LANDFILL MANAGEMENT PLAN
FORMER LOS ANGELES LANDFILL
Albuquerque, New Mexico

Prepared for:

City of Albuquerque Environmental Health Department
Environmental Services Division
One Civic Plaza
P.O. Box 1293
Albuquerque, New Mexico 87103

Prepared by:

INTERA Incorporated
6000 Uptown Blvd. NE
Suite 220
Albuquerque, New Mexico

September 2012

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PLATES

LIST OF TABLES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane
µg/L	micrograms per liter
AEHD	City of Albuquerque Environmental Health Department
AGIS	Albuquerque Geographic Information System
AIBF	Albuquerque International Balloon Fiesta
AMAFCA	Albuquerque Metropolitan Arroyo Flood Control Authority
bgs	below ground surface
BMPs	Best Management Practices
Board	Albuquerque-Bernalillo County Air Quality Control Board
CFR	Code of Federal Regulations
CO	certificate of occupancy
COA	City of Albuquerque
COCs	contaminants of concerns
CPU	central processing unit
EPA	U.S. Environmental Protection Agency
FID	flame ionizing detector
Fox	Fox Consulting Engineers and Geologists
Freon^{TM} 11	trichlorofluoromethane
Freon^{TM}-113	1,1,2-trichloro-2,2,1-trifluoroethane
ft	feet
GFCI	ground fault circuit interruption
gpm	gallons per minute
HAZWOPER	Hazardous Waste Operation and Emergency Response
HDPE	high-density polyethylene
HELP	Hydrologic Evaluation of Landfill Performance
HP	horsepower
INTERA	INTERA Incorporated
Interim Guidelines	Interim Guidelines for Development within City Designated Landfill Buffer Zones
IT	International Technology Corporation
LALF	former Los Angeles Landfill

LEL	lower explosive limit
LFG	landfill gas
LMP	landfill management plan
MDP	Balloon Fiesta Park Master Development Plan
Mg	megagrams
mg/L	milligrams per liter
MMBtu	million British thermal units
MS4	Municipal Separate Storm Sewer System
MSW	Municipal Solid Waste
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMOC	non-methane organic compound
NMSA	New Mexico Statutes Annotated
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standard
O&M	operation and maintenance
OMMP	Operation Maintenance and Monitoring Plan
OSE	Office of the State Engineer
OSHA	Occupational Safety and Health Administration
PCE	Tetrachloroethene
PE	Professional Engineer
PLC	process logic control
PNM	Public Service Company of New Mexico
ppm	parts per million
PTS	pretreatment storage
PVC	poly vinyl chloride
RCRA	Resource Conservation and Recovery Act
RV	recreational vehicle
scfm	standard cubic feet per minute
SEM	surface emissions monitoring
SVE	soil vapor extraction
TCE	trichloroethene
UEL	upper explosive limit
VOCs	volatile organic compounds
WEP	Waste Excavation Plan

WQCC	Water Quality Control Commission

1.0 INTRODUCTION

This landfill management plan (LMP) for the former City of Albuquerque (COA) Los Angeles Landfill (LALF) has been prepared by INTERA Incorporated (INTERA) on behalf of the COA Environmental Health Department (AEHD). The purpose of this LMP is to establish management and operating procedures that will control discharges from the LALF to the greatest extent possible and mitigate risks associated with the decomposition of waste in the unlined landfill. Much of the LMP is dedicated to the monitoring and control of landfill gas (LFG), since it poses the most acute risk to property and public welfare. There is extensive existing infrastructure on and adjacent to the LALF that has been integrated into an LFG extraction, destruction, and monitoring system. The AEHD has developed routine maintenance and monitoring activities that this LMP documents and develops into a written action plan. In addition to on-site LFG management, this LMP specifies engineering controls and protocols to implement to abate LFG exposure and safety risks. These controls and protocols include property development procedures, public use restrictions, and public use preparation guidelines.

Concurrent with LFG generation, the LALF has also been identified as a contributing source of non-methane organic compounds (NMOCs) that have impacted soil, soil vapor, and groundwater beneath the landfill. Once the contaminants reached groundwater, they were transported beyond the landfill boundary. The AEHD has installed and operated soil and groundwater remediation equipment. The LMP summarizes actions that have been taken to abate subsurface environmental impacts and includes an action plan for continuing remediation work.

Development of an LMP for the LALF was initially directed by the Planning Department as a condition of approval of the *Balloon Fiesta Park Master Development Plan* (MDP) in 1998. The Planning Department charged the AEHD with assessing the risks associated with the LALF and with remediating environmental hazards that pose a risk to the public's health and safety. The MDP indicates that the use of the landfill "must be consistent with minimizing environmental impacts and associated risks to public health and safety." According to the MDP, the LMP must address construction of structures, revegetation, water application, long-term grading and drainage, surface cover, installation of utilities, and the use of the landfill for event parking. These requirements are addressed in this LMP. Additionally, this LMP incorporates:

- A description of the human and environmental safety risks at the landfill.
- A description of the remediation systems that have been installed at the landfill.
- An LFG Control Plan (including a Landfill Drainage and Surface Maintenance Plan).
- An LFG Monitoring Plan.
- A Groundwater Contamination Control Plan.

- Guidelines for development on the landfill and within the buffer zone around the perimeter of the landfill (relative to the AEHD *Interim Guidelines for Development within City Designated Landfill Buffer Zones* [*Interim Guidelines*] [COA, 2004b]).
- A Utility Plan.
- A Long-Term LFG Monitoring Plan.

This LMP has been developed based on existing conditions at the time of authorship. It should be considered a dynamic document that should be periodically reviewed and updated to address changing circumstances.

1.1 Landfill Description and History

The LALF comprises a 77-acre parcel located in northeast Albuquerque at the recognized street address of 4300 Alameda Boulevard NE. It is bounded to the north by Alameda Boulevard NE and San Carlos Cemetery, to the east by Washington Business Park and Clifford Industrial Park, to the south by the Albuquerque Metropolitan Arroyo Flood Control Authority [AMAFCA] Domingo Baca Arroyo, and to the west by the AMAFCA North Diversion Channel. It is located approximately 1.5 miles east of the Rio Grande and approximately 1 mile west of Interstate 25. Figure 1 shows the location of the LALF in northeast Albuquerque.

Before its use as a landfill, the property was operated as a commercial sand and gravel quarry by Springer Corporation. The COA purchased the property and used it as one of two COA municipal waste landfills from 1978 to 1983 (International Technology Corporation [IT], 1997a). Nelson (1997) indicates that the waste depth was 25 to 47 feet (ft), while other sources indicate that the average thickness of waste was 6 to 41 ft (IT, 1996). The variable thickness was likely due to the variability in the depth of the quarry pits, although it has been reported that prior to accepting waste, the quarry pits were cut down and leveled (IT, 1997a). The waste stream was reported to include residential, commercial, and construction and demolition waste. Septic waste, car wash sludge, dead animals, and some industrial liquids (i.e., waste printer's ink) were also reported to have been accepted at the LALF (IT, 1997a). There was reportedly no official waste screening plan implemented to keep hazardous materials out of the landfill (Nelson, 1997), and no designated liquid disposal cells were established (IT, 1997a). Industrial waste was accepted with little or no documentation kept of the generators of the waste or types of industrial waste accepted. A 1986 U.S. Environmental Protection Agency (EPA) inspection report indicated that improperly disposed industrial waste was accepted at the LALF at an approximate rate of 200,000 pounds per year (EPA, 1986). Medical waste has been observed during maintenance work performed at the LALF, and hazardous compounds (mostly chlorinated solvent residuals and daughter products) have been detected in LFG and groundwater samples collected from below the landfill.

In 1983, the former LALF was closed with an approximate volume of 118 million cubic feet of waste (IT, 1998b). Closure was completed by covering the surface with approximately 3 ft of soil. No liner was installed beneath the waste, and the cover is not an engineered cap. During a 1983 study by Fox Consulting Engineers and Geologists, the thickness of the cap was reportedly between 1 and 11 ft (IT, 1997a); however, annual fill and grading events have added significant amounts of fill to some sections of the LALF and a current cap thickness estimate is not maintained. The original closure plan called for a final grade over the site of 2% and seeding to minimize erosion. The seeding portion of the closure plan, however, was not implemented (Nelson, 1997), largely because of the routine grading and drainage maintenance that is performed.

Closure activities also included the installation of six leachate monitoring wells (two completed with added LFG probes) and ten methane observation wells (Fox, 1983).

In 1984, the LALF property was transferred to the COA Parks and Recreation Department. From 1984 to 1995, the LALF was used as a launching site for the Albuquerque International Balloon Fiesta (AIBF) (IT, 1997a), and from 1996 through 2011, the LALF has been used for parking and recreational vehicle (RV) accommodations during the AIBF.

In 1995, methane gas was detected in the Washington Business Park to the east of the LALF (IT, 1997a). Subsequently, monitoring and testing of the structures and utilities around the LALF were initiated. These monitoring efforts eventually led to the installation of an LFG collection system at the LALF, the installation of offsite LFG probes, the installation of 19 groundwater monitoring wells, and construction of a remediation system (soil vapor extraction [SVE] and groundwater pump-and-treat) to address NMOC impacts to soil and groundwater.

