:50pm | 30a | 9/3/09 10:40am | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2615 | **210** | 14.40% |
| 8/31/09 1:10pm | 30b | 9/8/09 12pm | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2770 | **220** | 14.40% |
| | | | | | | | |
| 9/1/09 12:50pm | 31a | 9/3/09 11am | east side shell/ 11:50am/ 10% | 119.50 | 3050 | **240** | 21.20% |
| 9/1/09 1:05pm | 31b | 9/8/09 12:20pm | east side shell/ 11:50am/ 10% | 119.50 | 2852 | **230** | 21.20% |
| | | | | | | | |
| 9/2/09 9:40am | 32a | 9/8/09 1:15pm | Ax - lift #18/ 9am/ 5% | 120.80 | 2807 | **220** | 18.70% |
| 9/2/09 10am | 32b | 9/9/9 10am | Ax - lift #18/ 9am/ 5% | 120.80 | 2130 | **170** | 18.70% |
| 9/2/09 1:10pm | 33a | 9/8/09 2:20pm | Ax - lift #18/ 12pm/ 5% | 119.90 | 2422 | **190** | 20.10% |
| 9/2/09 1:30pm | 33b | 9/9/9 10:20am | Ax - lift #18/ 12pm/ 5% | 119.9 | 3264 | **260** | 20.10% |
| | | | | | | | |
| 9/9/9 9:45am | 34a | | east side shell/ 8:45am/ 10% | 120.10 | | | 18.20% |
| 9/9/9 10am | 34b | | east side shell/ 8:45am/ 10% | 120.10 | | | 18.20% |
| 9/9/9 2:45pm | 35a | | Ax - lift #19/ 1:45pm/ 5% | 119 | | | 21.70% |
| 9/9/9 3pm | 35b | | Ax - lift #19/ 1:45pm/ 5% | 119.00 | | | 21.70% |

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 8/25/09 11:30am | 26a | 8/27/09 8:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 3768 | **300** | 15.70% |
| 8/25/09 11:50am | 26b | 9/1/09 7:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 4323 | **340** | 15.70% |
| 8/25/09 4:10pm | 27a | 8/27/09 9am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 3014 | **240** | 15.10% |
| 8/25/09 4:30pm | 27b | 9/1/09 8am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 4258 | **340** | 15.10% |
| | | | | | | | |
| 8/27/09 9:40am | 28a | 8/31/09 8:50am | Ax - lift #16/ 9am/ 5% | 121.50 | 3229 | **260** | 17.00% |
| 8/27/09 10am | 28b | 9/3/09 10:20am | Ax - lift #16/ 9am/ 5% | 121.50 | 3264 | **260** | 17.00% |
| 8/27/09 10:40am | 29a | 8/31/09 9:10am | east side shell/ 10:20am/ 10% | 121.00 | 3486 | **280** | 21.70% |
| 8/27/09 11am | 29b | 9/3/09 10am | east side shell/ 10:20am/ 10% | 121.00 | 5104 | **410*** | 21.70% |
| | | | | | | | |
| 8/31/09 12:50pm | 30a | 9/3/09 10:40am | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2615 | **210** | 14.40% |
| 8/31/09 1:10pm | 30b | 9/8/09 12pm | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2770 | **220** | 14.40% |
| | | | | | | | |
| 9/1/09 12:50pm | 31a | 9/3/09 11am | east side shell/ 11:50am/ 10% | 119.50 | 3050 | **240** | 21.20% |
| 9/1/09 1:05pm | 31b | 9/8/09 12:20pm | east side shell/ 11:50am/ 10% | 119.50 | 2852 | **230** | 21.20% |
| | | | | | | | |
| 9/2/09 9:40am | 32a | 9/8/09 1:15pm | Ax - lift #18/ 9am/ 5% | 120.80 | 2807 | **220** | 18.70% |
| 9/2/09 10am | 32b | 9/9/9 10am | Ax - lift #18/ 9am/ 5% | 120.80 | 2130 | **170** | 18.70% |
| 9/2/09 1:10pm | 33a | 9/8/09 2:20pm | Ax - lift #18/ 12pm/ 5% | 119.90 | 2422 | **190** | 20.10% |
| 9/2/09 1:30pm | 33b | 9/9/9 10:20am | Ax - lift #18/ 12pm/ 5% | 119.9 | 3264 | **260** | 20.10% |
| | | | | | | | |
| 9/9/9 9:45am | 34a | 9/14/09 8:30am | east side shell/ 8:45am/ 10% | 120.10 | 4439 | **350** | 18.20% |
| 9/9/9 10am | 34b | 9/16/09 8am | east side shell/ 8:45am/ 10% | 120.10 | 5104 | **410*** | 18.20% |
| 9/9/9 2:45pm | 35a | 9/14/09 9am | Ax - lift #19/ 1:45pm/ 5% | 119 | 1556 | **120** | 21.70% |
| 9/9/9 3pm | 35b | 9/16/09 8:30am | Ax - lift #19/ 1:45pm/ 5% | 119.00 | 3143 | **250** | 21.70% |
| | | | | | | | |
| 9/16/09 10:30am | 36a | | east side shell/ 9:30am/ 10% | 119.40 | | | 16.60% |
| 9/16/09 11am | 36b | | east side shell/ 9:30am/ 10% | 119.4 | | | 16.60% |

Break Log
*Test stopped due to limit of machine
**100psi min.**

## CONSOLIDATED ENGINEERING LABORATORIES

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 8/25/09 11:30am | 26a | 8/27/09 8:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 3768 | **300** | 15.70% |
| 8/25/09 11:50am | 26b | 9/1/09 7:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 4323 | **340** | 15.70% |
| 8/25/09 4:10pm | 27a | 8/27/09 9am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 3014 | **240** | 15.10% |
| 8/25/09 4:30pm | 27b | 9/1/09 8am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 4258 | **340** | 15.10% |
| | | | | | | | |
| 8/27/09 9:40am | 28a | 8/31/09 8:50am | Ax - lift #16/ 9am/ 5% | 121.50 | 3229 | **260** | 17.00% |
| 8/27/09 10am | 28b | 9/3/09 10:20am | Ax - lift #16/ 9am/ 5% | 121.50 | 3264 | **260** | 17.00% |
| 8/27/09 10:40am | 29a | 8/31/09 9:10am | east side shell/ 10:20am/ 10% | 121.00 | 3486 | **280** | 21.70% |
| 8/27/09 11am | 29b | 9/3/09 10am | east side shell/ 10:20am/ 10% | 121.00 | 5104 | **410*** | 21.70% |
| | | | | | | | |
| 8/31/09 12:50pm | 30a | 9/3/09 10:40am | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2615 | **210** | 14.40% |
| 8/31/09 1:10pm | 30b | 9/8/09 12pm | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2770 | **220** | 14.40% |
| | | | | | | | |
| 9/1/09 12:50pm | 31a | 9/3/09 11am | east side shell/ 11:50am/ 10% | 119.50 | 3050 | **240** | 21.20% |
| 9/1/09 1:05pm | 31b | 9/8/09 12:20pm | east side shell/ 11:50am/ 10% | 119.50 | 2852 | **230** | 21.20% |
| | | | | | | | |
| 9/2/09 9:40am | 32a | 9/8/09 1:15pm | Ax - lift #18/ 9am/ 5% | 120.80 | 2807 | **220** | 18.70% |
| 9/2/09 10am | 32b | 9/9/9 10am | Ax - lift #18/ 9am/ 5% | 120.80 | 2130 | **170** | 18.70% |
| 9/2/09 1:10pm | 33a | 9/8/09 2:20pm | Ax - lift #18/ 12pm/ 5% | 119.90 | 2422 | **190** | 20.10% |
| 9/2/09 1:30pm | 33b | 9/9/9 10:20am | Ax - lift #18/ 12pm/ 5% | 119.9 | 3264 | **260** | 20.10% |
| | | | | | | | |
| 9/9/9 9:45am | 34a | 9/14/09 8:30am | east side shell/ 8:45am/ 10% | 120.10 | 4439 | **350** | 18.20% |
| 9/9/9 10am | 34b | 9/16/09 8am | east side shell/ 8:45am/ 10% | 120.10 | 5104 | **410*** | 18.20% |
| 9/9/9 2:45pm | 35a | 9/14/09 9am | Ax - lift #19/ 1:45pm/ 5% | 119 | 1556 | **120** | 21.70% |
| 9/9/9 3pm | 35b | 9/16/09 8:30am | Ax - lift #19/ 1:45pm/ 5% | 119.00 | 3143 | **250** | 21.70% |
| | | | | | | | |
| 9/16/09 10:30am | 36a | 9/21/09 8:45am | east side shell/ 9:30am/ 10% | 119.40 | 3951 | **310** | 16.60% |
| 9/16/09 11am | 36b | 9/23/09 9am | east side shell/ 9:30am/ 10% | 119.4 | 5104 | **410*** | 16.60% |

CONSOLIDATED ENGINEERING
LABORATORIES
"Partners in Quality"

November 11, 2009

Mr. Steve Ellis
Lawrence Livermore National Laboratory
P.O. Box 808; L-871
Livermore, California 94551-0808

Subject: LLNL B-850 Soil Remediation
B850-S300
Livermore, CA
CEL Project #10-01272-LAW & 10-01274-LAW

**EARTHWORK AND LABORATORY TESTING SUMMARY**
**October 1, 2009 thru October 31, 2009**

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from October 1, 2009 thru October 31, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

An engineered fabric was not placed per the manufactures recommendations. We recommend that you confirm compliance with the intent of the system with the Project Engineer, SCS Engineers, to resolve this deviation from the manufacturer's recommendations. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these methods.

Respectfully submitted,
**CONSOLIDATED ENGINEERING LABORATORIES**

Michael Wissink
Project Manager

Eric J. Swenson, PE, GE
Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
ERIC J. SWENSON
No. 2474
Exp. 12/2010
GEOTECHNICAL
STATE OF CALIFORNIA

Enclosures: Daily Field Reports

Distribution: 1 to Addressee

MW/EJS: pmf
R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\October Summary (Steve Ellis).doc

Geosphere Cons ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| Report #: | Date: 9-28 TO 10-1-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1268 + 1274 |
| Page ______ of ______ | |
| Field Rep: Tony Phillips | Project Manager: |
| Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other | Hours Charged: ☒ Full Time ☐ Part Time |
| Contractor: CERRUDO SERVICES | Conditions: ☒ Sunny ☒ Windy ☒ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog |
| Contractor Representative: ANDY BELL | |

Comment/ Sketch:

9-28-09

SCS = CREW STARTED EXCAVATION OF SEDIMENT TRAP & FINISHED COMPACTION OF SECTOR A-1 JUST SOUTH OF TRAILER @ RT #4 & B-850 ACCESS ROAD INTERSECTION. FURTHER EXCAVATION IN SECTOR A-4 @ N. END OF EAST V-DITCH W. SIDE OF RT. #4.

9-29-09

SCS = STARTS EXCAVATION OF V-DITCH ALONG B-850 ACCESS ROAD (SOUTH V-DITCH) & ~~E. AND~~ EAST V-DITCH CREW ALSO STARTS INSTALLATION OF WADDLES ON S. SLOPE HILLSIDE IN SECTOR A-2. CREW CUT OUT ROAD CROSSING ON RT. #4 & ACCESS RD. TO B-850.

9-30-09

SCS = CONTINUE EXCAVATION OF S. & E. V-DITCH & INSTALL WADDLES S. SIDE SLOPE OF SECTOR A-2. CREW ALSO FIXED & EXTENDED SILT (CRITTER) FENCE IN SECTOR A-3 TO INCOMPUS NEW SECTOR A3-0 & IN SECTOR A-4 TO INCOMPUS NEW SECTOR A4-A, B, & C.

10-01-09

SCS = CONTINUE TO EXCAVATE E. SIDE V-DITCH & CLEAN UP SEDIMENT AREA @ N. END OF E. V-DITCH WATER HILLSIDES & REPAIR CRITTER FENCE & POLICE JOB SITE FOR SHOT @ 1300 HRS.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: ________ | Reviewed By: ____________ | Date: ________ |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 10-5 TO 10-8-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1274 | Page 1 of 2 | |
| Field Rep: TONY PHILLIPS | Project Manager: | | |
| Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench | ☒ Other | Hours Charged: ☒ Full Time | ☐ Part Time |
| Contractor: CERAUDO SERV. | Conditions: ☒ Sunny ☐ Cloudy | ☒ Windy ☐ Rain | ☒ Hot ☐ Cold ☐ Mild ☐ Fog |
| Contractor Representative: ANDY BELL | | | |

Comment/ Sketch:

10-5-09

SCS = STARTS EXCAVATION OF 1.3' CUT IN SECTOR A4-2 & COMPACT 1' BACK FILL IN DRAINAGE DITCH ON S. SIDE OF B-850 ACCESS ROAD IN SECTOR A-2 VISUAL INSPON METHOD OF BACK FILL & COMPACTION W/ 84" BO MAG. CREW ALSO USED EXCAVATOR W/ ROCK HAMMER TO BREAK UP ROCK FACE FOR S. V-DITCH TO ACHEIVE PROPER ELEVATION OF V-DITCH & EXCAVATION ~~of~~ OF E. V-DITCH CONTINUES.

10-6-09

SCS = CREW CONTINUES TO BRK ROCK & EXCAVATE S. V-DITCH. CREW ~~FIN~~ START'S PLACEMENT OF MARIFI FABRIC & PLACEMENT OF 6" & LARGER RIP-RAP IN E. V-DITCH. GEO TECH FABRIC NOT PLACED AS PER MANUFACTOR'S REQ. BUT OKED BY CONST. MANAGER.

10-7-09

SCS = CREW CONTINUES EXCAVATION OF S. V-DITCH & PLACEMENT OF RIP-RAP IN E. V-DITCH. CREW ALSO CONTINUES 1.3' CUT IN SECTOR A4-2, & CUT IN FOR GABION @ S. V-DITCH.

10-8-09

SCS = CREW INSTALLED 4" PERFORATED SUB DRAIN PIPE & MANIFOLD W/ 4" SOLID PVC IN SEDIMENT TRAP W/ ± 4" TO 6" DEPTH 3/4" ROCK BEDDING OVER GEO TECH FABRIC & 4" TO 6" OF ROCK OVER TOP OF PIPE W/ GEO. TECH. FABRIC OVER 3/4" ROCK & INSTALLED GABION W/ 6" & LESS IN S. V-DITCH. VERIFIED 1.3' CUT DEPTH IN SECTOR A4-2 OR DOWN TO ROCK. CREW ALSO BACK FILLED ± 2' E. V-DITCH @ N. END USING CLEAN SOIL, & COMPACTED SOIL W/ 84" BO MAG.

BROUGHT CONCERNS TO CONST. MGR. ABOUT 4" TO 6" GAP BETWEEN GABION & B-850 ACCESS RD. ON HOW SCS WOULD ACHIEVE COMPACTION IN SMALL AREA & HOW WOULD IT AFFECT INTEGRATY OF ROAD WAY.

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# [illegible]AILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 10-8-09 |
| Project Name: B-850 Soil Remediation | Project Number: 2AW1274 | Page 2 of 2 |
| Field Rep: Tony Phillips | Project Manager: | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☒ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: Gerardo Serv | | Conditions: | ☒ Sunny | ☒ Windy | ☒ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| | | | Density Testing Equipment | ☒ Nuclear | Type: Troxler |
| Compaction | 84" Bomag | 1 | | ☐ Tube | |
| Moving | Loader | 1 | | ☐ Sand Cone | |
| Water | Water Trk | 1 | Fill Source | ☒ Native | |
| Support | Dozer | 1 | | ☐ Import | |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | Lenard Long | |

Fill Location: N. End of E. V-Ditch @ CMP Crossing RT. #4

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A ~ 071409-01 | Mix Brn. Sandy | | | ☒ 90% | ☐ Opt. + 2% |
| | Silt w/ Sandstone | 114.5 | 14.5 | ☐ 95% | ☒ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 20's of CMP Cross RT4 | -1' | 124.0 | 16.9 | 106.0 | A | 93 | |
| 2 | 18's " " " " | FSG | 125.8 | ~~15.2~~ 15.0 | 109.2 | A | 95 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 10-12 TO 10-15-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1274 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor:

Contractor Representative:

Conditions: ☐ Sunny ☒ Windy ☐ Hot ☒ Mild ☒ Cloudy ☒ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

10-12-09

SCS = CREW INSTALLED SWPPP (BMP'S) WADDLES SILT. FENCH & ROCK DYKES ALONG ALL ROAD WAYS, V-DITCH'S & D.I.'S & DOWN HILL SLOPES THROUGH OUT JOB SITE IN PREPARATION OF WATER RUN OFF PRIOR TO RAIN STORM..

10-13-09

SCS = CREW MAINTAINED BMP'S THROUGH OUT JOB SITE DURING STORM. ~~SH~~ JOB SITE WAS SHUT DOWN DUE TO HEAVY WIND & RAIN.

10-14-09

SCS = SMALL CREW ON SITE TO INSPECT & FIX ANY BMP'S THAT WERE DAMAGED DURING RAIN STORM. ALL BMP'S INSTALLED HELD.
JOB SITE SHUT DOWN TOO MUDDY TO WORK.

10-15-09

SCS = CREW FINISHED N. END OF E. V-DITCH @ CMP. THAT CROSS RT. #4 W/ MIRAFI 140NC + RIP-RAP & FINISH INSTALLATION OF GABION & WEIR @ SEDIMENT TRAP IN S. V-DITCH & REPAIR OUT SIDE CRITTER FENCE.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Report #: | | Date: 10-19 TO 10-20-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1274 | Page 1 of 8 |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor:

Contractor Representative:

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☒ Mild ☒ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

10-19-09

SCS = PLACED WADDLES ON N. SIDE HILL SLOPE IN SECTOR A-3 & A-4, CREW CONTINUES TO CUT V-DITCH @ CMP CONNECTOR OF S. V-DITCH & E. V-DITCH & CUT 3:1 SLOPE ON E. SIDE OF SECTOR A-X + SET GRADE. 2' TO 3' OF CLEAN MATERIAL WAS EXCAVATED FROM THE CONTAINMENT EMBANKMENT AFTER THE ORIGENAL +1' CUT. IT IS UNCERTIAN IF 3' OF CLEAN CEMENT TREATED SOIL IS LEFT FOR CAP IN SECTOR A-X E. SIDE SLOPE.

±114' OF S. V-DITCH IS ON THE EDGE OF ACCESS ROAD TO B-850, THE GABION WEIR IS CUT IN TO THE ROAD; ALSO @ 18" CMP RT. #4 ROAD CROSSING. THESE AREA'S OF ROAD WAY MAY BE SUBJECT TO FUTURE FAILURE OF STRUCTURAL INTEGRITY. ALTHOUGH RT. 4 WAS INSTALLED AS PER DRWG. 08500015D SHT. 15 OF 23 DETAIL "18" CMP CROSSING) COMPACTED SOIL WAS REMOVED & RIP-RAP WAS PUT IN PLACE OF IT.

10-20-09

SCS = CONTINUES TO SET GRADE OF SLOPE TO 3:1 CUT E. SIDE OF CONTAINMENT EMBANKMENT + PLACE RIP-RAP ADJACENT TO RT #4 E. SIDE IN ROCK LINED CHANNEL. CREW CLEANED UP JOB SITE. SOIL SAMPLE WAS TAKEN OF CLASS II AB FOR CURVE. ELEVATION OF S. V-DITCH SUB GRADE IN 1293.7 @ GABION
1289.5 @ 100' E OF GABION
1284.3 @ CMP INVERT.



☒ This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 10-21 + 10-22-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1274 | Page 2 of 2 |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor:

Contractor Representative:

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☒ Mild ☒ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

10-21

SCS = MOVED CRZ FROM SOIL LAB BACK TO B-850. CONNECTED S. V-DITCH TO E. V-DITCH. PLACED MIRAFI + RIP-RAP FROM GABION TO E. OF GABION ± 100'. CREW STARTED OVER EXCAVATION OF SECTOR B-1 1.5' CUT + FINISHED 3:1 GRADE ON E. SIDE OF SECTOR A-X. CREW ALSO PLACED 21" CMP INTO JEEP TRAIL CROSSING TRENCH.

10-22

SCS = CONTINUES OVER EXCAVATION IN SECTOR B-1 + A3-1, + SAW CUT ASPHALT FOR 12" CMP THAT CROSS ROUTE #4 @ INTERSECTION + INSTALLED 12" CMP. + BACKFILLED W/ CLASS II AB.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| Report #: | Date: 10/26-29/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1272 | Page ____ of ____ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☑ Cold ☐ Fog

Comment/ Sketch:

10/26/09 | Mon

Lab work

Sunny 60°F

10/27/09 | Tue

compaction on AB @ SD ~~TK~~

high winds, no cement treatment

40 mph winds sunny 54°F

10/28/09 | Wed

- sample @ 9:45AM #37a 10:45AM, #37b 11AM
- Sample @ 12:45 pm #38a 1:30 pm ; #38b 2pm
- moist. cont.

Sunny 50° F

10/29/09 Thu

Sample @ 9:30AM #39a 10:30AM, #39b 11AM

Sunny 60°F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 10/29/09 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 10/27/09 | |
| Project Name: NL Site 3?D BSSD Soil R | Project Number: LAW 1272 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: | | |

| Scope of Work: | ☐ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☑ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | Conditions: | | | | |
|---|---|---|---|---|---|---|
| Contractor: | Cerrudo | | ☑ Sunny | ☑ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: | Andy Bell | | ☐ Cloudy | ☐ Rain | ☑ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | Vibra plate heavy | | Density Testing Equipment | ☑ Nuclear | Type: Troxler |
| Moving | | | | ☐ Tube | |
| | | | | ☐ Sand Cone | |
| Water | | | Fill Source | ☐ Native | |
| Support | | | | ☑ Import AB | |

| Plan | Engineer | Date | Fill Location: |
|---|---|---|---|
| Civil | | | SD line TR across road |
| Structural | | | |
| Geotech | | | |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| S091026-01 | Tan Cl II AB | 138.0 | 5.0 | ☐ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| 063009-01 | Brn sandy silt | 112.0 | 15.5 | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 25' east of west end | -3' FAB | | 8.5 | 128.3 | S091026-01 | 93 | P |
| 2 | 20' " " | -2' FAB | | 10.4 | 126.8 | \| | 92 | \| |
| 3 | 50' " " | FSG | | 17.3 | 102.3 | 063009-01 | 91 | \| |
| 4 | 20' " " | -1' FAB | | 12.8 | 131.3 | S091026-01 | 95 | \| |
| 5 | 10' " " | -1' FAB | | 9.5 | 133.0 | \| | 96 | \| |
| 6 | 15' " " | FAB | | 6.4 | 131.5 | \| | 95 | \| |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:

Top foot of AB 95%, below 90%

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 10/27/09 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 10-26 To 10-29-09 |
| Project Name: B-850 Soil Remediation | Project Number: LAW1274 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other — Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO SERV.

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☒ Windy ☐ Hot ☒ Mild ☒ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch:

10-26-09

SCS = CREW EXCAVATED TRENCH FOR 12" CMP + INSTALLED CMP. CONTINUES OVER EXCAVATION OF SECTOR A3-1, A3-2 + B-1, ALSO PLACED RIP-RAP IN S. V-DITCH.

10-27-09

SCS = STARTS BACK FILL OF 12" CMP TR. W/ CLASS II AB. + CONTINUES TO EXCAVATE LOWER SECTION OF SECTOR B-1 S. SIDE OF B-850 + MOVE CONTAMINATED SPOILS TO STK PILE IN SECTOR A-X.

JASON GREENLEE SUPT. W/SCS STOPPED PLACEMENT OF CEMENT DO TO WIND SPEEDS OVER 20 MPH. @ 1040 HRS. GRIFFIN BACK ON SITE

10-28-09

0700 - SAFETY MEETING W/ CERRUDO, SCS, GRIFFIN
0800 - SPREAD 10% CEMENT WT. 31# LIFT ELEV ±1303
0815 - MIX 10% CMT.
0900 - SPRD 5% CMT WT 20#
0930 - TOOK SOIL SAMPLE FOR CYL. BRK 10% CMT.
1030 - COMPACTION TEST 10% CMT.
1130 - SPRD 5% CMT. WT. 13#
1300 - SOIL SAMPLE FOR CYL. BRK 5% CMT
1330 = DENSITY TEST ON 5% CMT.

10-29-09

0815 - SPRD 5% CMT WT. 14# LIFT ELEV. ±1304
0930 - SOIL SAMPLE FOR CYL. BRK 5% CMT
1030 - DENSITY TEST ON 5% CMT.
1345 - SPRD 10% CMT WT. 29#
1400 - MIX + COMPACT 10% CMT.
1430 - SPRD 5% CMT WT. 17#
1445 = CHECK CMT WT. ON 10% SPRD 30#
1630 - DENSITY TEST ON 10% CMT.



☒ This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

CONSOLIDATED ENGINEERING
LABORATORIES
"Partners in Quality"

December 8, 2009

Mr. Steve Ellis
Lawrence Livermore National Laboratory
P.O. Box 808; L-871
Livermore, California 94551-0808

Subject: LLNL B-850 Soil Remediation
B850-S300
Livermore, CA
CEL Project #10-01276-LAW & 10-01278-LAW

**EARTHWORK AND LABORATORY TESTING SUMMARY**
**November 2, 2009 thru November 30, 2009**

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from November 2nd thru November 30th, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

We note that some low density tests were measured as presented by these test results. We recommend that you confirm acceptance with the Project Engineer, SCS Engineers, to resolve the low density results observed in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Respectfully submitted,
**CONSOLIDATED ENGINEERING LABORATORIES**

Michael Wissink
Project Manager

Eric J. Swenson, PE, GE
Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
ERIC J. SWENSON
No. 2474
Exp. 12/2010
GEOTECHNICAL
STATE OF CALIFORNIA

Enclosures: Daily Field Reports
Moisture/Density Curves
Sand Cone Testing
Moisture Content Summary
Break Log Summary

Distribution: 1 to Addressee

MW/EJS: pmf
R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\11 - November Summary.doc

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: | | Date: 11-2 + 11-3-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1276 | Page 1 of 2 | |
| Field Rep: Tony Phillips | Project Manager: | | |
| Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
| Contractor: CERRADO SERV. | Conditions: ☒ Sunny ☐ Cloudy | ☐ Windy ☐ Rain | ☐ Hot ☐ Cold ☒ Mild ☐ Fog |
| Contractor Representative: ANDY BELL | | | |

Comment/ Sketch:

11-2-09

0800 - SPREAD 5% CEMENT WT. 14# @ ELEV. 1304
0830 - MIX & REMIX & COMPACT 5% CMT.
1215 - SPRD 10% CMT WT. 31# OUTER SHELL
1250 - MIX & REMIX & COMPACT 10% CEMENT.
1430 - DENSITY TEST ON OUTER SHELL 10% CMT.
1500 - DENSITY TEST ON 5% CEMENT
1510 - SPRD 5% CMT. WT 13#
1515 - MIX & REMIX & COMPACT 5% CMT
1645 - DENSITY TEST 5% CMT.
SES CONTINUES TO EXCAVATE SOIL FROM A3-1 & 2 & SECTOR A4-2

11-3-09

0800 - DENSITY TEST 5% CMT GPS CORRECT ELEV. 1304
0810 - DENSITY TEST 5%
0835 - SPRD 10% CMT OUTER SHELL WT 32#
0845 - SPRD 5% CMT THEN WT 14#
0915 - SPRD & MIX PAD FOR CTR. MONITORING WELLS
1115 - SPRD 5% CMT. WT. 13# ON PAD
1140 - DENSITY TEST 10% CMT.
1145 - SES INSTALLED 3' EXTENSIONS & OUTSIDE SLEEVES W/
CENTRALIZERS ON CTR. MONITORING WELLS.
1400 DENSITY TEST 5% CMT.
1300 - SOIL SAMPLE 5% CYL. BRK.

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: | Date: | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Con... ...ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Project Name: B-850 Soil Remediation | Project Number: LAW 1276 | Report #: ~~17~~ Date: 11-2 TO 11-4-09 Page ___ of ___ |
| Field Rep: Ty Phillips | Project Manager: | |
| Scope of Work: ☐ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☒ Full Time ☐ Part Time | |
| Contractor: Cerrudo | Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog | |
| Contractor Representative: | | |

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|---|
| A | 080409-01 | BRN SDY SLT w/SS 5% CMT | 111.5 | 17.5 | ☒ 90% | ☐ Opt. + 2% |
| B | 081009-01 | " " " " " " | 105.5 | 19.0 | ☐ 95% | ☒ Opt. + 2% to 5% |
| C | 090109-01 | " " " " 10% CMT | 107.0 | 18.5 | ☐ Other: | ☐ Other: |
| | | | | | | |
| | | | | | | |
| | * | 88% ✓ | | | | |
| | * | 89% COMPACTION OKED PER SOIL ENGR. LENARD LONG W/SCS | | | | |
| | * | M.W. = MONITORING WELLS. | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| | 11-2-09 | | | | | | | |
| 1 | ±30' E OF CTR. MW | 1304 | 118.9 | 24.8 | 95.3 | C | 89 | * |
| 2 | @ CTR MW | " | 121.2 | 21.3 ~~23.3~~ | 99.9 ~~97.3~~ | A | 90 | |
| 3 | ±40' N.W. OF N. MW. | " | 115.4 | 21.3 | 95.1 | A | 85 | F |
| | 11-3-09 | | | | | | | |
| 1 | RT #3 DATE 11-2-09 | 1304 | 119.7 | 21.6 | 98.4 | A | 88 | P* |
| 2 | ±18' S OF N. MW | " | 120.0 | 20.0 | 100.0 | A | 90 | |
| 3 | ±96' W OF MW | " | 121.3 | 17.3 | 103.4 | C | 97 | |
| 4 | ±21' S. OF CTR MW | " | 116.8 | 24.5 | 93.8 | B | 89 | * |
| | 11-4-09 | | | | | | | |
| 1 | ±53' S OF CTR MW | 1304 | 116.8 | 23.3 | 94.7 | C | 89 | * |
| 2 | ±70' W. NW OF N. MW | " | 120.8 | 21.1 | 99.8 | B | 95 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: ______ | Reviewed By: ______ | Date: ______ |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 11-4 & 11-5-09 |
| Project Name: R-350 SOIL REMEDIATION | Project Number: LAW 1276 | Page 2 of 2 |
| Field Rep: Ty Phillips | Project Manager: | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☒ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
| Contractor: CERRUDO SERV. | | | | Conditions: | ☒ Sunny | ☐ Windy | ☐ Hot / ☒ Mild |
| Contractor Representative: ANDY BELL | | | | | ☒ Cloudy | ☐ Rain | ☐ Cold / ☐ Fog |

Comment/ Sketch:

11-4-09

0800 - SPRD 10% CMT OUTER SHELL WT 32#
0900 - SPRD 5% CMT TIE IN WT 13#
SCS CREW EXCAVATES SECTOR A3-1 & 2 & A4-2
1000 - MIX & REMIX & COMPACT 10% & 5% OUTER SHELL & TIE IN.
1100 - SOIL SAMPLE 10% CMT FOR CYL. BRK.
1110 - SOIL SAMPLE FOR CURVE CHECK POINT.
1130 - DENSITY TEST 10%
1145 - SCS CREW STARTED 3:1 CUT ON OUTER SHELL ON W. SIDE OF CMT. PAD.
1230 - SPRD 5% CMT WT 13#
1300 - MIX & REMIX & COMPACT 5% CMT
1330 - SPOT CHECK CMT WT 13# 5%
1430 - 5% SOIL SAMPLE FOR CYL. BRK
1510 - DENSITY TEST 5%

11-5-09

0800 - SPRD 5% CMT ON S. SIDE MONITORING WELLS WT. 17# & MIX & COMPACT.
0930 - SPRD 10% CMT OUTER SHELL WT. 30#
1015 - SPRD 5% CMT WT 14# TIE IN.
1030 - MIX & REMIX & COMPACT 10% & 5% ON E. SIDE OUTER SHELL & TIE IN ONLY.
1035 - SPRD 5% CMT ONTO PAD FOR MONITORING WELLS CTR & N. WELLS
1100 - HYDRO SEED SECTION A-4 E. SIDE SLOPE & INSTALL WADDLES.
1130 - MIX PADS FOR MONITORING WELLS
1230 - BACKFILL AROUND WELLS & COMPACTED
1330 - MIX PADS FOR MONITORING WELLS
1430 - BACKFILL AROUND WELLS & COMPACTED
1600 - CLEAN UP JOB SITE.



☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: | Date: | Reviewed By: | Date: |

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 11-9 TO 11-12-09 |
| Project Name: B550 SOIL REMEDIATION | Project Number: LAW1276 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

| Scope of Work: | ☐ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☐ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contractor: CERRUDO | Conditions: | ☐ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: | | ☐ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A = 080409-01 | BRN SDY SLT W/SS PLUS 5% CMT | 111.5 | 17.5 | ☒ 90% | ☐ Opt. + 2% |
| B = 081009-01 | " " " " " " " | 105.5 | 19.0 | ☐ 95% | ☒ Opt. + 2% to 5% |
| C = 090109-01 | " " " " " 10% CMT | 107.0 | 18.5 | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |
| * | TEST RESULTS ARE BASED ON WET DENSITIES FOR COMPACTION | | | | |
| | AS PER SPEC'S & SES SOIL ENGR. LENARD LONG | | | | |
| * | MW = MONITORING WELLS | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | 11-9 | | | | | | | |
| 1 | ±96' W OF CTR MW. | 1305 | 116.5 | 25.0 | 93.2 | C | 87 | * |
| 2 | ±96' W. NW. OF CTR MW | | 116.4 | 24.6 | 93.7 | B | 89 | * |
| 3 | ±40' W. NW OF N. MW | | 121.4 | 21.6 | 99.8 | A | 90 | |
| | 11-10 | | | | | | | |
| 1 | ±33' N. NE OF CTR MW | 1306 | 118.5 | 18.8 | 99.7 | C | 93 | |
| | 11-11 | | | | | | | |
| 1 | ±54' N OF CTR MW | 1306 | 116.2 | 23.8 | 93.9 | B | 89 | * |
| 2 | ±48' N. NW OF CTR MW | | 118.5 | 19.0 | 99.6 | C | 93 | |
| | 11-12 | | | | | | | |
| 1 | ±8' S. OF CTR MW | 1307 | 114.7 | 20.5 | 95.2 | B | 90 | |
| 2 | ±40' W OF N. MW | | 117.4 | 18.3 | 99.2 | B | 94 | |
| 3 | @ CTR MW | | 105.2 | 20.6 | 87.2 | B | 83 | F |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: ________ | Date: ________ | Reviewed By: ________ | Date: ________ |
|---|---|---|---|

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 11-9 TO 11-10-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: SAW 1276 | Page 1 of 2 |
| Field Rep: Tony Phillips | Project Manager: | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☒ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |

| | | | | | |
|---|---|---|---|---|---|
| Contractor: CERRODO | Conditions: | ☒ Sunny | ☐ Windy | ☐ Hot | ☒ Mild |
| Contractor Representative: ANDY BELL | | ☒ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

Comment/ Sketch:

11-9-09

0845 - SPRD 10% CMT WT 33# FOR OUTER SHELL & 5% CMT WT. 17# FOR OUTER SHELL TIE-IN.
0915 - MIX 10% & 5% CMT.
1000 - REMIX & COMPACT 10% & 5% CMT
1045 - SOIL SAMPLE 10% & 5% CMT FOR CYL. BRK.
1130 - DENSITY TEST 10%
1145 - DENSITY TEST 5%
1230 - SPRD 5% CMT WT 14#
1300 - MIX & REMIX 5% CMT
1345 - SPOT CHECK 5% CMT WT. 13#
1445 - DENSITY TEST
1500 - SAND CONE TEST.
1515 - CONTINUED COMPACTION OF 5% CMT.
1600 - HYDROSEED SECTOR A-2

11-10-09

0830 - SPRD 10% CMT WT. 30# & 5% CMT WT 15# FOR OUTER SHELL & TIE-IN. ELEV 1206 ±
0930 - MIX & REMIX 10% & 5% CMT
1000 - COMPACT OUTER SHELL & TIE IN
1030 - DENSITY TEST
1035 - SOIL SAMPLE OF 10% CMT FOR CYL. BRK.
1230 - SPRD 5% CMT 3 PASSES N. OF CTR MONITORING WELL. CMT WT. 15#
1300 - MIX & REMIX
1330 - COMPACT 5% CMT.
1400 - BACK FILL AROUND CTR. M.W. & COMPACT.
1500 - DENSITY TEST @ M.W.
1510 - PLACEMENT OF CLEAN BACK FILL @ N.E. CORNER OF SECTOR A-X PAD TO BRING PAD TO PROPER ELEV. CREW STARTS OVER EXCAVATION IN SECTOR A3-0 & B-1



☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: | Date: | Reviewed By: | Date: |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | | Report #: | Date: 11-11 & 11-12-09 |
| Project Name: R-850 SOIL REMEDIATION | | Project Number: 2AW1276 | Page 2 of 2 |
| Field Rep: TONY PHILLIPS | | Project Manager: | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☒ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
| Contractor: | CERRUDO | | | Conditions: | ☒ Sunny | ☐ Windy | ☐ Hot ☒ Mild |
| Contractor Representative: | ANDY BELL | | | | ☒ Cloudy | ☐ Rain | ☐ Cold ☐ Fog |

Comment/ Sketch:

11-11-09

0730 - SPRD 5% CMT @ N. SIDE OF CTR. MONITORING WELLS CMT WT 16#
0800 - MIX & REMIX 5% CMT
0930 - 5% CMT SOIL SAMPLE FOR CYL BRK & START OF COMPACTION
1015 - DENSITY TEST
1330 - SPRD 10% CMT OUTER SHELL WT 31#
1430 - SPRD 5% CMT TIE IN WT 16#
1450 - START MIX & REMIX OF 10 & 5% CMT
1515 - COMPACT 5 & 10% CMT
1545 - DENSITY TEST.
SCS CREW CONTINUES TO OVER EXCAVATE SECTOR A3-D & B-1 & INSTALL WADDLES IN SECTOR A-3

11-12-09

0730 - START 5% CMT SPRD WT 13# N. SIDE CTR. M.W.
0745 - MIX 5% CMT.
0900 - REMIX OF 5% CMT
0920 - START COMPACT OF 5% CMT
0930 - SOIL SAMPLE 5% CYL. BRK.
0945 - DENSITY TEST
1130 - DENSITY TEST
1140 - DENSITY TEST. @ M.W.
1530 - SPRD 10% CMT OUTER SHELL CMT WT 31# E. SIDE
1600 - SPRD 5% CMT TIE IN CMT WT 17# E. SIDE
1620 - MIX & REMIX 5% & 10% CMT.
1630 - COMPACT E. SIDE OUTER SHELL
1700 - START PLACEMENT OF DAY LIFT COVER OVER SOLIDIFIED SOIL IN SECTOR A-X.



☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: | Date: | Reviewed By: | Date: |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Report #: | | Date: 11-16 & 11-17-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LA011276 | Page 1 of 2 |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other | Hours Charged: ☒ Full Time ☐ Part Time

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: | CERAUDO | Conditions: | ☒ Sunny | ☐ Windy | ☐ Hot | ☒ Mild |
| Contractor Representative: | ANDY BELL | | ☒ Cloudy | ☐ Rain | ☐ Cold | ☐ Fog |

Comment/ Sketch:

11-16-09

0800 SPRD 10% CMT WT. 31 OUTER SHELL S. SIDE
0845 START 10% 3 LIFTS OF CLEAN OUTER SHELL + TIE IN & OVER COMPLETE PAD
SPRD 10% CMT @ TIE IN WT. 30#
0850 START HYDRO SEED HILL SIDE IN SECTION A-3
0920 MIX + REMIX OUTER SHELL + TIE IN
0930 SCS PLACED/INSTALLED EXTENSIONS ON CTR. MONITORING WELLS.
1015 SOIL SAMPLE FOR CURVE OF ~~10%~~ CONTAMINATED SOIL MIXED W/ 10% CMT.
1150 SPRD 10% CMT N. OF CTR MONITORING WELL (M.W)
1200 DENSITY TEST
1215 DENSITY TEST
1230 MIX + REMIX
1300 COMPACT
1330 SOIL SAMPLE 10% CMT. TREATED CONTAMINATED FOR CYL. BRK.
1350 DENSITY TEST.
1540 DENSITY TEST
1600 SCS CREW CONTINUES TO BRING SPOILS FROM SECTOR AN-A, B, C. TO PAD IN SECTOR AX.

11-17-09

0800 ELEV OF PAD IS 1308 @ W. SIDE + 1304 @ N.E. CORNER, CREW WANTS TO BRING N.E. CORNER UP TO ± SAME ELEV. AS 1308 ALL LIFT'S IN 12" ± LIFTS.
1100 SPRD CMT 10% @ N.E. CORNER OF PAD WT. 30#
1130 MIX + REMIX OF CMT
1200 COMPACT SOIL N.E. CORNER
1300 SOIL SAMPLE 10% CONTAMINATED SOIL FOR CYL. BRK.
1330 DENSITY TEST.
1430 CMT WT CHECK 29#
1600 DENSITY TEST.



☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: | Date: | Reviewed By: | Date: |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 11-18 & 11-19-09 |
| Project Name: B-850 Soil Remediation | Project Number: LAW1276 | Page 2 of 8 |
| Field Rep: Tony Phillips | Project Manager: | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☒ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
| Contractor: CERRUDO SERV | | | | Conditions: | ☒ Sunny | ☐ Windy | ~~☒ Hot~~ | ☒ Mild |
| Contractor Representative: ANDY BELL | | | | | ☒ Cloudy | ☐ Rain | ☒ Cold | ☐ Fog |

Comment/ Sketch: 11-18-09

0815 SCS CREW CONTINUES OVER EXCAVATION OF SECTOR A3-0 & CLEAN UP HILL SIDE OF B-1
0825 SPRD 10% CMT WT 31# ON N.E. CORN OF PAD @ SECTOR A-X
1000 MIX & REMIX N.E. CORNER 2ND LIFT
1100 COMPACT 2ND LIFT 100' X 100' SQ FT.
1500 SPREAD 10% CMT WT 30# OUTER SHELL & TIE IN @ E. SIDE PAD
1530 MIX & REMIX
1630 COMPACT OUTER SHELL ONLY

11-19-09

0800 SCS PLACED 2ND LIFT OF 10% CMT TREAT SOIL OVER ENTIRE PAD @ SECTOR A-X
1000 SPRD 10% CMT WT 30# FOR OUTER SHELL S. SIDE OF PAD
1100 MIX & REMIX CMT. OUTER SHELL TO CTR. MONITORING WELLS
1145 SOIL SAMPLE OF 10% CMT
1150 COMPACT MIXED SOIL
1210 GRIFFIN STOPPED MIXING OF CMT & SOIL DUE TO RT. FRT. WHEEL ON MIXER HAD BROKEN LUG NUTS ON WHEEL ~~&~~ JOB STOPPED FOR SAFETY PAUSE.
1215 DENSITY TEST
1230 SAND CONE ON 10% CONTAMINATED SOIL

SCS CREW CLEAN UP SPOILS ON S. SIDE OF B-850 ACCESS RD. & AROUND GRAVEL BAN, & HYDRO SEEDED SECTOR A3-0 & A3-1, & PLACED MIRAFI FABRIC & RIP-RAP ON W. END OF SEDIMENT TRAP, & INSTALLED WADDLES AROUND JOB SITE FOR BMP'S POSSIBLE RAIN.



☐ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: | Date: | Reviewed By: | Date: |

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 11-16 TO 11-19-09 | |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1276 | Page ____ of ____ | |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☐ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☐ Full Time ☐ Part Time

Contractor: CERADO
Contractor Representative:

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|---|
| A - | 081009-01 | BRN SDY SLT W/SS 5% CMT | 105.5 | 19.0 | ☒ 90% | ☐ Opt. + 2% |
| B - | 090109-01 | " " " " 10% CMT | 107.0 | 18.5 | ☐ 95% | ☒ Opt. + 2% to 5% |
| C - | 111609-01 | " " " " " " DIRTY | 106.5 | 18.5 | ☐ Other: | ☐ Other: |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | * | MW = MONITORING WELLS | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | 11-16 | | | | | | | |
| 1 | RT #3 DATE 11-12-09 | 1307 | 112.7 | 19.1 | 94.6 | A | 90 | |
| ~~2~~ | ~~±40' W OF N. MW~~ | | | | | | | |
| 2 | ±54' W OF CTR. MW | 1308 | 117.8 | 19.7 | 98.4 | C | 92 | |
| 3 | ±40' N OF CTR MW | ~~1307~~ 1308 | 120.7 | 21.1 | 99.7 | C | 94 | |
| 4 | @ N. MW. | 1308 | 113.8 | 18.0 | 96.4 | C | 91 | |
| | 11-17 | | | | | | | |
| 1 | ±60' N. OF N. MW | 1309 | 118.8 | 21.0 | 98.2 | C | 92 | |
| 2 | ±30' N.NE OF CTR MW. | ~~1308~~ 1309 | 121.5 | 20.0 | 101.3 | B | 95 | |
| | 11-18 | | | | | | | |
| | NO TEST TAKEN | | | | | | | |
| | 11-19 | | | | | | | |
| 1 | ±21' S OF CTR MW | ~~1309~~ 1310 | 117.9 | 22.8 | 96.0 | C | 90 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] | Date: ________ | Reviewed By: ________ | Date: ________

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 11-23 TO 11-25-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1276 | Page ____ of ____ |
| Field Rep: Tony Wallis | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☒ Cold ☐ Fog

Comment/ Sketch: 11-23-09

0900 RESPREAD 10% CMT OUTER SHELL E. & W. SIDE CMT WT. 30#

1000 MIX & REMIX & COMPACT

1100 SPRD 10% CMT WT 33# BETWEEN CTR & N. MONITORING WELLS

1115 MIX & REMIX & COMPACT

1130 SOIL SAMPLE CYL. BAR.

1200 DENSITY TEST.

1400 SPRD 10% CMT N. OF N. MW. WT. 31#

1430 MIX & REMIX

1530 COMPACT.

SCS = START OVER EX IN SECTOR A3-2A, A3-1A & CUT IN JEEP TRAIL

11-24-09

0730 SCS PLACED LIFT ON PAD. CLEAN SOIL FROM CTR MW. SOUTH. & CONTAMINATED SOIL FROM CTR. MW. NORTH.

1200 SPRD 10% CMT N. OF N. MW. CMT. WT. 30#

1245 MIX + REMIX

1430 COMPACT MIX SOIL ± 300 CYD. TREATED TODAY.

SCS CONTINUES TO EX. SOIL FROM SECTOR A3-2A + A3-1A.

11-25-09

GRIFFIN ON SITE TO FIX MIXER

SCS HYDRO SEED E. SLOPE OF SECTOR A-X & CONTINUES TO EXCAVATE SOIL FROM SECTOR A3-2A & A3-1A & STOCK PILE SPOILS IN SECTOR A-X

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Con: ints, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 11-23-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW1276 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☐ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☐ Full Time ☐ Part Time

Contractor: GERARDO

Contractor Representative:

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A- 111609-01 | BRN SANDY SILT w/SS | | | ☐ 90% | ☐ Opt. + 2% |
| | PLUS 10% CMT | 106.5 | 18.5 | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | MW = MONITORING WELL | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | ±87' W of N. MW | 130 | 116.7 | 20.0 | 97.3 | A | 91 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



☐ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: ____________ Date: ________ Reviewed By: ____________ Date: ________

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 11-30 to 12-2-09 | |
| Project Name: B-850 Soil Remediation | Project Number: 14417.6 | Page 1 of 2 | |
| Field Rep: Tony Phillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CENRUDO

Contractor Representative: ANDY DELL

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☒ Cold ☐ Fog

Comment/ Sketch:

* 11-30-09 *

0900 SPRD 10% CMT WT 31# ON S. OUTER SHELL
1000 MIX & REMIX
1110 SOIL SAMPLE CYL BRK & START COMPACTION
1200 DENSITY TEST
1300 SPRD 10% CMT WT. 30# BETWEEN N. & CTR MONITORING WELLS
1400 MIX & REMIX
1430 COMPACT
1600 DENSITY TEST

12-1-09

0800 DEPTH OF LIFT CHECK BY SCS ±14"
0900 10% CMT WT 31#
1000 MIX & REMIX CHECK CMT. WT. 33#
1100 SOIL SAMPLE FOR CYL BRK.
1115 COMPACT
1200 DENSITY TEST
1300 CMT WT. CHECK 31#
1440 SOIL SAMPLE CYL BRK.
1515 DENSITY TEST.
SCS INSTALL WADDLES & HYDRO SEED IN SECTOR A-3 & A-4
& STARTED BACK FILL OF 6' PIT IN SECTOR A-4

12-2-09

0800 SCS PL. LIFT ON PAD IN SECTOR AX
GRIFFIN FIXED SPREADER TRUCK AUGER BEARING.
SCS STARTED REMOVING HAUL ROAD BEHIND B-850
& RD. AROUND B-850
0930 SPRD 10% CMT WT 32# W. SIDE OUTER SHELL & TIE-IN
1000 MIX & REMIX & COMPACT
1035 MIXER BROKE 11 LUGS BROKE ON RT. FRT. WHEEL
1220 DENSITY TEST.
1400 MIXER FIXED
1430 MIX PAD FOR CTR MONITORING WELL
1445 DENSITY TEST ON 6' PIT IN SECTOR A-4
1500 SCS BACKFILL 6" LIFT AROUND CTR M.W.
1530 COMPACT 6" LIFT.



☒ This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Con... ants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | ~~Report #:~~ B 583005 | Date: 11/2-5/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1278 | Page ____ of ____ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor:

Contractor Representative:

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☒ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch

11/2/09 Mon

— Break #37a @ 5days 350 psi 9am
#38a @ 5days 280 psi 9:30 am
#39a @ 4days 230 psi 9:45 am
— Sample @ 1:30pm #40a @ ~~40a~~ 2:30pm, #40b 2:45pm
— moist. cont.
Sunny 60° F

11/3/09 Tue

— Sample @ 1pm #41a 2pm, #41b 2:15pm
Sunny 60° F

11/4/09 Wed

— Break #37b @ 7days 410 psi Max 9Am
#38b @ 7days 360 psi 9:30am
— Sample @ 11 Am #42a 11:45 Am, #42b 12:15 pm
— Check point
— Sample @ 2:30pm #43a 3:30pm, #43b 3:45pm
Sunny 60° F

11/5/09 Thu

Break #39b @ 7days 280 psi 2pm
#40a @ 3days 110 psi 2:30 pm
#41a @ 2days 260 psi 2:45 pm

Sunny 60° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: 11/5/09 Reviewed By: ____ Date: ____

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 8/24/2009 | lift #14 51' east of MW 11:10am | | 1294 | 116.4 | 95.6 | 21.7 | **93.00** |
| 8/24/2009 | lift #14 70' west of MW 4:15pm | | 1294 | 119.3 | 99.4 | 20 | **95.00** |
| | | | | | | | |
| 8/25/2009 | lift #15 35' east of MW 11:10am | | 1295 | 119.4 | 102.1 | 16.9 | **95.00** |
| 8/25/2009 | monit. Wells (MW) 1:30pm | | 1295 | 116.8 | 99.5 | 17.4 | **93.00** |
| 8/25/2009 | lift #15 50' north of MW 4:30pm | DUPLICATE | 1295 | 119.5 | 101 | 18.3 | **95.00** |
| | | | | | | | |
| 8/27/2009 | lift #16 80' north of MW 9:35am | elevations based on GPS | 1293 | 121.5 | 101.8 | 19.4 | **92.00** |
| 8/27/2009 | 60' east of MW - 10% shell - 10:35am | | 1288 | 121 | 99.8 | 21.3 | **92.00** |
| 8/27/2009 | at MW 1pm | | 1293 | 121.4 | 105.4 | 15.2 | **91.00** |
| 8/27/2009 | lift #16 45' south MW 2:50pm | | 1293 | 119.9 | 103.8 | 15.5 | **90.00** |
| | | | | | | | |
| 8/31/2009 | lift #17 96' west NW of MW 12:40pm | | | 120.8 | 102.8 | 17.5 | **92.00** |
| | | | | | | | |
| 9/1/2009 | lift #17 60' west SW of MW 11am | | | 124.7 | 102.5 | 21.7 | **95.00** |
| 9/1/2009 | lift #2 east side shell 10% cement 12:40pm | | | 119.5 | 100.8 | 18.5 | **91** |
| | | | | | | | |
| 9/2/2009 | lift #18 30' north NW of MW 9:30am | | | 120.8 | 101.5 | 19 | **92.00** |
| 9/2/2009 | at Monit. Wells 10:10am | DUPLICATE | | 115.5 | 97.6 | 18.4 | **92** |
| 9/2/2009 | lift #18 40' south of MW 1pm | | | 119.9 | 98.9 | 21.2 | **96.00** |
| | | | | | | | |
| 9/9/2009 | lift #4 east side shell 10% cement 9:10am | | | 120.1 | 100 | 20.1 | **95.00** |
| 9/9/2009 | lift #19 80' west SW of MW 2:25pm | | | 119 | 100.2 | 18.8 | **90** |
| | | | | | | | |
| 9/10/2009 | at MW lift #4 10:35am | | | 119.5 | 100.5 | 18.9 | **91.00** |
| 9/10/2009 | at MW lift #5 12:15pm | | | 119.2 | 100.9 | 18.1 | **91.00** |
| 9/10/2009 | east side shell 10% cement 4:15pm | | | 122.4 | 100 | 22.4 | **97** |
| | | | | | | | |
| 9/15/2009 | 60' south SW of MW 3:15pm | | | 116.7 | 96.3 | 21.2 | **93.00** |
| 9/15/2009 | 4' N of N monit. Well 3:30pm | | | 115.9 | 95.1 | 21.9 | **92.00** |
| | | | | | | | |
| 9/16/2009 | 41' east of MW at east side shell 10:15am | | | 119.4 | 98.4 | 21.4 | **94.00** |
| | | | | | | | |
| 10/28/2009 | shell 10:30am | | 1303 | 119.3 | 96.5 | 23.6 | **94** |
| 10/28/2009 | 1:20pm | | | 119.9 | 96.1 | 24.8 | **96.00** |
| | | | | | | | |
| 10/29/2009 | 50' west of MW on shell 10:30am | DUPLICATE | 1304 | 120 | 98.3 | 22.1 | **96.00** |
| 10/29/2009 | 33' south of MW on shell 4:30am | | 1304 | 121 | 100.1 | 20.9 | **96** |
| | | | | | | | |
| 11/2/2009 | 30' south of MW on shell 2:30pm | DUPLICATE | 1304 | 118.9 | 95.3 | 24.8 | **94.00** |
| 11/2/2009 | at MW 3pm | | 1304 | 121.2 | 99.9 | 21.3 | **92.00** |
| 11/2/2009 | 40' NW of MW 4:45pm | | 1304 | 115.4 | 95.1 | 21.3 | 88 |
| | | | | | | | |
| 11/3/2009 | ***Retest of #3*** 11/2/09 8am | | 1304 | 119.9 | 98.4 | 21.6 | **91.00** |
| 11/3/2009 | 18' south of MW 8am | DUPLICATE | 1304 | 120 | 100 | 20 | **91.00** |
| 11/3/2009 | 96' west of MW 1:45pm | DUPLICATE | 1304 | 121.3 | 103.4 | 17.3 | **96** |
| 11/3/2009 | 21' south of MW 2pm | DUPLICATE | 1304 | 116.8 | 93.8 | 24.5 | **93** |
| | | | | | | | |

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 11/4/2009 | 53' south of MW 11:30am | | | 116.8 | 94.7 | 23.3 | **92.00** |
| 11/4/2009 | 70' west NW of MW 3pm | | | 120.8 | 99.8 | 21.1 | **96.00** |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 8/25/09 11:30am | 26a | 8/27/09 8:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 3768 | **300** | 15.70% |
| 8/25/09 11:50am | 26b | 9/1/09 7:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 4323 | **340** | 15.70% |
| 8/25/09 4:10pm | 27a | 8/27/09 9am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 3014 | **240** | 15.10% |
| 8/25/09 4:30pm | 27b | 9/1/09 8am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 4258 | **340** | 15.10% |
| | | | | | | | |
| 8/27/09 9:40am | 28a | 8/31/09 8:50am | Ax - lift #16/ 9am/ 5% | 121.50 | 3229 | **260** | 17.00% |
| 8/27/09 10am | 28b | 9/3/09 10:20am | Ax - lift #16/ 9am/ 5% | 121.50 | 3264 | **260** | 17.00% |
| 8/27/09 10:40am | 29a | 8/31/09 9:10am | east side shell/ 10:20am/ 10% | 121.00 | 3486 | **280** | 21.70% |
| 8/27/09 11am | 29b | 9/3/09 10am | east side shell/ 10:20am/ 10% | 121.00 | 5104 | **410*** | 21.70% |
| | | | | | | | |
| 8/31/09 12:50pm | 30a | 9/3/09 10:40am | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2615 | **210** | 14.40% |
| 8/31/09 1:10pm | 30b | 9/8/09 12pm | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2770 | **220** | 14.40% |
| | | | | | | | |
| 9/1/09 12:50pm | 31a | 9/3/09 11am | east side shell/ 11:50am/ 10% | 119.50 | 3050 | **240** | 21.20% |
| 9/1/09 1:05pm | 31b | 9/8/09 12:20pm | east side shell/ 11:50am/ 10% | 119.50 | 2852 | **230** | 21.20% |
| | | | | | | | |
| 9/2/09 9:40am | 32a | 9/8/09 1:15pm | Ax - lift #18/ 9am/ 5% | 120.80 | 2807 | **220** | 18.70% |
| 9/2/09 10am | 32b | 9/9/9 10am | Ax - lift #18/ 9am/ 5% | 120.80 | 2130 | **170** | 18.70% |
| 9/2/09 1:10pm | 33a | 9/8/09 2:20pm | Ax - lift #18/ 12pm/ 5% | 119.90 | 2422 | **190** | 20.10% |
| 9/2/09 1:30pm | 33b | 9/9/9 10:20am | Ax - lift #18/ 12pm/ 5% | 119.9 | 3264 | **260** | 20.10% |
| | | | | | | | |
| 9/9/9 9:45am | 34a | 9/14/09 8:30am | east side shell/ 8:45am/ 10% | 120.10 | 4439 | **350** | 18.20% |
| 9/9/9 10am | 34b | 9/16/09 8am | east side shell/ 8:45am/ 10% | 120.10 | 5104 | **410*** | 18.20% |
| 9/9/9 2:45pm | 35a | 9/14/09 9am | Ax - lift #19/ 1:45pm/ 5% | 119 | 1556 | **120** | 21.70% |
| 9/9/9 3pm | 35b | 9/16/09 8:30am | Ax - lift #19/ 1:45pm/ 5% | 119.00 | 3143 | **250** | 21.70% |
| | | | | | | | |
| 9/16/09 10:30am | 36a | 9/21/09 8:45am | east side shell/ 9:30am/ 10% | 119.40 | 3951 | **310** | 16.60% |
| 9/16/09 11am | 36b | 9/23/09 9am | east side shell/ 9:30am/ 10% | 119.4 | 5104 | **410*** | 16.60% |
| | | | | | | | |
| 10/28/09 10:45am | 37a | 11/2/09 9am | shell/ 10:45am/ 10% | 119.30 | 4388 | **350** | 23.60% |
| 10/28/09 11am | 37b | 11/4/09 9am | shell/ 10:45am/ 10% | 119.30 | 5104 | **410*** | 23.60% |
| 10/28/09 1:30pm | 38a | 11/2/09 9:30am | Ax/ 12:45pm/ 5% | 119.9 | 3471 | **280** | 22.00% |
| 10/28/09 2pm | 38b | 11/4/09 9:30am | Ax/ 12:45pm/ 5% | 119.90 | 4489 | **360** | 22.00% |
| | | | | | | | |
| 10/29/09 10:30am | 39a | 11/2/09 9:45am | Ax/ 9:30am/ 5% | 120.00 | 2933 | **230** | 21.90% |
| 10/29/09 11am | 39b | 11/5/09 2pm | Ax/ 9:30am/ 5% | 120.00 | 3479 | **280** | 21.90% |
| | | | | | | | |
| 11/02/09 2:30pm | 40a | 11/5/09 2:30pm | shell/ 1:30am/ 10% | 118.9 | 1348 | **110** | 23.40% |
| 11/02/09 2:45pm | 40b | | shell/ 1:30am/ 10% | 118.90 | | | 23.40% |
| | | | | | | | |
| 11/3/09 2pm | 41a | 11/5/09 2:45pm | Ax/ 1pm/ 5% | 116.80 | 3300 | **260** | 23.70% |
| 11/3/09 2:15pm | 41b | | Ax/ 1pm/ 5% | 116.8 | | | 23.70% |
| | | | | | | | |
| 11/4/09 11:45am | 42a | | shell/ 11am/ 10% | 116.80 | | | 21.40% |
| 11/4/09 12:15pm | 42b | | shell/ 11am/ 10% | 116.80 | | | 21.40% |
| 11/4/09 3:30pm | 43a | | Ax/ 2:30pm/ 5% | 120.8 | | | 24.00% |
| 11/4/09 3:45pm | 43b | | Ax/ 2:30pm/ 5% | 120.8 | | | 24.00% |
| | | | | | | | |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | ~~Report #:~~ B 58300S | Date: 11/9-12/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1278 | Page ______ of ______ | |
| Field Rep: | Project Manager: Cal Dickerman | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
| Contractor: | Cerrudo | | | Conditions: | ☒ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: | Andy Bell | | | | ☐ Cloudy | ☐ Rain | ☒ Cold | ☐ Fog |

Comment/ Sketch: 11/9/09 Mon

- Break #40b @ 7days 290 psi 1pm
  #42a @ 5days 230 psi 1:30pm
  #43a @ 5days 210 psi 2pm
- Sample @ 10:45 am #44a 11:30 AM, #44b 11:40 AM
- Sample @ 10:45 AM #45a 12 pm, #45b 12:30 pm
- Sand cone
- compaction tests at V-ditch Sunny 55° F

11/10/09 Tue

- Break #41b @ 7days 330 psi Duplicate
- Sample @ 10:30 AM #46a 11 AM, #46b 11:20 AM
- V-ditch obs. - rock dams 2' high, approx. 40' apart Sunny 55° F

11/11/09 Wed

- Break #42b @ 7days 370 psi 12 pm
  #43b @ 7days 290 psi 12:20 pm
- Sample @ 9:30 AM #47a 10:30 AM, #47b 11 AM
- V-ditch obs. compaction of 20' long area along south side of road to B-850, one lift completed, will cont. tomorrow
  Sunny 55° F

11/12/09 Thu

- Break #44a @ 3 days 9 AM 290 psi.
  #45a @ 3 days 9:20 AM 190 psi
  #46a @ 2 days 9:40 AM 270 psi
- Sample @ 9:30 am #48a 10 AM, #48b 10:20 AM

Sunny 55° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 11/12/09 | Reviewed By: | Date: |

Geosphere Cons[...]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# [D]AILY FIELD REPORT

| | | |
|---|---|---|
| ~~Report~~ #: B S83005 | Date: 11/9/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1278 | Page ____ of ____ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other — Hours Charged: ☒ Full Time ☐ Part Time

| | | | | | |
|---|---|---|---|---|---|
| Contractor: Cerrudo | Conditions: | ☒ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | ☐ Cloudy | ☐ Rain | ☒ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | Jumping Jack | | Density Testing Equipment | ☒ Nuclear | Type: Trox |
| Moving | | | | ☐ Tube | |
| | | | | ☐ Sand Cone | |
| Water | | | Fill Source | ☒ Native on site | |
| Support | | | | ☐ Import | |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: west side of V-ditch at SE area of Ax

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 071409-01 | Brn sandy silt w/SS | 114.5 | 14.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| ~~S091026~~ | ~~Tan Cl II AB~~ | ~~138.0~~ | ~~5.0~~ | ☐ Other: | ☒ Other: |
| | | | | | over opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 45'E of NC7-09 MW | -2' FSG | | 14.9 | 105.2 | 071409-01 | 92 | |
| 2 | 40'E " " | -1.5' FSG | | 15.7 | 103.5 | \| | 90 | |
| 3 | 45'E " " | -1' FSG | | 15.2 | 103.1 | \| | 90 | |
| 4 | 40'E " " | FSG | | 14.6 | 106.3 | \| | 93 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch: AB cover around pipe was compacted w/ jumping jack

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 11/9/09 | Reviewed By: ____ | Date: ____ |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# [illegible]AILY FIELD REPORT

| | | |
|---|---|---|
| ~~Report #~~: B 58300S | | Date: 11/9/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1278 | Page ______ of ______ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Scope of Work: | ☑ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☑ Full Time | ☐ Part Time |

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: | Cerrudo | Conditions: | ☑ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: | Andy Bell | | ☐ Cloudy | ☐ Rain | ☑ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | Rax | | Density Testing Equipment | ☐ Nuclear | Type: |
| Moving | | | | ☐ Tube | |
| Water | | | | ☑ Sand Cone | |
| Support | | | Fill Source | ☑ Native on site | |
| | | | | ☐ Import | |

| Plan | Engineer | Date | Fill Location: |
|---|---|---|---|
| Civil | | | Ax |
| Structural | | | |
| Geotech | | | |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 080409-01 | Brn sandy silt w/SS plus 5% cement | 111.5 | 17.5 | ☑ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☑ Other: |
| | | | | | over opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | approx 30' NW of MWells | 1305' | 125.6 | 22.6 | 102.4 | 080409-01 | 92 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:



☑ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 11/9/09 | Reviewed By: ______ | Date: ______ |

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 11/9/09
PROJECT #: LAW 1278
COMPACTION SPEC: 90
MOISTURE SPEC: over opt. moist.

INSPECTOR: Robert U. / Tony P.
PROJECT NAME: LLNL Site 300 B850 Soil R
TEST LOCATION: Ax

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6875.2 | g | |
| B | WT of cone, jar, sand - After | 3841.1 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 3034.1 | g | A - B |
| E | WT of sand in hole | 1454.1 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 16.2 / 0.0358 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | — | lbs | |
| I | WT of TARE #2 | ~~138.4~~ | lbs | |
| J | Net WT of soil | 2038.9 / 4.495 | lbs | H - I |
| **K** | **WT Density** | 125.6 | **pcf** | **J ÷ G** |
| L | Soil + TARE (Wet) | 1344.2 | lbs | |
| M | TARE #2 | 138.4 | lbs | |
| N | Soil + TARE (Dry) | 1122.3 | lbs | |
| O | WT of Water | ~~222.1~~ 221.9 | lbs | L - N |
| P | WT of Soil | 983.9 | lbs | N - M |
| **Q** | **Moisture Content** | 22.6 | **%** | **O ÷ P** |
| | Optimum Moisture Content | | % | |
| **R** | **Dry Density** | 102.4 | **pcf** | **K ÷ (I + Q)** |
| S | Lab Maximum (Lab No. ________) | | pcf | |
| **T** | **Percent Compaction** | | **%** | **R ÷ S** |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 8/25/09 11:30am | 26a | 8/27/09 8:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 3768 | **300** | 15.70% |
| 8/25/09 11:50am | 26b | 9/1/09 7:45am | Ax - lift #15/ 10:50am/ 5% | 119.40 | 4323 | **340** | 15.70% |
| 8/25/09 4:10pm | 27a | 8/27/09 9am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 3014 | **240** | 15.10% |
| 8/25/09 4:30pm | 27b | 9/1/09 8am | Ax - lift #15/ 3:30pm/ 5% | 119.50 | 4258 | **340** | 15.10% |
| | | | | | | | |
| 8/27/09 9:40am | 28a | 8/31/09 8:50am | Ax - lift #16/ 9am/ 5% | 121.50 | 3229 | **260** | 17.00% |
| 8/27/09 10am | 28b | 9/3/09 10:20am | Ax - lift #16/ 9am/ 5% | 121.50 | 3264 | **260** | 17.00% |
| 8/27/09 10:40am | 29a | 8/31/09 9:10am | east side shell/ 10:20am/ 10% | 121.00 | 3486 | **280** | 21.70% |
| 8/27/09 11am | 29b | 9/3/09 10am | east side shell/ 10:20am/ 10% | 121.00 | 5104 | **410*** | 21.70% |
| | | | | | | | |
| 8/31/09 12:50pm | 30a | 9/3/09 10:40am | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2615 | **210** | 14.40% |
| 8/31/09 1:10pm | 30b | 9/8/09 12pm | Ax - lift #17/ 12:10pm/ 5% | 120.80 | 2770 | **220** | 14.40% |
| | | | | | | | |
| 9/1/09 12:50pm | 31a | 9/3/09 11am | east side shell/ 11:50am/ 10% | 119.50 | 3050 | **240** | 21.20% |
| 9/1/09 1:05pm | 31b | 9/8/09 12:20pm | east side shell/ 11:50am/ 10% | 119.50 | 2852 | **230** | 21.20% |
| | | | | | | | |
| 9/2/09 9:40am | 32a | 9/8/09 1:15pm | Ax - lift #18/ 9am/ 5% | 120.80 | 2807 | **220** | 18.70% |
| 9/2/09 10am | 32b | 9/9/9 10am | Ax - lift #18/ 9am/ 5% | 120.80 | 2130 | **170** | 18.70% |
| 9/2/09 1:10pm | 33a | 9/8/09 2:20pm | Ax - lift #18/ 12pm/ 5% | 119.90 | 2422 | **190** | 20.10% |
| 9/2/09 1:30pm | 33b | 9/9/9 10:20am | Ax - lift #18/ 12pm/ 5% | 119.9 | 3264 | **260** | 20.10% |
| | | | | | | | |
| 9/9/9 9:45am | 34a | 9/14/09 8:30am | east side shell/ 8:45am/ 10% | 120.10 | 4439 | **350** | 18.20% |
| 9/9/9 10am | 34b | 9/16/09 8am | east side shell/ 8:45am/ 10% | 120.10 | 5104 | **410*** | 18.20% |
| 9/9/9 2:45pm | 35a | 9/14/09 9am | Ax - lift #19/ 1:45pm/ 5% | 119 | 1556 | **120** | 21.70% |
| 9/9/9 3pm | 35b | 9/16/09 8:30am | Ax - lift #19/ 1:45pm/ 5% | 119.00 | 3143 | **250** | 21.70% |
| | | | | | | | |
| 9/16/09 10:30am | 36a | 9/21/09 8:45am | east side shell/ 9:30am/ 10% | 119.40 | 3951 | **310** | 16.60% |
| 9/16/09 11am | 36b | 9/23/09 9am | east side shell/ 9:30am/ 10% | 119.4 | 5104 | **410*** | 16.60% |
| | | | | | | | |
| 10/28/09 10:45am | 37a | 11/2/09 9am | shell/ 10:45am/ 10% | 119.30 | 4388 | **350** | 23.60% |
| 10/28/09 11am | 37b | 11/4/09 9am | shell/ 10:45am/ 10% | 119.30 | 5104 | **410*** | 23.60% |
| 10/28/09 1:30pm | 38a | 11/2/09 9:30am | Ax/ 12:45pm/ 5% | 119.9 | 3471 | **280** | 22.00% |
| 10/28/09 2pm | 38b | 11/4/09 9:30am | Ax/ 12:45pm/ 5% | 119.90 | 4489 | **360** | 22.00% |
| | | | | | | | |
| 10/29/09 10:30am | 39a | 11/2/09 9:45am | Ax/ 9:30am/ 5% | 120.00 | 2933 | **230** | 21.90% |
| 10/29/09 11am | 39b | 11/5/09 2pm | Ax/ 9:30am/ 5% | 120.00 | 3479 | **280** | 21.90% |
| | | | | | | | |
| 11/02/09 2:30pm | 40a | 11/5/09 2:30pm | shell/ 1:30am/ 10% | 118.9 | 1348 | **110** | 23.40% |
| 11/02/09 2:45pm | 40b | 11/9/09 1pm | shell/ 1:30am/ 10% | 118.90 | 3651 | **290** | 23.40% |
| | | | | | | | |
| 11/3/09 2pm | 41a | 11/5/09 2:45pm | Ax/ 1pm/ 5% DUPLICATE | 116.80 | 3300 | **260** | 23.70% |
| 11/3/09 2:15pm | 41b | 11/10/09 12pm | Ax/ 1pm/ 5% DUPLICATE | 116.8 | 4149 | **330** | 23.70% |
| | | | | | | | |
| 11/4/09 11:45am | 42a | 11/9/09 1:30pm | shell/ 11am/ 10% | 116.80 | 2926 | **230** | 21.40% |
| 11/4/09 12:15pm | 42b | 11/11/09 12pm | shell/ 11am/ 10% | 116.80 | 4105 | **370** | 21.40% |
| 11/4/09 3:30pm | 43a | 11/9/09 2pm | Ax/ 2:30pm/ 5% | 120.8 | 2585 | **210** | 24.00% |
| 11/4/09 3:45pm | 43b | 11/11/09 12:20pm | Ax/ 2:30pm/ 5% | 120.8 | 3586 | **290** | 24.00% |
| | | | | | | | |

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 11/9/09 11:30am | 44a | 11/12/09 9am | shell/ 10:45am/ 10% | 116.50 | 3659 | **290** | 24.70% |
| 11/9/09 11:40am | 44b | | shell/ 10:45am/ 10% | 116.50 | | | 24.70% |
| 11/9/09 12pm | 45a | 11/12/09 9:20am | Ax/ 10:45am/ 5% | 116.40 | 2407 | **190** | 27.20% |
| 11/9/09 12:30pm | 45b | | Ax/ 10:45am/ 5% | 116.40 | | | 27.20% |
| | | | | | | | |
| 11/10/09 11am | 46a | 11/12/09 9:40am | shell/ 10:30am/ 10% | 118.50 | 3443 | **270** | 25.10% |
| 11/10/09 11:20am | 46b | | shell/ 10:30am/ 10% | 118.50 | | | 25.10% |
| | | | | | | | |
| 11/11/09 10:30am | 47a | | Ax/ 9:30am/ 5% | 116.20 | | | 23.20% |
| 11/11/09 11am | 47b | | Ax/ 9:30am/ 5% | 116.20 | | | 23.20% |
| | | | | | | | |
| 11/12/09 10:30am | 48a | | Ax/ 9:30am/ 5% | 114.70 | | | |
| 11/12/09 11am | 48b | | Ax/ 9:30am/ 5% | 114.70 | | | |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 11/4/2009 | 53' south of MW 11:30am | | | 116.8 | 94.7 | 23.3 | **92.00** |
| 11/4/2009 | 70' west NW of MW 3pm | | | 120.8 | 99.8 | 21.1 | **96.00** |
| | | | | | | | |
| 11/9/2009 | 96' west of MW 11:30am | | 1305 | 116.5 | 93.2 | 25 | **92.00** |
| 11/9/2009 | 96' west NW of MW 11:45am | | 1305 | 116.4 | 93.7 | 24.6 | **93.00** |
| 11/9/2009 | 40' west NW of north MW 2:45pm | | 1305 | 121.4 | 99.8 | 21.6 | **92.00** |
| | | | | | | | |
| 11/10/2009 | 33' north NE of MW 10:30am | | 1306 | 118.5 | 99.7 | 18.8 | **94.00** |
| 11/10/2009 | at center of MW | | 1306 | 113.4 | 90.4 | 25.4 | **90.00** |
| | | | | | | | |
| 11/11/2009 | 54' north of center of MW 10am | | 1306 | 116.2 | 93.9 | 23.8 | **93.00** |
| 11/11/2009 | 48' north NW of center of MW 3:45pm | | 1306 | 118.5 | 99.6 | 19 | **94.00** |
| | | | | | | | |
| 11/12/2009 | 8' south of center of MW 9:45am | | | 114.7 | 95.2 | 20.5 | **91** |
| 11/12/2009 | 40' west of north MW 11:30am | | | 117.4 | 99.2 | 18.3 | **94.00** |
| 11/12/2009 | at center of MW 11:40am | | | 105.2 | 87.2 | 20.6 | **84** |

2001 Crow Canyon Road, Suite 100 ~ San Ramon, California 94583 ~ Tel: 925/ 314.7100 ~ Fax: 925/ 855.7140

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| ~~Report #:~~ B 583005 | Date: 11/16-19/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1278 | Page ____ of ____ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman |
| Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☑ Full Time ☐ Part Time |
| Contractor: Cerrudo | Conditions: ☑ Sunny ☐ Windy ☐ Hot ☐ Mild |
| Contractor Representative: Andy Bell | ☐ Cloudy ☐ Rain ☑ Cold ☐ Fog |

Comment/ Sketch:

11/16/09 mon

- Break #44b @ 7days 360 psi 12 pm
  #45b @ 7days 220 psi 12:20 pm
  #47a @ 5 days 130 psi 12:40 pm
  #48a @ 4 days 140 psi 1 pm
- Curve
- Sample @ 1:30 pm #49a 2pm, #49b 2:20pm

Sunny 55° F

11/17/09 Tue

- Break #46b @ 7days 390 psi 10 AM
- Sample @ 1pm #50a 2:30pm, #50b 2:50pm

Sunny 55° F

11/18/09 wed

- Break #47b @ 7days 180 psi 10 AM

Sunny 55° F

11/19/09 Thu

- Break #48b @ 7 days 170 psi 8:30 AM
  #49a @ 3 days 250 psi 8:50 AM
  #50a @ 2 days 360 psi 9:10 am
- Sample @ 12pm #51a 12:30 pm, #51b 1pm
- Sandcone

Sunny 55° F



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 11/19/09 | Reviewed By: | Date: |

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 11/4/2009 | 53' south of MW 11:30am | | | 116.8 | 94.7 | 23.3 | **92.00** |
| 11/4/2009 | 70' west NW of MW 3pm | | | 120.8 | 99.8 | 21.1 | **96.00** |
| | | | | | | | |
| 11/9/2009 | 96' west of MW 11:30am | | 1305 | 116.5 | 93.2 | 25 | **92.00** |
| 11/9/2009 | 96' west NW of MW 11:45am | DUPLICATE | 1305 | 116.4 | 93.7 | 24.6 | **93.00** |
| 11/9/2009 | 40' west NW of north MW 2:45pm | | 1305 | 121.4 | 99.8 | 21.6 | **92.00** |
| | | | | | | | |
| 11/10/2009 | 33' north NE of MW 10:30am | | 1306 | 118.5 | 99.7 | 18.8 | **94.00** |
| 11/10/2009 | at center of MW | | 1306 | 113.4 | 90.4 | 25.4 | **90.00** |
| | | | | | | | |
| 11/11/2009 | 54' north of center of MW 10am | | 1306 | 116.2 | 93.9 | 23.8 | **93.00** |
| 11/11/2009 | 48' north NW of center of MW 3:45pm | | 1306 | 118.5 | 99.6 | 19 | **94.00** |
| | | | | | | | |
| 11/12/2009 | 8' south of center of MW 9:45am | | | 114.7 | 95.2 | 20.5 | **91** |
| 11/12/2009 | 40' west of north MW 11:30am | DUPLICATE | | 117.4 | 99.2 | 18.3 | **94.00** |
| 11/12/2009 | at center of MW 11:40am | | | 105.2 | 87.2 | 20.6 | 84 |
| | | | | | | | |
| 11/16/2009 | **retest of #3 11/12/09** | | 1308 | 112.7 | 94.6 | 19.1 | **90.00** |
| 11/16/2009 | 54' west of center of MW | | 1308 | 117.8 | 98.4 | 19.7 | **93** |
| 11/16/2009 | 40' north of center of MW | DUPLICATE | 1308 | 120.7 | 99.7 | 21.1 | **95.00** |
| 11/16/2009 | at north MW | | 1308 | 113.8 | 96.4 | 18 | **90.00** |
| | | | | | | | |
| 11/17/2009 | 60' north of north MW | | 1308 | 118.8 | 98.2 | 21 | **94** |
| 11/17/2009 | 30' north NE of center of MW | | 1308 | 121.5 | 101.3 | 20 | **96.00** |
| | | | | | | | |
| 11/19/2009 | 21' south of center of MW | | 1308 | 117.9 | 96 | 22.8 | **93.00** |

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 11/9/09 11:30am | 44a | 11/12/09 9am | shell/ 10:45am/ 10% | 116.50 | 3659 | **290** | 24.70% |
| 11/9/09 11:40am | 44b | 11/16/09 12pm | shell/ 10:45am/ 10% | 116.50 | 4533 | **360** | 24.70% |
| 11/9/09 12pm | 45a | 11/12/09 9:20am | Ax/ 10:45am/ 5% | 116.40 | 2407 | **190** | 27.20% |
| 11/9/09 12:30pm | 45b | 11/16/09 12:20pm | Ax/ 10:45am/ 5% | 116.40 | 3371 | **270** | 27.20% |
| | | | | | | | |
| 11/10/09 11am | 46a | 11/12/09 9:40am | shell/ 10:30am/ 10% | 118.50 | 3443 | **270** | 25.10% |
| 11/10/09 11:20am | 46b | 11/17/09 10am | shell/ 10:30am/ 10% | 118.50 | 4892 | **390** | 25.10% |
| | | | | | | | |
| 11/11/09 10:30am | 47a | 11/16/09 12:40pm | Ax/ 9:30am/ 5% | 116.20 | 1681 | **130** | 23.20% |
| 11/11/09 11am | 47b | 11/18/09 10am | Ax/ 9:30am/ 5% | 116.20 | 2280 | **180** | 23.20% |
| | | | | | | | |
| 11/12/09 10:30am | 48a | 11/16/09 1pm | Ax/ 9:30am/ 5% | 114.70 | 1756 | **140** | 20.00% |
| 11/12/09 11am | 48b | 11/19/09 8:30am | Ax/ 9:30am/ 5% | 114.70 | 2130 | **170** | 20.00% |
| | | | | | | | |
| 11/16/09 2pm | 49a | 11/19/09 8:50am | Ax/ 1:30pm/ 10% | 117.80 | 3100 | **250** | 21.20% |
| 11/16/09 2:20pm | 49b | | Ax/ 1:30pm/ 10% | 117.8 | | | 21.20% |
| | | | | | | | |
| 11/17/09 2:30pm | 50a | 11/19/09 9:10am | Ax/ 1pm/ 10% | 118.80 | 4533 | **360** | 17.20% |
| 11/17/09 2:50pm | 50b | | Ax/ 1pm/ 10% | 118.80 | | | 17.20% |
| | | | | | | | |
| 11/19/09 12:30pm | 51b | | Ax/ 12pm/ 10% | 117.90 | | | |
| 11/19/09 1pm | 51b | | Ax/ 12pm/ 10% | 117.90 | | | |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# [illegible]AILY FIELD REPORT

| | |
|---|---|
| ~~Report #~~: B S8300S | Date: 11/19/09 |
| Project Name: LLNL Site 300 B880 Soil R. | Project Number: LAW 1278 | Page ___ of ___ |
| Field Rep: | Project Manager: Cal Dickerman |

| Scope of Work: | ☑ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☑ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: | Cermodo | Conditions: | ☑ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: | Andy Bell | | ☐ Cloudy | ☐ Rain | ☑ Cold | ☐ Fog |

| Equipment | Type | Number | | |
|---|---|---|---|---|
| Compaction | | | Density Testing Equipment | ☐ Nuclear Type: |
| Moving | | | | ☐ Tube |
| Water | | | | ☑ Sand Cone |
| Support | | | Fill Source | ☑ Native on site |
| | | | | ☐ Import |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: Ax

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 111609-01 | brn sandy silt w/SS | ~~[illegible]~~ | ~~[illegible]~~ | ☑ 90% | ☐ Opt. + 2% |
| | plus 10% cement | 106.5 | 18.5 | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☑ Other: |
| | | | | | above opt |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 21' south of center MW | +1308' | 124.3 | 19.6 | 103.9 | 111609-01 | 98 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:



☑ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 11/19/09 | Reviewed By: | Date: |

CONSOLIDATED ENGINEERING
LABORATORIES

DATE: 11/19/09
PROJECT #: LAW 1278
COMPACTION SPEC: 90
MOISTURE SPEC: above opt. Moist.