1.2 Landfill Area Geology

The LALF is located on the first river terrace east of Edith Boulevard and approximately 1.5 miles east of the current river course. The surrounding surface topography generally slopes to the west. The geology at this location is comprised of middle and upper Pleistocene fluvial terrace deposits consisting largely of pebbly to cobbly sand and gravel (Connell et al., 2001). This river terrace has been used for sand and gravel mining for decades and is still mined at several locations in Albuquerque. The LALF is underlain by alluvial materials deposited on the ancestral floodplain of the Rio Grande. These alluvial materials are principally derived from the Santa Fe Group, and the contact between them has been reported at depths of approximately 80 to 120 ft below ground surface (bgs). The materials in the immediate vicinity of the LALF are characterized by unconsolidated alluvial sands and gravels with interbedded, discontinuous layers and lenses of silt and clay. Aquifer testing was performed on one of the existing groundwater extraction wells (GWEX-1), and the observed hydraulic conductivity of the sandy materials in which the well is completed (GWEX-1 is screened from approximately 90 to 190 ft bgs) was approximately 50 ft/day (Hydro Geo Chem, 2003). The groundwater table occurs at depths of approximately 120 to 150 ft bgs, and flows generally to the south-southeast of the Site at a velocity of 0.5 to 1 ft/day (NMED, 2004). The shallowest aquifer is unconfined; however, local perched water zones occur in some areas above the regional water table. Groundwater flow direction in the vicinity of the LALF is influenced by groundwater pumping at the General Mills Plant to the southwest, the Reeves Power Station to the southeast, the Centex Property to the east, and Alpha Septic to the south.

1.3 Applicable or Relevant and Appropriate Regulations

Landfills, by nature of their content and associated risks, are subject to multiple regulations. Because of the age and closure date of the LALF, many federal and state regulations for landfills do not apply to its maintenance and operations of the LALF's infrastructure. There are still, however, regulations and laws that impact how the COA maintains and manages the former LALF. This section identifies some of the more pertinent applicable or relevant regulations that apply to the landfill and how compliance is achieved. In several instances, Federal regulations are enforced by State or local regulatory agencies that have developed and implemented regulations that are not less stringent than Federal law. In these instances, only the State or local regulations may be referenced.

1.3.1 LFG and Closure/Maintenance

Landfills are regulated on the Federal level by regulations promulgated in 40 Code of Federal Regulations (CFR). There are two important federal standards that require Municipal Solid Waste (MSW) landfills to capture and control LFG: the Clean Air Act's New Source Performance Standard (NSPS) for MSW Landfills (40 CFR 60 subpart WWW) and the Emission Guidelines for MSW Landfills (40 CFR 60 subpart CC). The landfill NSPS requires landfills that have a design capacity of 2.5 million cubic meters or greater and 2.5 million megagrams (Mg) or greater and that commenced construction, reconstruction, or modification on or after May 30, 1991, to capture and control the LFG if the NMOC emissions exceed 50 Mg per year. The Emission Guidelines are applicable to landfills that commenced construction, reconstruction, or modification prior to May 30, 1991, but that received waste (or have remaining capacity to receive waste) after November 8, 1987. Because the LALF was closed in 1983 and has not received waste since that time, there are no regulatory requirements for LFG collection. The development and operation of LFG collection and monitoring infrastructure by the COA have been motivated by public welfare concerns and responsible environmental stewardship.

Resource Conservation and Recovery Act (RCRA) Subtitle D specifies safety standards for MSW landfills (40 CFR 257.3-8). These safety standards specify that LFG may not exceed an accumulation of 25% of the lower explosive limit (LEL) for methane (12,500 parts per million [ppm]) within structures (buildings, vaults, culverts, etc.) near the facility, and may not exceed the LEL at the property boundary. These safety standards apply to landfills that received waste after October 9, 1991, which excludes the LALF; however, these standards have been used to develop action levels in this LMP.

The New Mexico Environment Department (NMED) Solid Waste Bureau regulations (Title 20, Chapter 9, and Part 2 of the New Mexico Administrative Code [NMAC]) provide requirements for municipal landfills. The regulations establish that the landfill is a "category 1 landfill", meaning that it was closed between April 11, 1974 and May 14, 1989. Because of the closure date of the LALF, the following NMED regulations do not apply to the LALF:

- LFG monitoring is not required by the Solid Waste Bureau at landfills closed prior to 1993 (20.9.5.9 NMAC).
- Post closure requirements do not apply to landfills that stopped accepting waste prior to 1989 (20.9.6.8 NMAC).
- Category 1 landfills are not required by the Solid Waste Bureau to have groundwater monitoring and control plans (20.9.9.8 NMAC).

The closure of the LALF was completed in accordance with a closure plan approved by the NMED Solid Waste Bureau. All maintenance activities conducted at the landfill are performed in a manner that insures that the LALF maintains its current regulatory status of a closed category 1 landfill as defined by the NMED's Solid Waste Bureau regulations (20.9 NMAC). These regulations include compliance with the approved closure plan and special requirements pertaining to the excavation of waste from the landfill. Excavation of waste is prohibited without written approval from NMED unless for maintenance purposes or during emergency situations (20.9.2.10 NMAC). A general Waste Excavation Plan (WEP) is included in Appendix A for routine landfill maintenance activities. A similar WEP has been approved previously by the NMED and the document in Appendix A should be submitted for general approval for future excavation events. Some modifications to the document may be needed to achieve NMED approval.

1.3.2 Worker Health and Safety

Because this site falls under RCRA, workers involved with operations and maintenance (O&M) at the LALF are subject to the requirements of Occupational Safety and Health Administration (OSHA) Standard 1910.120 "Hazardous Waste Operation and Emergency Response" (HAZWOPER). This Standard requires that employers develop and implement a written health and safety program which is designed to identify, evaluate, and control health and safety hazards, and prepare employees for any emergency response situations that may occur at the site.

Employees working at the landfill are required to receive, at a minimum, 40 hours of initial offsite HAZWOPER training and a minimum of three days of actual field experience under the direct supervision of a trained experienced supervisor. On-site management and supervisors are required to receive 40 hours of initial training and three days of supervised field experience. Training includes the employer's health and safety program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedures and techniques. Employees, managers, and supervisors are required to receive eight hours of refresher training annually. Employers are required to institute a medical surveillance program. Under this program, medical examinations and consultations are made available to employees (paid for by the employer):

- Prior to assignment.
- At least once every 12 months for each employee covered unless the attending physician believes a longer interval (not greater than biennially) is appropriate.
- At termination of employment or reassignment to a non-hazardous area if the employee has not had an examination within the last six months.
- As soon as possible upon notification by an employee that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the permissible exposure limits or published exposure levels in an emergency situation.
- At more frequent intervals if the examining physician determines that an increased frequency of examination is medically necessary.

OSHA Standard 1910.120 also provides guidance for engineering controls, work practices, personal protective equipment, or a combination of these to be implemented to protect employees from exposure to hazardous substances and safety and health hazards.

1.3.3 Air Quality

The Albuquerque-Bernalillo County Air Quality Control Board (Board) enforces the New Mexico Air Quality Control Act (20.2.74 NMAC) and has jurisdiction over the LALF as stated in Ordinance 9-5-1-1 to 9-5-1-99. The Board issued an Air Quality Registration Certificate (#NM/001/00874) to the LALF on June 24, 2010. Any commercial or industrial stationary source that emits more than 2,000 pounds per year of any regulated air contaminant or any amount of a hazardous air pollutant is required to obtain a permit from the Board. Sources listed on the certificate for the LALF are the enclosed ground flare, the microturbine, the SVE system, and the air stripper. These systems are allowed to run continuously. The Registration Certificate is available for review at the AEHD.

The Board also requires a Fugitive Dust Control Construction Permit as specified in 20.11.20 NMAC. The LALF has been issued a Programmatic Low Impact Permit, Number P04-0015. A programmatic permit is issued for "a permittee that performs routine maintenance or routine ongoing active operations on real property, but does not include full depth reconstruction of a roadway or substantial removal and replacement of a manmade facility" (20.11.20.7). Fugitive dust control measures include dust suppression during construction activities and wind screen barriers.

1.3.4 Stormwater

The National Pollutant Discharge Elimination System (NPDES) Stormwater Program regulates stormwater discharges from three potential sources: municipal separate storm sewer systems, construction activities, and industrial activities. The EPA is the permitting authority in the State of New Mexico. Activities at the LALF are considered ongoing construction activities and as a COA owned property, these activities are covered by the COA's Municipal Separate Storm Sewer System (MS4) NPDES Permit Number NMS000101. AEHD requires that Best Management Practices (BMPs) that minimize the discharge of pollutants from earth disturbing activities be designed and installed to maintain erosion for each construction activity.

1.3.5 Groundwater Quality

Although the NMED Solid Waste Bureau regulations exempt the LALF from having to implement a groundwater monitoring and control plan, groundwater impacts are still regulated by the NMED Ground Water Quality Bureau. Because the LALF has been identified as a source of groundwater contamination, it is subject to compliance with the New Mexico Water Quality Act, New Mexico Statutes Annotated (NMSA) 1978 §§74-6-5 through 74-6-17 and the New Mexico Water Quality Control Commission (WQCC) Regulations, 20.6.2 NMAC. The groundwater monitoring plan that the AEHD has implemented, and is described later in this document, is approved under NMED Discharge Permit Number DP-1468. The groundwater remediation systems are operated under an NMED-approved Stage 2 Voluntary Abatement Plan as required by the WQCC regulations. The Discharge Permit and the Abatement Plan specify monitoring/sampling frequencies, monitoring/sampling methods, laboratory analytical methods, reporting requirements, contaminants of concern (COCs), clean up levels, special conditions, and reinjection approval.

The New Mexico Office of the State Engineer (OSE) regulates the construction of all monitoring and remediation wells, water rights, and groundwater appropriations (19.27 NMAC). Well permits have been obtained from the Office of the State Engineer and the groundwater pump-and-treat and reinjection system operates under Groundwater Appropriations Permit Number RG-79750, which allows water to be pumped, treated, and reinjection without using the water for beneficial purposes.

2.0 IDENTIFICATION OF LALF MANAGEMENT ISSUES

Most of the landfill management strategies recommended for the LALF have been developed based on the need to control recognized hazards and environmental risks. The LALF appears to be little more than an undeveloped parcel of land when viewed from the street. The actual hazards associated with the landfill are mostly related to the buried waste and its decomposition. Physical hazards at the surface are easily identified as objects that have worked through the cap or have been excavated during landfill maintenance. Items like glass, metal, or medical waste have the potential to cause injury or damage to equipment. Other physical hazards at the LALF relate to the operation of infrastructure-related equipment at the landfill that is provided with high-voltage power and has moving mechanical parts or operates at very high temperatures. The hazards with the greatest potential for significant risks are those that cannot be seen and are associated with the decomposition of the waste. LFG has the potential to be highly flammable, resulting in explosive conditions that can cause catastrophic damage and/or injury. Other chemical compounds derived from the waste have the potential to impact the environment. Control of LFG and hazardous chemical compounds released to the environment from the waste has been, and will continue to be, a primary landfill maintenance and management issue for the COA.

2.1 Description of LFG and Associated Risks

LFG is predominantly a product of the anaerobic decomposition of organic waste and is comprised of a variety of different components. For landfills containing mostly household waste, the typical steady-state composition of LFG in decreasing concentrations are methane, carbon dioxide, nitrogen, oxygen, hydrogen sulfide, and volatile organic compounds (VOCs). Of these constituents, methane has the highest explosive potential. The concentration level at which a gas has a potential to explode is called the explosive limit. The potential for a gas to explode is determined by its LEL and its upper explosive limit (UEL). The LEL and UEL are measures of the percent of gas in the air by volume. Methane has an LEL of 5% and a UEL of 15%. While methane levels in the LALF are on average greater than the UEL, this does not mean that the potential for explosion is less. At a point of exposure to LFG, methane will rapidly mix with ambient air and pass through the explosive range; for this reason any exposure to levels exceeding the LEL are considered hazardous, and the UEL will not be referred to again in this LMP.

The amount of methane produced by a landfill is dependent on a variety of conditions including landfill age, the mass of organic material, and moisture. For newer landfills, methane concentrations typically range between 45% and 75% by volume, with a gradual reduction in concentration over time. By volume, the LFG typically measured at the enclosed ground flare at the LALF contains 30% to 40% methane (the average methane level observed at the enclosed ground flare at the LALF in 2011 was approximately 36%), approximately 30% to 35% carbon dioxide, and a balance consisting of nitrogen and small amounts of oxygen, sulfides, and NMOCs such as chlorinated compounds and petroleum hydrocarbons. These LFG mixtures vary dramatically across the LALF. Some LFG extraction wells routinely produce approximately 50% methane, while others rarely produce significant amounts.

When production of LFG is significant, the landfill can become pressurized, forcing LFG outward beyond the boundaries of the landfill. Migrating LFG follows the path of least resistance, which includes utility corridors, deposits of sand and gravel, or areas of prior excavation that have not been properly compacted. There have been documented instances at other landfills where LFG has been detected at distances of over 1,000 ft from a landfill. For this reason, there is a potential danger associated with development activities near closed landfills. The presence of the LFG constituent methane also presents a risk to development (i.e., structures, utility conduits, vaults, etc.) occurring at the surface of a former landfill, where migration of methane beneath the surface and through the surface cover of the landfill can occur, with methane potentially accumulating in confined spaces and buildings. LFG is most likely to be released through the surface of the landfill near penetrations (well locations, excavation locations, etc.), settlement cracks, or areas of thin soil cover. The concentration of LFG is highest at the point of release (i.e., ground surface) and dissipates rapidly as it mixes with ambient air.

In addition to potentially being combustive, LFG may also present a health hazard due to other common LFG compounds such as carbon dioxide, hydrogen sulfide, and VOCs. Carbon dioxide is an asphyxiant, hydrogen sulfide is flammable and extremely toxic, and VOCs present a range of hazards including the potential for exposure to constituents which are known human carcinogens.

Asphyxiant gases displace oxygen in confined spaces or low-lying areas. Although LFG typically exhibits a distinguishable odor attributed to waste decomposition, gases like methane (also an asphyxiant, though its flammability presents a more acute risk) and carbon dioxide alone are odorless and can only be confirmed to be present or absent with appropriate instrumentation. For this reason, health and safety procedures have been put in place to set protocols for entering confined spaces, trenches, or other excavated areas. Although asphyxiants are presented here as gases that displace oxygen, it should be understood that the biological degradation of waste also results in the consumption of oxygen, and atmospheres in the waste prism will likely be oxygen deficient for that reason.

Hydrogen sulfide gas, commonly associated with the decomposition of gypsum-based drywall, is a highly toxic compound. When inhaled, this compound inhibits cellular respiration and the uptake of oxygen, causing biochemical suffocation. Health impacts can be observed at relatively low concentrations (as low as 10 ppm, or 0.001% in air), and at levels exceeding 200 ppm, collapse, coma, and death due to respiratory failure can occur within seconds after only a few inhalations. Hydrogen sulfide can be sensed more readily than other LFG constituents (a strong rotten egg smell); however, it will rapidly fatigue the human sense of smell, causing the temporary loss of this sense. Hydrogen sulfide is commonly detected in LFG at the LALF, and has been detected at levels exceeding 100 ppm. The most recent hydrogen sulfide survey was conducted in December 2011 by screening LFG with a hand-held instrument. Readings were collected from wellhead plumbing at LFG extraction wells; concentrations of hydrogen sulfide exceeding 100 ppm were observed at several locations. Results from the December 2011 survey are included on Figure 2.

NMOCs typically make up a very small portion of LFG. Their occurrence is evidence of the disposal of industrial waste, chemicals in household waste, and the degradation of synthetic materials (e.g., plastic). Regulated VOCs that have been detected in LALF LFG, soil gas, and groundwater include chlorofluorocarbons (commonly used as chemical propellants, refrigerants, and solvents), chlorinated compounds (commonly used solvents), and petroleum hydrocarbons. Some of these compounds are known carcinogens, but health impacts typically result from chronic exposures (e.g., daily occupational exposures) or very acute exposure (e.g., direct exposure or ingestion of concentrated product). Even though VOCs constitute a small part of LFG (less than 2% at most landfills [SWANA, 2002]), they can persist in the environment for many years, and contamination of soil and groundwater is difficult and costly to remediate.

In 2011, the COA recovered nearly 170 million cubic feet of LFG from the LALF. Although the LFG generation rate is decreasing with time, managing it in a way that will be protective of the public and the environment will be a necessary commitment by the COA for years to come. Additionally, controls placed on use and development of the LALF and surrounding properties are necessary to mitigate LFG hazards.

2.2 Other Recognized Environmental Conditions

In the summer of 1995, the former division of the Public Service Company of New Mexico (PNM) that serviced natural gas distribution detected elevated methane levels during routine leak detection surveillance of gas lines in the Washington Business Park. Subsequent analyses indicated that the detected methane was not a PNM product (IT, 1996).

The COA responded by performing additional investigations that ultimately led to the installation and operation of the LFG collection system at the landfill. During the course of the investigations, the following VOCs (chlorinated compounds and petroleum hydrocarbons) were detected in LFG samples submitted for laboratory analyses (note that the analyte list was originally limited to just 16 NMOCs):

- 1,1-Dichloroethene (1,1-DCE)
- 1,2-Dichloroethene (total)
- 1,1,1-Trichloroethane
- 1,1,2-Trichloroethane
- Benzene
- Chloroform
- Ethylbenzene
- Tetrachloroethene (PCE)
- Toluene
- Trichloroethene (TCE)
- Total Xylenes

On behalf of the COA, IT conducted site investigation activities and a preliminary risk assessment during 1995 and 1996. The results of the investigation were provided in a report entitled, *Site Investigation and Preliminary Risk Assessment of the Los Angeles Landfill*, dated February 1997. The objective of the assessment work was related to determining the source of the groundwater contamination that was discovered under and downgradient of the LALF. The assessment included an extensive look at former landfill operations, local geology/hydrogeology, LFG composition, and geochemistry of groundwater. These topics were critical to the mitigation design process for the SVE and groundwater remediation systems that were eventually installed.

The investigation included modeling leachate migration using "Hydrologic Evaluation of Landfill Performance" (HELP) modeling software. The results indicated that leachate was not likely to migrate beneath the landfill based on closure assumptions and existing conditions at the time. IT's investigation resulted in a site conceptual model that indicated groundwater contamination resulted not from leachate reaching groundwater, but from the migration of VOC-laden vapors (later studies provided evidence that leachate likely did reach groundwater).

The risk assessment included in the 1997 IT investigation report identified 1 metal and 11 chemical compounds that were considered COCs in groundwater. These included manganese; dichlorodifluoromethane; 1,1-DCE; 1,1-dichloroethane (1,1-DCA); 1,2-dichloropropane; 1,1,2-trichloro-2,2,1-trifluoroethane (FreonTM-113); methylene chloride; TCE; PCE; toluene; 1,1,1-trichloroethane (1,1,1-TCA); and trichlorofluoromethane (Freon^{TM} 11).

The risk assessment identified a municipal well approximately 3.1 miles south of the LALF as the closest receptor to the landfill-derived groundwater contamination. This was the only route of exposure identified with regard to human contact with the COCs; however, since the source of the COCs is the LALF, exposure to these chemicals may also be expected through contact with, or inhalation of, LFG, vapors collected from beneath the landfill through the SVE system, and contact with liquid condensate.

The VOCs detected in groundwater were found to have moved from the landfill to the south and south-southeast and have been detected in wells located up to half of a mile from the south end of the LALF. An SVE system was designed and installed to prevent the landfill from continuing to be a contributing source of contamination by removing contaminated soil vapors and leachate from between the waste and groundwater (vadose zone). The SVE system was also intended to remove VOCs from groundwater. A groundwater pump-and-treat system was designed to capture the migration of the contaminant plume. In December of 2004, the NMED issued a Discharge Permit (Number DP-1468) to the COA for operation of the systems. The Discharge Permit identified the COCs for focused remediation as: PCE, TCE, 1,1-DCE, and methylene chloride.