INSPECTOR: Tony P. / R. Uribe
PROJECT NAME: LLNL site 300 B850 Soil R.
TEST LOCATION: Ax shell
21' S of Center MW

## SAND CONE TESTING

| | | | | |
|---|---|---|---|---|
| A | WT of cone, jar, sand - Before | 6902.1 | g | |
| B | WT of cone, jar, sand - After | 3842.8 | g | |
| C | WT of sand in cone | 1580 | g | |
| D | WT of sand used | 3059.3 | g | A - B |
| E | WT of sand in hole | 1479.3 | g | D - C |
| F | Density of sand | 89.6 | pcf | |
| G | Volume of hole | 16.510 / 0.0364 | cf | E ÷ F |
| H | Gross WT of excavated soil + TARE | | lbs | |
| I | WT of TARE | | lbs | |
| J | Net WT of soil | 2052.6 / 4.525 | lbs | H - I |
| K | **WT Density** | 124.3 | pcf | J ÷ G |
| L | Soil + TARE (Wet) | 901.7 | lbs | |
| M | TARE #6 | 137.2 | lbs | |
| N | Soil + TARE (Dry) | 776.2 | lbs | |
| O | WT of Water | 125.5 | lbs | L - N |
| P | WT of Soil | 639.0 | lbs | N - M |
| Q | **Moisture Content** | 19.6 | % | O ÷ P |
| | Optimum Moisture Content | | % | |
| R | **Dry Density** | 103.9 | pcf | K ÷ (I + Q) |
| S | Lab Maximum (Lab No. 111609-01) | 106.5 | pcf | |
| T | Percent Compaction | 98 | % | R ÷ S |

Weight = WT
Cubic Feet = cf
Pounds = lbs
Grams = G
Pounds per Cubic Feet = pcf
Conversion Grams ÷ 453.6 = lbs.

2001 Crow Canyon Road, Suite 100 • San Ramon, California 94583 • TEL: (925) 314-7100 • FAX: (925) 855-7140

Dirty

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 11/4/2009 | 53' south of MW 11:30am | | | 116.8 | 94.7 | 23.3 | **92.00** |
| 11/4/2009 | 70' west NW of MW 3pm | | | 120.8 | 99.8 | 21.1 | **96.00** |
| | | | | | | | |
| 11/9/2009 | 96' west of MW 11:30am | | 1305 | 116.5 | 93.2 | 25 | **92.00** |
| 11/9/2009 | 96' west NW of MW 11:45am | DUPLICATE | 1305 | 116.4 | 93.7 | 24.6 | **93.00** |
| 11/9/2009 | 40' west NW of north MW 2:45pm | | 1305 | 121.4 | 99.8 | 21.6 | **92.00** |
| | | | | | | | |
| 11/10/2009 | 33' north NE of MW 10:30am | | 1306 | 118.5 | 99.7 | 18.8 | **94.00** |
| 11/10/2009 | at center of MW | | 1306 | 113.4 | 90.4 | 25.4 | **90.00** |
| | | | | | | | |
| 11/11/2009 | 54' north of center of MW 10am | | 1306 | 116.2 | 93.9 | 23.8 | **93.00** |
| 11/11/2009 | 48' north NW of center of MW 3:45pm | | 1306 | 118.5 | 99.6 | 19 | **94.00** |
| | | | | | | | |
| 11/12/2009 | 8' south of center of MW 9:45am | | | 114.7 | 95.2 | 20.5 | **91** |
| 11/12/2009 | 40' west of north MW 11:30am | DUPLICATE | | 117.4 | 99.2 | 18.3 | **94.00** |
| 11/12/2009 | at center of MW 11:40am | | | 105.2 | 87.2 | 20.6 | 84 |
| | | | | | | | |
| 11/16/2009 | **retest of #3 11/12/09** | | 1308 | 112.7 | 94.6 | 19.1 | **90.00** |
| 11/16/2009 | 54' west of center of MW | | 1308 | 117.8 | 98.4 | 19.7 | **93** |
| 11/16/2009 | 40' north of center of MW | DUPLICATE | 1308 | 120.7 | 99.7 | 21.1 | **95.00** |
| 11/16/2009 | at north MW | | 1308 | 113.8 | 96.4 | 18 | **90.00** |
| | | | | | | | |
| 11/17/2009 | 60' north of north MW | | 1308 | 118.8 | 98.2 | 21 | **94** |
| 11/17/2009 | 30' north NE of center of MW | | 1308 | 121.5 | 101.3 | 20 | **96.00** |
| | | | | | | | |
| 11/19/2009 | 21' south of center of MW | | 1308 | 117.9 | 96 | 22.8 | **93.00** |
| | | | | | | | |
| 11/23/2009 | 87' west of north MW | | | 116.7 | 97.3 | 20 | **92.00** |

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 11/9/09 11:30am | 44a | 11/12/09 9am | shell/ 10:45am/ 10% | 116.50 | 3659 | **290** | 24.70% |
| 11/9/09 11:40am | 44b | 11/16/09 12pm | shell/ 10:45am/ 10% | 116.50 | 4533 | **360** | 24.70% |
| 11/9/09 12pm | 45a | 11/12/09 9:20am | Ax/ 10:45am/ 5% | 116.40 | 2407 | **190** | 27.20% |
| 11/9/09 12:30pm | 45b | 11/16/09 12:20pm | Ax/ 10:45am/ 5% | 116.40 | 3371 | **270** | 27.20% |
| | | | | | | | |
| 11/10/09 11am | 46a | 11/12/09 9:40am | shell/ 10:30am/ 10% | 118.50 | 3443 | **270** | 25.10% |
| 11/10/09 11:20am | 46b | 11/17/09 10am | shell/ 10:30am/ 10% | 118.50 | 4892 | **390** | 25.10% |
| | | | | | | | |
| 11/11/09 10:30am | 47a | 11/16/09 12:40pm | Ax/ 9:30am/ 5% | 116.20 | 1681 | **130** | 23.20% |
| 11/11/09 11am | 47b | 11/18/09 10am | Ax/ 9:30am/ 5% | 116.20 | 2280 | **180** | 23.20% |
| | | | | | | | |
| 11/12/09 10:30am | 48a | 11/16/09 1pm | Ax/ 9:30am/ 5% | 114.70 | 1756 | **140** | 20.00% |
| 11/12/09 11am | 48b | 11/19/09 8:30am | Ax/ 9:30am/ 5% | 114.70 | 2130 | **170** | 20.00% |
| | | | | | | | |
| 11/16/09 2pm | 49a | 11/19/09 8:50am | Ax/ 1:30pm/ 10% | 117.80 | 3100 | **250** | 21.20% |
| 11/16/09 2:20pm | 49b | 11/23/09 1pm | Ax/ 1:30pm/ 10% | 117.8 | 4171 | **330** | 21.20% |
| | | | | | | | |
| 11/17/09 2:30pm | 50a | 11/19/09 9:10am | Ax/ 1pm/ 10% | 118.80 | 4533 | **360** | 17.20% |
| 11/17/09 2:50pm | 50b | 11/24/09 9am | Ax/ 1pm/ 10% | 118.80 | 4764 | **380** | 17.20% |
| | | | | | | | |
| 11/19/09 12:30pm | 51b | 11/23/09 1:30pm | Ax/ 12pm/ 10% | 117.90 | 3586 | **290** | 24.90% |
| 11/19/09 1pm | 51b | 11/25/09 9am | Ax/ 12pm/ 10% | 117.90 | 3922 | **310** | 24.90% |
| | | | | | | | |
| 11/23/09 12pm | 52a | 11/25/09 9:30am | Ax/ 11:30am/ 10% | 116.7 | 3029 | **240** | 21.10% |
| 11/23/09 12:30pm | 52b | | Ax/ 11:30am/ 10% | 116.70 | | | 21.10% |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | ~~Report #~~: B 583005 | Date: 11/23-25/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1278 | Page ______ of ______ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☒ Cold ☐ Fog

Comment/ Sketch:

11/23/09 mon

- Break #49b @ 7days 330 psi 1pm
  #51a @ 4days 290 psi 1:30 pm
- Sample @ 11:30 am #52a 12pm, #52b 12:30 pm
- Obs. of rock apron SW of MW NC7-61, rock apron was ~~redesinged~~ redesigned by L. Long w/ SCS, no spec associated with new design, SG underlying fabric was smooth and stiff

sunny 55° F

11/24/09 Tue

- Break #50b @ 7days 380 psi 9AM

Sunny 60° F

11/25/09 wed

- Break #51b @ 6days 310 psi 9AM
  #52a @ 2days 240 psi 9:30 am

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 11/25/09 | Reviewed By: ______ | Date: ______ |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| ~~Report #~~: B S8300S | Date: 11/30/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1278 | Page ____ of ____ |
| Field Rep: | Project Manager: Cal Dickerman |
| Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: ☒ Full Time ☐ Part Time |
| Contractor: Cerrudo | Conditions: ☒ Sunny ☐ Windy ☐ Hot ☐ Mild |
| Contractor Representative: Andy Bell | ☐ Cloudy ☐ Rain ☒ Cold ☐ Fog |

Comment/ Sketch:

Sample @ 11:30 am #53a 12 pm
#53b 12:30 pm
Break #52b @ 7 days 330 psi 9am

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 11/30/09 | Reviewed By: | Date: |
|---|---|---|---|

CONSOLIDATED ENGINEERING
LABORATORIES
"Partners in Quality"

January 12, 2010

Mr. Steve Ellis
Lawrence Livermore National Laboratory
P.O. Box 808; L-871
Livermore, California 94551-0808

Subject: LLNL B-850 Soil Remediation
B850-S300
Livermore, CA
CEL Project #10-01280LAW & 10-01279LAW

**EARTHWORK AND LABORATORY TESTING SUMMARY**
**December 1, 2009 thru December 31, 2009**

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from December 1, 2009 thru December 31, 2009. Laboratory testing was performed on soil samples from the site. Enclosed are the results of the field and laboratory testing.

It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Respectfully submitted,
**CONSOLIDATED ENGINEERING LABORATORIES**

REGISTERED PROFESSIONAL ENGINEER
ERIC J. SWENSON
No. 2474
Exp. 12/2010
GEOTECHNICAL
STATE OF CALIFORNIA

Michael Wissink
Project Manager

Eric J. Swenson, PE, GE
Principal Geotechnical Engineer

Enclosures: Daily Field Reports
Moisture/Density Curves
Sand Cone Testing
Moisture Content Summary
Break Log Summary

Distribution: 1 PDF to Addressee, ellis12@llnl.gov

MW/EJS: pmf
R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\12 - December Summary.doc

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| ~~Report #:~~ B583005 | | Date: 12/1-4/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1280 | Page ___ of ___ | |
| Field Rep: | Project Manager: Cal Dickerman | | |
| Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other | Hours Charged: | ☑ Full Time | ☐ Part Time |
| Contractor: Cerrudo | Conditions: ☑ Sunny ☐ Cloudy | ☐ Windy ☐ Rain | ☐ Hot ☑ Cold ☐ Mild ☐ Fog |
| Contractor Representative: Andy Bell | | | |

Comment/ Sketch:

12/1/09 Tue

Sample @ 11am #54a 11:30 am
#54b 12 pm
Sample @ 3pm #55a 3:30 pm
#55b 4 pm
Sunny 55° F

12/2/09 Wed

slow progress

Sunny 55° F

12/3/09 Thu

- Sample @ 10:30 am #56a 11am #56b 11:30 am
- sample @ 3:45 pm #57a 4:15 pm
- Break #53a @ 3 days 250 psi 10 am

Sunny 55° F

12/4/09 Fri

Break #54a @ 3days 210 psi 12:30 pm
Break #55a @ 3days 190 psi 1pm
Sample @ 12:45 pm #58a 1:45 pm, #58b 2 pm
Sample @ 3pm #59a 4pm, #59b 4:30 pm

Sunny 55° F

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☑ This DFR is Preliminary - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ This DFR is Final - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 12/4/09 | Reviewed By: | Date: |
|---|---|---|---|

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 11/9/09 11:30am | 44a | 11/12/09 9am | shell/ 10:45am/ 10% | 116.50 | 3659 | **290** | 24.70% |
| 11/9/09 11:40am | 44b | 11/16/09 12pm | shell/ 10:45am/ 10% | 116.50 | 4533 | **360** | 24.70% |
| 11/9/09 12pm | 45a | 11/12/09 9:20am | Ax/ 10:45am/ 5% | 116.40 | 2407 | **190** | 27.20% |
| 11/9/09 12:30pm | 45b | 11/16/09 12:20pm | Ax/ 10:45am/ 5% | 116.40 | 3371 | **270** | 27.20% |
| | | | | | | | |
| 11/10/09 11am | 46a | 11/12/09 9:40am | shell/ 10:30am/ 10% | 118.50 | 3443 | **270** | 25.10% |
| 11/10/09 11:20am | 46b | 11/17/09 10am | shell/ 10:30am/ 10% | 118.50 | 4892 | **390** | 25.10% |
| | | | | | | | |
| 11/11/09 10:30am | 47a | 11/16/09 12:40pm | Ax/ 9:30am/ 5% | 116.20 | 1681 | **130** | 23.20% |
| 11/11/09 11am | 47b | 11/18/09 10am | Ax/ 9:30am/ 5% | 116.20 | 2280 | **180** | 23.20% |
| | | | | | | | |
| 11/12/09 10:30am | 48a | 11/16/09 1pm | Ax/ 9:30am/ 5% | 114.70 | 1756 | **140** | 20.00% |
| 11/12/09 11am | 48b | 11/19/09 8:30am | Ax/ 9:30am/ 5% | 114.70 | 2130 | **170** | 20.00% |
| | | | | | | | |
| 11/16/09 2pm | 49a | 11/19/09 8:50am | Ax/ 1:30pm/ 10% | 117.80 | 3100 | **250** | 21.20% |
| 11/16/09 2:20pm | 49b | 11/23/09 1pm | Ax/ 1:30pm/ 10% | 117.8 | 4171 | **330** | 21.20% |
| | | | | | | | |
| 11/17/09 2:30pm | 50a | 11/19/09 9:10am | Ax/ 1pm/ 10% | 118.80 | 4533 | **360** | 17.20% |
| 11/17/09 2:50pm | 50b | 11/24/09 9am | Ax/ 1pm/ 10% | 118.80 | 4764 | **380** | 17.20% |
| | | | | | | | |
| 11/19/09 12:30pm | 51b | 11/23/09 1:30pm | Ax/ 12pm/ 10% | 117.90 | 3586 | **290** | 24.90% |
| 11/19/09 1pm | 51b | 11/25/09 9am | Ax/ 12pm/ 10% | 117.90 | 3922 | **310** | 24.90% |
| | | | | | | | |
| 11/23/09 12pm | 52a | 11/25/09 9:30am | Ax/ 11:30am/ 10% | 116.7 | 3029 | **240** | 21.10% |
| 11/23/09 12:30pm | 52b | 11/30/09 9am | Ax/ 11:30am/ 10% | 116.70 | 4163 | **330** | 21.10% |
| | | | | | | | |
| 11/30/09 12pm | 53a | 12/3/09 10am | Ax/ 11:30am/ 10% | 118.00 | 3193 | **250** | 23.60% |
| 11/30/09 12:30pm | 53b | | Ax/ 11:30am/ 10% | 118 | | | 23.60% |
| | | | | | | | |
| 12/1/09 11:30pm | 54a | 12/4/09 12:30pm | Ax/ 11am/ 10% | 119.30 | 2630 | **210** | 22.40% |
| 12/1/09 12pm | 54b | | Ax/ 11am/ 10% | 119.30 | | | 22.40% |
| 12/1/09 3:30pm | 55a | 12/4/09 1pm | Ax/ 3pm/ 10% | 118.6 | 2430 | **190** | 25.50% |
| 12/1/09 4pm | 55b | | Ax/ 3pm/ 10% | 118.60 | | | 25.50% |
| | | | | | | | |
| 12/3/09 11am | 56a | | Ax/ 10:30am/ 10% | 119.40 | | | 23.60% |
| 12/3/09 11:30am | 56b | | Ax/ 10:30am/ 10% | 119.40 | | | 23.60% |
| 12/3/09 4:15pm | 57 | | Ax/ 3:45pm/ 10% | 121.70 | | | 23.00% |
| | | | | | | | |
| 12/4/09 1:45pm | 58a | | Ax/ 12:45pm/ 10% | 118.50 | | | |
| 12/4/09 2pm | 58b | | Ax/ 12:45pm/ 10% | 118.50 | | | |
| 12/409 3:45pm | 59a | | Ax/ 3pm/ 10% | 121.90 | | | |
| 12/4/09 4pm | 59b | | Ax/ 3pm/ 10% | 121.9 | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Geosphere Cons ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 11-30 TO 12-2-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAU 1276 | Page 1 of 2 |
| Field Rep: TONY PHILLIPS | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☒ Cold ☐ Fog

Comment/ Sketch:

11-30-09

0900 SPRD 10% CMT WT 31# ON S. OUTER SHELL
1000 MIX & REMIX
1110 SOIL SAMPLE CYL BRK & START COMPACTION
1200 DENSITY TEST
1300 SPRD 10% CMT WT. 30# BETWEEN N. & CTR MONITORING WELLS
1400 MIX & REMIX
1430 COMPACT
1600 DENSITY TEST

12-1-09

0800 DEPTH OF LIFT CHECK BY SCS ±14"
0900 10% CMT WT. 31#
1000 MIX & REMIX CHECK CMT. WT. 33#
1100 SOIL SAMPLE FOR CYL BRK.
1115 COMPACT
1200 DENSITY TEST
1300 CMT WT. CHECK 31#
1440 SOIL SAMPLE CLY BRK.
1515 DENSITY TEST.
SCS INSTALL WADDLES & HYDRO SEED IN SECTOR A-3 & A-4
& STARTED BACK FILL OF 6' PIT IN SECTOR A-4

12-2-09

0800 SCS PL. LIFT ON PAD IN SECTOR AX
GRIFFIN FIXED SPREADER TRUCK AUGER BEARING.
SCS STARTED REMOVING HAUL ROAD BEHIND B-850
& RD. AROUND B-850
0930 SPRD 10% CMT WT 32# W. SIDE OUTER SHELL & TIE-IN
1000 MIX & REMIX & COMPACT
1035 MIXER BROKE 11 LUGS BROKE ON RT. FRT. WHEEL
1220 DENSITY TEST.
1400 MIXER FIXED
1430 MIX PAD FOR CTR MONITORING WELL
1445 DENSITY TEST ON 6' PIT IN SECTOR A-4
1500 SCS BACKFILL 6" LIFT AROUND CTR M.W.
1530 COMPACT 6" LIFT.



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | |
|---|---|
| Report #: | Date: 12-3 + 12-4-09 |
| Project Name: B-330 SOIL REMEDIATION | Project Number: LAW 1278 |
| Page 2 of 2 | |
| Field Rep: Tony Phillips | Project Manager: |
| Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other | Hours Charged: ☒ Full Time ☐ Part Time |
| Contractor: CERRUDO | Conditions: ☒ Sunny ☐ Windy ☐ Hot ☐ Mild |
| Contractor Representative: ANDY BELL | ☐ Cloudy ☐ Rain ☒ Cold ☐ Fog |

Comment/ Sketch:

12-3-09

0800 SPRD 10% CMT OVER LAST LIFT OF CONTAMINATED SOIL ON PAD IN SECTOR A-X WT. 32#
0830 MIX + REMIX PAD FOR BACK FILL AROUND CTR. MONITORING WELL
0900 BACK FILL AROUND CTR. MW.
0900 MIX + REMIX PAD
1000 DENSITY TEST
1030 COMPACT PAD
1030 SOIL SAMPLE FOR CYL. BRK.
1100 DENSITY TEST
1120 CHECK WT. OF CMT. 31#
1145 DENSITY TEST.
1545 SOIL SAMPLE FOR CYL. BRK., MIXER BROKE TONGUE SNAPPED
1630 DENSITY TEST.

12-4-09

0700 SCS CREW PLACED ±15" LIFT (FINAL LIFT) OF CLEAN FILL OVER ENTIRE PAD IN SECTOR A-X. DEPTH VERIFIED BY SCS USING PROBE MARKED @ 15". CREW ALSO ROUGH SHAPED 3:1 SLOPE ON E., S., + W. SIDE OF PAD GRIFFIN - WELDED TONGUE BACK ON MIXER.
1030 SPRD CMT 10% WT 31#
1045 MIX + REMIX
1055 MIXER BROKE WELD DID NOT HOLD
1200 MIXER FIXED + BACK TO MIXING 10% CMT.
1250 SOIL SAMPLE FOR CYL. BRK
1300 COMPACT TREATED SOIL
1330 DENSITY TEST
1345 CHECK ~~CM~~ WT. ON CMT. 10% 30#
1500 SOIL SAMPLE CYL. BRK.
1545 DENSITY TEST.
1645 DENSITY TEST
SCS CREW HYDROSEED A-3 + B-1 + A-2 SECTORS

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Con. ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 11-30 TO 12-5-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW~~278~~1279 | Page 1 of 2 |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other — Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO

Contractor Representative: ANDY BELL

Conditions: ☒ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☒ Cold ☐ Fog

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A – 90109-01 | BRN SDY SLT W/SS 10% CMT | 107.0 | 18.5 | ☒ 90% | ☐ Opt. + 2% |
| B – 11169-01 | " " " " " " DIRTY | 106.5 | 18.5 | ☐ 95% | ☒ Opt. + 2% to 5% |
| C – 071409-01 | MIX BRN SDY SLT W/SS | 114.5 | 14.5 | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | MW = MONITORING WELLS | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | 11-30-09 | | | | | | | |
| 1 | ± 30' SW OF CTR. MW | 1312 | 118.0 | 19.4 | 98.8 | A | 92 | |
| 2 | ± 40' NW OF CTR MW | " | 119.8 | 18.6 | 101.0 | B | 95 | |
| | 12-1-09 | | | | | | | |
| 1 | ± 60' W. OF N. MW | ~~1313~~ 1313 | 119.3 | 22.2 | 97.6 | B | 92 | |
| 2 | ± 60' N OF CTR MW | " | 118.6 | 22.6 | 96.7 | B | 91 | |
| | 12-2-09 | | | | | | | |
| 1 | ± 80' W OF CTR MW | 1313 | 119.5 | 21.7 | 98.2 | A | 92 | |
| 2 | @ A-4 PIT | -3' SG | 118.8 | 12.3 | 105.7 | C | 92 | |
| | 12-3-09 | | | | | | | |
| 1 | @ CTR MW | 1314 | 118.5 | 23.0 | 96.3 | A | 90 | |
| 2 | ± 70' W. NW. OF N. MW | " | 119.4 | 23.4 | 96.8 | A | 90 | |
| 3 | @ A-4 PIT | -2' SG | 118.3 | 13.7 | 104.0 | C | 91 | |
| 4 | ± 6' W OF CTR MW | 1314 | 121.7 | 22.8 | 99.1 | A | 93 | |
| | 12-4-09 | | | | | | | |
| 1 | ± 90' N. NW OF N. MW | 1315 | 118.5 | 22.6 | 96.7 | A | 90 | |
| 2 | ± 40' N OF CTR MW | " | 121.9 | 21.5 | 103.0 | A | 94 | |
| 3 | ± 120' NW OF CTR. MW | " | 118.4 | 20.4 | 98.3 | A | 92 | |
| | | | | | | | | |

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: | Reviewed By: | Date: |

Geosphere Con: ints, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# AILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: 12-9-09 | |
| Project Name: B-850 Soil Remediation | Project Number: WW1279 | Page ____ of ____ | |
| Field Rep: Troy DePhillips | Project Manager: | | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor:

Contractor Representative:

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☒ Cloudy ☐ Rain ☒ Cold ☐ Fog

| Equipment | Type | Number |
|---|---|---|
| Compaction | BOMAG | 1 |
| Moving | LOADER | 1 |
| Water | | |
| Support | | |

Density Testing Equipment: ☒ Nuclear Type: TROXLER ☐ Tube ☐ Sand Cone

Fill Source: ☒ Native ☐ Import

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: A-4 6' PIT

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A - 071409-01 | MIX BRN SDY SLT w/ SS | 114.5 | 14.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☒ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☐ Other: |
| | | | | | |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | A-4 PIT | -1' SG | 119.1 | 14.7 | 103.8 | A | 91 | |
| 2 | A-4 PIT | FSG | 118.3 | 13.0 | 104.6 | A | 91 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

Field Representative: [signature] Date: ________ Reviewed By: ________________ Date: ________

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 12-7 TO 12-10-09 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1279 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☑ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: CERRUDO SERV.

Contractor Representative: ANDY BELL

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☑ Cloudy ☑ Rain ☑ Cold ☐ Fog X SNOW

Comment/ Sketch:

12-7-09

SCS CREW DECONTAMINATE GRIFFIN'S WATER TRK & THE OFF RD. HAUL TRUCK. & CLEANED 2+" OF SNOW OFF OF PAVED ACCESS ROADS. FOUL WEATHER & HAZARDOUS CONDITIONS, SLIP, TRIPS, FALLS ARE THE MAJOR HAZARDS TODAY & POSSIBLE FROST BITE DUE TO DECONNING EQUIP. LLNL & SCS WAS INFORMED OF THESE HAZARDS BY CERRUDO & MYSELF, BUT WORK CONTINUED. FORTUNITLY NO ACCIDENTS HAPPEND TODAY EVERYONE WAS SAFE.

12-8-09

SCS CREW CONTINUES TO DECON EQUIP & SHAPE EAST, WEST. & SOUTH SIDE OF PAD TO 3:1 SLOPE

12-9-09

SCS CREW CONTINUES TO SHAPE PAD IN SECTOR A-X TO A 3:1 SLOPE, & GRADE JEEP TRAIL, DECON EQUIP., INSTALL WADDLES IN SECTOR A-4. CREW MIXED NEAT CEMENT (CONCRETE SLURRY) 1=94# SACK TO 6 GAL. OF WATER & PUMPED SLURRY BETWEEN PVC CASTING & PVC LINER PIPE USING A TRIMEE METHOD ± 12' DEEP @ MONITORING WELLS W-850-2417, W-850-2416, + NC7-28, CTR.MW. & @ N.MW; NC7-71. BACK FILL & COMPACT A-4 PIT DENSITY TEST TAKEN.

12-10-09

SCS CREW CONTINUES TO DECON EQUIP. & PLACE WADDLES ON SLOPES OF SECTOR A-X. CREW ALSO EXCAVATED ±4" OF SOIL @ JEEP TRAIL ENTRY @ A.C. & PLACE MIRAFI UNDER 4" OF AB.



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: ______ | Reviewed By: ______ | Date: ______ |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| ~~Report #:~~ B-583005 | | Date: 12/7-10/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1280 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |
| Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench | ☐ Other | Hours Charged: ☒ Full Time | ☐ Part Time |
| Contractor: Gerrodo | Conditions: ☒ Sunny ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | ☒ Cloudy ☐ Rain | ☒ Cold | ☐ Fog |

Comment/ Sketch:

12/7/09 Mon

Break #53b @ 7days 350 psi 9AM
#56a @ 4 days 320 psi 9:30 AM
#58a @ 3days 350 psi 10 AM
#59a @ 3 days 260 psi 10:30 AM

snow, Cloudy 32°F

12/8/09 Tue

Break #54b @ 7days 290 psi 10 AM
#55b @ 7days 310 psi 11am

Sunny 35°F

12/9/09 Wed

Break #56b @ 6 days 320 psi 8:30 AM
#57b @ 6 days 310 psi 9AM
#58b @ 5 days 390 psi 9:30 am
#59b @ 5 days 360 psi 10 AM

Sunny 35°F

12/10/09 Thu

- Reports
- Lab work

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 12/10/09 | Reviewed By: ____ | Date: ____ |

COMPACTION LOCATION
SUMMARY SHEET

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Date | **Density Designation for Cement Treated. Fill** in area Ax | Location: Northing / Easting | Elevation MSL | Wet Den. | Dry Den. | % Moist | **90% min.** |
|---|---|---|---|---|---|---|---|
| 11/4/2009 | 53' south of MW 11:30am | | | 116.8 | 94.7 | 23.3 | **92.00** |
| 11/4/2009 | 70' west NW of MW 3pm | | | 120.8 | 99.8 | 21.1 | **96.00** |
| | | | | | | | |
| 11/9/2009 | 96' west of MW 11:30am | | 1305 | 116.5 | 93.2 | 25 | **92.00** |
| 11/9/2009 | 96' west NW of MW 11:45am | DUPLICATE | 1305 | 116.4 | 93.7 | 24.6 | **93.00** |
| 11/9/2009 | 40' west NW of north MW 2:45pm | | 1305 | 121.4 | 99.8 | 21.6 | **92.00** |
| | | | | | | | |
| 11/10/2009 | 33' north NE of MW 10:30am | | 1306 | 118.5 | 99.7 | 18.8 | **94.00** |
| 11/10/2009 | at center of MW | | 1306 | 113.4 | 90.4 | 25.4 | **90.00** |
| | | | | | | | |
| 11/11/2009 | 54' north of center of MW 10am | | 1306 | 116.2 | 93.9 | 23.8 | **93.00** |
| 11/11/2009 | 48' north NW of center of MW 3:45pm | | 1306 | 118.5 | 99.6 | 19 | **94.00** |
| | | | | | | | |
| 11/12/2009 | 8' south of center of MW 9:45am | | | 114.7 | 95.2 | 20.5 | **91** |
| 11/12/2009 | 40' west of north MW 11:30am | DUPLICATE | | 117.4 | 99.2 | 18.3 | **94.00** |
| 11/12/2009 | at center of MW 11:40am | | | 105.2 | 87.2 | 20.6 | 84 |
| | | | | | | | |
| 11/16/2009 | **retest of #3 11/12/09** | | 1308 | 112.7 | 94.6 | 19.1 | **90.00** |
| 11/16/2009 | 54' west of center of MW | | 1308 | 117.8 | 98.4 | 19.7 | **93** |
| 11/16/2009 | 40' north of center of MW | DUPLICATE | 1308 | 120.7 | 99.7 | 21.1 | **95.00** |
| 11/16/2009 | at north MW | | 1308 | 113.8 | 96.4 | 18 | **90.00** |
| | | | | | | | |
| 11/17/2009 | 60' north of north MW | | 1308 | 118.8 | 98.2 | 21 | **94** |
| 11/17/2009 | 30' north NE of center of MW | | 1308 | 121.5 | 101.3 | 20 | **96.00** |
| | | | | | | | |
| 11/19/2009 | 21' south of center of MW | | 1308 | 117.9 | 96 | 22.8 | **93.00** |
| | | | | | | | |
| 11/23/2009 | 87' west of north MW | | | 116.7 | 97.3 | 20 | **92.00** |
| | | | | | | | |
| 11/30/2009 | 30' SW of center MW 12pm | | 1312 | 118 | 98.8 | 19.4 | **93.00** |
| 11/30/2009 | 40' NW of center MW 4pm | | 1312 | 119.8 | 101 | 18.6 | **95** |
| | | | | | | | |
| 12/1/2009 | 60' west of north MW 12pm | | 1313 | 119.3 | 97.6 | 22.2 | **94** |
| 12/1/2009 | 60' north of center MW 3:15pm | | 1313 | 118.6 | 96.7 | 22.6 | **94** |
| | | | | | | | |
| 12/2/2009 | 80' west of center MW 12:20pm | | 1313 | 119.5 | 98.2 | 21.7 | **94** |
| | | | | | | | |
| 12/3/2009 | at center MW 10am | | 1314 | 118.5 | 96.3 | 23 | **94** |
| 12/3/2009 | 70' west NW of north MW 11am | | 1314 | 119.4 | 96.8 | 23.4 | **94.00** |
| 12/3/2009 | 6' west of center MW 4:30pm | | 1314 | 121.7 | 99.1 | 22.8 | **96.00** |
| | | | | | | | |
| 12/4/2009 | 90' north NW of north MW 1pm | | 1315 | 118.5 | 96.7 | 22.6 | **94** |
| 12/4/2009 | 40' north of center MW 3:45pm | | 1315 | 121.9 | 100.3 | 21.5 | **96.00** |
| 12/4/2009 | 120' NW of center MW 4:45pm | | 1315 | 118.4 | 98.3 | 20.4 | **94.00** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Break Log**
*Test stopped due to limit of machine
**100psi min.**

**CONSOLIDATED ENGINEERING LABORATORIES**

LLNL Site 300 B-850 Soil Remediation
B-583005

| Sample Date time molded | Sample 4" diam. | Break Date time | Sample Location/ Time/ %cement | unit wt. wet | Max Load (lbs) | **Test Strength (psi)** | moist. C. |
|---|---|---|---|---|---|---|---|
| 11/9/09 11:30am | 44a | 11/12/09 9am | shell/ 10:45am/ 10% | 116.50 | 3659 | **290** | 24.70% |
| 11/9/09 11:40am | 44b | 11/16/09 12pm | shell/ 10:45am/ 10% | 116.50 | 4533 | **360** | 24.70% |
| 11/9/09 12pm | 45a | 11/12/09 9:20am | Ax/ 10:45am/ 5% | 116.40 | 2407 | **190** | 27.20% |
| 11/9/09 12:30pm | 45b | 11/16/09 12:20pm | Ax/ 10:45am/ 5% | 116.40 | 3371 | **270** | 27.20% |
| | | | | | | | |
| 11/10/09 11am | 46a | 11/12/09 9:40am | shell/ 10:30am/ 10% | 118.50 | 3443 | **270** | 25.10% |
| 11/10/09 11:20am | 46b | 11/17/09 10am | shell/ 10:30am/ 10% | 118.50 | 4892 | **390** | 25.10% |
| | | | | | | | |
| 11/11/09 10:30am | 47a | 11/16/09 12:40pm | Ax/ 9:30am/ 5% | 116.20 | 1681 | **130** | 23.20% |
| 11/11/09 11am | 47b | 11/18/09 10am | Ax/ 9:30am/ 5% | 116.20 | 2280 | **180** | 23.20% |
| | | | | | | | |
| 11/12/09 10:30am | 48a | 11/16/09 1pm | Ax/ 9:30am/ 5% | 114.70 | 1756 | **140** | 20.00% |
| 11/12/09 11am | 48b | 11/19/09 8:30am | Ax/ 9:30am/ 5% | 114.70 | 2130 | **170** | 20.00% |
| | | | | | | | |
| 11/16/09 2pm | 49a | 11/19/09 8:50am | Ax/ 1:30pm/ 10% | 117.80 | 3100 | **250** | 21.20% |
| 11/16/09 2:20pm | 49b | 11/23/09 1pm | Ax/ 1:30pm/ 10% | 117.8 | 4171 | **330** | 21.20% |
| | | | | | | | |
| 11/17/09 2:30pm | 50a | 11/19/09 9:10am | Ax/ 1pm/ 10% | 118.80 | 4533 | **360** | 17.20% |
| 11/17/09 2:50pm | 50b | 11/24/09 9am | Ax/ 1pm/ 10% | 118.80 | 4764 | **380** | 17.20% |
| | | | | | | | |
| 11/19/09 12:30pm | 51b | 11/23/09 1:30pm | Ax/ 12pm/ 10% | 117.90 | 3586 | **290** | 24.90% |
| 11/19/09 1pm | 51b | 11/25/09 9am | Ax/ 12pm/ 10% | 117.90 | 3922 | **310** | 24.90% |
| | | | | | | | |
| 11/23/09 12pm | 52a | 11/25/09 9:30am | Ax/ 11:30am/ 10% | 116.7 | 3029 | **240** | 21.10% |
| 11/23/09 12:30pm | 52b | 11/30/09 9am | Ax/ 11:30am/ 10% | 116.70 | 4163 | **330** | 21.10% |
| | | | | | | | |
| 11/30/09 12pm | 53a | 12/3/09 10am | Ax/ 11:30am/ 10% | 118.00 | 3193 | **250** | 23.60% |
| 11/30/09 12:30pm | 53b | 12/7/09 9am | Ax/ 11:30am/ 10% | 118 | 4356 | **350** | 23.60% |
| | | | | | | | |
| 12/1/09 11:30pm | 54a | 12/4/09 12:30pm | Ax/ 11am/ 10% | 119.30 | 2630 | **210** | 22.40% |
| 12/1/09 12pm | 54b | 12/8/09 10am | Ax/ 11am/ 10% | 119.30 | 3644 | **290** | 22.40% |
| 12/1/09 3:30pm | 55a | 12/4/09 1pm | Ax/ 3pm/ 10% | 118.6 | 2430 | **190** | 25.50% |
| 12/1/09 4pm | 55b | 12/8/09 11am | Ax/ 3pm/ 10% | 118.60 | 3321 | **260** | 25.50% |
| | | | | | | | |
| 12/3/09 11am | 56a | 12/7/09 9:30am | Ax/ 10:30am/ 10% | 119.40 | 4061 | **320** | 23.60% |
| 12/3/09 11:30am | 56b | 12/9/09 8:30am | Ax/ 10:30am/ 10% | 119.40 | 4083 | **320** | 23.60% |
| 12/3/09 4:15pm | 57 | 12/9/09 9am | Ax/ 3:45pm/ 10% | 121.70 | 3863 | **310** | 23.00% |
| | | | | | | | |
| 12/4/09 1:45pm | 58a | 12/7/09 10am | Ax/ 12:45pm/ 10% | 118.50 | 4453 | **350** | 20.20% |
| 12/4/09 2pm | 58b | 12/9/09 9:30am | Ax/ 12:45pm/ 10% | 118.50 | 4856 | **390** | 20.20% |
| 12/409 3:45pm | 59a | 12/7/09 10:30am | Ax/ 3pm/ 10% | 121.90 | 3321 | **260** | 23.10% |
| 12/4/09 4pm | 59b | 12/9/09 10am | Ax/ 3pm/ 10% | 121.9 | 4525 | **360** | 23.10% |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | ~~Report #:~~ B-583005 | Date: 12/14-17/09 |
| Project Name: LLNL Site 300 B 850 Soil R. | Project Number: LAW 1280 | Page 1 of 1 |
| Field Rep: Robert Uribe | Project Manager: Cal Dickelman | |

Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☑ Full Time ☐ Part Time

Contractor: Cerrudo

Contractor Representative: Andy Bell

Conditions: ☑ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☑ Cold ☐ Fog

Comment/ Sketch:

$\boxed{12/14-16/09}$ Mon-wed

clean, prep soils lab for transport

$\boxed{12/17/09}$ Thur

SCG placed mix of AB and clumps of soil in low areas on access road behind B 850, material is over opt. moist, area was scarified and will be allowed to dry out over night

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 12/17/09 | Reviewed By: | Date: |

Geosphere Cons[illegible]nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | ~~Report #:~~ B 583005 | Date: 12/17/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1280 | Page ___ of ___ | |
| Field Rep: | Project Manager: Cal Dickerman | | |

| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | Conditions: | | | | |
|---|---|---|---|---|---|---|
| Contractor: Cervudo | | | ☒ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | | ☐ Cloudy | ☐ Rain | ☒ Cold | ☐ Fog |

| Equipment | Type | Number | Density Testing Equipment | |
|---|---|---|---|---|
| Compaction | Sheeps foot | | ☒ Nuclear | Type: Trox |
| Moving | | | ☐ Tube | |
| | | | ☐ Sand Cone | |
| Water | | | Fill Source: ☒ Native on site | |
| Support | | | ☐ Import | |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: C-1 30'×20' area North of large bin

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 7080901 | Lt Brn sandy silt | 113.5 | 16.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☒ Other: |
| | | | | | over opt moist |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 10'E and 10'S of NW corner | FSG | | ~~[illegible]~~ 21.1 | 103.2 | 70809-01 | 91 | |
| 2 | 10'N and 10'W of SE corner | \| | | 20.3 | 104.9 | | 92 | |
| | | \| | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 12/17/09 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 12-14 TO 12-17 |
| Project Name: B-850 SOIL REMEDIATION | Project Number: LAW 1279 | Page ______ of ______ |
| Field Rep: Tony Phillips | Project Manager: | |

Scope of Work: ☒ Mass Grading ☐ Pavement ☐ Utility Trench ☒ Other

Hours Charged: ☒ Full Time ☐ Part Time

Contractor: CERRUDO SERV.

Contractor Representative: ANDY BELL

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☒ Cloudy ☒ Rain ☒ Cold ☐ Fog

Comment/ Sketch:

12-14-09

SCS. CONTINUES TO HYDRO SEED SOUTH SIDE SLOPE OF PAD @ V-DITCH SECTOR A-X & DECON EQUIP. CREW ALSO STARTED HYDRO SEED SECTOR A-4.
SCS CREW USED 650 DOZER & LOADER TO SCRAPE & SHAPE ± 1½" OF MUD & LOOSE MATERIAL OFF OF PAD IN SECTOR A-X. USING EQUIP OVER FINISHED CEMENT TREATED & COMPACTED SOIL MAY POSSIBLY CAUSE FRACTURING ~~OF~~ TOP OF PAD.

12-15-09

SCS CONTINUES TO HYDRO SEED SECTOR A-4 & DECON EQUIP. CREW EXCAVATED BENCH ±8' WIDE ON EAST SIDE ~~OF~~ SLOPE OF PAD SECTOR A-X HOGGING OUT CEMENT TREATED SOIL 1' TO 2' DIA. LEAVING HOLE IN EXCAVATED AREA THEN USING EXCAVATOR W/BUCKET TO COMPACT LOOSE TREATED SOIL TO BACK FILL HOLE'S. THEN GRADED BENCH & SHAPED IT, W/ 650 DOZER. CREW OFF HAULED SPOILS TO CLEAN STOCK PILE @ LOWER CORP. YARD.
THIS WORK & TRACKING OVER CEMENT TREATED PAD MAY ~~CROM~~ COMPROMISE (FRACTURE) THE INTREGRATIE OF COMPACTED PAD FINAL LIFT.

12-16-09

LENARD LONG W/SCS SHUT DOWN JOB SITE DUE TO RAIN. EXCAVATOR BROKE & CAN NOT USE. CEL SOIL LAB TRAILER OFF HAULED TODAY, RON WILLIAMS TOOK EQUIP. OUT OF TRAILER & BACK TO OAKLAND LAB. UNITED RENTAL ON SITE TO FIX EXCAVATOR. GRIFFIN ON SITE TO OFF HAUL MIXER, & REX COMPACTOR. EXCAV. CAN NOT BE FIXED

12-17-09

SCS CREW INSTALLED WADDLES ON BOTH SIDES OF B-850 ACCESS ROAD & ROAD AROUND B-850. CREW ALSO PLACED CLASS II A.B. IN ROAD WAY OVER MUD BEHIND B-850 & CLEANED & ORGANIZED CRZ. AREA IN FRONT OF B-850



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: ______ | Reviewed By: ______ | Date: ______ |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| ~~Report~~ #: B S8300S | | Date: 12/18/09 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1280 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

| Scope of Work: | ☒ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Contractor: Cerrudo | | Conditions: | ☒ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | | ☐ Cloudy | ☐ Rain | ☒ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | Sheeps foot | | Density Testing Equipment | ☒ Nuclear | Type: Trox |
| Moving | | | | ☐ Tube | |
| | | | | ☐ Sand Cone | |
| Water | | | Fill Source | ☒ Native on site | |
| Support | | | | ☐ Import | |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: @ NC7-09 MW

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| 090109-01 | Brn sandy silt w/SS plus 10% cement | 107.0 | 18.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | ☐ Other: | ☒ Other: over opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 1' S of MW NC7-09 | -2' FSG | | 21.5 | 98.1 | 090109-01 | 92 | |
| 2 | 2' S " " | -1' FSG | | 22.8 | 101.3 | \| | 95 | |
| 3 | 1' S " " | R FSG | | 20.5 | 97.4 | \| | 91 | |
| 4 | 1' N " " | -2' FSG | | 21.4 | 98.2 | \| | 92 | |
| 5 | 2' N " " | -1' FSG | | 20.0 | 99.4 | \| | 93 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch: South side of sediment trap was cleaned up all morning, hydroseed was placed at south side of area A1, slope at MW NC7-09 was compacted and built up, part of temp. pad at south side of MW #2417 was removed, small dozer still not repaired

**NOTICE:** Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 12/18/09 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | ~~Report #:~~ B 58300 S | | Date: 12/22,23/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1280 | | Page ___ of ___ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Scope of Work: | ☑ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☑ Full Time ☐ Part Time |

| | | | | | |
|---|---|---|---|---|---|
| Contractor: Cerrudo | Conditions: | ☑ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | ☐ Cloudy | ☐ Rain | ☑ Cold | ☐ Fog |

| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | sheeps foot roller | 1 | Density Testing Equipment | ☑ Nuclear | Type: Trox |
| Moving | | | | ☐ Tube | |
| | | | | ☐ Sand Cone | |
| Water | | | Fill Source | ☑ Native on site | |
| Support | | | | ☐ Import | |

| Plan | Engineer | Date |
|---|---|---|
| Civil | | |
| Structural | | |
| Geotech | | |

Fill Location: 12/22 #1 Jeep road; # 2-4 east R. #4; 12/23 #1-2 east of R. #4

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A | brown sandy silt w/SS W/ cem | 107.0 | 18.5 | ☑ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| B | Lt Brn sandy silt | 113.5 | 16.5 | ☐ Other: | ☑ Other: |
| | | | | | above opt. |

| | Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|---|
| 12/22 | 1 | 15' west of east end | FSG | | 18.9 | 101.3 | A | 95 | |
| 12/22 | 2 | 5' E and 10' S of large V-ditch | -2' FSG | | 17.1 | 103.6 | B | 91 | |
| 12/22 | 3 | " " | -1' FSG | | 19.5 | 105.3 | B | 93 | |
| 12/22 | 4 | " " | @ FSG | | 18.5 | 102.9 | B | 91 | |
| | | | | | | | | | |
| | | | | | | | | | |
| 12/23 | 1 | 5' E and 30' S of large V-ditch | -1.5' FSG | | 16.6 | 104.1 | B | 92 | |
| 12/23 | 2 | 5' E and 40' S " " | -6" FSG | | 17.4 | 107.6 | B | 95 | |

Comment/ Sketch: Tests # 2 - 4 on 12/22 were taken in 20' x 15' area along east side of Route 4 and south of V-ditch
Tests # 1-2 on 12/23 were taken along east side of Route 4 south of large V-ditch



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 12/23/09 | Reviewed By: | Date: |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | ~~Report #:~~ B S83005 | | Date: 12/21-23/09 |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1280 | | Page ____ of ____ |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |
| Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench | ☐ Other | Hours Charged: | ☑ Full Time ☐ Part Time |
| Contractor: | Conditions: | ☐ Sunny ☐ Windy | ☐ Hot ☐ Mild |
| Contractor Representative: | | ☐ Cloudy ☐ Rain | ☐ Cold ☐ Fog |

Comment/ Sketch:

12/21/09 Mon

SCS cont. to clean temp. pad near 3 MWs, cut upper part of jeep road, picked up rocks on north side of clean pile, cont. work on bench cut on east side of Camu

Light rain

12/22/09 Tue

SCS cont. work on bench cut, work on jeep road subgrade completed, all MWs grouted to top; compaction on jeep road and along side of large V-ditch at route #4

12/23/09 Wed

AB placed on jeep road, compaction along side of route #4 west side of clean pile, fly over at 11AM fine grading on top of camu

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsiblity for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 12/23/09 | Reviewed By: ____ | Date: ____ |

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| | Report #: | Date: | |
| Project Name: LLNL Site 300 B850 | Project Number: 10-01280-LAW | Page ____ of ____ | |
| Field Rep: Robert Oribe | Project Manager: Cal Dickerman | | |

Scope of Work: ☐ Mass Grading ☐ Pavement ☐ Utility Trench ☐ Other

Hours Charged: ☐ Full Time ☐ Part Time

Contractor:

Contractor Representative:

Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild ☐ Cloudy ☐ Rain ☐ Cold ☐ Fog

Comment/ Sketch: 12/28/09 Mon

SCS compacted approx 4" of material on east side of Route #4 south of V ditch, light rain prevented testing, hydro seeding at A2, B1, work on bench cut, removed cattle gards and removed fabric and AB undergards, 0.1" of rain in an hour and no standing water on Camu

---

12/29/09 Tue

Waddles on east side of Camu, added rock to south side of sediment trap, put up road markers on Route #4, cleaned up B850, no standing water on Camu

Sunny

NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractural requirements. No one except our client may rely on our findings and opinions. The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 12/29/09 | Reviewed By: ____ | Date: ____ |

CONSOLIDATED ENGINEERING
LABORATORIES
"Partners in Quality"

February 16, 2010

Mr. Steve Ellis
Lawrence Livermore National Laboratory
P.O. Box 808; L-871
Livermore, California 94551-0808

Subject: LLNL B-850 Soil Remediation
B850-S300
Livermore, CA
CEL Project #10-01282-LAW & 10-01283-LAW

**EARTHWORK AND LABORATORY TESTING SUMMARY**
January 4, 2010 through January 17, 2010

CEL representatives observed site operations and/or performed nuclear gauge moisture and density determinations on compacted soils at the above project from January 4, 2010 through January 17, 2010. Laboratory testing from previous work on soil samples were used to evaluate the field results. Enclosed are the results of the field and laboratory testing.

We submit the density tests as presented in this report. We recommend that you confirm with the Project Engineer, SCS Engineers, to accept the density results submitted in these tests. It is the responsibility of LLNL to review and after consulting with SCS Engineers, approve these test results.

Respectfully submitted,
**CONSOLIDATED ENGINEERING LABORATORIES**

Michael Wissink
Project Manager

Eric J. Swenson, PE, GE
Principal Geotechnical Engineer

Enclosures: Daily Field Reports

Distribution: 1 to Addressee

MW/EJS: pmf
R:\Geotech Projects by Number\LLNL\LLNL Bldg 850 Excavation and Remediation Plan - 95% Submittal\Monthly Summary Reports\01 January 2010 Summary.doc

Geosphere Cons...nts, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| ~~Report~~ #: ~~LAW~~ B-583005 | | Date: 1/4-7/10 | |
| Project Name: LLNL Site 300 B850 Soil R. | Project Number: LAW 1282 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |
| Scope of Work: ☑ Mass Grading ☐ Pavement ☐ Utility Trench | ☐ Other | Hours Charged: ☑ Full Time | ☐ Part Time |
| Contractor: Cerrudo | Conditions: ☐ Sunny ☐ Windy ☐ Hot ☐ Mild | | |
| Contractor Representative: Andy Bell | ☑ Cloudy ☐ Rain ☑ Cold ☐ Fog | | |

Comment/ Sketch:

1/4/10 Mon

- mud removed from bottom of jeep road
- small stock pile removed from top of Camu
- two loads of hydro seed removed from site
- back hoe delivered to site
- north side of clean pile graded and track rolled
- low areas filled with soil on west side of BLDG no more than 2"-3" in depth

1/5/10 Tue

- BLDG 850 clean up cont.
- work cont. on clean pile, 3 to 1 slope and track walked
- sweeper and concrete saw brought on site @ 3:30 pm
- hydro seed was moved down to office trailer

1/6/10 Wed

- cont. work on clean pile 3 to 1 slope grading
- road to BLDG 850 was swepted, north side of BLDG was power washed
- silt fence around site was removed by LLNL
- areas to be patched with AC were outlined

1/7/10 Thu

- west side of access road was subexed approx 2' and backfilled and compacted in two lifts
- work cont. on clean pile
- Route #4 swepted and power washed
- D6 removed from site, small vibra plate brought on site
- Jeep road tested in center area, sides need to be compacted



☑ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: [signature] | Date: 1/7/10 | Reviewed By: | Date: |

Geosphere Con[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | | |
|---|---|---|---|
| Report #: B-589005 | | Date: 1/7/10 | |
| Project Name: LLNL Site 300 B850 soil R. | Project Number: LAW 1282 | Page ____ of ____ | |
| Field Rep: Robert Uribe | Project Manager: Cal Dickerman | | |

| Scope of Work: | ☑ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☐ Other | Hours Charged: | ☑ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contractor: Cerrudo | Conditions: | ☐ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | ☑ Cloudy Fog | ☐ Rain | ☑ Cold | ☐ Fog |

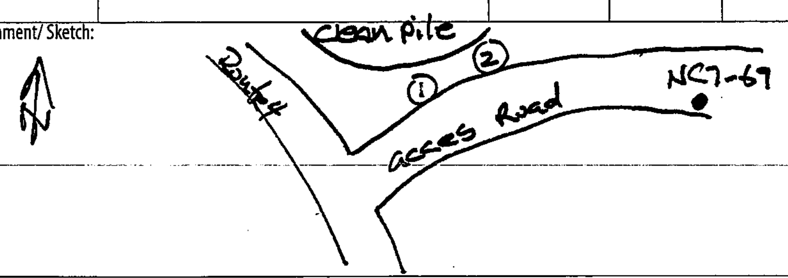
| Equipment | Type | Number | Density Testing Equipment | |
|---|---|---|---|---|
| Compaction | smooth drum roller | 1 | | ☑ Nuclear Type: Trox |
| Moving | | | | ☐ Tube |
| | | | | ☐ Sand Cone |
| Water | | | Fill Source | ☑ Native on site |
| Support | | | | ☐ Import |

| Plan | Engineer | Date | Fill Location: |
|---|---|---|---|
| Civil | | | west side of access road to MW #NC7-69 |
| Structural | | | |
| Geotech | | | |

| Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|
| A | Lt Brn Sandy Silt | 113.5 | 16.5 | ☑ 90% | ☐ Opt. + 2% |
| | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| B | Tan CL II AB | 136.0 | 4.0 | ☐ Other: | ☑ Other: |
| | | | | | above opt. |
| | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | 40' NE of Route 4 | -1' FSG | | 17.7 | 103.9 | A | 92 | |
| 2 | 60' NE of Route 4 | RFSG | | 16.8 | 101.7 | A | 90 | |
| | | | | | | | | |
| 3 | center of jeep road 50' ~~east~~ west | FAB | | 6.3 | 134.5 | B | 99 | |
| | of ~~west~~ east end | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/ Sketch:




NOTICE: Our firm's professionals are represented on site soley to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☑ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 1/7/10 | Reviewed By: | Date: |
|---|---|---|---|

Geosphere Consultants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| | Report #: | Date: 1-11-10 |
| Project Name: B-850 Soil Remediation | Project Number: LA01283 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

| Scope of Work: | ☐ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☒ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contractor: CERRUDO SERV. | Conditions: | ☐ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: ANDY BELL | | ☐ Cloudy | ☒ Rain | ☒ Cold | ☒ Fog |

Comment/ Sketch:

1-11-10

SCS CREW MOISTURE CONDITION THE SIDE OF JEEP RD. & RE COMPACTED USING VIBERA-PLATE. DUE TO RD. IS HIGHER THAN FINISHED GRADE & THE EDGE OF ROAD IS NOT CONFINED VISUAL INSP. SOIL APPEARS TO BE TIGHT.

WORK CONTINUES ON CLEAN PILE & GRADE TO A 3:1 % SLOPE. COMPACTION ACHIEVED ON RD. SHOULDER OF DO All RD. W/ SMOOTH DRUM ROLLER SECTOR A-1. CREW ALSO CONTINUES TO WASH & CLEAN B-850 ACCESS RD.

HYDRO SEED & INSTALL WADDLES AROUND CLEAN PILE.

1-12-10

RAIN DAY. SCS CREW INSTALLED SILT FENCE PERIMETER OF CLEAN PILE & SCRAPED MUD OFF All PAVED ROADS.

~~1-13~~ 1-13-10

SCS CREW SAW CUT AC PAVEMENT FOR PATCH WORK IN ROADS. CREW ALSO CLEANED ROAD RT. #4 & BACK FILLED AC AREA IN FRONT OF B-850 W/ CL. II A.B. AREA 10'W X 15'L. X 2" DEEP & USED SMOOTH DRUM ROLLER FOR COMPACTION.

1-14-10

SCS CREW REMOVED CHIPPED AC AROUND FROM SAW CUT AREAS IN ROADWAY, & TACK OILED EDGES OF AC PATCH WORK. AC ON SITE @ 10:00 HRS, TEMP 280° USED SMOOTH DRUM ROLLER FOR COMPACTION ON AC PATCH WORK ON RT. #4 & B-850 ACCESS RD.



☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/ or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: ______ | Reviewed By: ______ | Date: ______ |
|---|---|---|---|

Geosphere Cons[illegible]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# [illegible]AILY FIELD REPORT

| | | |
|---|---|---|
| Report #: | | Date: 1-11-10 |
| Project Name: B-850 Soil Remediation | Project Number: LAW 1283 | Page ____ of ____ |
| Field Rep: Tony Phillips | Project Manager: | |

| Scope of Work: | ☐ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☒ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contractor: CERRUDO | Conditions: | ☐ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: Andy Bell | | ☐ Cloudy | ☐ Rain | ☒ Cold | ☒ Fog |

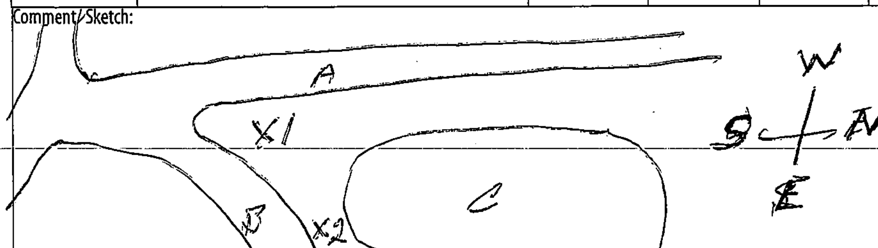
| Equipment | Type | Number | | | |
|---|---|---|---|---|---|
| Compaction | SMOOTH DRUM BOMAG | 1 | Density Testing Equipment | ☒ Nuclear | Type: TROXLER |
| Moving | | | | ☐ Tube | |
| | | | | ☐ Sand Cone | |
| Water | | | Fill Source | ☒ Native | |
| Support | | | | ☐ Import | |

| Plan | Engineer | Date | Fill Location: CLEAN PILE |
|---|---|---|---|
| Civil | LENARD LONG w/SCS | | |
| Structural | / | / | / |
| Geotech | | | |

| | Curve # | Description | Max Density | Opt. Moisture | Required Compaction | Required Moisture |
|---|---|---|---|---|---|---|
| A | 071409-01 | MIX BRN SANDY SILT w/SS | 114.5 | 14.5 | ☒ 90% | ☐ Opt. + 2% |
| | | | | | ☐ 95% | ☐ Opt. + 2% to 5% |
| | | | | | ☐ Other: | ☐ Other: |
| | | | | | | |
| | | | | | | |

| Test # | Location | Elevation | Wet Density (pcf) | Moisture Content | Dry Density (pcf) | Curve # | Percent Compaction | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| 1 | S. OF CLEAN PILE @ | | | | | | | |
| | DOAN RD + RT #4 | FSG | 123.8 | 17.2 | 105.6 | A | 92 | |
| 2 | S. OF CLEAN PILE @ | | | | | | | |
| | 3' N. OF DO AN RD. | FSG | 122.6 | 18.5 | 103.5 | A | 90 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comment/Sketch:




A = RT. #4
B = DO AN RD.
C = CLEAN PILE
X1 = TEST #1
X2 = TEST #2

**NOTICE:** Our firm's professionals are represented on site solely to observe operations of the contractor identified, to form opinions about the adequacy of those operations, and to report those opinions to our client. The presence and activities of our field representatives do not relieve any contractor from its obligation to meet contractual requirements. **No one except our client may rely on our findings and opinions.** The contractor retains sole responsibility for site safety and the methods, operations, and sequences of construction.

☒ **This DFR is Preliminary** - A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final** - A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| Field Representative: [signature] | Date: 1-11-10 | Reviewed By: ______ | Date: ______ |
|---|---|---|---|

Geosphere Cons[ult]ants, Inc.
AN ETS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

# DAILY FIELD REPORT

| | | |
|---|---|---|
| Report #: | | Date: 1-19-10 |
| Project Name: B-850 soil REMEDIATION | Project Number: LAW 1283 | Page ____ of ____ |
| Field Rep: Tom Phillips | Project Manager: | |

| Scope of Work: | ☐ Mass Grading | ☐ Pavement | ☐ Utility Trench | ☒ Other | Hours Charged: | ☒ Full Time | ☐ Part Time |
|---|---|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Contractor: | Conditions: | ☐ Sunny | ☐ Windy | ☐ Hot | ☐ Mild |
| Contractor Representative: | | ☒ Cloudy | ☒ Rain | ☒ Cold | ☐ Fog |

Comment/ Sketch: RAIN ! SCS CREW INSTALL silT FENCE ON W. SIDE OF RT. #4 @ LOWER CMP. ROAD CROSSING. REPOSITION & REINSTALL EXISTING WADDLES AROUND JOB SITE & OFF HAULED EQUIP. TRAILER. FIXED FILTER FABRIC IN D.I. & MUCKED OUT MUD ON S-SIDE OF B-850 ACCESS RD



☐ **This DFR is Preliminary -** A preliminary report is provided solely as evidence that field observation was performed. Observations and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

☐ **This DFR is Final -** A final report is an instrument of professional service. Any conclusions drawn from this report should be discussed with and evaluated by the professional involved.

| | | | |
|---|---|---|---|
| Field Representative: ____________ | Date: ________ | Reviewed By: ____________ | Date: ________ |

# Appendix C

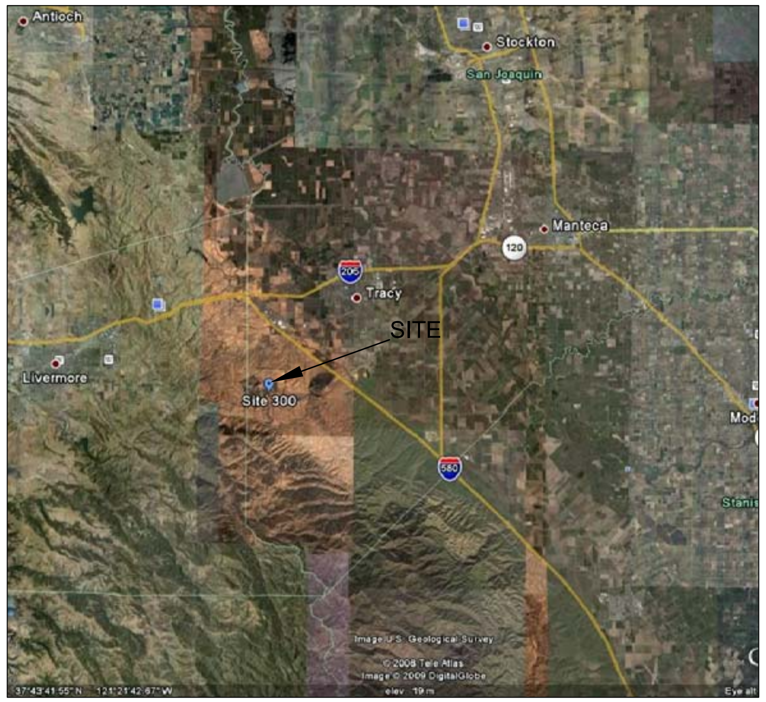
# Building 850 Corrective Action Management Unit As-Built Drawings

# BUILDING 850, SITE 300 SOIL REMEDIATION PROJECT
# RECORDS DRAWINGS
# SAN JOAQUIN COUNTY, CALIFORNIA

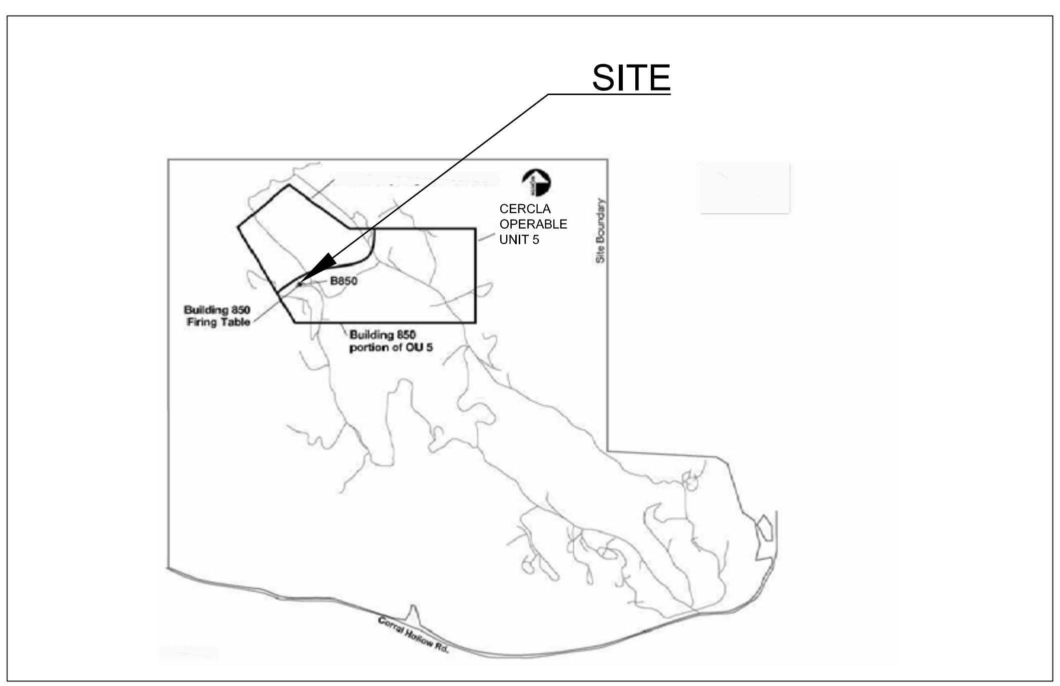
Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.




LOCATION MAP
SCALE: NONE




VICINITY MAP
SCALE: NONE

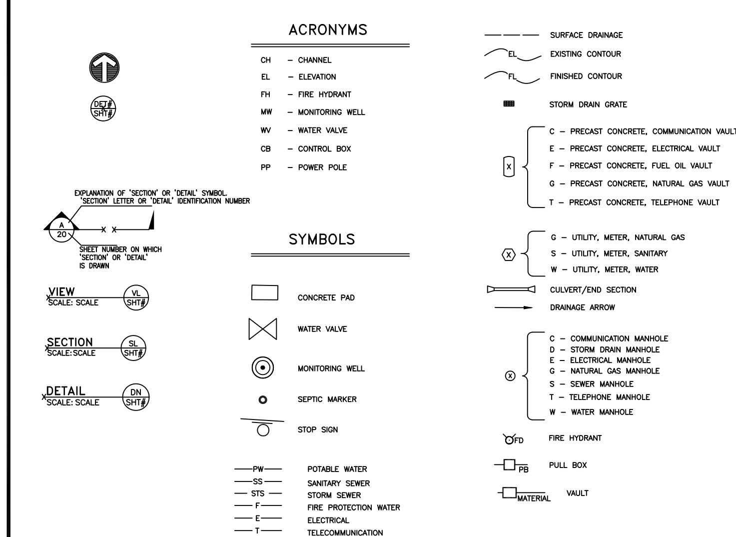
## INDEX OF DRAWINGS



| DRAWING NUMBER: | SHT. NO.: | DRAWING TITLE: |
|---|---|---|
| PSC2008–0850–0001BA | 1 | LOCATION MAP, VICINITY MAP, AND INDEX OF DRAWINGS |
| PSC2008–0850–0002BA | 2 | SITE PLAN |
| PSC2008–0850–0003BA | 3 | DRAINAGE FLOW FEATURES |
| PSC2008–0850–0004BA | 4 | EXCAVATION PLAN FOR IMPACTED SOIL |
| PSC2008–0850–0005BA | 5 | CLEAN FILL OVER–EXCAVATION PLAN |
| PSC2008–0850–0006BA | 6 | FILL PLAN |
| PSC2008–0850–0007BA | 7 | CROSS SECTION: SECTION A |
| PSC2008–0850–0008BA | 8 | CROSS SECTION: SECTION B |
| PSC2008–0850–0009BA | 9 | CROSS SECTION: SECTION C |
| PSC2008–0850–0010BA | 10 | CROSS SECTION: SECTION D |
| PSC2008–0850–0011BA | 11 | CROSS SECTION: SECTION E |
| PSC2008–0850–0012BA | 12 | DRAINAGE CHANNEL |
| PSC2008–0850–0013BA | 13 | CMP LAYOUT |
| PSC2008–0850–0014BA | 14 | LOWER YARD DETAILS |
| PSC2008–0850–0015BA | 15 | SLOPE RESTORATION/STABILIZATION PLAN |
| PSC2008–0850–0016BA | 16 | SEDIMENT TRAP AND CHECK DAM DETAILS |
| PSC2008–0850–0017BA | 17 | SEDIMENT TRAP UNDERDRAIN DETAIL |
| PSC2008–0850–0018BA | 18 | EROSION DETAILS |
| PSC2008–0850–0019BA | 19 | EROSION DETAILS |
| PSC2008–0850–0020BA | 20 | MISCELLANEOUS DETAILS |
| PSC2008–0850–0021BA | 21 | WELL EXTENSION DETAILS |
| PSC2008–0850–0022BA | 22 | WELL EXTENSION DETAILS |
| PSC2008–0850–0023BA | 23 | SOIL STAGING AREAS |
| PSC2008–0850–0024BA | 24 | SOIL VERIFICATION SAMPLE RESULTS AND FINAL EXCAVATION |

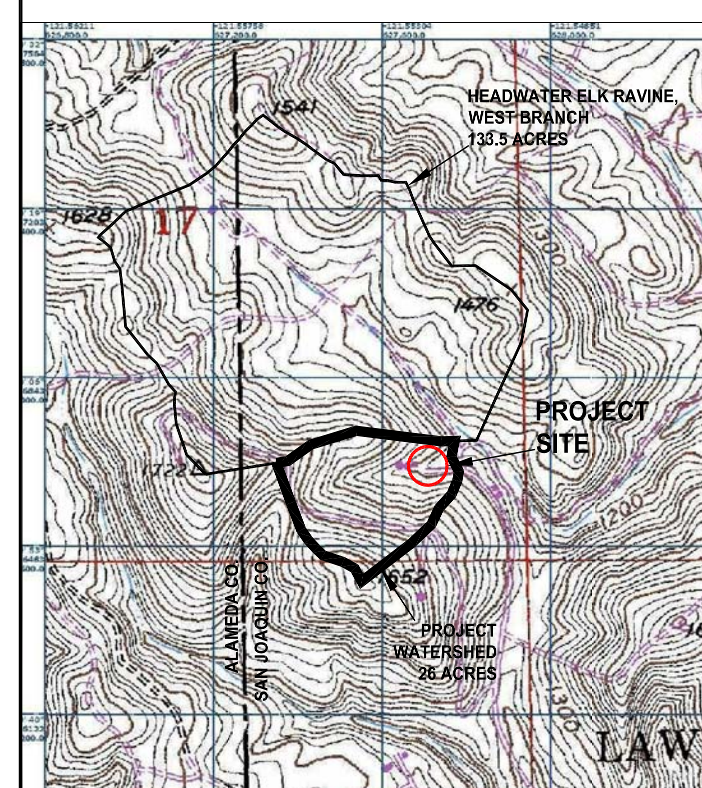


## MAP SYMBOLS




## USGS QUAD SHEET

1 MIDWAY QUAD
APPROXIMATE SCALE 1" = 1,500'




RELEASED FOR CONSTRUCTION

| | |
|---|---|
| PE Dept. Head: | |

APPROVED BY

| | |
|---|---|
| Client: | |
| Project Mngr.: | |
| Design: | |

REVIEWED BY

| | |
|---|---|
| M & O: | |
| Haz. Ctrl: | |
| Security: | |
| S & S P: | |

Project Title
BUILDING 850, SITE 300 SOIL REMEDIATION PROJECT RECORDS DRAWINGS SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 1 - Title Sheet.dwg

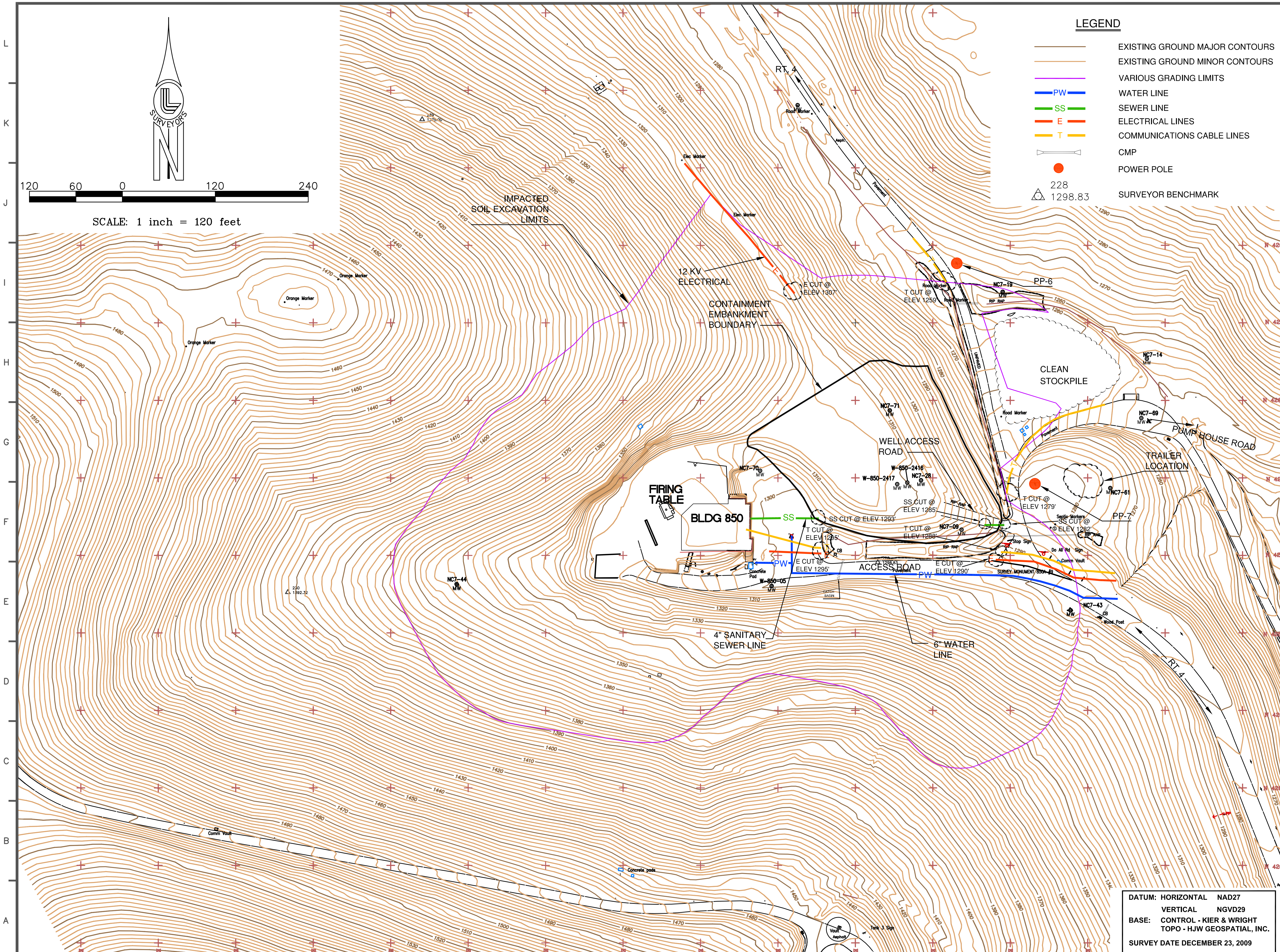
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title
LOCATION MAP, VICINITY MAP, AND INDEX OF DRAWINGS

Dwg. No. PSC2008-0850-0001BA

Sht. No. 1 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 1 – Title Sheet.dwg Date Plotted: 2/10/2010 9:22 AM




Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants

SCS ENGINEERS

Environmental Consultants and Contractors

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title

BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Des: L. LONG 2/8/10
Dwn: H. GRANT 2/8/10
Chk: L. LONG 2/8/10

File Name: Sheet 2 - Site Plan.dwg

PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010

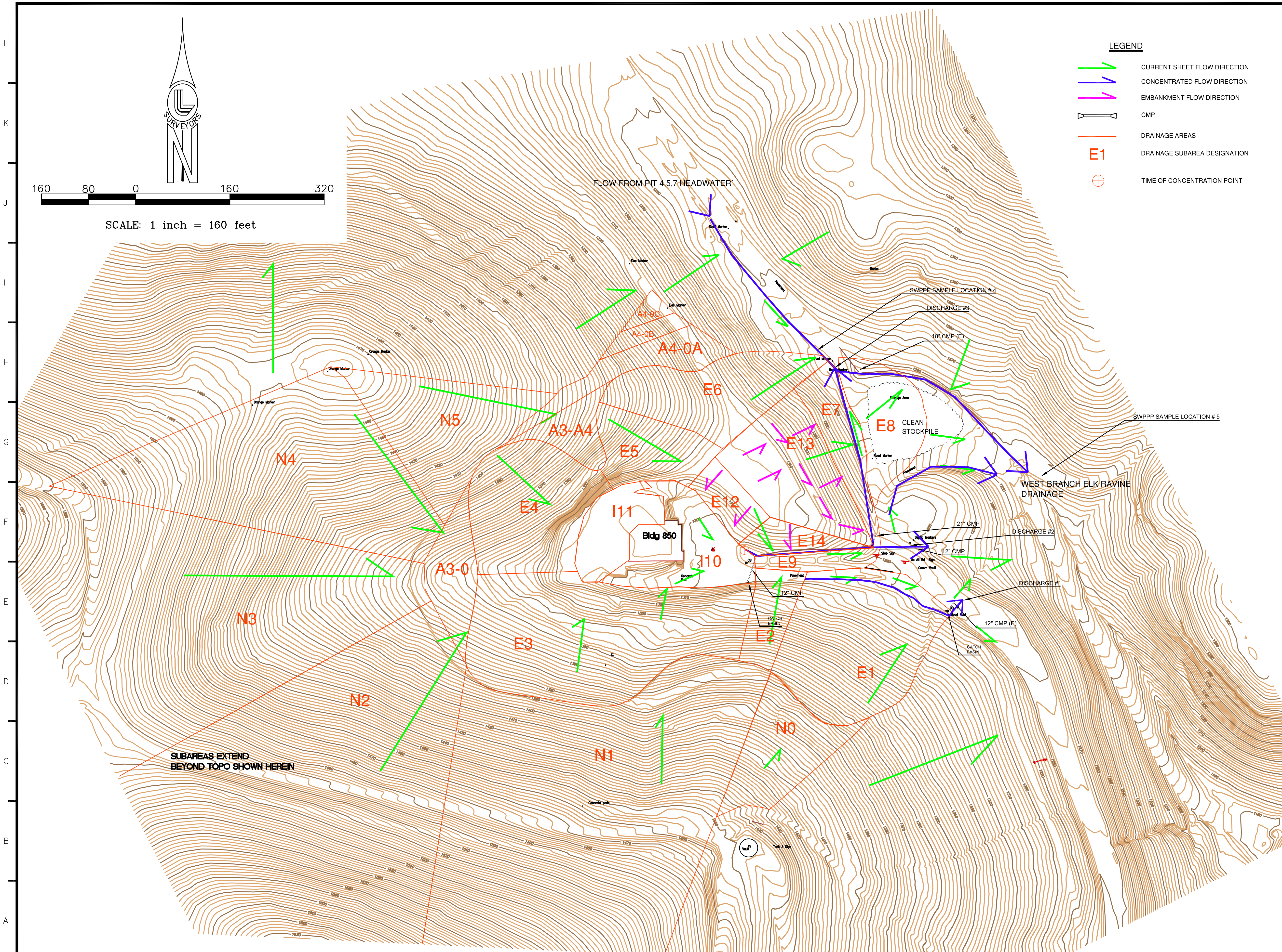
Sheet Title

SITE PLAN

Dwg. No. PSC2008-0850-0002BA

Sht. No. 2 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 - LLNL Site 300 Bldg 850\As-Builts\Sheet 2 - Site Plan.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:25 PM




Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants

SCS ENGINEERS

Environmental Consultants and Contractors

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| 1 | 090923 | CO#11 | | |
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 3 -Drainage Flow Features.dwg

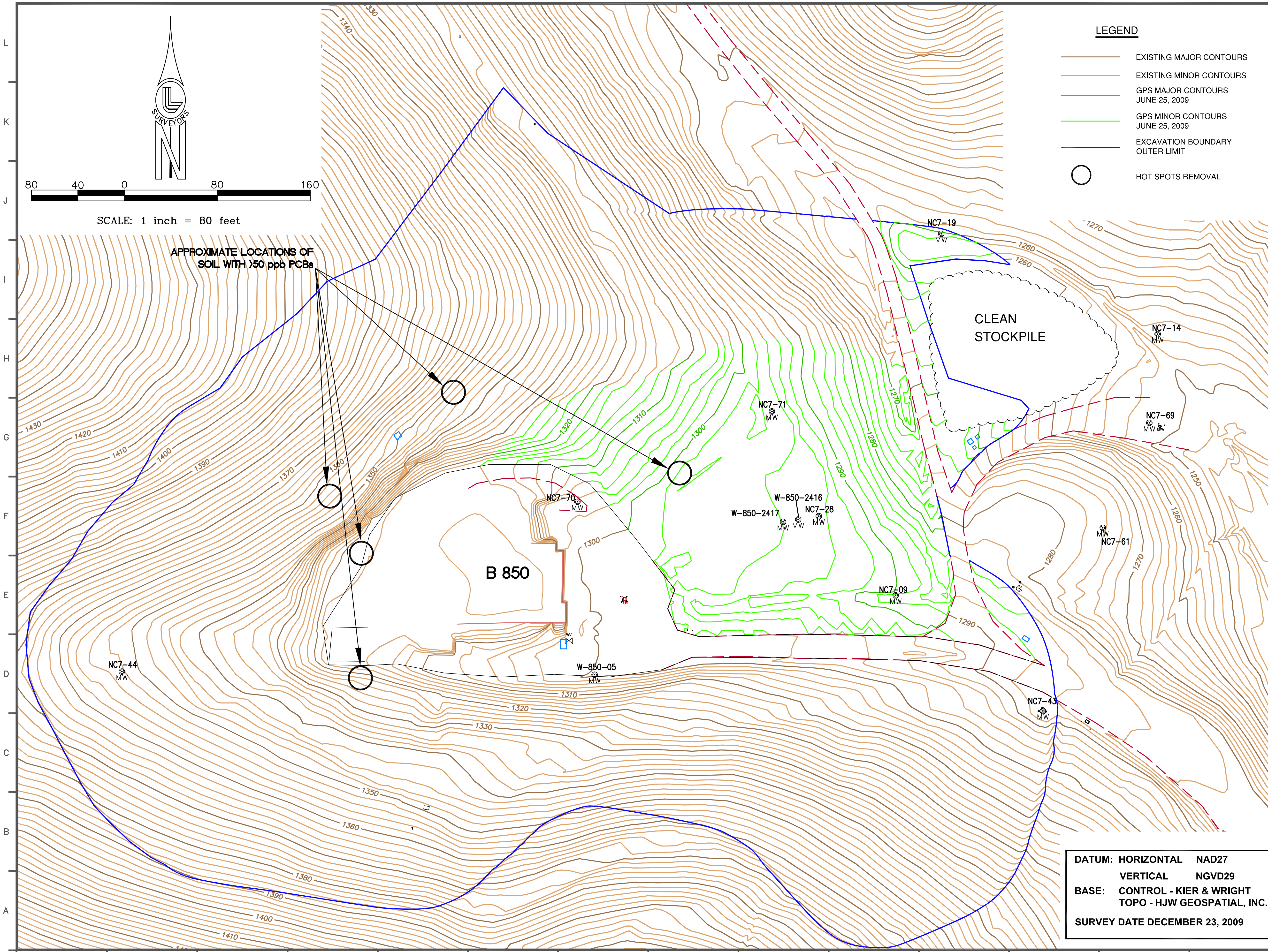
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title
DRAINAGE FLOW FEATURES

Dwg. No. PSC2008-0850-0003BA

Sht. No. 3 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 3 –Drainage Flow Features.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:26 PM




Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
**SCS ENGINEERS**
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0767