Because the LALF is unlined, VOCs will continue to disperse from the bottom of the landfill as soil vapor or to be dissolved in leachate/storm water. The COA's operation of the existing remediation systems has resulted in diminished contaminant concentrations in groundwater. To sustain this trend and prevent additional groundwater contamination, the systems will need to be maintained and operated for at least the near future.

2.3 Development Pressures and Recreational Uses

The LALF is located in a portion of Albuquerque that has seen development only within the last several decades. Once considered outside the northern edge of the city, the LALF is now one of the last remaining large tracts of undeveloped property in the area. It is surrounded by a mixture of industrial, residential, commercial, and recreational use properties (zoning designations within 1,000 ft of the LALF are shown on Figure 3). As property values and the demand for land have escalated, there has been an increased interest in development strategies for the property. The costs associated with waste removal or building methods that adequately address subsidence and LFG mitigation have prevented reasonable consideration of development on the property.

Because the LALF property is owned by the COA, there has been past interest in utilizing the property for projects that could profit the COA. As land becomes more difficult for the COA to procure, there will be added pressure to exploit the available space. For example, at the writing of this document, there was recent consideration by the COA for a new north-south street that would connect the Balloon Fiesta Park north of Alameda Boulevard NE with Paseo del Norte

Boulevard NE. This new traffic corridor, "Channel Road," was being considered to alleviate traffic congestion during the AIBF. Of the potential routes considered, two were alignments that would take it over either the east or the west sides of the landfill. Either orientation would have significantly impact the existing LALF infrastructure.

Beyond the interest in development of the property for economic gain or for COA infrastructure, the LALF has a long history of being used for recreational purposes. Since the property was transferred to the COA's Parks and Recreation Division in 1984, it has been used during the annual AIBF as a launch area, a landing area, and a temporary campground for RVs. As the event grew in popularity, so did the partnership between the COA and the AIBF organization. Over the past several years, the landfill has hosted several thousand RVs each year during the nine-day event. As the event's popularity has increased and the COA has invested in providing permanent facilities for the AIBF north of Alameda Boulevard NE, the AEHD has refined the protocols and procedures associated with providing the public with access to the landfill while mitigating the risk associated with LFG and other physical hazards. Each year the COA invests heavily with capital expenditures and labor to prepare the LALF for public use during the AIBF. These efforts are complemented by extensive efforts by citizen volunteers to set up and take down temporary AIBF infrastructure (i.e., traffic control, water-line layouts, electrical layouts, and housekeeping).

The large vacant area of the LALF attracts public interest for other recreational uses throughout the year. The site, however, lacks the infrastructure to support unsupervised public access, and LALF O&M goals conflict with shared public use. There has been increased interest in periodically opening the LALF for multi-purpose recreational events. Opening the LALF to recreational use poses risks to the public and the existing infrastructure. It also exposes the COA to liability associated with those risks. Identified risks include exposure to flammable/explosive gases, toxic compounds, asphyxiants, waste (including medical waste), physical hazards, and damage to LFG and remediation system infrastructure.

2.4 O&M of LALF Infrastructure

The COA has invested heavily in the design, installation, and maintenance of LALF-related infrastructure. Any discussion regarding landfill management issues must include the importance of maintaining and operating existing and planned infrastructure. Most of this infrastructure is related to LFG monitoring and control, and groundwater monitoring, treatment, and protection. This infrastructure will be described in detail in the following sections. In short, it includes LFG probes, LFG extraction wells, LFG extraction conveyance piping, condensate collection systems, an enclosed ground flare, an LFG extraction blower system, SVE and air injection wells, SVE and air injection plumbing, an SVE condensate collection system, groundwater monitoring wells, groundwater extraction and injection wells, a groundwater pump-and-treat system, and a groundwater injection/backflush pump system. Plate 1 shows the infrastructure located on and immediately adjacent to the LALF property. Plate 2 includes the location of electrical, telecommunications, and natural gas utilities that service the SVE system and the LFG collection system.

The LFG extraction system and the SVE system are located on the LALF property; however, the groundwater pump-and-treat system is installed south of the landfill on the PNM Reeves Station. The location of the pump-and-treat system, including wells and buried piping, is shown on Figure 4.

In addition to the LFG and remediation infrastructure listed above, the COA has also installed and maintained utilities and infrastructure that support the AIBF. In 2007, to address the need for providing temporary power to RVs during the AIBF event, the COA worked with the AIBF to safely provide permanent power infrastructure to a portion of the LALF. The infrastructure includes buried power from a preexisting transformer to a series of permanent step-down transformers, disconnects, and circuit breaker boxes. From the circuit breaker boxes, temporary power lines are rolled out to removable junction boxes/outlets. The electrical distribution system was installed on the east side of the LALF near the east entrance gate (Gate 8). The distribution system provides 50-amp, 250-volt service to 40 RV spaces, and 30-amp, 120-volt service to 200 RV spaces. The permanent infrastructure is enclosed by chain-link fencing, and the circuit breaker/motor control cabinets have locking doors. The layout of the buried RV electrical infrastructure is shown on Plate 2. At the writing of this document, there are plans to construct additional electrical outlets for RV parking on a separate area of the landfill.

The LALF has been targeted by vandals and thieves on multiple occasions over the years. This included the theft of AIBF's electrical roll out conductors in 2007. To protect the COA's electrical conductors from being stolen, the infrastructure was equipped with a tamper-proof alarm system that is monitored continuously by a remote service.

The COA's Parks and Recreation Division maintains buried water lines that run down the center of the LALF from north to south. Water spigots daylight at the surface for connection of roll outs or direct connection by RVs. Water is supplied from the Washington Business Park near Gate 8. The approximate location of the water lines is shown on Plate 2. No survey data is thought to exist for the water lines, and the mapping of the buried water lines was based on isolated excavations of the pipes for repairs or daylighted features like valves and faucets.

The SVE building is the only permanent structure on the landfill. This building is a pre-engineered metal structure that is secured to footings and has a gravel floor. The only other structures on the landfill are semi-mobile features. The COA has a mobile storage container adjacent to the flare station that is used to store spare parts for the LALF infrastructure, and the AIBF maintains a skid-mounted shed for RV registration. The shed has been stationed near the north end of the landfill for the past several years. There are two permanent COA structures on the PNM Reeves Station property that house the water treatment equipment and the pumps for groundwater reinjection.

Management of the LALF must include the maintenance and proper operation of the COA's infrastructure as described in the following sections.

3.0 EXISTING ENVIRONMENTAL CONTROL SYSTEMS

Since the landfill closure work in 1983, many site investigations, LFG abatement actions, and subsurface remediation efforts have been performed at the LALF. As a result of these efforts, the LFG extraction system and the groundwater remediation system were installed. Concurrent with the system installations, was the installation of monitoring wells and other ancillary infrastructure. This section highlights some of the important work that has been completed and provides greater detail on the specific infrastructure that the COA has installed at the LALF.

3.1 LFG Extraction and Control

In 1998, the COA installed an LFG extraction system on the east side of the landfill to mitigate the potential for LFG to migrate beyond the property boundary of the landfill (Phase I). In 2000, the LFG extraction system was expanded to its current configuration of piping, perimeter wells, and interior wells (Phase II). LFG is extracted from the landfill and destroyed by combustion through the operation of a blower system and an enclosed ground flare located at the southeast end of the site. Isolation valves, condensate sumps, and a condensate recovery/destruction system are supporting infrastructure to the existing LFG extraction system.

3.1.1 LFG Extraction System Installation

In May 1997, IT submitted the final Phase I design for the LALF perimeter LFG extraction system, including the design for a perimeter LFG collection system. The design was for the installation of infrastructure along the eastern edge of the LALF to mitigate the offsite migration of LFG (IT, 1997b).

The first phase of construction of the perimeter LFG extraction system was completed by IT in 1998. Significant Phase I system components included:

- An 8-inch nominal diameter buried header system.
- 6-inch nominal diameter buried lateral piping to each extraction well.
- 4-inch diameter LFG extraction wells (17 perimeter extraction wells, 5 extraction wells on the interior portion of the landfill).
- Pre-assembled horizontal wellhead assemblies installed below ground in flush-mounted vaults at each extraction well.
- Pre-fabricated condensate sumps (five) with pneumatic pumps supplied with air from a compressor at the flare station through a 1-inch pipe, and condensate collection pipe (2-inch) to convey condensate to the flare station.

- A skid-mounted, enclosed ground flare system that included the following elements:
  - An enclosed ground flare with a 22-million British thermal units (MMBtu) per hour rating.
  - An automatic condensate destruction system (mist evaporation in the enclosed flare).
  - A condensate knockout vessel.
  - A 20-horsepower (HP), 150 to 1,000 standard cubic feet per minute (scfm) blower.
  - An air compressor and dryer for the condensate recovery system.
  - A control system with an alarm autodialer (IT, 1998a).

The operational goals for the LFG extraction system were identified as:

- Removal of LFG from the adjacent Washington Business Park.
- Control of offsite subsurface migration along the eastern edge of the LALF.
- Maintenance of an anaerobic state within LFG-generating areas of the landfill.
- Conformance with environmental regulatory compliance requirements (IT, 1998b).

In 1999, the COA responded to the detection of LFG west of the former LALF in the Alameda Business Park by purchasing property from the developer which would eventually be developed for recreational use as baseball fields. Concurrent with the property acquisition, Phase II expansion of the LFG extraction system was started.

Phase I construction of the LFG extraction system included flanged ends on the header to allow for later expansion. In 1999 and 2000, the remainder of the LFG extraction system was installed as Phase II. The Phase II expansion included connecting the existing header system on the east side of the LALF with an additional section of header that circumnavigated the entire south, west, and north edges of the LALF, creating a complete loop. The header system expansion connected an additional 24 perimeter and 11 interior LFG extraction wells. Additionally, nine isolation valves, three condensate sumps, two air line isolation valves, and two condensate line isolation valves were installed during Phase II work. One of the installed laterals connected the header on the east and west sides of the LALF about midway between the north and south ends. Isolation valves installed at each point on the header where the crossing lateral connected provided added flexibility in operating the LFG extraction system and the ability to isolate sections of the landfill from extraction (useful in system optimization or when performing system repairs).

As in Phase I, the new infrastructure was constructed below grade where feasible. The extraction wellheads were upgraded to pre-fabricated vertical wellheads that allow increased flexibility for dealing with subsidence issues. Another variance from the original design included the installation of a 2-inch diameter air-supply line to the condensate sumps. A drawing showing the final system layout, including recent upgrades, is included as Plate 1. The infrastructure installed during Phases I and II is still operational as of the date of this document, and few substantial changes have been made to the 60-well extraction system. Well construction details for the extraction wells are included in Appendix B.

Since 2000, improvements and maintenance actions to the LFG extraction system have been documented and are on file with the AEHD. The most significant changes have been the replacement of all of the horizontal wellheads on the LFG extraction wells with vertical wellheads, installation of passive condensate sumps, and upgrading of system controls. The Phase I construction on the east side of the landfill included the installation of horizontal wellheads at each well. This configuration used polyvinyl chloride (PVC) components and solvent welded joints. As the landfill aged and differential settlement occurred, this type of plumbing started to pull apart, causing leaks in the extraction system. The vertical wellhead assemblies are designed so that most of the buried plumbing is high-density polyethylene (HDPE) pipe, which is stronger than PVC. The other advantage of replacing the horizontal wellheads was to achieve consistent flow measurement methods across the landfill. The old horizontal wellheads were designed with orifice plate flow measurement devices that were susceptible to corrosion. The vertical wellheads use pitot tube technology for flow measurement. Normalizing flow measurements to one method helps ensure that the data is comparable from well to well.

The LFG extraction system was designed so that the extraction wellheads were higher in elevation than the header, and the lateral piping connecting the wells to the header sloped continuously toward the header. This allowed condensate that formed to drain to the headers and the existing condensate recovery sumps. As the LALF has aged, the landfill surface has subsided, resulting in a change of slope to many of the laterals. Maintenance activities have included excavation of laterals for realignment; however, subsidence around a number of wells has been so great that lateral realignment is no longer possible if minimum bury depths of the plumbing is to be maintained. At these types of wells, the COA has begun to install passive condensate sumps at the wells or in low-lying portions of the laterals. These passive sumps aren't integrated into the pneumatic condensate recovery system that runs around the perimeter of the landfill. This results in the need to periodically pump the sumps manually to clear the lines. There are currently seven passive condensate sumps that have been installed at locations shown on Plate 1.

Record drawings for the original landfill construction (Phases I and II) and subsequent modifications are included as Appendix C.

3.1.2 Microturbine

In 2006, the COA installed a microturbine at the LALF as a pilot project to obtain a beneficial use from the collected LFG by using it to generate electricity. The microturbine was installed adjacent to the enclosed ground flare at the south end of the LALF. Generated power was returned to the electrical utility grid. Due to repeated mechanical problems that caused the unit to shut down and difficulty maintaining operation because of the low quality of the LFG, the pilot project was abandoned in 2011. The infrastructure is still on-site and consists of a skid-mounted system that includes the following components:

- An inlet moisture separator
- A condensate pump
- A blower (plumbed to the header)
- A gas/gas and gas/water heat exchanger
- A packaged air chiller
- A control panel with remote system control
- A granular activated carbon filter vessel
- The microturbine (Ingersoll Rand Model MT 70)

Engineer drawings for the microturbine and pretreatment skid are available for review in the AEHD's project files.

3.1.3 LFG Extraction Performance

Performance of the LFG extraction system is closely monitored to ensure that the operational goals are achieved. This includes, at a minimum, weekly site visits to record flare operation parameters and semiweekly (every other week) well field balancing. The balancing event includes recording the LFG quality (methane, carbon dioxide, oxygen, and the balance [assumed to be mostly nitrogen]), flow, and vacuum at each extraction well, and making adjustments as necessary to:

- Maintain minimum methane levels being supplied to the flare.
- Ensure that the vacuum is not too high, resulting in oxygen intrusion into the landfill.
- Ensure that landfill temperatures are not excessive (greater than 125 degrees Fahrenheit).
- Ensure that a negative pressure is maintained in wells that meet the above criteria.

There are some exceptions to the above procedures (i.e., maintaining vacuum on wells near the perimeter of the LALF that have poor gas quality to control offsite migration).

Data from the flare operation visits and the well field balancing events have been collected since 2001. A large volume of data has been collected; a representative sample of which is included in Table 1. The data in Table 1 includes methane levels measured at each LFG extraction well for the year (May 2011 to June 2012) as measured during the semiweekly balancing events. An illustration of the average methane distribution across the LALF for this period is provided as Figure 5. All of the historical flare and well field balancing data are available in the COA's files for public review.

Select LFG data from the extraction system flare station are included in Table 2. The data show that there is a gradual decrease in LFG production based on trending gas quality as measured by the calculated heat value of the gas (presented in thousands Btu). Average methane concentrations recorded after well field balancing events average around 38% to 40%. While well field balancing activities are performed to optimize LFG recovery rates, and these efforts have yielded fairly consistent methane levels observed at the flare, the average LFG recovery rate is gradually declining. This apparent reduction in LFG production is consistent with the expected life cycle of the landfill. LFG production models predict that the highest LFG production rates typically occur shortly after the closure date of the landfill. This peak is followed by a rapid decrease in LFG production followed by a moderate decrease over several decades or longer depending on the physical properties of the landfill. This moderate decrease observed at the LALF is illustrated on Figure 6, which shows the trend of the heat value of the gas since 2001 to present (July 2012). This decrease will continue until the blower flare system needs to be resized or supplemental fuel is required to sustain operation. No LFG production data are available from 1983 to 2001.

3.2 LFG Monitoring Infrastructure and Data

LFG monitoring probes have been installed at the perimeter and outside of the LALF boundary. LFG probes were installed over a period of time from 1983 to 1999. Generally, LFG probe installations correspond with the following events:

- Initial site characterization activities.
- Screening of LFG levels along the perimeter on the east side LALF.
- Offsite monitoring outside the LALF at a distance of several hundred feet from the boundary.
- Installation by entities other than the COA as a result of development within the landfill buffer zone.

In 1983, Fox Consulting Engineers and Geologists (Fox) installed six leachate monitoring wells (W1 through W6). These wells (2-inch diameter) were originally installed in the landfill with 5 ft of perforated pipe advanced approximately 5 to 10 ft below the waste (Fox, 1983). The wells were intended to monitor for leachate leaving the landfill, but have also been used for LFG monitoring. Today, W2 and W6 are the only leachate wells that are still accessible at the LALF. The other wells were damaged, abandoned, or lost (i.e. covered by fill material).

Concurrent with installation of the leachate wells, Fox also installed ten LFG probes inside the perimeter of the landfill (M01 to M10). In their 1983 Closure Plan, Fox described the construction details for these probes, but no map is provided showing their locations. Of these original ten probes, only five are known to still exist – M01, M02, M03, M04, and M08. The probes that Fox installed were single 2-inch probes that extended approximately 50 ft bgs with perforations from the bottom to within 10 ft of the surface (Fox, 1983).

Prior to 1997, eight more probes (MW01 to MW08) were installed just inside the east edge of the landfill. These probes were installed as clusters of three wells in each location with 1-inch diameter well casings slotted at different depths (shallow, intermediate, and deep).

Between 1996 and 2000, the COA installed LFG probes outside of the landfill boundary on adjacent properties (M11 to MW19, E01, and E02). These probes were placed approximately 200 ft or more from the landfill boundary and were installed as clusters (shallow, intermediate, and deep). The offsite probes were installed before the LFG extraction system had reached its full effectiveness and LFG was being detected beyond the boundary of the landfill. Screen intervals and/or probe depths for each of the COA's LFG probes are provided in Table 3 and probe locations are shown on Figure 7.

In addition to the COA's perimeter and offsite LFG probes, there have been LFG probes installed in conjunction with land development within the 1,000-ft landfill buffer zone. These probes were installed as part of the developer's LFG assessment and/or as part of the facility's operations monitoring and maintenance plan. The COA is not responsible for monitoring probes installed during property development with the exception of LFG probes installed in the Alameda Business Park (west of the LALF). In 1999, the developer of the Alameda Business Park installed 63 LFG probes, with a minimum of one probe on each of the 59 lots in the development. A few of the probes were destroyed or abandoned during property development, but most are still accessible. The COA maintains a number of the probes that were installed on lots that were purchased by the COA and developed into Little League baseball fields and supporting infrastructures. These probes are considered COA property.

The COA performs LFG probe readings from COA's perimeter and offsite probes every other week as part of the routine LALF maintenance and monitoring activities. Methane was last detected in offsite LFG probes in September 2010. The last methane detection in an LALF perimeter probe was in August 8, 2012 at MW05 (exceeding the LEL of methane). The COA reads LFG levels from the COA-owned Alameda Business Park LFG probes on a quarterly basis. Methane was last detected in the Alameda Business Park in July 2010 (below the LEL for methane).

Because most of the LFG data from offsite and perimeter probes collected over the past 13 years are non-detect values, quantitative historical data have not been included in this document. Review of past LFG data from offsite and perimeter probes is possible by arranging to access the AEHD's project files maintained at their offices downtown.

3.3 Groundwater Monitoring Wells and Data

A hydrogeologic study was performed in 1987 that included the installation of groundwater monitoring wells and development of a groundwater model. Additional wells were installed by the COA between 1989 and 1991 to determine contaminant contributions to groundwater from the landfill (IT, 1997a). A total of 19 groundwater monitoring wells were installed at or near the LALF property (identified as LALF01 through LALF19). Seven of these groundwater monitoring wells are within the fenced portion of the LALF. The LALF groundwater monitoring wells were typically constructed with riser casing that is a few feet above the ground surface. Bollards are used in most locations to protect the wells from being damaged by vehicles. The COA routinely accesses these groundwater monitoring wells for groundwater level gauging (monthly) and sampling (quarterly) as part of O&M activities at the LALF.