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY,
CALIFORNIA

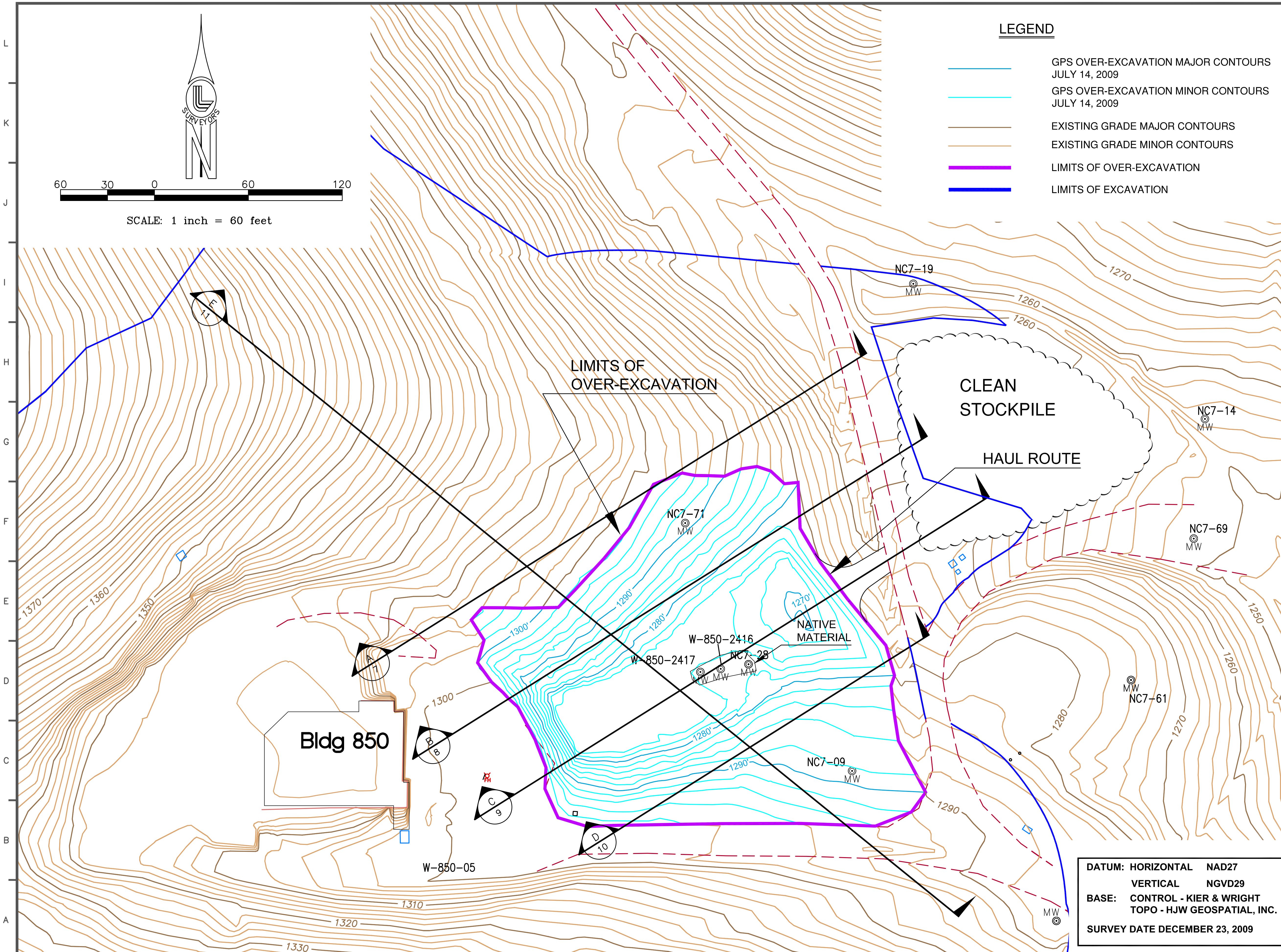
| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Des: L. LONG 2/8/10
Dwn: H. GRANT 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 4 - Excavation Plan.dwg
PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010

Sheet Title
EXCAVATION PLAN
FOR IMPACTED SOIL

Dwg. No. PSC2008-0850-0004BA
Sht. No. 4 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 4 – Excavation Plan.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:27 PM




Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Des: L. LONG 2/8/10
Dwn: H. GRANT 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 5 - Over-Excavation Plan.dwg

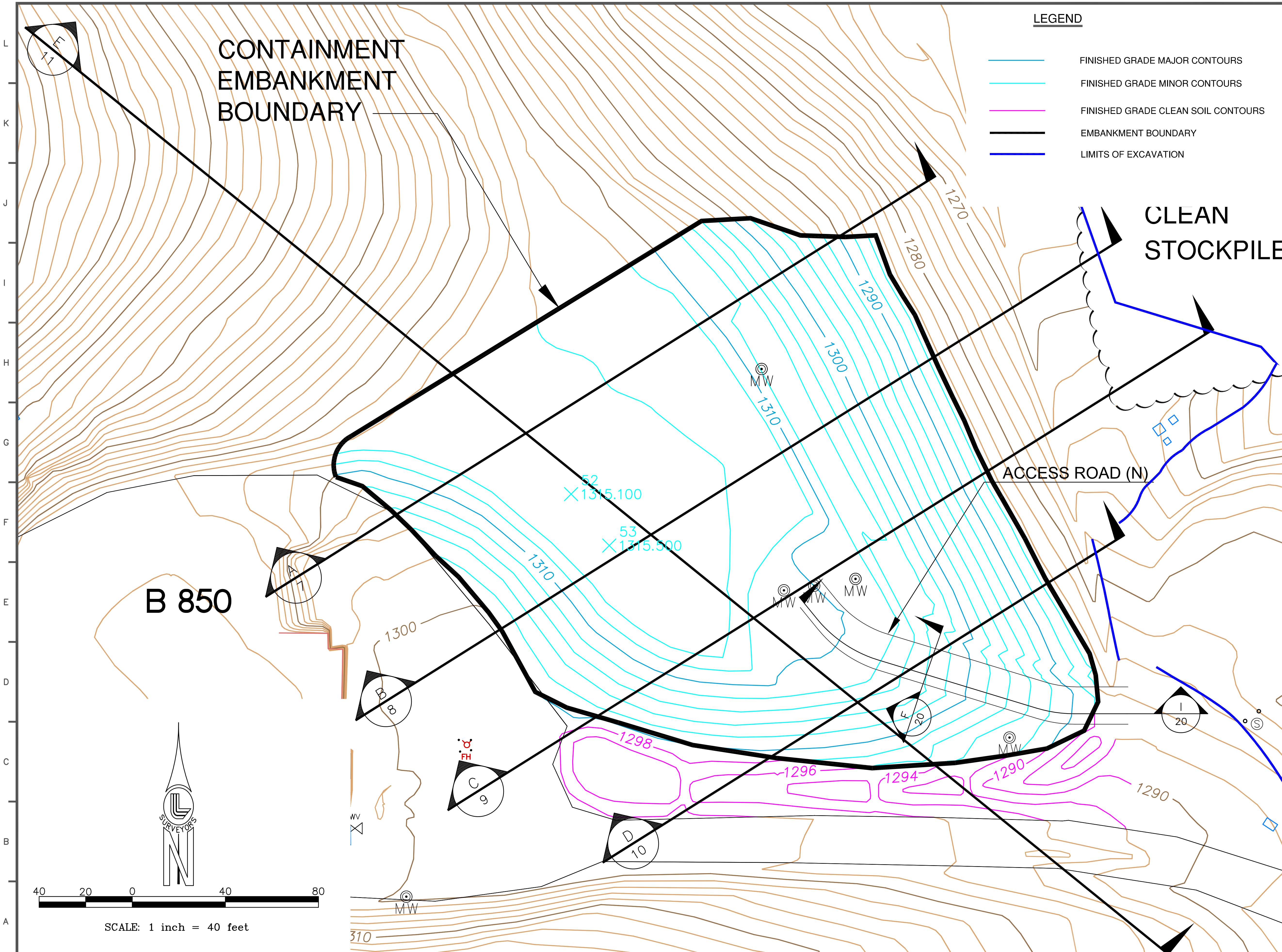
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title
CLEAN FILL
OVER-EXCAVATION PLAN

Dwg. No. PSC2008-0850-0005BA

Sht. No. 5 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 5 – Over-Excavation Plan.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:29 PM




Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants

**SCS ENGINEERS**

Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 6 - Fill Plan.dwg

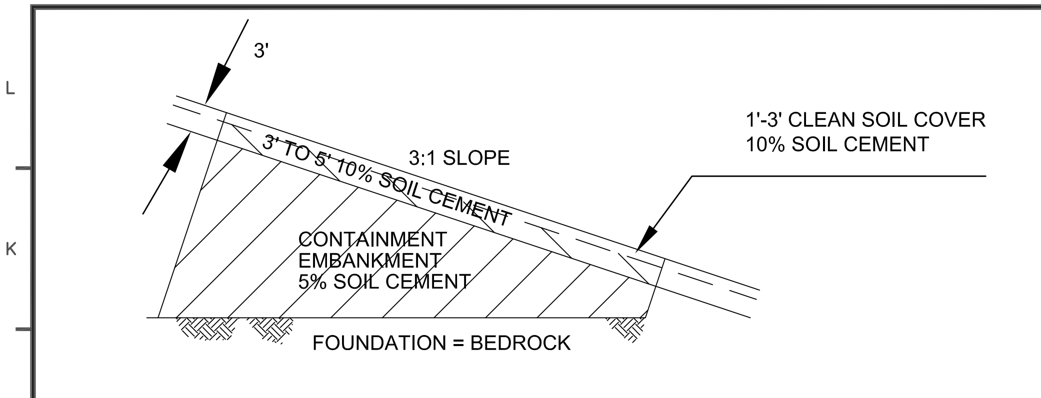
| PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AUTOCAD2010 |
|---|---|---|

Sheet Title
FILL PLAN

Dwg. No. PSC2008-0850-0006BA

Sht. No. 6 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 6 – Fill Plan.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:31 PM



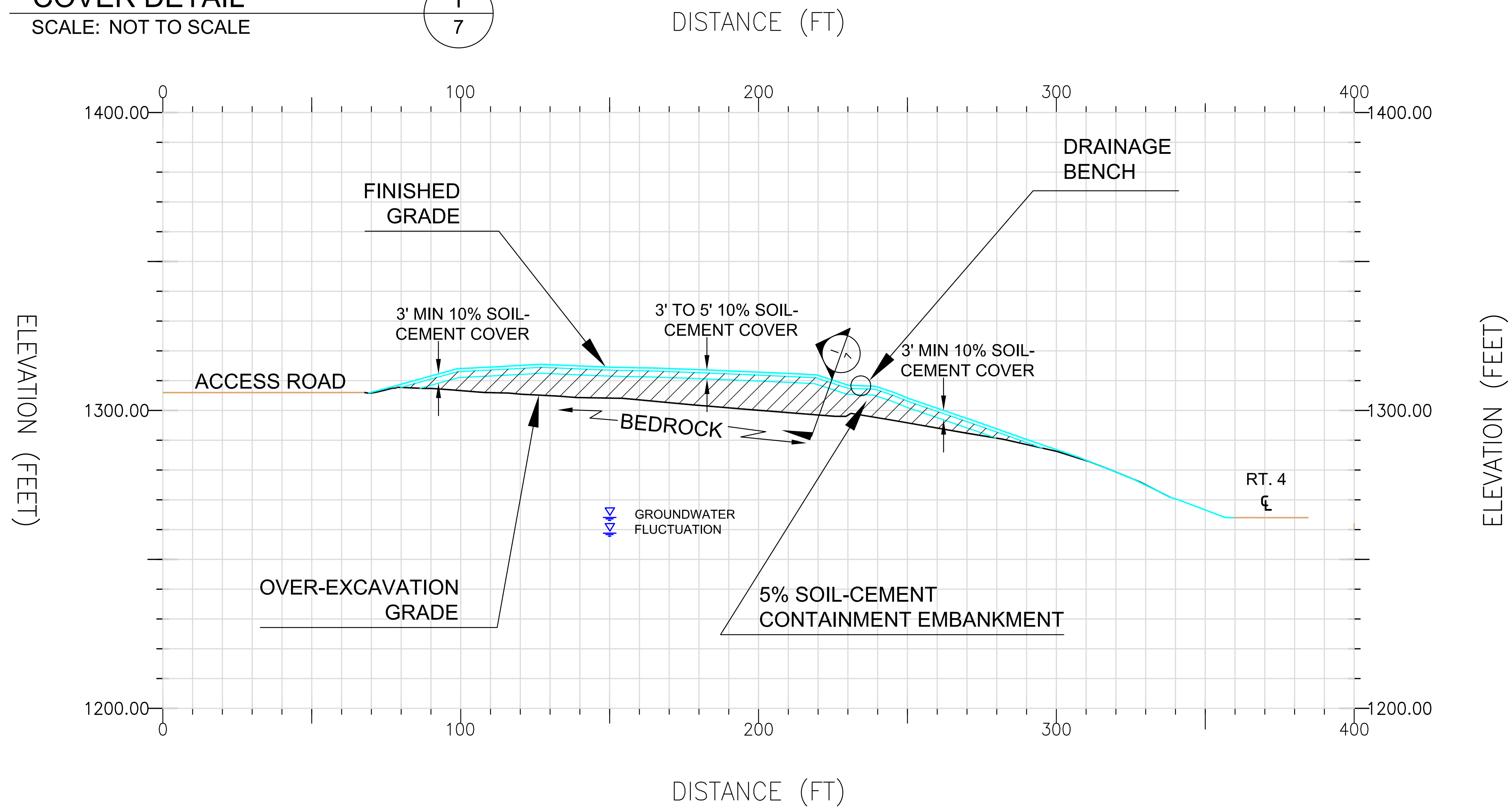

COVER DETAIL I/7
SCALE: NOT TO SCALE

LEGEND

FINISHED GRADE

OVER-EXCAVATION GRADE

CONTAINMENT EMBANKMENT




SECTION A/7
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 40'

Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

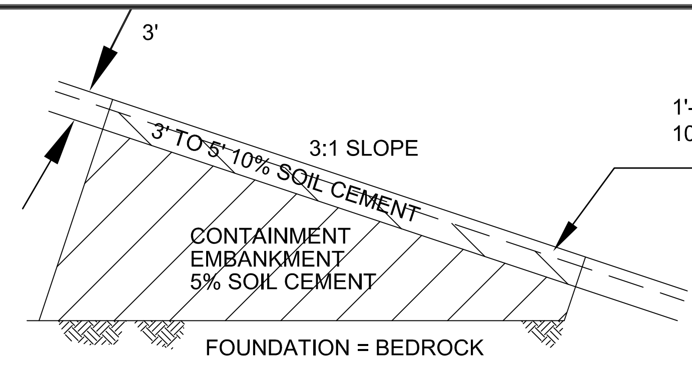
Des: L. LONG 2/8/10
Dwn: H. GRANT 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 7-11 - Cross Sections.dwg
PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010

Sheet Title
CROSS SECTION
SECTION A

Dwg. No. PSC2008-0850-0007BA

Sht. No. 7 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 - LLNL Site 300 Bldg 850\As-Builts\Sheet 7-11 - Cross Sections.dwg Plotted By: 2701HLG Date Plotted: 2/8/2010 8:40 AM



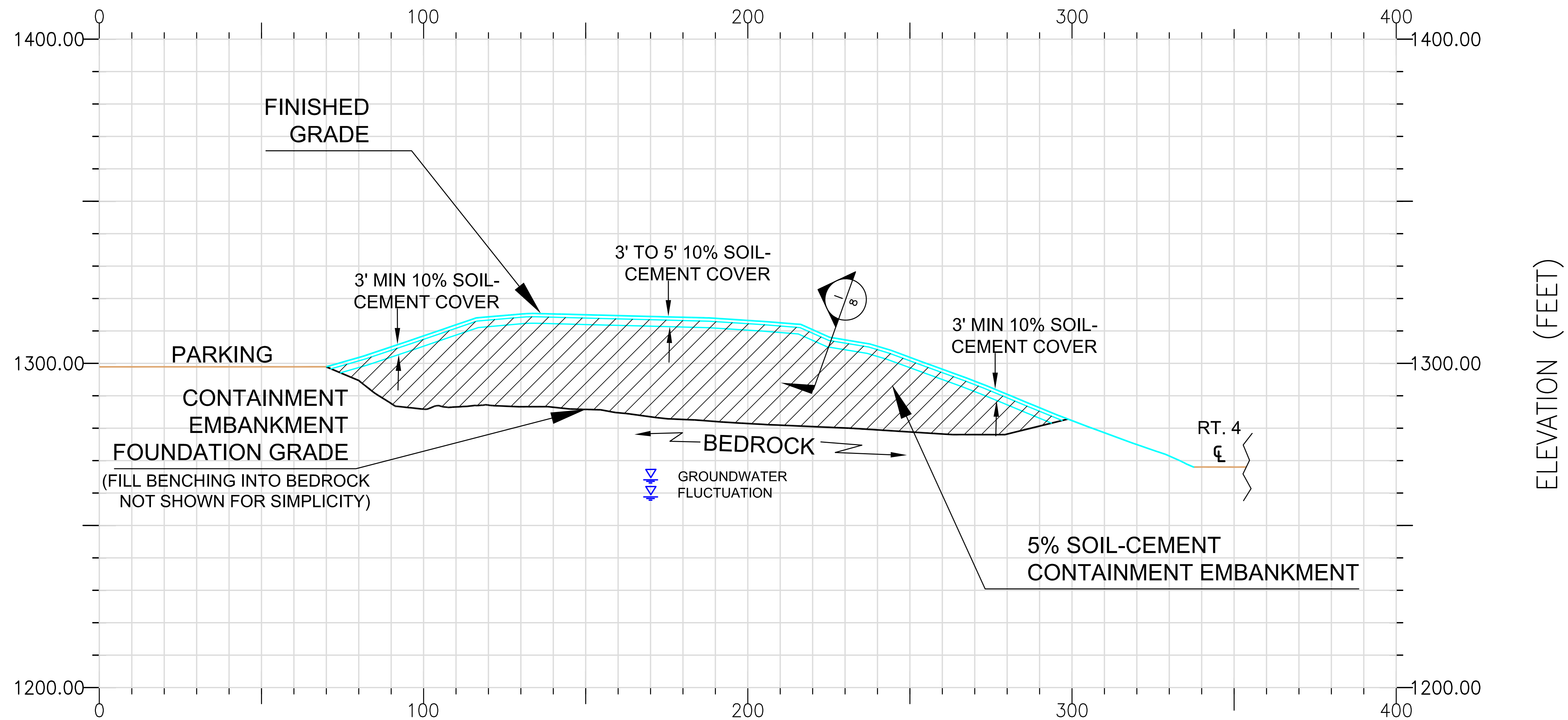

## COVER DETAIL

SCALE: NOT TO SCALE

I / 8

**LEGEND**

| | |
|---|---|
| (cyan line) | FINISHED GRADE |
| (black line) | OVER-EXCAVATION GRADE |
| (hatched) | CONTAINMENT EMBANKMENT |




## SECTION

B / 8

HORIZONTAL SCALE: 1" = 40'

VERTICAL SCALE: 1" = 40'


Lawrence Livermore
National Laboratory,
Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY,
CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 7-11 - Cross Sections.dwg

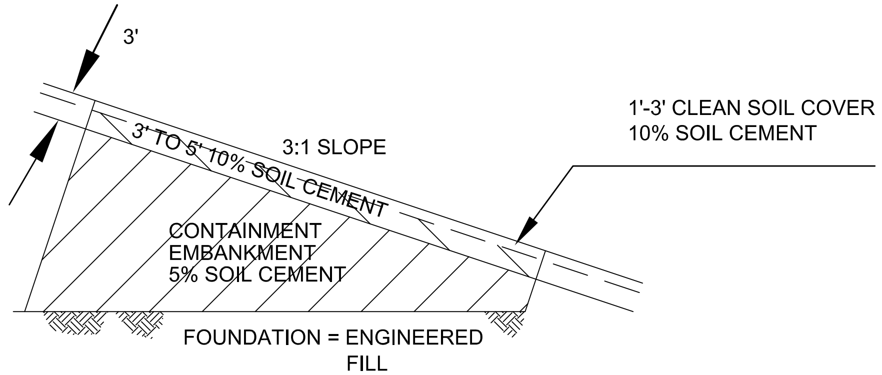
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title
CROSS SECTION
SECTION B

Dwg. No. PSC2008-0850-0008BA

Sht. No. 8 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 7-11 – Cross Sections.dwg Plotted By: 2701HLG Date Plotted: 2/8/2010 8:42 AM




## COVER DETAIL

SCALE: NOT TO SCALE

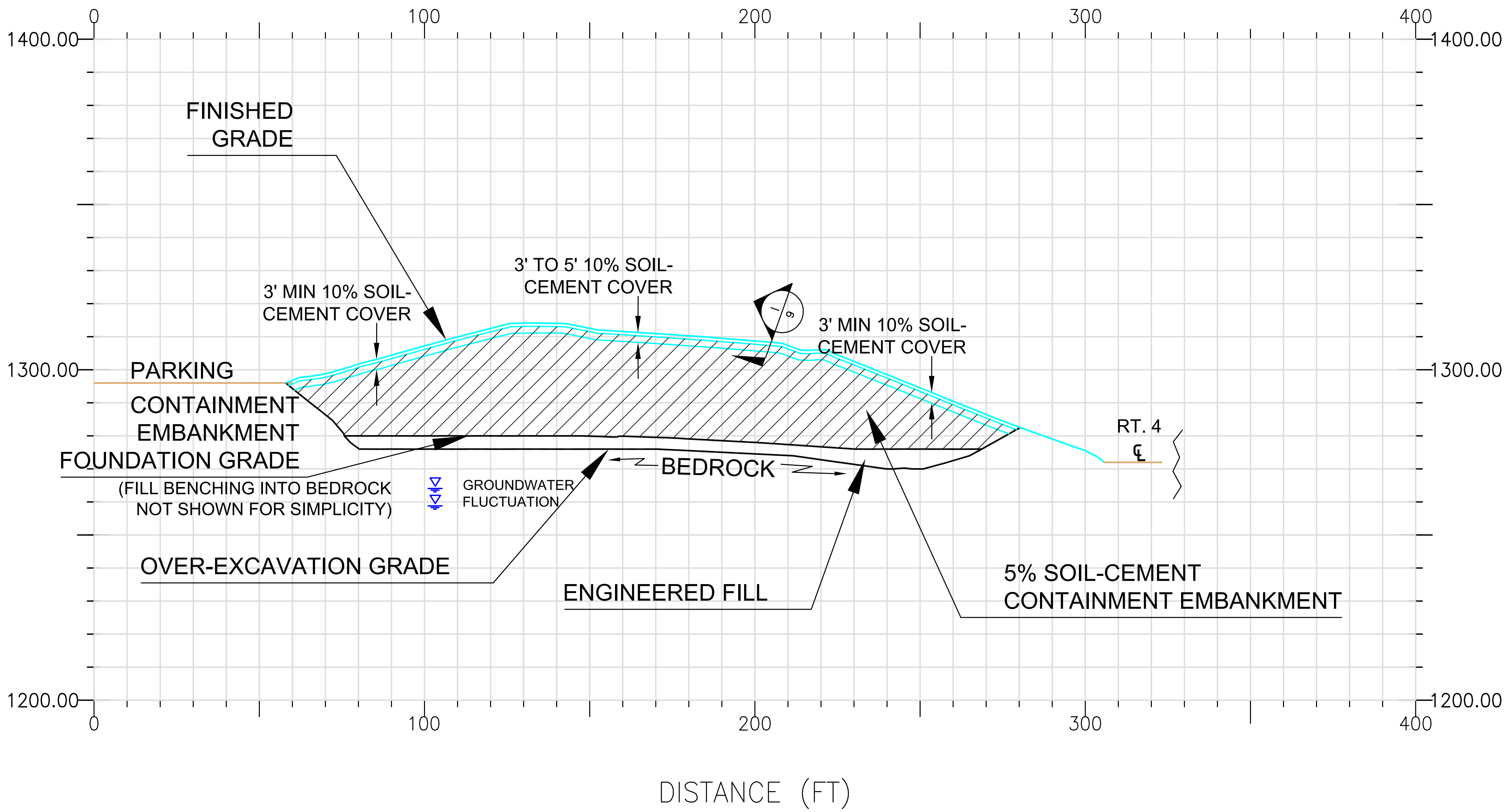
I / 9

**LEGEND**

FINISHED GRADE

OVER-EXCAVATION GRADE

CONTAINMENT EMBANKMENT




## SECTION

HORIZONTAL SCALE: 1" = 40'

VERTICAL SCALE: 1" = 40'

C / 9


Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 7-11 - Cross Sections.dwg

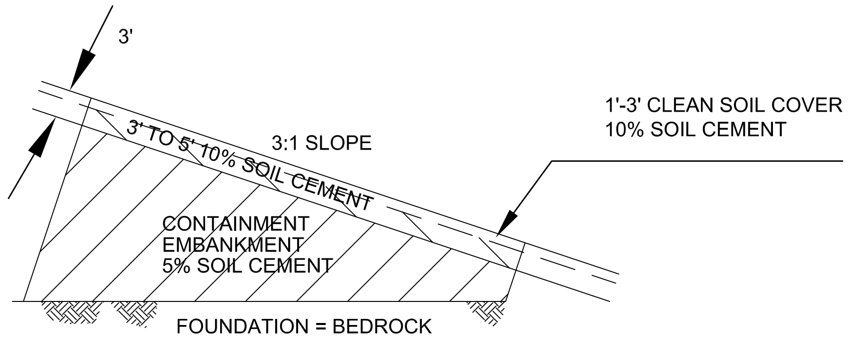
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title
CROSS SECTION
SECTION C

Dwg. No. PSC2008-0850-0009BA

Sht. No. 9 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 - LLNL Site 300 Bldg 850\As-Builts\Sheet 7-11 - Cross Sections.dwg Plotted By: 2701HLG Date Plotted: 2/8/2010 8:43 AM




## COVER DETAIL

SCALE: NOT TO SCALE

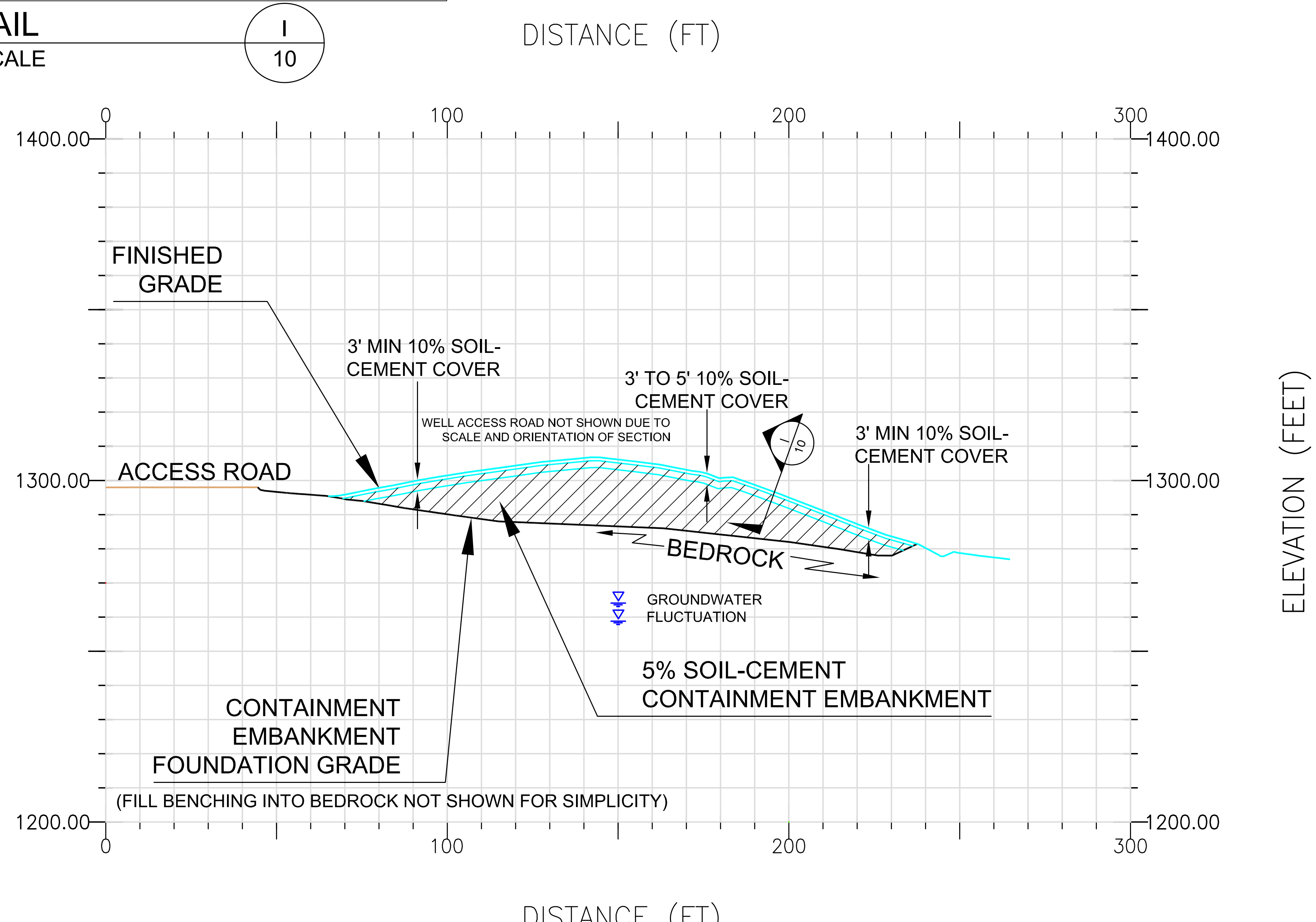
I / 10

## LEGEND

FINISHED GRADE

OVER-EXCAVATION GRADE

CONTAINMENT EMBANKMENT




## SECTION

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 40'

D / 10


Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 7-11 - Cross Sections.dwg

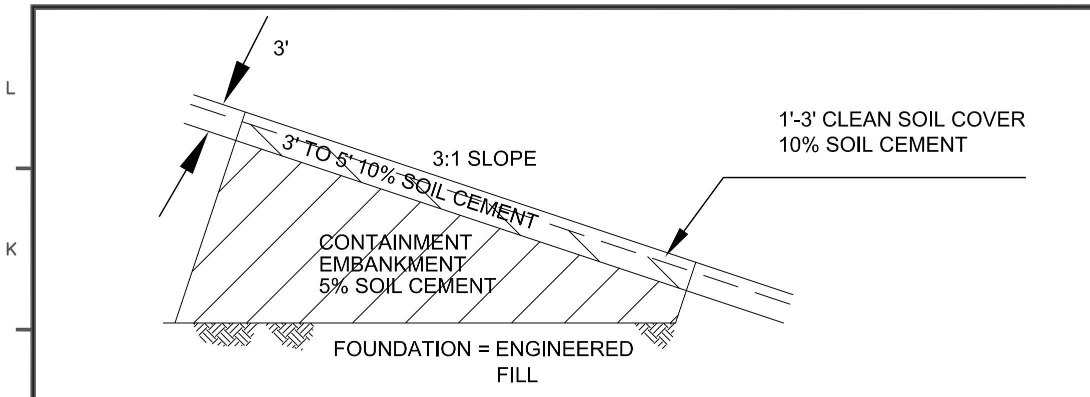
| PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010 |
|---|---|---|

Sheet Title
CROSS SECTION
SECTION D

Dwg. No. PSC2008-0850-0010BA

Sht. No. 10 of 24

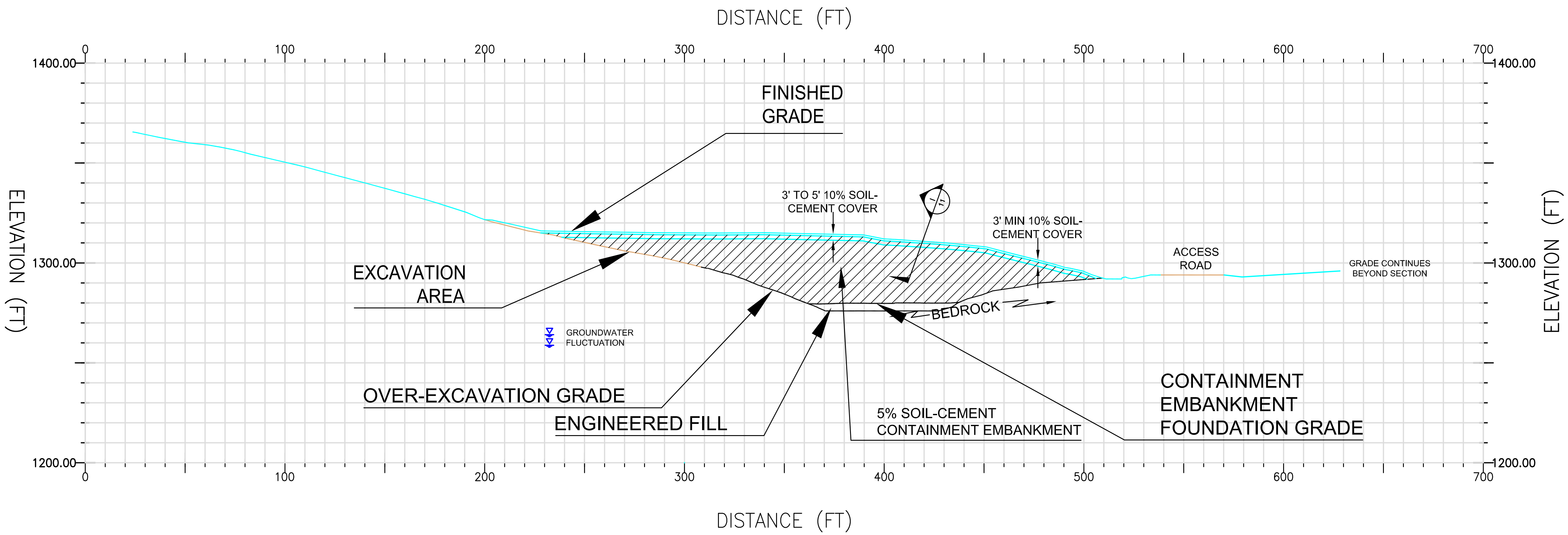
File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 7-11 – Cross Sections.dwg Plotted By: 2701HLG Date Plotted: 2/8/2010 8:44 AM




COVER DETAIL
SCALE: NOT TO SCALE
I
11

LEGEND

FINISHED GRADE
OVER-EXCAVATION GRADE
CONTAINMENT EMBANKMENT




SECTION
HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 60'
E
11

Lawrence Livermore
National Laboratory,
Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY,
CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 7-11 - Cross Sections.dwg

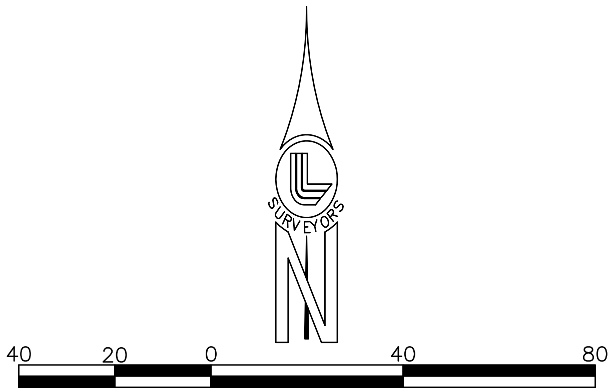
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title
CROSS SECTION
SECTION E

Dwg. No. PSC2008-0850-0011BA

Sht. No. 11 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 7-11 – Cross Sections.dwg Plotted By: 2701HLG Date Plotted: 2/8/2010 8:45 AM



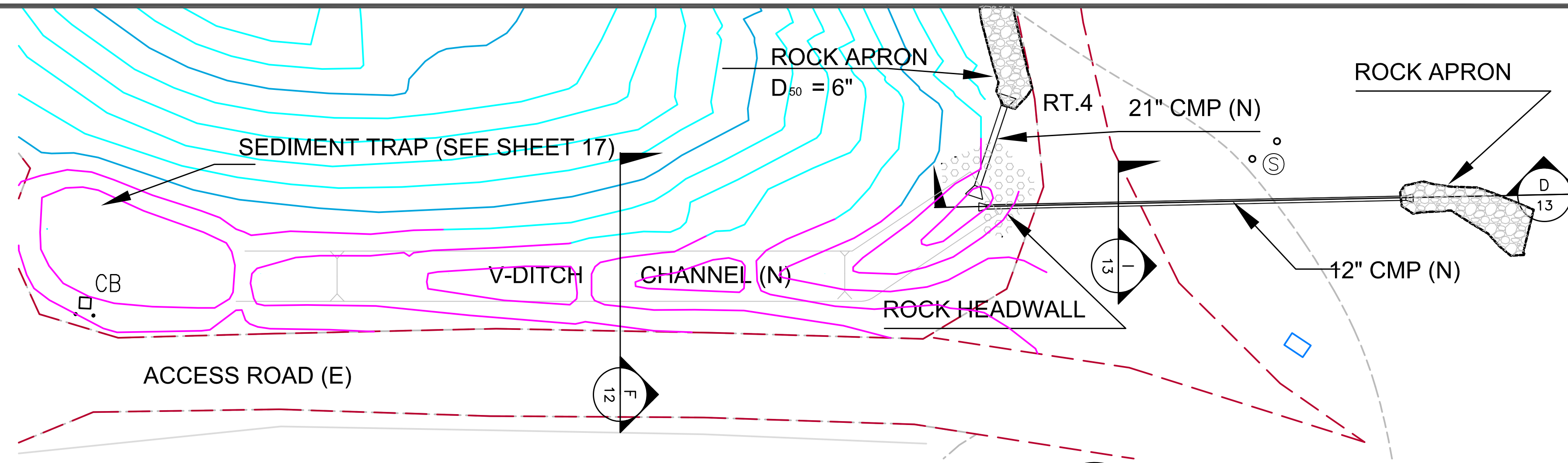

## LEGEND

FINISHED GRADE MAJOR CONTOURS

FINISHED GRADE MINOR CONTOURS

FINISHED GRADE CLEAN SOIL CONTOURS

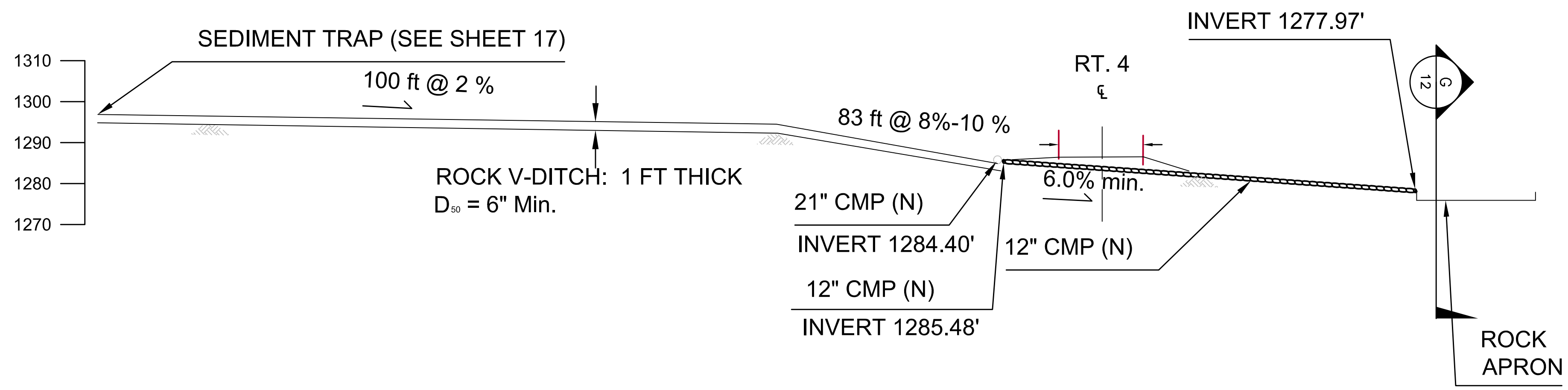
CMP




## V-DITCH PLAN VIEW

A 12

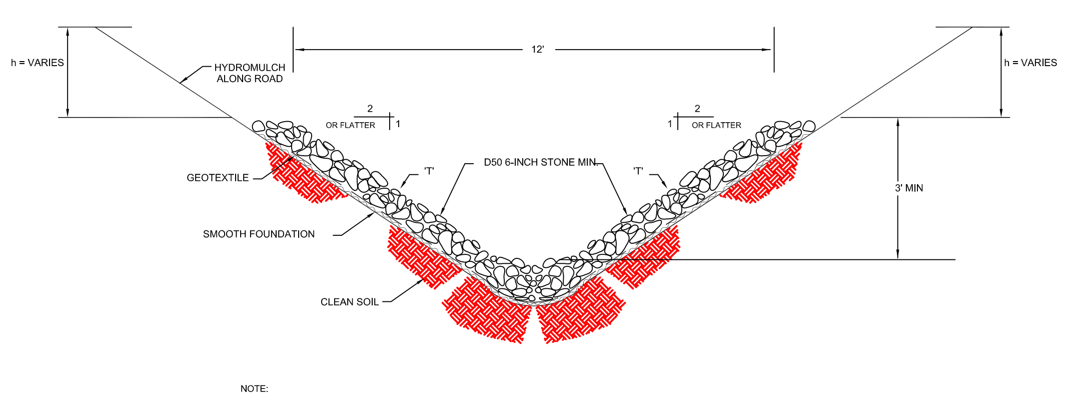
SCALE: 1" =40'




## V-DITCH PROFILE VIEW

B 12

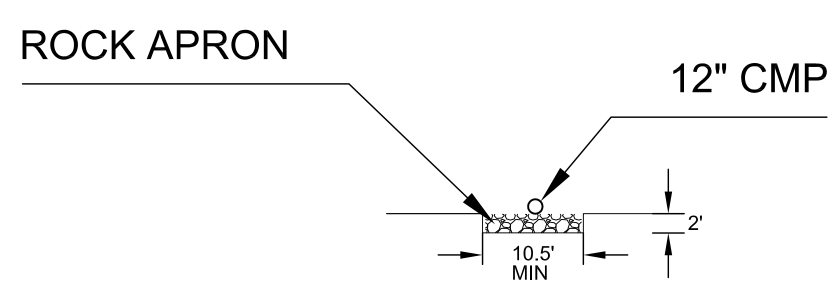
SCALE: 1" = 40'




## V-DITCH CHANNEL SECTION

F 12

SCALE: NOT TO SCALE




## ROCK APRON SECTION

G 12

SCALE: 1" = 20'


Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| 1 | 092009 | CO#11 | | |
| 2 | 100209 | ROCK_MODIFICATION | | |
| 3 | 101509 | SUBMITTAL_40 | | |
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |

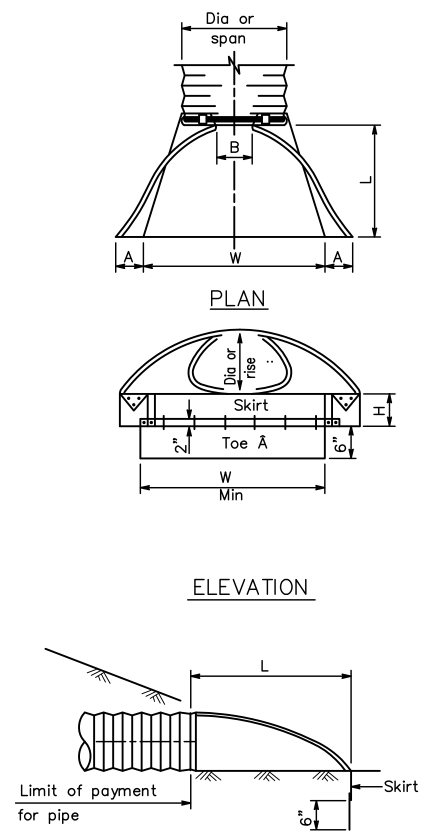
Des: L. LONG 2/8/10
Dwn: H. GRANT 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 12 - Drainage Channel.dwg
PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010

Sheet Title
DRAINAGE CHANNEL

Dwg. No. PSC2008-0850-0012BA

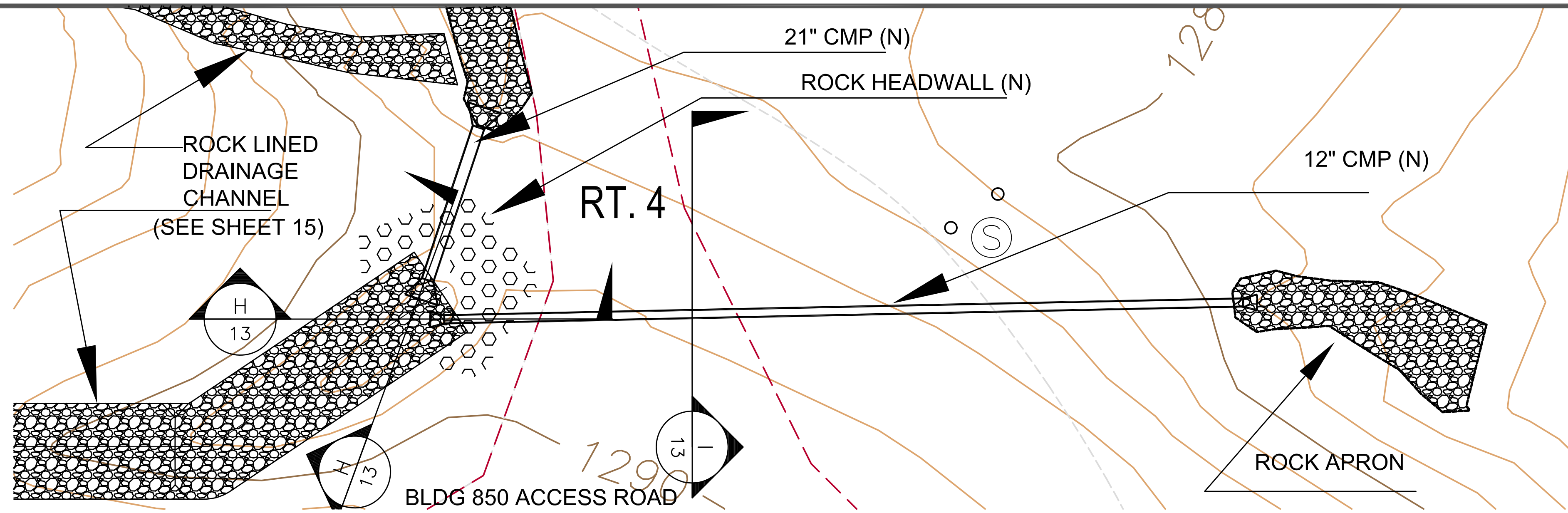
Sht. No. 12 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 12 – Drainage Channel.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:37 PM

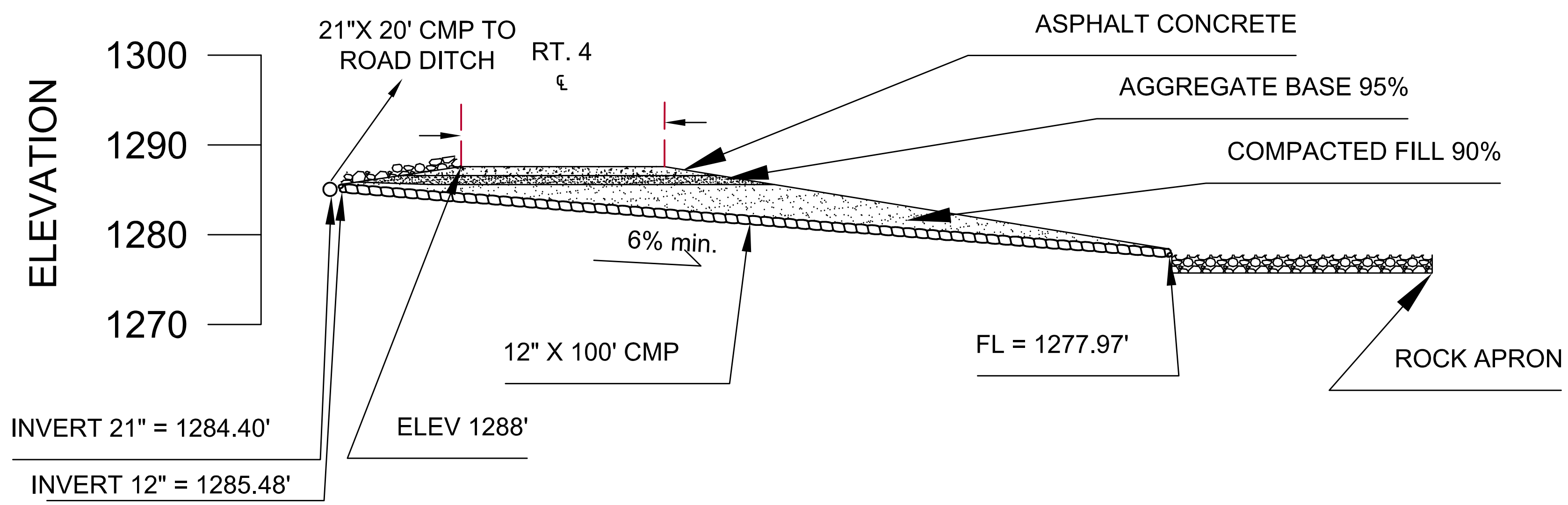



TYPICAL CROSS–SECTION (H/13)

| CIRCULAR PIPES | | | | | | |
|---|---|---|---|---|---|---|
| PIPE DIA | END SECTION THICKNESS | DIMENSION | | | | |
| | | A | B | H | L | W |
| 12" | 0.064" | 6" | 6" | 6" | 1'–9" | 2'–0" |
| 18" | 0.064" | 8" | 10" | 6" | 2'–7" | 3'–0" |




PLAN VIEW (C/13)
SCALE: 1" = 20'

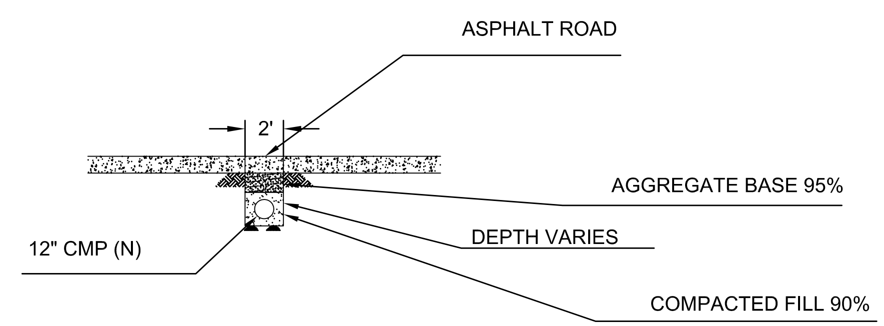



PROFILE VIEW (D/13)
SCALE: 1" =20'

## LEGEND

EXISTING CONTOURS

NEW CMP




CMP TRENCH SECTION (I/13)
SCALE: 1" =10'


Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| | 090920 | CO#11 | | |
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |

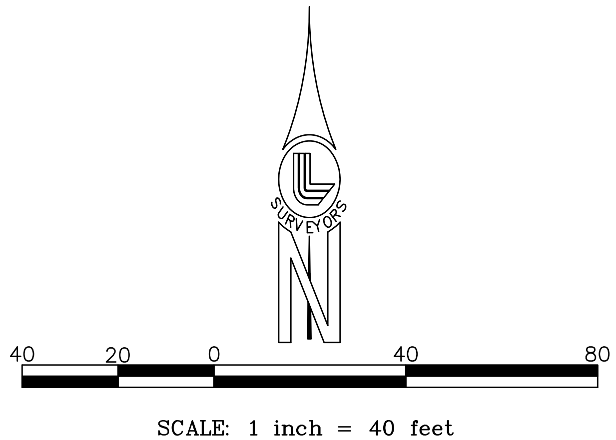
Des: L. LONG 2/8/10
Dwn: H. GRANT 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 13 - CMP Layout.dwg
PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010

Sheet Title
CMP LAYOUT

Dwg. No. PSC2008-0850-0013BA

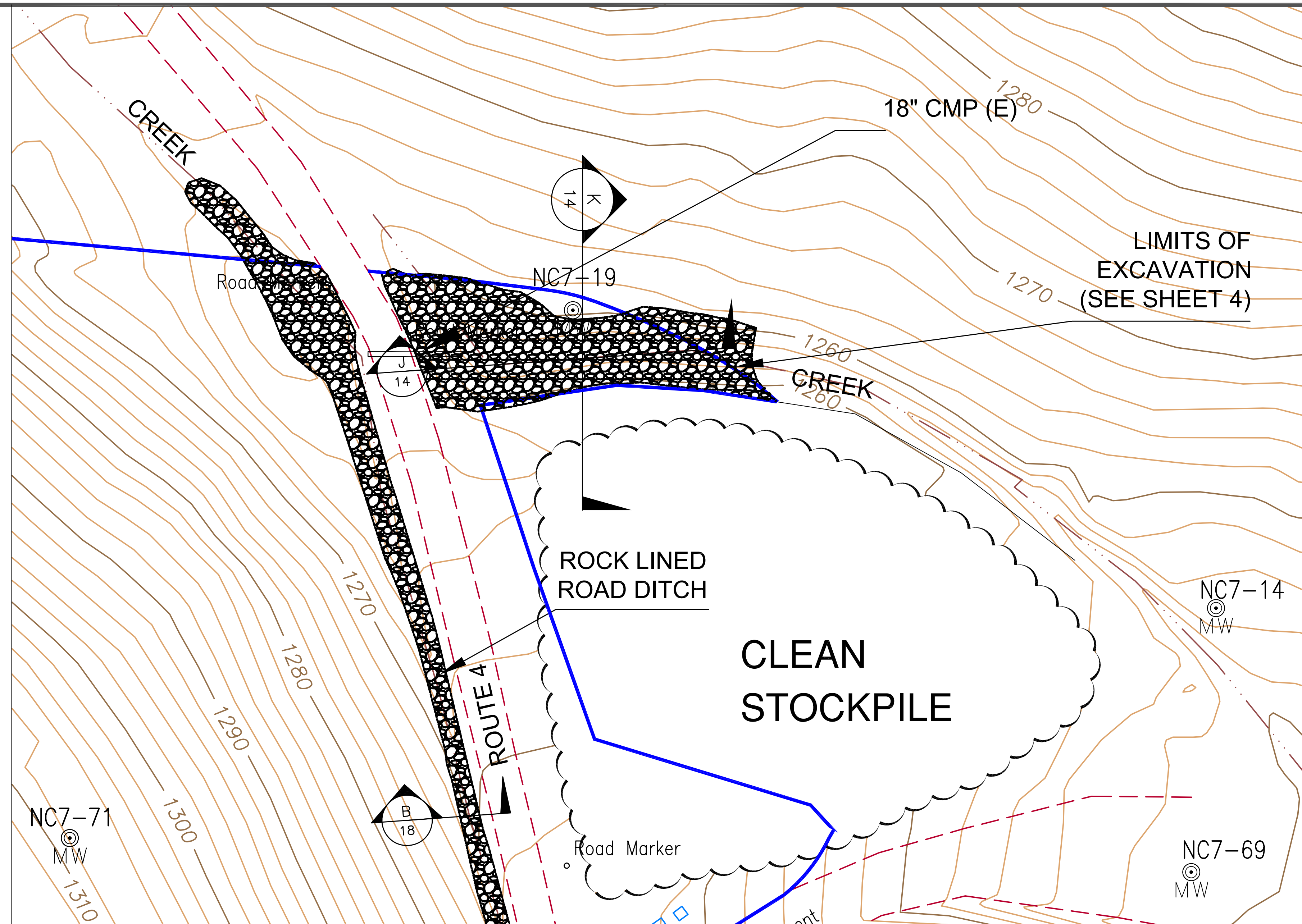
Sht. No. 13 of 24

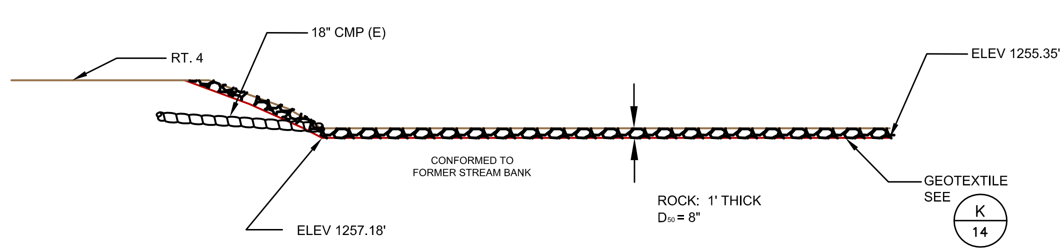
File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 13 – CMP Layout.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 2:12 PM




## LEGEND

- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- CMP
- MONITORING WELL (E) — MW
- LIMITS OF EXCAVATION

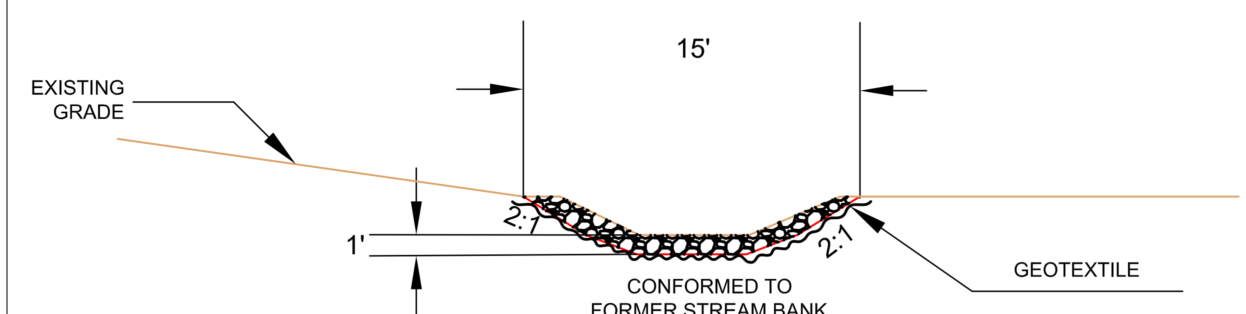



## ROCK LINED CREEK PROFILE

SCALE: 1" =20'

J 14




## ROCK LINED CREEK SECTION

SCALE: 1" =10'

K 14

Lawrence Livermore
National Laboratory,
Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY,
CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

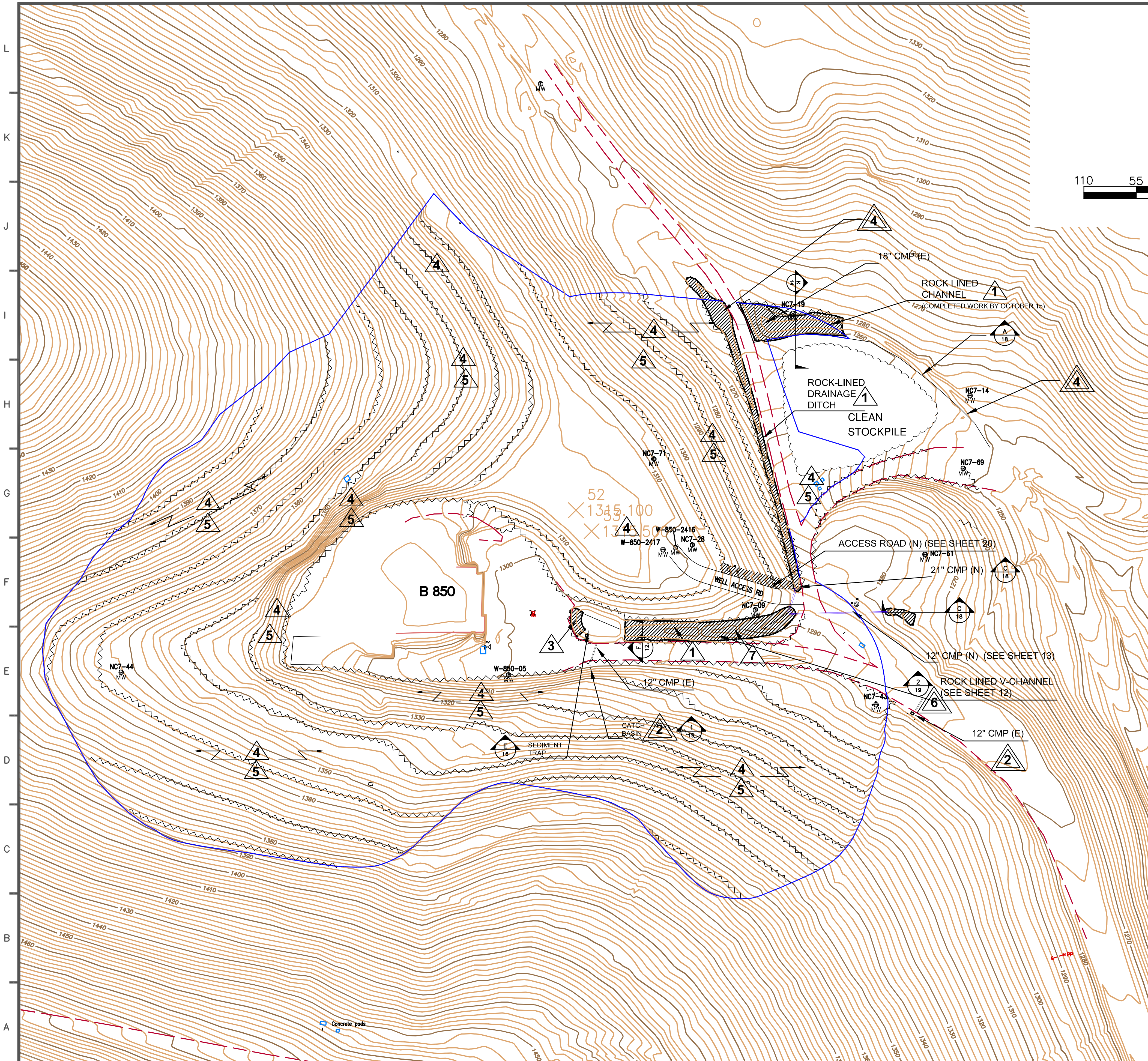
Des: L. LONG 2/8/10
Dwn: H. GRANT 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 14 - Lower Yard Details.dwg
PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010

Sheet Title
LOWER YARD DETAILS

Dwg. No. PSC2008-0850-0014BA

Sht. No. 14 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 14 – Lower Yard Details.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:39 PM





Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


110 55 0 110 220

SCALE: 1 inch = 110 feet

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

## LEGEND

- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- FIBER ROLL LOCATION
- ROCK LINED CHANNEL
- NEW CULVERTS
- PRE-CONSTRUCTION CULVERTS
- SEDIMENT TRAP
- PRE-CONSTRUCTION BMPS

## KEYNOTES

1. DITCH OR CHANNEL ROCKED PER DRAINAGE DESIGN.
2. INLET PROTECTION CONSISTING OF FIBER ROLL (SHEET 18).
3. SEDIMENT TRAP (SEE SHEET 17).
4. HILLSIDE EROSION PROTECTION CONSISTING OF FIBER ROLLS SPACED ALONG SLOPES. FIBER ROLLS PLACED ACCORDING TO SWPPP (BMP SE-5).
5. AREAS RE-VEGETATED USING SEED MIX SPECIFIED BY LLNL BIOLOGIST. SEED PLACED USING HYDROSEED OR EQUIVALENT METHOD. JUTE NETING, MULCH, OR OTHER TACKIFIER APPLIED PER SWPPP BMP (SC-3,4). (FIELD LOCATE)
6. TRACK OUT CONTROL (SEE SHEET 19)
7. CHECK DAMS.

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| 1 | 090920 | CO#11 | | |
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 15 - Slope R-S Plan.dwg

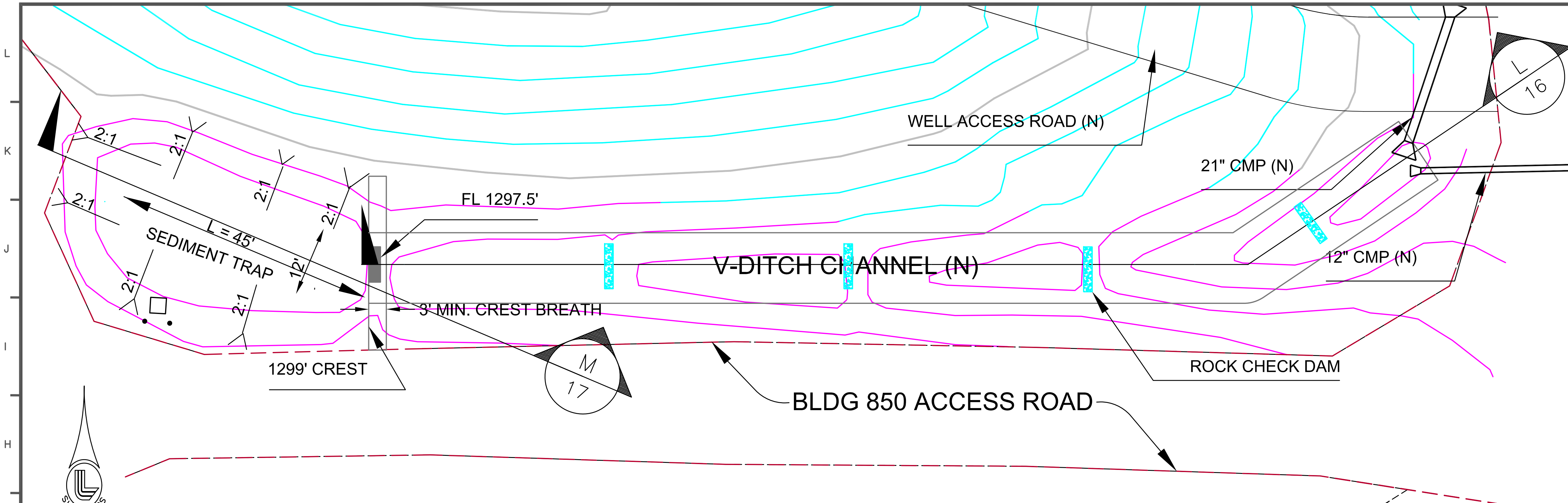
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title
SLOPE RESTORATION/ STABILIZATION PLAN

Dwg. No. PSC2008-0850-0015BA

Sht. No. 15 of 24

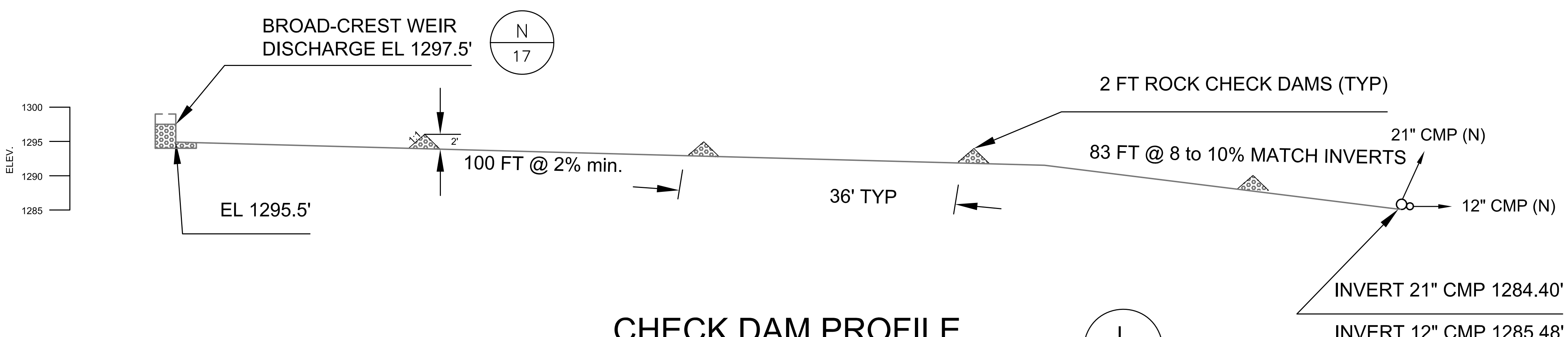
File Name: K:\ES\PROJECTS\2008\01208096.00 — LLNL Site 300 Bldg 850\As-Builts\Sheet 15 — Slope R-S Plan.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:40 PM




## SEDIMENT TRAP PLAN VIEW

SCALE: 1" = 20'

E / 16




## CHECK DAM PROFILE

SCALE: 1" = 20'

L / 16

## LEGEND

- FINISHED GRADE MAJOR CONTOURS
- FINISHED GRADE MINOR CONTOURS
- FINISHED GRADE CLEAN SOIL CONTOURS


Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| 1 | 092009 | CO#11 | | |
| 2 | 100209 | ROCK_MODIFICATION | | |
| 3 | 101509 | SUBMITTAL_40 | | |
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 16 - Sed Trap & Check Dams.dwg

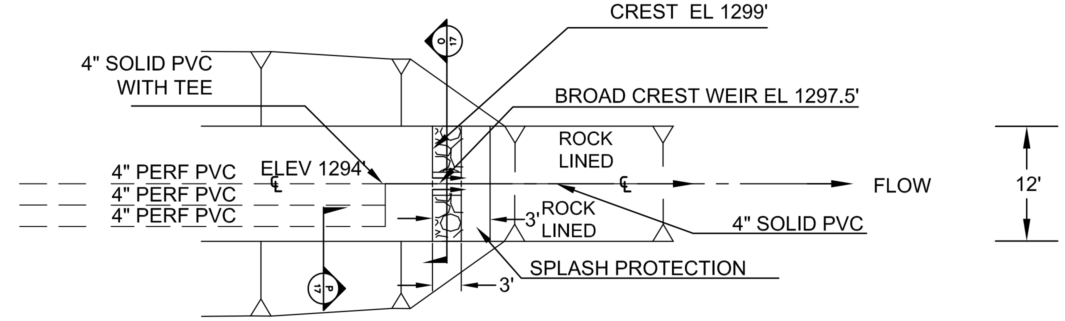
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title
SEDIMENT TRAP AND CHECK DAM DETAILS

Dwg. No. PSC2008-0850-0016BA

Sht. No. 16 of 24

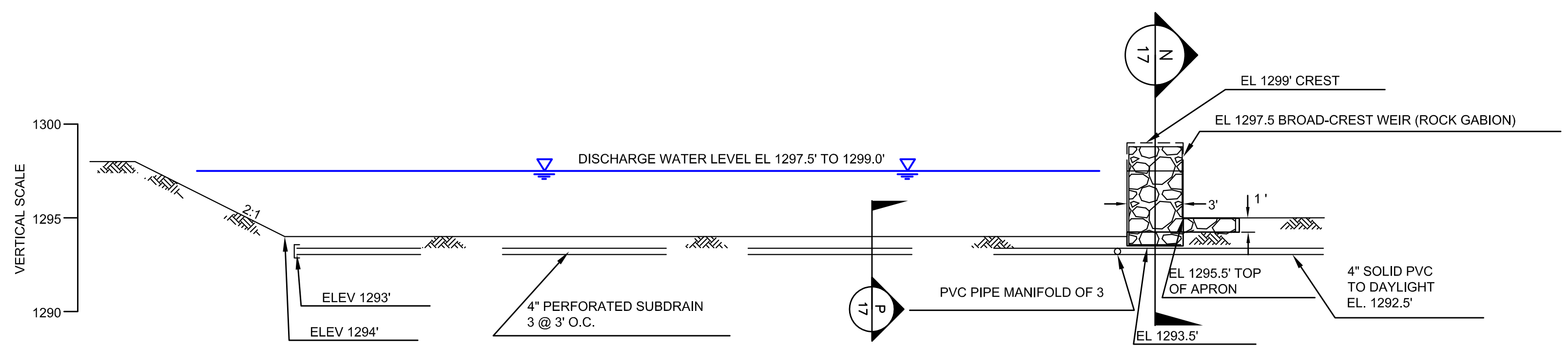
File Name: K:\ES\PROJECTS\2008\01208096.00 - LLNL Site 300 Bldg 850\As-Builts\Sheet 16 - Sed Trap & Check Dams.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:43 PM




## WEIR PLAN VIEW

SCALE: 1" = 20'

N
17



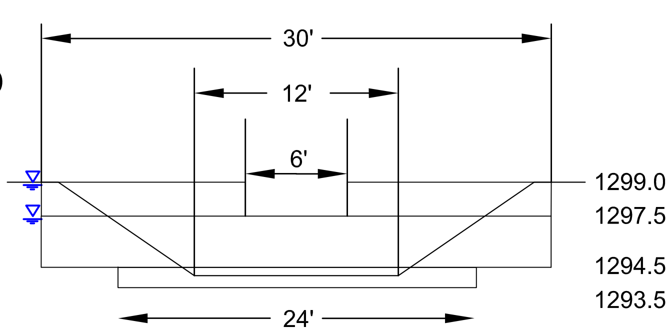

PROFILE VIEW SHOWN IS
A LIMITED SECTION

## SEDIMENT TRAP PROFILE

SCALE: 1" = 10'

M
17

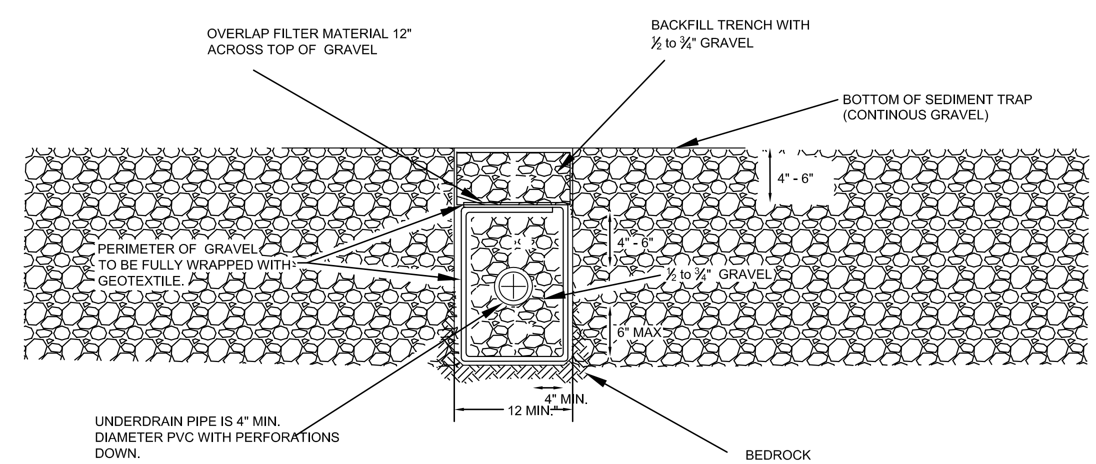
ACCESS ROAD




## WEIR SECTION VIEW

SCALE: AS SHOWN

O
17




## SUBDRAIN SECTION

SCALE: N.T.S.

P
17


Lawrence Livermore
National Laboratory,
Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY,
CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| 1 | 10/1/09 | Hard Rock Mod | Long | Long |
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |

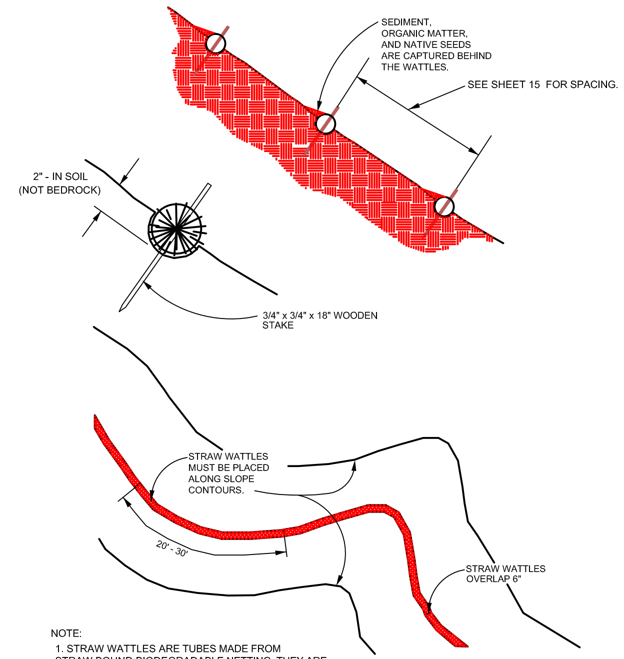
Des: L. LONG 2/8/10
Dwn: H. GRANT 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 17 - Sediment Trap Underdrain Detail.dwg
PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010

Sheet Title
SEDIMENT TRAP
UNDERDRAIN DETAIL

Dwg. No. PSC2008-0850-0017BA

Sht. No. 17 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 17 – Sediment Trap Underdrain Detail.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:44 PM

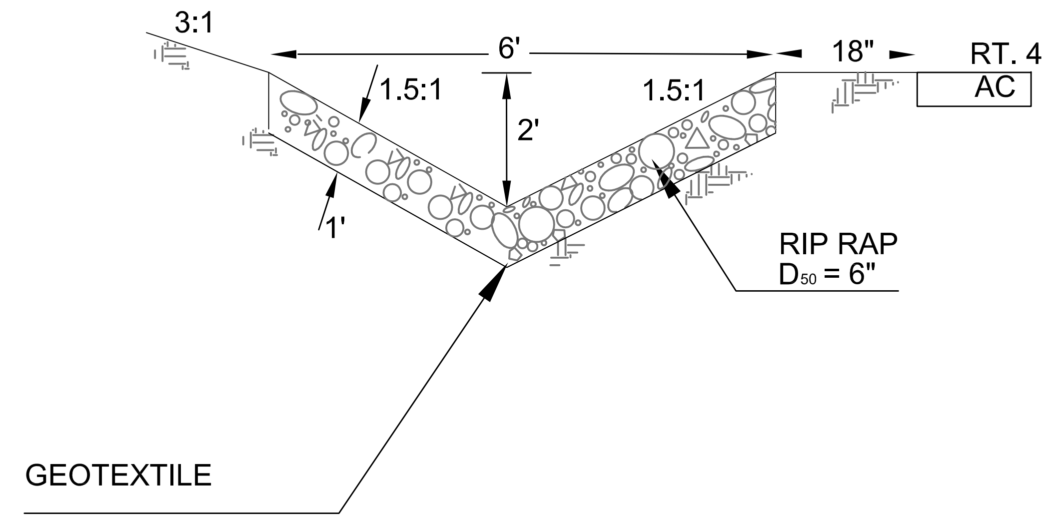



NOTE:

1. STRAW WATTLES ARE TUBES MADE FROM STRAW BOUND BIODEGRADABLE NETTING. THEY ARE APPROX. 8" DIA. AND 20 - 30 FT. LONG.
2. STRAW WATTLES TRAP SEDIMENT AND REDUCE SHEET & RILL EROSION BY REDUCING SLOPE GRADIENT, INCREASING INFILTRATION RATES AND BY PRODUCING A FAVORABLE ENVIRONMENT FOR PLANT ESTABLISHMENT.
3. STRAW WATTLE INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE WATTLE IN A TRENCH, 2" - 3" DEEP (SOIL ONLY), DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND WATTLE.

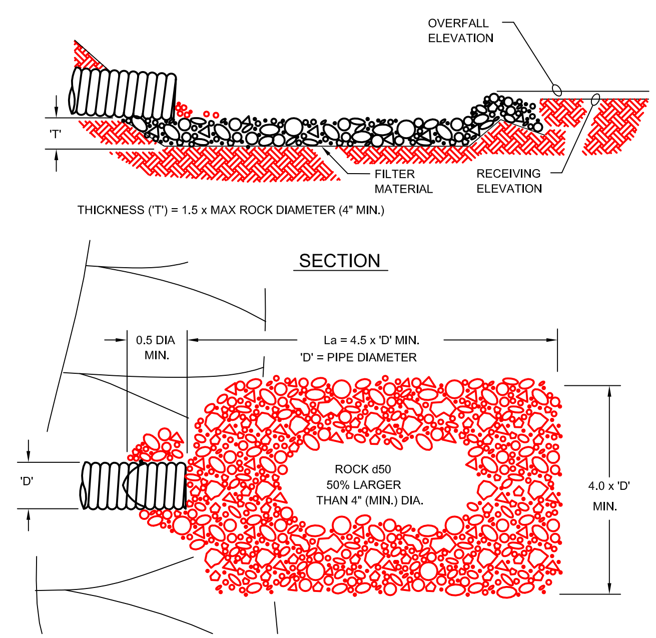
A/18 DETAIL - BIODEGRADABLE STRAW WATTLES

NOT TO SCALE




B/18 DETAIL - RT. 4 ROCK LINED DITCH

NOT TO SCALE




NOTES:

1. DIMENSIONS AS SHOWN.
2. APRON FIELD FIT TO NEW ROCK LINED DITCH.
3. FILTER MATERIAL IS FILTER FABRIC.

C/18 DETAIL - ENERGY DISSIPATOR

NOT TO SCALE


Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| 1 | 100709 | SWPPP REVIEW | | |
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |

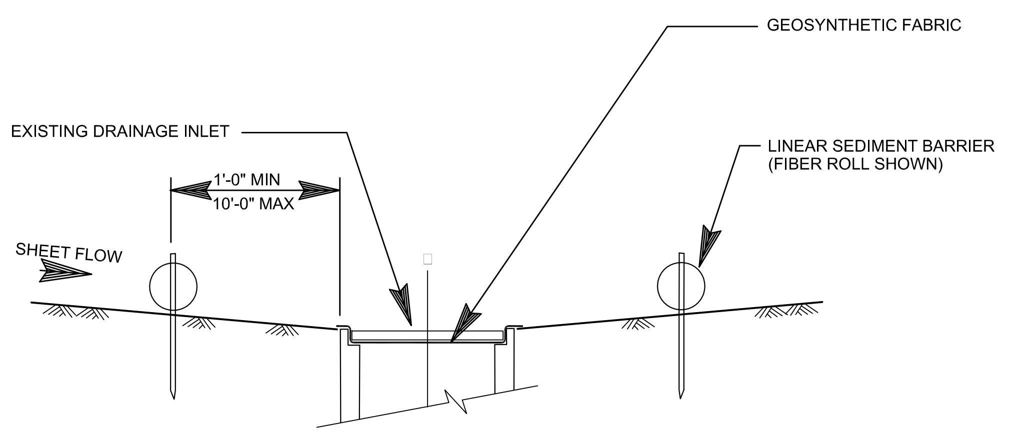
Des: L. LONG 2/8/10
Dwn: H.GRANT/T. SISON 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 18-19 - Details.dwg
PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2009

Sheet Title
EROSION DETAILS

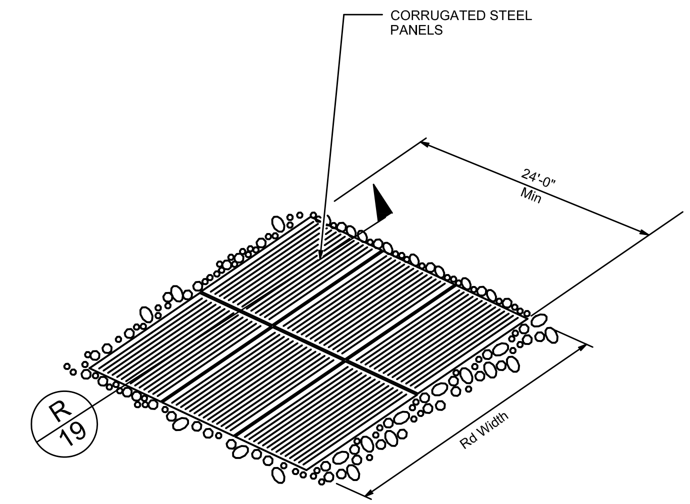
Dwg. No. PSC2008-0850-0018BA

Sht. No. 18 of 24


File Name: K:\ES\PROJECTS\2008\01208096.00 - LLNL Site 300 Bldg 850\As-Builts\Sheet 18-19 - Details.dwg Date Plotted: 2/5/2010 1:45 PM

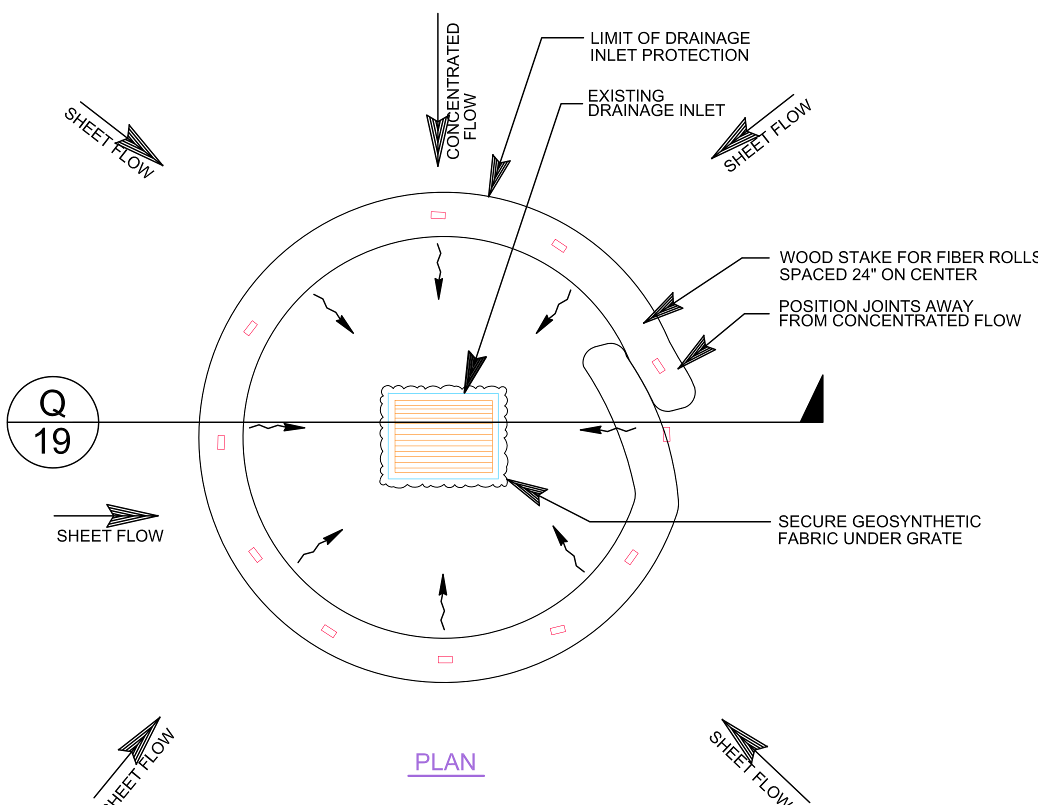



Q 19 SECTION
N.T.S.