In addition to monitoring and sampling their own wells, the COA has access to the monitoring wells and water production wells installed on the PNM Reeves Generating Station and the American Gypsum property. PNM has six groundwater monitoring wells (Reeves1 through Reeves6) on their property and two facility production wells. The monitoring wells have been incorporated into the COA's quarterly monitoring plan. The Reeves production wells (REEVESPRODE and REEVESPRODW) are sampled annually, but there is no access into the wells for measuring water levels. The American Gypsum well is sampled quarterly, and is also sealed at the surface. The locations of the groundwater monitoring wells are included on Figure 8. Table 4 provides basic well construction details and depths to water for a recent monthly gauging event (July 2, 2012). Well construction details and/or boring logs are provided in Appendix D.

The quarterly and annual groundwater sampling performed by the COA on the groundwater wells includes the collection of field parameters (dissolved oxygen, turbidity, conductivity, temperature, and pH) and samples for laboratory analyses. The samples are sent to an environmental analytical laboratory. Analytes include VOCs, inorganics, general chemistry, and select anions. A summary of laboratory analytical results for COC are included in Table 5. The COA retains records of all field and analytical data that can be made available if more detailed information is needed.

In general, the groundwater quality data shows that the dissolved contaminant plume extends south-southeast of the LALF, as far as the PNM Reeves Station. Maximum PCE and TCE concentrations have been detected at 23 micrograms per liter (µg/L) (at LALF10 in September 2007) and 14.9 µg/L (at LALF12 in January 2008), respectively. Plate 3 shows the distribution of PCE and select biodegradation daughter products as detected during the May 2011 annual groundwater sampling event. There has been a gradual decrease in contaminant concentrations over time, which can be attributed, in part, to the consistent operation of the SVE system beneath the LALF.

3.4 SVE System Installation

Site investigation work to characterize the extent and magnitude of the persistent contamination of groundwater beneath and downgradient of the LALF was performed in 2001. Vapor samples collected from LFG extraction wells and existing soil gas probes were found to contain the VOCs previously identified as COCs. Most of the compounds detected are associated with either solvents, refrigerants, or the production of plastics.

In 2005 and 2006, the COA addressed the contamination of groundwater by installing a groundwater pump-and-treat system and an SVE system. The SVE system was installed on the LALF property and consists of a number of vapor extraction and injection wells. All of the SVE wells are screened at depths below the bottom of the landfill. An induced vacuum acts to remove VOCs from the vadose zone (unsaturated soils between the ground surface and the groundwater table) to prevent ongoing contamination of the groundwater from the landfill. A vacuum is induced on the extraction wells by a blower connected to the wells by conveyance piping. Collected vapors are discharged directly to the atmosphere.

In order to reduce the potential for the extraction wells to pull LFG from the bottom of the landfill or introduce added oxygen into the landfill from an induced vertical pressure gradient, air is injected into strategically placed air injection wells. The objective of the air injection system was to try to sustain a horizontal flow pattern in the vadose zone.

The SVE system was constructed with the following elements:

- 20 extraction wells at ten separate locations with shallow and deep wells installed at each location (nested).

- Six air injection wells installed at three separate locations (nested).
- Common extraction piping connecting the ten extraction well locations and common injection piping connecting the three injection well locations.
- 19 condensate sumps.
- 13 flush-mounted well vaults containing wellhead plumbing and controls including gate valves, sample ports, and pressure gauges (four of the SVE wellheads have since been converted to aboveground completions).
- 13 monitoring probes with separate shallow and deep screen sections at each location.
- A skid-mounted blower system consisting of a 15-HP extraction blower, a 10-HP injection blower, a condensate knockout vessel, and a 1-HP condensate transfer pump.
- A condensate storage tank.
- System controls.
- A pre-engineered metal building (enclosing the pump skid, tank, and controls).

Most of the conveyance piping is installed below grade, but the remainder of the SVE system infrastructure penetrates the landfill cover (i.e., well vaults and condensate sumps) or is constructed above grade (e.g., piping that crosses over Clifford Channel). Each sump consists of a riser pipe and a valve box surrounded by bollards. The skid building is centrally located on the LALF and is serviced by buried high-voltage power lines from the transformer located on the east side of the LALF. A site plan showing the layout of the SVE system at the LALF is provided as Plate 1. As-built drawings for the SVE system are included in Appendix E.

3.5 Groundwater Remediation System

The original design and construction of the groundwater pump-and-treat remediation system consisted of four extraction wells, a treatment plant, two injection wells, and instrumentation and controls. The remediation system is located at the PNM Reeves Station (south of Paseo del Norte), approximately ½ mile south-southwest of the LALF (see Figure 8 for the location of the generating station relative to the LALF). As designed, the treatment process consists of the pumping of contaminated water from the extraction wells at a rate of approximately 65 to 85 gallons per minute (gpm) each, for a total combined maximum flow rate of 320 gpm. This water is conveyed to the treatment building, through a bag filter element, and into a pretreatment storage (PTS) tank. The raw water is then pumped into a shallow-tray air stripper where air is blown through the cascading water, which volatizes the dissolved contaminants and removes them through ventilation into the atmosphere. Treated water is transferred through another bag filter to pre-injection storage tanks where it is detained until reinjection into the aquifer. A skid-mounted pump building contains injection pumps, cartridge filters, and a process logic control

(PLC) panel that controls injection metrics and backflushing of the injection wells. A site plan showing the location of wells, piping, buildings, and tanks is provided as Figure 4.

The original construction of the system was completed in the summer of 2005 with start-up in October 2005. The system was operated off and on for two months through early December 2005. In early 2006, frequent injection well clogging events eventually led to the system being turned off in March 2006.

The system remained idle for over a year before the COA commissioned a system evaluation to determine the cause of the clogging. In 2007, the evaluation report determined that a variety of design deficiencies could be contributing to the injection well clogging. Per the recommendation of the evaluation report, two new injection wells were drilled and installed in 2008. Equipping of the new injection wells required the construction of the preinjection storage tanks, pump skid building, and injection well infrastructure including the following equipment at the injection well:

- Two automatically actuated globe valves to direct injection and backflush flow to the appropriate pipe.
- A submersible pump for backflushing the well.
- A variable orifice flow control valve for maintaining constant injection rates and allowing the injection and backflush to use the same downhole tubing.
- A hydraulic pump to operate the flow control valve.
- A heated enclosure to protect the wellhead equipment.

The system was restarted in late 2010 and operated for several weeks before the injection well clogged again. Subsequent investigations determined that calcium carbonate scale was forming in the well when treated water mixed with groundwater. The chemical sequestering agent used to prevent scale in the treatment and injection system appeared to be diluting in the well, which allowed scale to form. In 2011/2012, a design for a sulfuric acid delivery system was completed, and the COA is presently planning the pilot testing of the system. Acid injection will adjust the pH instead of sequestering it, thereby preventing scale from forming. Record drawings for the original system construction and the injection modifications are maintained in the AEHD's project files, and are available for public review.

When the pump-and-treat system was operable, it was effective in its ability to treat the contaminated water. All COCs were removed from the raw water to below laboratory detection limits. Table 6 provides a summary of influent and effluent sample results from samples collected in February 2012.

4.0 LFG CONTROL PLAN

Successful management of the LALF relies most heavily on controlling the most significant hazard, LFG. The LALF's ability to generate LFG at a rate that causes pressurization of the landfill leads to offsite migration, creating the potential for acute physical and health risks and long-term impacts to the environment. Since the late 1990s, the COA has focused significant resources on developing LFG control infrastructure and implementing operational procedures. This section of the LMP formalizes the O&M of the existing LFG extraction system as the most significant LFG control process. It also considers how to minimize LFG production to begin with, and how to mitigate the migration of uncaptured LFG. This plan recommends LFG values which would cause the AEHD to institute changes to the LFG control plan. Lastly, the LFG control plan will address the feasibility of using the methane gas generated by the landfill as an energy source.

4.1 LFG Control by Extraction

4.1.1 LFG Extraction Fundamental Operating Goals

The LALF is still generating enough LFG to contribute to offsite impacts if not physically extracted using the existing infrastructure; however, with it being nearly 30 years since the LALF was closed, it is clear that the trend in LFG production rates is gradually decreasing from year to year. Not only was this demonstrated in the data presented in Figure 6, it is also evident by the number of wells that are able to sustain LFG extraction. Of the 60 extraction wells installed at the LALF, only about 20 to 30 of the wells are open to vacuum at any one time (see the data in Table 1). Only those extraction wells where minimum LFG quality is present are open to extraction. The fundamental requirement in the operation of the LFG extraction system is to operate the system in a manner that does not introduce oxygen into the waste near the wells.

The most efficient process for the degradation of organic material is an aerobic process. The aerobic degradation process is facilitated by bacteria that use oxygen to oxidize substrate. Because of the large mass of organic material in landfills, the aerobic degradation process occurs rapidly, which results in the consumption of available oxygen. Once the oxygen needed by aerobes (aerobic bacteria) is consumed, the landfill process becomes anaerobic. Anaerobic bacteria rely on a more complex process for degrading organic material that ultimately results in methane generation. Aerobic degradation in landfills is discouraged for three main reasons:

1. Heat is a product of aerobic degradation, and excessive heat in the waste can result in the combustion of organic material (landfill fires are typically difficult to extinguish).
2. Related to Number 1, above, oxygen is needed to sustain combustion and keep landfill fires burning.

3. It can take time to return portions of the landfill to anaerobic conditions once oxygen is introduced and anaerobic bacteria populations are diminished.