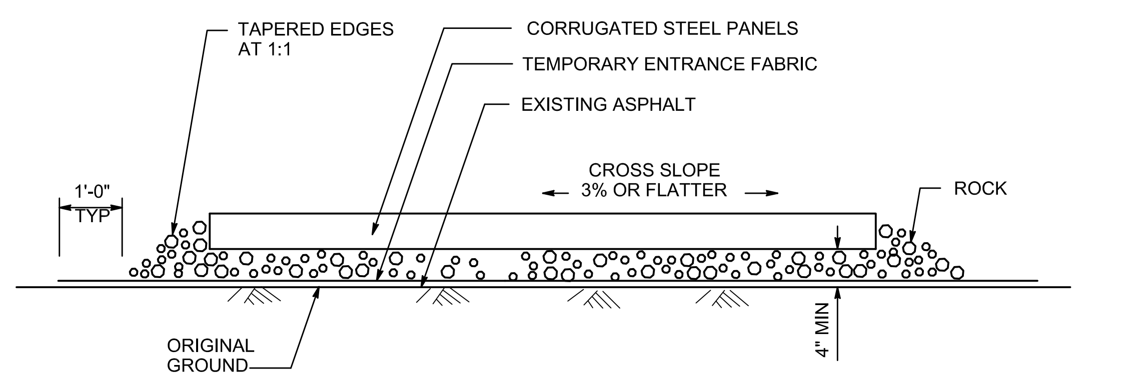

PERSPECTIVE

TEMPORARY CONSTRUCTION ENTRANCE
TRACK OUT CONTROL 2 19




PLAN

TEMPORARY DRAINAGE
INLET PROTECTION 1 19




R 19 SECTION: TRACK OUT CONTROL
N.T.S.


Lawrence Livermore
National Laboratory,
Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY,
CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT/T. SISON | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 18-19 - Details.dwg

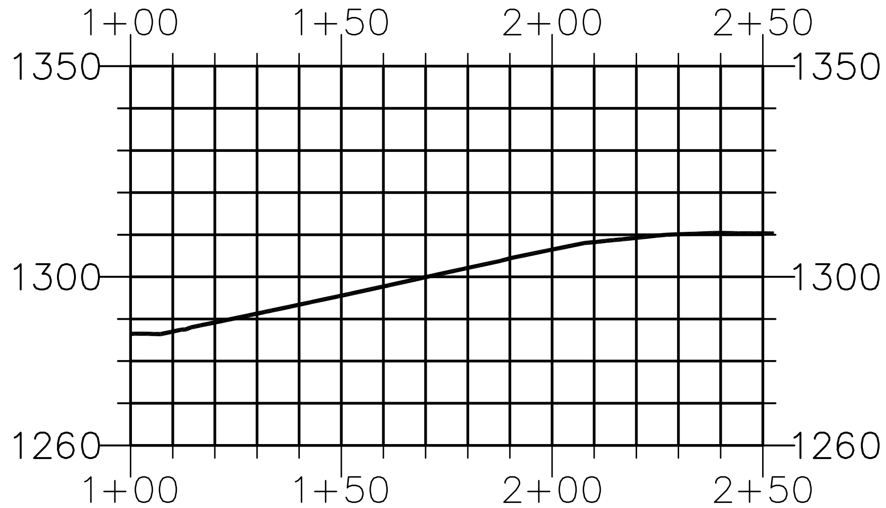
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2009 |

Sheet Title
EROSION DETAILS

Dwg. No. PSC2008-0850-0019BA

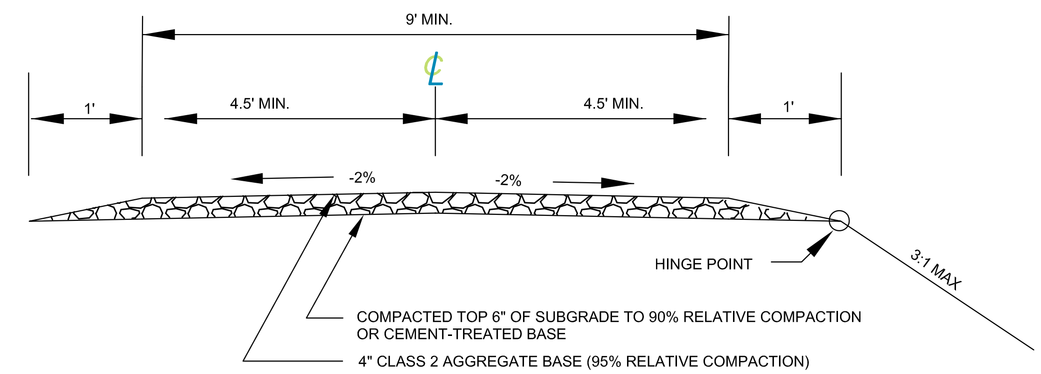
Sht. No. 19 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 18-19 – Details.dwg Date Plotted: 2/5/2010 1:46 PM



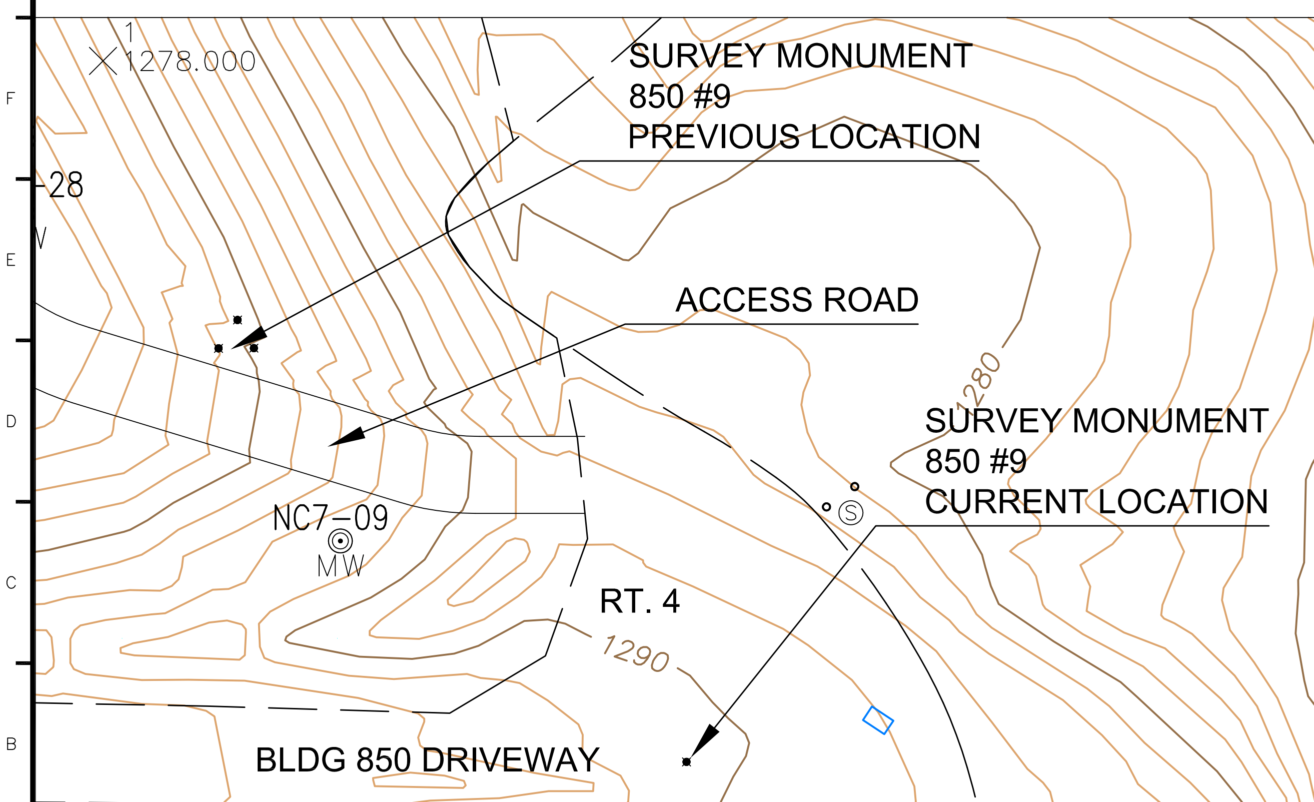

I/20 ACCESS ROAD PROFILE

SCALE: AS SHOWN



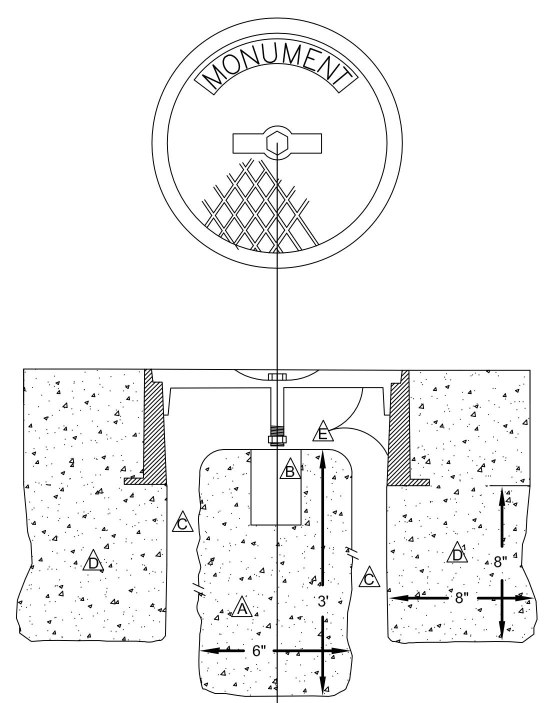

F/20 ACCESS ROAD SECTION DETAIL

AS SHOWN




SURVEY MONUMENT LOCATION PLAN VIEW F/20

SCALE: 1" = 40'




A. POURED 3.0' LONG X 6" DIAMETER CONCRETE CYLINDER.

B. LEFT 3" LONG X 2" DIAMETER CAVITY FOR FUTURE MONUMENT PLACEMENT BY OTHER.

C. ASSURED 1" CLEAR FOR DRAINAGE.

D. POURED 8" DEEP X 8" WIDE RING TO SUPPORT WELL BODY.

E. PHOENIX IRON WORKS SURVEY MONUMENT COVER & FRAME/WELL BODY, NO. P-2001-a (CLEAR OPENING 6-3/4", OVERALL BASE DIA 12", HEIGHT 4-1/2"), OR APPROVED EQUAL.

ALL CONCRETE POURED SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH IN 28 DAYS OF 2,500 PSI.

G/20 DETAIL - SURVEY MONUMENT

NOT TO SCALE

Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

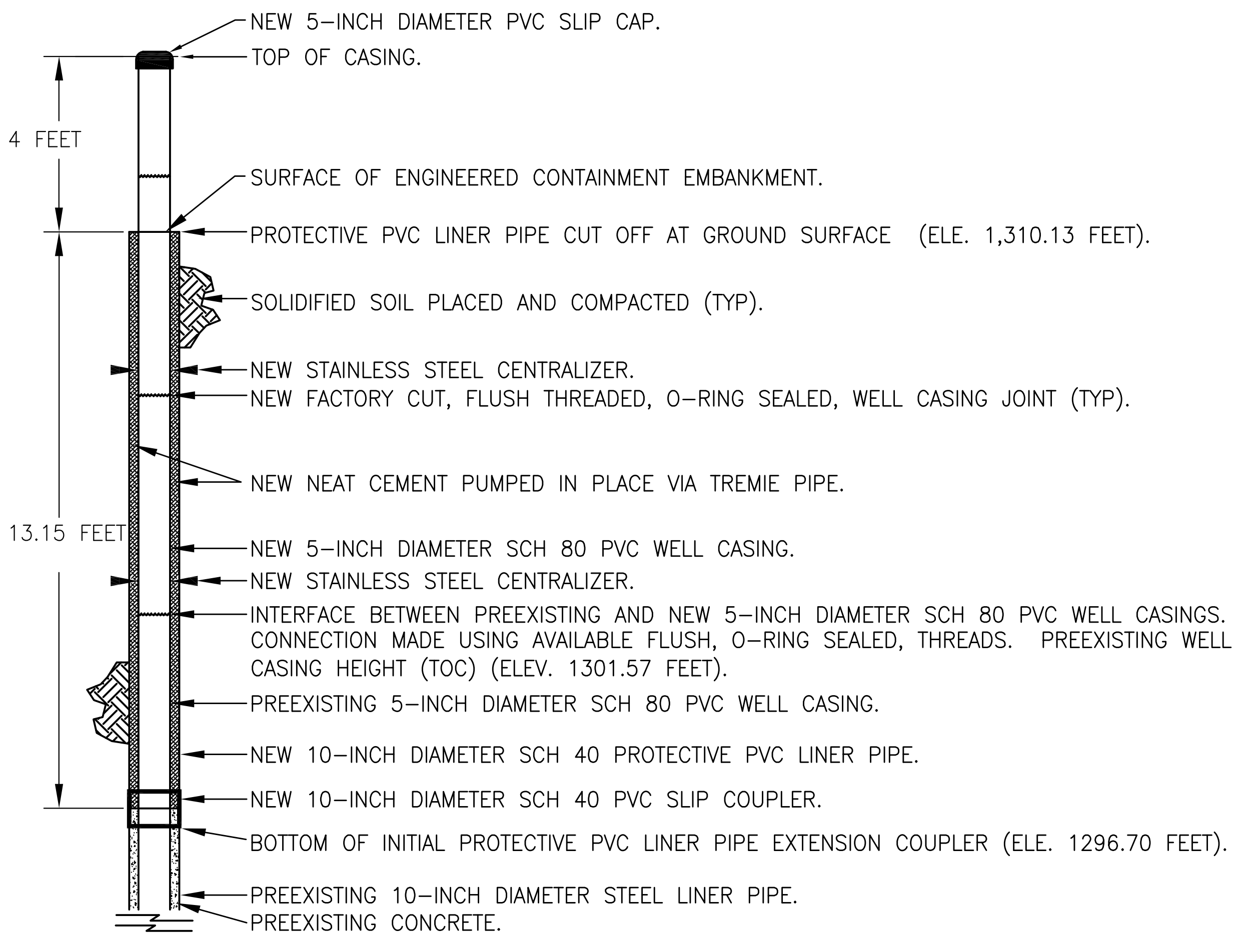
Des: L. LONG 2/8/10
Dwn: H. GRANT/T. SISON 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 20 - Misc Details.dwg
PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010

Sheet Title
MISCELLANEOUS DETAILS

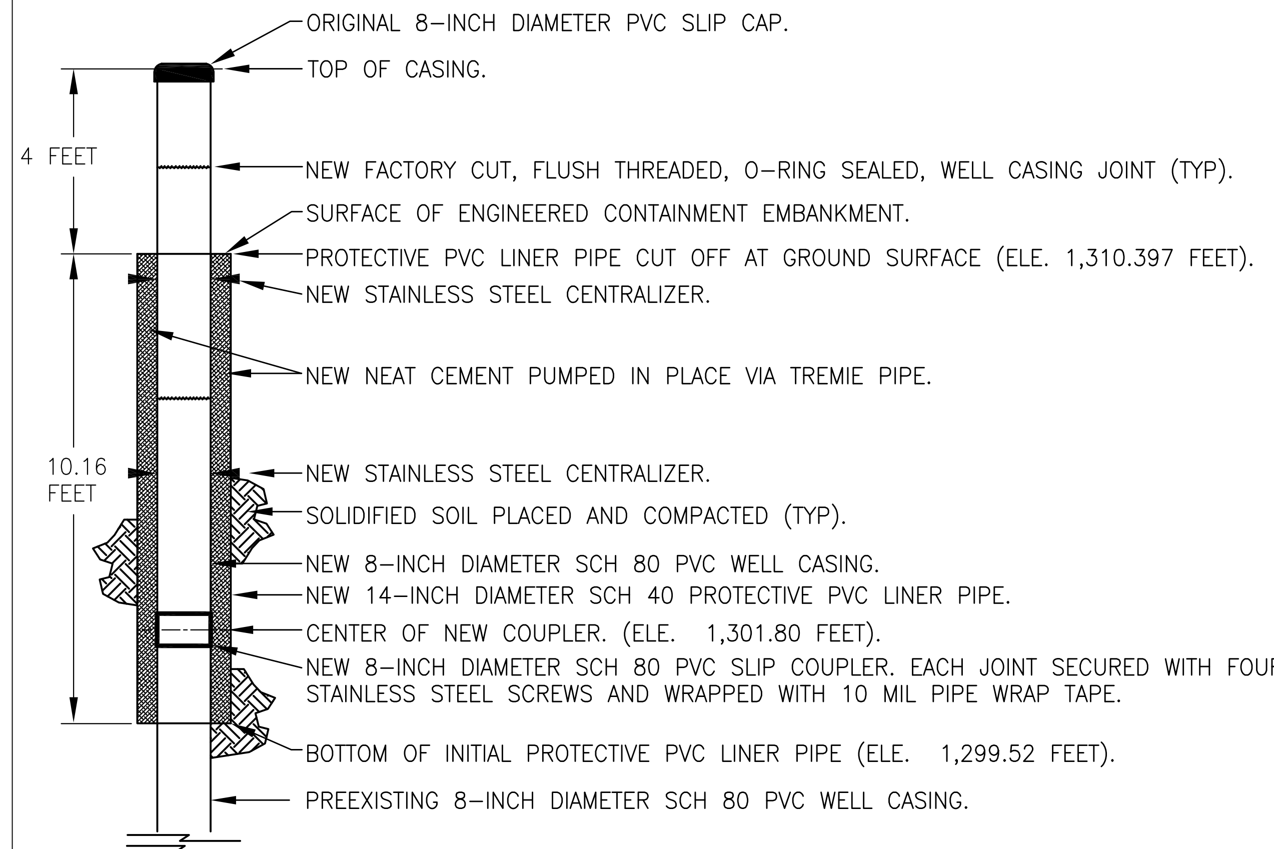
Dwg. No. PSC2008-0850-0020BA

Sht. No. 20 of 24

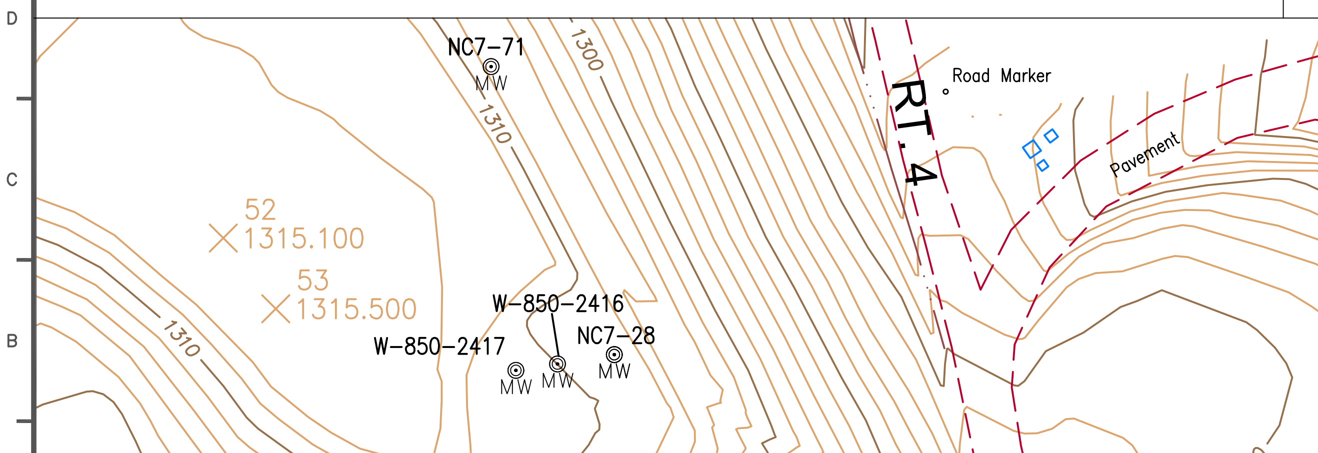
File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 20 – Misc Details.dwg Date Plotted: 2/8/2010 1:30 PM

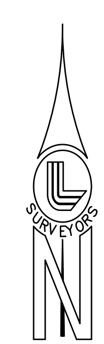



DETAIL – W-850-2416
WELL EXTENSION DIAGRAM (H / 21)
NOT TO SCALE




DETAIL – W-850-2417
WELL EXTENSION DIAGRAM (I / 21)
NOT TO SCALE




WELL LOCATION PLAN VIEW (G / 21)
SCALE: 1" = 60'

LEGEND

EXISTING GROUND MAJOR CONTOURS
EXISTING GROUND MINOR CONTOURS
MW MONITORING WELL LOCATION

NOTES:

1. EACH SECTION OF INSTALLED WELL CASING WAS PRECUT TO 5-FOOT LENGTHS BY THE MANUFACTURER.
2. SECTIONS OF PROTECTIVE PVC LINER PIPE WERE FIELD CUT TO APPROXIMATELY 5-FOOT SECTIONS AND WERE CONNECTED WITH SLIP COUPLERS OR BELL END FITTINGS.
3. LLNL TO INSTALL PROTECTIVE SURFACE CONCRETE PAD AND METAL MONUMENT WELL COVER.
4. NEW TOP OF CASING HEIGHT SHOULD BE SURVEYED BY CA LICENSED SURVEYOR.


Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707


IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: T. SISON/H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 21 - Well Details.dwg

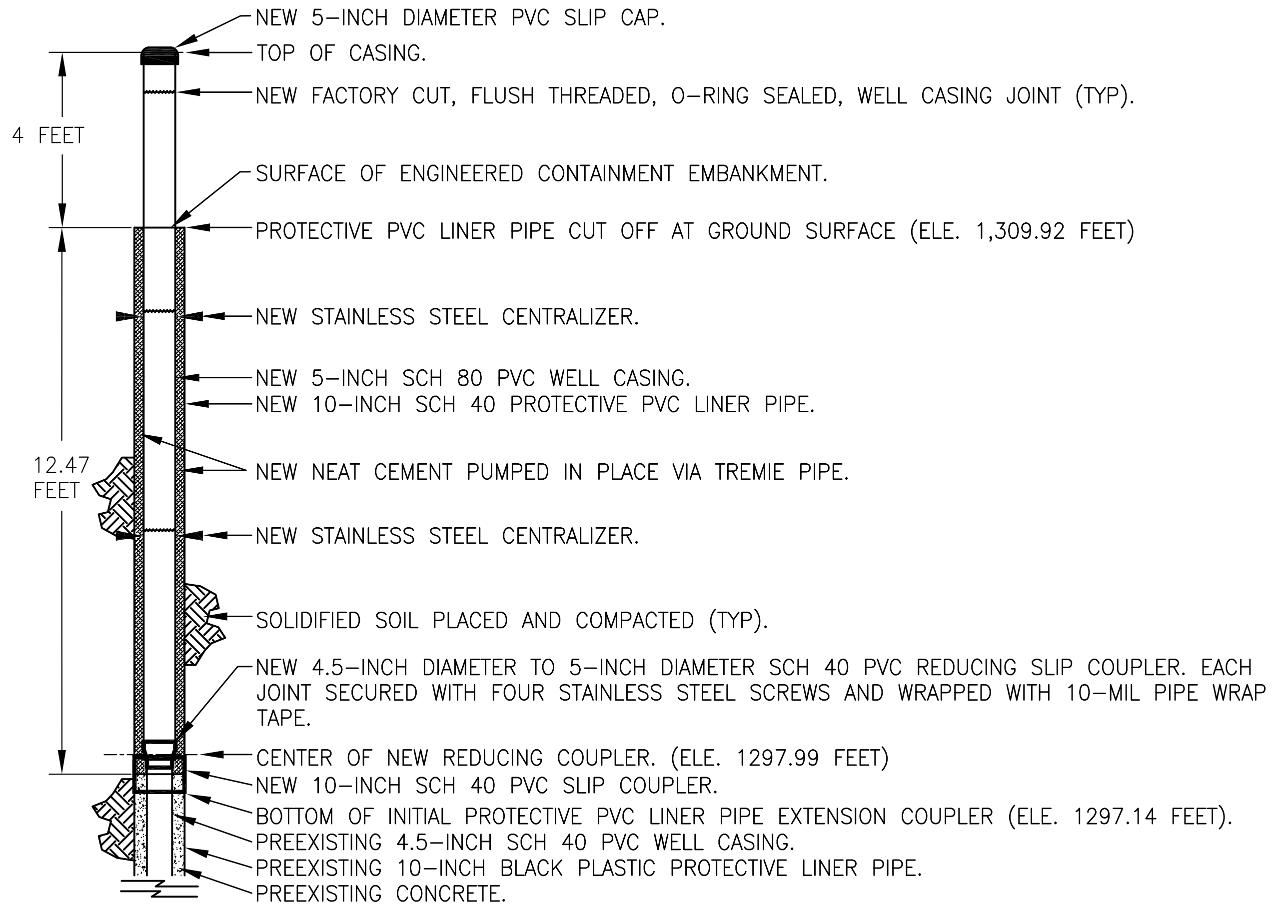
| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title
WELL EXTENSION DETAILS

Dwg. No. PSC2008-0850-0021BA

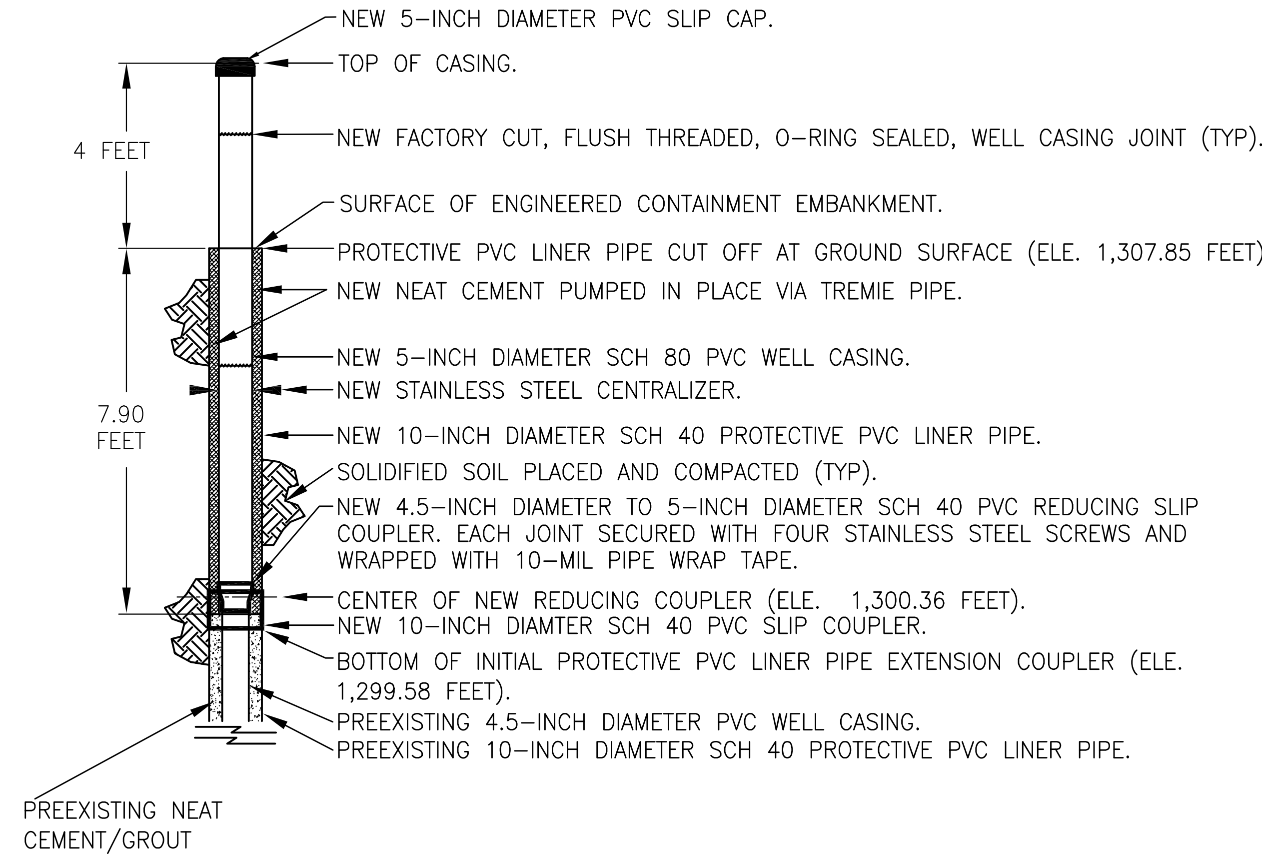
Sht. No. 21 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 21 – Well Details.dwg Plotted By: 2701HLG Date Plotted: 2/8/2010 9:32 AM



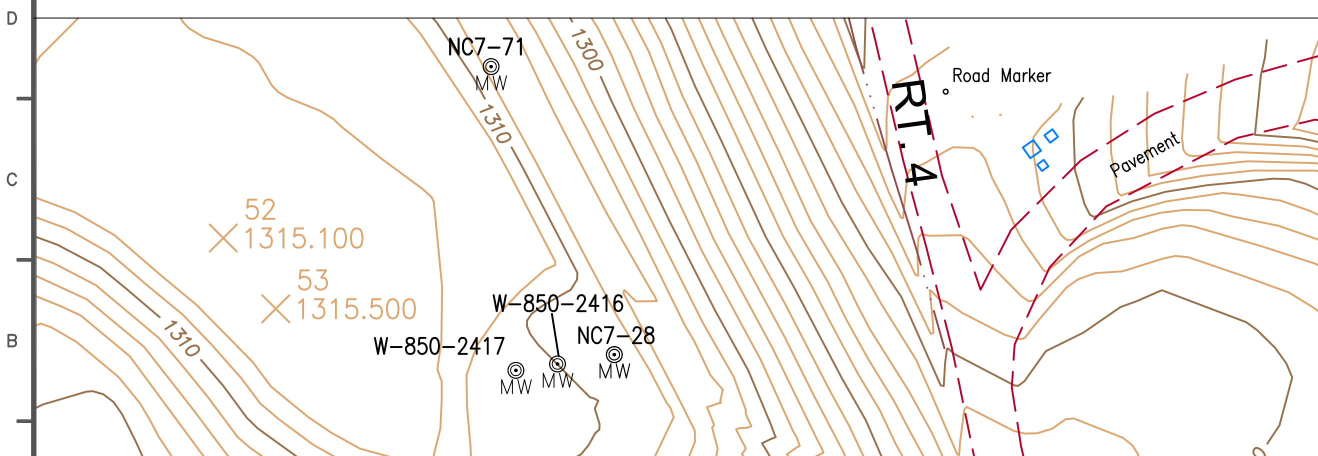

DETAIL – NC7–28
WELL EXTENSION DIAGRAM
NOT TO SCALE

J
22



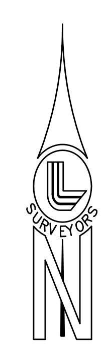

DETAIL – NC7–71
WELL EXTENSION DIAGRAM
NOT TO SCALE

K
22




WELL LOCATION PLAN VIEW
SCALE: 1" = 60'

G
21




LEGEND

EXISTING GROUND MAJOR CONTOURS
EXISTING GROUND MINOR CONTOURS
MW MONITORING WELL LOCATION

NOTES:

1. EACH SECTION OF INSTALLED WELL CASING WAS PRECUT TO 5-FOOT LENGTHS BY THE MANUFACTURER.
2. SECTIONS OF PROTECTIVE PVC LINER PIPE WERE FIELD CUT TO APPROXIMATELY 5-FOOT SECTIONS AND WERE CONNECTED WITH SLIP COUPLERS OR BELL END FITTINGS.
3. LLNL TO INSTALL PROTECTIVE SURFACE CONCRETE PAD AND METAL MONUMENT WELL COVER.
4. NEW TOP OF CASING HEIGHT SHOULD BE SURVEYED BY CA LICENSED SURVEYOR.

Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| 1 | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Des: L. LONG 2/8/10
Dwn: T. SISON/H. GRANT 2/8/10
Chk: L. LONG 2/8/10
File Name: Sheet 22 - Well Details.dwg

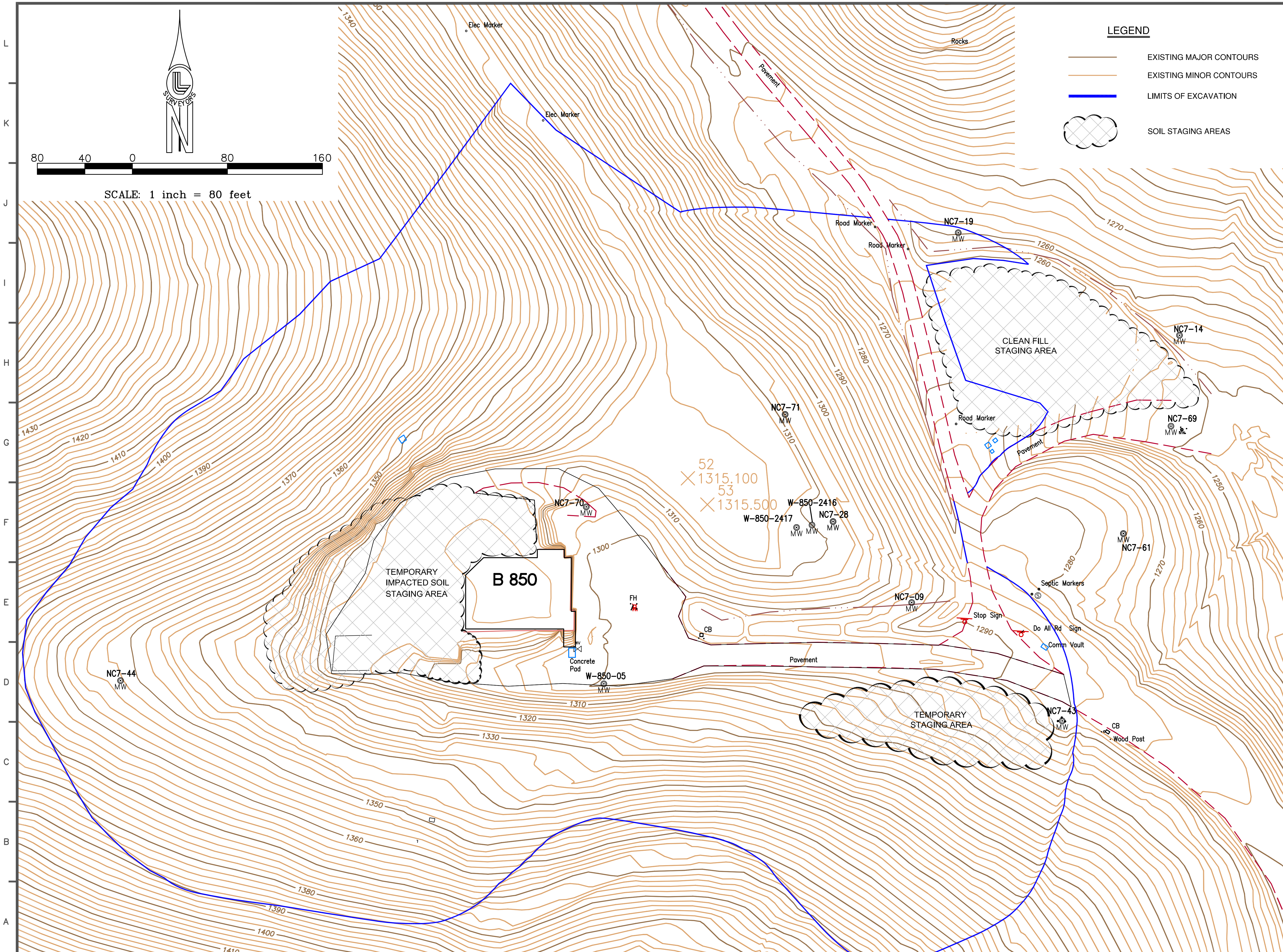
| PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010 |
|---|---|---|

Sheet Title
WELL EXTENSION DETAILS

Dwg. No. PSC2008-0850-0022BA

Sht. No. 22 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 – LLNL Site 300 Bldg 850\As-Builts\Sheet 22 – Well Details.dwg Plotted By: 2701HLG Date Plotted: 2/8/2010 9:33 AM




Lawrence Livermore
National Laboratory,
Plant Engineering
Livermore, CA. 94550

Consultants
SCS ENGINEERS
Environmental Consultants and Contractors
6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title
BUILDING 850, SITE 300
SOIL REMEDIATION PROJECT
RECORDS DRAWINGS
SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| A | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: T.SISON | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 23 - Soil Staging Areas.dwg

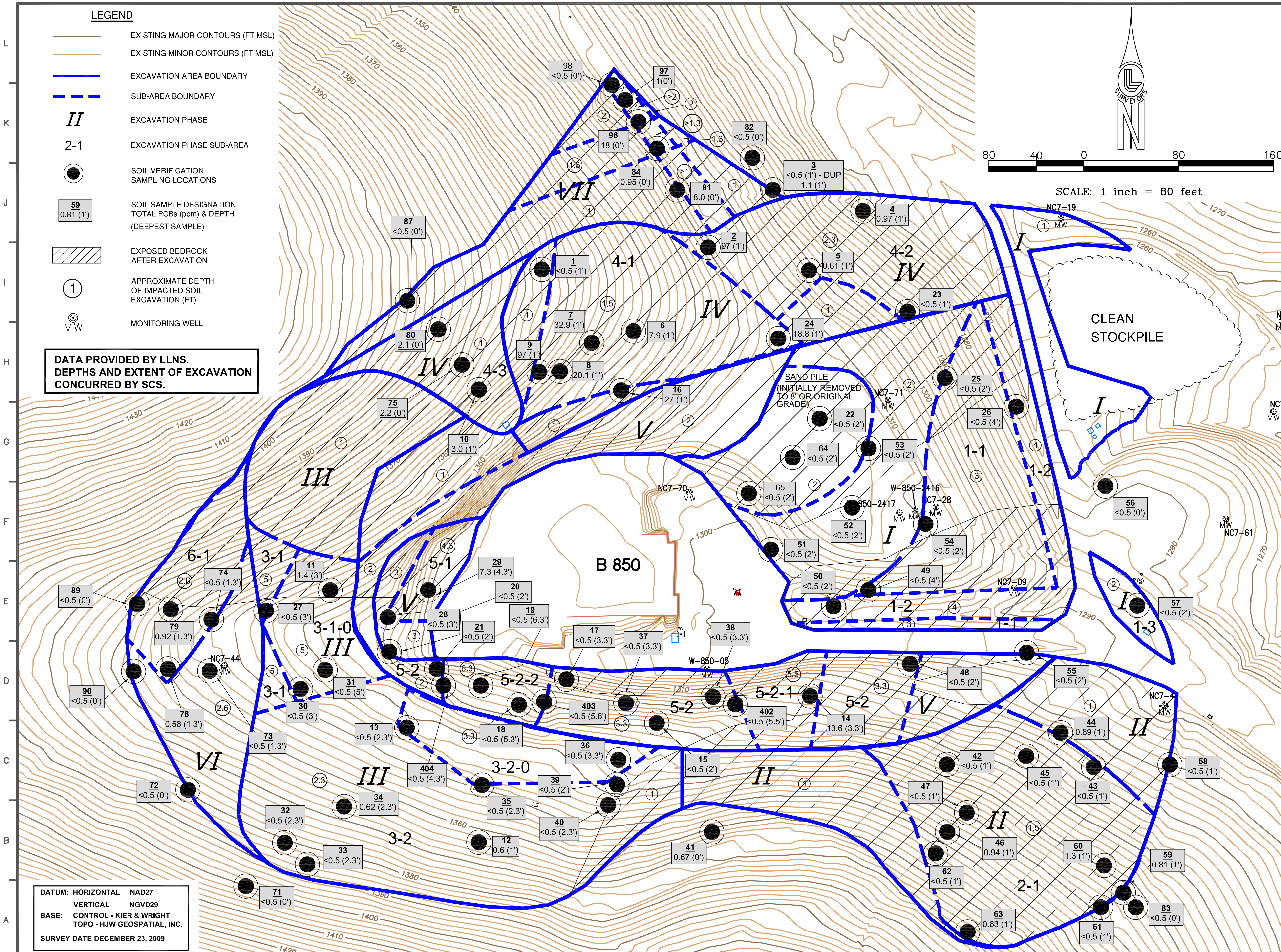
| PFNID: 850-2008-001 | Scale: AS SHOWN | Software: AutoCAD 2010 |
|---|---|---|

Sheet Title
SOIL STAGING AREAS

Dwg. No. PSC2008-0850-0023BA

Sht. No. 23 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 - LLNL Site 300 Bldg 850\As-Builts\Sheet 23 - Soil Staging Areas.dwg Plotted By: 2701HLG Date Plotted: 2/5/2010 1:52 PM




Lawrence Livermore National Laboratory, Plant Engineering
Livermore, CA. 94550

Consultants

**SCS ENGINEERS**

Environmental Consultants and Contractors

6601 Koll Center Parkway, Suite 140
Pleasanton, California 94566
(925) 426-0080 FAX: (925) 426-0707

IF THIS SHEET IS LESS THAN 11"X17", IT IS A REDUCED PRINT. SCALE ACCORDINGLY.

PE Stamps

Project Title

BUILDING 850, SITE 300 SOIL REMEDIATION PROJECT RECORDS DRAWINGS SAN JOAQUIN COUNTY, CALIFORNIA

| REV No | DATE | REVISIONS | DWN BY | CHK BY |
|---|---|---|---|---|
| 1 | 1/21/10 | RECORDS DRAWINGS | HLG | LDL |
| 2 | 2/8/10 | RECORDS DRAWINGS | HLG | LDL |

| | |
|---|---|
| Des: L. LONG | 2/8/10 |
| Dwn: H. GRANT | 2/8/10 |
| Chk: L. LONG | 2/8/10 |

File Name: Sheet 24 - Soil Verification Results.dwg

| PFNID: | Scale: | Software: |
|---|---|---|
| 850-2008-001 | AS SHOWN | AutoCAD 2010 |

Sheet Title

SOIL VERIFICATION SAMPLE RESULTS AND FINAL EXCAVATION

Dwg. No. PSC2008-0850-0024BA

Sht. No. 24 of 24

File Name: K:\ES\PROJECTS\2008\01208096.00 - LLNL Site 300 Bldg 850\As-Builts\Sheet 24 - Soil Verification Results.dwg Plotted By: 2701HLG Date Plotted: 2/11/2010 12:45 PM

# Appendix D

# Building 850 Soil Removal Action Verification Sampling and Analysis Result Reports

# Building 850 Removal Action
# Verification Sampling and Analysis Status Report
# Phase 1: Dioxin/Furan Compound Results

## INTRODUCTION

Remediation of PCB-, dioxin-, and furan-contaminated soil and sandpile at the Lawrence Livermore National Laboratory Site 300 Building 850 is being conducted as Non-Time Critical Removal Action under the Comprehensive Environmental Response, Compensation, and Liability Act.

The remedy selected in the Building 850 Soil Removal Action Memorandum (DOE, April 2008) consists of excavation and solidification of contaminated soil and the sandpile. A sampling and analysis plan to verify that the Building 850 area remedy has met cleanup standards was presented and approved in the Building 850 Engineering Evaluation/Cost Analysis (Dibley et al., February 2008).

In accordance with the approved verification sampling and analysis plan, the excavation for the Building 850 area was divided into 5 subareas, each containing 13 sampling locations (Figure 1), for a total of sixty-five randomly-selected sample locations throughout the entire excavation area. Soil samples for PCB and dioxin/furan analysis are being collected following the soil excavation to the prescribed depth(s) of anticipated contamination presented in the Building 850 Removal Action Design. The original sampling plan entails one sample from each location plus 6 interlaboratory duplicates being analyzed for PCBs for a total of 71 samples. The 13 sampling locations from each of the excavation phases will be composited and analyzed for dioxin/furans for a total of 5 samples.

The Interim Site-Wide Record of Decision (DOE, 2001) set PCB and dioxin/furan cleanup standards of 0.74 mg/kg and $1.6 \times 10^{-5}$ mg/kg, respectively (U.S. EPA Preliminary Remediation Goal for soil at industrial sites). In areas where the PCB results do not meet these regulatory criteria, additional soil will be excavated, re-sampled, and analyzed until the criteria are met.

To evaluate the dioxin/furan results, the toxic equivalent concentration (TEC) for the composite sample will be calculated by multiplying the individual dioxin/furan compound concentration by the associated Toxicity Equivalence Factor (TEF). The TEF is defined as an order of magnitude estimate of the toxicity of the various dioxin and furan compounds relative to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The sum of the resultant TECs is the total TEC for the sample. If the calculated 2,3,7,8-TCDD TEC concentration of the composited sample exceeds the dioxin/furan cleanup standard, additional soil will be excavated from the region, re-sampled, composited, and analyzed until the composited sample meets the dioxin/furan cleanup standard.

The sampling locations are being located using a Global Positioning System. At soil sampling locations where soil excavation has resulted in exposed bedrock, or the location poses too much risk to the samplers due to slipping or falling hazards, the sample location will be moved to the nearest exposed soil within the excavation phase area so that 13 samples are collected from each subarea.

**PHASE 1 DIOXIN/FURAN COMPOUND RESULTS**

Following the excavation of at least one foot of soil from the Phase 1 area, surface soil samples were collected from the newly exposed ground surface on June 11, 2009 for PCB and dioxin/furan analysis. The locations of samples collected from this area are shown on Figure 1. The location of samples 22, 26, 64, and 65 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. The thirteen dioxin/furan soil samples were stored in the refrigerator awaiting compositing until the PCB results were received.

The PCB Arochlor 1254 was detected at concentrations above the 0.74 milligrams per kilogram (mg/kg) PCB cleanup standard at sample locations 26 and 49 (Figure 1). Both of these sample locations were within the drainage way that runs south and then east of the Upper Corporation Yard and where sedimentation appears to have occurred over time. Two feet of additional soil was excavated in the area between the sample locations 26 and 49 and the nearest sample location with a result below the cleanup standard (Figure 2). An additional 2 feet of soil were removed along the drainage way to ensure all contaminated soil was removed, for a total of 4 feet (Figure 2). Following this additional excavation, surface soil samples were collected from locations 26, 49, and 57 on June 18, 2009 for PCBs and dioxin/furans analysis. PCBs were not detected at concentrations above either the 0.5 mg/kg detection limit or the 0.74 mg/kg PCB cleanup standard in any of the soil samples collected on June 18, 2009 following the second excavation. As a result, the cleanup of PCB-contaminated soil in the Phase 1 excavation is considered complete.

The samples collected from locations 22, 25, 50-54, 56, 57, 64 and 65 in the Phase 1 excavation area were composited and submitted to the analytical laboratory for dioxin/furan analysis by EPA Method 8290. Samples from locations 26 and 49 were not composited and were sent in individually for dioxin/furan analysis to verify whether any contamination remained in the streambed at these discrete locations. This is a variance from the original sampling plan in which all 13 samples were to be composited into one sample for dioxin/furan analysis. However, this alternate sampling and analysis is more conservative than the original plan in that it addresses the potential for dioxin/furan contamination in the drainage ways where the PCB concentrations exceeded cleanup standards.

To evaluate the dioxin/furan results, the toxic equivalent concentration (TEC) for the samples was calculated by multiplying the individual dioxin/furan compound concentration by the associated 1998 World Health Organization Toxicity Equivalence Factor (TEF). All three dioxin/furan sample TECs were below the dioxin/furan cleanup standard of $1.6 \times 10^{-5}$ mg/kg (Tables 1 through 3). The cleanup of dioxin/furan-contaminated soil in the Phase 1 excavation is considered complete.

**NEXT STEPS**

With this verification/confirmation that the PCB-, dioxin-, and furan-contaminated soil has been removed from the Phase 1 area to meet the cleanup standards, DOE/LLNL plan to proceed with the overexcavation, backfilling, and compaction of the non-engineered clean fill under the planned footprint of the solidified soil Corrective Action Management Unit.

A status report summarizing PCB analytical results for the Phase 2 excavation area will be sent to the regulatory agencies upon receipt of those results.

Table 1. Sample location 3SS-850-349A dioxin/furan compound analytical results and toxicity equivalent concentration sampled on June 18, 2009.

| Compound | Toxic Equivalent Factor[a] | Measured Concentration (mg/kg) | Toxicity Equivalent Concentration |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDD | 1.00E-01 | 4.67E-07 | 4.67E-08 |
| 1,2,3,7,8,9-HxCDD | 1.00E-01 | 7.00E-07 | 7.00E-08 |
| 1,2,3,4,6,7,8-HpCDD | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8,9-OCDD | 1.00E-04 | 1.77E-06 | 1.77E-10 |
| 2,3,7,8-TCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDF | 5.00E-02 | 0.00E+00 | 0.00E+00 |
| 2,3,4,7,8-PeCDF | 5.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 2,3,4,6,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8-HpCDF | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8,9-HpCDF | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8,9-OCDF | 1.00E-04 | 0.00E+00 | 0.00E+00 |
| | | *Total toxicity equivalent concentration* | 1.17E-07 |

Notes:
[a] World Health Organization 1998 Toxic Equivalent Factor.
Cleanup standard = 1.6 x $10^{-5}$ mg/kg

Table 2. Sample location 3SS-850-326A dioxin/furan compound analytical results and toxicity equivalent concentration sampled on June 18, 2009.

| Compound | Toxic Equivalent Factor[a] | Measured Concentration (mg/kg) | Toxicity Equivalent Concentration |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDD | 1.00E+00 | 5.35E-07 | 5.35E-07 |
| 1,2,3,4,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDD | 1.00E-01 | 1.02E-06 | 1.02E-07 |
| 1,2,3,4,6,7,8-HpCDD | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8,9-OCDD | 1.00E-04 | 1.56E-06 | 1.56E-10 |
| 2,3,7,8-TCDF | 1.00E-01 | 4.27E-07 | 4.27E-08 |
| 1,2,3,7,8-PeCDF | 5.00E-02 | 2.39E-07 | 1.20E-08 |
| 2,3,4,7,8-PeCDF | 5.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 2,3,4,6,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDF | 1.00E-01 | 1.52E-06 | 1.52E-07 |
| 1,2,3,4,6,7,8-HpCDF | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8,9-HpCDF | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8,9-OCDF | 1.00E-04 | 0.00E+00 | 0.00E+00 |
| | | *Total toxicity equivalent concentration* | 8.44E-07 |

Notes:
[a] World Health Organization 1998 Toxic Equivalent Factor.
Cleanup standard = 1.6 x $10^{-5}$ mg/kg

**Table 3. Sample location 3SS-850-366 dioxin/furan compound analytical results and toxicity equivalent concentration sampled on June 18, 2009.**

| Compound | Toxic Equivalent Factor[a] | Measured Concentration (mg/kg) | Toxicity Equivalent Concentration |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8-HpCDD | 1.00E-02 | 2.09E-06 | 2.09E-08 |
| 1,2,3,4,6,7,8,9-OCDD | 1.00E-04 | 1.19E-05 | 1.19E-09 |
| 2,3,7,8-TCDF | 1.00E-01 | 6.55E-06 | 6.55E-07 |
| 1,2,3,7,8-PeCDF | 5.00E-02 | 9.86E-07 | 4.93E-08 |
| 2,3,4,7,8-PeCDF | 5.00E-01 | 2.70E-06 | 1.35E-06 |
| 1,2,3,4,7,8-HxCDF | 1.00E-01 | 7.51E-07 | 7.51E-08 |
| 1,2,3,6,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 2,3,4,6,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDF | 1.00E-01 | 9.29E-07 | 9.29E-08 |
| 1,2,3,4,6,7,8-HpCDF | 1.00E-02 | 5.59E-07 | 5.59E-09 |
| 1,2,3,4,7,8,9-HpCDF | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8,9-OCDF | 1.00E-04 | 7.52E-07 | 7.52E-11 |
| | | *Total toxicity equivalent concentration* | 2.25E-06 |

**Notes:**
**[a] World Health Organization 1998 Toxic Equivalent Factor.**
**Cleanup standard = 1.6 x $10^{-5}$ mg/kg**
**Sample location 3SS-850-366 is a composite of locations 22, 25, 50, 51, 52, 53, 54, 56, 57A, 64, and 65.**

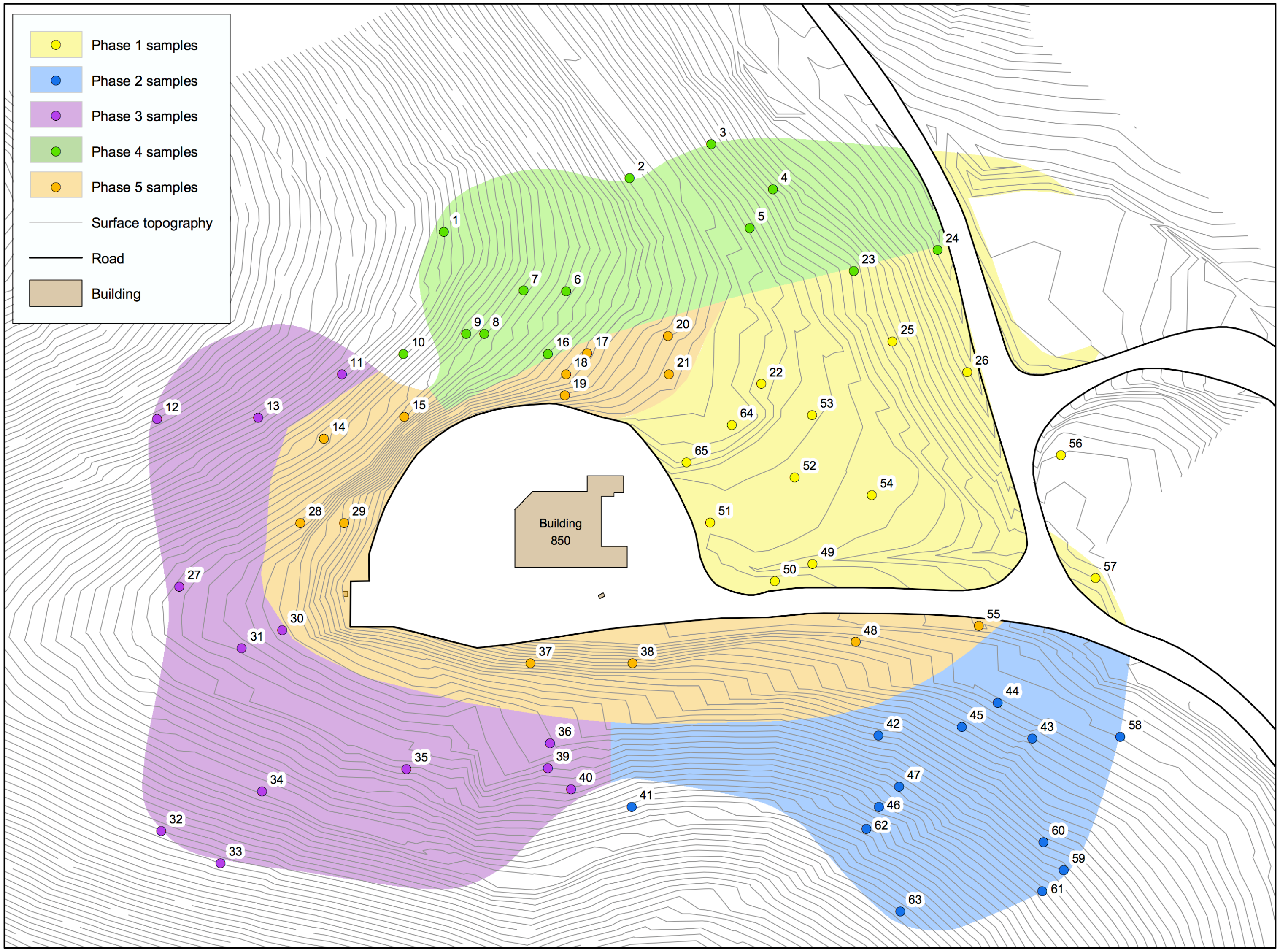



**Figure 1. Soil Verification Sampling Plan**

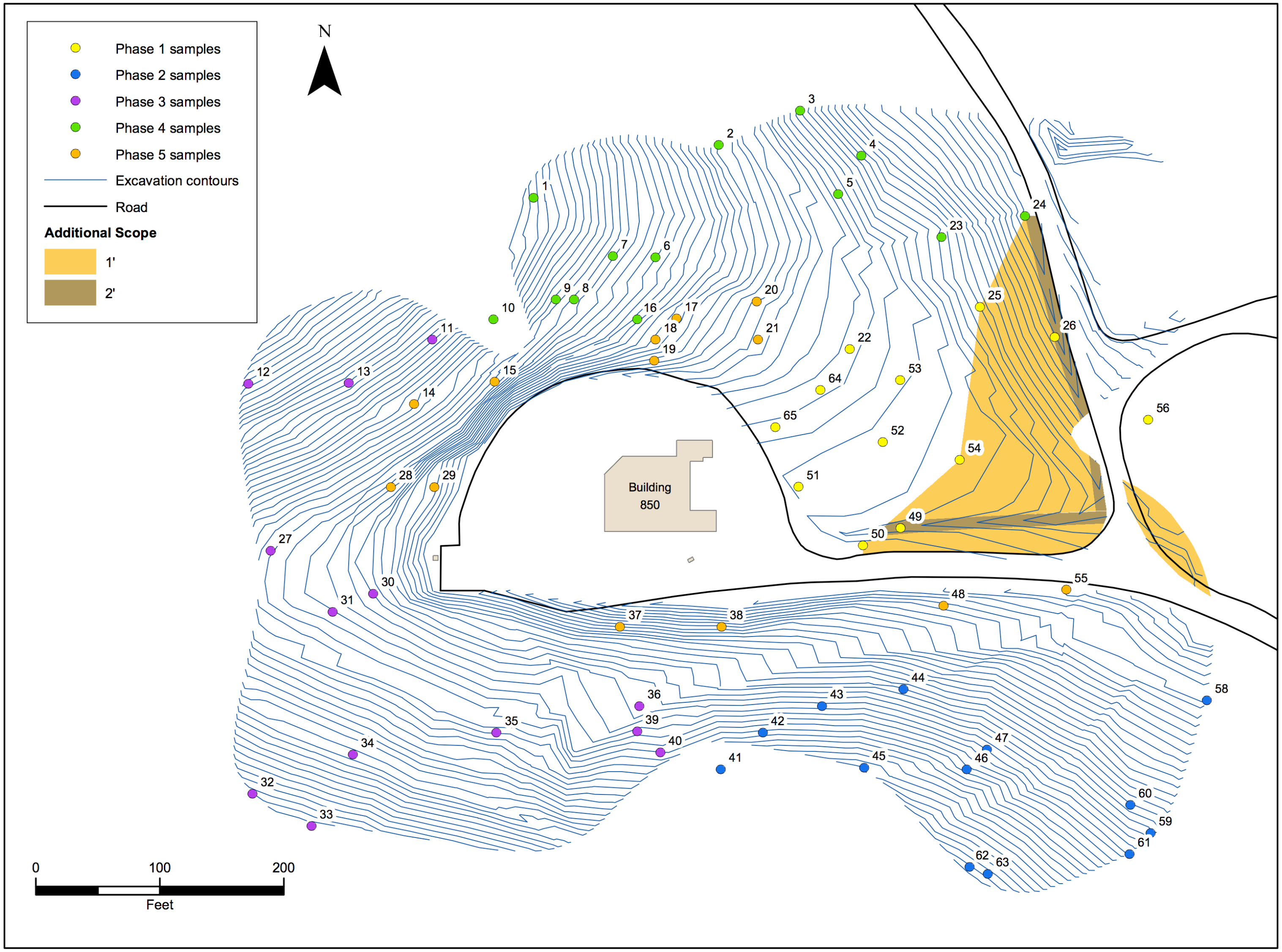



**Figure 2. Building 850 Soil Excavation, Additional Scope - June 16, 2009**

# Building 850 Removal Action
# Verification Sampling and Analysis Status Report
# Phase 1: Polychlorinated Biphenyl (PCB) Results

## INTRODUCTION

Remediation of PCB-, dioxin-, and furan-contaminated soil and sandpile at the Lawrence Livermore National Laboratory Site 300 Building 850 is being conducted as Non-Time Critical Removal Action under the Comprehensive Environmental Response, Compensation, and Liability Act.

The remedy selected in the Building 850 Soil Removal Action Memorandum (DOE, April 2008) consists of excavation and solidification of contaminated soil and the sandpile. A sampling and analysis plan to verify that the Building 850 area remedy has met cleanup standards was presented and approved in the Building 850 Engineering Evaluation/Cost Analysis (Dibley et al., February 2008).

In accordance with the approved verification sampling and analysis plan, the excavation for the Building 850 area was divided into 5 subareas, each containing 13 sampling locations (Figure 1), for a total of sixty-five randomly-selected sample locations throughout the entire excavation area. Soil samples for PCB and dioxin/furan analysis are being collected following the soil excavation to the prescribed depth(s) of anticipated contamination presented in the Building 850 Removal Action Design. The original sampling plan entails one sample from each location plus 6 interlaboratory duplicates being analyzed for PCBs for a total of 71 samples. The 13 sampling locations from each of the excavation phases will be composited and analyzed for dioxin/furans for a total of 5 samples.

The Interim Site-Wide Record of Decision (DOE, 2001) set PCB and dioxin/furan cleanup standards of 0.74 mg/kg and $1.6 \times 10^{-5}$ mg/kg, respectively (U.S. EPA Preliminary Remediation Goal for soil at industrial sites). In areas where the PCB results do not meet these regulatory criteria, additional soil will be excavated, re-sampled, and analyzed until the criteria are met.

To evaluate the dioxin/furan results, the toxic equivalent concentration (TEC) for the composite sample will be calculated by multiplying the individual dioxin/furan compound concentration by the associated Toxicity Equivalence Factor (TEF). The TEF is defined as an order of magnitude estimate of the toxicity of the various dioxin and furan compounds relative to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The sum of the resultant TECs is the total TEC for the sample. If the calculated 2,3,7,8-TCDD TEC concentration of the composited sample exceeds the dioxin/furan cleanup standard, additional soil will be excavated from the region, re-sampled, composited, and analyzed until the composited sample meets the dioxin/furan cleanup standard.

The sampling locations are being located using a Global Positioning System. At soil sampling locations where soil excavation has resulted in exposed bedrock, or the location poses too much risk to the samplers due to slipping or falling hazards, the sample location will be moved to the nearest exposed soil within the excavation phase area so that 13 samples are collected from each subarea.

## PHASE 1 PCB RESULTS

Following the excavation of at least one foot of soil from the Phase 1 area, surface soil samples were collected from the newly exposed ground surface on June 11, 2009 for PCB and dioxin/furan analysis. The locations of samples collected from this area are shown on Figure 1. The location of samples 22, 26, 64, and 65 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. Thirteen soil samples collected from the Phase 1 area were submitted to the analytical laboratory for PCB analysis using EPA Method 8082. The dioxin/furan samples were stored in the refrigerator awaiting compositing until the PCB results were received. The PCB analytical results for the samples collected on June 11, 2009 are shown in Table 1.

The PCB Arochlor 1254 was detected at concentrations above the 0.74 milligrams per kilogram (mg/kg) PCB cleanup standard at sample locations 26 and 49 (Figure 1). Both of these sample locations were within the drainage way that runs south and then east of the Upper Corporation Yard and where sedimentation appears to have occurred over time. Two feet of additional soil was excavated in the area between the sample locations 26 and 49 and the nearest sample location with a result below the cleanup standard (Figure 2). An additional 2 feet of soil were removed along the drainage way to ensure all contaminated soil was removed, for a total of 4 feet (Figure 2). Following this additional excavation, surface soil samples were collected from locations 26, 49, and 57 on June 18, 2009 for PCBs and dioxin/furans analysis. While the first sample collected from location 57 did not contain PCBs above the cleanup standard, a second sample was collected from this location because an additional foot of soil was removed in the area. As shown in Table 1, PCBs were not detected at concentrations above either the 0.5 mg/kg detection limit or the 0.74 mg/kg PCB cleanup standard in any of the soil samples collected on June 18, 2009 following the second excavation. As a result, the cleanup of PCB-contaminated soil in the Phase 1 excavation is considered complete.

## NEXT STEPS

The samples collected from locations 22, 25, 50-54, 56, 57, 64 and 65 in the Phase 1 excavation area were composited and submitted to the analytical laboratory for dioxin/furan analysis by EPA Method 8290. Samples from locations 26 and 49 were not composited and were sent in individually for dioxin/furan analysis to verify whether any contamination remained in the streambed at these discrete locations. This is a variance from the original sampling plan in which all 13 samples were to be composited into one sample for dioxin/furan analysis. However, this alternate sampling and analysis is more conservative than the original plan in that it addresses the potential for dioxin/furan contamination in the drainage ways where the PCB concentrations exceeded cleanup standards.

A status report summarizing the dioxin/furan analytical results will be sent to the regulatory agencies upon receipt of those results. These dioxin/furan results will be used to determine if excavation/cleanup of the Phase 1 area is complete or if additional soil excavation is required. In addition, a new sampling plan showing the new sampling locations for those samples that were moved will be included.

**Table 1. PCB sample location and results.**

| Sample Location | Sample ID | PCB RESULTS (mg/kg) | Cleanup Standard (mg/kg) | Phase | Sample date | Notes |
|---|---|---|---|---|---|---|
| 22 | 3SS-850-322 | <0.5 | 0.74 | 1 | 6/11/09 | Field duplicate |
| 22 | 3SS-850-322 | <0.5 | 0.74 | 1 | 6/11/09 | |
| 25 | 3SS-850-325 | <0.5 | 0.74 | 1 | 6/11/09 | |
| 26 | 3SS-850-326 | **1.5** | 0.74 | 1 | 6/11/09 | PCB 1254 |
| 26 | 3SS-850-326A[a] | <0.5 | 0.74 | 1 | 6/18/09 | Resample, new depth |
| 49 | 3SS-850-349 | **3.2** | 0.74 | 1 | 6/11/09 | PCB 1254 |
| 49 | 3SS-850-349A[a] | <0.5 | 0.74 | 1 | 6/18/09 | Resample, new depth |
| 50 | 3SS-850-350 | <0.5 | 0.74 | 1 | 6/11/09 | |
| 51 | 3SS-850-351 | <0.5 | 0.74 | 1 | 6/11/09 | |
| 52 | 3SS-850-352 | <0.5 | 0.74 | 1 | 6/11/09 | |
| 53 | 3SS-850-353 | <0.5 | 0.74 | 1 | 6/11/09 | |
| 54 | 3SS-850-354 | <0.5 | 0.74 | 1 | 6/11/09 | |
| 56 | 3SS-850-356 | 0.69 | 0.74 | 1 | 6/11/09 | PCB 1254, Field duplicate |
| 56 | 3SS-850-356 | <0.5 | 0.74 | 1 | 6/11/09 | |
| 57 | 3SS-850-357 | 0.66 | 0.74 | 1 | 6/11/09 | PCB 1254 |
| 57 | 3SS-850-357A[a] | <0.5 | 0.74 | 1 | 6/18/09 | Resample, new depth |
| 64 | 3SS-850-364 | <0.5 | 0.74 | 1 | 6/11/09 | |
| 65 | 3SS-850-365 | <0.5 | 0.74 | 1 | 6/11/09 | |

**[a] Indicates samples collected following second soil excavation.**

# Building 850 Removal Action Polychlorinated Biphenyl and Dioxin/Furan Compound Verification Sampling and Analysis Status Report

## 1. Introduction

This report summarizes polychlorinated biphenyl (PCB) and dioxin/furan compound verification sampling and analysis results for the Building 850 Removal Action. Verification sampling and analysis status reports for PCB and dioxin/furan compound results in the Phase 1 excavation area were submitted to the regulatory agencies on June 24 and June 25, 2009, respectively, confirming that the PCB and dioxin/furan compound cleanup in Phase 1 was complete. This report presents the verification sampling and analysis results for PCB and dioxin/furan compound analysis for the Phase 2 through 5 excavation areas and the new Phase 6 and 7 excavation areas.

Verification sampling and analysis has demonstrated that the PCB- and dioxin/furan compound-contaminated soil in the Phase 2 through 7 areas has been removed to meet cleanup standards.

## 2. Background

Remediation of PCB-, dioxin-, and furan-contaminated soil and sandpile material at the Lawrence Livermore National Laboratory Site 300 Building 850 area was conducted as a Non-Time Critical Removal Action under the Comprehensive Environmental Response, Compensation, and Liability Act.

The remedy selected in the Building 850 Soil Removal Action Memorandum (DOE, April 2008) consists of excavation and solidification of contaminated soil and the sandpile. A sampling and analysis plan to verify that the Building 850 area remedy has met cleanup standards was presented and approved in the Building 850 Engineering Evaluation/Cost Analysis (Dibley et al., February 2008).

In accordance with the approved verification sampling and analysis plan, the excavation for the Building 850 area was divided into 5 original excavation phase areas (1-5), each containing 13 sampling locations (Figure 1), for a total of sixty-five randomly-selected sample locations throughout the entire excavation area. Soil samples for PCB and dioxin/furan analysis were collected following the soil excavation to the prescribed depth(s) of anticipated contamination presented in the Building 850 Removal Action Design. The original sampling plan entailed one sample from each location plus 6 interlaboratory duplicates being analyzed for PCBs using EPA Method 8082B for a total of 71 samples. The plan specified that samples collected from the 13 sampling locations in each of the excavation phases be composited and analyzed for dioxin/furans using EPA Method 8290 for a total of 5 samples.

The Interim Site-Wide Record of Decision (DOE, 2001) set PCB and dioxin/furan cleanup standards of 0.74 milligrams per kilogram (mg/kg) and $1.6 \times 10^{-5}$ mg/kg, respectively (U.S. EPA Preliminary Remediation Goals for soil at industrial sites). In areas where the PCB results did not meet these regulatory criteria, additional soil was excavated, re-sampled, and analyzed until the criteria were met.

To evaluate the dioxin/furan results, the toxic equivalent concentration (TEC) for the composite sample was calculated by multiplying the individual dioxin/furan compound concentration by the associated Toxicity Equivalence Factor (TEF). The TEF is defined as an order of magnitude estimate of the toxicity of the various dioxin and furan compounds relative to the toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The sum of the resultant TECs is the total TEC for the sample. If the calculated 2,3,7,8-TCDD TEC concentration of the composited sample exceeds the dioxin/furan cleanup standard, additional soil will be excavated from the region, re-sampled, composited, and analyzed until the composited sample meets the dioxin/furan cleanup standard.

The sampling locations were located using a Global Positioning System. The lateral and vertical extents of all excavations were located using GPS and depth stakes. Final depths of all excavations were verified by GPS and field measurements. At soil sampling locations where soil excavation resulted in exposed bedrock, or the location posed too much risk to the samplers due to slipping or falling hazards, the sample locations were moved to the nearest exposed soil within the excavation phase area to ensure that 13 samples were collected from each subarea. Where PCBs or dioxin/furan compounds were detected above cleanup standards in the verification samples, the area was re-excavated to a new depth.

At the July 8, 2009 RPM meeting, the regulatory agencies agreed that:

- DOE did not have to move verification samples if the additional excavation exposed bedrock at the original verification sample location. Therefore, verification sample locations were not moved during subsequent excavation phases once bedrock was encountered.
- Areas in the remaining excavation phase areas (2, 3, 4, and 5) requiring additional excavation would be determined by extrapolating a contour around the sample locations below cleanup standards and those above cleanup standards. Additional verification samples could also be collected at the sidewall of the new excavation area. In general, we conservatively excavated to the nearest sample location that exhibited PCBs below cleanup standards.

The initial dioxin/furan samples were collected at the same time as the PCB samples and were stored in a refrigerator awaiting compositing upon receipt of PCB results. When the PCB results were above the cleanup standard, or holding times were exceeded, the dioxin/furan samples awaiting compositing were disposed of, and new samples were collected after the new excavation was completed unless bedrock was exposed at the sampling location.

During verification sampling of the Phase 3 and 4 areas, additional contamination was detected outside the original excavation contours. These areas were identified as Phases 6 and 7 (Figure 1). Figure 1 shows all excavation areas and final depths, soil sampling locations, and total PCB concentrations with depth. Figure 2 shows these features and the distribution of bedrock at ground surface when all excavation had been completed.

Soil excavation and sampling activities and PCB and dioxin/furan verification sampling analytical results for the Phases 2 through 7 areas are discussed in Section 3 through 8.

## 3. Phase 2 Excavation and Sampling Activities and Verification Sampling Results

Section 3.1 describes the two rounds of excavation performed in the Phase 2 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 3.2 describes the sampling conducted in the Phase 2 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

### 3.1 Phase 2 Excavation and Sampling Activities and PCB Verification Sampling Results

In the Phase 2 area, soil was excavated to a depth of at least one foot, or to bedrock, whichever was shallower. Following this soil excavation, the initial thirteen soil verification samples were collected on June 18, 2009 from locations 41, 42, 43, 44, 45, 46, 47, 58, 59, 60, 61, 62, 63, and 83 for PCB analysis and for later compositing for dioxin/furan analysis. These sample locations and total PCB concentrations are shown on Figure 1. The location of samples 42, 43, 44, 45, and 62 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. The location of samples 58 and 59 were moved because their original locations were found to fall outside the excavation area. The PCB analytical results for soil samples collected in the Phase 2 area are listed in Table 1. The PCB Aroclor 1254 was detected at concentrations above the 0.74 mg/kg PCB cleanup standard in samples collected from locations 44, 46, 59 and 60 (Table 1) following the first excavation.

A second excavation was conducted in the Phase 2 area, removing an additional 0.5 feet (ft) of soil (or less in zones of shallow bedrock) in the area denoted as Subarea 2-1 in Figure 1. The excavation of Subarea 2-1 included soil removal from sample locations 44, 46, 59 and 60 up to the nearest sample location with a result below the cleanup standard that still contained soil (Figure 1). Following the second excavation, bedrock was exposed (all soil was removed) throughout the entire Phase 2 area and a second set of verification samples could not be collected from locations 44, 46, 59 and 60 for PCBs. Because all the soil was removed (Figure 2), the cleanup of PCB-contaminated soil in the Phase 2 excavation area is considered complete.

### 3.2. Phase 2 Dioxin/Furan Compound Verification Sample Analytical Results

Soil from sample locations 41, 42, 43, 45, 47, 58, 61, 62, and 63 (Figure 1) were composited and submitted for dioxin and furan compound analysis on July 7, 2009, before completion of the second phase of excavation to bedrock throughout the Phase 2 area. The composite sample dioxin/furan TEC was below the cleanup standard of $1.6 \times 10^{-5}$ mg/kg (Table 2). Soil from sample locations 44, 46, 59 and 60 were not included in a second composite sample because these areas were excavated to bedrock during the first excavation (Figure 2). The cleanup of dioxin/furan-contaminated soil in the Phase 2 excavation is considered complete.

## 4. Phase 3 Excavation and Sampling Activities and Verification Sampling Results

Section 4.1 describes the three rounds of excavation performed in the Phase 3 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 4.2 describes the sampling conducted in the Phase 3 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

### 4.1. Phase 3 Excavation and Sampling Activities and PCB Verification Sampling Results

In the Phase 3 area, soil was excavated to a depth of at least one foot, except where bedrock was encountered at a shallower depth. Following this soil excavation, the initial thirteen soil verification samples were collected on June 25, 2009 from locations 11, 12, 13, 27, 30, 31, 32, 33, 34, 35, 36, 39, and 40 for PCB analysis and for later compositing for dioxin/furan analysis. These sample locations and total PCB results are shown on Figure 1. The location of samples 11, 12, 13, and 40 were moved to the nearest area of soil due to excavation to bedrock at their initial sampling plan locations. Sample location 30 was moved west of location 31 because its original location was found to fall within the Phase 5 area. Sample locations 32 and 33 were moved because their original locations were found to fall outside the excavation area. The PCB analytical results for the soil samples collected in the Phase 3 area are listed in Table 1. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in samples collected from locations 11, 13, 27, 30, 31, 32, 33, 34, 35, 36, and 40 following the first excavation. The majority of the PCBs were Aroclor 1254. However, Aroclor 1260 was also detected (Table 1).

A second excavation was conducted in the Phase 3 area, removing an additional 2 ft of soil (3 ft total) in the area denoted as Subarea 3-1 on Figure 1. The excavation of Subarea 3-1 included soil removal from sample locations 11, 27, 30, and 31 up to the nearest sample locations with results below the cleanup standard or to bedrock. An additional 1.3 ft (2.3 ft total) of soil was excavated in the area denoted as Subarea 3-2 on Figure 1. The excavation of Subarea 3-2 included soil removal from sample locations 12, 13, 30, 32, 33, 34, 35, 36, and 40 up to the nearest sample locations with results below the cleanup standard or bedrock (Figure 1). A second set of verification samples, including dioxin/furan samples for compositing, were collected on November 17, 2009 from sample locations 11, 12, 13, 27, 30, 31, 32, 33, 34, 35, 36, and 40 and submitted for PCB analysis. The second set of verification samples are listed in Table 1 with an “A” following the sample ID (i.e., 3SS-850-3XXA). PCBs were detected at concentrations above the cleanup standard in the samples collected from locations 11, 31, and 36 following the second excavation.

A third excavation was conducted in the Phase 3 area. An additional 2 feet of soil (5 ft total) was excavated where present to this depth or to bedrock in the area denoted as Subarea 3-1-0 in Figure 1. The excavation of Subarea 3-1-0 included the removal of soil at sample locations 11 and 31 up to the nearest sample locations with a result below the cleanup standard. An additional 1 ft (3.3 ft total) of soil was excavated in the area denoted as Subarea 3-2-0 in Figure 1. The excavation of Subarea 3-2-0 included the removal of soil at sample location 36 up to the nearest sample locations with results below the cleanup standard (Figure 1).

Following the third excavation, a third set of verification samples were collected from sample location 31 in Subarea 3-1-0 and from sample location 36 in Subarea 3-2-0 on November 23, 2009 for PCB analysis. Bedrock was exposed and a surface soil sample could not be collected from location 11. New dioxin/furan samples for compositing were also collected from these sample locations 31 and 36. The third set of verification samples are listed in Table 1 with a “B” following the sample ID (i.e., 3SS-850-3XXB). PCBs were not detected in the third set of verification samples at concentrations above the 0.5 mg/kg detection limit. As a result, the cleanup of PCB-contaminated soil in the Phase 3 excavation is considered complete.

### 4.2. Phase 3 Dioxin/Furan Compound Verification Sample Analytical Results

Soil from sample locations 12A, 13A, 27A, 30A, 31B, 32A, 33A, 34A, 35A, 36B, 39A, and 40A (Figure 1) were composited and submitted for dioxin and furan compound analysis on December 1, 2009. The sample from location 11 was not included in the composite because this area was excavated to bedrock during the third excavation (Figure 2).

The dioxin/furan composite sample TEC was below the dioxin/furan cleanup standard of $1.6 \times 10^{-5}$ mg/kg (Table 3). Therefore, the cleanup of dioxin/furan-contaminated soil in the Phase 3 excavation area is considered complete.

## 5. Phase 4 Excavation and Sampling Activities and Verification Sampling Results

Section 5.1 describes the two rounds of excavation performed in the Phase 4 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 5.1 also describes the PCB sampling and excavation conducted in the area west of the original Phase 4 area. Section 5.2 describes the sampling conducted in the Phase 4 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

### 5.1. Phase 4 Excavation and Sampling Activities and PCB Verification Sampling Results

In the Phase 4 area, soil was excavated to a depth of at least one foot, except where bedrock was encountered at a shallower depth. Following this soil excavation, the initial thirteen soil verification samples were collected on June 30, 2009 from locations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 23, and 24 for PCB analysis and for later compositing for dioxin/furan analysis. These sample locations and total PCB results are shown on Figure 1. The location of samples 1, 2, 4, and 7 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. Sample locations 3, 23, and 24 were moved as their original locations were found to fall either outside the excavation area, or in the adjacent excavation phase. The PCB analytical results for soil samples collected in the Phase 4 area are shown in Table 1. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in samples collected from locations 2, 3, 4, 6, 7, 8, 9, 10, 16, and 24 following the first excavation.

Because PCBs were detected above the cleanup standard in the initial Phase 4 verification sample collected from the un-excavated area west of Phase 4 (sample location 10), new sample locations 75, 80, and 87 (Figure 1) were located in the field and sampled for PCBs on July 7 and 16, 2009 to bound the lateral extent of PCB contamination to the west of the Phase 4 area. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in surface soil samples from locations 75 and 80 (Table 1).

A second excavation was conducted in the Phase 4 area. An additional 0.5 feet of soil (1.5 ft total) was excavated, where present to this depth, in the area denoted as Subarea 4-1 in Figure 1. The excavation of Subarea 4-1 included the removal of soil at sample locations 6, 7, 8, 16, and 24 up to the nearest sample location with a result below the cleanup standard or bedrock. An additional 1.3 ft of soil (2.3 ft total) was excavated in the area denoted as Subarea 4-2 in Figure 1. The excavation of Subarea 4-2 included the removal of soil at sample locations 2 and 4 up to the nearest sample location with a result below the cleanup standard or bedrock. The area denoted as Subarea 4-3 in Figure 1, that encompassed sample locations 10, 75, and 80, was also excavated to 1 ft or less, resulting in exposed bedrock throughout this area (Figure 2). Following the second excavation, bedrock was exposed in all of the Phase 4 area and a second set of verification samples could not be collected from locations 2, 3, 4, 6, 7, 8, 9, 10, 16, 24, 75, and 80 for PCB analysis.

Because all the contaminated soil was removed, the cleanup of PCB-contaminated soil in the Phase 4 area is considered complete.

### 5.2. Phase 4 Dioxin/Furan Compound Verification Sample Analytical Results

Because the entire Phase 4 area was excavated to bedrock during the second excavation, samples collected from locations 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 23, and 24 following the first round of soil excavation were not composited and analyzed for dioxin and furan compounds and no dioxin/furan TEC was calculated (Figure 2). No samples were collected for compositing and dioxin/furan analysis from locations 75, 80, and 87 in Subarea 4-3 because this area was excavated to bedrock during excavation.

Because all the contaminated soil was removed, the cleanup of dioxin/furan-contaminated soil in the Phase 4 excavation area is considered complete.

## 6. Phase 5 Excavation and Sampling Activities and Verification Sampling Results

Section 6.1 describes the three rounds of excavation performed in the Phase 5 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 6.2 describes the sampling conducted in the Phase 5 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

### 6.1. Phase 5 Excavation and Sampling Activities and PCB Verification Sampling Results

In the Phase 5 area, soil was excavated to a depth of at least one, two, or three feet, depending on the original excavation plan. Following this soil excavation, the initial thirteen soil verification samples were collected on September 10 and 15, 2009 from locations 14, 15, 17, 18, 19, 20, 21, 28, 29, 37, 38, 48, and 55 for PCB analysis and for later compositing for dioxin/furan analysis. These sample locations and PCB results are shown on Figure 1. The location of samples 14, 15, 17, 18, 19, 20, 21, 28, and 29 were moved to the nearest area of sufficient soil due to excavation to bedrock at their initial sampling plan locations. The location of sample 37 was moved upslope (south) due to safety concerns of working on the steep slope. The PCB analytical results for soil samples collected in the Phase 5 area are listed in Table 1. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in samples collected from locations 14, 17, 18, 19, 29, 37 and 38 following the first excavation.

Due to the detection of PCBs at concentrations exceeding the cleanup standard at sample locations 14, 17, 18, 19, 29, 37 and 38, a second round of excavation was conducted in the Phase 5 area. An additional 1.3 feet of soil (4.3 ft total) was excavated, where present to this depth, in the area denoted as Subarea 5-1 in Figure 1. The excavation of Subarea 5-1 included the removal of soil at sample location 29 up to the nearest sample location with a result below the cleanup standard (sample location 28) and the edges of the original 3 ft cut area or bedrock. The southern extent of Subarea 5-1 was selected by projecting a line perpendicular from the western extent of the Phase 5 area west to sample point 28.

An additional 1.3 ft of soil (3.3 ft total) was excavated in the area denoted as Subarea 5-2 in Figure 1. The excavation of Subarea 5-2 included the removal of soil at sample locations 14, 17, 18, 19, 37 and 38 up to the nearest sample location with a result below the cleanup standard (samples location 21 on the west and 48 on the east, and the edges of the original northern and southern boundaries of the Phase 5 area or bedrock (Figures 1 and 2).

A second set of verification samples were collected from Subareas 5-1 and 5-2 on November 2 and 3, 2009 for PCB analysis. The second set of verification samples are listed in Table 1 with an "A" following the sample ID (i.e., 3SS-850-3XXA). PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in the samples from location 29A in

Subarea 5-1 and locations 14, 18, and 19 in Subarea 5-2. These PCB results indicated that further excavation was required in Subarea 5-1 and in two portions of Subarea 5-2.

A third round of excavation was conducted in which the entire extent of Subarea 5-1 was excavated to bedrock, thereby removing all PCB-contaminated soil (Figure 2.)

Subarea 5-2 was further subdivided into Subareas 5-2-1 containing sample locations 14 and 38, and Subarea 5-2-2 containing sample locations 18 and 19, in which a third round of soil excavation was conducted (Figure 1).

The third round of excavation conducted in Subarea 5-2-1 removed an additional 2.2 ft of soil (5.5 ft total or to bedrock) between sample locations 14 and 38. The depth and western extent of additional excavation in Subarea 5-2-1 was determined by digging a test pit at a location just east of sample location 38 where the extrapolation of the 0.74 mg/kg cleanup standard would fall (location 402 on Figure 1), and collecting samples from the side wall on November 11, 2009, just above the soil-bedrock contact at a total depth of 5.5 ft. The eastern extent of excavation was defined by sample location 14, where bedrock had been exposed at ground surface after the second excavation. PCBs were not detected in the location 402 sample. Therefore, location 402 was used to bound the western edge of Subarea 5-2-1. In a third phase of excavation, soil was excavated to a total depth of 5.5, or to bedrock) from location 402 eastward to sample location 14 where bedrock was exposed at the surface.

The depth and lateral extent of excavation to be conducted in Subarea 5-2-2 were determined by digging four test pits. Test pit 1 was located between sample locations 17 and 18 where the extrapolation of the 0.74 mg/kg cleanup standard would fall (shown as location 403 on Figure 1). Test pits 2 and 3 were located at sample locations 18 and 19, respectively. Test pit 4 was located between sample locations 19 and 21 where the extrapolation of the 0.74 mg/kg cleanup standard would fall (shown as sample location 404 on Figure 1).

On November 9, 2009, side wall samples were collected from the test pits as follows:

- Test pit 1 (sample location 403) - sampled just below the contact of the upper alluvium and a lighter-colored soil horizon at a depth of 2.5 ft below ground surface at that point (total depth of 5.8 ft.)
- Test pit 2 (sample location 18) - sampled in the same horizon at a depth of 2.0 ft from the current surface (total depth of 5.3 ft.)
- Test pit 3 (sample location 19) - sampled in the same horizon at a depth of 2.5 ft from the current surface (total depth of 5.8 ft.)
- Test pit 4 – (sample location 404 - sampled in the same horizon at a depth of 1.0 ft below the current surface (total depth of 4.3 ft.)

The samples collected at sample locations 18 and 19 were the third set of verification samples collected at these locations, and thus are shown in Table 1 with a "B" following the sample ID (i.e., 3SS-850-3XXB).

In order to expedite the excavation activities in advance of the impending wet season, all soil was removed between locations 403 and 404 to a total depth of 5.8 ft (2.5 additional ft) prior to obtaining PCB results. It was later determined that PCBs were not detected in the samples collected at test pit 1 (location 403), test pit 2 (location 18), and test pit 4 (location 404) (Table 1). However, the sample collected in test pit 3 (location 19) contained PCBs above the cleanup standard. Therefore, an additional 0.5 ft was excavated from the entire 5-2-2 area. Following this fourth excavation, a surface soil verification sample was collected again at sample location

19 on November 17, 2009 at a total depth 6.3 ft. No PCBs were detected in the fourth verification sample (shown in Table 1 with a "C" following the sample ID [3SS-850-319C]).

As a result of these sampling, analysis, and excavation activities, the cleanup of PCB-contaminated soil in the Phase 5 excavation area is considered complete.

### 6.2. Phase 5 Dioxin/Furan Compound Verification Sample Analytical Results

Soil from sample locations 15, 17A, 18B, 19C, 20, 21, 28, 37A, 38A, 48, and 55 (Figure 1) were composited and identified as sample 3SS-850-370. In addition, soil from new sample locations 402, 403, and 404 (Figure 1) were composited and identified as sample 3SS-850-405. Both samples were submitted for dioxin and furan compound analysis on November 24, 2009. Sample locations 14 and 29 were not composited and analyzed for dioxin and furan compounds because these areas were excavated to bedrock during the third excavation (Figure 2).

The dioxin/furan TEC was below the dioxin/furan cleanup standard of $1.6 \times 10^{-5}$ mg/kg in both sample 3SS-850-370 (Table 4) and 3SS-850-405 (Table 5). Therefore, the cleanup of dioxin/furan-contaminated soil in the Phase 5 excavation is considered complete.

## 7. Phase 6 Excavation and Sampling Activities and Verification Sampling Results

Section 7.1 describes the two rounds of excavation performed in the Phase 6 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 7.2 describes the sampling conducted in the Phase 6 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

### 7.1. Phase 6 Excavation and Sampling Activities and PCB Verification Sampling Results

Because PCBs were detected in the initial Phase 3 verification sample from location 27, located at the western edge of the excavation area, new sample locations 71, 72, 73, 74, 78, 79, 89, and 90 (Figure 1) were sampled for PCBs on July 7, 2009 to bound the lateral extent of PCB contamination west of Phase 3. The PCB analytical results for soil samples collected in the Phase 6 area are listed in Table 1. PCBs were detected at concentrations above the 0.74 milligrams per kilogram (mg/kg) PCB cleanup standard at ground surface at sample locations 73, 74, 78, and 79.

As shown on Figure 1, the area around these new locations and bounded by sample locations 72, 89, and 90 and lines extending to the edges of the Phase 3 area was designated as Phase 6. Surface soil was excavated in the Phase 6 area to a depth of at least 1.3 feet. The initial verification samples were collected from the newly-exposed ground surface at sample locations 73, 74, 78, and 79 on November 17, 2009 for PCB and dioxin/furan analysis. The initial verification samples are shown in Table 1 with an "A" following the sample ID (i.e., 3SS-850-3XXA). PCB concentrations were below the 0.74 mg/kg PCB cleanup standard in samples from locations 73, 74, and 78 (Table 1), but above the cleanup standard at sample location 79 (Table 1).

A second excavation was conducted in Phase 6, removing an additional 1.3 feet of soil (2.6 ft total) in the area denoted on Figure 1 as Subarea 6-1. The excavation of Subarea 6-1 included soil removal from sample location 79 up to the nearest sample location with a result below the cleanup standard. Following the second excavation, bedrock was exposed and a second set of verification samples could not be collected from location 79 for PCB analysis. Because PCB verification samples results were below the PCB cleanup standard or contaminated soil was removed to bedrock (Subarea 6-1), the cleanup of PCB-contaminated soil in the Phase 6 excavation is considered complete.

### 7.2. Phase 6 Dioxin/Furan Compound Verification Sample Analytical Results

Soil from sample locations 72A, 73A, 74A, 78A, 89A, and 90A (Figure 1) were composited as sample 3SS-850-400 that was submitted for dioxin and furan compound analysis on November 24, 2009. Soil from location 79 was not included in the dioxin and furan composite because this area was excavated to bedrock during the second excavation. Soil from location 71 was not included in the composite because soil from more proximal locations along the southwestern edge of Phase 6 were already included in the composite, i.e. locations 72A and 90A.

The dioxin/furan TEC in composite sample 3SS-850-400 was below the dioxin/furan cleanup standard of $1.6 \times 10^{-5}$ mg/kg (Table 6). Therefore, the cleanup of dioxin/furan-contaminated soil in the Phase 6 excavation is considered complete.

## 8. Phase 7 Excavation and Sampling Activities and Verification Sampling Results

Section 8.1 describes the one round of excavation performed in the Phase 7 area, the sampling conducted to verify achievement of the PCB cleanup standards, and the PCB sample analytical results. Section 8.2 describes the sampling conducted in the Phase 7 area to verify achievement of dioxin/furan cleanup standards, and the dioxin/furan analytical results.

### 8.1. Phase 7 Excavation and Sampling Activities and PCB Verification Sampling Results

Because PCBs were detected above the cleanup standard in the initial Phase 4 verification sample from locations 2 and 3, located at the northern edge of the excavation area, new sample locations 81, 82, 84, 96, 97, and 98 (Figure 1) were located in the field and sampled for PCBs on July 13, 21, and 28, 2009 to bound the lateral extent of PCB contamination to the north-northwest of the Phase 4 area. PCBs were detected at concentrations above the 0.74 mg/kg cleanup standard in surface soil samples from locations 81, 84, 96, and 97 (Table 1).

As a result, soil was excavated to bedrock (1 to 2 ft total) in the area denoted on Figure 1 as Phase 7. The excavation of the Phase 7 area included soil removal from sample locations 81, 84, 96, and 97 and was bounded by projecting lines from the furthest sample location with PCB results below the cleanup standard (location 98). The first line was projected from sample location 98 southwest to a point between sample locations 87 and 80 and intersected the area excavated to bedrock at Subarea 4-3. The second line defining Phase 7 was projected along a steep break in topography from sample location 98 to sample location 3. Sample location 3 contained < 0.5 and 1.1 (in duplicate sample) mg/kg of PCBs and was also excavated to bedrock.

Because all soil was removed to bedrock, no additional verification samples were collected. Because all the soil was removed (Figure 2), the cleanup of PCB-contaminated soil in the Phase 7 excavation is considered complete.

### 8.2. Phase 7 Dioxin/Furan Compound Verification Sample Analytical Results

Because the Phase 7 area was excavated to bedrock, no samples could be collected from locations 81, 82, 84, 96, 97, and 98 from compositing and dioxin/furan analysis, and no dioxin/furan sample TEC was calculated.

Because all the contaminated soil was removed, the cleanup of dioxin/furan-contaminated soil in the Phase 7 area is considered complete.

## 9. Summary and Conclusions

Approximately one to six feet of soil were removed during one to three rounds of excavation in the Phase 2 through 7 excavation areas as part of the Building 850 Soil Removal Action Project. Verification samples were collected following the various rounds of excavation and submitted for PCB and dioxin/furan analysis, unless soil was excavated to bedrock. The PCB and dioxin/furan analytical results for these samples verify that cleanup standards for PCBs, dioxins, and furans as specified in the Building 850 Action Memorandum (DOE, 2008) have been met in the Phase 2 through 7 areas. The excavated PCB- and dioxin/furan-contaminated soil was solidified and consolidated in the Building 850 Corrective Action Management Unit (CAMU) and a cover consisting of clean soil mixed with 10% cement was placed on the top and sides of the CAMU. Because winter rains have commenced that could destabilize the excavated slopes surrounding Building 850, DOE/LLNL has completed restoration of these areas.

## 10. References


Dibley, V., L. Ferry, M. Taffet, G. Carli, and E. Friedrich (2008), *Engineering Evaluation/Cost Analysis for PCB-, Dioxin, and Furan-contaminated Soil at the Building 850 Firing Table, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-233862).

U.S. DOE (2001), *Interim Site-Wide Record of Decision for Lawrence Livermore National Laboratory Site 300,* Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-138470).

U.S. DOE (2008), *Action Memorandum for the Removal Action at the Building 850 Firing Table, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (LLNL-AR-403206).

**Table 1. Building 850 Removal Action verification sample locations and PCB results.**

| Sample Location | Sample ID | Depth (ft) | Aroclor 1254 (mg/kg) | Aroclor 1260 (mg/kg) | Total PCB (mg/kg) | Sample date | Phase/ Subarea |
|---|---|---|---|---|---|---|---|
| 41 | 3SS-850-341 | 0 | 0.67 | <0.5 | 0.67 | 6/18/09 | 2 |
| 42 | 3SS-850-342 | 1 | <0.5 | <0.5 | <0.5 | 6/18/09 | 2 |
| 43 | 3SS-850-343 | 1 | <0.5 | <0.5 | <0.5 | 6/18/09 | 2 |
| 44 | 3SS-850-344 | **1** | **0.89** | <0.5 | **0.89** | 6/18/09 | 2 |
| 44* | 3SS-850-344 | **1** | **0.87** | <0.5 | **0.87** | 6/18/09 | 2 |
| 45 | 3SS-850-345 | 1 | <0.5 | <0.5 | <0.5 | 6/18/09 | 2 |
| 46 | 3SS-850-346 | **1** | **0.94** | <0.5 | **0.94** | 6/18/09 | 2 |
| 47 | 3SS-850-347 | 1 | <0.5 | <0.5 | <0.5 | 6/18/09 | 2 |
| 58 | 3SS-850-358 | 1 | <0.5 | <0.5 | <0.5 | 6/18/09 | 2 |
| 59 | 3SS-850-359 | **1** | **0.81** | <0.5 | **0.81** | 6/18/09 | 2 |
| 60 | 3SS-850-360 | **1** | **1.3** | <0.5 | **1.3** | 6/18/09 | 2 |
| 61 | 3SS-850-361 | 1 | <0.5 | <0.5 | <0.5 | 6/18/09 | 2 |
| 62 | 3SS-850-362 | 1 | <0.5 | <0.5 | <0.5 | 6/18/09 | 2 |
| 63 | 3SS-850-363 | 1 | 0.63 | <0.5 | 0.63 | 6/18/09 | 2 |
| 83 | 3SS-850-383 | 0 | <0.5 | <0.5 | <0.5 | 6/18/09 | 2 |
| 11 | 3SS-850-311 | **1** | **260** | <0.5 | **260** | 6/25/09 | 3 |
| 11 | 3SS-850-311A | **3** | **1.4** | <0.5 | **1.4** | 11/17/09 | 3-1 |
| 12 | 3SS-850-312 | 1 | 0.61 | <0.5 | 0.61 | 6/25/09 | 3 |
| 13 | 3SS-850-313 | **1** | **0.78** | <0.5 | **0.78** | 6/25/09 | 3 |
| 13 | 3SS-850-313A | 2.3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 3-2 |
| 27 | 3SS-850-327 | **1.1** | **1.1** | <0.5 | **1.1** | 6/25/09 | 3 |
| 27 | 3SS-850-327A | 3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 3-1 |
| 30 | 3SS-850-330 | **1** | **30** | **4.7** | **34.7** | 6/25/09 | 3 |
| 30 | 3SS-850-330A | 3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 3-1 |
| 31 | 3SS-850-331 | **1** | **2** | <0.5 | **2** | 6/25/09 | 3 |
| 31 | 3SS-850-331A | **3** | **2.2** | <0.5 | **2.2** | 11/17/09 | 3-1 |
| 31 | 3SS-850-331B | 5 | <0.5 | <0.5 | <0.5 | 11/23/09 | 3-1-0 |
| 32 | 3SS-850-332 | **1** | **21** | **3.8** | **21** | 6/25/09 | 3 |
| 32* | 3SS-850-332 | **1** | **23** | <0.5 | **23** | 6/25/09 | 3 |
| 32 | 3SS-850-332A | 2.3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 3-2 |
| 33 | 3SS-850-333 | **1** | **2.5** | <0.5 | **2.5** | 6/25/09 | 3 |
| 33 | 3SS-850-333A | 2.3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 3-2 |

**Table 1. Building 850 Removal Action verification sample locations and PCB results (continued).**

| Sample Location | Sample ID | Depth (ft) | Aroclor 1254 (mg/kg) | Aroclor 1260 (mg/kg) | Total PCB (mg/kg) | Sample date | Phase/ Subarea |
|---|---|---|---|---|---|---|---|
| 34 | 3SS-850-334 | **1** | **1.3** | <0.5 | **1.3** | 6/25/09 | 3 |
| 34 | 3SS-850-334A | 2.3 | 0.62 | <0.5 | 0.62 | 11/17/09 | 3-2 |
| 35 | 3SS-850-335 | **1** | **2.7** | <0.5 | **2.7** | 6/25/09 | 3 |
| 35 | 3SS-850-335A | 2.3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 3-2 |
| 36 | 3SS-850-336 | **1** | **3.4** | <0.5 | **3.4** | 6/25/09 | 3 |
| 36 | 3SS-850-336A | **2.3** | **8.3** | **1.3** | **9.6** | 11/17/09 | 3-2 |
| 36 | 3SS-850-336B | 3.3 | <0.5 | <0.5 | <0.5 | 11/23/09 | 3-2-0 |
| 39 | 3SS-850-339 | 2 | <0.5 | <0.5 | <0.5 | 6/25/09 | 3 |
| 40 | 3SS-850-340 | **1** | **2.9** | **0.61** | **3.5** | 6/25/09 | 3 |
| 40 | 3SS-850-340A | 2.3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 3-2 |
| 1 | 3SS-850-301 | 1 | <0.5 | <0.5 | <0.5 | 6/30/09 | 4 |
| 2 | 3SS-850-302 | **1** | **83** | **14** | **97** | 6/30/09 | 4 |
| 3 | 3SS-850-303 | 1 | <0.5 | <0.5 | <0.5 | 6/30/09 | 4 |
| 3* | 3SS-850-303 | **1** | **1.1** | <0.5 | **1.1** | 6/30/09 | 4 |
| 4 | 3SS-850-304 | **1** | **0.97** | <0.5 | **0.97** | 6/30/09 | 4 |
| 5 | 3SS-850-305 | 1 | 0.61 | <0.5 | 0.61 | 6/30/09 | 4 |
| 6 | 3SS-850-306 | **1** | **6.3** | **1.6** | **7.9** | 6/30/09 | 4 |
| 7 | 3SS-850-307 | **1** | **29** | **3.9** | **32.9** | 6/30/09 | 4 |
| 8 | 3SS-850-308 | **1** | **17** | **3.1** | **20.1** | 6/30/09 | 4 |
| 9 | 3SS-850-309 | **1** | **87** | **10** | **97** | 6/30/09 | 4 |
| 10 | 3SS-850-310 | **1** | **2.3** | **0.72** | **3.0** | 6/30/09 | 4 |
| 16 | 3SS-850-316 | **1** | **31** | **4.3** | **35.3** | 6/30/09 | 4 |
| 16* | 3SS-850-316 | **1** | **27** | **0.74** | **27.74** | 6/30/09 | 4 |
| 23 | 3SS-850-323 | **1** | **<0.5** | **0.74** | **.74** | 6/30/09 | 4 |
| 24 | 3SS-850-324 | **1** | **17** | **1.8** | **18.8** | 6/30/09 | 4 |
| 18 | 3SS-850-318 | **2** | **31** | **4.4** | **35.4** | 9/15/09 | 5 |
| 18 | 3SS-850-318A | **3.3** | **1.3** | <0.5 | **1.3** | 11/3/09 | 5-2 |
| 18 | 3SS-850-318B | 5.3 | <0.5 | <0.5 | <0.5 | 11/9/09 | 5-2-2 |

**Table 1. Building 850 Removal Action verification sample locations and PCB results (continued).**

| Sample Location | Sample ID | Depth (ft) | Aroclor 1254 (mg/kg) | Aroclor 1260 (mg/kg) | Total PCB (mg/kg) | Sample date | Phase/ Subarea |
|---|---|---|---|---|---|---|---|
| 19 | 3SS-850-319 | **2** | **0.92** | <0.5 | **0.92** | 9/15/09 | 5 |
| 19 | 3SS-850-319A | **3.3** | **5.6** | **0.52** | **7.1** | 11/3/09 | 5-2 |
| 19 | 3SS-850-319B | **5.8** | **1.1** | <0.5 | **1.1** | 11/9/09 | 5-2-2 |
| 19 | 3SS-850-319C | 6.3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 5-2-2 |
| 20 | 3SS-850-320 | 2 | <0.5 | <0.5 | <0.5 | 9/15/09 | 5 |
| 21 | 3SS-850-321 | 2 | <0.5 | <0.5 | <0.5 | 9/15/09 | 5 |
| 28 | 3SS-850-328 | 3 | <0.5 | <0.5 | <0.5 | 9/10/09 | 5 |
| 29 | 3SS-850-329 | **3** | **8.9** | **1.5** | **10.4** | 9/10/09 | 5 |
| 29 | 3SS-850-329A | **4.3** | **6.4** | **0.91** | **7.3** | 11/2/09 | 5-1 |
| 37 | 3SS-850-337 | **2** | **2.6** | <0.5 | **2.6** | 9/15/09 | 5 |
| 37 | 3SS-850-337A | 3.3 | <0.5 | <0.5 | <0.5 | 11/2/09 | 5-2 |
| 38 | 3SS-850-338 | **2** | **6.9** | **1** | **7.9** | **9/15/09** | 5 |
| 38 | 3SS-850-338A | 3.3 | <0.5 | <0.5 | <0.5 | 11/2/09 | 5-2 |
| 48 | 3SS-850-348 | 2 | <0.5 | <0.5 | <0.5 | 9/15/09 | 5 |
| 55 | 3SS-850-355 | 2 | <0.5 | <0.5 | <0.5 | 9/15/09 | 5 |
| 402 | 3SS-850-402 | 5.5 | <0.5 | <0.5 | <0.5 | 11/9/09 | 5-2-1 |
| 403 | 3SS-850-403 | 5.8 | <0.5 | <0.5 | <0.5 | 11/9/09 | 5-2-2 |
| 404 | 3SS-850-404 | 4.3 | <0.5 | <0.5 | <0.5 | 11/9/09 | 5-2-2 |
| 71 | 3SS-850-371 | 0 | <0.5 | <0.5 | <0.5 | 7/7/09 | 6 |
| 72 | 3SS-850-372 | 0 | <0.5 | <0.5 | <0.5 | 7/7/09 | 6 |
| 73 | 3SS-850-373 | **0** | **0.91** | <0.5 | **0.91** | 7/7/09 | 6 |
| 73 | 3SS-850-373A | 1.3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 6-1 |
| 74 | 3SS-850-374 | **0** | **2.2** | **0.76** | **3.0** | 7/7/09 | 6 |
| 74 | 3SS-850-374A | 1.3 | <0.5 | <0.5 | <0.5 | 11/17/09 | 6-1 |
| 78 | 3SS-850-378 | **0** | **1.8** | **0.57** | **2.4** | 7/7/09 | 6 |
| 78 | 3SS-850-378A | 1.3 | 0.58 | <0.5 | 0.58 | 11/17/09 | 6-1 |
| 79 | 3SS-850-379 | **0** | **0.77** | <0.5 | **0.77** | 7/7/09 | 6 |
| 79 | 3SS-850-379A | **1.3** | **0.92** | <0.5 | **0.92** | 11/17/09 | 6-1 |
| 89 | 3SS-850-389 | 0 | <0.5 | <0.5 | <0.5 | 7/16/09 | 6 |
| 90 | 3SS-850-390 | 0 | <0.5 | <0.5 | <0.5 | 7/16/09 | 6 |

**Table 1. Building 850 Removal Action verification sample locations and PCB results (continued).**

| Sample Location | Sample ID | Depth (ft) | Aroclor 1254 (mg/kg) | Aroclor 1260 (mg/kg) | Total PCB (mg/kg) | Sample date | Phase/ Subarea |
|---|---|---|---|---|---|---|---|
| 75 | 3SS-850-375 | **0** | **1.7** | **0.53** | **2.2** | 7/7/09 | 7 |
| 80 | 3SS-850-380 | **0** | **2.1** | <0.5 | **2.1** | 7/7/09 | 7 |
| 81 | 3SS-850-381 | **0** | **4.8** | **3.2** | **8.0** | 7/13/09 | 7 |
| 82 | 3SS-850-382 | 0 | <0.5 | <0.5 | <0.5 | 7/13/09 | 7 |
| 84 | 3SS-850-384 | **0** | **0.95** | <0.5 | **0.95** | 7/13/09 | 7 |
| 87 | 3SS-850-387 | 0 | <0.5 | <0.5 | <0.5 | 7/16/09 | 7 |
| 96 | 3SS-850-396 | **0** | **18** | <0.5 | **18** | 7/21/09 | 7 |
| 97 | 3SS-850-397 | **0** | **1.0** | <0.5 | **1.0** | 7/21/09 | 7 |
| 98 | 3SS-850-398 | 0 | <0.5 | <0.5 | <0.5 | 7/28/09 | 7 |

**Notes:**
**ID = Identification**
**mg/kg = Milligrams per kilogram**
**PCB = Polychlorinated biphenyls**
***= Field duplicate sample**

**Color Coding for Soil Sample Phase Excavation Area**

| | |
|---|---|
| | **Soil samples collected from Phase 2 excavation area** |
| | **Soil samples collected from Phase 3 excavation area** |
| | **Soil samples collected from Phase 4 excavation area** |
| | **Soil samples collected from Phase 5 excavation area** |
| | **Soil samples collected from Phase 6 excavation area** |
| | **Soil samples collected from Phase 7 excavation area** |

**Table 2. Dioxin/furan compound analytical results and toxicity equivalent concentration for composite sample 3SS-850-367[a] sampled on July 7, 2009 (Phase 2 area).**

| Compound | Toxic Equivalent Factor[b] | Measured Concentration (mg/kg) | Toxicity Equivalent Concentration |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8-HxCDD | 1.00E-01 | 5.61E-07 | 5.61E-08 |
| 1,2,3,6,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8-HpCDD | 1.00E-02 | 1.04E-05 | 1.04E-07 |
| 1,2,3,4,6,7,8,9-OCDD | 1.00E-04 | 1.03E-04 | 1.03E-08 |
| 2,3,7,8-TCDF | 1.00E-01 | 1.22E-05 | 1.22E-06 |
| 1,2,3,7,8-PeCDF | 5.00E-02 | 1.45E-06 | 7.25E-08 |
| 2,3,4,7,8-PeCDF | 5.00E-01 | 3.79E-06 | 1.90E-06 |
| 1,2,3,4,7,8-HxCDF | 1.00E-01 | 1.02E-06 | 1.02E-07 |
| 1,2,3,6,7,8-HxCDF | 1.00E-01 | 5.20E-07 | 5.20E-08 |
| 2,3,4,6,7,8-HxCDF | 1.00E-01 | 3.45E-07 | 3.45E-08 |
| 1,2,3,7,8,9-HxCDF | 1.00E-01 | 4.48E-07 | 4.48E-08 |
| 1,2,3,4,6,7,8-HpCDF | 1.00E-02 | 9.14E-07 | 9.14E-09 |
| 1,2,3,4,7,8,9-HpCDF | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8,9-OCDF | 1.00E-04 | 6.81E-07 | 6.81E-11 |
| | | *Total toxicity equivalent concentration* | 3.60E-06 |

**Notes:**
**[a] Sample location 3SS-850-367 is a composite of samples collected from locations 41, 42, 43, 45, 47, 58, 61, 62, and 63.**
**[b] World Health Organization 1998 Toxic Equivalent Factor.**
**Cleanup standard = 1.6 x $10^{-5}$ mg/kg (1.60E-05)**

**Table 3. Dioxin/furan compound analytical results and toxicity equivalent concentration for composite sample 3SS-850-368[a] sampled on December 1, 2009 (Phase 3 area).**

| Compound | Toxic Equivalent Factor[b] | Measured Concentration (mg/kg) | Toxicity Equivalent Concentration |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDD | 1.00E-01 | 2.11E-07 | 2.11E-08 |
| 1,2,3,4,6,7,8-HpCDD | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8,9-OCDD | 1.00E-04 | 9.95E-07 | 9.95E-11 |
| 2,3,7,8-TCDF | 1.00E-01 | 3.05E-06 | 3.05E-07 |
| 1,2,3,7,8-PeCDF | 5.00E-02 | 6.21E-07 | 3.11E-08 |
| 2,3,4,7,8-PeCDF | 5.00E-01 | 1.58E-06 | 7.90E-07 |
| 1,2,3,4,7,8-HxCDF | 1.00E-01 | 5.77E-07 | 5.77E-08 |
| 1,2,3,6,7,8-HxCDF | 1.00E-01 | 2.84E-07 | 2.84E-08 |
| 2,3,4,6,7,8-HxCDF | 1.00E-01 | 2.18E-07 | 2.18E-08 |
| 1,2,3,7,8,9-HxCDF | 1.00E-01 | 3.20E-07 | 3.20E-08 |
| 1,2,3,4,6,7,8-HpCDF | 1.00E-02 | 3.24E-07 | 3.24E-09 |
| 1,2,3,4,7,8,9-HpCDF | 1.00E-02 | 1.80E-07 | 1.80E-09 |
| 1,2,3,4,6,7,8,9-OCDF | 1.00E-04 | 2.54E-07 | 2.54E-11 |
| | | *Total toxicity equivalent concentration* | 1.29E-06 |

**Notes:**
**[a] Sample location 3SS-850-368 is a composite of samples collected from locations 12A, 13A, 27A, 30A, 31B, 32A, 33A, 34A, 35A, 36B, 39A, and 40A.**
**[b] World Health Organization 1998 Toxic Equivalent Factor.**
**Cleanup standard = 1.6 x $10^{-5}$ mg/kg (1.60E-05)**

**Table 4. Dioxin/furan compound analytical results and toxicity equivalent concentration for composite sample 3SS-850-370[a] sampled on November 24, 2009 (Phase 5 area).**

| Compound | Toxic Equivalent Factor[b] | Measured Concentration (mg/kg) | Toxicity Equivalent Concentration |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDD | 1.00E-01 | 2.10E-07 | 2.10E-08 |
| 1,2,3,7,8,9-HxCDD | 1.00E-01 | 2.24E-07 | 2.24E-08 |
| 1,2,3,4,6,7,8-HpCDD | 1.00E-02 | 2.67E-06 | 2.67E-08 |
| 1,2,3,4,6,7,8,9-OCDD | 1.00E-04 | 2.05E-05 | 2.05E-09 |
| 2,3,7,8-TCDF | 1.00E-01 | 1.93E-05 | 1.93E-06 |
| 1,2,3,7,8-PeCDF | 5.00E-02 | 4.45E-06 | 2.23E-07 |
| 2,3,4,7,8-PeCDF | 5.00E-01 | 8.37E-06 | 4.19E-06 |
| 1,2,3,4,7,8-HxCDF | 1.00E-01 | 2.28E-06 | 2.28E-07 |
| 1,2,3,6,7,8-HxCDF | 1.00E-01 | 1.51E-06 | 1.51E-07 |
| 2,3,4,6,7,8-HxCDF | 1.00E-01 | 6.40E-07 | 6.40E-08 |
| 1,2,3,7,8,9-HxCDF | 1.00E-01 | 4.73E-07 | 4.73E-08 |
| 1,2,3,4,6,7,8-HpCDF | 1.00E-02 | 9.15E-07 | 9.15E-09 |
| 1,2,3,4,7,8,9-HpCDF | 1.00E-02 | 3.03E-07 | 3.03E-09 |
| 1,2,3,4,6,7,8,9-OCDF | 1.00E-04 | 1.04E-06 | 1.04E-10 |
| | | *Total toxicity equivalent concentration* | 6.91E-06 |

**Notes:**

**[a] Sample location 3SS-850-370 is a composite of samples collected from locations 15, 17A, 18B, 19C, 20, 21, 28, 37A, 38A, 48, and 55.**

**[b] World Health Organization 1998 Toxic Equivalent Factor.**

**Cleanup standard = 1.6 x $10^{-5}$ mg/kg (1.60E-05)**

**Table 5. Dioxin/furan compound analytical results and toxicity equivalent concentration for composite sample 3SS-850-405[a] sampled on November 24, 2009 (Phase 5 area).**

| Compound | Toxic Equivalent Factor[b] | Measured Concentration (mg/kg) | Toxicity Equivalent Concentration |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8-HpCDD | 1.00E-02 | 2.22E-07 | 2.22E-09 |
| 1,2,3,4,6,7,8,9-OCDD | 1.00E-04 | 8.44E-07 | 8.44E-11 |
| 2,3,7,8-TCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDF | 5.00E-02 | 0.00E+00 | 0.00E+00 |
| 2,3,4,7,8-PeCDF | 5.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 2,3,4,6,7,8-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDF | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8-HpCDF | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,7,8,9-HpCDF | 1.00E-02 | 0.00E+00 | 0.00E+00 |
| 1,2,3,4,6,7,8,9-OCDF | 1.00E-04 | 1.00E-07 | 1.00E-11 |
| | | *Total toxicity equivalent concentration* | 2.31E-09 |

**Notes:**

**[a] Sample location 3SS-850-405 is a composite of samples collected from locations 402, 403, and 404.**

**[b] World Health Organization 1998 Toxic Equivalent Factor.**

**Cleanup standard = 1.6 x $10^{-5}$ mg/kg (1.60E-05)**

**Table 6. Dioxin/furan compound analytical results and toxicity equivalent concentration for composite sample 3SS-850-400[a] sampled on November 24, 2009 (Phase 6 area).**

| Compound | Toxic Equivalent Factor[b] | Measured Concentration (mg/kg) | Toxicity Equivalent Concentration |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8-PeCDD | 1.00E+00 | 6.86E-08 | 6.86E-08 |
| 1,2,3,4,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,6,7,8-HxCDD | 1.00E-01 | 0.00E+00 | 0.00E+00 |
| 1,2,3,7,8,9-HxCDD | 1.00E-01 | 4.13E-07 | 4.13E-08 |
| 1,2,3,4,6,7,8-HpCDD | 1.00E-02 | 3.93E-07 | 3.93E-09 |
| 1,2,3,4,6,7,8,9-OCDD | 1.00E-04 | 1.79E-06 | 1.79E-10 |
| 2,3,7,8-TCDF | 1.00E-01 | 8.76E-06 | 8.76E-07 |
| 1,2,3,7,8-PeCDF | 5.00E-02 | 1.56E-06 | 7.80E-08 |
| 2,3,4,7,8-PeCDF | 5.00E-01 | 3.87E-06 | 1.94E-06 |
| 1,2,3,4,7,8-HxCDF | 1.00E-01 | 9.63E-07 | 9.63E-08 |
| 1,2,3,6,7,8-HxCDF | 1.00E-01 | 5.64E-07 | 5.64E-08 |
| 2,3,4,6,7,8-HxCDF | 1.00E-01 | 3.64E-07 | 3.64E-08 |
| 1,2,3,7,8,9-HxCDF | 1.00E-01 | 7.35E-07 | 7.35E-08 |
| 1,2,3,4,6,7,8-HpCDF | 1.00E-02 | 3.36E-07 | 3.36E-09 |
| 1,2,3,4,7,8,9-HpCDF | 1.00E-02 | 1.57E-07 | 1.57E-09 |
| 1,2,3,4,6,7,8,9-OCDF | 1.00E-04 | 2.69E-07 | 2.69E-11 |
| | | *Total toxicity equivalent concentration* | 3.27E-06 |

**Notes:**

**[a] Sample location 3SS-850-400 is a composite of samples collected from locations 72A, 73A, 74A, 78A, 89A, and 90A.**

**[b] World Health Organization 1998 Toxic Equivalent Factor.**

**Cleanup standard = 1.6 x $10^{-5}$ mg/kg (1.60E-05)**

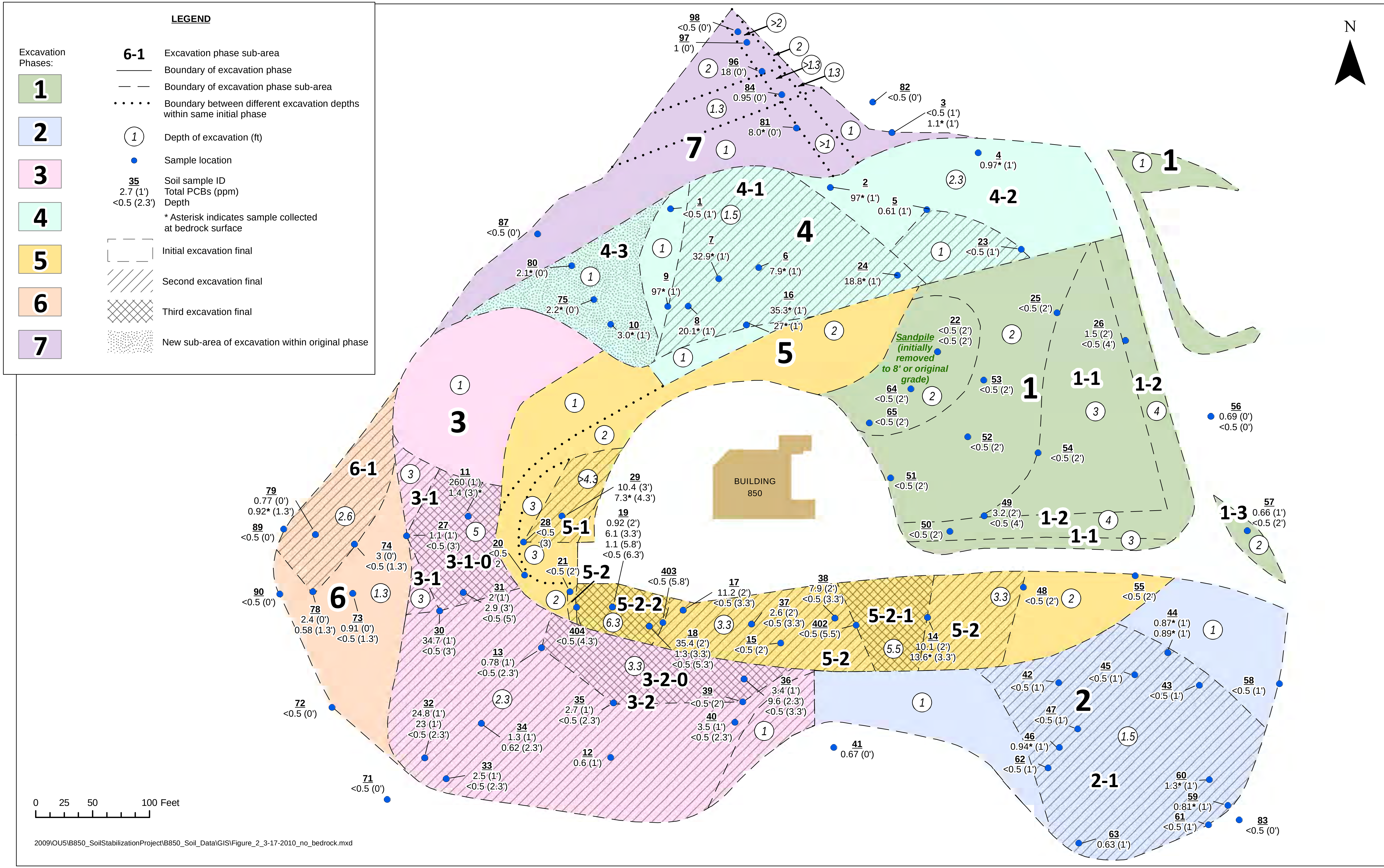



**Figure 1. Map of Site 300 Building 850 area showing excavation areas and associated depths, soil verification sample locations, and total PCB concentrations (mg/kg) for phases 1 through 7.**

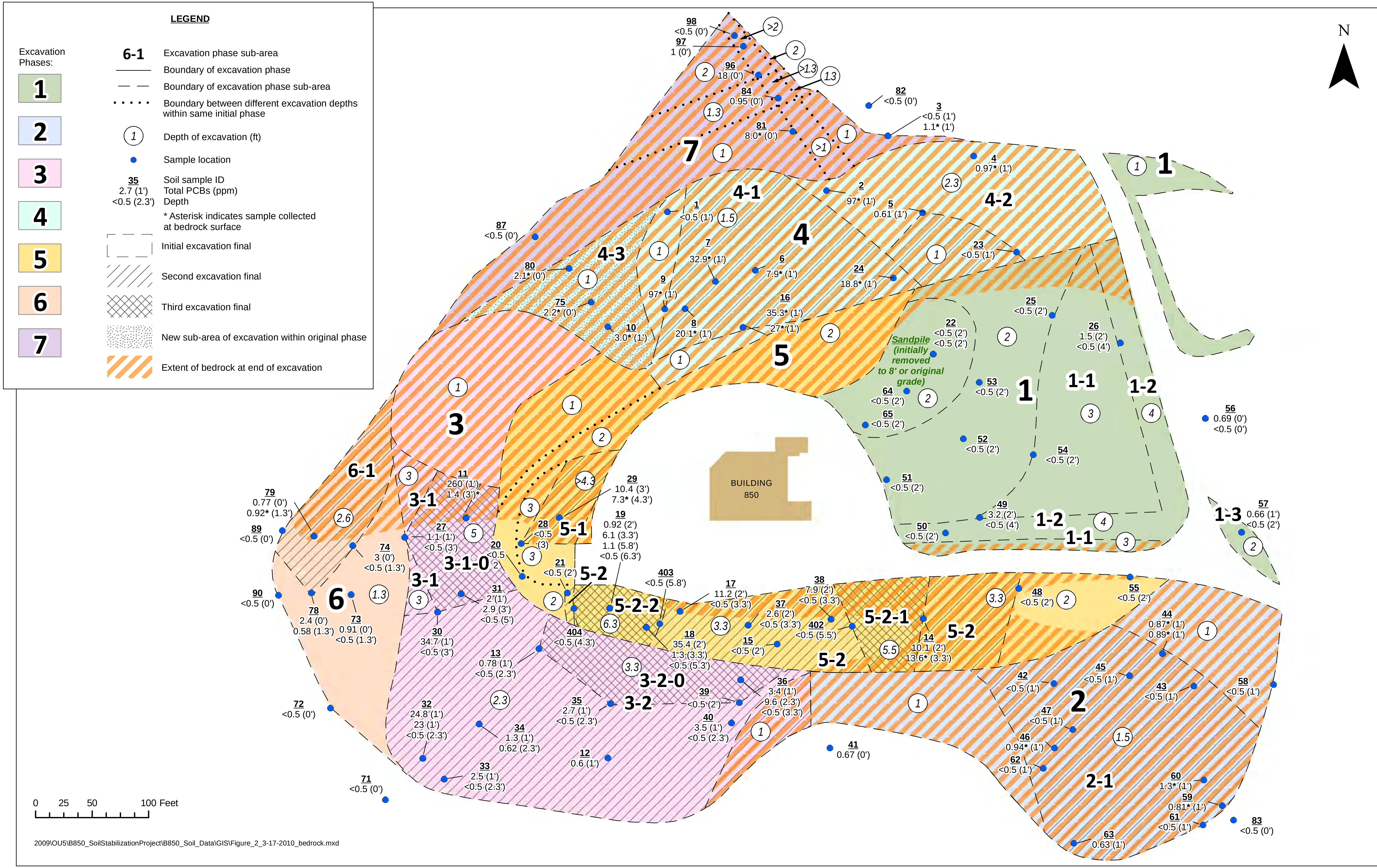



**Figure 2. Map of Site 300 Building 850 area showing excavation areas and associated depths, soil verification sample locations, total PCB concentrations (mg/kg), and extent of bedrock at completion of excavation for Phases 1 through 7.**

# Appendix E

# Building 850 Soil Removal Action
# Material and Product Description Sheets

# FOOTHILL MATERIALS, INC.

P.O. BOX 147, VALLEY SPRINGS, CA 95252
3650 HOGAN DAM ROAD, VALLEY SPRINGS, CA 95252

**PHONE: (209) 728-8176**
**FAX: (209) 728-3475**

| | |
|---|---|
| TO: Ses Engineering | DATE: 10/02/09 |
| ATTN: Leonard | No. OF SHEETS: three |
| FAX: 925 240-5629 | PROJECT: Hogan Quarry |
| FROM: Jerry Middleton | PROJECT No.: 09-002 |

MESSAGE/COMMENTS: Attached you will find a Submittal for our 5x12 Rip Rap and some sodium sulfate test results

JM

cc:

KLEINFELDER
An employee owned company

File No. 20-2520-02.LAB
November 10, 1997

Jerry Middleton
Ford Construction Company, Inc.
639 E. Lockeford Street
Lodi, CA 95240

Subject: **LABORATORY TEST RESULTS**
**SODIUM SULFATE SOUNDNESS**
**PO #9460(100-14)**

Dear Mr. Middleton:

At your request we performed a Sodium Sulfate Soundness test on crushed aggregate that was sampled and delivered on October 20, 1997 by your representative. The test was performed in accordance with the applicable ASTM and Caltrans standards. Presented in the following table are the test results.

**ASTM C-88, Sodium Sulfate Soundness**

| Sample I. D. | % Loss |
|---|---|
| 1/2" X 3/8" | 0.64 |

< 15% OK

**CTM 214, Sodium Sulfate Soundness**

| Sample I. D. | % Loss |
|---|---|
| 1/2" X 3/8" | 0.35 |

If you have any questions, please contact me.

Respectfully submitted,

**KLEINFELDER, INC.**

K. C. Crawford

K. C. Crawford
Laboratory Supervisor

KC:kcc


20-2520-02.LAB/2017L562
KLEINFELDER 2825 East Myrtle Street, Stockton, CA 95205-4794 (209) 948-1345 (209) 948-0621 fax

# FOOTHILL MATERIALS, Inc.

**P.O. Box 147**
**Valley Springs, CA 95252**
**(209) 728-8176**

August 21, 2009

**Hogan Quarry 5" x 12" Rip Rap**
**Section 72 Rock Slope Protection (No. 2 Class RSP)**

The Hogan Quarry 5" x 12" Rip Rap supplied by FOOTHILL MATERIALS Inc. conforms to the specification requirements of Caltrans Section 72, RSP for Number Two Backing. This Rip Rap is produced at the Hogan Rock Quarry in Calaveras County near the town of Valley Springs. The typical physical properties of the aggregate are summarized below.

| **Sieve Size** | **Hogan Quarry** | % Larger<br>**Caltrans Section 72**<br>**No. 2 Class RSP** |
|---|---|---|
| 75 pound | 5 % | 0 - 5 |
| 25 pound | 61 % | 25 – 75 |
| 5 pound | 92 % | 90 - 100 |
| Specific Gravity | 2.80 | 2.5 min |
| Absorption, % | 0.1% | 4.2% max |
| Durability Index | 62 | 52 min |
| Abrasion Loss, | 13.8% (1,000 revolutions) | |

If you have any questions, concerns, or need more information please call (209) 728-8176.

Sincerely,
**Foothill Materials, Inc.**

**Jerry Middleton**
Project Manager

This data have been consolidated from information and tests of materials submitted to material laboratories that are assumed to be representative of the materials to be used. All test have been made in compliance with current ASTM or applicable methods of testing. No liability arising out of the use of this data will be assumed by this corporation

JM Eagle
*Building essentials for a better tomorrow*™

# SOLVENT WELD

## SUBMITTAL AND DATA SHEET

### PERFORATED UNDERDRAIN PIPE : :

**JM EAGLE™ PVC ASTM D3034 SOLVENT WELD SDR35 SEWER PIPE**

**JM EAGLE™ SOLVENT WELD SEWER PIPE CONFORMS TO SPECIFICATIONS PRIOR TO PERFORATION AND CELL CLASS 12454 OR 12364 AS DEFINED IN ASTM D1784**

| NOM. PIPE SIZE (IN) | O.D. (IN) | NOM. I.D. (IN) | MIN T. (IN) | APPROX. WEIGHT (LBS/FT) |
|---|---|---|---|---|
| 4" | 4.215 | 3.961 | 0.120 | 1.022 |
| 4" x 10' Perf | 4.215 | 3.961 | 0.120 | 1.022 |
| 6" | 6.275 | 5.893 | 0.180 | 2.285 |
| 6" x 10' Perf | 6.275 | 5.893 | 0.180 | 2.285 |

: : Standard Color: Green, Standard length: 10' or 20' Overall, Belled End Only
: : Standard perforations for pipe are two rows of holes 1/2" in diameter on 5" centers and 120° angle apart. Perforated pipe does not have ASTM designation on print line.

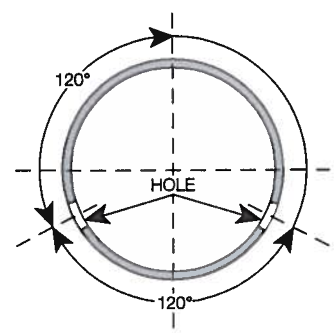
**When using JM Eagle™ PVC ASTM D3034 Solvent Weld Sewer Pipe for septic tank fields, please install in accordance with ASTM D2321, and JM Eagle™ Publication JME-05B, "Gravity Sewer Installation Guide."**

**JM EAGLE™ PVC ASTM D2729 SOLVENT WELD DRAIN PIPE**

NO PRIMER

**JM EAGLE™ SOLVENT WELD DRAIN PIPE CONFORMS TO SPECIFICATIONS AND CELL CLASS 12454 OR 12164 AS DEFINED IN ASTM D1784**

| NOM. PIPE SIZE (IN) | O.D. (IN) | NOM. I.D. (IN) | MIN T. (IN) | APPROX. WEIGHT (LBS/FT) |
|---|---|---|---|---|
| 3" Solid | 3.250 | 3.102 | 0.070 | 0.465 |
| 3" Perf | 3.250 | 3.102 | 0.070 | 0.465 |
| 4" Solid | 4.215 | 4.056 | 0.075 | 0.648 |
| 4" Perf | 4.215 | 4.056 | 0.075 | 0.648 |
| 6" Solid | 6.275 | 6.063 | 0.100 | 1.300 |
| 6" Perf | 6.275 | 6.063 | 0.100 | 1.300 |




: : Standard Color: White, Standard length: 10' Overall, Belled End Only
: : Standard perforations for pipe are two rows of holes 1/2" in diameter on 5" centers and 120° angle apart. Three perforation rows may be available.

**When using JM Eagle™ PVC ASTM D2729 Solvent Weld Drain Pipe for septic tank fields, please install in accordance with ASTM F481, and JM Eagle™ Publication JME-05B, "Gravity Sewer Installation Guide."**

* Prior to ordering or specifying, please consult JM Eagle™ for product and /or listing availability.
I.D. : Inside Diameter
O.D. : Outside Diameter
T. : Wall Thickness

JM Eagle
Building essentials for a better tomorrow™

September 28, 2009

RE: JM Eagle PVC Pipe Manufactured in the USA

To Whom It May Concern:

This response is to confirm that JM Eagle's 4" SDR 35 Perforated PVC pipe is manufactured in the United States within the meaning of the Buy American provisions of the American Recovery and Reinvestment Act of 2009.

The resin used to produce our pipe is purchased on the open market in the USA from domestic producers. A majority of our resin is produced by our parent company in Texas, and ingredients used in compounding are also USA produced.

If you should have any further questions concerning the domestic content of our products, please feel free to contact me at extension 6233.

Sincerely,

William Luong

William Luong
Product Assurance Engineer

JM Eagle
5200 West Century Boulevard • Los Angeles, CA 90045 • Tel: 800.621.4404 • Fax: 973.422.4892 • www.jmeagle.com

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

# MATERIAL SAFETY DATA SHEET

DATE ISSUED: JANUARY 3, 2006

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

## SECTION I

| | |
|---|---|
| MANUFACTURER'S NAME<br>J-M Manufacturing Company, Inc. | EMERGENCY TELEPHONE NO.<br>(973) 535-1633 |
| ADDRESS (NUMBER, STREET, CITY, STATE, & ZIP CODE)<br>9 Peach Tree Hill Road, Livingston, NJ 07039 | |
| CHEMICAL NAME AND SYNONYMS<br>Polyvinyl Chloride [CAS #: 9002-86-2] | TRADE NAME AND SYNONYMS<br>PVC plastic pipes |
| CHEMICAL FAMILY<br>Polymer of Chlorinated Hydrocarbon | FORMULA<br>-- $(CH_2CHCl)_n$ -- |

## SECTION II – HAZARDOUS INGREDIENTS

| Paints, Preservatives, Solvents | | % | TLV | Alloys & Metallic Coating | | % | TLV |
|---|---|---|---|---|---|---|---|
| Pigments | N/A | | | Base Metal | N/A | | |
| Catalyst | N/A | | | Alloys | N/A | | |
| Vehicle | N/A | | | Metallic Coatings | N/A | | |
| Solvents | N/A | | | Filler Metal plus coating or core flux | N/A | | |
| Additives | N/A | | | Others | N/A | | |
| Others | N/A | | | | | | |

| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | % | TLV* |
|---|---|---|
| PVC [CAS #: 9002-86-2], A Nuisance Dust | | 10 mg/M$^3$ |
| May/may not contain trace amounts of Vinyl Chloride Monomer | | 1 ppm |
| [CAS#: 75-01-4], A carcinogen determined by IARC and OSHA No | | |

*TLVs refer to airborne concentrations over 8-hr TWA

## SECTION III – PHYSICAL DATA

| | | | |
|---|---|---|---|
| Boiling Point (°F) | N/A | Specific Gravity ($H_2O$=1) | 1.4 |
| Vapor Pressure (mm Hg) | N/A | Percent Volatile by Volume | N/A |
| Vapor Density (Air=1) | N/A | Evaporation Rate (_________=1)_____ | N/A |
| Solubility in Water | Insol. | | |
| Appearance & Odor: Pipes are green, blue, gray, white, brown, purple, buff, and are odorless. | | | |

## SECTION IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): 734°F SELF-IGNITION: 850°F (ASTM D1929)
FLAMMABLE LIMITS: N/A

EXTINGUISHING MEDIA:
Water, carbon dioxide, or dry chemical (ABC only).

SPECIAL FIRE FIGHTING PROCEDURES:
Wear NIOSH approved, positive pressure, self-contained breathing apparatus, and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
PVC is nonflammable and nonexplosive under normal conditions of use. An external fire causes it to burn and Hydrogen Chloride gas is liberated.

## SECTION V – HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE:
Shown on first page; no acute health effects associated with inhalation of PVC dust.

EFFECTS OF OVEREXPOSURE:
May cause eye, skin, nose, and throat irritation. Prolonged exposure may cause adverse effects on lungs.

EMERGENCY AND FIRST AID PROCEDURES:
No emergency situation is likely to arise from the routine handling of PVC pipes. However, should it happen: Eyes – immediately flush eyes with clean water for at least 15 minutes. Skin – wash affected area with soap and water. Inhalation – remove to fresh air. Ingestion – dilute swallowed material by drinking water and obtain medical attention. If symptoms develop, consult a physician.

## SECTION VI – REACTIVITY DATA

STABILITY: XX STABLE ____ UNSTABLE
CONDITIONS TO AVOID:
Do not heat to temperatures greater than 350°F, which causes slow darkening and decomposition. Higher heat (≥482°F) increases rate & evolution of HCI gas (an acidic & corrosive gas).

INCOMPATIBILITY (MATERIALS TO AVOID):
Fluorine, acetyl, amine-containing materials, certain ketones & organic solvents.

HAZARDOUS DECOMPOSITION PRODUCTS:
Thermal decomposition produces HCI, CO, and $CO_2$ (482°F).

HAZARDOUS POLYMERIZATION: _____ May occur __X__ Will not occur
CONDITIONS TO AVOID: N/A

## SECTION VII – SPILL OR LEAK PROCEDURES

| |
|---|
| STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Remove sources of ignition, use adequate ventilation and wear a dust respirator. Sweep, vacuum or shovel up the spill. |
| WASTE DISPOSAL METHOD: Handle in accordance with Federal, State and local environmental control regulations. |

## SECTION VIII – SPECIAL PROTECTION INFORMATION

| | | |
|---|---|---|
| RESPIRATORY PROTECTION (SPECIFY TYPE): Use NIOSH/MSHA approved dust respirators as needed. | | |
| VENTILATION: | LOCAL EXHAUST – YES<br>MECHANICAL (GENERAL) – N/A | SPECIAL – N/A<br>OTHER – N/A |
| SKIN PROTECTION: | Minimize contact with product. Wear gloves and/or suitable long sleeved clothing. | |
| EYE PROTECTION: | Wear safety glasses with side shields, goggles or face shield for protection against dust. | |
| OTHER PROTECTIVE EQUIPMENT: Not required for ordinary handling. | | |

## SECTION IX – SPECIAL PRECAUTIONS

| |
|---|
| PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Use with adequate ventilation. Avoid contact with eyes and skin. Electrostatic charge may build up during handling. Grounding of equipment is recommended. Store in a cool dry, well-ventilated area silo away from sources of heat, flame, and sparks. When opening railcar for unloading, ventilate before entering. |
| OTHER PRECAUTIONS: All tools, which may create PVC dust in excess of the exposure limits, shall be provided with local exhaust ventilation systems. |

Note: This information is given without warranty, representation, inducement or license of any kind, except that it is accurate to the best of our knowledge or obtained from sources believed by us to be accurate, and we do not assume any legal responsibility for use or reliance upon it.

PACIFIC
CORRUGATED PIPE CO.®

# CERTIFICATE OF COMPLIANCE

8/27/09

S C S Engineers

Attn: Lenard Long

This is to certify that the **12"& 21" 16ga Corrugated Metal Pipe with Band Couplers, and Flared End Sections**, supplied by **Pacific Corrugated Pipe Co**, to **S C S Engineers**, for the **LLNL Site 300 Bldg 850** project complies in all respects with **Caltrans Sect. 66 & 70, AASHTO Bridge Sect 12, M-36 & M-218** as well as **ASTM A796 & A929** including mechanical property requirements. Further more, we certify that all manufacturing processes for all steel materials occurred within the **United States.**

Copies of certified mill test reports showing the chemical analysis and weight of coating for each heat, lift, coil number, gauge, size and type of material used to fabricate this material, are on file and available at any time in the steel manufacturer's office.

Sincerely,

Glenn Horner
Pacific Corrugated Pipe Co.

8110 37th Avenue • Sacramento, CA 95824-2318 • (916) 383-4891 • (916) 383-5420 FAX

Serving the Western States from:

Eugene, OR • Sacramento, CA • Fontana, CA • Casa Grande, AZ
Olympia, WA • Las Vegas, NV • Santa Fe, NM

5" diam Sch 80 PVC Well Casing (Blank)
→ 5-ft Long Sections (New ones)
→ 4 5-ft Long Sections

PVC Pressure And Strength Tables

| Pipe Size (inches) | Collapse Pressure (psi) Sch. 40 | Collapse Pressure (psi) Sch. 80 | Burst Pressure (psi) Sch. 40 | Burst Pressure (psi) Sch. 80 | Tensile Strength (lb) Sch. 40 | Tensile Strength (lb) Sch. 80 |
|---|---|---|---|---|---|---|
| 1/2 | 1,100 | 2,700 | 300 | 425 | 264 | 344 |
| 3/4 | 630 | 1,590 | 240 | 345 | 362 | 487 |
| 1 | 520 | 1,270 | 225 | 315 | 581 | 727 |
| 1-1/4 | 300 | 770 | 185 | 260 | 859 | 878 |
| 1-1/2 | 220 | 590 | 165 | 235 | 954 | 1,225 |
| 2 | 140 | 390 | 140 | 200 | 942 | 1,542 |
| 2-1/2 | 180 | 450 | 150 | 210 | 2,093 | 2,890 |
| 3 | 120 | 320 | 130 | 185 | 2,786 | 3,839 |
| 4 | 70 | 210 | 110 | 160 | 4,119 | 5,823 |
| 5 | 50 | 150 | 95 | 145 | 5,491 | 6,864 |
| 6 | 40 | 140 | 90 | 140 | 7,165 | 11,384 |
| 8 | 30 | 100 | 80 | 125 | 10,387 | 17,332 |
| 10 | 20 | 85 | 70 | 115 | 15,086 | 25,124 |
| 12 | 16 | 80 | 65 | 115 | 19,548 | 34,430 |

**COLLAPSE PRESSURE**
Pounds per square inch of external hydrostatic pressure that can be safely applied.

**BURST PRESSURE**
Pounds per square inch of internal hydrostatic pressure that can be safely applied.

**TENSILE STRENGTH**
The suspended weight the threaded joint can sustain in a vertical position without causing stretching or failure.

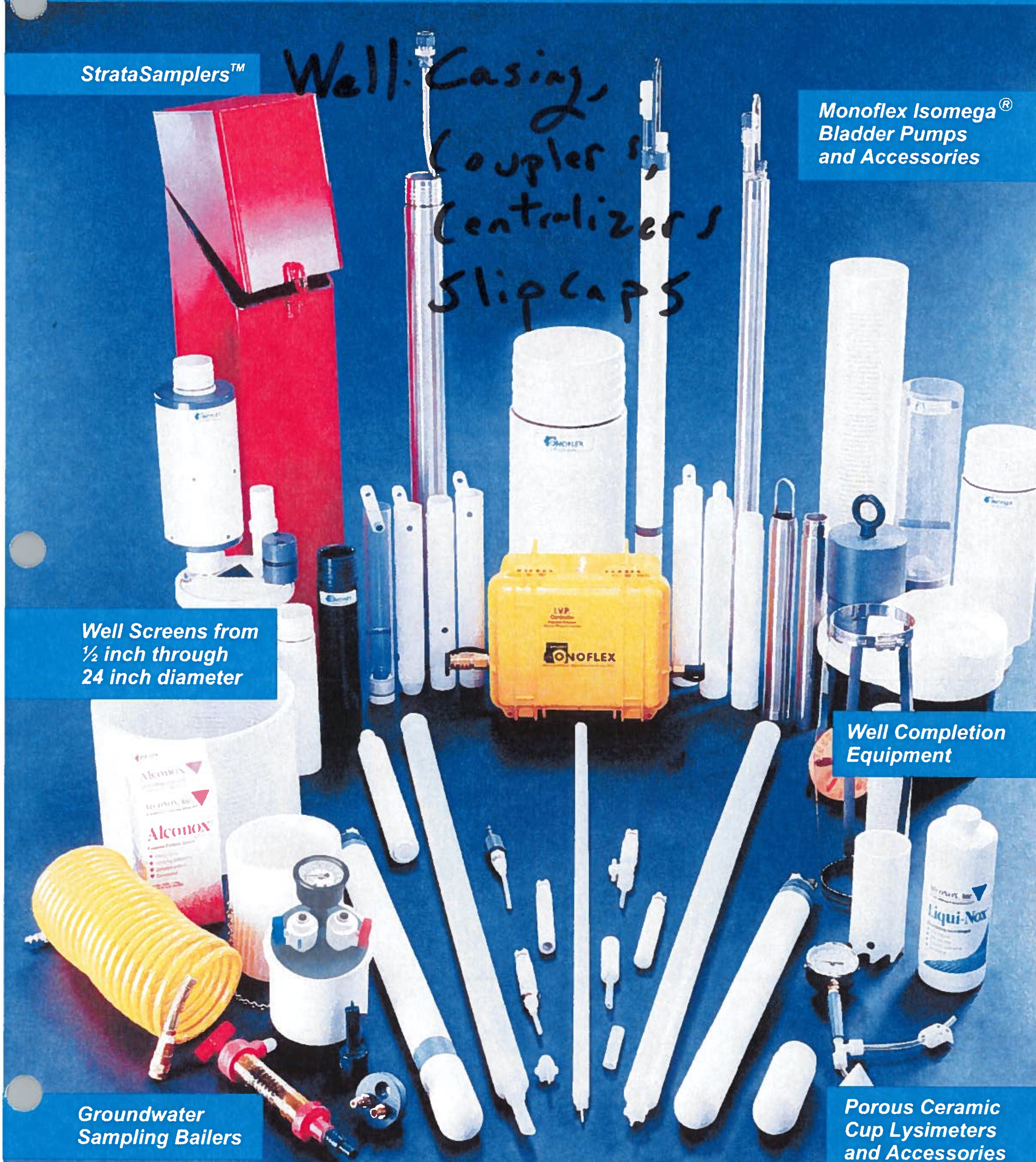

Manufactured By:
Bear Industrial Supply & Manufacturing
1600 E. 33rd St., Unit A, Long Beach, California 90807
562.989.6080 Phone
562.989.6090 Fax

# Monoflex Product Catalog

Quality well screen and sampling equipment from the leading manufacturer of groundwater monitoring products since 1973

Campbell MONOFLEX

Well: Casing, Couplers, Centralizers, Slipcaps




StrataSamplers™

Monoflex Isomega® Bladder Pumps and Accessories

Well Screens from ½ inch through 24 inch diameter

Well Completion Equipment

Groundwater Sampling Bailers

Porous Ceramic Cup Lysimeters and Accessories

Call Toll Free 800-523-0224 Website - www.campbellmfg.com

Monoflex Flush Thread Screens and Casings are used for groundwater monitoring, leak detection, recovery systems, water wells, etc. CNC computerized lathes are used to machine the threads to 2 TPI, 4 TPI, and 8 TPI (ASTM F-480) recommendations. Monoflex-designed automated slotting machines maintain continuous slot spacing and accuracy. Flush thread PVC is "Enviro-wrapped" as a standard procedure. **In addition to the many popular screens and casings listed in this catalog, Monoflex offers a full range of other product combinations, (see charts below). Chart Key: (S) Standard, (O) Optional.**

| DIAMETERS | STANDARD LENGTHS | | | | SCH 40 THREADS PER INCH | | | SLOT WIDTHS | INTEGRATED ENDS AVAILABLE | | SPACING OF SLOTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2.5' | 5' | 10' | 20' | 2TPI | 4TPI | 8TPI | .006 - .500* | PLUG | POINT | 1/8" | 1/4" | 3/16" |
| 1/2" | S | S | S | N/A | | | S | .006 - .500* | O | N/A | S | O | O |
| 3/4" | S | S | S | N/A | | | S | .006 - .500* | O | N/A | S | O | O |
| 1" | S | S | S | S | | | S | .006 - .500* | O | O | S | O | O |
| 1-1/4" | S | S | S | S | | | S | .006 - .500* | O | O | S | O | O |
| 1-1/2" | S | S | S | S | | O | S | .006 - .500* | O | O | S | O | O |
| 2" | S | S | S | S | S | O | O | .006 - .500* | O | O | S | O | O |
| 2-1/2" | S | S | S | S | S | O | O | .006 - .500* | O | N/A | S | O | O |
| 3" | S | S | S | S | S | O | O | .006 - .500* | O | O | S | O | O |
| 4" | S | S | S | S | S | O | O | .006 - .500* | O | O | S | O | O |
| 5" | S | S | S | S | S | O | O | .006 - .500* | O | N/A | S | O | O |
| 6" | S | S | S | S | S | O | O | .006 - .500* | O | N/A | O | S | O |
| 8" | S | S | S | S | S | | | .015 - .500* | O | N/A | N/A | S | N/A |
| 10" | S | S | S | S | S | | | .020 - .500* | O | N/A | N/A | S | N/A |
| 12" | S | S | S | S | S | | | .020 - .500* | O | N/A | N/A | S | N/A |
| 14" | S | S | S | S | S | | | .050 - .500* | O | N/A | N/A | S | N/A |
| 16" | S | S | S | S | S | | | .060 - .500* | O | N/A | N/A | S | N/A |

| DIAMETERS | STANDARD LENGTHS | | | | SCH 80 THREADS PER INCH | | | SLOT WIDTHS | INTEGRATED ENDS AVAILABLE | | SPACING OF SLOTS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2.5' | 5' | 10' | 20' | 2TPI | 4TPI | 8TPI | .006 - .500* | PLUG | POINT | 1/8" | 1/4" | 3/16" |
| 1/2" | S | S | S | N/A | | | S | .006 - .500* | O | N/A | S | O | O |
| 3/4" | S | S | S | N/A | | S | O | .006 - .500* | O | N/A | S | O | O |
| 1" | S | S | S | S | | S | O | .006 - .500* | O | O | S | O | O |
| 1-1/4" | S | S | S | S | S | | O | .006 - .500* | O | O | S | O | O |
| 1-1/2" | S | S | S | S | S | O | O | .006 - .500* | O | O | S | O | O |
| 2" | S | S | S | S | S | O | O | .006 - .500* | O | O | S | O | O |
| 2-1/2" | S | S | S | S | S | O | O | .010 - .500* | O | N/A | S | O | O |
| 3" | S | S | S | S | S | O | O | .010 - .500* | O | O | S | O | O |
| 4" | S | S | S | S | S | O | O | .010 - .500* | O | O | S | O | O |
| 5" | S | S | S | S | S | O | O | .015 - .500* | O | N/A | S | O | O |
| 6" | S | S | S | S | S | O | O | .020 - .500* | O | N/A | O | S | O |
| 8" | S | S | S | S | S | | | .020 - .500* | O | N/A | N/A | S | N/A |
| 10" | S | S | S | S | S | | | .020 - .500* | O | N/A | N/A | S | N/A |
| 12" | S | S | S | S | S | | | .030 - .500* | O | N/A | N/A | S | N/A |
| 14" | S | S | S | S | S | | | .050 - .500* | O | N/A | N/A | S | N/A |
| 16" | S | S | S | S | S | | | .060 - .500* | O | N/A | N/A | S | N/A |

Lengths are measured as "laying length", (not including male thread length), in 2" and 4" diameters, Sch. 40 and Sch 80 and 6" Sch. 80. All other diameters and schedules are measured end to end. Standard slot widths are .010, .012, 015, .020, .030 and .040 inch. Standard slot spacing is 1/8", 3/16" and 1/4". * Slot sizes .040 to .100 are manufactured at a **minimum** of 1/4" slot spacing. Slot sizes larger than .100 are manufactured at a minimum of 1/2" to 1" slot spacing Many **custom** slot widths and patterns are available upon request, (please call regarding setup charges). Standard flush thread PVC screens and casings are male x female. National Pipe Taper thread (NPT) is also available

**Not all slot sizes and pipe diameters may be available from all plants.**

# MONOFLEX PART NUMBERING SYSTEM

## (SCREEN, CASING, RAW PIPE AND CUSTOM DRILL & TAP ONLY)

**END**
- A2 - 2 TPI
- A4 - 4 TPI
- A8 - 8 TPI
- NP - National Pipe Thread
- OE - Open End
- PW - Partially Slotted
- L - Labor
- R - Raw PVC
- RPE - Raw Polyethylene
- PE2 - 2 TPI HDPE
- PE4 - 4 TPI HDPE
- PE8 - 8 TPI HDPE
- PE - Polyethylene
- RM - Raw Metric
- RSS - Raw Stainless Steel

**SPACING**
- 125 - 1/8"
- 3 - 3/16"
- 4 - 1/4"
- 5 - 1/2"
- 1 - 1"

**SCREEN/ CASING**
- S
- C
- D&T (drill & tap)

**THREAD CONFIG.**
- T (BOTH ENDS)
- F (FEM. ONLY)
- M (MALE ONLY)

**MATERIAL**
- 4 - PVC SCH 40
- 8 - PVC SCH 80
- C4 - Clear PVC SCH 40
- C8 - Clear PVC SCH 80
- 1 - PVC SCH 120
- X - CPVC SCH 40
- V - CPVC SCH 80
- L - SDR 41, 100 PSI
- M - SDR 27.5
- R - SDR 21, 200 PSI
- 6 - SDR 26, 160 PSI
- W - SDR 13.5, 315 PSI
- P - SDR 17
- U - SDR 35
- 11- SDR 11
- 27 -D-2729, S&D
- PE - Polyethylene
- SS - Stainless Steel

**DIAMETER**
0050, 0075, 0100, 0125, 0150, 0200, 0250, 0300, 0400, 0450, 0500, 0600, 0800, 1000, 1200, 1400, 1600, 1800, 2000, 2400

**LENGTH NOMINAL**
01, 02, 25, 03, 04, 05, 06, 07, 08, 09, 10, 13, 15, 20

**SLOT WIDTH**
006, 008, 010, 012, 015, 020, 025, 030, 040, 050, 060, 080, 125, 250, 500 (Drill & Tap Size)

- B - Bell
- BF - Bell F-480
- BG - Bell and Gasket
- C - Cap
- P - Plug
- T - Point
- W - Wash Down Valve
- F - Female (Drill & Tap)
- G - Gray
- M - Meter

- S - Solid
- J - Full Box**
- X - Full Box**
- K - Full Skid
- L - Full Skid

Call for Qty.

** Box quantity information regarding schedule 40 and 80 screen and casing:
2" - 6 pieces - "J" box from Wisconsin
2" - 9 pieces - "X" box from Florida and Pennsylvania
4" - 2 pieces - "J" box from Wisconsin
4" - 4 pieces - "X" box from Florida and Pennsylvania

EXAMPLE: A 2 S T 4 0 2 0 0 1 0 0 1 0

- A - ASTM F-480 THREAD
- 2 - 2 TPI
- S - SCREEN
- T - THREADED BOTH ENDS
- 4 - SCH 40
- 0200 - 2"
- 10 - 10'
- 010 - .010 SLOT

# PVC PIPE SPECIFICATIONS

## PVC Schedule 40

| Nominal Pipe Size (in.) | O.D. | Average I.D. | Min. Wall | Nominal Wt./ft. | Max. W.P. PSI* |
|---|---|---|---|---|---|
| 1/8 | .405 | .261 | .068 | .045 | 810 |
| 1/4 | .540 | .354 | .088 | .081 | 780 |
| 3/8 | .675 | .483 | .091 | .109 | 620 |
| 1/2 | .840 | .608 | .109 | .161 | 600 |
| 3/4 | 1.050 | .810 | .113 | .214 | 480 |
| 1 | 1.315 | 1.033 | .133 | .315 | 450 |
| 1-1/4 | 1.660 | 1.364 | .140 | .426 | 370 |
| 1-1/2 | 1.900 | 1.592 | .145 | .509 | 330 |
| 2 | 2.375 | 2.049 | .154 | .682 | 280 |
| 2-1/2 | 2.875 | 2.445 | .203 | 1.076 | 300 |
| 3 | 3.500 | 3.042 | .216 | 1.409 | 260 |
| 3-1/2 | 4.000 | 3.520 | .226 | 1.697 | 240 |
| 4 | 4.500 | 3.998 | .237 | 2.006 | 220 |
| 5 | 5.563 | 5.017 | .258 | 2.726 | 190 |
| 6 | 6.625 | 6.031 | .280 | 3.535 | 180 |
| 8 | 8.625 | 7.943 | .322 | 5.305 | 160 |
| 10 | 10.750 | 9.976 | .365 | 7.532 | 140 |
| 12 | 12.750 | 11.890 | .406 | 9.949 | 130 |
| 14 | 14.000 | 13.072 | .437 | 11.810 | 130 |
| 16 | 16.000 | 14.940 | .500 | 15.416 | 130 |
| 18 | 18.000 | 16.809 | .562 | 20.112 | 130 |
| 20 | 20.000 | 18.743 | .593 | 23.624 | 120 |
| 24 | 24.000 | 22.544 | .687 | 32.873 | 120 |

## PVC Schedule 80

| Nominal Pipe Size (in.) | O.D. | Average I.D. | Min. Wall | Nominal Wt./ft. | Max. W.P. PSI* |
|---|---|---|---|---|---|
| 1/8 | .405 | .203 | .095 | .058 | 1230 |
| 1/4 | .540 | .288 | .119 | .100 | 1130 |
| 3/8 | .675 | .407 | .126 | .138 | 920 |
| 1/2 | .840 | .528 | .147 | .202 | 850 |
| 3/4 | 1.050 | .724 | .154 | .273 | 690 |
| 1 | 1.315 | .935 | .179 | .402 | 630 |
| 1-1/4 | 1.660 | 1.256 | .191 | .554 | 520 |
| 1-1/2 | 1.900 | 1.476 | .200 | .673 | 470 |
| 2 | 2.375 | 1.913 | .218 | .932 | 400 |
| 2-1/2 | 2.875 | 2.289 | .276 | 1.419 | 420 |
| 3 | 3.500 | 2.864 | .300 | 1.903 | 370 |
| 3-1/2 | 4.000 | 3.326 | .318 | 2.322 | 350 |
| 4 | 4.500 | 3.786 | .337 | 2.782 | 320 |
| 5 | 5.563 | 4.767 | .375 | 3.867 | 290 |
| 6 | 6.625 | 5.709 | .432 | 5.313 | 280 |
| 8 | 8.625 | 7.565 | .500 | 8.058 | 250 |
| 10 | 10.750 | 9.492 | .593 | 11.956 | 230 |
| 12 | 12.750 | 11.294 | .687 | 16.437 | 230 |
| 14 | 14.000 | 12.410 | .750 | 19.790 | 220 |
| 16 | 16.000 | 14.214 | .843 | 25.430 | 220 |
| 18 | 18.000 | 16.014 | .937 | 31.830 | 220 |
| 20 | 20.000 | 17.814 | 1.031 | 40.091 | 220 |
| 24 | 24.000 | 21.418 | 1.218 | 56.882 | 210 |

## PVC Schedule 120

| Nominal Pipe Size (in.) | O.D. | Average I.D. | Min. Wall | Nominal Wt./ft. | Max. W.P. PSI* |
|---|---|---|---|---|---|
| 1/2 | .84 | .480 | .170 | .223 | 1010 |
| 3/4 | 1.050 | .690 | .170 | .295 | 770 |
| 1 | 1.315 | .891 | .200 | .440 | 720 |
| 1- 1/4 | 1.660 | 1.204 | .215 | .614 | 600 |
| 1-1/2 | 1.900 | 1.423 | .225 | .744 | 540 |
| 2 | 2.375 | 1.845 | .250 | 1.052 | 470 |
| 2-1/2 | 2.875 | 2.239 | .300 | 1.529 | 470 |
| 3 | 3.500 | 2.758 | .350 | 2.184 | 440 |
| 4 | 4.500 | 3.572 | .437 | 3.516 | 430 |
| 6 | 6.625 | 5.434 | .562 | 6.759 | 370 |

## SDR 21 - W.P. 200 PSI (Water @ 73.4°F.)

| Nominal Pipe Size (in.) | O.D. | Average I.D. | Min. Wall | Nominal Wt./ft. |
|---|---|---|---|---|
| 3/4 | 1.050 | .910 | .060 | .129 |
| 1 | 1.315 | 1.169 | .063 | .170 |
| 1-1/4 | 1.660 | 1.482 | .079 | .263 |
| 1-1/2 | 1.900 | 1.700 | .090 | .339 |
| 2 | 2.375 | 2.129 | .113 | .521 |
| 2-1/2 | 2.875 | 2.581 | .137 | .754 |
| 3 | 3.500 | 3.146 | .167 | 1.106 |
| 3-1/2 | 4.000 | 3.596 | .190 | 1.443 |
| 4 | 4.500 | 4.046 | .214 | 1.825 |
| 5 | 5.563 | 5.001 | .265 | 2.792 |
| 6 | 6.625 | 5.955 | .316 | 3.964 |
| 8 | 8.625 | 7.755 | .410 | 6.679 |

## SDR 26 - W.P. 160 PSI (Water @ 73.4°F.)

| Nominal Pipe Size (in.) | O.D. | Average I.D. | Min. Wall | Nominal Wt./ft. |
|---|---|---|---|---|
| 1 | 1.315 | 1.175 | .060 | .164 |
| 1-1/4 | 1.660 | 1.512 | .064 | .221 |
| 1-1/2 | 1.900 | 1.734 | .073 | .284 |
| 2 | 2.375 | 2.173 | .091 | .432 |
| 2-1/2 | 2.875 | 2.635 | .110 | .622 |
| 3 | 3.500 | 3.210 | .135 | .915 |
| 3-1/2 | 4.000 | 3.672 | .154 | 1.183 |
| 4 | 4.500 | 4.134 | .173 | 1.494 |
| 5 | 5.563 | 5.109 | .214 | 2.288 |
| 6 | 6.625 | 6.085 | .255 | 3.228 |
| 8 | 8.625 | 7.921 | .332 | 5.468 |
| 10 | 10.750 | 9.874 | .413 | 8.492 |
| 12 | 12.750 | 11.710 | .490 | 11.956 |
| 14 | 14.000 | 12.860 | .538 | 14.430 |
| 16 | 16.000 | 14.696 | .615 | 18.810 |
| 18 | 18.000 | 16.534 | .692 | 23.860 |
| 20 | 20.000 | 18.370 | .769 | 29.470 |
| 24 | 24.000 | 22.043 | .923 | 42.520 |

## CLEAR PVC Schedule 40

| Nominal Pipe Size (in.) | O.D. | Average I.D. | Min. Wall | Nominal Wt./ft. | Max. W.P. PSI* |
|---|---|---|---|---|---|
| 1/4 | .540 | .354 | .088 | .081 | 390 |
| 3/8 | .675 | .483 | .091 | .109 | 310 |
| 1/2 | .840 | .608 | .109 | .161 | 300 |
| 3/4 | 1.050 | .810 | .113 | .214 | 240 |
| 1 | 1.315 | 1.033 | .133 | .315 | 220 |
| 1-1/4 | 1.660 | 1.364 | .140 | .429 | 180 |
| 1-1/2 | 1.900 | 1.592 | .145 | .509 | 170 |
| 2 | 2.375 | 2.049 | .154 | .682 | 140 |
| 2-1/2 | 2.875 | 2.445 | .203 | 1.076 | 150 |
| 3 | 3.500 | 3.042 | .216 | 1.409 | 130 |
| 3-1/2 | 4.000 | 3.520 | .226 | 1.697 | 120 |
| 4 | 4.500 | 3.998 | .237 | 2.006 | 110 |
| 6 | 6.625 | 6.031 | .280 | 3.535 | 90 |
| 6 x 1/8 | 6.625 | 6.355 | .125 | 1.647 | 45 |
| 8 | 8.625 | 7.943 | .322 | 5.305 | 80 |

**Note:** Clear PVC ***Schedule 80*** is available in 1/4" through 4" pipe diameters.

Bell and Gasket PVC Pipe is available in Schedules 40, 80, 120 and SDR's 21, 26, 35, 41 and C-900.
Compounds used in the manufacture of PVC and CPVC Pipe meet ASTM Standard D-1784.
Schedules 40, 80 and 120 PVC Pipe meet ASTM Standard D-1785.
Pressure Rated (SDR Series) PVC Pipe meets ASTM Standard D-2241.
ASTM Standard D-1784 classification equivalents:
PVC Normal Impact = Type I Grade I = PVC 1120 = Cell Classification 12454-B
For more complete information, request "Condensed Catalog HPB-103-A&B"

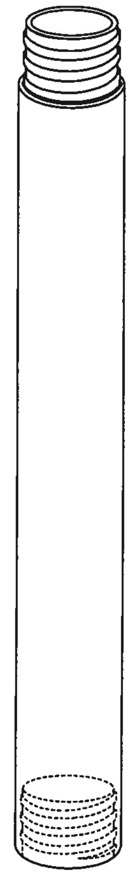
* **Note:** All pressure ratings are for water at 73.4° F with solvent cemented joints.