For these reasons, the operation of the LFG extraction system is based on procedures that minimize oxygen introduction into the waste. This is accomplished by performing frequent well field balancing events, which include monitoring LFG quality and adjusting the extraction rate at each well. The term "balancing" refers to the objective of balancing the extraction rate with the LFG generation rate. Because the goal of the LALF extraction system's operation is to prevent offsite migration of LFG, pressure at the well is adjusted to maintain a slight vacuum. A positive pressure at the well indicates that LFG generation in that portion of the landfill exceeds the extraction rate, and the possibility for offsite migration is present. Wells that have oxygen present in the LFG or that have low methane levels or high temperatures should be isolated from the extraction system by closing the valve at the wellhead. For the LALF, the following criteria have been established for opening a well to vacuum during well field balancing:

- Methane must exceed 35%.
- Oxygen must be lower than 3%.
- The temperature of the LFG must not be greater than 125 degrees Fahrenheit.

Occasionally, wells with LFG quality outside the above parameters will need to be opened to vacuum to prevent offsite migration or to maintain sufficient flow to the flare.

As LFG generation rates diminish at the LALF, these balancing criteria will become more difficult to maintain. The enclosed ground flare is designed to operate at LFG flow rates of 150 to 1,000 cubic feet per minute. Additionally, the LFG blower has a maximum vacuum capacity of approximately 35 to 42 inches of water. As wells are turned off from the extraction vacuum, the LFG flow rate decreases and the vacuum in the pipe increases. O&M of the LFG extraction system should be performed with an understanding of these operational limitations.

4.1.2 LFG Extraction System O&M

Because of the importance of maintaining control of potential offsite LFG migration, the ability to operate the LFG extraction system as near to 100% of the time as possible is paramount. Near constant operation requires consistent performance of O&M to all the system components. The following O&M program has been developed by the AEHD and is adopted by this LMP.

Performance of routine O&M of the LALF LFG extraction system requires frequent visits to the landfill with a recommended minimum of two visits per week. Visits should be spaced such that they will not only result in the completion of necessary tasks, but also serve to periodically verify system operations and site security. The operation of the flare system can also be verified remotely at any time using the online telemetry connection to the flare's control panel. The remote telemetry system allows real time observations of operation parameters and trends in the electronic chart recorder data, with limited ability for system manipulation (i.e., set point adjustments).

4.1.2.1 Enclosed Ground Flare and Blower Skid

O&M checks of the LFG extraction blower and flare systems shall be performed at least weekly, and more frequently depending on the activities being performed onsite. These O&M visits shall include careful documentation of the skid-mounted extraction system and flare performance. The LFG extraction system is operated through a central control panel. The panel offers displays of key operating parameters and set points. These data will be recorded at least weekly and before and after every well field balancing event. In addition to documenting operating parameters, pressure gauges that are read directly shall be vented and zeroed before each reading. LFG quality will be measured from a point located on the vacuum side of the blower. The LFG will be analyzed with hand-held meters for methane, carbon dioxide, oxygen, balance gas (predominantly nitrogen), and NMOCs. The control panel is equipped with an electronic "chart" recorder. This recorder shall be inspected for operation trends between site visits. The data from the recorder will be periodically downloaded and archived by the AEHD. A list of data that will be recorded during each site visit is provided below:

- Inlet temperature of LFG
- Vacuum induced in the header pipe from the blower
- Differential pressure across the demister
- Air pressures on condensate destruction system (3)
- Suction and discharge pressures on air dryer
- LFG flow
- Flare temperature
- Louver positions on the flare
- Amperage draw by the blower
- Hour meter for the blower
- Condensate level in the demister
- Blower discharge temperature
- Blower discharge pressure
- Programming set points

- Thermocouple selection
- Burner flame signal
- Pressure at the flame arrestor
- Pressure at the condensate aspirator
- Burner position
- Pressure from the supplemental fuel source
- Pressure on the pilot fuel
- Condensate sump pressure (air)
- Air compressor oil pressure
- LFG quality (before blower)
- Position of the valve on header connection
- Meter reading on the natural gas supplemental fuel line
- List of enabled alarms (if any)
- Weather conditions (temperature, barometric pressure, wind speed, rainfall, etc.)

These data shall be reviewed for trends or evidence of impending maintenance requirements and then archived by the AEHD.

In addition to recording operational data, the equipment shall be checked weekly for proper lubrication and operation, particularly with regard to the condensate destruction system.

Some O&M tasks do not need to be performed as frequently as weekly. These include quarterly O&M of the flare system and the air compressor/air dryer. Some actions require that the equipment be turned off to complete them. Established equipment shut down and start-up procedures shall be followed to safely perform these activities. The following items on the flare system shall be checked and/or adjusted quarterly in accordance with manufacturer recommendations:

- Check flare igniter for spark and gap setting and adjust as needed.
- Check igniter wiring for heat damage and worn insulation.
- Check the pilot by verifying that it lights and that voltage is in an acceptable range.
- Verify that the thermocouple signal is within calibration range.
- Manually actuate the fail-safe valve and verify that it closes in less than two seconds.
- Start the blower manually and ensure that startup and shutdowns are smooth.

- Verify set points.
- Calibrate the flow and pressure transmitters.
- Inspect and clean the demister element (if pressure drop is significant).
- Verify that the louvers fully open and close.
- Change the oil in the compressor.
- Clean air filters on the compressor and air dryer.
- Adjust the belt tension on the compressor.
- Manually operate the condensate destruction system and confirm proper operation.
- Verify that the proper time is displayed on the system central processing unit (CPU).
- Perform forced shutdown using set points and equipment manipulations to test alarm conditions. The shutdown alarm conditions shall include high temperature, blower fail (overload), pilot fail, flame fail, and low temperature.

Finally, there are O&M actions that are recommended only once a year. These include:

- Check the switches and contactor and look for arcing contactor points.
- Re-torque electrical connections and check for loose bolts on the structure and flanges.
- Inspect the flare interior, including the flare, burners, and refractory/insulation material.
- Inspect the flare exterior, including louvers, louver motors, surfaces, insulation, and sight glass.
- Replace the battery in the CPU.

Additional details for these tasks are specified in the document entitled, *Operation & Maintenance Manual for an [sic] 22 mmBtu/h Enclosed Gas Flare Station for the Los Angeles Landfill, Albuquerque, New Mexico* (Perennial Energy, Inc., 1997). The maintenance schedule and spare parts list from this document are included in Appendix F. The full document is available in the AEHD's project file.

4.1.2.2 Condensate Management

One of the key components in the degradation of waste and the generation of LFG is moisture. Moisture retained in the waste is extracted with the LFG. Typically there is a temperature drop between the waste prism and the lateral/header piping. As the LFG cools, condensate forms and accumulates in the pipes. Nine condensate sumps installed at intervals along the header were originally designed to handle all of the condensate. These nine sumps (CS01 to CS09) are plumbed to the condensate collection and destruction system at the flare station. The original sumps (and LFG extraction well IW10) are equipped with pneumatic pumps that are designed to continuously pump water fluid from the sumps to the condensate storage tank at the flare station where it is ultimately injected into the enclosed ground flare as part of the condensate destruction system. Two primary issues limit the effectiveness of the of the condensate recovery system (1) the limited amount of moisture that enters the landfill, and (2) the impacts of differential settlement on the plumbing that has been previously described. Most of these sumps do not perform as intended, collecting only nominal amounts of condensate. Because of the limited condensate recovery, the pumps are not left to run continuously and are instead only pumped manually as needed (with the exception of the pump installed in extraction well IW10, which runs continuously). The seven passive condensate sumps installed at low-lying points on lateral piping runs are also pumped only as needed. There are noticeable seasonal variations in the amount of condensate that is generated. Typically, condensate accumulates more readily during the seasons where precipitation is more likely to occur and during the winter months when the ground around the header/lateral piping is cooler. During these periods, condensate can accumulate in pipes and occlude LFG movement if not removed.

Because of the variability in the condensate generation rate, the equipped and passive sumps should be checked weekly and evacuated as needed. Equipped condensate sumps are pumped using the pneumatic pumps and the pressurized air supplied by the compressor at the flare station. The passive condensate sumps are evacuated using an electrical submersible pump that is moved from sump to sump. Condensate management is an important O&M task. Occluded pipes can block LFG flow from recovery which may result in offsite LFG migration. Also, when wells are blocked from LFG extraction, the result is higher vacuum and flows on the other extraction wells, which disrupts the well field balancing previously described. There are times when condensate accumulates in portions of the piping system that are not serviceable by a condensate sump. When this occurs, a more aggressive procedure is required to move the condensate. This procedure involves iterative manipulation of the system's nine isolation valves (located at intervals on the header system) to temporarily focus vacuum and flow to the blockages and move condensate to functioning collection points.

The other condensate management tool that has been installed at select LFG extraction wells at the LALF is the P-trap device. This device is constructed with pipe that connects the lateral directly to the well casing to passively drain condensate in the lateral back into the well. The device is constructed with either a U-shaped plumbing configuration or a check valve to ensure that LFG control is maintained through the wellhead plumbing. P-traps do not require operational maintenance, but they need to be routinely checked to confirm plumbing integrity and make certain that short circuiting around the wellhead plumbing is not occurring. During the driest months, fluid may need to be added to the P-traps to retain vacuum control to the well.

4.1.2.3 LFG Extraction Wells and Plumbing

The LFG extraction well field and conveyance piping shall be maintained as needed. During routine balancing events, the wellheads shall be inspected for signs of stresses resulting from localized subsidence. When resulting stresses appear to impact the integrity of the extraction well or plumbing, the area will be excavated and the plumbing adjusted and/or repaired. Additionally, general maintenance on the LFG extraction wells shall include ensuring proper valve operation; making sure sampling and testing ports are clear; and replacing sampling ports, thermometers, flow valves, pitot tubes, etc. as required.