# FLUSH THREAD PVC SCREEN AND CASING

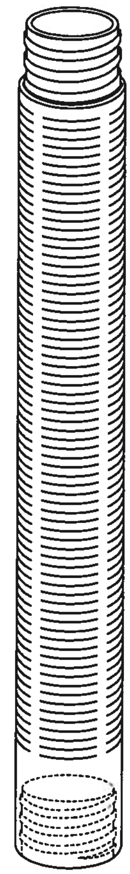
- ✓ Monoflex CNC computer lathed flush threads follow ASTM F-480 recommendations for reliable, consistent results on the job site.
- ✓ Our close tolerances provide a strong connection while retaining ease of assembly.
- ✓ Manufactured from quality PVC pipe, Monoflex flush thread screens and casings are available in diameters of 1/2" through 16" with 2, 4, or 8 threads per inch in Sch. 40 & Sch. 80. Other schedules and SDR's are available in PVC and high density polyethylene.
- ✓ Lengths are measured as "laying length", (not including male thread length), in 2" and 4" diameters, Sch. 40 and Sch. 80 and 6" Sch. 80. All other diameters and schedules are measured end to end. Custom lengths are available in all diameters.
- ✓ All standard Monoflex PVC threads are compatible with other materials threaded to ASTM F-480 recommendations, with the same TPI. <u>**Note**</u>: Threads on 14" and 16" Monoflex screens and casings are not ASTM F-480 as the flush thread guideline does not specify pipe diameters larger than 12".
- ✓ All standard screens provide maximum net open area. A wide variety of slot sizes and spacings are available to adapt to various site conditions and applications.
- ✓ 1/2" through 6" Sch. 40 and Sch. 80 screens and casings are provided with Buna-N O-rings. O-rings may be installed or packaged separately depending on size. O-rings for all other sizes and schedules are sold separately. Please specify if O-rings are required when placing order.
- ✓ All flush thread screens and casings are Envirowrapped and hermetically sealed at both ends as a standard practice.

The following pages list flush thread PVC screens and casings along with the appropriate Buna-N O-rings, and flush thread caps, plugs, and points. Custom lengths, threads and adapters are available.

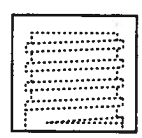
**Please specify part number when ordering.**



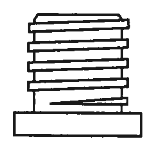
Flush Thread Casing



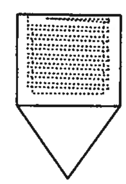
Flush Thread Screen



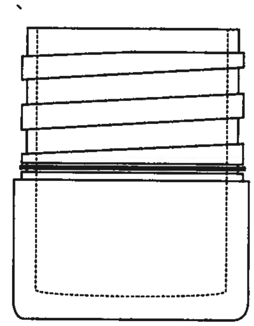
Female Cap (solid)



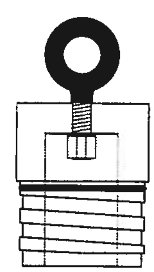
Male Plug (solid)



Female Point (solid)



Male Plug (molded)



Hoist Plug (solid)

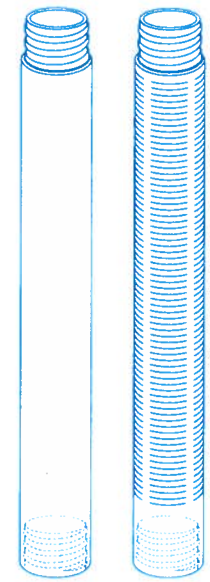
## ENGINEERING SPECIFICATIONS

## PVC FLUSH THREAD MONITOR WELL SCREENS AND CASINGS

1. All PVC well screens and casings used on this project shall be manufactured by Monoflex and conform to ASTM F-480: "Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80."
2. PVC materials used to produce the raw PVC pipe shall meet ASTM Standard D-1784: "Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds for PVC Normal Impact, Type I Grade I (1120), cell classification 12454-B."
3. The finished schedules 40, 80, and 120 raw pipe shall meet the requirements of ASTM Standard D-1785: "Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120." In addition, both the raw material and the finished raw pipe shall be approved by the National Sanitation Foundation (NSF) for use in potable water applications.
4. The PVC pipe used to produce the well screens and casings shall be made from virgin plastic produced by the original compounder.
5. The pipe shall be homogeneous throughout and essentially uniform in color, opacity and density. The inside and outside surfaces shall be glossy in appearance and free of chalking, sticky or tacky material and visually free of oils, grease, dust and marks imparted as a result of the manufacturing process. In addition the pipe walls shall be free of ink, cracks, holes, blisters, voids, foreign inclusions, or other defects that are visible to the naked eye and that may affect the wall integrity. Machined slots or holes deliberately placed in the pipe are acceptable.
6. The outside diameters, wall thicknesses and out of roundness tolerances shall fall within the guidelines of Tables 1 & 2 of the ASTM F-480 Standard Specification when measured in accordance with Test Method D-2122.
7. All flush thread materials must be slotted and threaded without the use of any type of liquid coolant. Air is the only acceptable coolant.
8. Well screens 1/2" through 5" are to be slotted on 1/8" spacing. Well screens 6" and larger are to be slotted on 1/4" spacing unless otherwise specified. ALL well screens .040 slot and larger will be slotted on 1/4" spacing unless otherwise specified.
9. All screens and casings shall be nominal length except for 2" and 4" sch. 40 and 6" sch. 80 which shall be laying length. The term "laying length" refers to the overall length less the length required to complete the assembly.
10. The threads per inch for the various diameters and schedules of flush thread materials shall be the same as that produced by Monoflex, Bechtelsville, Pennsylvania or approved equal.
11. All flush thread screens & casings shall be supplied in individual polyethylene bags hermetically sealed at BOTH ends. Said products shall be shipped in cardboard boxes with properly secured ends. Each box shall display a color coded label containing a full description of the product inside. Said label must indicate the number of pieces per box, the threads per inch, the date of packaging, the signatures of the packer and QC inspector and show a drawing of the product.

## ◆ 4 INCH - PVC - SCHEDULE 80 ◆ CLASS (02)

4" Schedule 80 Buna-N O-rings are included with screen and casing orders at no additional charge. Replacement Buna-N O-rings may be purchased separately.



| Part Number | Flush Thread Casing | Pieces Per Box |
|---|---|---|
| A2CT8040025 | 4" x 2.5' Casing | *** |
| A2CT8040005 | 4" x 5' Casing | *** |
| A2CT8040010 | 4" x 10' Casing | *** |
| A2CT8040020 | 4" x 20' Casing | N/A |

| Part Number | Flush Thread Screen | Pieces Per Box |
|---|---|---|
| A2ST8040025_*_ | 4" x 2.5' Screen | *** |
| A2ST8040005_*_ | 4" x 5' Screen | *** |
| A2ST8040010_*_ | 4" x 10' Screen | *** |
| A2ST8040020_*_ | 4" x 20' Screen | N/A |

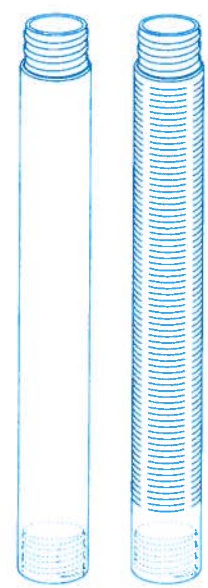
** Specify Slot Size*

| Part Number | Description | Pieces Per Box |
|---|---|---|
| ORING155 | 4" Buna-N O-ring | N/A |
| MLDCAPA2F80400 | 4" Flush Thread Cap - Molded | 20 |
| MLDPLGA2M80400 | 4" Flush Thread Plug - Molded | 20 |
| PNTA2_†_80400 | 4" Flush Thread Point | 20 |
| MLDPNTA2_†_80400 | 4" Flush Thread Point - Molded | 20 |
| PLGA2M80400HS | 4" Hoist Plug - Male - Solid | N/A |

*† Specify M or F*

## ◆ 5 INCH - PVC - SCHEDULE 80 ◆ CLASS (02)

5" Schedule 80 Buna-N O-rings are included with screen and casing orders at no additional charge. Replacement Buna-N O-rings may be purchased separately.



| Part Number | Flush Thread Casing | Pieces Per Box |
|---|---|---|
| A2CT8050025 | 5" x 2.5' Casing | 1 |
| A2CT8050005 | 5" x 5' Casing | 1 |
| A2CT8050010 | 5" x 10' Casing | 1 |
| A2CT8050020 | 5" x 20' Casing | N/A |

| Part Number | Flush Thread Screen | Pieces Per Box |
|---|---|---|
| A2ST8050025_*_ | 5" x 2.5' Screen | 1 |
| A2ST8050005_*_ | 5" x 5' Screen | 1 |
| A2ST8050010_*_ | 5" x 10' Screen | 1 |
| A2ST8050020_*_ | 5" x 20' Screen | N/A |

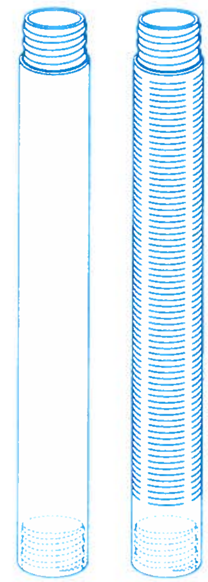
** Specify Slot Size*

| Part Number | Description |
|---|---|
| ORING242 | 5" Buna-N O-ring |
| CAPA2F80500 | 5" Flush Thread Cap |
| PLGA2M80500 | 5" Flush Thread Plug |
| PLGA2M80500HS | 5" Hoist Plug - Male - Solid |

*** ***For these items, see page 5 for Box Quantity Information***

## ◆ 6 INCH - PVC - SCHEDULE 80 ◆ CLASS (02)

6" Schedule 80 Buna-N O-rings are included with screen and casing orders at no additional charge. Replacement Buna-N O-rings may be purchased separately.



| Part Number | Flush Thread Casing | Pieces Per Box |
|---|---|---|
| A2CT8060025 | 6" x 2.5' Casing | 1 |
| A2CT8060005 | 6" x 5' Casing | 1 |
| A2CT8060010 | 6" x 10' Casing | 1 |
| A2CT8060020 | 6" x 20' Casing | N/A |

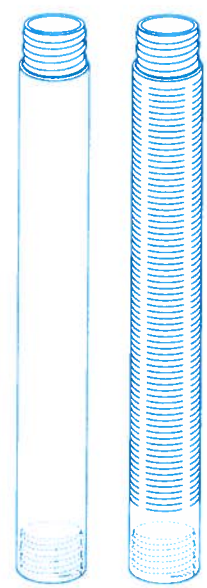
| Part Number | Flush Thread Screen | Pieces Per Box |
|---|---|---|
| A2ST8060025_*_ | 6" x 2.5' Screen | 1 |
| A2ST8060005_*_ | 6" x 5' Screen | 1 |
| A2ST8060010_*_ | 6" x 10' Screen | 1 |
| A2ST8060020_*_ | 6" x 20' Screen | N/A |

* *Specify Slot Size*

| Part Number | Description |
|---|---|
| ORING251 | 6" Buna-N O-ring |
| CAPA2F80600 | 6" Flush Thread Cap |
| PLGA2M80600 | 6" Flush Thread Plug |

## ◆ 8 INCH - PVC - SCHEDULE 80 ◆ CLASS (02)

Buna-N O-rings sold separately (not included as standard).



| Part Number | Flush Thread Casing | Pieces Per Box |
|---|---|---|
| A2CT8080025 | 8" x 2.5' Casing | 1 |
| * A2CT8080005 | 8" x 5' Casing | 1 |
| A2CT8080010 | 8" x 10' Casing | 1 |
| A2CT8080020 | 8" x 20' Casing | N/A |

| Part Number | Flush Thread Screen | Pieces Per Box |
|---|---|---|
| A2ST8080025_*_ | 8" x 2.5' Screen | 1 |
| A2ST8080005_*_ | 8" x 5' Screen | 1 |
| A2ST8080010_*_ | 8" x 10' Screen | 1 |
| A2ST8080020_*_ | 8" x 20' Screen | N/A |

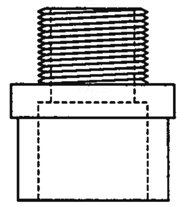
* *Specify Slot Size*

| Part Number | Description |
|---|---|
| * ORING262 | 8" Buna-N O-ring |
| CAPA2F80800 | 8" Flush Thread Cap |
| PLGA2M80800 | 8" Flush Thread Plug |

# PVC SLIP FITTINGS & ADAPTERS CLASS (07)

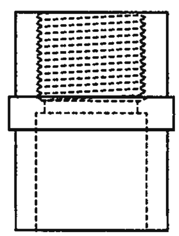
## Male Adapters

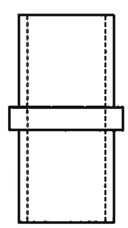
| Male Adapters | Size |
|---|---|
| 40MA2 | 1/2” |
| 40MA3 | 3/4” |
| 40MA4 | 1” |
| 40MA5 | 1-1/4” |
| 40MA6 | 1-1/2” |
| 40MA8 | 2” |
| 40MA12 | 3” |
| 40MA16 | 4” |
| 40MA24 | 6” |
| 40MA32 | 8” |



## Female Adapters

| Female Adapters | Size |
|---|---|
| 40FA2 | 1/2” |
| 40FA3 | 3/4” |
| 40FA4 | 1” |
| 40FA5 | 1-1/4” |
| 40FA6 | 1-1/2” |
| 40FA8 | 2” |
| 40FA12 | 3” |
| 40FA16 | 4” |
| 40FA24 | 6” |
| 40FA32 | 8” |





## Internal Slip Couplings Sch 40 x Sch 40

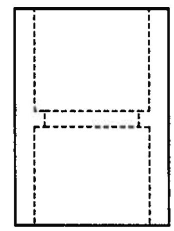
| Internal Slip Couplings Sch 40 x Sch 40 | Size | Qty Box |
|---|---|---|
| ISC11/4S4 | 1-1/4” x 1-1/4” | 10 |
| ISC11/2S4 | 1-1/2” x 1-1/2” | 10 |
| ISC2S4 | 2” x 2” | 10 |

## Internal Slip Couplings Sch 40 x SDR 26

| Internal Slip Couplings Sch 40 x SDR 26 | Size |
|---|---|
| ISC11/2S4XS160 | 1-1/2” x 1-1/2” |

## Slip Couplings

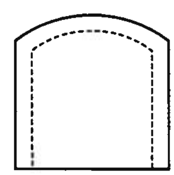
| Slip Couplings | Size |
|---|---|
| 40SC2 | 1/2” |
| 40SC3 | 3/4” |
| 40SC4 | 1” |
| 40SC5 | 1-1/4” |
| 40SC6 | 1-1/2” |
| 40SC8 | 2” |
| 40SC12 | 3” |
| 40SC16 | 4” |
| * 40SC20 | 5” |
| 40SC24 | 6” |
| 40SC32 | 8” |
| 40SC40 | 10” |
| 40SC48 | 12” |



*80SC32
8" diam. slip coupling (sch80)

## Slip Caps Sch 40

| Slip Caps Sch 40 | Size |
|---|---|
| 40CAP2 | 1/2” |
| 40CAP3 | 3/4” |
| 40CAP4 | 1” |
| 40CAP5 | 1-1/4” |
| 40CAP6 | 1-1/2” |
| 40CAP8 | 2” |
| 40CAP10 | 2-1/2” |
| 40CAP12 | 3” |
| 40CAP16 | 4” |
| 40CAP24 | 6” |
| * 40CAP32 | 8” |
| 40CAP40 | 10” |
| 40CAP48 | 12” |

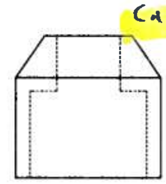


Larger sizes available

* 40CAP20
5" diam slip cap (sch40)

## Reducing Coupling

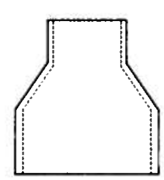
| Reducing Coupling | Size |
|---|---|
| RDCP4X2SXS | 4” x 2” |



## Reducing Coupling

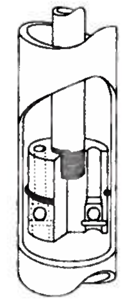
| Reducing Coupling | Size |
|---|---|
| RDCP4X2CL | 4” x 2” |

Clean line style



## PVC SURGE BLOCKS CLASS (06)

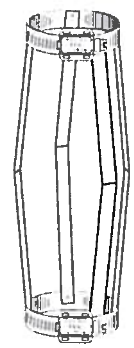
Monoflex PVC surge blocks are used for well development or well rehabilitation. All units are constructed of solid PVC and machined to match the applicable inside diameter of Schedule 40 PVC wells. Internally threaded with female pipe thread for use with steel pipe extensions.



| PART NUMBER | DESCRIPTION | LBS. EA. |
|---|---|---|
| SB2XFPT3/4 | 2" Solid Surge Block with 3/4" female NPT | .35 |
| SB4XFPT1 | 4" Solid Surge Block with 1" female NPT | 1.65 |
| SB6XFPT11/4 | 6" Solid Surge Block with 1-1/4" female NPT | 4.00 |

## STAINLESS STEEL CENTRALIZERS CLASS (08)

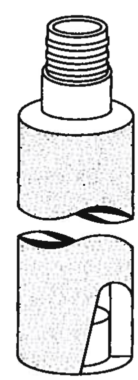
Monoflex adjustable centralizers hold screens and casings in place to eliminate off center placement during installation. Constructed from high quality spring stainless steel, Monoflex centralizers resist corrosion and will not contaminate the well. Stainless steel worm gears tighten easily for quick attachment to the screens and casings.



| PART NUMBER | DESCRIPTION | LBS. EA. |
|---|---|---|
| SSC2X12 | 2" Adjusts up to 12" diameter hole | .40 |
| SSC3X12 | 3" Adjusts up to 12" diameter hole | .55 |
| SSC4X12 | 4" Adjusts up to 12" diameter hole | .60 |
| * SSC5X12 | 5" Adjusts up to 12" diameter hole | .60 |
| SSC6X20 | 6" Adjusts up to 20" diameter hole | .70 |
| * SSC8X24 | 8" Adjusts up to 24" diameter hole | 1.00 |
| SSC10X26 | 10" Adjusts up to 26" diameter hole | 1.00 |
| SSC12X28 | 12" Adjusts up to 28" diameter hole | 1.00 |

## POROUS PIEZOMETERS/SPARGE POINTS CLASS (09)

Monoflex manufactures porous polyethylene piezometers for water level measurements, water sampling and air sparging. They do not include any transducers or measuring equipment. The bottom has a PVC plug and the top is fitted with a 1" PVC Sch. 80 male (4 TPI) flush thread. Available in 12" and 24" lengths. The piezometers have a .935 inside diameter and a 50 micron pore size.



| PART NUMBER | DESCRIPTION |
|---|---|
| PIEZPLY1.6X1X12 | Porous Polyethylene Piezometer, 1.6" x 12" |
| PIEZPLY1.6X1X24 | Porous Polyethylene Piezometer, 1.6" x 24" |

**Note**: If Schedule 40 flush thread casing is to be used, a Sch. 40 x Sch. 80 adapter must be purchased separately. With sufficient notice, units can be made with your choice of Sch. 40 male (8TPI) flush thread, male NPT thread or plain end PVC pipe.

Other diameters, lengths, pore sizes and top fittings can be custom built to your specifications. Call for prices and availability.

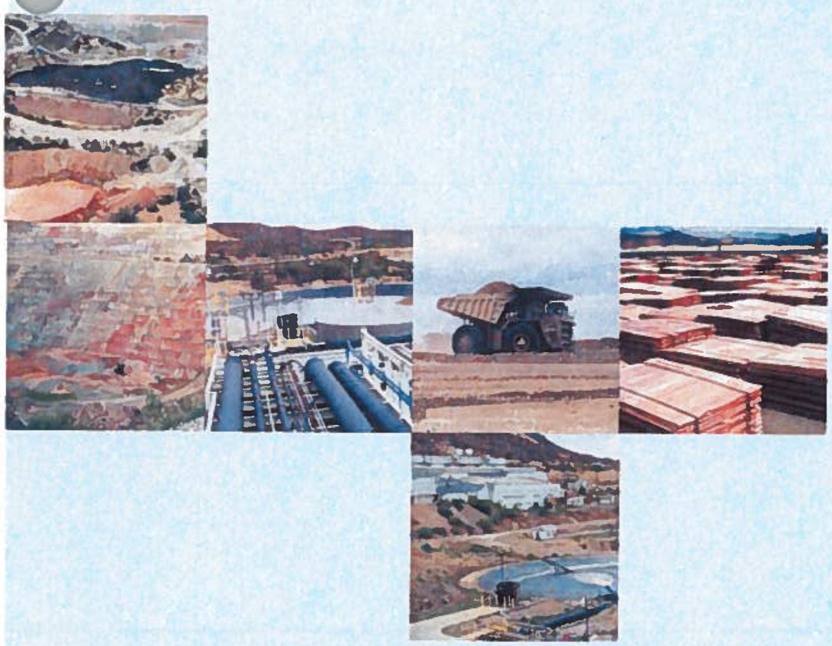

*Monoflex's four U.S. manufacturing facilities are strategically located to provide our high quality products on a timely basis throughout North America, South America, and overseas.*

## Monoflex Northeast
Bechtelsville, Pennsylvania

## Monoflex Southeast
Largo, Florida

## Monoflex Midwest
Prairie du Sac, Wisconsin

## Monoflex Southwest



## Monoflex Division
## Sales and Customer Service

Telephone: 800-523-0224
Facsimile: 610-367-5675
Email: monoflex@campbellmfg.com

## Campbell Manufacturing, Inc.
## Corporate Headquarters

Telephone: 800-523-0224
Facsimile: 610-369-3580
Email: moreinfo@campbellmfg.com
Website: www.campbellmfg.com

Campbell MONOFLEX

*Quality groundwater monitoring products since 1973*

Available from Aetna Plastics (www.aetnaplastics.com)
Quantity and OEM Discounts May Apply

SPEARS®

5" to 4" Reducer Couplings

Discount Codes

| | | |
|---|---|---|
| 020 | Irrigation Specialty Products | |
| 040 | PVC Schedule 40 White Molded Fittings Thru 8" | |
| 041 | PVC Schedule 40 White Molded Fittings 10" and Larger | |
| 043 | PVC Schedule 40 Gray Molded Fittings | |
| 046 | PVC Schedule 40 Molded Reinforced Fittings | |
| 047 | PVC Schedule 40 White Fabricated Fittings | |
| 080 | PVC Schedule 80 Molded Fittings Thru 8" | |
| 081 | PVC Schedule 80 Molded Fittings 10" and Larger | |
| 082 | PVC Schedule 80 Fabricated Pressure Fittings | |
| 086 | PVC Schedule 80 Molded Reinforced Fittings | |
| 140 | PVC & PP Insert Fittings 3/8" - 4" | |
| 320 | 100# PIP (SDR41) Fabricated Fittings | |
| 361 | PVC Class 125 Molded Fittings 10" and Larger | |

# PVC White Schedule 40 Fittings, Unions & Saddles

MADE IN THE U.S.A. WITH PRIDE

PRICE SCHEDULE 40-1-0308
Effective March 26, 2008
Supersedes: 40-1-0306A

Visit our web site:
www.spearsmfg.com
*See Spears® On-line Catalog for most current pricing, updated daily.*

SPEARS® MANUFACTURING COMPANY
Since 1969
SYLMAR, CALIFORNIA

LPCB
UKAS QUALITY MANAGEMENT 007

Quality Systems Certificate No. 293
Corporate Facilities, Sylmar, CA
Assessed to ISO 9001: 2000

2008 EDITION
SCHEDULE 40
WHITE
PVC

# PVC White Schedule 40 Fittings, Unions & Saddles

## HOW TO USE THIS CATALOG

Spears® PVC White Schedule 40 Fittings, Unions & Saddles catalog has been arranged for easy use in selection of desired products according to part number, size, packaging and pricing information. A complete listing of content is located at the end of this catalog. Additional information on individual product dimensions can be found in Spears® publication 40-4, PVC White Schedule 40 Fittings, Unions & Saddles Weights & Dimensions.

## ORGANIZATION

Products in this catalog are listed in columns by type and configuration. Similar configuration types are grouped together, such as Tees, then Elbows, etc.

## COLUMN HEADER INFORMATION

Each product column header label identifies the following product particulars:

| | |
|---|---|
| Part Number | the number used to order the part. |
| Size | nominal diameter of pipe with which the fitting is to be used. NOTE: Fittings may be same size (only one size designation) or reducing (multiple sizes designated). |
| Standard Pack (Std Pk) | the quantity of parts packaged in an individual box or bag. |
| Master Carton (Mstr Ctn) | the total quantity of parts contained in individual boxes or bags which are packaged together. |
| Discount Code (Disc Code) | identification code for applicable discount to the list price of the product. NOTE: This is a Product Group code and is not a calculation of discount. Discount codes are not the same for all products contained in this price schedule. |
| Price Each | the designated list price of the product. |

## PRODUCT CONFIGURATION

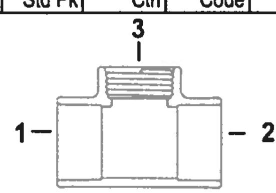
Each group of product configuration types is headed by the product's name and an abbreviated configuration description of the fitting outlet connections. Configuration descriptions are defined on the following page. Line drawing illustrations are general representations of the fittings in the group, but may not be an exact depiction of all configurations listed. Line drawings are correlated to the configuration description. The drawing is read left to right for Elbow and Adapter configurations. Tees have an additional outlet branch and are read left to right (run) then top (branch). Drawings for Wyes and Crosses are read top to bottom then left to right and bushings drawings are read as outside x inside configuration. The configuration description also correlates to the size designation. As with the nominal size designations, only one description is given when all outlets are the same. Reducing sizes list run configuration x branch configuration. Refer to illustration below.

### Example

| Part Number | Size | Std Pk | Mstr Ctn | Disc Code | Price Each |
|---|---|---|---|---|---|

Product Name — **Tee**

Abbreviated Configuration Description — **Soc x Fipt**

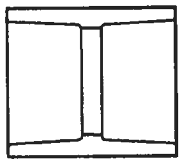



**In this example, outlet description is "Soc x Fipt", which indicates:**
**1. Socket x**
**2. Socket x**
**3. Female Iron Pipe Thread**

| | | | | | |
|---|---|---|---|---|---|
| 402-003 | 3/8 | 50 | 0 | 040 | 2.12 |
| 402-005 | 1/2 | 50 | 300 | 040 | .89 |
| 402-007 | 3/4 | 50 | 0 | 040 | 1.38 |

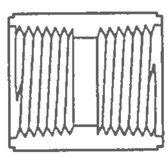
# PVC White Schedule 40 Fittings, Unions & Saddles

## Coupling
### Soc



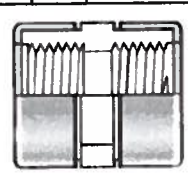
| Part Number | Size | Std Pk | Mstr Ctn | Disc Code | Price Each |
|---|---|---|---|---|---|
| 429-003 | 3/8 | 50 | 300 | 040 | .97 |
| 429-005 | 1/2 | 50 | 600 | 040 | .36 |
| 429-005N | 1/2 | 50 | 600 | 040 | .36 |
| 429-007 | 3/4 | 50 | 400 | 040 | .49 |
| 429-007N | 3/4 | 50 | 400 | 040 | .49 |
| 429-010 | 1 | 50 | 0 | 040 | .86 |
| 429-010N | 1 | 50 | 0 | 040 | .86 |
| 429-012 | 1-1/4 | 25 | 150 | 040 | 1.18 |
| 429-015 | 1-1/2 | 25 | 0 | 040 | 1.26 |
| 429-020 | 2 | 25 | 0 | 040 | 1.93 |
| 429-025 | 2-1/2 | 12 | 0 | 040 | 4.27 |
| 429-030 | 3 | 10 | 0 | 040 | 6.68 |
| 429-040 | 4 | 6 | 0 | 040 | 9.66 |
| 429-045F | 4-1/2 | 1 | 10 | 047 | 43.02 |
| 429-050 | 5 | 5 | 0 | 040 | 17.70 |
| 429-060 | 6 | 5 | 0 | 040 | 30.56 |
| 429-080 | 8 | 8 | 0 | 040 | 57.07 |
| 429-100 | 10 | 1 | 1 | 041 | 166.33 |
| 429-100F | 10 | 1 | 36 | 047 | 75.27 |
| 429-120 | 12 | 1 | 1 | 041 | 331.40 |
| 429-120F | 12 | 1 | 0 | 047 | 110.80 |
| 429-140 | 14 | 1 | 0 | 041 | 484.54 |
| 429-140F | 14 | 1 | 0 | 047 | 179.91 |
| 429-160F | 16 | 1 | 0 | 047 | 200.66 |
| 429-180F | 18 | 1 | 0 | 047 | 342.20 |
| 429-200F | 20 | 1 | 0 | 047 | 596.97 |
| 429-240F | 24 | 1 | 0 | 047 | 829.07 |

## Coupling
### Fipt



| Part Number | Size | Std Pk | Mstr Ctn | Disc Code | Price Each |
|---|---|---|---|---|---|
| 430-005 | 1/2 | 50 | 600 | 040 | .68 |
| 430-005G | 1/2 | 50 | 500 | 043 | .77 |
| 430-007 | 3/4 | 50 | 400 | 040 | 1.26 |
| 430-010 | 1 | 50 | 0 | 040 | 1.66 |
| 430-012 | 1-1/4 | 10 | 120 | 040 | 5.59 |

## Special Reinforced Coupling
### SR Fipt - Stainless Steel Collar

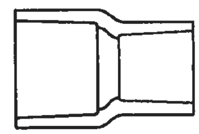


| Part Number | Size | Std Pk | Mstr Ctn | Disc Code | Price Each |
|---|---|---|---|---|---|
| 430-005SR | 1/2 | 25 | 300 | 046 | 3.10 |
| 430-007SR | 3/4 | 25 | 300 | 046 | 4.41 |

## Special Reinforced Coupling (continued)
### SR Fipt - Stainless Steel Collar

| Part Number | Size | Std Pk | Mstr Ctn | Disc Code | Price Each |
|---|---|---|---|---|---|
| 430-010SR | 1 | 25 | 200 | 046 | 4.71 |
| 430-012SR | 1-1/4 | 10 | 120 | 046 | 5.87 |
| 430-015SR | 1-1/2 | 10 | 60 | 046 | 12.99 |
| 430-020SR | 2 | 10 | 0 | 046 | 13.62 |

## Reducer Coupling
### Soc



| Part Number | Size | Std Pk | Mstr Ctn | Disc Code | Price Each |
|---|---|---|---|---|---|
| 429-101 | 3/4X1/2 | 50 | 200 | 040 | .89 |
| 429-130[1] | 1X1/2 | 25 | 200 | 040 | 2.12 |
| 429-131 | 1X3/4 | 50 | 0 | 040 | 1.52 |
| 429-166[1] | 1-1/4X1/2 | 25 | 0 | 040 | 4.01 |
| 429-167[1] | 1-1/4X3/4 | 8 | 48 | 040 | 4.01 |
| 429-168 | 1-1/4X1 | 25 | 0 | 040 | 2.56 |
| 429-209[1] | 1-1/2X1/2 | 8 | 64 | 040 | 3.34 |
| 429-210 | 1-1/2X3/4 | 25 | 0 | 040 | 2.71 |
| 429-211[1] | 1-1/2X1 | 25 | 0 | 040 | 4.18 |
| 429-212 | 1-1/2X1-1/4 | 25 | 0 | 040 | 2.71 |
| 429-247[1] | 2X1/2 | 10 | 0 | 040 | 5.89 |
| 429-248[1] | 2X3/4 | 10 | 0 | 040 | 5.89 |
| 429-249[1] | 2X1 | 25 | 0 | 040 | 5.71 |
| 429-250[1] | 2X1-1/4 | 10 | 0 | 040 | 5.89 |
| 429-251 | 2X1-1/2 | 10 | 40 | 040 | 4.31 |
| 429-291[1] | 2-1/2X1-1/2 | 10 | 0 | 040 | 11.52 |
| 429-292 | 2-1/2X2 | 10 | 0 | 040 | 8.87 |
| 429-335[1] | 3X1 | 10 | 0 | 040 | 26.12 |
| 429-337[1] | 3X1-1/2 | 8 | 0 | 040 | 26.12 |
| 429-338 | 3X2 | 8 | 0 | 040 | 23.19 |
| 429-339[1] | 3X2-1/2 | 8 | 0 | 040 | 19.67 |
| 429-416[1] | 4X3/4 | 10 | 0 | 040 | 30.32 |
| 429-417[1] | 4X1 | 8 | 0 | 040 | 48.16 |
| 429-420 | 4X2 | 4 | 0 | 040 | 28.08 |
| 429-421[1] | 4X2-1/2 | 6 | 0 | 040 | 35.37 |
| 429-422 | 4X3 | 4 | 0 | 040 | 28.96 |
| 429-460F | 4-1/2X4 | 1 | 4 | 047 | 46.18 |
| 429-486F | 5X2 | 1 | 24 | 047 | 102.39 |
| 429-487F | 5X2-1/2 | 1 | 10 | 047 | 88.58 |
| 429-488F | 5X3 | 1 | 6 | 047 | 78.82 |
| 429-490F | 5X4 | 1 | 6 | 047 | 50.89 |
| 429-491F | 5X4-1/2 | 1 | 15 | 047 | 48.83 |
| 429-528F | 6X2 | 1 | 4 | 047 | 75.43 |
| 429-530F | 6X3 | 1 | 15 | 047 | 66.13 |
| 429-532 | 6X4 | 4 | 0 | 040 | 38.22 |
| 429-533F | 6X5 | 1 | 15 | 047 | 58.31 |
| 429-534F | 6X4-1/2 | 1 | 15 | 047 | 70.46 |
| 429-578F | 8X2 | 1 | 4 | 047 | 167.90 |
| 429-580F | 8X3 | 1 | 4 | 047 | 150.23 |

# Watch for New Product Announcements from Spears® Innovation and Technology


## SPEARS® MANUFACTURING COMPANY

**CORPORATE OFFICE**
15853 Olden Street, Sylmar, CA 91342
PO Box 9203, Sylmar, CA 91392
(818) 364-1611 • www.spearsmfg.com

**PACIFIC SOUTHWEST**
15860 Olden Street
Sylmar (Los Angeles), CA 91342
P.O. Box 9203, Sylmar, CA 91392
(818) 364-1611
(800) 862-1499
Fax (818) 367-3014

**NORTHWEST**
4103 C St. NE Suite 200
Auburn (Seattle), WA
98002
(253) 939-4433
(800) 347-7327
Fax (253) 939-7557

**ROCKY MOUNTAIN**
4880 Florence Street
Denver, CO
80238
(303) 371-9430
(800) 777-4154
Fax (303) 375-9546

**SOUTH CENTRAL**
4250 Patriot Drive, Suite 300
Grapevine (Dallas), TX
76051-2317
(972) 691-4003
(800) 441-1437
Fax (972) 691-4404

**UTAH**
5395 West 1520 South
Salt Lake City, UT
84104
(303) 371-9430
(800) 777-4154
Fax (303) 375-9546

**NORTHEAST**
590 Industrial Drive, Suite 100
Lewisberry (Harrisburg), PA
17339-9532
(717) 938-8844
(800) 233-0275
Fax (717) 938-6547

**SOUTHEAST**
4205 Newpoint Place, Suite 100
Lawrenceville (Atlanta), GA
30043
(678) 985-1263
(800) 662-6326
Fax (678) 985-5642

**FLORIDA**
9563 Parksouth Court
Orlando, FL
32837
(407) 843-1960
(800) 327-6390
Fax (407) 425-3563

**MIDWEST**
1 Gateway Court, Suite A
Bolingbrook (Chicago), IL
60440
(630) 759-7529
(800) 662-6330
Fax (630) 759-7515

**INTERNATIONAL SALES**
15853 Olden Street
Sylmar (Los Angeles), CA
91342
(818) 364-1611
Fax (818) 898-3774


**AUTHORIZED DISTRIBUTOR**





40-1-0308

Protective Sleeves & couplings

# HARRINGTON

## Industrial Plastics

HARRINGTON INDUSTRIAL PLASTICS

EMPLOYEES CUSTOMERS VENDORS

50 YEARS

1959 - 2009

Do not test or use PVC piping for air or compressed gases. Care should be taken to avoid ketones, chlorinated hydrocarbon and aromatic solvents.

- IPS-sized (inches) ¼" through 24".
- Schedule 40 pipe is not suitable for threading.
- Pipe sizes ¼" and ⅜" are gray in color. All other pipe is normally white.
- Available in larger sizes on request.

## 40 Schedule PVC Pipe

| Pipe Size (In.) | Part Number | List Price/Ft. ($) | Approx. Wt/100 Ft. (Lbs.) | Maximum Working Pressure @ 73.4°F | Outside Diameter (In.) | Minimum Wall Thickness (In.) |
|---|---|---|---|---|---|---|
| ⅛ | 400-001 | 1.44 | 5.1 | 810 | .405 | .068 |
| ¼ | 400-002 | 1.14 | 8.6 | 780 | .540 | .088 |
| ⅜ | 400-003 | 1.54 | 11.5 | 620 | .675 | .091 |
| ½ | 400-005 | .84 | 17.0 | 600 | .840 | .109 |
| ¾ | 400-007 | 1.04 | 22.6 | 480 | 1.050 | .113 |
| 1 | 400-010 | 1.47 | 33.3 | 450 | 1.315 | .133 |
| 1¼ | 400-012 | 1.91 | 45.0 | 370 | 1.660 | .140 |
| 1½ | 400-015 | 2.14 | 53.7 | 330 | 1.900 | .145 |
| 2 | 400-020 | 2.78 | 72.0 | 280 | 2.375 | .154 |
| 2½ | 400-025 | 4.78 | 113.6 | 300 | 2.875 | .203 |
| 3 | 400-030 | 5.84 | 148.8 | 260 | 3.500 | .216 |
| 4 | 400-040 | 8.03 | 211.8 | 220 | 4.500 | .237 |
| 5 | 400-050 | 14.96 | 287.4 | 190 | 5.563 | .258 |
| 6 | 400-060 | 15.24 | 373.3 | 180 | 6.625 | .280 |
| 8 | 400-080 | 24.21 | 561.9 | 160 | 8.625 | .322 |
| * 10 | 400-100 | 35.43 | 796.6 | 140 | 10.750 | .365 |
| 12 | 400-120 | 47.28 | 1053.4 | 130 | 12.750 | .406 |
| * 14 | 400-140 | 58.54 | 1246.2 | 130 | 14.00 | .437 |
| 16 | 400-160 | 75.81 | 1628.6 | 130 | 16.00 | .500 |
| 18 | 400-180 | 98.02 | 2058.7 | 130 | 18.00 | .562 |
| 20 | 400-200 | 124.68 | 2418.3 | 120 | 20.00 | .593 |
| 24 | 400-240 | 176.93 | 3365.2 | 120 | 24.00 | .687 |

| 40 Schedule PVC | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Wye** S | ½ | 475-005 | 2.31 |
| | ¾ | 475-007 | 3.63 |
| | 1 | 475-010 | 5.09 |
| | 1¼ | 475-012 | 7.82 |
| | 1½ | 475-015 | 10.03 |
| | 2 | 475-020 | 30.10 |
| | 3 | 475-030 | 50.70 |
| | 4 | 475-040 | 95.83 |
| | 6 | 475-060 | 202.32 |
| | 8 | 475-080 | 325.42 |
| | 10 | 475-100 | 1,078.29 |
| | 12 | 475-120 | 1,593.23 |
| | 10x6 | 475-626 | 924.07 |
| | 10x8 | 475-628 | 1,026.74 |

| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Coupling** S | ⅜ | 429-003 | 0.97 |
| | ½ | 429-005 | 0.36 |
| | ¾ | 429-007 | 0.49 |
| | 1 | 429-010 | 0.86 |
| | 1¼ | 429-012 | 1.18 |
| | 1½ | 429-015 | 1.26 |
| | 2 | 429-020 | 1.93 |
| | 2½ | 429-025 | 4.27 |
| | 3 | 429-030 | 6.68 |
| | 4 | 429-040 | 9.66 |
| | 5 | 429-050 | 17.70 |
| | 6 | 429-060 | 30.56 |
| | 8 | 429-080 | 57.07 |
| | 10 | 429-100 | 166.33 |
| | 12 | 429-120 | 331.40 |
| | 14 | 429-140 | 484.54 |

| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Coupling** FPT | ½ | 430-005 | .61 |
| | ¾ | 430-007 | 1.13 |
| | 1 | 430-010 | 1.49 |
| | 1¼ | 430-012 | 5.03 |

| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Reinforced Coupling** SR FPT | ½ | 430-005SR | 3.10 |
| | ¾ | 430-007SR | 4.41 |
| | 1 | 430-010SR | 4.71 |
| | 1¼ | 430-012SR | 5.87 |
| | 1½ | 430-015SR | 12.99 |
| | 2 | 430-020SR | 13.62 |

| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Reducer Coupling** S | ¾ x ½ | 429-101 | 0.89 |
| | 1 x ¾ | 429-131 | 1.52 |
| | 1¼ x 1 | 429-168 | 2.56 |
| | 1½ x ¾ | 429-210 | 2.71 |
| | 1½ x 1¼ | 429-212 | 2.71 |
| | 2 x 1½ | 429-251 | 4.31 |
| | 2½ x 2 | 429-292 | 8.87 |
| | 3 x 2 | 429-338 | 23.19 |
| | 4 x 2 | 429-420 | 28.08 |
| | 4 x 3 | 429-422 | 28.96 |
| | 6 x 4 | 429-532 | 38.22 |

| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Female Adapter** SxFPT | ⅜ | 435-003 | 1.98 |
| | ½ | 435-005 | 0.60 |
| | ¾ | 435-007 | 0.77 |
| | 1 | 435-010 | 0.89 |
| | 1¼ | 435-012 | 1.38 |
| | 1½ | 435-015 | 1.58 |

| 40 Schedule PVC | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Female Adapter** SxFPT Continued | 2 | 435-020 | 2.12 |
| | 2½ | 435-025 | 5.37 |
| | 3 | 435-030 | 7.22 |
| | 4 | 435-040 | 11.97 |
| | 5 | 435-050 | 30.98 |
| | 6 | 435-060 | 44.02 |
| | 8 | 435-080 | 83.00 |

| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Reinforced Female Adapter** SxSR FPT | ¼ | 435-002SR | 4.69 |
| | ⅜ | 435-003SR | 4.69 |
| | ½ | 435-005SR | 2.60 |
| | ¾ | 435-007SR | 3.79 |
| | 1 | 435-010SR | 5.64 |
| | 1¼ | 435-012SR | 9.12 |
| | 1½ | 435-015SR | 11.22 |
| | 2 | 435-020SR | 19.57 |
| | 2½ | 435-025SR | 30.88 |
| | 3 | 435-030SR | 34.80 |
| | 4 | 435-040SR | 59.80 |

| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Reducing Female Adapter** SxFPT | ½x¼ | 435-072 | 1.09 |
| | ½x⅜ | 435-073 | 1.09 |
| | ½x¾ | 435-074 | 1.09 |
| | ¾x½ | 435-101 | 1.09 |
| | ¾x1 | 435-102 | 1.44 |
| | 1x½ | 435-130 | 1.44 |
| | 1x¾ | 435-131 | 1.44 |
| | 1x1½ | 435-133 | 2.90 |

| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Reinforced Reducing Female Adapter** SxSR FPT | ½x¾ | 435-074SR | 3.79 |
| | ¾x½ | 435-101SR | 3.79 |
| | ¾x1 | 435-102SR | 5.64 |
| | 1x½ | 435-130SR | 5.64 |
| | 1x¾ | 435-131SR | 5.64 |

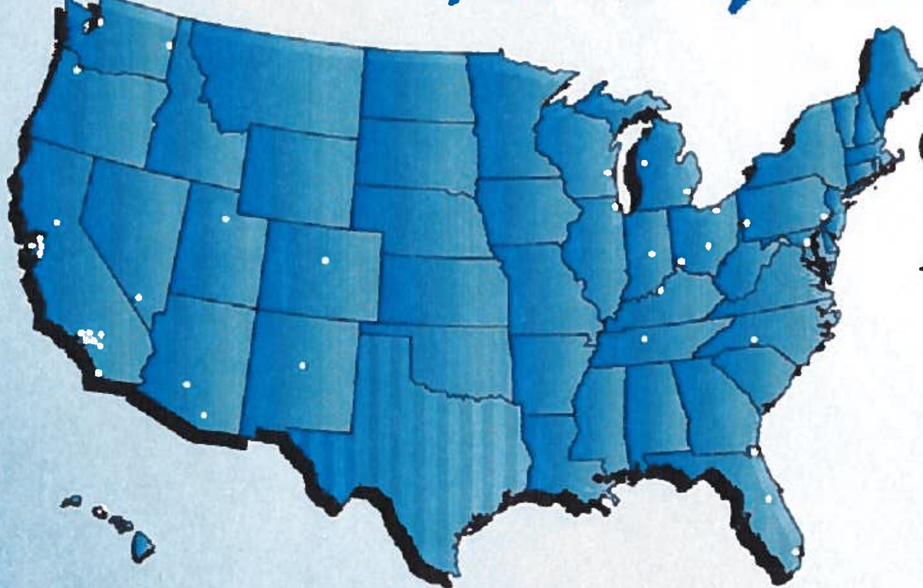
| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Spigot Female Adapter** SPIGxFPT | ½ | 478-005 | 0.68 |
| | ¾ | 478-007 | 0.80 |
| | 1 | 478-010 | 1.27 |
| | 1¼ | 478-012 | 1.78 |
| | 1½ | 478-015 | 2.20 |
| | 2 | 478-020 | 3.23 |
| | 3 | 478-030 | 10.96 |
| | 4 | 478-040 | 18.19 |

| | Size (In.) | Part Number | List Price ($) |
|---|---|---|---|
| **Reinforced Spigot Female Adapter** SPIGxSR FPT | ½ | 478-005SR | 3.43 |
| | ¾ | 478-007SR | 4.04 |
| | 1 | 478-010SR | 6.22 |
| | 1¼ | 478-012SR | 9.91 |
| | 1½ | 478-015SR | 11.87 |
| | 2 | 478-020SR | 19.77 |
| | 3 | 478-030SR | 36.33 |
| | 4 | 478-040SR | 61.68 |

## Key to Abbreviations

- S = Socket
- FPT = Female Iron Pipe Thread
- MPT = Male Iron Pipe Thread
- SPIG = Spigot
- SR = Special Reinforced
- OD = Pipe Outside Diameter

# Providing Industrial Plastic Products For 50 Years.



**HARRINGTON**

**Industrial Plastics**

**CORPORATE HEADQUARTERS**

14480 Yorba Avenue • Chino, CA 91710
(909) 597-8641 • FAX (909) 597-9826
www.harringtonplastics.com

**Branch e-mails:**
**<theCity>@hipco.com**
**Example: Las Vegas Branch**
**lasvegas@hipco.com**

## Always Available @ 1-800-877-4472 • www.HarringtonPlastics.com

### ARIZONA

**PHOENIX**
1048 W. Maricopa Freeway
Phoenix, AZ 85007
(602) 252-7616
FAX (602) 252-6083

**TUCSON**
4141 E. Tennessee Street
Tucson, AZ 85714
(520) 745-8433
FAX (520) 745-6510

### CALIFORNIA

**ANAHEIM**
162 Freedom Avenue
Anaheim, CA 92801
(714) 879-9030
FAX (714) 526-1568

**BERKELEY**
1810 2nd Street
Berkeley, CA 94710
(510) 548-5600
FAX (510) 548-8107

**BURLINGAME**
890-J Cowan Road
Burlingame, CA 94010
(650) 637-9910
FAX (650) 637-9916

**CHINO (CORPORATE HEADQUARTERS)**
14480 Yorba Avenue
Chino, CA 91710
(909) 597-8641
FAX (909) 597-9826

**HAYWARD**
30587 Huntwood Avenue
Hayward, CA 94544
(510) 476-1311
FAX (510) 476-1321

**LOS ANGELES**
10440-2 Ontiveros Place
Santa Fe Springs, CA 90670
(562) 941-1969
FAX (562) 946-8604

**RIVERSIDE**
3403 Durahart Street
Riverside, CA 92507
(951) 782-0190
FAX (951) 782-0198

**SACRAMENTO**
4680 Pell Drive
Sacramento, CA 95838
(916) 920-5392
FAX (916) 920-5303

**SAN DIEGO**
7557 Convoy Court
San Diego, CA 92111
(858) 278-9311
FAX (858) 278-1533

**SANTA CLARA**
2250 De La Cruz Blvd.
Santa Clara, CA 95050
(408) 734-4470
FAX (408) 734-4369

**VAN NUYS**
7003 Valjean Avenue
Van Nuys, CA 91406
(818) 780-5212
FAX (818) 780-5037

**VENTURA**
4773 Ortega Street
Ventura, CA 93003
(805) 644-6894
FAX (805) 644-2167

### COLORADO

**DENVER**
5040 Oakland Street
Denver, CO 80239
(303) 371-4480
FAX (303) 371-6727

### FLORIDA

**JACKSONVILLE**
8641 Western Way
Jacksonville, FL 32256
(904) 731-7770
FAX (904) 731-9566

**ORLANDO**
2605 Ace Road
Orlando, FL 32804
(407) 296-3338
FAX (407) 296-9318

**FORT LAUDERDALE**
5610-204 NW 12th Avenue
Fort Lauderdale, FL 33309
(954) 928-1590
FAX (954) 928-1719

### HAWAII

**OAHU**
98-726 Kuahao Place
Pearl City, HI 96782
(808) 487-5524
FAX (808) 487-1944

### ILLINOIS

**CHICAGO**
471 W. Wrightwood Avenue
Elmhurst, IL 60126
(630) 530-2067
FAX (630) 530-2165

### INDIANA

**INDIANAPOLIS**
3440 Park Davis Circle
Indianapolis, IN 46235
(317) 890-7000
FAX (317) 890-7010

### KENTUCKY

**LOUISVILLE**
10151 Bunsen Way
Louisville, KY 40299
(502) 491-1270
FAX (502) 499-2171

### MARYLAND

**ELKRIDGE**
6675-A Santa Barbara Rd.
Tech 100 Elkridge, MD 21075
(410) 379-0829
FAX (410) 379-8027

### MICHIGAN

**DETROIT**
13042 Fairlane Road
Livonia, MI 48150
(734) 425-1900
FAX (734) 425-1723

**GRAND RAPIDS**
4540-D East Paris Avenue SE
Grand Rapids, MI 49512
(616) 554-2030
FAX (616) 554-2036

### NEVADA

**LAS VEGAS**
1051-A Mary Crest Road
Henderson, NV 89074
(702) 566-5690
FAX (702) 566-1576

### NEW MEXICO

**ALBUQUERQUE**
5311 Oakland Avenue NE
Albuquerque, NM 87113
(505) 884-0295
FAX (505) 881-2464

### NORTH CAROLINA

**CHARLOTTE**
601-C Eagleton Downs Drive
Pineville, NC 28134
(704) 588-0541
FAX (704) 588-5742

### OHIO

**CINCINNATI**
1227 Hillsmith Drive
Cincinnati, OH 45215
(513) 771-0880
FAX (513) 771-5915

**CLEVELAND**
5405-C Valley Belt Road
Independence, OH 44131
(216) 459-0447
FAX (216) 459-0477

**COLUMBUS**
708 Enterprise Drive
Westerville, OH 43081
(614) 433-0722
FAX (614) 433-0711

### OREGON

**PORTLAND**
7051 Southwest Sandburg Road,
Suite 100 Tigard, OR 97224
(503) 684-0990
FAX (503) 684-5150

### PENNSYLVANIA

**PHILADELPHIA**
2385-B Maryland Road
Willow Grove, PA 19090
(215) 657-2490
FAX (215) 657-4290

**PITTSBURGH**
14 Leonberg Road
Cranberry Twp, PA 16066
(724) 772-0830
FAX (724) 772-0834

### TENNESSEE

**NASHVILLE**
2403 Kline Avenue
Nashville, TN 37211
(615) 726-0112
FAX (615) 259-4361

### UTAH

**SALT LAKE CITY**
1907 W. Indiana Avenue
Salt Lake City, UT 84104
(801) 974-5533
FAX (801) 974-5597

### WASHINGTON

**SEATTLE**
4322 South 104th Place
Seattle, WA 98178
(206) 725-9100
FAX (206) 723-4252

**SPOKANE**
2224 Locust Road
Spokane, WA 99206
(509) 926-4142
FAX (509) 926-1366

### WISCONSIN

**MILWAUKEE**
W134 N4949 Campbell Drive
Menomonee Falls, WI 53051
(262) 373-1992
FAX (262) 373-1993

**EXPORT**
14480 Yorba Avenue
Chino, CA 91710
(909) 597-8641
FAX (909) 597-9826

All prices are subject to change without notice.

# HARRINGTON

## *Industrial Plastics*

Your Harrington
Representative

-50thAnnCat_081218

**PROVIDING INDUSTRIAL PLASTIC PRODUCTS FOR 50 YEARS**

*Always Available @* **1-800-937-2527**

**www.HarringtonPlastics.com**

an Aliaxis company

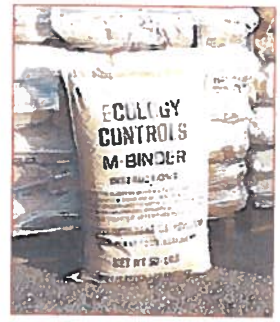
# Erosion Control

S&S Seeds, Inc.
P.O. Box 1275
Carpinteria, CA
93014-1275

(805) 684-0436
(805) 684-2798 fax



## Ecology Controls M-Binder Mulch Tackifier-Soil Stabilizer




**What Is Ecology Controls M-Binder?**
Ecology controls M-Binder is composed of the finely ground outer coating of a seed. Nature has designed this protective coating to perpetuate this particular species. The plant produces a seed head which eventually drops to the ground. Moisture dampens the muciloid outer coating enough to fasten or stick the seed to the ground until germination starts.

Ecology Controls has selected this particular material for use as a tackifier in hydroseeding after many years of research. Ecology Controls M-Binder utilizes the natural property of the muciloid coating for the exact purpose nature intended: to bind seed and soil together until germination and growth begin.

**Features:**

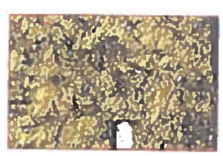
- COST EFFECTIVE - increases plant density and seed rention
- IMPROVES - slurry suspension and slurry flow
- DURABLE - forms a firm, resilient, rewettable membrane which fastens seed to soil surface
- EASY - to handle, easy to apply and easy to cleanup
- SAFE - all organic-non-toxic, non-corrosive for animals and plant material
- VERSATILE - used for Dust Abatement, Hydroseeding, Straw and Fiber Tackifying

**Usage:**
Ecology Controls M-Binder may be applied as a dry powder or as a wet slurry to dry or wet surfaces. It does not require set-up or drying time because when wet it is a heavy muciloid material and when dry it is a firm but rewettable membrane. It may even be applied during rain.

Ecology Controls M-Binder, whether used alone as a dust control product, or in combination with straw, fibers, seed and fertilizers in hydroseeding keeps materials where you want them.

**Proven Results:**
In a test of seven stabilizers by University of California at Davis (Agronomy progress report #49, Ag Experiment Station) Ecology Controls M-Binder proved to be superior in seed retention, promoting germination and controlling erosion.


Competitive Product


M-Binder


Fiber only, 1,000 lbs. per acre

Note: The above left and center illustrations soil has not cracked, fiber only has soil movement. Observe heaviest growth in the center photo M-Binder test. All treatments contained wood fiber.

Haiku, Oahu, Hawaii
Rainfall in excess of 200 inches per year

Southern California
Excellent soil retention, exceptionally uniform germination (no irrigation)

GENERAL APPLICATION RATES:*

| | |
|---|---|
| M-Binder | 80-200 lbs. |
| Water | as required for slurry flow |
| Wood or Paper Fiber | as specified |
| Seed | as specified |

*Rates vary depending on job site-consult your Ecology Controls supplier for your specific needs.

TECHNICAL SPECIFICATIONS:

| | |
|---|---|
| Protein content | 1.62 |
| Ash content | 2.70 |
| Fiber | 4.00 |
| PH of 1% solution | 6.80 |
| Settleable Solids | 5.00 |

**Shipping Information:**
Packed in 50 lb. polywoven-lined paper bags with loading instructions on the bag. All palletized shipments shrink wrapped and banded (2000 lbs./pallet).

**Typical Specifications:**
Wood Fiber shall be derived from Hemlock, Aspen or Alder chips dyed green in 50 lb. bales. Applied at the rate of 1,000 to 2,000 lbs. per acre.

Soil Stabilizer shall be Ecology Controls M-Binder applied at the rate of 40 to 160 lbs. per acre. Add slowly to avoid lumping.

Fertilizer shall be as specified by architect, agency, or argronomist knowledgeable of existing soil conditions. Generally between 400 and 800 lbs. per acre.

Seed shall be of commercial quality and of the best standard of purity available and shall be free of noxious weeds. The weights of the various materials to be used in the slurry shall be determined from marked weights per sack and sack count or by weighing on approved scales.

Mixing: The slurry shall be prepared by mixing mulch, seed, fertilizer, Ecology Controls M-Binder and water in the mixer in the proper proportions specified. The materials shall be loaded into the mixer and mixed in such sequence as to provide a thoroughly mixed, homogeneous slurry. The slurry shall have the proper consistency to adhere to the earth slopes without lumping or running.

**Download MSDS information in Acrobat® PDF format**

m-binder_msds.pdf

Get Acrobat Reader

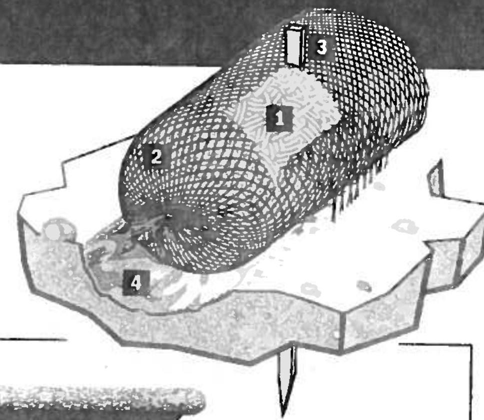
Click here to download the free Acrobat® Reader software.

**Seed Mixes:** Wildflowers | Turfgrasses | Reclamation / Erosion

Other Products | **New!** Erosion Control Blankets

# Earth Saver® Rice Straw Wattle

## Standard Configurations




### 1 Fiber
- 100% Noxious Weed Free Rice Straw
- Certified under Food & Agriculture Code Sect ons 5101 & 5205

### 2 Netting Choices
- Photodegradable
- Biodegradable, natural fiber

### 3 Anchor
- 1x wood center stake

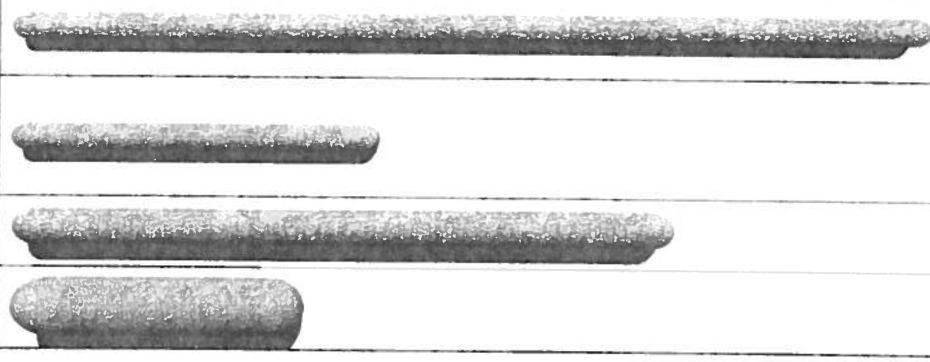
### 4 Trenching
- 2-3 inch anchor furrow

7.50" x 25'
EE07.525PRL
8.50" x 25'
EE08.525PRL

7.50" x 10'
EE07.510PRL
8.50 x 10'
EE08.510PRL

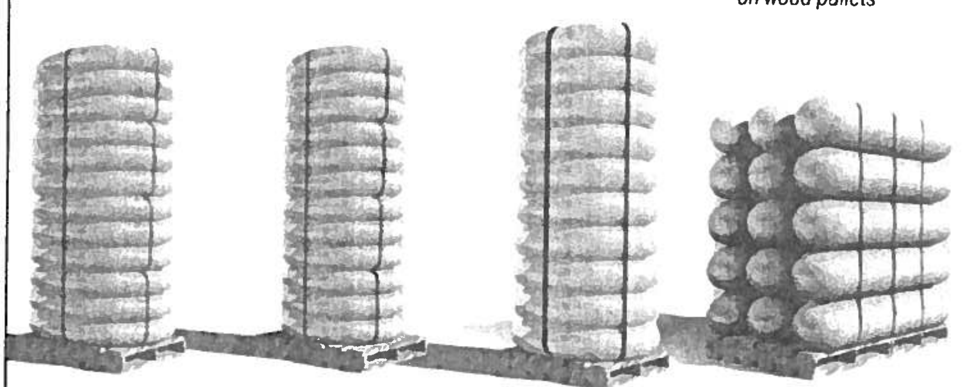
11.5" x 18'
EE11.518PRL

19.0" x 8'
EE19.08PRL



**Coiled**
*Shrink-wrapped/non shrink-wrapped (ECO) on wood pallets*

**Stacked**
*Shrink wrapped on wood pallets*



| 7.50" x 25'<br>8.50" x 25'<br>8.00" x 25' (BIO) | 7.50" x 10'<br>8.50" x 10'<br>8.00" x 10' (BIO) | 11.5" x 18'<br>12.0" x 18' (BIO) | 19" x 8' |
|---|---|---|---|
| *12 wattles = 300 lin.ft.* | *24 wattles = 240 lin.ft.*<br>*(2 wattles per coil)* | *10 wattles = 100 lin.ft.* | *15 wattles = 120 lin.ft.*<br>*(Biodegradable net available)* |
| **ECO**<br>EE07.525PRP-12<br>EE08.525PRP-12<br>EE0825BRP-12 | **ECO**<br>EE07.510PRP-24<br>EE08.510PRP-24<br>EE0810BRP-24 | **ECO**<br>EE11.518BRP-8<br>EE11.518PRP-10<br>EE1218BRP-10 | **Wrapped**<br>ES1908PRP-15 |
| **Wrapped**<br>ES07.525PRP-12<br>ES08.525PRP-12<br>ES0825BRP-12 | **Wrapped**<br>ES07.510PRP-24<br>ES08.510PRP-24<br>ES0810BRP-24 | **Wrapped**<br>ES11.518PRP-8<br>ES11.518PRP-10<br>EE1218BRP-8<br>EE1218BRP-10 | |

*Custom pallet quantities also available*

To meet ever changing project specifications, Earth Saver® offers four distinctive sizes. The first is the tried and true 7.5" dia. (190mm), meeting the Caltrans 175mm specification and an 8.5"dia. (216mm) wattle, again well-exceeding the minimum 200 mm Caltrans specification. The 12" nominal wattle is tagged 11.5" (292mm) and the 20" nominal wattle is tagged 19" (482mm) diameter.

**Material Ordering Nomenclature**

*i.g. ES07.525PRP-12*

E S 07.5 25 P R P -12

- **E** - *Manufacturer (Earth Saver)*
- **S** - *Shrink-wrapped w/cap*
- **E** - *ECO (minimal shrink wrap w/o cap)*
- **07.5** - *Diameter*
- **25** - *Length*
- **P** - *Net type (Photo)*
- **B** - *(Burlap)*
- **R** - *Fiber type (Rice)*
- **P** - *Packaging (Pallet)*
- **L** - *Loose*
- **-12** - *Number of wattles/pallet*

# Earth Saver Rice Straw Wattle

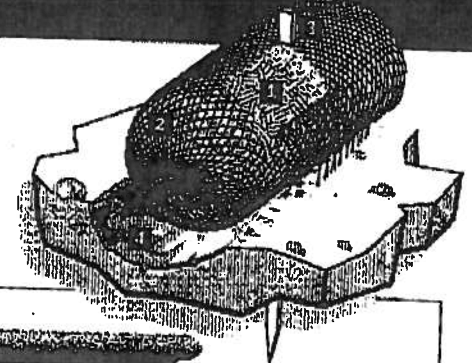
## Standard Configurations

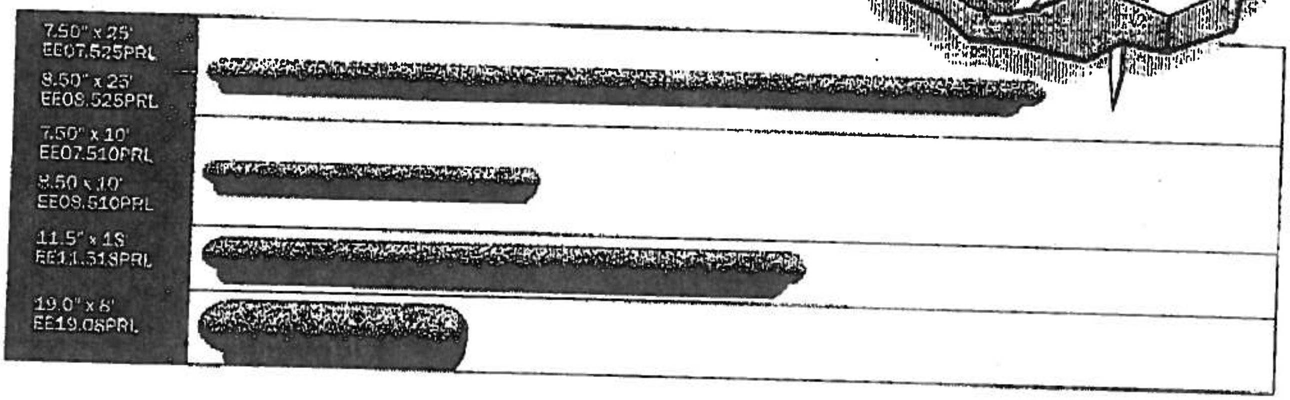
**1 Fiber**
- 100% Noxious Weed Free Rice Straw
- Certified under Food & Agriculture Code Sections 5101 & 5205

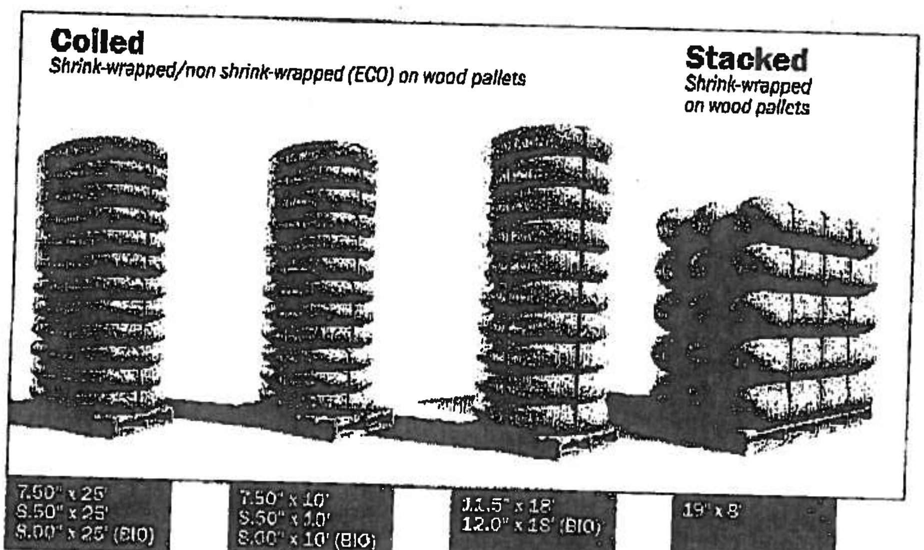
**2 Netting Choices**
- Photodegradable
- Biodegradable, natural fiber

**3 Anchor**
- 1x wood center stake

**4 Trenching**
- 2-3 inch anchor furrow




To meet ever changing project specifications, Earth Saver® offers four distinctive sizes. The first is the tried and true 7.5" dia. (190mm), meeting the Caltrans 175mm specification and an 8.5"dia. (216mm) wattle, again well-exceeding the minimum 200 mm Caltrans specification. The 12" nominal wattle is tagged 11.5" (292mm) and the 20" nominal wattle is tagged 19" (482mm) diameter.

| 7.50" x 25' / 8.50" x 25' / 8.00" x 25' (BIO) | 7.50" x 10' / 8.50" x 10' / 8.00" x 10' (BIO) | 11.5" x 18' / 12.0" x 18' (BIO) | 19" x 8' |
|---|---|---|---|
| *12 wattles = 300 lin.ft.* | *24 wattles = 240 lin.ft.* *(2 wattles per coil)* | *10 wattles = 100 lin.ft.* | *15 wattles = 120 lin.ft.* *(Biodegradable net available)* |
| **ECO** EE07.525PRP-12 EE08.525PRP-12 EE0825BRP-12 | **ECO** EE07.510PRP-24 EE08.510PRP-24 EE0810BRP-24 | **ECO** EE11.518BRP-8 EE11.518PRP-10 EE1218BRP-10 | **Wrapped** ES1908PRP-15 |
| **Wrapped** ES07.525PRP-12 ES08.525PRP-12 ES0825BRP-12 | **Wrapped** ES07.510PRP-24 ES08.510PRP-24 ES0810BRP-24 | **Wrapped** ES11.518PRP-8 ES11.518PRP-10 EE1218BRP-8 EE1218BRP-10 | |

*Custom pallet quantities also available*

**Material Ordering Nomenclature**

i.g. ES07.525PRP-12

E S 07.5 25 P R P 12

- P - Net type (Photo)
- B - (Burlap)
- R - Fiber type (Rice)
- P - Packaging (Pallet)
- L - Loose
- -12 - Number of wattles/pallet
- 25 - Length
- 07.5 - Diameter
- S - Shrink-wrapped w/cap
- E - ECO (minimal shrink wrap w/o cap)
- E - Manufacturer (Earth Saver)

Cal-Vista Erosion Control Products
P.O. BOX 954 • ARBUCKLE, CA 95912
1-877-225-8478
Fax: (530) 476-2564

**CAL-VISTA EROSION CONTROL PRODUCTS**

*Specifications for*

# STRAW WATTLES VARIATIONS

## *UV-8 & UV-12 Straw Wattles*

**The UV-8 and UV-12 Straw Wattles are manufactured from rice straw or other specified straw, and are wrapped in a tubular plastic netting. The netting has a strand thickness of 0.03 inch, and a knot thickness of 0.055 and a weight of 0.35 ounce per foot (each +/- 10%) and is made from 85% high density polyethylene, 14% ethyl vinyl acetate and 1% color for UV inhibition.**

**The UV-8 Straw Wattles are 8 inches in diameter (+/- one inch), and have a density weight of approximately 1.8 pounds per foot (+/- 10%). Maximum length is 25 feet long (+/- 0.5 feet).**

**The UV-12 Straw Wattles are 12 inches in diameter (+/- one inch), and have a density weight of approximately 4 pounds per foot (+/- 10%). Maximum length is 12 feet long (+/- 0.5 feet).**

## *Bio-8 Straw Wattles*

**The Bio-8 Straw Wattles are manufactured from rice straw or other specified straw, and are wrapped in a 100% Biodegradable tubular 7 oz. Plain Burlap. The burlap is Medium Weight Natural Burlap with a 8 x 8 Warp & Fill and weigh 7 oz. per square yard.**

**The Bio-8 Straw Wattles are eight inches in diameter (+/- one inch), and have a density weight of approximately 1.6 pounds per foot (+/- 10%). Maximum length is 25 feet (+/- 0.5 feet).**

**Email: Info@CalVistaErosion.com • Website: www.CalVistaErosion.com**

**Cal-Vista Erosion Control Products**

P.O. Box 954 • Arbuckle, California 95912
Office: (530) 476-0706 • Fax: (530) 476-2554

Certificate of Compliance

Project:

April 27, 2009

Cal Vista Erosion Control Products, LLC Submittal

We certify that our Straw Wattles meet the requirements in Section 20-3, "Erosion Control," and specified dimensions in Section 20-2, "Materials" of the Caltrans Standard Specifications for fiber rolls.

The BIO-8 Type 2 Straw Wattles are manufactured from 100% noxious weed free rice straw and are wrapped in tubular 100% biodegradable 7 oz plain burlap. The burlap is medium weight natural burlap with a 8 x 8 warp & fill and weigh 7 oz. per square yard. The BIO-8 straw wattles are eight inches in diameter (+/- one inch), and have a density weight of approximately 1.6 pounds per foot (+/- 10%). Maximum length is 25 feet (+/- 0.5 feet).

Stakes shall be fir or pine and shall be a minimum of 25 mm x 25 mm x 600 mm in length.

Gerald Shadinger

Cal-Vista Erosion Control Products, LLC

MACCAFERRI

**Maccaferri** reserves the right to amend product specifications without notice and specifiers are requested to check as to the validity of the specifications they are using.

| Table—Sizes for Reno mattresses | | | |
|---|---|---|---|
| L=Length ft (m) | W=Width ft (m) | H=Height in. (mm) | # of cells |
| 9 (2.7) | 6 (1.8) | 6 (150) | 3 |
| 12 (3.6) | 6 (1.8) | 6 (150) | 4 |
| 9 (2.7) | 6 (1.8) | 9 (230) | 3 |
| 12 (3.6) | 6 (1.8) | 9 (230) | 4 |
| 12 (3.6) | 6 (1.8) | 12 (300) | 4 |

All sizes and dimensions are nominal.
Tolerances of ± 5% of the width, length, and ± 10% of the height shall be permitted.

| Table 2—Standard mesh-wire | | | |
|---|---|---|---|
| Type | D in. (mm) | Tolerance | Wire Dia in. (mm) |
| 6x8/ ZN | 2.5 (64) | ±10% | 0.087 (2.20) |

| Table 3—Standard wire diameters | | Lacing Wire | Mesh Wire | Selvedge Wire |
|---|---|---|---|---|
| Wire Mesh Diameter | ø in. mm | 0.087 (2.20) | 0.087 (2.20) | 0.106 (2.70) |
| Wire Tolerance | (±) ø in. mm | 0.004 (0.10) | 0.004 (0.10) | 0.004 (0.10) |
| Minimum Quantity of Zinc | $oz/ft^2$ $g/m^2$ | 0.70 (214) | 0.70 (214) | 0.80 (244) |

## Quantity Request

When requesting a quotation, please specify:
- number of units,
- size of units (length x width x height, see Fig. 1),
- type of mesh,
- type of coating.

EXAMPLE: No. 100 Reno mattresses, 9x6x9, Mesh type 6x8, Wire diam. 0.087 in. (2.20 mm) Galvanized.

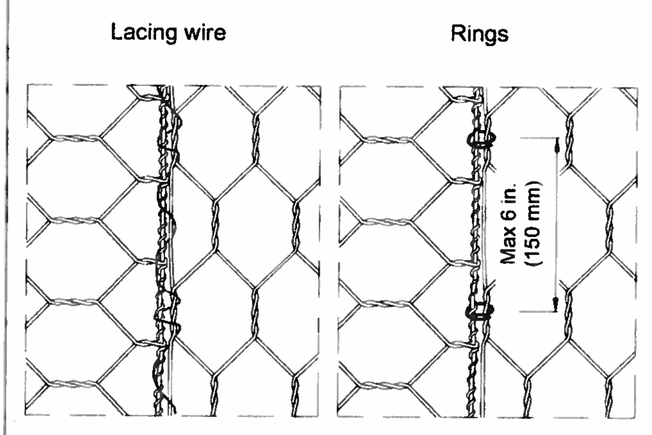


Figure 4

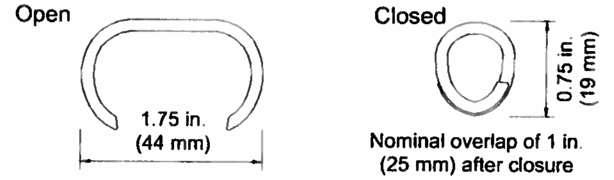
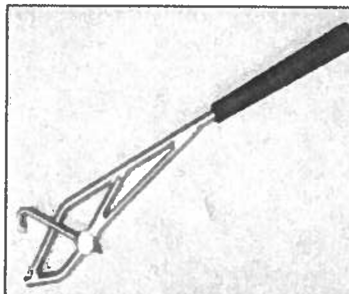
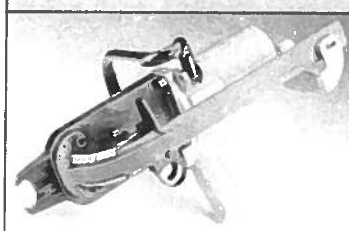


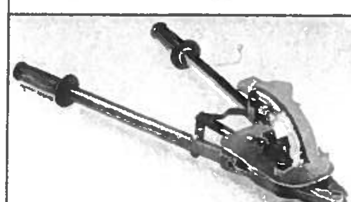
Figure 5



**A** Lid closer



**B** Pneumatic Spenax tool



**C** Manual tool

Figure 6


MACCAFERRI

website: www.maccaferri-usa.com

**Headquarters:**
10303 Governor Lane Boulevard
Williamsport, MD 21795-3116
Tel: 301-223-6910
Fax: 301-223-6134
email: hdqtrs@maccaferri-usa.com

**MACCAFERRI INC.**

**Area Offices:**
AZ, Phoenix; CA, Sacramento; FL, Coral Gables; KY, Lexington; MD, Williamsport; NJ, Ramsey; NM, Albuquerque; PR, Caguas; TX, Lewisville

MACCAFERRI

# TECHNICAL DATA SHEET

*Rev: 01, Issue Date 04.01.2008*

American Units

# RENO MATTRESS
GALVANIZED

## Product Description

The Reno mattress is a structure made of 6x8 double twisted hexagonal woven steel wire mesh type as per ASTM A975-97 (Fig. 1 and 2). Reno mattresses are filled with stones at the project site to form flexible and permeable, monolithic structures such as river bank protection and channel linings for erosion control.
The steel wire used in the manufacture of the mattress is heavily zinc-coated soft temper steel. The standard specifications of mesh and wire are shown in Table 2.
To reinforce the structure, all mesh panel edges are selvedged with a wire having a greater diameter (Table 3).
Reno mattresses are divided into cells by internal diaphragms. Dimensions and sizes of Reno mattresses are shown in Table 1.

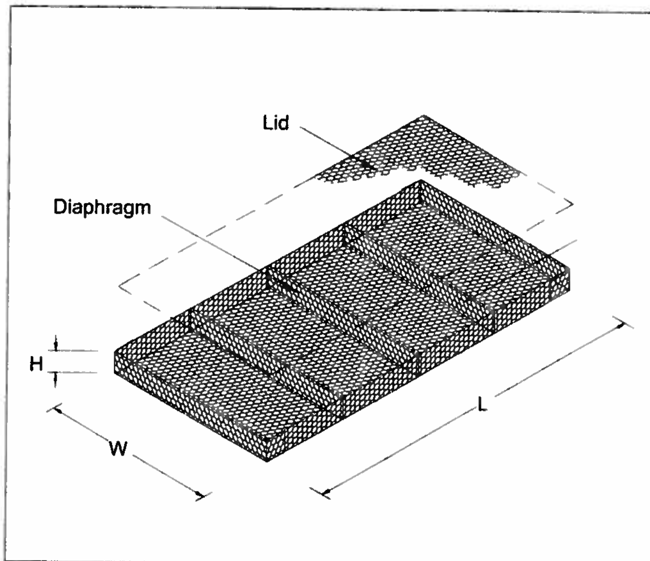


Figure 1

## Wire

All tests on wire must be performed prior to manufacturing the mesh. All wire should comply with ASTM A975-97, style 1 coating. Wire used for the manufacture of Reno mattresses and the lacing wire, shall have a maximum tensile strength of 75,000 psi (515 MPa) as per ASTM A641/A641M-03, soft temper steel.

The tolerance on the opening of mesh 'D' being the distance between the axis of two consecutive twists, is according to ASTM A975-97.

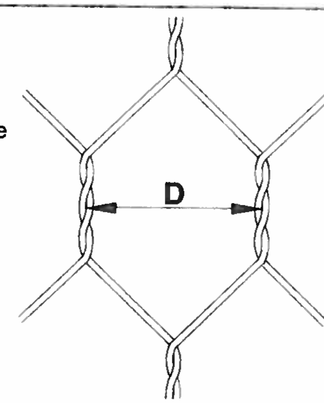


Figure 2

## Woven Wire Mesh Type 6x8

The mesh and wire characteristics shall be in accordance with ASTM A975-97 Table 1, Mesh type 6x8. The nominal mesh opening D = 2.5 in. (64 mm) as per Fig. 2.
The minimum mesh properties for strength and flexibility should be in accordance with the following:

- *Mesh Tensile Strength* shall be 2300 lb/ft (33.6 kN/m) minimum when tested in accordance with ASTM A975-97 section 13.1.1.
- *Punch Test* resistance shall be a minimum of 4000 lb (17.8 kN) when tested in compliance with ASTM A975-97 section 13.1.4.
- *Connection to Selvedges* should be 700 lb/ft (10.2 kN/m) when tested in accordance with ASTM A975-97.

## Lacing, Assembly and Installation

Reno mattresses are assembled and connected using lacing wire specified in Table 3 and described in Fig. 4. Galvanized steel ring fasteners can be used instead of, or to complement, lacing wire (Fig. 5 and Fig. 6).
Galvanized steel rings for galvanized Reno mattresses shall be in accordance with ASTM A975-97 section 6.3.
Spacing of the rings shall be in accordance with ASTM A975-97 Table 2, Panel to Panel connection, Pull-Apart Resistance. In any case, ring fasteners spacing shall not exceed 6 in. (150 mm) (Fig. 4).
Steel fasteners can be placed using pneumatic or manual tools (Fig. 6). For full details please see the Reno Mattress Product Installation Guide.


Figure 3-Example of Reno mattresses

MACCAFERRI

# TECHNICAL DATA SHEET

*Rev: 01, Issue Date 03.01.2007*

American Units

# GABION

GALFAN®

## Product Description

Gabions are baskets manufactured from 8x10 double twisted hexagonal woven steel wire mesh, as per ASTM A975-97 (Figs. 1, 2). Gabions are filled with stones at the project site to form flexible, permeable, monolithic structures such as retaining walls, channel linings, and weirs for erosion control projects.

The steel wire used in the manufacture of the gabion is heavily Galfan® (zinc-5% aluminum-mischmetal [Zn-5 Al-MM] alloy) coated soft temper steel. The standard specifications of mesh-wire are shown in Table 2.

The gabion is divided into cells by diaphragms positioned at approximately 3 ft (0.9 m) centers (Fig.1). To reinforce the structure, all mesh panel edges are selvedged with a wire having a greater diameter (Table 3). Dimensions and sizes of Galfan® gabions are shown in Table 1.

Gabions shall be manufactured and shipped with all components mechanically connected at the production facility.

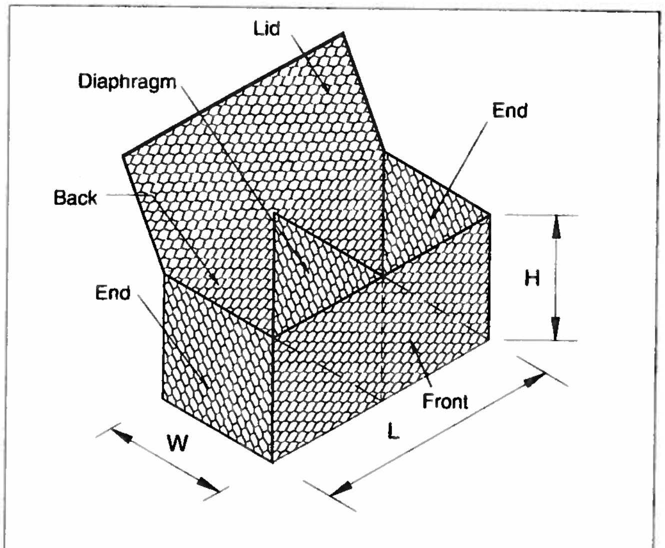



Figure 1

## Wire

All tests on wire must be performed prior to manufacturing the mesh. All wire should comply with ASTM A975-97, style 2 coating. Wire used for the manufacture of Gabions and the lacing wire, shall have a maximum tensile strength of 75,000 psi (515 MPa) as per ASTM A856-03, soft temper steel.

The tolerance on the opening of mesh 'D' being the distance between the axis of two consecutive twists, is according to ASTM A975-97

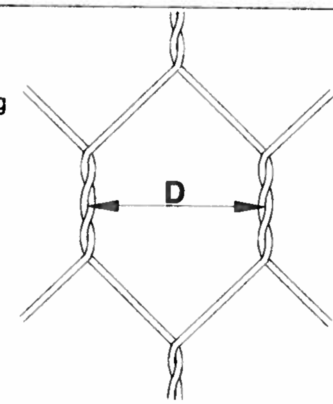



Figure 2

## Woven Wire Mesh Type 8x10

The mesh and wire characteristics shall be in accordance with ASTM A975-97 Table 1, Mesh type 8x10. The nominal mesh opening D = 3.25 in. (83 mm) as per Fig. 2.

The minimum mesh properties for strength and flexibility should be in accordance with the following:

- *Mesh Tensile Strength* shall be 3500 lb/ft (51.1 kN/m) minimum when tested in accordance with ASTM A975-97 section 13.1.1.
- *Punch Test* resistance shall be a minimum of 6000 lb (26.7 kN) when tested in compliance with ASTM A975-97 section 13.1.4 .
- *Connection to Selvedges* should be 1400 lb/ft (20.4 kN/m) when tested in accordance with ASTM A975-97.

## Lacing, Assembly and Installation

Gabion units are assembled and connected to one another using lacing wire specified in Table 3 and described in Fig. 4. MacTie preformed stiffeners or lacing wire can be used as internal connecting wires when a structure requires more than one layer of gabions to be stacked on top of each other. Internal connecting wires with lacing wire shall connect the exposed face of a cell to the opposite side of the cell. Internal connecting preformed stiffeners shall connect the exposed face of a cell to the adjacent side of the cell. Preformed stiffeners are installed at 45° to the face/side of the unit, extending an equal distance along each side to be braced (approximately 1 ft. (300 mm)). An exposed face is any side of a gabion cell that will be exposed or unsupported after the structure is completed.

Stainless steel ring fasteners can be used instead of, or to complement, the lacing wire (Fig. 5).

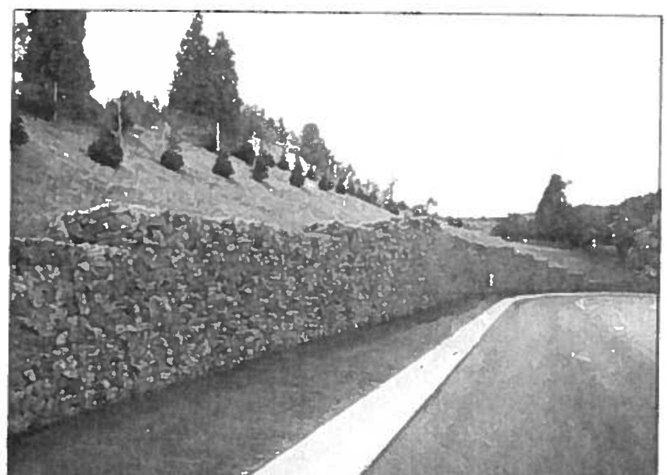


Figure 3—Example of gabion wall

MACCAFERRI

**Maccaferri** reserves the right to amend product specifications without notice and specifiers are requested to check as to the validity of the specifications they are using.

**Table 1—Sizes for Gabions**

| L=Length ft (m) | W=Width ft (m) | H=Height ft (m) | # of cells |
|---|---|---|---|
| 6 (1.8) | 3 (0.9) | 3 (0.9) | 2 |
| 9 (2.7) | 3 (0.9) | 3 (0.9) | 3 |
| 12 (3.6) | 3 (0.9) | 3 (0.9) | 4 |
| 6 (1.8) | 3 (0.9) | 1.5 (0.45) | 2 |
| 9 (2.7) | 3 (0.9) | 1.5 (0.45) | 3 |
| 12 (3.6) | 3 (0.9) | 1.5 (0.45) | 4 |
| 6 (1.8) | 3 (0.9) | 1 (0.3) | 2 |
| 9 (2.7) | 3 (0.9) | 1 (0.3) | 3 |
| 12 (3.6) | 3 (0.9) | 1 (0.3) | 4 |
| 4.5 (1.4) | 3 (0.9) | 3 (0.9) | 1 |

All sizes and dimensions are nominal. Tolerances of ± 5% of the width, height, and length of the gabions shall be permitted.

Stainless steel rings for Galfan® gabions shall be in accordance with ASTM A975-97 section 6.3.
Spacing of the rings shall be in accordance with ASTM A975-97 Table 2, Panel to Panel connection, Pull-Apart Resistance. In any case, ring fasteners spacing shall not exceed 6 in. (150 mm) (Fig. 4).
The rings can be installed using pneumatic or manual tools (Fig. 6).
For full details, please see the Gabion Product Installation Guide.

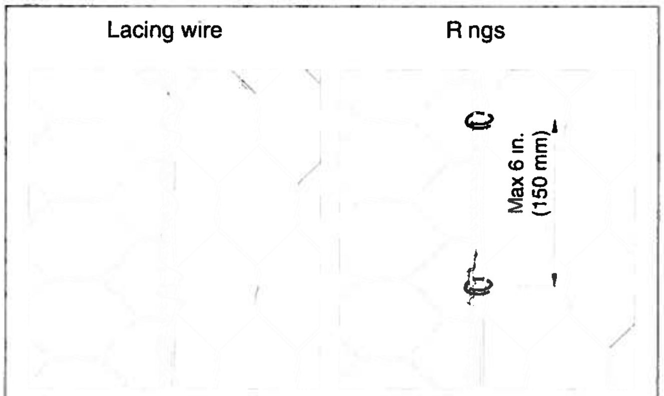


Figure 4

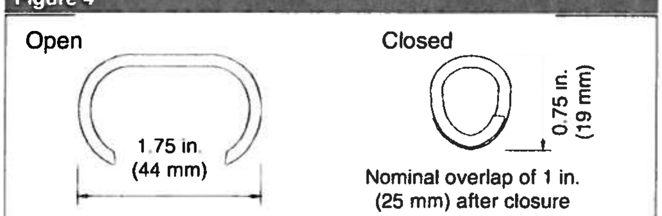


Figure 5

**Table 2—Standard mesh-wire**

| Type | D in. (mm) | Tolerance | Wire Dia in. (mm) |
|---|---|---|---|
| 8x10/ Galfan® | 3.25 (83) | ±10% | 0.12 (3.05) |

**Table 3—Standard wire diameters**

| | Lacing Wire | Mesh Wire | Selvedge Wire / Preformed Stiffeners |
|---|---|---|---|
| Mesh Diameter ø in. (mm) | 0.087 (2.20) | 0.120 (3.05) | 0.153 (3.90) |
| Wire Tolerance (±) ø in. (mm) | 0.004 (0.10) | 0.004 (0.10) | 0.004 (0.10) |
| Minimum Quantity/Galfan® $oz/ft^2$ ($g/m^2$) | 0.70 (214) | 0.85 (259) | 0.90 (275) |

**Quantity Request**

When requesting a quotation, please specify:

- number of units,
- size of units (length x width x height, see Table 1),
- type of mesh,
- type of coating.

EXAMPLE: No. 100 gabions, 6x3x3, Mesh type 8x10, Wire diam. 0.120 in, Galfan®.

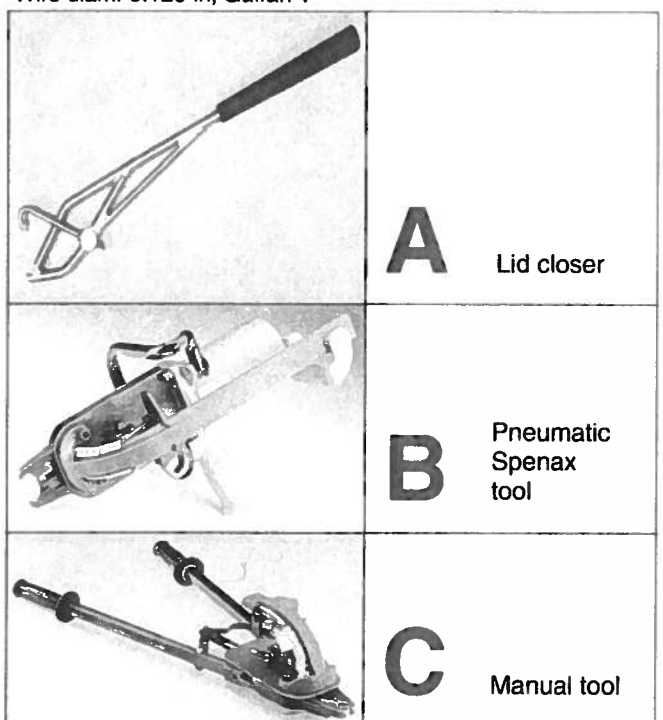


Figure 6

MACCAFERRI

**Headquarters:**
10303 Governor Lane Boulevard
Williamsport, MD 21795-3116
Tel: 301-223-6910
Fax: 301-223-6134
email: hdqtrs@maccaferri-usa.com

**website: www.maccaferri-usa.com**

**MACCAFERRI INC.**

**Area Offices:**

AZ, Phoenix · CA, Sacramento · FL, Coral Gables · KY, Lexington · MD, Williamsport · NJ, Ramsey · NM, Albuquerque · PR, Caguas · TX, Lewisville

MACCAFERRI

| | |
|---|---|
| Gabions | Retaining Walls |
| Reno Mats | Engineering Services |
| Geogrids | Rockfall Mesh |
| Filter Fabrics | Erosion Control Products |

3650 Seaport Blvd.
West Sacramento, CA 95691
Tel.: (916) 371-5805
Fax: (916) 371-0764

---

Lenard D. Long, P.E., V.P.
**SCS Engineers**
6601 Koll Center Parkway, Ste. #140
Pleasanton, CA 94566
Tel.: (925) 240-5152, Ext. 22
Fax: (925) 240-5629
llong@scsengineers.com

April 7, 2009
Qte 28

**Project:** Tracy, CA 95304
**To Supply:** Galvanized Gabions, Hog Rings and Pneumatic Tool

**THE QUANTITIES FURNISHED ARE INTENDED ONLY TO ASSIST THE CONTRACTORS IN DOING THEIR OWN TAKE-OFF. THE CONTRACTOR IS RESPONSIBLE FOR THE QUANTITIES THAT ARE ORDERED.**

| Quantity | Unit | Description | Unit Price | Total |
|---|---|---|---|---|
| 1 | EA | Galvanized wire mesh gabion 6' x 3' x 3' | | |
| 2 | EA | Galvanized wire mesh gabion 12' x 3' x 3' | | |
| 2 | EA | Galvanized wire mesh gabion 12' x 3' x 1.5' | | |
| 2 | EA | 12' x 6' x 1' Reno Mattress Galv. (6x8) base&lid | | |
| | | | | |
| 1 | BX | Spenax Hog Rings - Galvanized (1600/box) | | |
| 1 | EA | Spenax SC-50 Air Gun - Tool Rental ($22.86/daily) | | |
| | | ($1,000.00 deposit required for rental tool) | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | Subtotal | |
| | | | Tax | |
| | | | Freight | |
| | | | Total | |

**NOTES:**
- This is not a guaranteed bill of materials but our interpretation of the requirements of the project.
- Any variation to the quantities may be subject of a price revision.
- Freight is a present fair estimate and will be charged as per actual at the time of delivery.

**Terms:**
**Price valid for :** 30 days from the date of this quotation

**Sales Tax:** ? Included ? Excluded

**F.O.B.:** West Sacramento, CA

Accepted in accordance terms and conditions herein expressed - subject to award of contract to the undersigned.

Firm: ____________
By: ____________
Title: ____________
Date: ____________

Unless accepted by buyer within thirty (30) days from date of issue, this quote will be subject to revision.

By: *Neil Hansen*
Title: Area Manager
Website: www.maccaferri-usa.com
E-mail: nhansen@maccaferri-usa.com

TENCATE
Mirafi®

SEPARATION

DRAINAGE

# Mirafi® N-Series Nonwoven Polypropylene Geotextiles

## for Soil Separation and Drainage

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

The Difference Mirafi® N-Series Nonwoven Geotextiles Make:

- Construction. Mirafi® N-Series polypropylene nonwoven geotextiles easily conform to the ground or trench surface for trouble-free installation.
- Strength. Mirafi® N-Series geotextiles withstand installation stresses with high puncture and tear resistance.
- Drainage. High permittivity properties provide high water flow rates while providing excellent soil retention.
- Environmental. Mirafi® N-Series geotextiles are chemically stable in a wide range of aggressive environments.
- Cost Effective. Mirafi® N-Series geotextiles provide economical solutions to many civil engineering applications including a cost-effective alternative to graded-aggregate filters.

### APPLICATIONS

Mirafi® N-Series nonwoven geotextiles are used in a wide variety of applications including soil separation and drainage applications. Lightweight nonwovens are predominantly used for subsurface drainage applications along highways, within embankments, under airfields, and athletic fields. For these drainage structures to be effective, they must have a properly designed protective filter.

Mirafi® N-Series nonwoven geotextiles eliminate the problems of determining the aggregate gradation required to match soil conditions, finding a convenient and economical source of a specific aggregate gradation, transporting and placing graded aggregate, and assuring that the in-place aggregate gradation provides effective filter performance.

Heavyweight nonwovens are used in critical subsurface drainage systems, soil separation, permanent erosion control, and geomembrane liner protection within landfills. These geotextiles provide the required strength and abrasion resistance to withstand installation and application stresses to create an effective, long-term drainage solution.

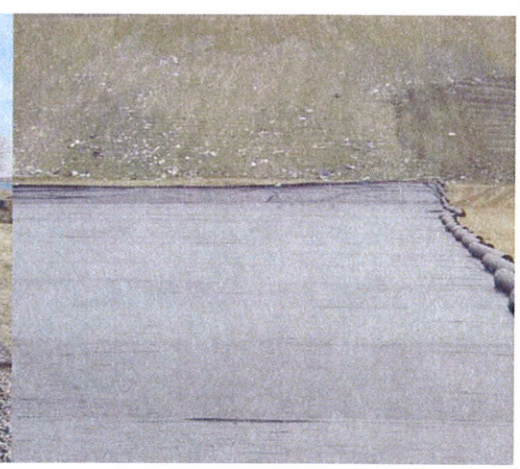
Mirafi® N-Series Nonwoven Geotextiles

### INSTALLATION GUIDELINES*

French and Trench Drains Geosynthetic Placement

Cut geosynthetic to proper width prior to placement. Width should be enough to conform to the trench perimeter with at least a 15cm (6in) top overlap. Place the geosynthetic roll over the trench, and unroll enough geosynthetic that the geosynthetic can be placed down into the trench. Anchor the edges of the geosynthetic with heavy objects to prevent the geosynthetic from falling into the trench. Where overlaps are necessary between rolls, allow for 1m (3ft) overlap from the upstream to the downstream roll.

* These guidelines serve as a general basis for installation. Detailed instructions are available from your TenCate™ representative.



TENCATE

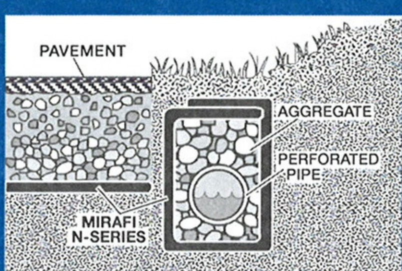
# Mirafi®

## Mirafi® N-Series Nonwoven Polypropylene Geotextiles
### for Soil Separation and Drainage

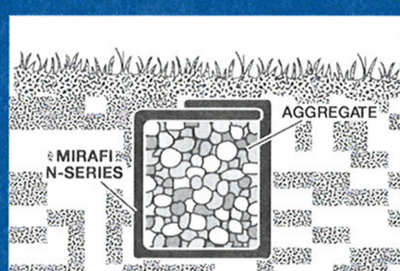
| Property / Test Method | Units | 140NL | 140NC | 140N | 160N | 170N | 180N | 1100N | 1120N | 1160N |
|---|---|---|---|---|---|---|---|---|---|---|
| **MECHANICAL PROPERTIES** | | | | | | | | | | |
| **Grab Tensile Strength**<br>ASTM D 4632 | | | | | | | | | | |
| Strength @ Ultimate | kN (lbs) | 0.40 (90) | 0.45 (100) | 0.54 (120) | 0.71 (160) | 0.80 (180) | 0.91 (205) | 1.12 (250) | 1.34 (300) | 1.69 (380) |
| Elongation @ Ultimate | % | 50 | 60 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| **Trapezoidal Tear Strength** | kN | 0.18 | 0.20 | 0.22 | 0.27 | 0.33 | 0.36 | 0.45 | 0.52 | 0.62 |
| ASTM D 4533 | (lbs) | (40) | (45) | (50) | (60) | (75) | (80) | (100) | (115) | (140) |
| **Puncture Strength** | kN | 0.25 | 0.29 | 0.29 | 0.42 | 0.47 | 0.49 | 0.69 | 0.78 | 1.05 |
| ASTM D 4833 | (lbs) | (55) | (65) | (65) | (95) | (105) | (110) | (155) | (175) | (235) |
| **CBR Puncture Strength** | kN | 1.11 | 1.12 | 1.34 | 1.78 | 2.00 | 2.23 | 3.14 | 3.58 | 4.45 |
| ASTM D 6241 | (lbs) | (250) | (250) | (300) | (400) | (450) | (500) | (700) | (800) | (1000) |
| **UV Resistance after 500 hrs.**<br>ASTM D 4355 | % strength | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| **HYDRAULIC PROPERTIES** | | | | | | | | | | |
| **Apparent Opening Size (AOS)** | US Sieve | 60 | 70 | 70 | 70 | 100 | 80 | 100 | 100 | 100 |
| ASTM D 4751 | mm | 0.25 | 0.212 | 0.212 | 0.212 | 0.15 | 0.180 | 0.149 | 0.149 | 0.150 |
| **Permittivity**<br>ASTM D 4491 | $sec^{-1}$ | 2.0 | 1.9 | 1.8 | 1.4 | 1.2 | 1.1 | 1.0 | 0.8 | 0.54 |
| **Flow Rate**<br>ASTM D 4491 | $l/min/m^2$<br>($gal/min/ft^2$) | 5907<br>(145) | 5704<br>(140) | 5500<br>(135) | 4481<br>(110) | 4278<br>(105) | 3870<br>(95) | 3056<br>(75) | 2648<br>(65) | 2037<br>(50) |
| **Packaging** | | | | | | | | | | |
| Roll Width | m (ft) | 3.8 (12.5)<br>4.5 (15.0) | 3.8 (12.5)<br>4.5 (15.0) | 3.8 (12.5)<br>4.5 (15.0) | 4.5 (15.0) | 4.5 (15.0) | 4.5 (15.0) | 4.5 (15.0) | 4.5 (15.0) | 4.5 (15.0) |
| Roll Length | m (ft) | 110 (360) | 110 (360) | 110 (360) | 91 (300) | 91 (300) | 91 (300) | 91 (300) | 91 (300) | 91 (300) |
| Est. Gross Weight | kg (lbs) | 60 (133)<br>70 (160) | 69 (152)<br>83(182) | 74 (164)<br>89 (197) | 99 (217) | 110 (242) | 113 (250) | 154 (339) | 175 (386) | 205 (453) |
| Area | $m^2$ ($yd^2$) | 418 (500)<br>502 (600) | 418 (500)<br>502 (600) | 418 (500)<br>502(600) | 418 (500) | 418 (500) | 418 (500) | 418 (500) | 418 (500) | 418 (500) |

*NOTE: Mechanical Properties and Hydraulic Properties shown are Minimum Average Roll Values (MARV). Apparent Opening Size (AOS) properties shown are Maximum Average Roll Values. (Values and methods could change witout notice)

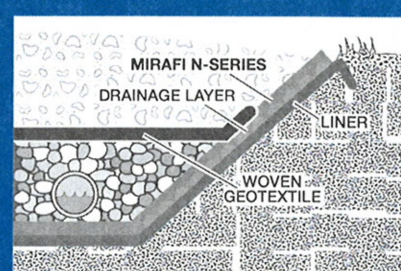
### Mirafi® N-Series Nonwoven Geotextiles




**Cut-off/Inceptor Drain Along a Roadway Or Another Critical Struction**




**French Drain Without Pipe**




**Liner Protection Within a Landfill**



PDS.N0208

365 South Holland Drive
Pendergrass, GA 30567
Tel 800 685 9990
Tel 706 693 2226
Fax 706 693 4400
www.mirafi.com

QUALITY ASSURANCE GAI-LAP-35-97 ACCREDITED LABORATORY

GMA Geosynthetic Materials Association

BSI ISO 9001 FM 61026

TENCATE™ materials that make a difference

# MATERIAL SAFETY DATA SHEET

**DO NOT USE THIS PRODUCT UNTIL YOU HAVE READ THIS INFORMATION**


**MSDS Prepared By:**
Ten Cate Nicolon
365 South Holland Drive
Pendergrass, GA 30567


**Chemtrec Emergency:**

| | |
|---|---|
| 24-hour Phone: | (800) 424-9300 |
| Ten Cate Nicolon Phone: | (770) 689-2627 |
| Date Prepared | December 2003 |
| Revised: | |

## Section 1: General Information

**Trade Names and Synonyms: Mirafi® Products: N-Series and S-Series, Mirapave, Mirascape, Furniture Nonwoven Fabrics**

**Chemical Names and Family**: Polypropylene nonwoven fabrics
**Product Use**: Construction Products
**HMIS Ratings: Health 0, Fire 1, Reactivity 0, PPE (see section 8)**

## Section 2: Hazardous Ingredients/Identity Information

| Ingredient (Chemical Name, CAS#, and Common Name) | OSHA PEL or TWA | ACGIH TLV | Weight % |
|---|---|---|---|
| Polypropylene resin(9003-07-0) | n/a | n/a | 98 – 100 % |
| Minor Additives (Mixture) | n/a | n/a | < 1% |
| Carbon Black(1333-86-4) | 3.5 mg/cm TWA | 3.5 mg/cm TWA | < 1% |

## Section 3: Hazards Identification/Potential Effects

**Overview:** Based upon pertinent data available, polypropylene cloth products are not hazardous under OSHA Hazard Communication Standard (29 CFR 1910.120).

**Routes of Exposure:**

| | |
|---|---|
| Inhalation: | Not likely, under normal use |
| Skin contact: | Yes |
| Skin absorption: | No |
| Eye Contact: | Yes |

**Symptoms of Acute Overexposure:** Product may contain surface applied process lubricants that may cause skin to dry out.

**Symptoms of Chronic Overexposure**: No known health effects have been observed with normal use.

**Medical Conditions Aggravated By Exposure:** Persons with preexisting skin disorders may be susceptible to effects of the material.

**Carcinogenity: See Section 11**

## Section 4: First Aid Procedures

**Eye Contact:** As with any foreign object, flush with water. If pain or irritation persists, consult physician.
**Skin Contact:** Wash with soap and water. In case of irritation, consult physician.
**Ingestion:** N/A

## Section 5: Fire and Explosion Hazard Data

**Flash Point (Method Used)**: Greater than 300°C
**Flammable Limits**: **LEL**: N/A **UEL**: N/A
**Extinguishing Media**: _x_ Water Fog _x_ Carbon Dioxide
_x_ Regular Foam _x_ Dry Chemical ___ Other
**Special Fire Fighting Procedures**: Material will not burn unless preheated. Over heated or molten material may burn slowly with dense smoke. As with any fire, wear approved self-contained breathing apparatus.
**Unusual Fire and Explosion Hazards**: Not applicable

## Section 6: Accidental Release Measures

No environmental threat is expected from release.

## Section 7: Handling and Storage

**Storage:** Store away from oxidizing materials, in cool dry area. Avoid direct sunlight.

**Handling:** No special handling unless large rolls are used. Use lifting devices as necessary. If product is molten, avoid contact with skin or eyes

## Section 8: Exposure Controls/ Rolls may be heavy; use lifting devices for moving Personal Protection

**Ventilation Requirements:** Not required for normal use. If process generates dust, use ventilation to keep exposure below exposure limit.
**Personal Protective Equipment:**
**Eye Protection:** Not normally required.
**Skin Protection:** Not normally required. Persons with exposure sensitivity may need suitable gloves.
**Respiratory Protection:** Not required, unless dust generated

Other Clothing and Equipment: Normal work clothing.

## Section 9: Physical and Chemical

**Boiling Point**: N/A
**Vapor Pressure (mm Hg.)**: N/A
**Vapor Density (Air =1)**: N/A
**Solubility in Water**: Not soluble
**Specific Gravity** ($H_2O$=1): Less than 1
**Evaporation Rate (Butyl Acetate=1)**: N/A
**Melting Point**: about 320 degrees F
**Appearance and Odor**: Fabric wound on a cardboard core.

## Section 10: Stability and Reactivity

**Stability**: _x_ Stable ___ Unstable
**Conditions to Avoid**: Keep away from sparks or flame
**Incompatibility (Materials to Avoid)**: Strong oxidizers.
**Hazardous Polymerization**:__x__ May Occur __Will Not Occur
**Hazardous Decomposition Products (Including Combustion Products)**: carbon dioxide, carbon monoxide, hydrocarbons, etc.

## Section 11: Toxicological Information

**Eye Effects:** Not toxic
**Skin Effects:** Not toxic
**Target Organs:** None
**Carcinogenity:** Carbon black is classified as a Group 2B possible human carcinogen. When encapsulated in a plastic matrix, risk of exposure is minimized.
**Mutagenitive and Reproductive Effects:** Not considered to be a hazard

## Section 12: Ecological Information

**Environmental Data:** Not expected to be hazardous to the environment in present form.

## Section 13: Disposal Considerations

**Disposal:** Spent material should be recycled or disposed according to current regulations
**RCRA Hazard Class:** Does not contain RCRA regulated materials.

## Section 14: Transport information

**DOT Classification: Non-hazardous**

## Section 15: Regulatory Information

This product may contain ingredients in the fiber lubricant and additives in "De Minimus" quantities, which would be listed in SARA 311/313: Acute Health Hazard. At levels under 0.01% by weight, no "Reportable Quantities" will be reached with typical fabric inventories.

The information and recommendations contained in this publication have been compiled from sources believed to be reliable and to represent the best current opinion on the subject at the time of publication. Since we cannot anticipate or control the many different conditions under which this information or our products may be used, we make no guarantee that the recommendations will be adequate for all individuals or situations. Each user of the product described herein should determine the suitability of the described product for his particular purpose and should comply with all federal and state rules and regulations concerning the described products.

GEORGE REED INC. GENERAL ENGINEERING CONTRACTORS

# Jackson Valley Quarry

**Product:** 5" x 3" Crushed

| Sieve Analysis | | CTM 202 |
|---|---|---|
| Size | % Passing | Specs |
| 6" | 100 | |
| 5" | 90 | |
| 4" | 79 | |
| 3" | 37 | |
| 2" | 9 | |
| 1-1/2" | 3 | |
| 1" | 1 | |
| 3/4" | 1 | |

**Durability** — CTM 229
Coarse: 86 OK

**L.A. Rattler** — % Loss
CTM 214 @ 100 Rev.: 2.9 OK
CTM 214 @ 500 Rev.: 13.3 OK
ASTM C535 @ 1000 Rev.: 15.8 Approved by Engineer

**Unit Weight** — CTM 212
Dry - Loose: 90 pcf
Dry - Rodded: 98 pcf

**Specific Gravity** — CTM 206/208, ASTM C128
Fine Bulk Dry: 2.76
Fine Bulk SSD: 2.77
Fine Apparent: 2.78
Fine Absorption: 0.3%

**Crushed Particles** — CTM 205
100%

## TurfMaker Job Analysis Worksheet

**JOB NAME:** Building 850, Site 300, LLNL <

September 28, 2009

**ACTUAL JOB SIZE**

Square feet = 435,800 < Acres = 10.01 Square Yds = 48,422

**MATERIALS PREFERENCES or SPECIFICATIONS**

| Materials | | Pounds Per Acre | Pounds per 1,000 Sq Ft |
|---|---|---|---|
| Hydromulch | < | 3,000 < | 68.9 |
| 16-20-0 w/sulfur | < | 250 < | 5.7 |
| Sticky Sticky | < | 0 < | 0.0 |
| Bermuda | < | 0 < | 0.0 |
| Tackifier | < | 0 < | 0.0 |
| Seed | < | 54 < | 1.2 |
| Other | < | 0 < | 0.0 |
| Other | < | 0 < | 0.0 |
| Other | < | 0 < | 0.0 |
| Other | < | 0 < | 0.0 |

**MATERIALS INFORMATION and REQUIREMENTS**

| Materials | Pounds in Each Bag | Total Bags Required | Total Pounds Required |
|---|---|---|---|
| Hydromulch | 50 < | 600.3 | 30,016.5 |
| 16-20-0 w/sulfur | 50 < | 50.0 | 2,501.4 |
| Sticky Sticky | 15 < | 0.0 | 0.0 |
| Bermuda | 50 < | 0.0 | 0.0 |
| Tackifier | 50 < | 0.0 | 0.0 |
| Seed | 50 < | 10.8 | 540.3 |
| Other | 50 < | 0.0 | 0.0 |
| Other | 50 < | 0.0 | 0.0 |
| Other | 50 < | 0.0 | 0.0 |
| Other | 50 < | 0.0 | 0.0 |



# MSDS Material Safety Data Sheet
PROFILE Products, LLC

Profile

**TerraMatrix™**



## 1 PRODUCT AND COMPANY IDENTIFICATION

**Manufacturer**

PROFILE Products, LLC
750 LAKE COOK ROAD
SUITE 440
BUFFALO GROVE, IL 60089

**Contact:**
**Telephone Number:**(847) 215-1144
**FAX Number:** (847) 215-0577
**E-Mail:** profileproducts.com
**Web** www.profileproducts.com

**Product Name:** TerraMatrix™
**Revision Date:** 6/11/08
**MSDS Number:** CON040
**CAS Number:** Not applicable
**Product Use:** Erosion control mulch for hydraulic seeding

Product Description: Green dyed wood fibers and a proprietary binder mixture.

## 2 HAZARDS IDENTIFICATION

**Route of Entry:** Inhalation, skin contact, eye contact
**Target Organs:**
**Inhalation:** Wood may cause sneezing, irritation, and dryness of the nose and throat. Dust may aggravate pre-existing respiratory conditions.
**Skin Contact:** Wood dust can cause irritation. Skin absorption is not known to occur.
**Eye Contact:** Wood dust can irritate the eyes.
**Ingestion:** No reports of human ingestion.

NFPA-ratings (scale 0-4): Health = 1, Fire = 2, Reactivity = 0

OSHA Classification: Wood dust is a hazardous substance as defined by the Hazard Communication Standard 29CFR 1910.1200

## 3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

| Cas # | Perc. | Chemical Name |
|---|---|---|
| 9000300 | PROPRIETARY | VEGETABLE HYDRO-COLLOID |

2

# MSDS Material Safety Data Sheet
PROFILE Products, LLC

Profile

TerraMatrix™

MSDS Number: CON040 | Revision Date: 6/11/08



## 13 DISPOSAL CONSIDERATIONS

Normally can be disposed of as a wood residue. Ensure disposal is in compliance with local, provincial (state), and federal regulations.

## 14 TRANSPORT INFORMATION

DOT Class: Not regulated #

## 15 REGULATORY INFORMATION

COMPONENT / (CAS/PERC) / CODES

REGULATORY KEY DESCRIPTIONS

MASS = MA Massachusetts Hazardous Substances List
NRC = Nationally Recognized Carcinogens
OSHAWAC = OSHA Workplace Air Contaminants
PA = PA Right-To-Know List of Hazardous Substances
TXAIR = TX Air Contaminants with Health Effects Screening Level

CERCLA = Superfund clean up substance
CSWHS = Clean Water Act Hazardous substances
EHS302 = Extremely Hazardous Substance
EPCRAWPC = EPCRA Water Priority Chemicals
HAP = Hazardous Air Pollutants
NJEHS = NJ Extraordinarily Hazardous Substances
NJHS = NJ Right-to-Know Hazardous Substances
OSHAPSM = OSHA Chemicals Requiring process safety management
SARA313 = SARA 313 Title III Toxic Chemicals

## 16 OTHER INFORMATION

END OF MSDS DOCUMENT

5





The initial seed mix from the LLNL biologist (with bushes removed per LLNL request) is presented in the Table 6 below. The Regreen is a fast growing sterile wheatgrass and the second item is another relatively consistent nurse crop seed. The native seeds have deep roots and will take several years to establish. Subcontractor may deviate from this seed mix if approved by the project biologist. If this construction area is burned following the first two years of new seed application, additional annual hydroseed applications may be necessary.

Table 6. Proposed Vegetation Seed Mix for Site 300

| Species | Bulk Rate (lbs/acre) | Seed Purity P/G[1] |
|---|---|---|
| *Elymus X Triticum*, Regreen | 24 | 95/85 |
| *Vulpia microstachys*, Three Weeks Fescue | 6 | 90/70 |
| *Elymus glaucus* | 8 | 90/75 |
| *Nassella pulchra*, Purple Needlegrass | 4 | 90/70 |
| *Melica californica*, California Oniongrass | 3 | 80/80 |
| *Poa scabrella/secunda*, Native Pine Bluegrass | 3 | 90/70 |
| *Trifolium tridentatum*, Tom Cat Clover (herb) | 2 | 95/75 |
| *Lupinus bicolor*, Dove Lupine | 4 | 95/75 |

$890/AC

Notes: Seed Mix as provided by Cal Dibble of LLNL for Site 300 Area (with bushes removed per LLNL request of February 19, 2009 as confirmed by LLNL email dated March 6, 2009).
Seed Purity [1] P = Perennials / biennials.
G = Ornamental grasses.

F.O.B. LIVERMORE
VALID 60 DAYS
Kathy

Further information regarding this BMP can be found in Appendix D.

### Hydraulic Mulch (CASQA EC-3)

The grass seed above will be placed with hydraulic mulch to protect the seed and provide cover for germination. Further information regarding the Hydraulic Mulch BMP (CASQA EC-3) can be found in Appendix D.

### Velocity Dissipation Devices (CASQA EC-10)

New culvert pipes are anticipated with the remedial design. As such, the pipe outlets will be protected with rock velocity dissipation devices. Further information regarding the Velocity Dissipation Devices BMP (CASQA EC-10) can be found in Appendix D.

### Fiber Rolls (CASQA SE-5)

Fiber rolls are recommended for placement along the hillside areas after excavation activities are complete. The fiber rolls serve two purposes: to reduce storm water velocity as it flows down the hillside, and trap sediment that may be mobilized by the storm water. The fiber rolls are a temporary measure to reduce erosion until vegetation develops. The fiber rolls should be 100% biodegradable and wildlife-friendly. Any of the following fiber rolls are acceptable:



6

# Appendix F

# Pit 7-Source Ground Water Extraction and Treatment System As-Built Variations from Design Specifications

## Table F-1. Pit 7-Source Ground Water Extraction and Treatment System Configuration Summary.

| | Remedy Proposed in the Remedial Design Report | Current (March 2010) Remedial System |
|---|---|---|
| Number of Ground Water Extraction and Treatment Systems | 1 | 1 |
| Number of Soil Vapor Extraction and Treatment Systems | 0 | 0 |
| COC/Treatment Technology | Uranium/IX[a]<br>VOCs/GAC[b]<br>Nitrate/IX[c]<br>Perchlorate/IX[c]<br>Tritium/Not treated by facility (Monitored natural attenuation remedy selected) | Uranium/IX[a]<br>VOCs/GAC[b]<br>Nitrate/IX[c]<br>Perchlorate/IX[c]<br>Tritium/Not treated by facility (Monitored natural attenuation remedy selected) |
| Discharge Method | Tritiated water discharged into unsaturated alluvium via infiltration trench | Tritiated water discharged into unsaturated alluvium via infiltration trench |
| Number of Extraction Wells | 7[d] | 6 [d, e] |
| Extraction wells, Hydrostratigraphic unit | NC7-25, $Tnbs_0$<br>NC7-63, Qal/WBR<br>NC7-64, Qal/WBR<br>W-PIT7-1918, Qal/WBR<br>W-PIT7-2305, Qal/WBR and $Tnbs_0$<br>W-PIT7-2306, Qal/WBR<br>W-PIT7-2307, Qal/WBR | NC7-25, $Tnbs_0$<br>NC7-63, Qal/WBR<br>NC7-64, Qal/WBR<br>W-PIT7-2305, Qal/WBR and $Tnbs_0$<br>W-PIT7-2306, Qal/WBR<br>W-PIT7-2307, Qal/WBR |
| Anticipated Pumping Rate/ Maximum Design Capacity | 2 gpm/3 gpm | 2 to 3 gpm[f]/10 gpm |

Notes:

COC = Contaminant of Concern.
GAC = Granular activated carbon.
gpm = Gallons per minute.
IX = Ion-exchange.

[a] Three 2.5 cubic feet canisters in series (USF A-284).
[b] Three 2.5 cubic feet canisters in series (GAC).
[c] Three 2.5 cubic feet canisters in series (Sybron SR7).
[d] Three additional extraction wells may be drilled at a later date based on information collected after operation of the hydraulic diversion system.
[e] W-PIT7-1918 was an existing monitor well to be converted to an extraction well as part of the original wellfield design. However, the well was later deemed to be unsuitable for use as an extraction well because did not yield sufficient water, and the small (2-inch) well casing would not allow for the deployment of the required extraction and monitoring equipment.
[F] Pumping rate anticipated to increase as additional wells are added to the extraction wellfield.

## Table F-2. Pit 7-Source Ground Water Extraction and Treatment System Variations from Remedial Design Specifications.

| Description of Change | Justification |
|---|---|
| ***Ground Water Extraction Wellfield*** | |
| **Original Design: NC7-25, NC7-63, NC7-64, W-PIT7-1918, W-PIT7-2305, W-PIT7-2306, and W-PIT7-2307, with three additional extraction wells to be drilled and added later.**<br><br>**Modified Design: NC7-25, NC7-63, NC7-64, W-PIT7-2305, W-PIT7-2306, and W-PIT7-2307, with three additional extraction wells to be drilled and added later.** | **W-PIT7-1918 was an existing monitor well to be converted to an extraction well as part of the original wellfield design. However, the well was later found to be unsuitable for use as an extraction well because it did not yield sufficient water, and the small (2-inch) well casing would not allow for the installation of the required extraction and monitoring equipment.**<br><br>**Note: Ground water is not currently being extracted from well NC7-25. This well is completed in the $Tnbs_0/Tnbs_1$ hydrostratigraphic unit (HSU) and will only be pumped when ground water elevations in the overlying Qal/WBR HSU are sufficiently low to avoid pulling depleted uranium and other contaminants in the Qal/WBR HSU into the $Tnbs_0/Tnbs_1$ HSU.** |
| **The wellhead seal and downhole equipment were redesigned, and cycle counters were added to wells. In addition, a rigorous standard operating procedure was implemented to measure and capture water level data in all monitoring and extraction wells.** | **The new design allows for both manual water level and electronic water level measurements in the extraction wells, allowing calibration of water level transducers. The new pumps have a smaller diameter and allow implementation of the new downhole equipment design. Cycle counters provide additional verification of flow totals.**<br><br>**The new standard operating procedure ensures that reliable water and verifiable water level data is now being collected.** |
| **Original Design: Air from pneumatic submersible pump was discharged into the wellhead space.**<br><br>**Modified Design: Air from submersible pump is discharged to atmosphere. A coalescent filter was installed to return condensate to the well.** | **In the original design, air from pneumatic submersible pump discharged back to the well, which was affecting the water level data and causing instrument measurement errors. As a result of the change in the air discharge location, the water level data is now accurate.** |
| **The flow manifold was redesigned to prevent backflow into wells by removing the loop that bypassed the check valve. The flow meter and water filter were relocated, the check valve was replaced and re-positioned vertically, and the anti-siphon valves were upgraded.** | **The original flow manifold design allowed water to flow back into the extraction wells and the flow meter location resulted in discrepancies in flow rate measurements. The relocation of the flow meter to a vertical position allows for a more accurate flow reporting. The upgraded check valve allows all water to drain to the facility; whereas the original design did not. The upgraded anti-siphon valve seals well during non-pumping conditions and allows pumped water to gravity feed to the facility. The overall footprint of the manifold was reduced, allowing easier access and maintenance.** |

**Table F-2. Pit 7-Source Ground Water Extraction and Treatment System Variations from Remedial Design Specifications (continued.)**

| Description of Change | Justification |
|---|---|
| ***Ground Water Extraction Wellfield continued*** | |
| **Original Design: Bag filter with 8.25 in bags by Pentek.**<br><br>**Modified Design: Pentek 5-micron cartridge filter.** | **The type of particulate filter was changed to accommodate the manifold design change.** |
| ***Ground Water Treatment System*** | |
| **Original Design: 1.5 HP, 30 gallon, 115V, 60 Hz, 1 pz GAST compressor (model 7HDD-11TM750X).**<br><br>**Modified Design: A high capacity, dual 5 HP module oil-less Scroll compressors with 100% duty cycle, with a larger compressor housing with cooling capabilities and an 80 gallon storage tank.** | **The original design for the air compressor that drives the water pumping system, was determined to be undersized and failed multiple times during first system testing and verification.**<br><br>**Because the compressor was identified as a single point of failure and may not meet maximum process requirements, a new higher capacity compressor with backup capability (e.g., operator can easily switch to the backup compressor motor) was specified and installed.**<br><br>**In addition, the higher compressor capacity allows future wellfield/facility expansion, if needed.** |
| **The freeze protection scheme was evaluated and additional features were designed and implemented to insure full system freeze protection.** | **The previous design relied on gravity drains for freeze protection. The treatment facility would shut down and drain at temperatures below 32°F and would require manual restart by a facility operator.**<br><br>**The new design allows the Program Logic Controller to automatically shut down the system just before freezing conditions. This protects the pipes and equipment from damage. The system will automatically restart once the temperature reaches 35 degrees. In addition, a temperature freeze protection valve was added at the flow manifold to protect the flow section, and a vacuum breaker was installed to allow water to feed to the tank in the facility enclosure.** |
| **Original Design: Three 2.5 cubic feet ion-exchange (Sybron SR7) canisters for perchlorate removal.**<br><br>**Modified Design: Three 2.5 cubic feet Sybron SR7 ion-exchange canisters are currently in-place for perchlorate removal. However, when the resin is spent, it will be replaced with Purolite A-532E ion-exchange resin.** | **The manufactor (Sybron) of the SR7 ion-exchange resin has gone out of business since the original uranium ion-exchange resin was placed in the treatment facility. The SR7 resin, once spent, will be replaced with Purolite A-532E ion-exchange resin.** |

**Table F-2. Pit 7-Source Ground Water Extraction and Treatment System Variations from Remedial Design Specifications (continued.)**

| Description of Change | Justification |
|---|---|
| *Treated Effluent Discharge Infiltration Trench* | |
| **Original Design: Infiltration trench configuration/capacity - 4 ft X 10 ft X 80 ft (7,000 gallon capacity [assuming 30% pore space]).**<br><br>**Modified Design: Infiltration trench configuration/capacity - 4 ft X 10 ft X 100 ft (9,000 gallon capacity [assuming 30% pore space])** | **During construction of the infiltration trench, it was decided to increase the length of the trench to increase its capacity because:**<br>**1. The increased capacity will allow for more flexibility if additional extraction wells are needed to optimize cleanup in the future.**<br>**2. Once installed, this component of the system is not easily modified later.** |

**Notes:**

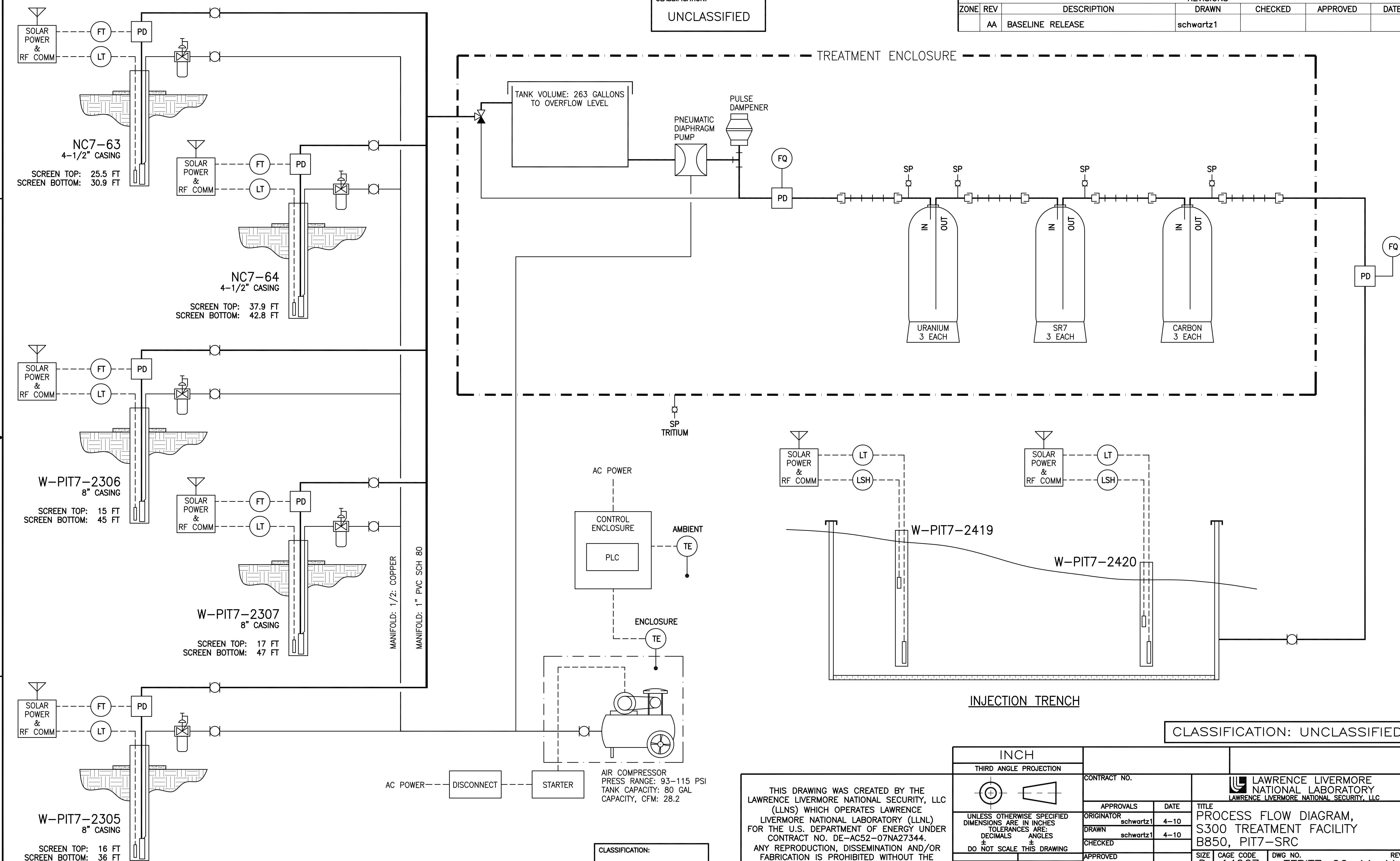
| | |
|---|---|
| ft = | feet. |
| HP = | Horsepower. |
| HSU = | Hydrostratigraphic unit. |
| Hz = | Hertz. |
| Qal/WBR = | Quaternary alluvium/weathered bedrock. |
| V = | Volt. |

# Appendix G

# Pit 7-Source Ground Water Extraction and Treatment System As-Built Drawings

| CLASSIFICATION: |
|---|
| UNCLASSIFIED |

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| ZONE | REV | DESCRIPTION | DRAWN | CHECKED | APPROVED | DATE |
| | AA | BASELINE RELEASE | schwartz1 | | | |




CLASSIFICATION: UNCLASSIFIED

INCH

THIRD ANGLE PROJECTION

THIS DRAWING WAS CREATED BY THE LAWRENCE LIVERMORE NATIONAL SECURITY, LLC (LLNS) WHICH OPERATES LAWRENCE LIVERMORE NATIONAL LABORATORY (LLNL) FOR THE U.S. DEPARTMENT OF ENERGY UNDER CONTRACT NO. DE-AC52-07NA27344. ANY REPRODUCTION, DISSEMINATION AND/OR FABRICATION IS PROHIBITED WITHOUT THE PERMISSION OF COGNIZANT LLNS PERSONNEL.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

| NEXT ASSY | USED ON |
|---|---|
| APPLICATIONS | |

CONTRACT NO.

| APPROVALS | | DATE |
|---|---|---|
| ORIGINATOR | schwartz1 | 4-10 |
| DRAWN | schwartz1 | 4-10 |
| CHECKED | | |
| APPROVED | | |
| ENGINEERING GROUP | | DRAWING LEVEL: II |

LAWRENCE LIVERMORE NATIONAL LABORATORY
LAWRENCE LIVERMORE NATIONAL SECURITY, LLC

TITLE
PROCESS FLOW DIAGRAM, S300 TREATMENT FACILITY B850, PIT7-SRC

| SIZE | CAGE CODE | DWG NO. | REV. |
|---|---|---|---|
| D | 14067 | TFPIT7-06-11-AA | |

| SCALE | NONE | SHEET 1 OF 1 |
|---|---|---|

| CLASSIFICATION: |
|---|
| UNCLASSIFIED |

DRAWING NUMBER TFPIT7-06-11-AA REV SHT 1

DRAWING: TFPIT7-06-11-AA.dwg MODEL: ACAD 2009

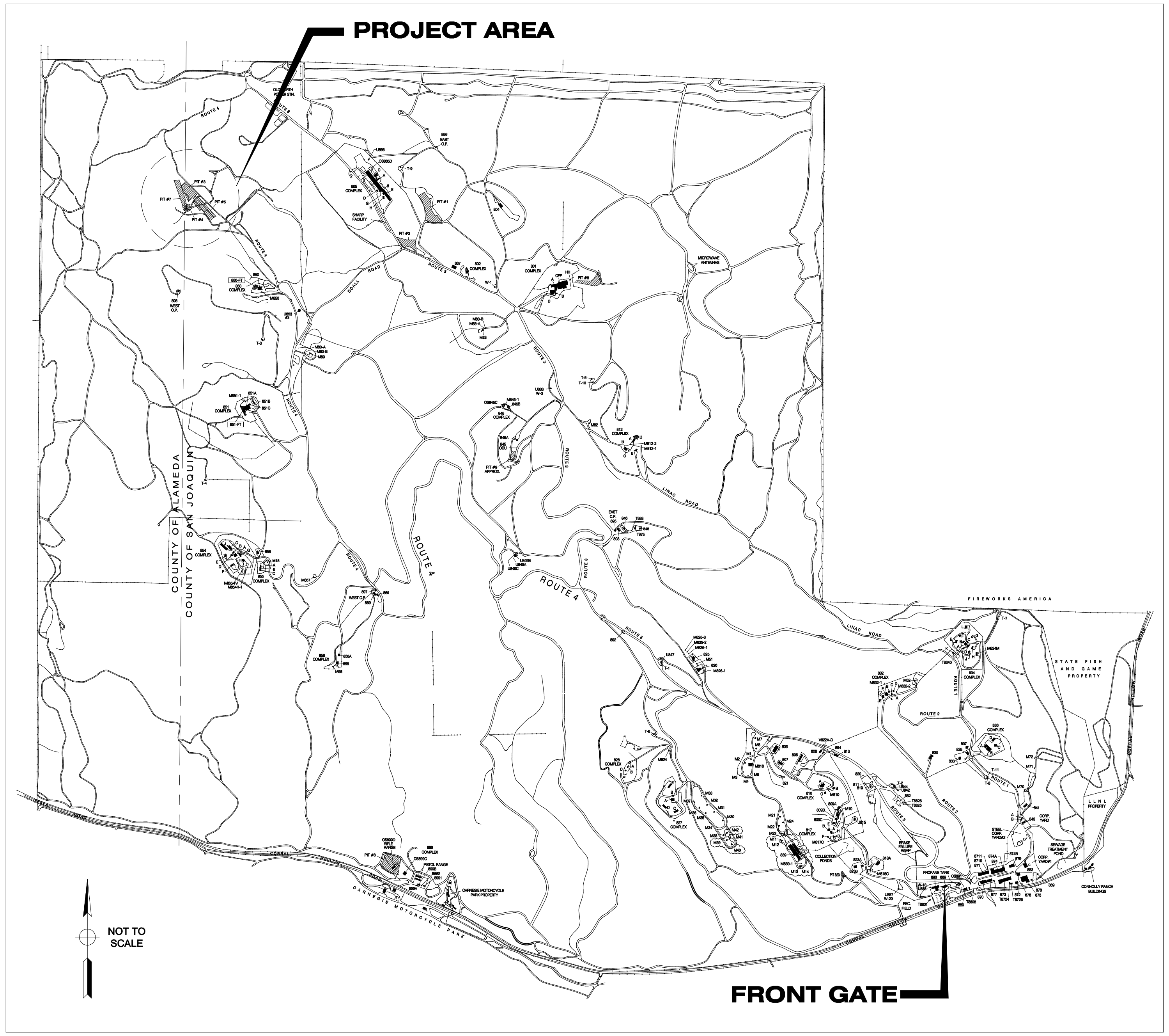
4/12/2010 11:19:27 AM, Check Print Only

# Appendix H

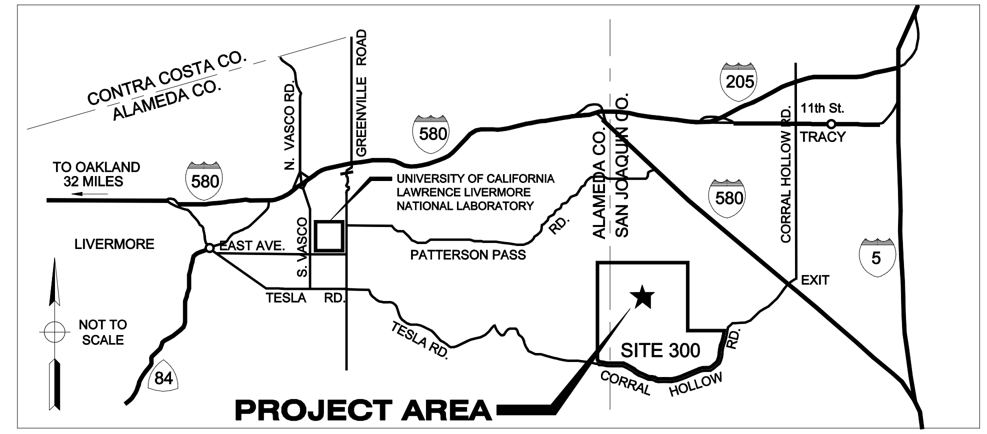
# Pit 7 Complex Drainage Diversion System As-Built Drawings

4 INCHES ON ORIGINAL

# PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM




## LOCATION MAP - SITE 300




## VICINITY MAP

## DRAWING INDEX

| DRAWING NO. | SHEET NO. | DRAWING TITLE |
|---|---|---|
| PSZ2007-0300-0001DA | T-1 | VICINITY MAP, LOCATION MAP, AND DRAWING INDEX |
| PSZ2007-0300-0002DA | C-1 | SITE IMPROVEMENT PLAN |
| PSZ2007-0300-0003DA | C-2 | DRAINAGE PLAN AND PROFILE |
| PSZ2007-0300-0004DA | C-3 | DRAINAGE PLAN AND PROFILE |
| PSZ2007-0300-0005DA | C-4 | CIVIL DETAILS |
| PSZ2007-0300-0006DA | C-5 | CIVIL DETAILS |
| PSZ2007-0300-0007DA | C-6 | CIVIL DETAILS |
| PSZ2007-0300-0008DA | C-7 | CIVIL DETAILS |
| PSZ2007-0300-0009DA | C-8 | CIVIL DETAILS |
| PSZ2007-0300-0010DA | S-1 | ABBREVIATIONS, LEGEND, AND GENERAL STRUCTURAL NOTES |
| PSZ2007-0300-0011DA | S-2 | TYPICAL STRUCTURAL DETAILS |
| PSZ2007-0300-0012DA | S-3 | SETTLING BASIN PLAN |
| PSZ2007-0300-0013DA | S-4 | STRUCTURAL DETAILS |

| RELEASED FOR CONSTRUCTION | | |
|---|---|---|
| PE Dept. Head: | MARK SUEKSDORF | Date: 9/21/07 |

| APPROVED BY | | |
|---|---|---|
| Client: | LESLIE FERRY | Date: 9/20/07 |
| Proj. Manager: | JUDY HOUDESHELL | Date: 9/20/07 |
| Design: | MEL VILLEGAS | Date: 9/20/07 |

CONSTRUCTION MANAGER: STEVEN SHIH 9/20/07

| REVIEWED BY | | |
|---|---|---|
| M & O: | ERIC FRAHM | Date: 9/20/07 |
| Haz. Ctrl: | JIM FORTE | Date: 9/20/07 |
| Security | PAUL FINK | Date: 9/20/07 |
| S & S P: | SUE BYARS | Date: 9/21/07 |

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

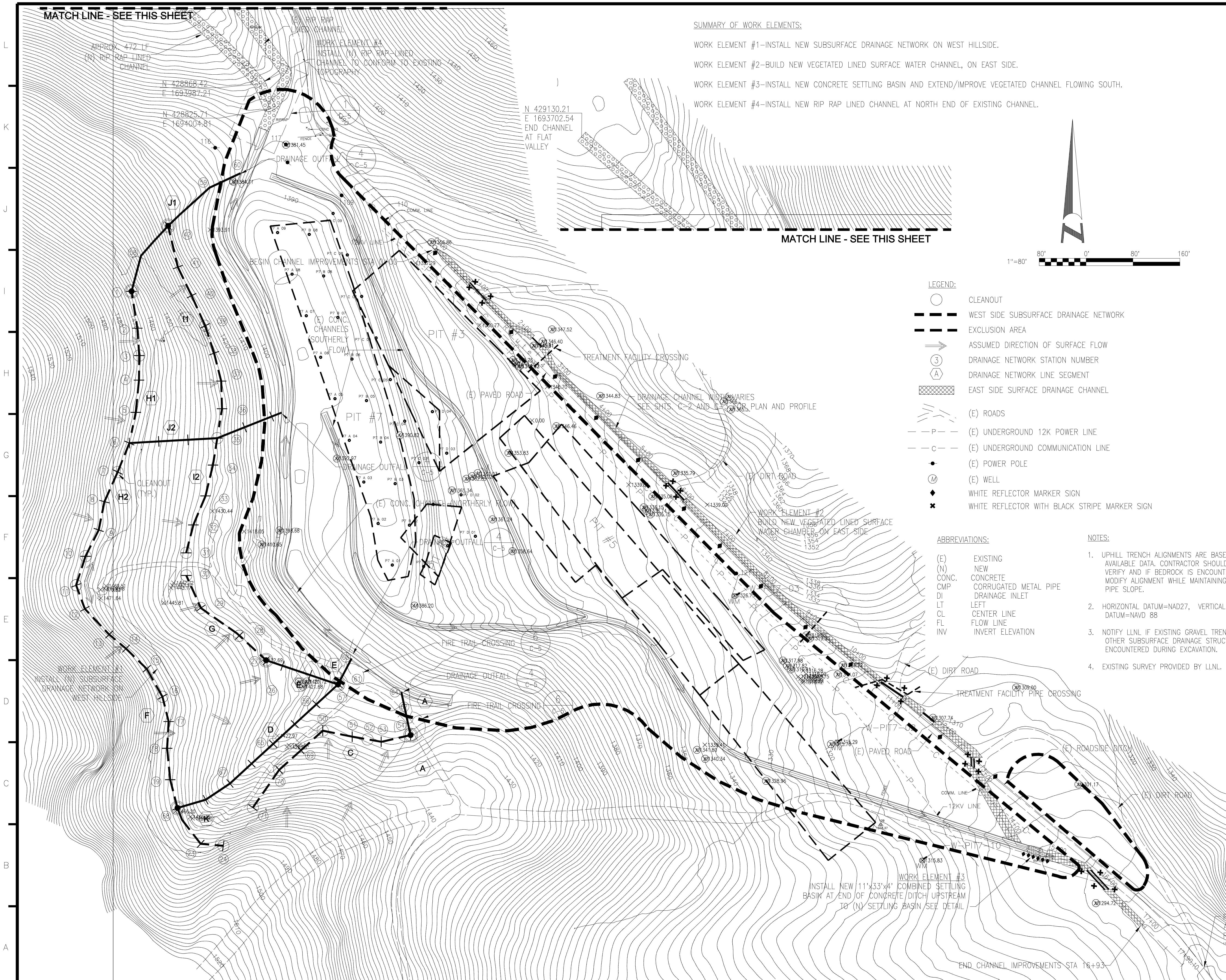
PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

VICINITY MAP, LOCATION MAP, AND DRAWING INDEX

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |

Dwg. No. PSZ2007-0300-0001DA Sht. No. T-1 1 of 13

FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED: ---- - ----




SUMMARY OF WORK ELEMENTS:

WORK ELEMENT #1–INSTALL NEW SUBSURFACE DRAINAGE NETWORK ON WEST HILLSIDE.

WORK ELEMENT #2–BUILD NEW VEGETATED LINED SURFACE WATER CHANNEL, ON EAST SIDE.

WORK ELEMENT #3–INSTALL NEW CONCRETE SETTLING BASIN AND EXTEND/IMPROVE VEGETATED CHANNEL FLOWING SOUTH.

WORK ELEMENT #4–INSTALL NEW RIP RAP LINED CHANNEL AT NORTH END OF EXISTING CHANNEL.

LEGEND:

- CLEANOUT
- WEST SIDE SUBSURFACE DRAINAGE NETWORK
- EXCLUSION AREA
- ASSUMED DIRECTION OF SURFACE FLOW
- (3) DRAINAGE NETWORK STATION NUMBER
- (A) DRAINAGE NETWORK LINE SEGMENT
- EAST SIDE SURFACE DRAINAGE CHANNEL
- (E) ROADS
- —P— (E) UNDERGROUND 12K POWER LINE
- —C— (E) UNDERGROUND COMMUNICATION LINE
- (E) POWER POLE
- (M) (E) WELL
- WHITE REFLECTOR MARKER SIGN
- WHITE REFLECTOR WITH BLACK STRIPE MARKER SIGN

ABBREVIATIONS:

| | |
|---|---|
| (E) | EXISTING |
| (N) | NEW |
| CONC. | CONCRETE |
| CMP | CORRUGATED METAL PIPE |
| DI | DRAINAGE INLET |
| LT | LEFT |
| CL | CENTER LINE |
| FL | FLOW LINE |
| INV | INVERT ELEVATION |

NOTES:

1. UPHILL TRENCH ALIGNMENTS ARE BASED ON AVAILABLE DATA. CONTRACTOR SHOULD FIELD VERIFY AND IF BEDROCK IS ENCOUNTERED SHOULD MODIFY ALIGNMENT WHILE MAINTAINING POSITIVE PIPE SLOPE.
2. HORIZONTAL DATUM=NAD27, VERTICAL DATUM=NAVD 88
3. NOTIFY LLNL IF EXISTING GRAVEL TRENCHES OR OTHER SUBSURFACE DRAINAGE STRUCTURES ARE ENCOUNTERED DURING EXCAVATION.
4. EXISTING SURVEY PROVIDED BY LLNL.

4 INCHES ON ORIGINAL

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | KO | AA | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY
CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

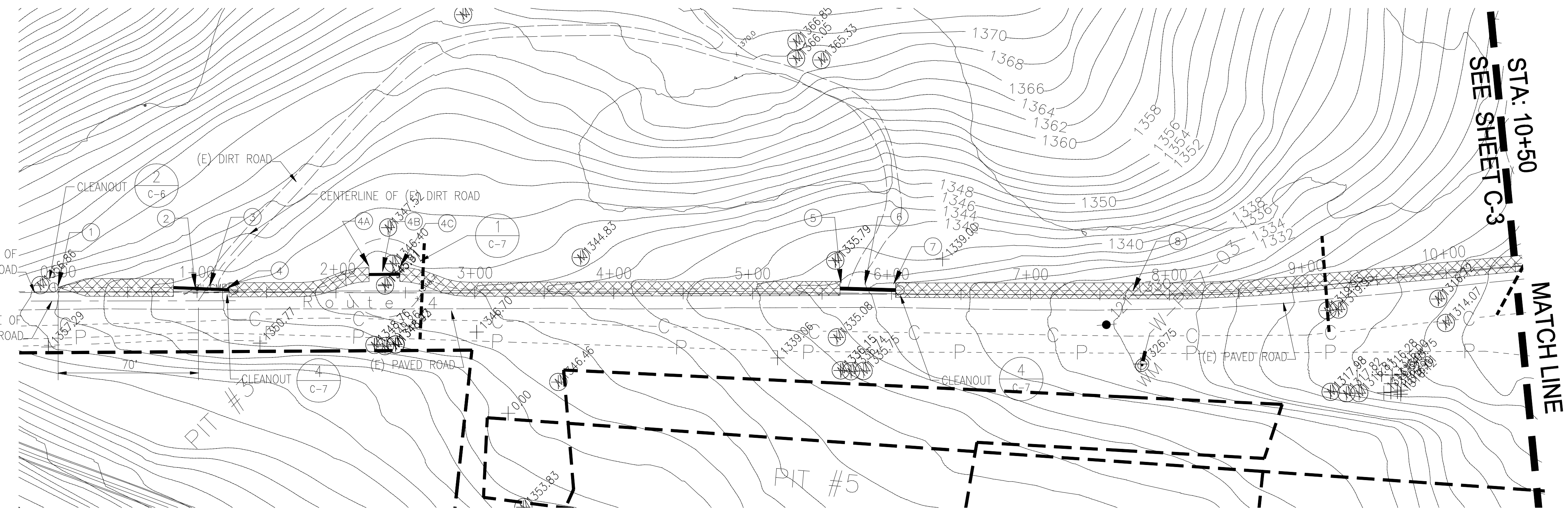
PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

SITE IMPROVEMENT PLAN

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: AS SHOWN |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-14-07 | S/W: AUTOCAD 2006 |
| Dwg. No. PSZ2007-0300-0002DA | | Sht. No. C-1 2 of 13 |

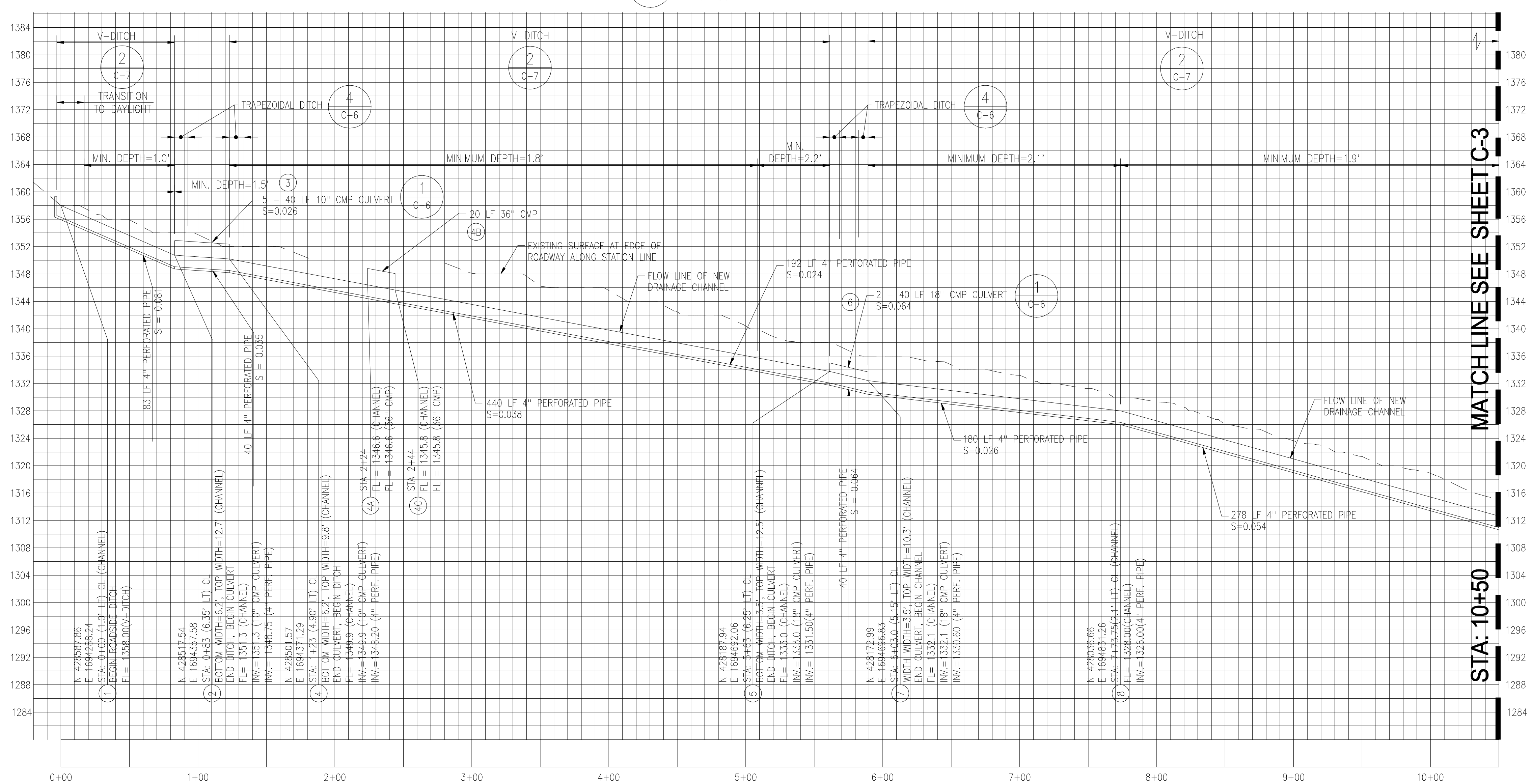
FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB-SITE.dwg DATE PLOTTED:

4 INCHES ON ORIGINAL




1 DRAINAGE – PLAN
1"=50'

1"=50'




2 DRAINAGE – PROFILE
1"=50' H 1"=10' V

NOTES:

1. CHANNEL WIDTH INCREASES/DECREASES LINEARLY BETWEEN CROSSINGS.
2. CONTRACTOR SHALL RELOCATE POWER POLES IF THE POWER POLES INTERFERE WITH NEW DRAINAGE CHANNELS.

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY
CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

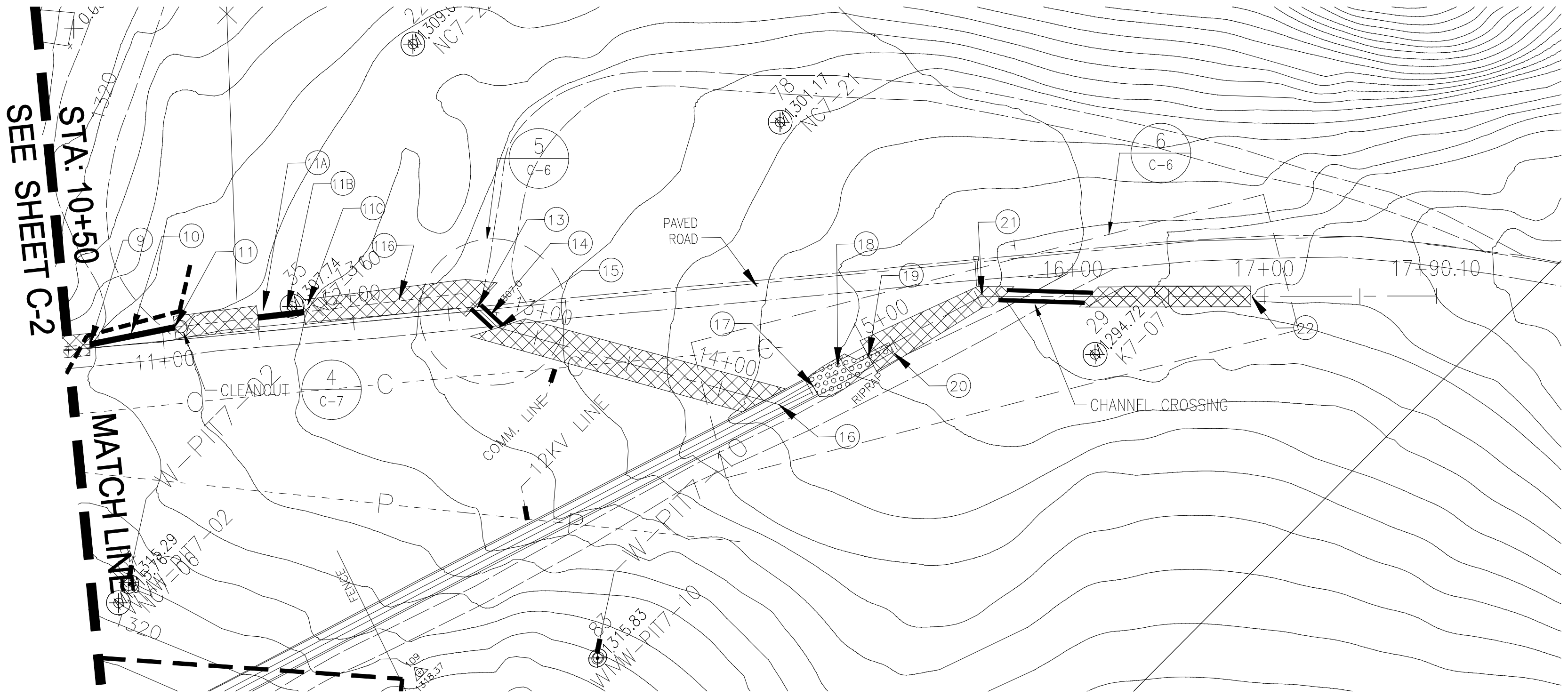
DRAINAGE PLAN AND PROFILE

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: AS SHOWN |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |
| Dwg. No. PSZ2007-0300-0003DA | | Sht. No. C-2 3 of 13 |

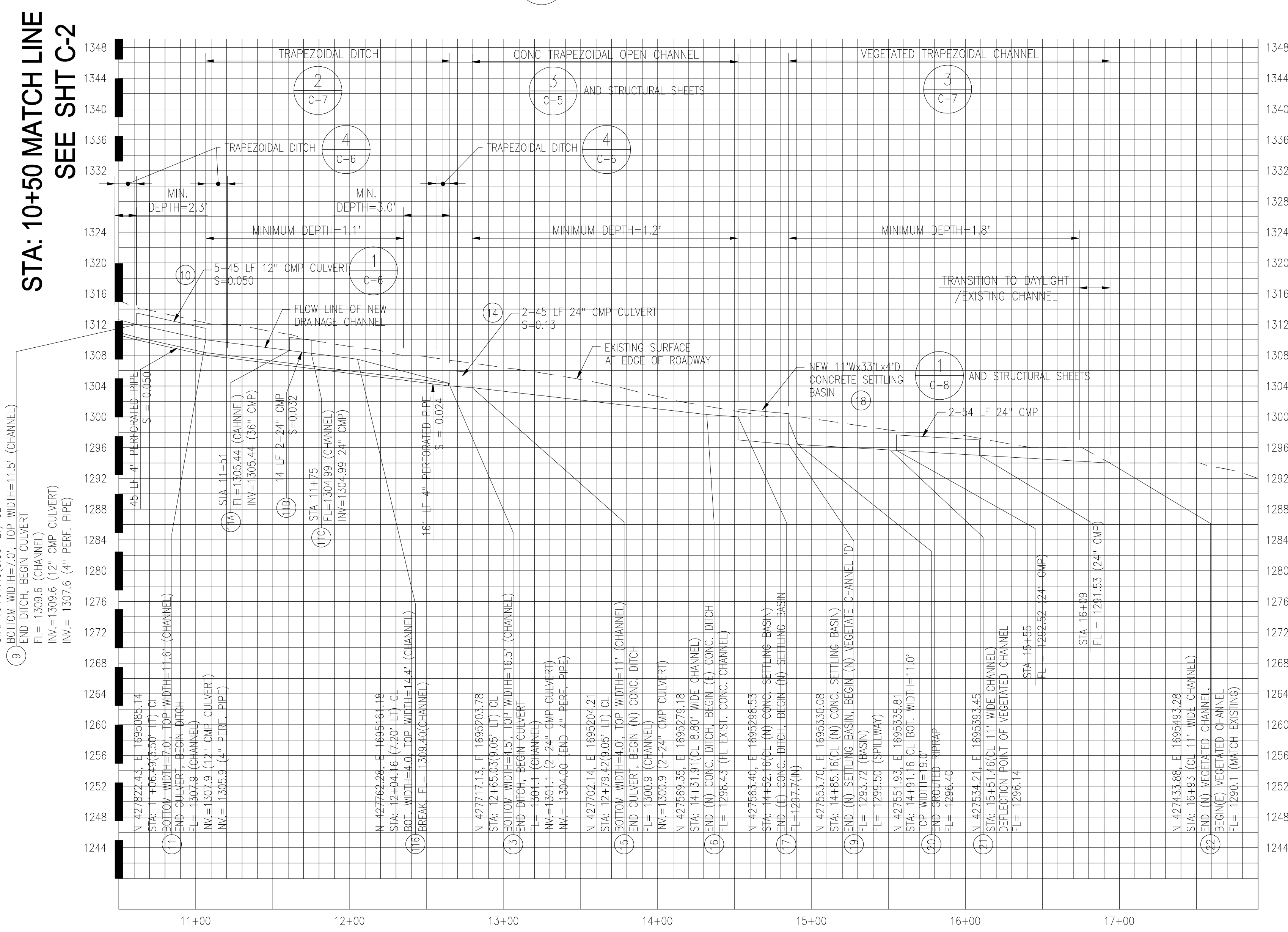
FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED:

4 INCHES ON ORIGINAL

1"=50'




1 DRAINAGE - PLAN
1"=50'




2 DRAINAGE - PROFILE
1"=50' H 1"=10' V

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY
CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

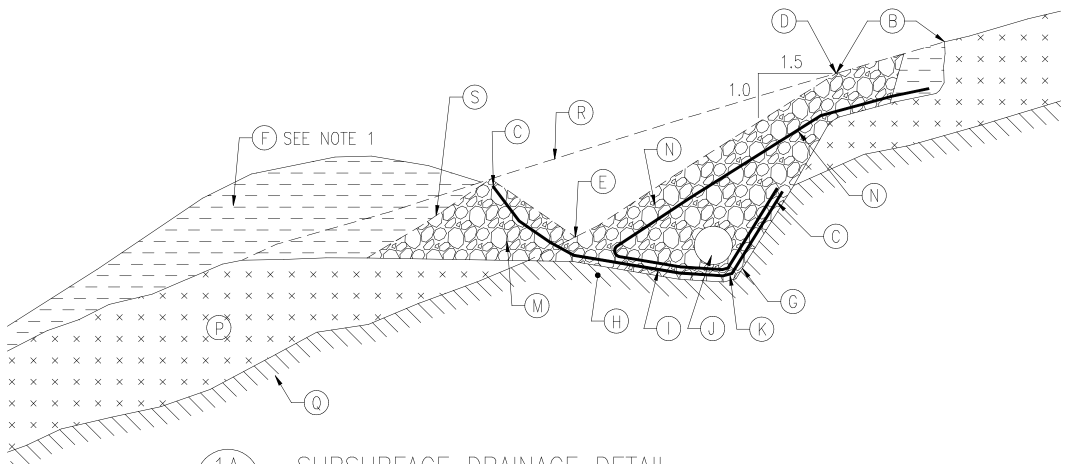
Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

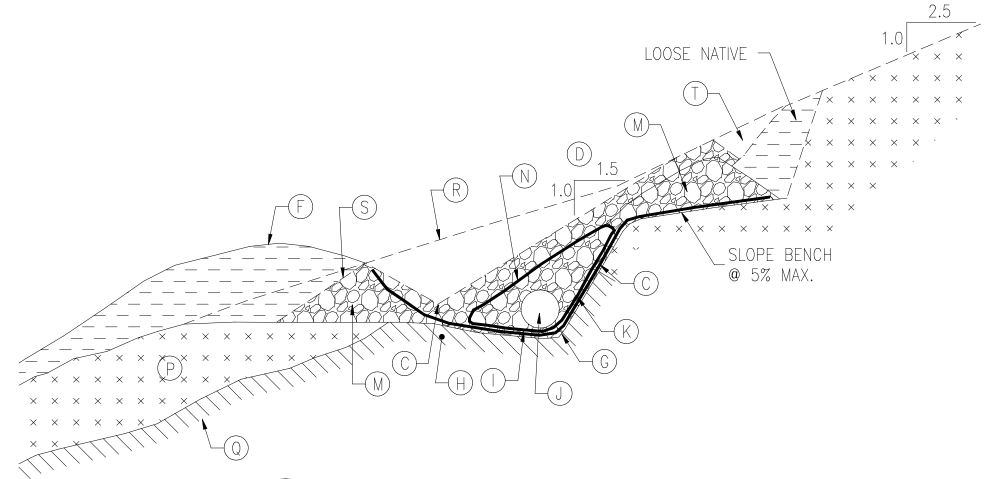
DRAINAGE PLAN AND PROFILE

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: AS SHOWN |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |
| Dwg. No. PSZ2007-0300-0004DA | Sht. No. C-3 | 4 of 13 |

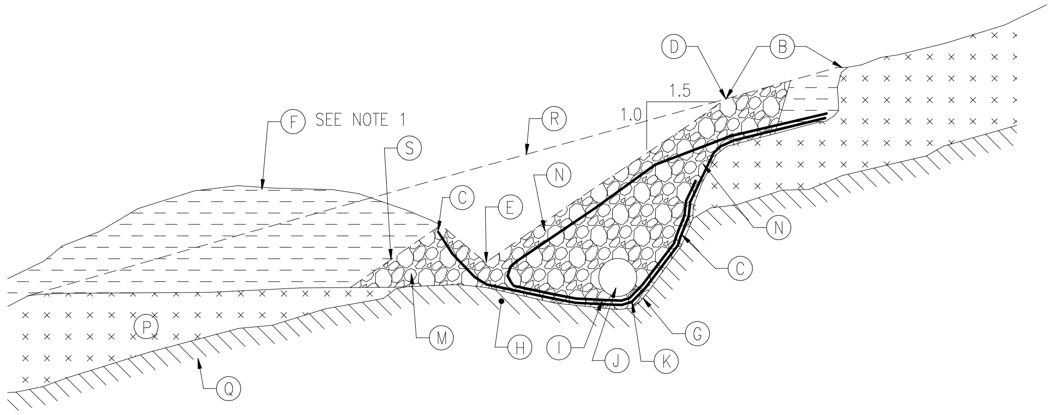
FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED: ---- - ----



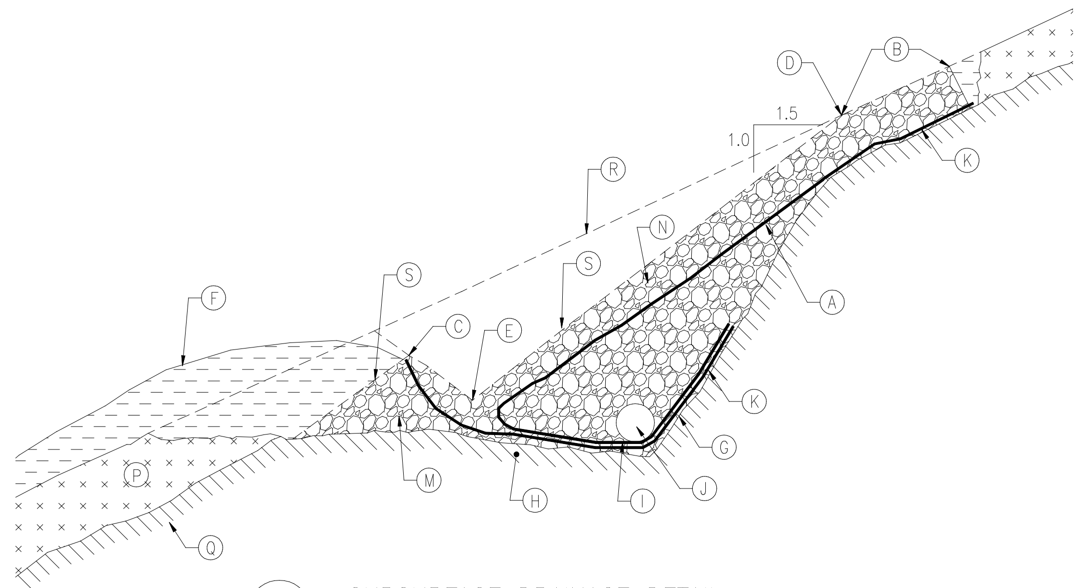

1A SUBSURFACE DRAINAGE DETAIL
NOT TO SCALE



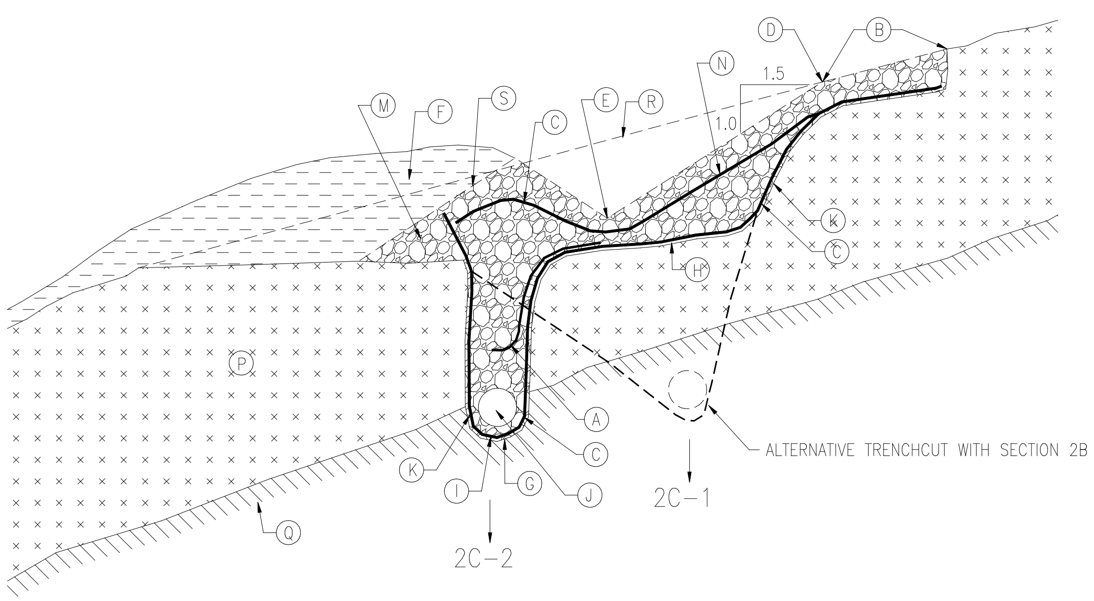

1A SUBSURFACE DRAINAGE DETAIL – REVISED
NOT TO SCALE



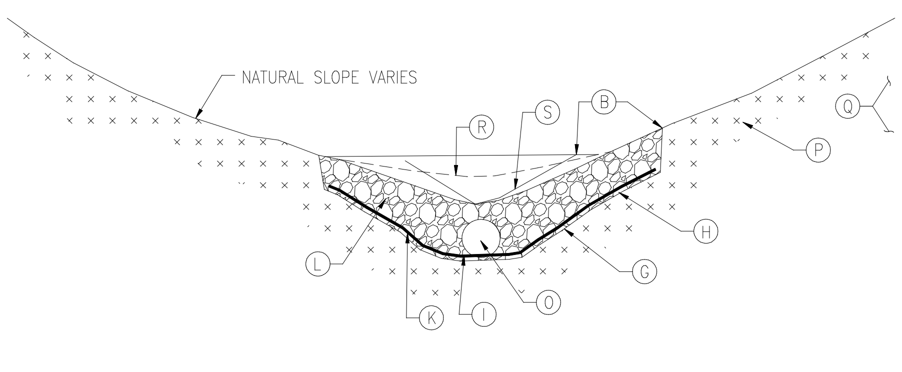

2A SUBSURFACE DRAINAGE DETAIL
NOT TO SCALE




2B SUBSURFACE DRAINAGE DETAIL
NOT TO SCALE




2C SUBSURFACE DRAINAGE DETAIL
NOT TO SCALE




3A SUBSURFACE DRAINAGE DETAIL
NOT TO SCALE

4 INCHES ON ORIGINAL

KEYNOTES:

A. IMPERMEABLE FABRIC TO EXTEND 1 FOOT PAST COLLUVIAL / BEDROCK CONTACT OR TO CENTER LINE OF PERF DRAIN PIPE.

B. SILT RAMP TO MATCH GRADE WITH NATIVE SLOPE MINIMUM 2 FEET UPSLOPE OF BENCH CUT SLOPE TOP EDGE. UP SLOPE 6" OF RAMP TO BE NATIVE SOIL, REMAINDER TO BE ANGULAR AGGREGATE. ALL FABRICS ARE TO BE COVERED BY NO LESS THAN 12" OF FILTER AGGREGATE ON SILT RAMP. MINIMUM OF 6" IN OTHER APPLICATIONS.

C. BREAK IN NATURAL SLOPE TO 1:1.5 SLOPE BEGINS AT EDGE OF SILT RAMP.

D. IMPERMEABLE FABRIC TO RISE TO WITHIN NO MORE THAN 6" BELOW COLLUVIAL / BEDROCK CONTACT AND ABOVE TOP OF PIPE.

E. FLOW LINE OF V–DITCH TO BE NO LESS THAN 6" ABOVE BENCH CUT.

F. COMPACT TO MATCH NATIVE SOIL OR BETTER (SEE NOTE 1).

G. USE NATIVE SANDY SOIL TO SMOOTH SURFACE TO PROTECT IMPERMEABLE FABRIC FROM NATIVE ROCK UP TO 6" ABOVE TOP OF PERF PIPE.

H. USE NATIVE SANDY SOIL TO GRADE SLOPE TOWARDS PERF PIPE OR GRADE CUT FOR SLOPE.

I. TAP AROUND TO SET PIPE DIRECTLY ON IMPERMEABLE FABRIC.

J. FLEXIBLE PERFORATED PIPE (SEE TABLE 1, SHEET C–6 FOR DIAMETER).

K. IMPERMEABLE FABRIC (AGRU 60 MIL HDPE LINER OR APPROVED EQUAL).

L. 3" TO 5" ANGULAR DRAIN ROCK.

M. 1 $\frac{1}{2}$" ANGULAR FILTER AGGREGATE TO BE USED IN ALL FILTER AGGREGATE APPLICATIONS.

N. PERMEABLE FILTER FABRIC MIRAFI 180N.

O. FLEXIBLE NON–PERFERATED PIPE (SEE TABLE 1, SHEET C–6 FOR DIAMETER).

P. NATIVE COLLUVIAL SOIL.

Q. NATIVE BEDROCK.

R. ORIGINAL GROUND SURFACE

S. 1.0 VERTICAL:1.5 HORIZONTAL.

T. SEDITRAP.

NOTE 1:

- ITEM 'F' WILL BE CONSTRUCTED ACCORDING TO SPECIFICATION 02200–3.05 D WITH MULTIPLE LIFTS.
- THE FINAL LIFT WILL BE COMPACTED SUITABLE FOR HYDROSEEDING FOLLOWED BY EROSION CONTROL BLANKET.
- THE TOE AREA OF THE EROSION CONTROL BLANKET WILL BE SCARIFIED AS REQUIRED.
- CLARIFY KEYNOTE 'C' FOR THE DOWNSLOPE SIDE OF THE IMPERMEABLE FABRIC.

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER&KELLY
CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

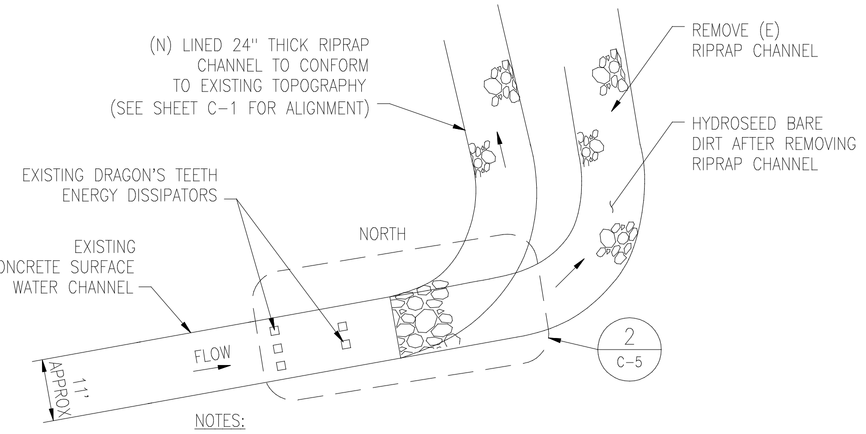
# PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

## CIVIL DETAILS

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09–12–07 | Scale: |
| Dwn: VHS | 09–13–07 | PFNID: 300–2007–001 |
| Chk: SRR | 09–12–07 | S/W: AUTOCAD 2006 |
| Dwg. No. PSZ2007-0300-0005DA | | Sht. No. C-4 5 of 13 |

FILE NAME: P:\Projects\07\03398–07–001 Cerrudo LLNL\CAD\5–AS–BUILTS\X–LLNL–TB.dwg DATE PLOTTED:

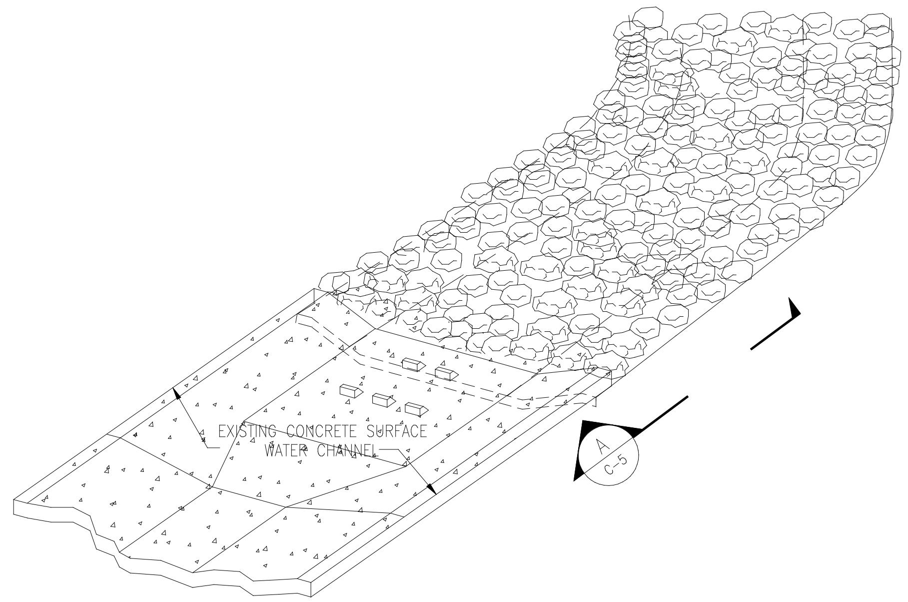
4 INCHES ON ORIGINAL



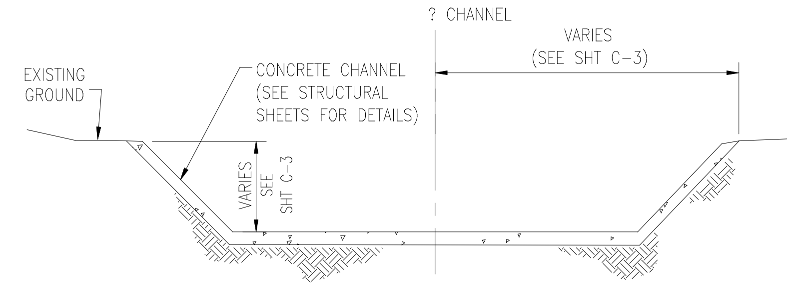

NOTES:

1. RE-USE (E) RIPRAP FROM (E) CHANNEL FOR (N) CHANNEL,
2. USE EXCAVATED MATERIAL FROM (N) CHANNEL TO FILL (E) CHANNEL BEFORE HYDROSEEDING.

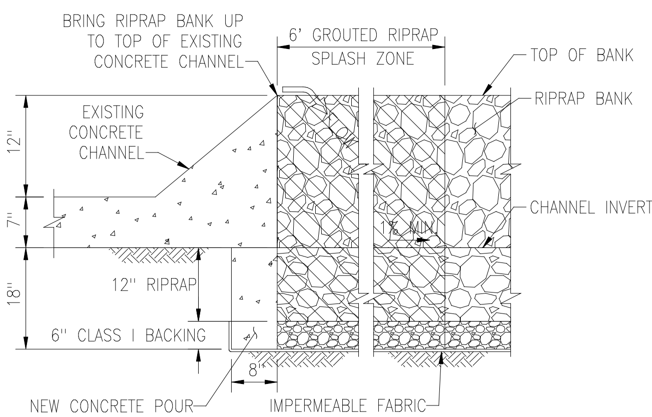
1 / C-1 NORTH SIDE RIPRAP CHANNEL
NOT TO SCALE



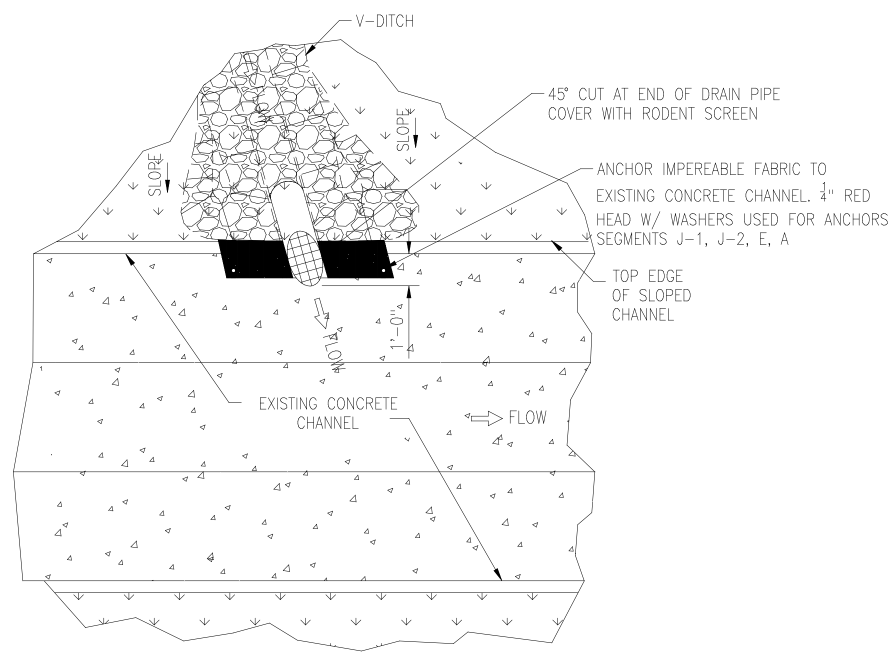

2 / C-5 NORTH CONCRETE CHANNEL
NOT TO SCALE



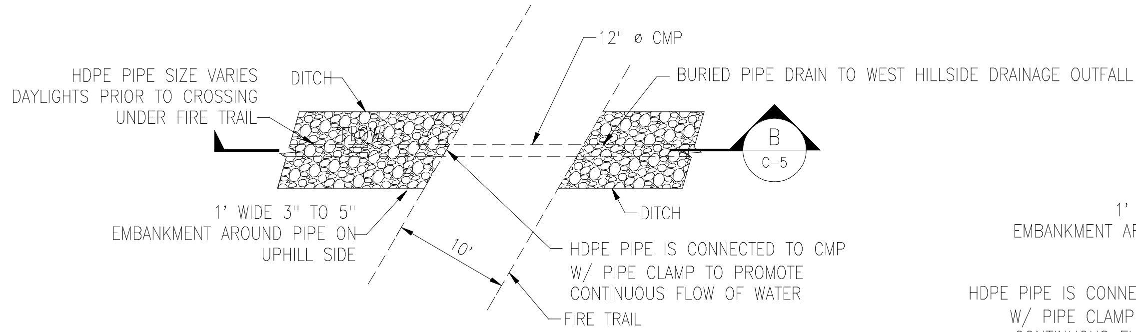

3 / C-3 SOUTH CONCRETE OPEN CHANNEL
C-5
NOT TO SCALE



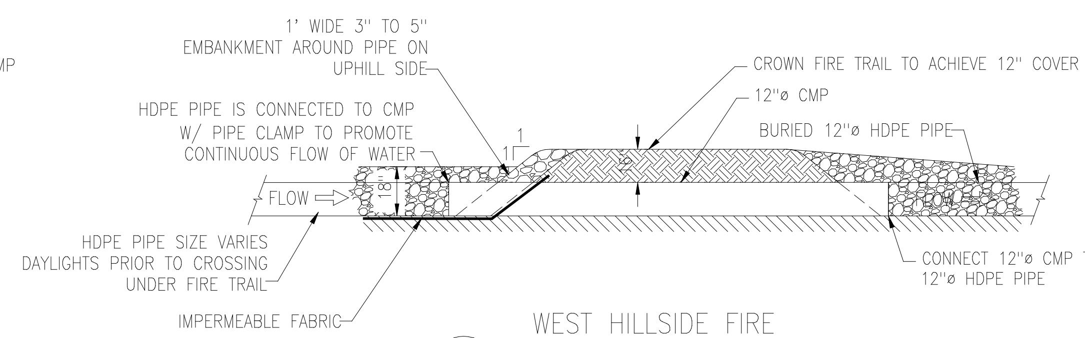

A / C-5 NORTH SECTION
NOT TO SCALE




4 / C-1 DRAINAGE OUTFALL
NOT TO SCALE




6 / C-1 WEST HILLSIDE FIRE TRAIL CROSSING LINES A & E
NOT TO SCALE




B / C-5 WEST HILLSIDE FIRE TRAIL CROSSING LINES A & E
NOT TO SCALE

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

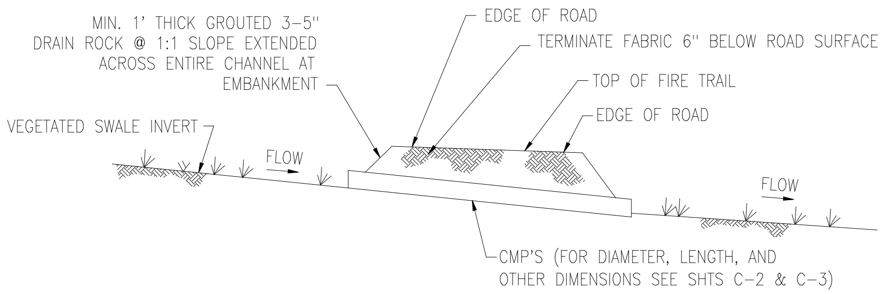
# PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

## CIVIL DETAILS

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |
| Dwg. No PSZ2007-0300-0006DA | | Sht. No. C-5 6 of 13 |

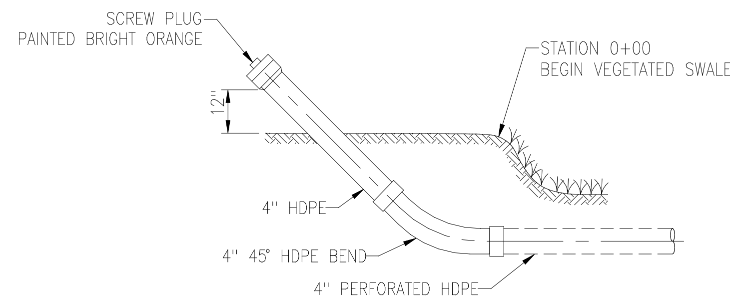
FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED: ---- - ----

4 INCHES ON ORIGINAL



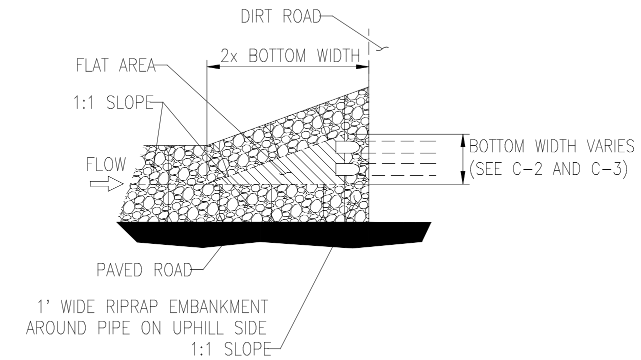

1 C-2 C-3 CULVERT EMBANKMENT DETAIL FOR EAST SIDE FIRE TRAIL CROSSING AT STA 1+00, 5+70, AND 10+60 (APPROX.)

NOT TO SCALE




2 C-2 C-4 EASTSIDE VEGETATED SWALE CLEANOUT DETAIL

NOT TO SCALE




4 C-2 C-3 FIRE TRIAL CROSSING – TRANSITION DETAIL

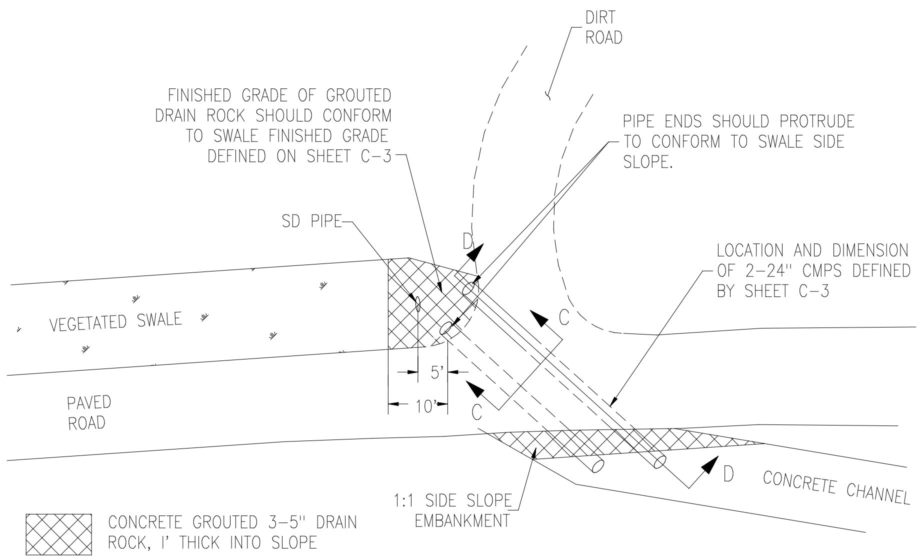
NOT TO SCALE

TABLE 1

| TRENCH SEGMENT | TYPE | PIPE DIAMETER (IN.) | TRENCH WIDTH (IN.) |
|---|---|---|---|
| PERFORATED PIPE | | | |
| B | V-DITCH | | |
| | PIPE | 8 | 18 |
| C | V-DITCH | | |
| | PIPE | 6 | 18 |
| F | V-DITCH | | |
| | PIPE | 12 | 24 |
| G | V-DITCH | | |
| | PIPE | 8 | 18 |
| H | V-DITCH | | |
| | PIPE | 12 | 24 |
| I | V-DITCH | | |
| | PIPE | 12 | 24 |
| K | V-DITCH | | |
| | PIPE | 12 | 24 |
| L | V-DITCH | | |
| | PIPE | 8 | 18 |
| NON-PERFORATED PIPE | | | |
| A | V-DITCH | | 18 |
| | PIPE | 6 | |
| D | V-DITCH | | 24 |
| | PIPE | 12 | |
| E | V-DITCH | | 30 |
| | PIPE | 18 | |
| J (ABOVE I) | V-DITCH | | 18 |
| | PIPE | 8 | |
| J (BELOW I) | V-DITCH | | 24 |
| | PIPE | 12 | |

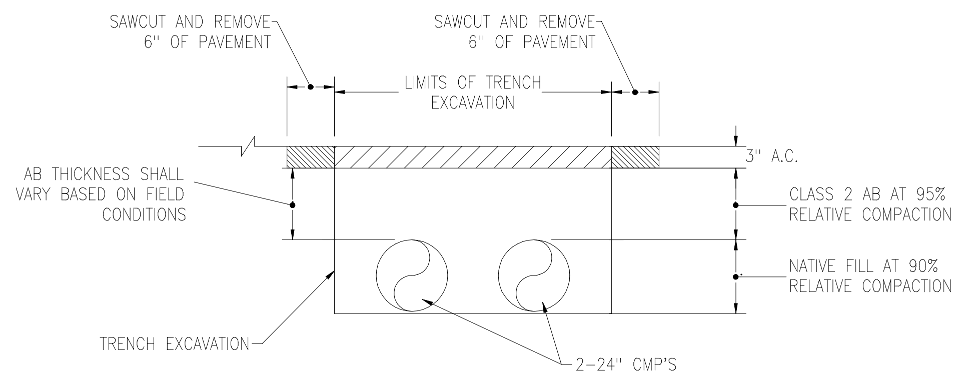
NOTES:

1. CONTRACTOR SHALL ENSURE THAT MIN. GRAVEL SIZE IS GREATER THAN WIDTH OF PIPE PERFORATIONS.

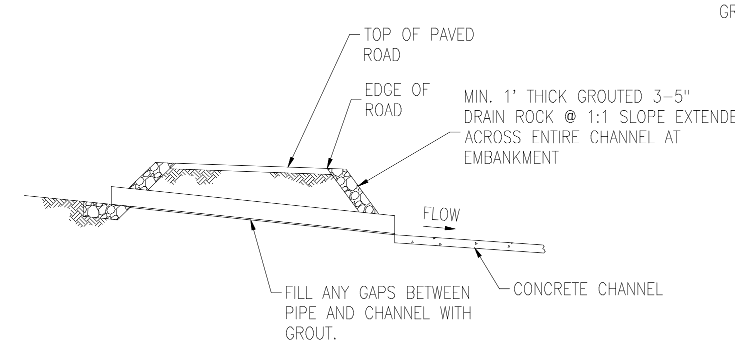



5 C-3 2-24" CMPS AND ROAD CROSSING DETAIL

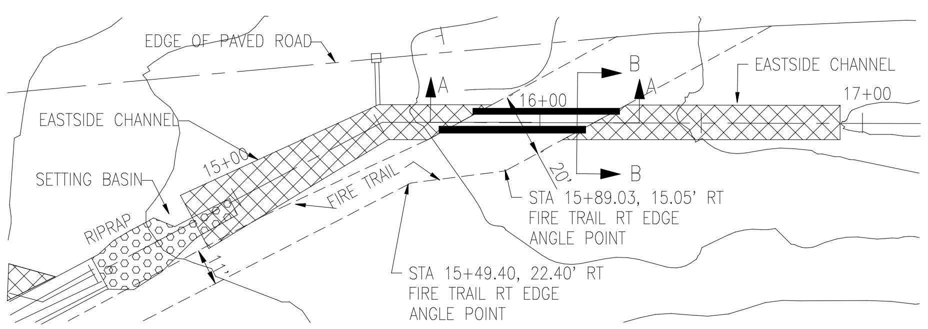
NOT TO SCALE

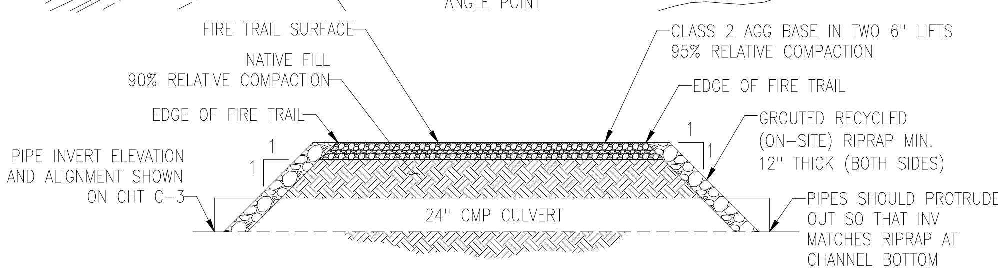



SECTION C–C

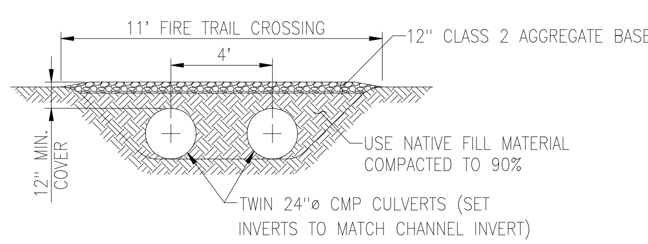



SECTION D–D




SECTION A–A




SECTION B–B

6 C-3 FIRE TRAIL WIDENING DETAIL

NOT TO SCALE

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

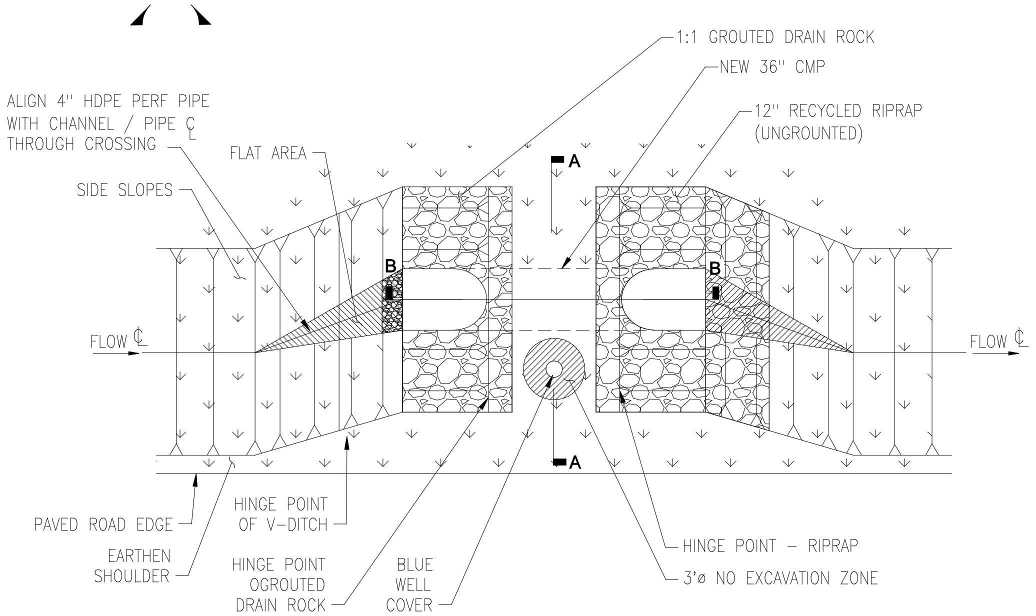
PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

CIVIL DETAILS

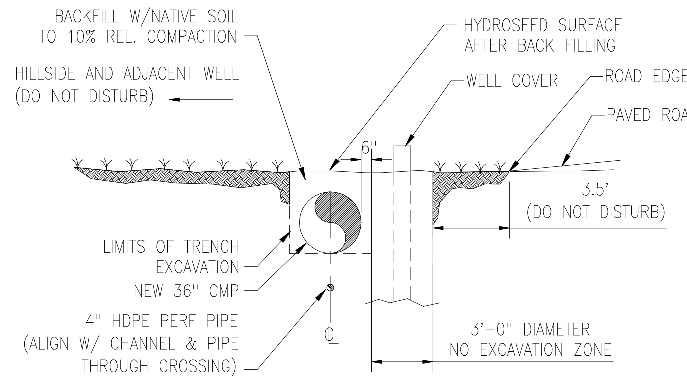
| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |
| Dwg. No. PSZ2007-0300-0007DA | | Sht. No. C-6 7 of 13 |

FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED: ---- -- ----

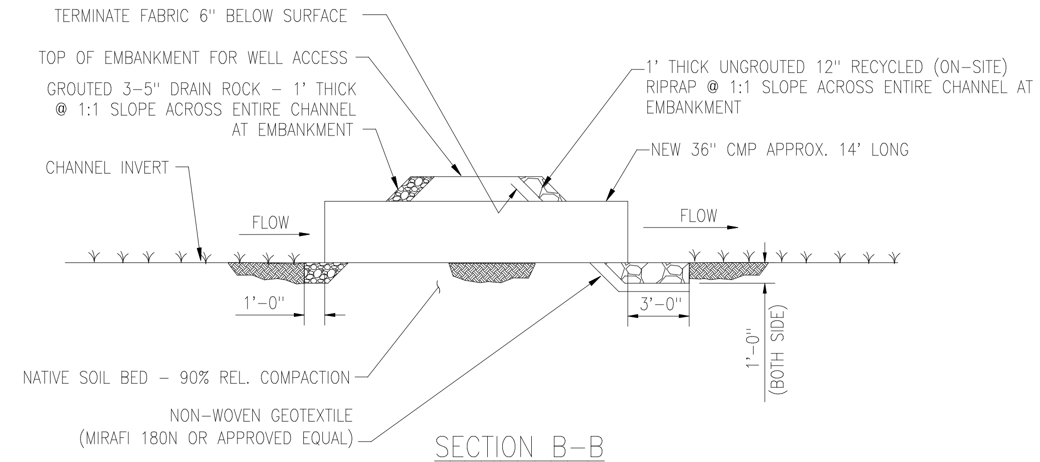
4 INCHES ON ORIGINAL




PLAN VIEW




SECTION A-A

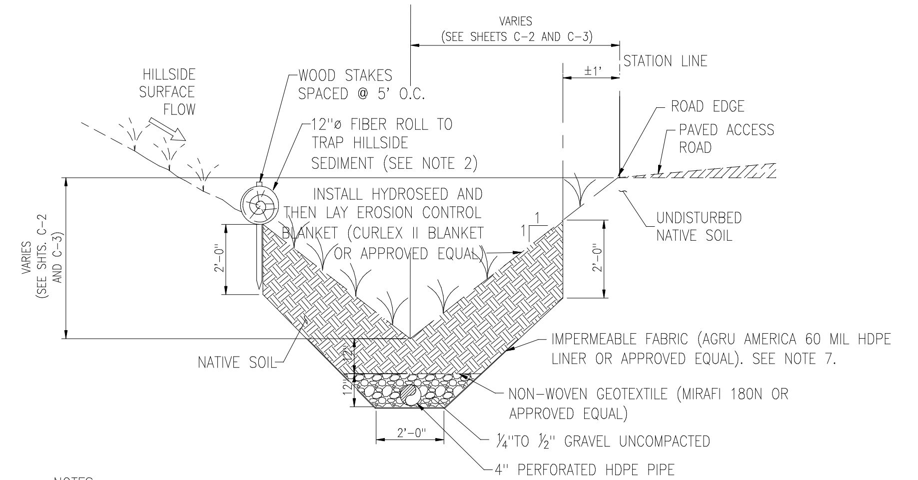



SECTION B-B

NOTE:

1. U/S AND P/S V-DITCH DIMENSIONS AND DEPTH ARE SHOWN ON SHT. NO. C-2.

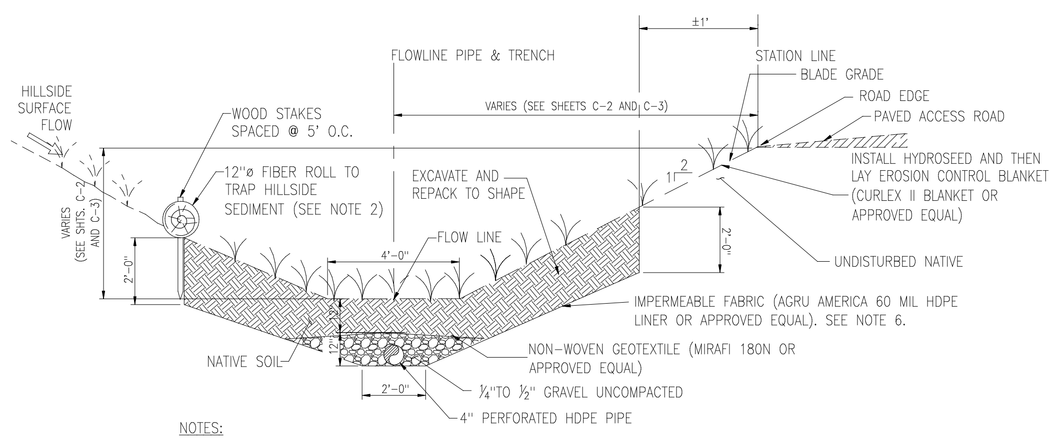
1 / C-1 WELL CROSSING @ STATION 2+50 (AFPR)
NOT TO SCALE




NOTES:

1. CONTRACTOR SHALL TAKE SPECIAL PRECAUTION WHEN EXCAVATING NEAR ADJACENT POWER POLES SHOWN ON SHEET C-1.
2. FIBER ROLL MAKE AND MODEL: NEDIA ENTERPRISES, COCONUT FIBER LOG, "KOIR LOG 12" OR APPROVED EQUAL. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
3. AT ROAD CROSSINGS PROVIDE FLAT BOTTOM WIDTH EQUAL TO CULVERT DIA. FOR 2-3 FT. THEN TRANSITION TO V-DITCH CROSS SECTION.
4. SEE DETAIL 2 SHEET C-6 FOR CLEANOUT DETAIL.
5. CONTRACTOR SHALL MAINTAIN A 3' RADIUS OF NON-VEGETATED AREA AROUND POWER POLES IN THIS AREA. RIP-RAP SHALL BE PLACED A MINIMUM OF 6" BELOW GROUND SURFACE AND A MAXIMUM OF 6" ABOVE GROUND SURFACE.
6. CONTRACTOR SHALL INSTALL THE EROSION CONTROL BLANKET PER MANUFACTURER'S RECOMMENDATION.
7. IMPERMEABLE FABRIC ONLY EXTENDS UP TO 24" FROM THE BOTTOM OF THE SWALE.

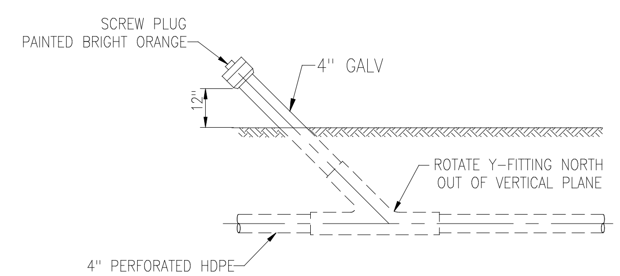
2 / C-2 V-DITCH VEGETATED SWALES
NOT TO SCALE




NOTES:

1. CONTRACTOR SHALL TAKE SPECIAL PRECAUTION WHEN EXCAVATING NEAR ADJACENT POWER POLES SHOWN ON SHEET C-1.
2. FIBER ROLL MAKE AND MODEL: NEDIA ENTERPRISES, COCONUT FIBER LOG, "KOIR LOG 12" OR APPROVED EQUAL. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
3. SEE DETAIL 2 SHEET C-6 FOR CLEANOUT DETAIL.
4. CONTRACTOR SHALL MAINTAIN A 3' RADIUS OF NON-VEGETATED AREA AROUND POWER POLES IN THIS AREA. RIP-RAP SHALL BE PLACED A MINIMUM OF 6" BELOW GROUND SURFACE AND A MAXIMUM OF 6" ABOVE GROUND SURFACE.
5. CONTRACTOR SHALL INSTALL THE EROSION CONTROL BLANKET PER MANUFACTURER'S RECOMMENDATION.
6. IMPERMEABLE FABRIC ONLY EXTENDS UP TO 24" FROM THE BOTTOM OF THE SWALE.

3 / C-3 TRAPEZOIDAL DITCH VEGETATED SWALES REACHES
NOT TO SCALE




4 / C-3 INTERMEDIATE CLEANOUT DETAIL
NOT TO SCALE

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

CIVIL DETAILS

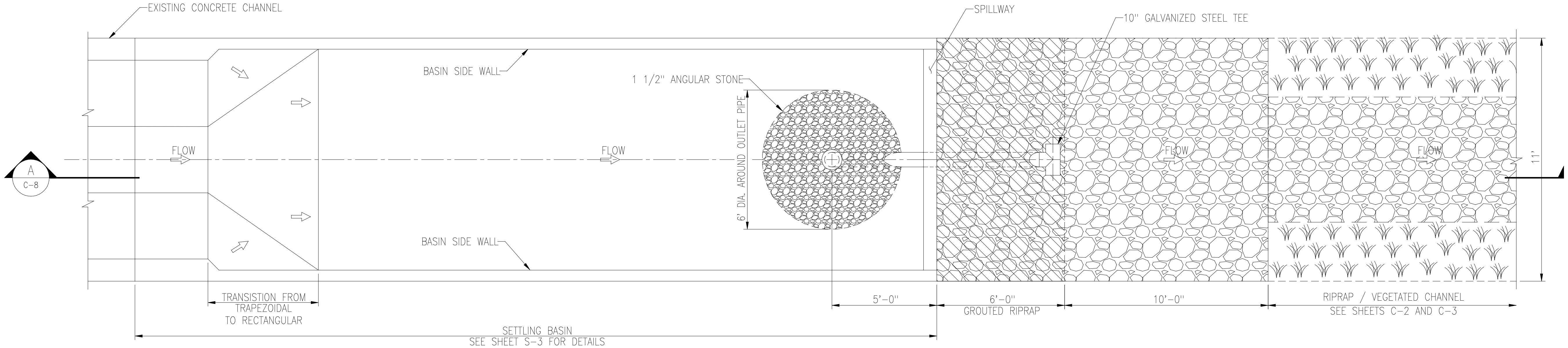
| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |
| Dwg. No. PSZ2007-0300-0008DA | | Sht. No. C-7 8 of 13 |

FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED:

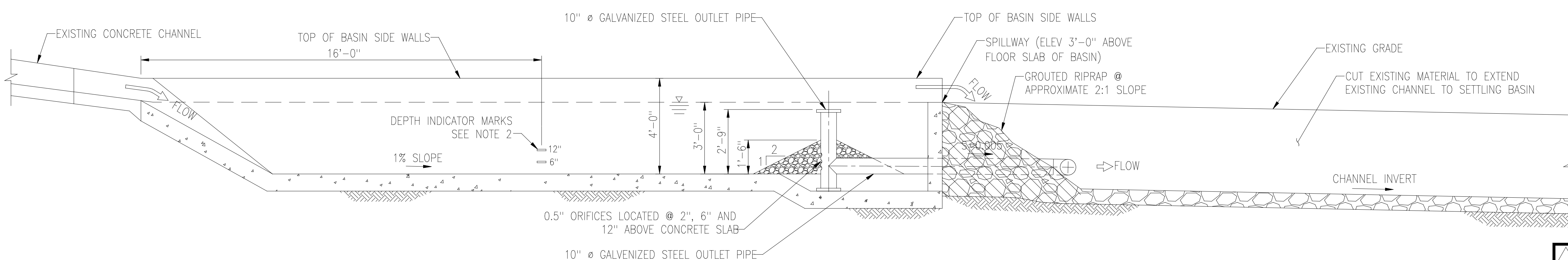
4 INCHES ON ORIGINAL

NOTES:

1. SEE SHEET S-3 FOR ADDITIONAL DIMENSIONS.
2. THE DEPTH INDICATOR MARKINGS SHALL BE LEVEL MARKS PAINTED ON BOTH BASIN SIDE WALLS AT 6" AND 12" INTERVALS ABOVE THE FINISH FLOOR SLAB OF THE SETTLING BASIN.




1 C-3 PLAN – SETTLING BASIN
NOT TO SCALE




A C-8 SECTION – SETTLING BASIN
NOT TO SCALE

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY
CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

CIVIL DETAILS

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |

Dwg. No. PSZ2007-0300-0009DA Sht. No. C-8 9 of 13

FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED: ----- - ----

4 INCHES ON ORIGINAL

## LEGEND

| | |
|---|---|
| | AGGREGATE BASE IN SECTION |
| | CONCRETE IN PLAN AND SECTION |
| | EARTH IN SECTION |

## ABBREVIATIONS

| | |
|---|---|
| AB | ANCHOR BOLT |
| ABC | AGGREGATE BASE COURSE |
| ABV | ABOVE |
| ADD'L | ADDITIONAL |
| ALT | ALTERNATE |
| ARCH | ARCHITECT/ARCHETECTURAL |
| & | AND |
| @ | AT |
| B | BOTTOM |
| B/ | BOTTOM OF |
| BB | BOTTOM BARS |
| BLDG | BUILDING |
| BLKG | BLOCKING |
| BM | BEAM |
| BN | BOUNDARY NAIL |
| BRG | BEARING |
| BS | BOTH SIDES |
| BTWN | BETWEEN |
| C | CHANNEL |
| CANT | CANTILEVER |
| CAP | CAPACITY |
| CBC | CALIFORNIA BUILDING CODE |
| CJ | CONSTRUCTION JOINT |
| CL | CENTERLILNE |
| CLG | CEILING |
| CLR | CLEAR |
| CMU | CONCRETE MASONRY UNIT |
| COL | COLUMN |
| CONC | CONCRETE |
| CONN | CONNECTION |
| CONSTR | CONSTRUCTION |
| CONT | CONTINUOUS |
| COORD | COORDINATE |
| CTR/CTR'D | CENTER/CENTERED |
| d | PENNY (NAIL SIZE) |
| DBL | DOUBLE |
| DET | DETAIL |
| DF | DOUGLAS FIR |
| DIA | DIAMETER |
| DIAG | DIAGONAL |
| DM | DIMENSION |
| DL | DEAD LOAD |
| Do | DITTO |
| DP | DEEP |
| DWG | DRAWING |
| DWL | DOWEL |
| E | EXISTING |
| EA | EACH |
| EF | EACH FACE |
| ELEV | ELEVATION |
| ELEC | ELECTRICAL |
| EMBED | EMBEDMENT |
| EN | EDGE NAIL |
| EQ | EQUAL |
| EQUIP | EQUIPMENT |
| ETC | ET CETERA |
| EW | EACH WAY |
| EWEF | EACH WAY EACH FACE |
| EXIST | EXISTING |
| EXP | EXPOSED |
| EXP | EXPANSION BOLT |
| EXT | EXTERIOR |
| FF | FINISHED FLOOR |
| FG | FINISHED GRADE |
| FH | FULL HEIGHT |
| FIN | FINISH |
| FL | FLOOR |
| FLG | FLANGE |
| FN | FACE NAIL |
| FND | FOUNDATION |
| FO | FACE OF |
| FOM | FACE OF MASONRY |
| FOW | FACE OF WALL |
| FRMG | FRAMING |
| FS | FAR SIDE |
| FTG | FOOTING |
| GA | GAUGE |
| GALV | GALVANIZED |
| GRT | GROUT |
| GSN | GENERAL STRUCTURAL NOTES |
| GYP | GYPSUM |
| HAS | HEADED ANCHOR STUDS |
| HD | HAND |
| HEF | HORIZONTAL EACH FACE |
| HIF | HORIZONTAL INSIDE FACE |
| HK | HOOK |
| HM | HOLLOW METAL |
| HOF | HORIZONTAL OUTSIDE FACE |
| HORZ | HORIZONTAL |
| HP | HIGH POINT |
| HT | HEIGHT |
| ID | INSIDE DIAMETER |
| IE | FOR EXAMPLE |
| INFO | INFORMATION |
| INT | INTERIOR |
| INTERMED | INTERMEDIATE |
| INTERSECT | INTERSECTION |
| INV | INVERT |
| JST | JOIST |
| JT | JOINT |
| L | ANGLE |
| LG | LONG |
| LL | LIVE LOAD |
| LLH | LONG LEG HORIZONTAL |
| LLV | LONG LEG VERTICAL |
| LOC | LOCATION |
| LONGIT | LONGITUDINAL |
| LP | LOW POINT |
| LSL | LONG SLOTS |
| LT | LEFT |
| MACH | MACHINE |
| MAINT | MAINTENANCE |
| MAS | MASONRY |
| MAX | MAXIMUM |
| MB | MACHINE BOLT |
| MC | CHANNEL |
| MCJT | MASONRY CONTROL JOINT |
| MECH | MECHANICAL |
| MFR | MANUFACTURER |
| MIN | MINIMUM |
| MNTG | MOUNTING |
| MO | MASONRY OPENING |
| MOD | MODIFIED |
| MTL | METAL |
| N | NEW |
| NIC | NOT IN CONTRACT |
| NOM | NOMINAL |
| NS | NEAR SIDE |
| NTS | NOT TO SCALE |
| # | NUMBER |
| OD | OUTSIDE DIAMETER |
| OF | OUTSIDE FACE |
| OPG | OPENING |
| OPP | OPPOSITE |
| P/C | PRE-CAST |
| PEB | PRE ENGINEERED BUILDING |
| PL | PLATE |
| PLCS | PLACES |
| PLUMB | PLUMBING |
| PLYWD | PLYWOOD |
| PNL | PANEL |
| PREFAB | PREFABRICATED |
| PT | POINT, PRESSURE TREATED |
| PVMT | PAVEMENT |
| QTY | QUANTITY |
| R | RADIUS |
| REF | REFERENCE |
| REG | REGULAR |
| REINF | REINFORCING |
| REQD | REQUIRED |
| RF | ROOF |
| RM | ROOM |
| RT | RIGHT |
| SHT | SHEET |
| SIM | SIMILAR |
| SLP | SLOPE |
| SP | SOIL PRESSURE |
| SPC | SPACE/SPACES |
| SPC'G | SPACING |
| SPEC | SPECIFICATIONS |
| SQ | SQUARE |
| STD | STANDARD |
| STIFF | STIFFENER |
| STL | STEEL |
| STRUCT | STRUCTURAL |
| SYMM | SYMMETRICAL |
| T | TOP |
| T/ | TOP OF |
| T & G | TOUNGE AND GROOVE |
| T & B | TOP AND BOTTOM |
| TB | TOP BAR |
| TECH | TECHNICAL |
| TG | TEMPERED GLASS |
| THD | THREAD |
| THK | THICK |
| TL | TOTAL LOAD |
| TOC | TOP OF CONCRETE |
| TOS | TOP OF STEEL |
| TRANS | TRANSVERSE |
| TS | TUBE STEEL |
| TYP | TYPICAL |
| UNO | UNLESS NOTED OTHERWISE |
| VEF | VERTICAL EACH FACE |
| VERT | VERTICAL |
| W/ | WITH |
| W | WIDE FLANGE (BEAM) |
| W/O | WITHOUT |
| WP | WORK POINT |
| WS | WATERSTOP |
| WT | WEIGHT |
| WWF | WELDED WIRE FABRIC |

## GENERAL STRUCTURAL NOTES

GENERAL

1. CONTRACTOR TO COORDINATE ALL STRUCTURAL DOCUMENTS WITH ALL OTHER DISCIPLINES AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO THE START OF ANY FABRICATION OR CONSTRUCTION.
2. UNLESS NOTED OTHERWISE, REFER TO DRAWINGS OTHER THAN STRUCTURAL FOR FINISHES, SLOPES, DEPRESSIONS, OPENINGS, CURBS, STAIRS, RAMPS, TRENCHES, EQUIPMENT AND LOCATIONS AND EXTENT OF SUCH CONDITIONS.
3. CONTRACTOR TO COORDINATE ALL NEW WORK WITH EXISTING SITE CONDITIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO CONSTRUCTION.
4. DETAILS OR CONDITIONS NOT FULLY DEVELOPED ON STRUCTURAL DOCUMENTS ARE SIMILAR TO DEVELOPED DETAILS.

CONCRETE

1. ALL CONCRETE SHALL BE NORMAL WEIGHT, WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
2. CONCRETE REINFORCING COVER SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE:

   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.....................................................................3 INCHES

   CONCRETE EXP0SED TO EARTH OR WEATHER:
   NO. 6 OR LARGER BARS.........................................2 INCHES
   NO. 5 OR SMALLER BARS....................................1.5 INCHES

   CONCRETE NOT EXPOSED TO EARTH OR IN CONTACT WITH GROUND:
   SLABS OR WALLS.............................................0.75 INCHES

3. ALL CONCRETE DIMENSIONS SHOWN ARE MINIMUM DIMENSIONS. CONTRACTOR TO REVIEW FORMING, REINFORCING DETAILS AND ANY EMBEDDED ITEMS AND DETERMINE PRIOR TO FABRICATION OF ANY REINFORCING, PLACEMENT REQUIREMENTS AND CLEARANCES.

REINFORCING

1. ALL CONCRETE REINFORCING SHALL BE ASTM A615, Fy = 60 KSI.
2. REINFORCING SHALL EXTEND CONTINUOUS FOR THE DIMENSION SHOWN.
3. NO WELDING OF ANY REINFORCING IS PERMITTED.
4. LOCATE ALL REINFORCING AS SHOWN ON DRAWINGS AND FASTEN SECURELY.
5. ALL REINFORCING TO TERMINATE WITH STANDARD HOOKS AS SHOWN ON PLANS.

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |


74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY
CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550


PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

ABBREVIATIONS, LEGEND AND GENERAL STRUCTURAL NOTES

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |

Dwg. No. PSZ2007-0300-0010DA

Sht. No. S-1 10 of 13

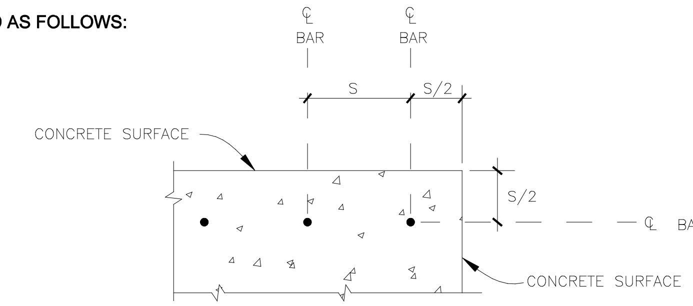
FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED: ----- - -----

4 INCHES ON ORIGINAL

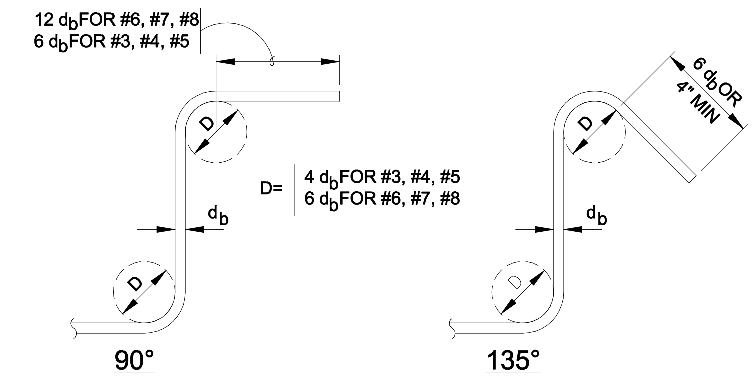
| DEVELOPMENT LENGTH (ℓd) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BAR SIZE | 3000 PSI CONC (f'c) | | | | 4000 PSI CONC (f'c) | | | | 5000 PSI CONC (f'c) | | | |
| | TOP | | OTHER | | TOP | | OTHER | | TOP | | OTHER | |
| | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" |
| #3 | 13 | 22 | 12 | 17 | 12 | 19 | 12 | 15 | 12 | 17 | 12 | 13 |
| #4 | 18 | 29 | 14 | 22 | 15 | 25 | 12 | 19 | 14 | 23 | 12 | 17 |
| #5 | 22 | 36 | 17 | 28 | 19 | 31 | 15 | 24 | 17 | 28 | 13 | 22 |
| #6 | 26 | 43 | 20 | 33 | 23 | 37 | 18 | 29 | 20 | 34 | 16 | 26 |
| #7 | 38 | 63 | 29 | 48 | 33 | 54 | 25 | 42 | 29 | 49 | 23 | 38 |
| #8 | 43 | 72 | 33 | 55 | 37 | 62 | 29 | 48 | 34 | 56 | 26 | 43 |
| #9 | 49 | 81 | 37 | 62 | 42 | 70 | 33 | 54 | 38 | 63 | 29 | 48 |
| #10 | 56 | 89 | 43 | 69 | 49 | 78 | 38 | 60 | 44 | 69 | 34 | 54 |
| #11 | 68 | 98 | 52 | 76 | 59 | 85 | 45 | 66 | 53 | 76 | 41 | 59 |
| TENSION LAP SPLICE LENGTH (CLASS 'B' SPLICE) | | | | | | | | | | | | |
| BAR SIZE | 3000 PSI CONC (f'c) | | | | 4000 PSI CONC (f'c) | | | | 5000 PSI CONC (f'c) | | | |
| | TOP | | OTHER | | TOP | | OTHER | | TOP | | OTHER | |
| | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" | s ≥ 6" | s < 6" |
| #3 | 17 | 28 | 16 | 22 | 16 | 25 | 16 | 19 | 16 | 22 | 16 | 17 |
| #4 | 23 | 38 | 18 | 29 | 20 | 33 | 16 | 25 | 18 | 29 | 16 | 23 |
| #5 | 28 | 47 | 22 | 36 | 25 | 41 | 19 | 31 | 22 | 36 | 17 | 28 |
| #6 | 34 | 56 | 26 | 43 | 29 | 49 | 23 | 38 | 26 | 44 | 20 | 34 |
| #7 | 49 | 82 | 38 | 63 | 43 | 71 | 33 | 55 | 38 | 63 | 30 | 49 |
| #8 | 56 | 93 | 43 | 72 | 49 | 81 | 38 | 62 | 44 | 72 | 34 | 56 |
| #9 | 63 | 105 | 49 | 81 | 55 | 91 | 42 | 70 | 49 | 81 | 38 | 63 |
| #10 | 73 | 116 | 56 | 90 | 63 | 101 | 49 | 78 | 57 | 90 | 44 | 70 |
| #11 | 88 | 128 | 68 | 99 | 76 | 111 | 59 | 85 | 68 | 99 | 53 | 76 |

NOTES:

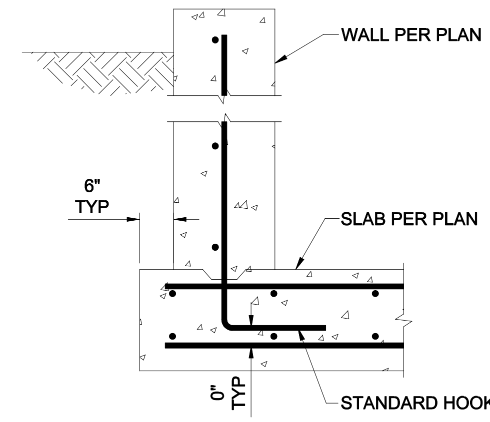
1. LENGTHS SHOWN ARE FOR GRADE 60 UNCOATED BARS
2. LENGTHS SHOWN ARE IN INCHES
3. INCREASE LENGTHS 30% FOR LIGHT WEIGHT CONCRETE
4. TOP BARS: HORIZONTAL BARS WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW THEM
5. THE QUANTITY 'S' IS DEFINED AS FOLLOWS:



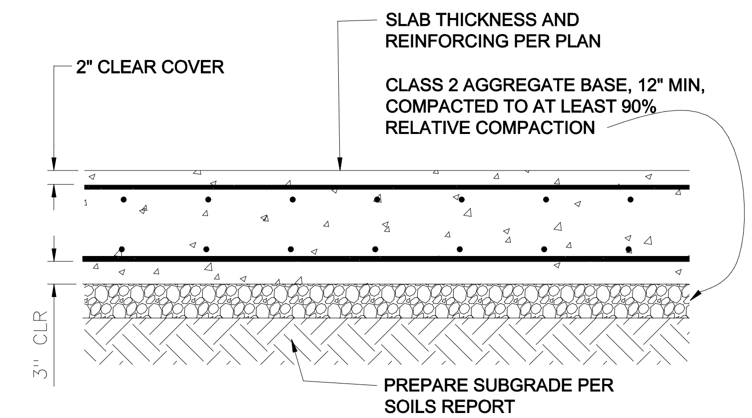

G1 VAR **BAR DEVELOPMENT LENGTHS AND LAP SPLICE LENGTHS**
SCALE: NOT TO SCALE



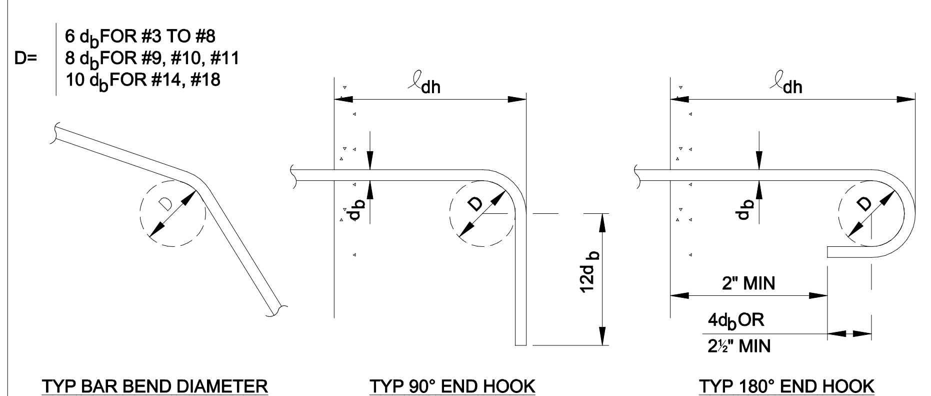

J13 VAR **STIRRUP AND TIE HOOKS**
SCALE: NOT TO SCALE




G13 VAR **WALL BASE CONSTRUCTION JOINT**
SCALE: NOT TO SCALE



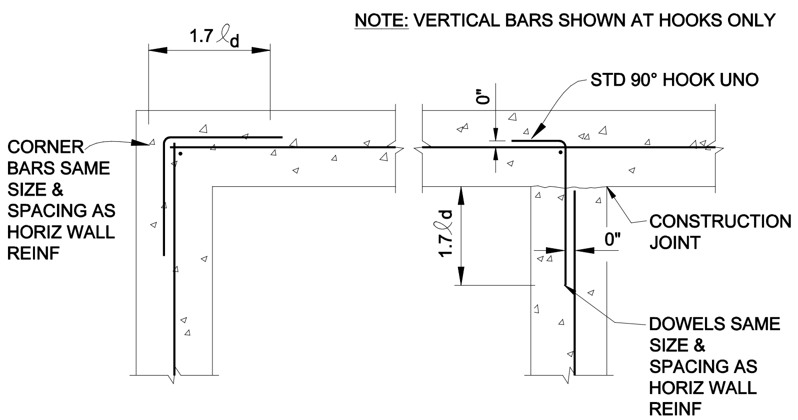

D1 VAR **SLAB ON GRADE**
SCALE: NOT TO SCALE



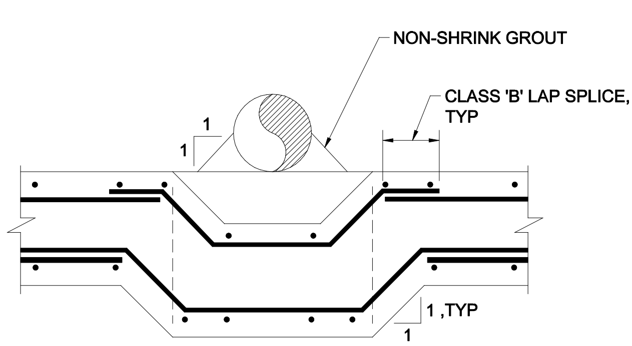

| MINIMUM TENSION EMBEDMENT LENGTHS ℓdh (IN.) FOR STANDARD END HOOKS ON REINFORCING BARS | | | | |
|---|---|---|---|---|
| BAR SIZE | NORMAL WEIGHT CONCRETE, f'c , PSI | | | |
| | 3000 | 4000 | 5000 | 6000 |
| #3 | 6 | 6 | 6 | 6 |
| #4 | 8 | 7 | 6 | 6 |
| #5 | 10 | 9 | 8 | 7 |
| #6 | 12 | 10 | 9 | 9 |
| #7 | 14 | 12 | 11 | 10 |
| #8 | 16 | 14 | 12 | 11 |
| #9 | 18 | 15 | 14 | 13 |
| #10 | 20 | 17 | 16 | 14 |
| #11 | 22 | 19 | 17 | 16 |
| #14 | 38 | 33 | 29 | 27 |
| #18 | 50 | 43 | 39 | 35 |

D5 VAR **REINF BAR BENDS & END HOOKS**
SCALE: NOT TO SCALE

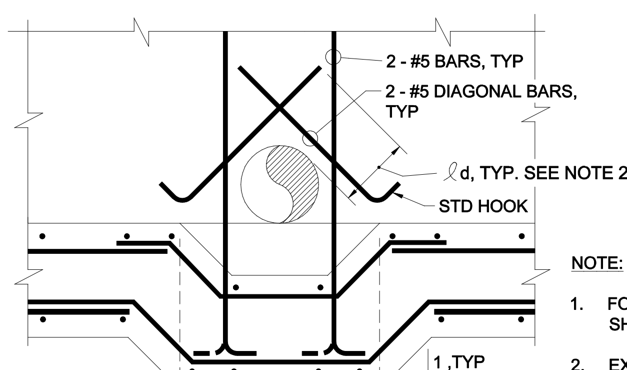
NOTE: VERTICAL BARS SHOWN AT HOOKS ONLY




A1 VAR **CORNER & INTERSECTION OF CONCRETE WALL**
SCALE: NOT TO SCALE




B1 S-3 **WALL PENETRATION REINF**
SCALE: NOT TO SCALE




NOTE:

1. FOR INFORMATION NOT SHOWN SEE DETAIL B2/S-2.
2. EXTEND AS FAR AS POSSIBLE OR END IN STD HOOK.

B2 S-3 **TROUGH DETAIL AT OUTLET PIPE**
SCALE: NOT TO SCALE

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |


74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

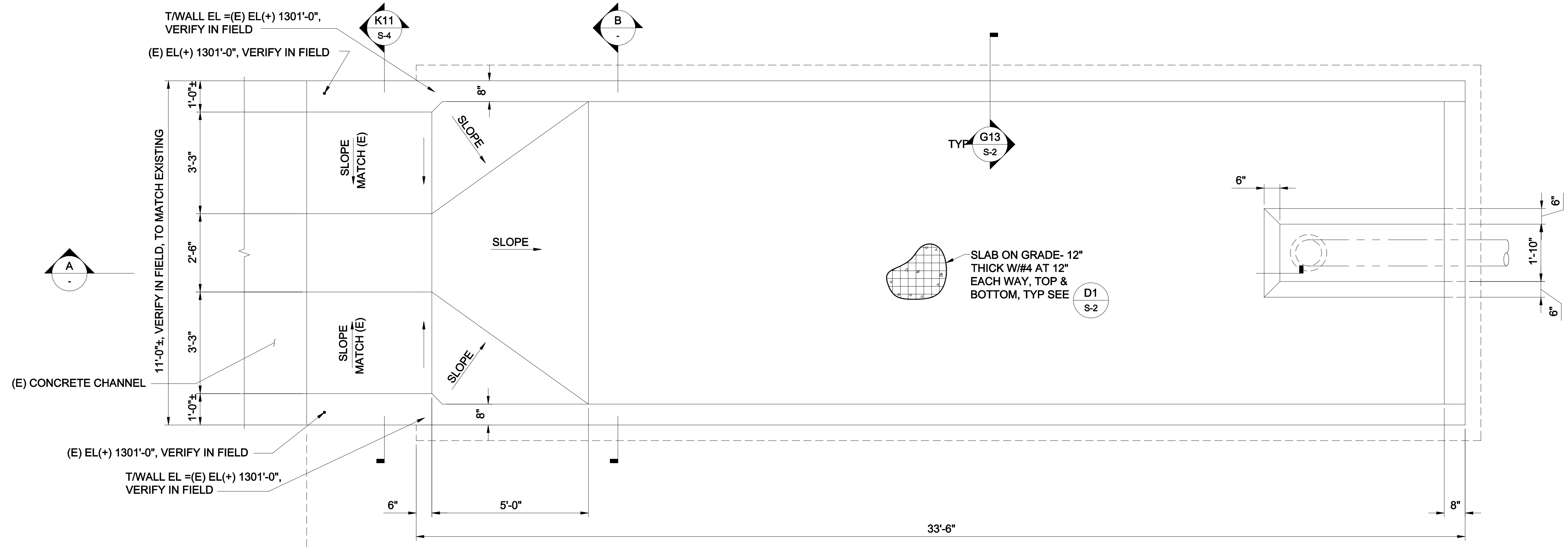

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

TYPICAL STRUCTURAL DETAILS

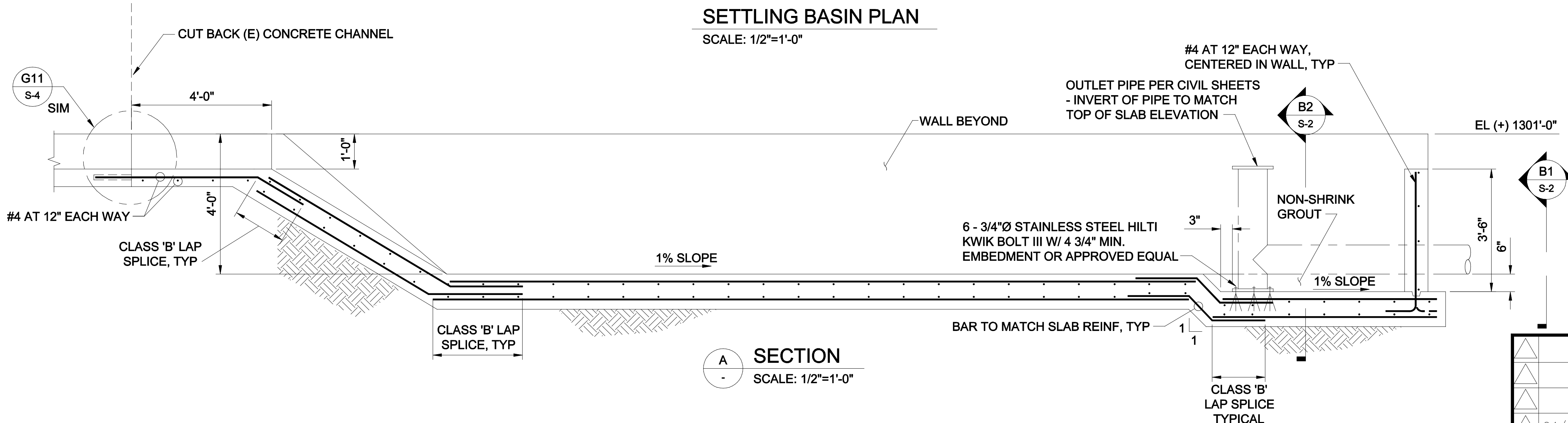
| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |
| Dwg. No. PSZ2007-0300-0011DA | | Sht. No. S-2 11 of 13 |

FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED: ---- - ----



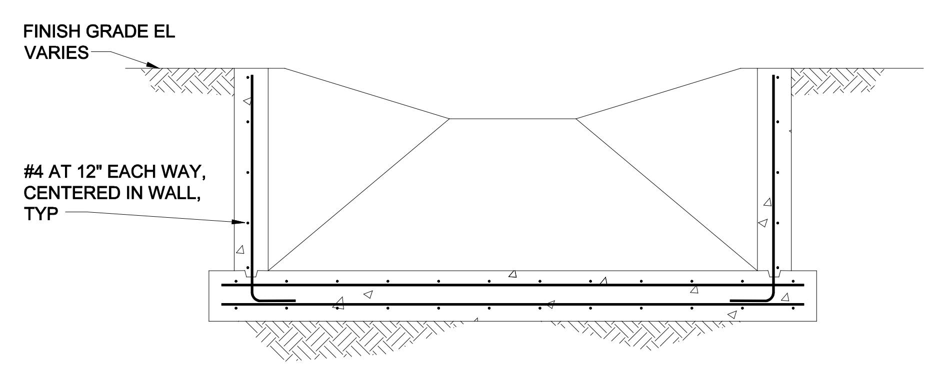

SETTLING BASIN PLAN

SCALE: 1/2"=1'-0"




A
-
SECTION

SCALE: 1/2"=1'-0"




B
-
SECTION

SCALE: 1/2"=1'-0"

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)


WINZLER & KELLY
CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com


Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

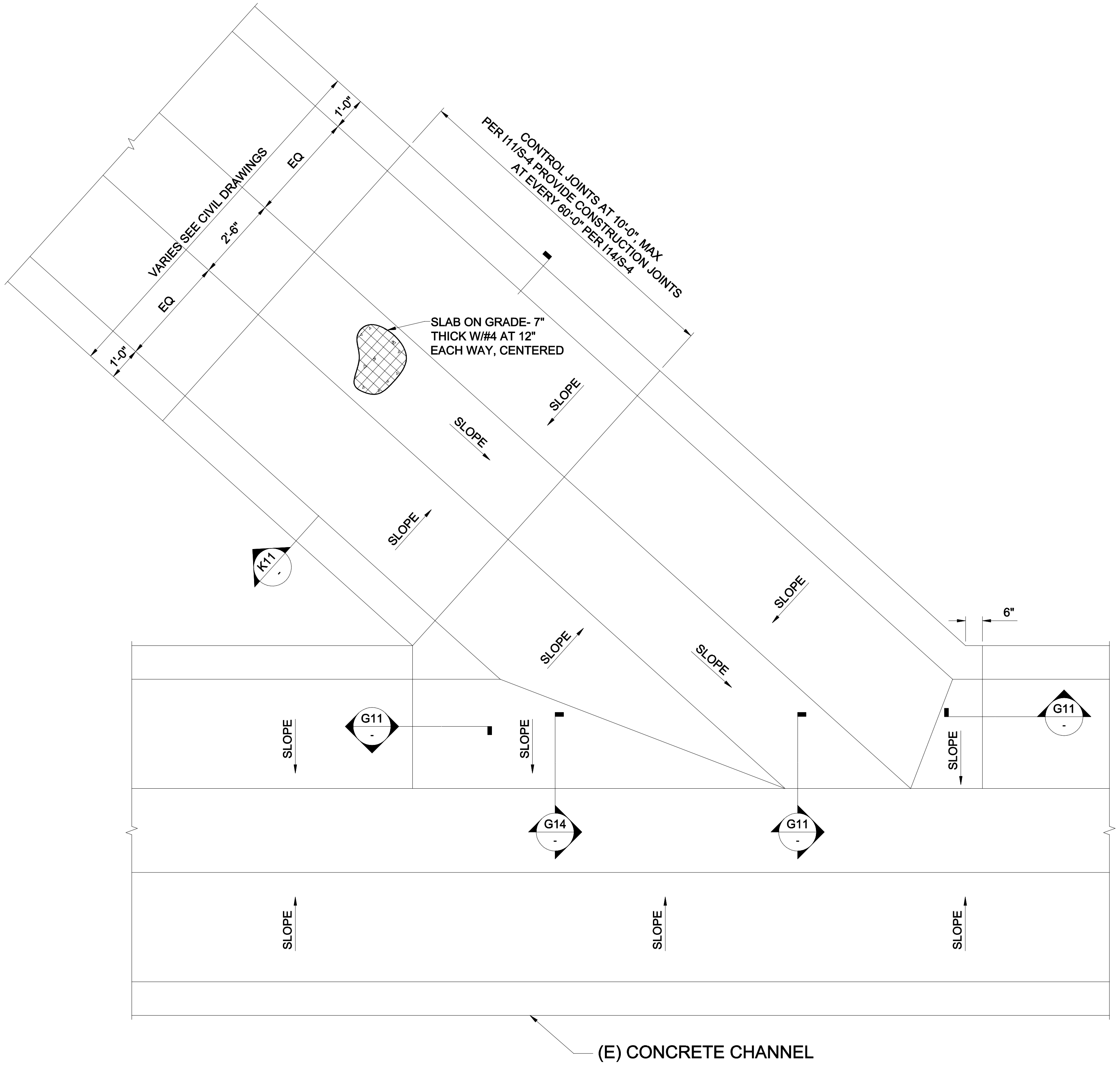
PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

SETTLING BASIN PLAN AND SECTIONS

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |
| Dwg. No. PSZ2007-0300-0012DA | | Sht. No. S-3 12 of 13 |

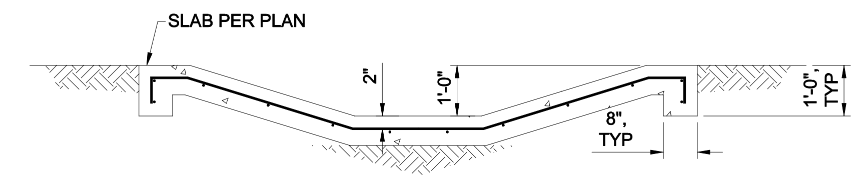
4 INCHES ON ORIGINAL

FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg DATE PLOTTED:




INLET CHANNEL PLAN

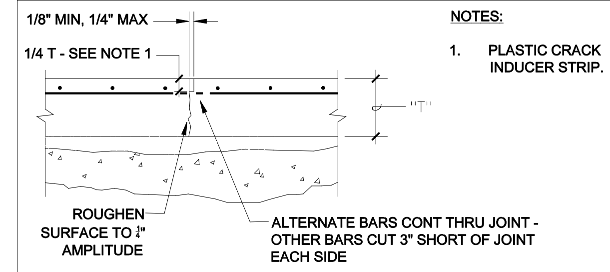
SCALE: 1/2"=1'-0"




K11 -

## CHANNEL SECTION

SCALE: 1/2"=1'-0"



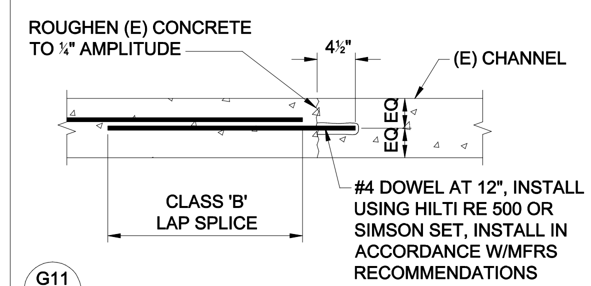

NOTES:

1. PLASTIC CRACK INDUCER STRIP.

I11 -

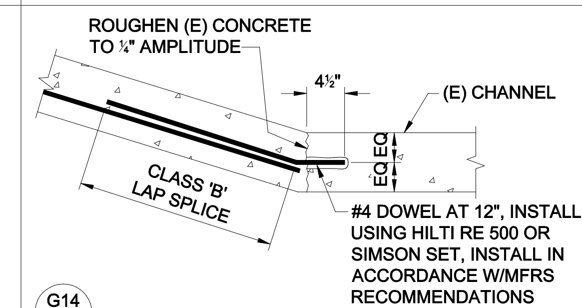
## CONTROL JOINT

SCALE: NOT TO SCALE




G11 -

SCALE: 1"=1'-0"




G14 -

SCALE: 1"=1'-0"

4 INCHES ON ORIGINAL

| No. | Date | Revision | Dwn | Chk | D/C | PM | CL |
|---|---|---|---|---|---|---|---|
| A | 04/01/08 | RECORD DRAWING | PS | AA | | AA | |

74 Digital Drive, No. 1
Novato, CA 94949
(415) 883-5017
(415) 883-5021(fax)

WINZLER & KELLY
CONSULTING ENGINEERS
417 Montgomery Street, Suite 700, San Francisco, CA 94104-1115
tel 415.283.4970 ♦ fax 415.283.4980 ♦ www.w-and-k.com

Lawrence Livermore National Laboratory
Plant Engineering, Livermore, CA 94550

PIT 7 COMPLEX DRAINAGE DIVERSION SYSTEM

INLET CHANNEL PLAN, SECTION, AND DETAILS

| | | |
|---|---|---|
| Des: SRR, VHS, MD, KO | 09-12-07 | Scale: |
| Dwn: VHS | 09-13-07 | PFNID: 300-2007-001 |
| Chk: SRR | 09-12-07 | S/W: AUTOCAD 2006 |

Dwg. No. PSZ2007-0300-0013DA   Sht. No. 13 of 13   S-4

FILE NAME: P:\Projects\07\03398-07-001 Cerrudo LLNL\CAD\5-AS-BUILTS\X-LLNL-TB.dwg   DATE PLOTTED: ----- - ----

# Appendix I

# Pit 7 Complex Drainage Diversion System As-Built Variations from Design Specifications

**Table I-1. Pit 7 Complex Drainage Diversion System As-Built Variations from Design Specifications.**

| Description of Change | Justification |
|---|---|
| **Work Element #1 – Western Hillside:** Added drain section J-2 in parallel to drain section J-1 (shown in as-built Sheet C-1, Appendix H.) | Drain section J-2 was included in the design to take advantage of a local change in topography. This section allows the horizontal sections of drains H and I to drain faster. This modification improved the functionality of the system. |
| **Work Element #1 – Western Hillside:** Modified drain sections A and C and eliminated drain section B (as-built Sheet C-1, Appendix H.) | Drain sections A and C were modified and drain section B was eliminated due to shallow bedrock encountered in the field. Drain section C was modified to follow the base of the bedrock. Drain section A was extended. This allowed elimination of drain section B. This modification improved the functionality of the system. |
| **Work Element #2 – Eastern Drainage Channel:** Two additional road crossings were added with culverts. | To allow vehicle access to the eastern hill slope, two additional road crossings were added to the drainage channel (as-built Sheet C-6, Appendix H.) These modifications did not alter the functionality or the capacity of the system. |
| **Work Element #2 – Eastern Drainage Channel:** Power poles were relocated to the western side of the main road and a culvert was added to protect extraction wells NC7-63 and NC7-64. | To allow for the maximum design width of the channel, power poles on the eastern side of the road were relocated to the western side. To protect extraction wells NC7-63 and NC7-64 from potential erosion damage, a culvert was installed in the section of the channel that lies in between the two wells (as-built Sheet C-7, Appendix H.) These modifications did not alter the functionality or the capacity of the system. |
| **Work Element #4 – Northern Rip-Rap:** The alignment of the riprap was adjusted (as-built Sheet C-5, Appendix H.) | The alignment of the riprap was adjusted to better fit the local topography and to prevent erosion down stream of the riprap. This modification did not alter the functionality or the capacity of the system. |

# Appendix J

# Photographic evidence of OU 5 Remedial/Removal Action Implementation

# Appendix J

## Table of Contents


- Building 850 Soil Removal Action Corrective Action Management Unit Photographs.

- Pit-7-Source Ground Water /Extraction and Treatment System Photographs.

- Pit 7 Complex Drainage Diversion System Photographs.

# Building 850 Soil Removal Action Corrective Action Management Unit Photographs

**Building 850 Corrective Action Management Unit (CAMU)**

**Building 850 CAMU and monitor well/maintenance access road**

# Pit 7-Source Ground Water Extraction and Treatment System Photographs

**Pit 7-Source extraction wellhead manifold and solar panel**

**Infiltration trench used for the discharge of treated effluent from the Pit 7-Source ground water treatment system and piezometers**

**Exterior of Pit 7-Source ground water treatment system enclosure**

**Interior of Pit 7-Source ground water treatment system showing treatment media and batch tank**

# Pit 7 Complex Drainage Diversion System Photographs

**Pit 7 Complex Landfill Caps and Drainage Diversion System**

**Pit 7 Complex Drainage Diversion System – Southern Settling Basin**

**Pit 7 Complex Drainage Diversion System – Northern Riprap**

**Pit 7 Complex Drainage Diversion System – Eastern Hillside Drainage Swale**

**Pit 7 Complex Drainage Diversion System – Western Hillslope Trenches**

LAWRENCE LIVERMORE
NATIONAL LABORATORY
Lawrence Livermore National Security, LLC • Livermore, California • 94551