Each year, the differential settlement at the LALF results in the need to excavate and repair plumbing/wellheads or removing swales in header/lateral piping. Generally, major repairs should performed in late summer to ensure that the LFG extraction system is in peak operating condition during the AIBF; however, conditions that detrimentally impact LFG collection efficiency should be addressed in a timely manner to prevent LFG migration/exposure risks. Plumbing repairs to HDPE pipe shall only be performed by a technician that is certified in butt-fusion and electrofusion welding. In order to maintain current drawings of buried infrastructure, any modifications to system components shall be documented and record drawings shall be placed in the AEHD’s project files.

4.2 Stormwater Drainage and Surface Maintenance Plan

Management of stormwater is an important part of the LFG management plan. One of the primary components in the rate of degradation of organic waste is the available moisture in the landfill. Landfills in arid environments, such as Albuquerque, typically have slower degradation rates, which corresponds with lower methane levels in LFG. These conditions benefit the management of LFG at the LALF, as offsite migration is easier to control. The introduction of moisture from stromwater infiltration has the effect of accelerating decomposition, increasing LFG generation, and causing localized differential settlement. These effects are discouraged and can be mitigated by minimizing the amount of stormwater incursion by promoting drainage off of the landfill surface.

The LALF was originally filled to match the surrounding natural grade (from east to west) and capped. This design worked well to maintain drainage from the landfill surface for several decades. As organic waste has degraded and the waste prism has naturally settled, the effects on the surface elevation have included a gradual site-wide decrease from several feet to over 10 feet. The COA started to compensate for this settlement by routinely importing soil fill to maintain drainage outlets to the two stormwater discharge points on the west side of the landfill that drain directly into the AMAFCA North Diversion Channel. Over the past several years, the subsidence has become so pronounced that the amount of fill that would be necessary to maintain site drainage could not be provided under the operations budget for the landfill. Stormwater now accumulates on the western edge of the landfill where it ponds until it evaporates or infiltrates.

Ideally, the landfill surface would be maintained at the same elevation as when originally closed; however, to achieve this goal, fill material would have to be imported and placed across most of the 77 acres of the landfill. This solution could require as much as several hundred thousand yards of imported fill material and is simply cost prohibitive. The AHED has instead adopted a routine grading and drainage plan that directs storm water to a common location on the west side of the landfill. By focusing the storm water to a single point, the effects of moisture intrusion to other parts of the landfill are avoided. LFG generation rates are closely monitored after precipitation events and additional efforts to remove condensate from the extraction system to ensure efficient LFG collection system operation are implemented during the wetter seasons.

Besides minimizing stormwater intrusion into the landfill, one of the other LALF management goals is to maintain drivable surfaces during the AIBF. Draining stormwater off of soil capped surfaces is essential to prohibiting the saturation of the soil and the development of muddy conditions. Maintaining driving surfaces is not only a convenience to those recreating on the landfill, but also serves to minimize damage to the landfill cap and buried infrastructure that could be damaged if heavy vehicles are sinking into the cap. The COA routinely grades parking and travel areas prior to public use to ensure that puddles do not form in travel and parking areas.

4.3 LFG Mitigation Measures

The COA's operation of the LFG extraction system has been responsible for mitigating the migration of LFG off of the LALF property. There are, however, a few other mitigation measures that have been installed at or adjacent to the LALF that the COA is responsible for maintaining. Most are resultant from the installation of utilities within the COA-designated buffer zone. A risk mitigation measure has also been installed at the COA's Alameda Little League complex west of the landfill. Section 6 of this LMP plan details the property and infrastructure development process and how to comply with the *Interim Guidelines* and Section 7 identifies subsurface utilities in the LALF landfill buffer zone.

In 2003, the COA installed a non-potable water line along the south side of Alameda Boulevard. The design for this water line included LFG mitigation measures to prevent the migration of LFG away from the LALF. The mitigation measures included the installation of a synthetic liner along the north edge of the landfill and a number of trench plugs and vents installed at intervals along the pipe. The liner extends from the proximity of the existing fence line toward the street and is buried beneath the water line. Low permeability trench plugs with passive vent pipes installed adjacent to the plugs minimize LFG migration along the utility trench. The passive vents daylight at the surface and are labeled with warning placards. The success of these mitigation measures relies on their being maintained as designed. Future work in the area shall be done in a way that does not circumvent these measures and shall only be performed with written approval from the AEHD. Damage or penetrations of the liner must be repaired with like material by a competent liner installer. The passive LFG vents shall not be impeded or removed without providing an alternate venting solution. The COA owns this infrastructure and is responsible for maintaining it in accordance with the intent of the design.

The Alameda Boulevard/Balloon Museum Drive intersection was improved in 2012. LFG mitigation measures that were incorporated into the improvements included the venting of vaults and pull boxes, installation of conduit seals on power and signal conductors, and posting of warning signs in all new subsurface boxes. The infrastructure is owned and maintained by the COA and any future modifications to the equipment or vaults shall retain the LFG mitigation measures specified in the design.

Between 2007 and 2010 the AEHD installed new power and communications lines on the landfill as a result of moving the power transformer (from the center of the landfill to the edge) and installing a power supply grid for RV parking. Prior to making these improvements, the COA commissioned the design of LFG mitigation measures to be incorporated into the infrastructure. Mitigation measures included the installation of conduit seals, the use of flexible HDPE conduit for underground sections, and prohibition on conductor splices/connections less than 18 inches above the landfill surface. These mitigation measures shall not be compromised by future work. Any new infrastructure that connects to buried utilities that cross or enter the landfill shall be designed and installed in accordance with the requirements in the *Interim Guidelines*.

As part of LFG risk mitigation measures, the COA purchased a number of lots on the east side of the Alameda Business Park. These lots are immediately adjacent to the west side of the landfill (separated from the landfill boundary by the North Diversion Channel). The COA developed these as Little League baseball fields. The development included the construction of one permanent structure on the lots that houses maintenance equipment, bathrooms, an administrative area, and kitchen/concessions booth. The design of the building did not include any special LFG mitigation measures; however, risk abatement measures included the installation of a methane sensor in the building. The sensor is connected to a control panel that continuously monitors methane levels and is programmed to generate an audible alarm and strobe if a methane threshold is exceeded. Upon construction of the building, the responsibility for calibrating and maintaining the methane detection system was retained by the AEHD. The AEHD shall facilitate the semiannual calibration of the sensor and perform confirmatory LFG screening in the building. These actions shall be performed until the AEHD approves an alternate plan.

Besides the mitigation measures installed and/or maintained by the COA, private industry has been responsible for the development of several lots within the LALF buffer zone since the promulgation of the *Interim Guidelines*. The extent of LFG mitigation measures range from passive vents to a forced air extraction system. The COA is not responsible for maintaining LFG mitigation measures installed on private property or for private development unless installed on COA infrastructure and there is an agreement that the COA will adopt the LFG mitigation infrastructure. The AEHD, however, is responsible for reviewing operation maintenance and monitoring plans (OMMPs) submitted by developers and tracking compliance with the plans. The AEHD shall track and enforce compliance with OMMPs developed for properties installed within the LALF buffer zone. Modifications to established OMMPs or LFG mitigation measures shall be approved by the AEHD prior to the changes. The AEHD must also periodically inspect and review mitigation measures installed on COA infrastructure and ensure that there have not been any changes in site conditions.

4.4 LFG Monitoring

LFG monitoring is essential to LFG control actions and is an established LALF operations activity, which incorporated into this LMP. The effectiveness of the LFG extraction system is most conveniently confirmed through the monitoring of LFG probes at the landfill perimeter and off site. LFG monitoring as a component of future development in the LALF buffer zone is also a tool that is likely to be employed.

4.4.1 LFG Monitoring at Existing COA Probes

The locations of the existing COA LFG probes provide representative coverage of potential LFG dispersion areas (see Figure 7). The perimeter and off site LFG probes are monitored by the COA every other week. The probes included in the confirmation monitoring are MW01 through MW08, M08, M14 through M19, E01, and E02. Former leachate wells are not monitored because they are in the landfill. Because of the threat of offsite migration of LFG, it is essential that the LFG monitoring from these probes be continued. Through repeated monitoring, it has been established that the sampling interval of every other week is sufficient to monitor perimeter and off site conditions. These monitoring events shall be performed in the week opposite of the well field balancing to ensure that there has been enough time for the landfill to stabilize after well manipulations. Data from these monitoring events shall be retained by the AEHD and made available to the public upon request.

The COA also monitors for LFG in select probes installed on lots on the east side of the Alameda Business Park (closest to the LALF). Most of these probes are on lots that the COA purchased for the Little League fields; however, a few of the probes are located on privately owned lots (probes AM11, AM34, AM35, AM58, and AM29) where LFG was historically detected or are closest the LALF. The select probes that are monitored are shown on Figure 7 and include AM11 through AM14, AM16, AM18, AM19, AM28, AM30, AM33, AM34, AM35, AM57, AM58, AM59 and AM63. LFG probes M16 and M17 are located between the LALF and the Alameda Business Park and are sentinel probes for detecting LFG migrating to the west. For this reason, the frequency of monitoring the probes in the Alameda Business Park has been established as quarterly. Each of the other lots in the Alameda Business Park also have probes installed in them as part of the LFG characterization work in the 1990s. With the continued operation of the LFG collection system, there is no reason to monitor the other probes in the business park as long as LFG is not detected in the probes that are included in the routine monitoring schedule. Property owners in the Alameda Business Park should be encouraged to maintain LFG probes in case conditions or operational strategies change at the LALF.

4.4.2 Requirements for Non-COA LFG Monitoring and Reporting

Any future development (i.e. new construction, utility installation, remodeling, etc.) within the LALF buffer zone is subject to the requirements specified in the *Interim Guidelines*. The development process is detailed in Section 6 of this LMP. In general, the decision to install LFG probes and perform routine LFG monitoring as a part of the development process shall be the decision of a qualified professional engineer (PE). The *Interim Guidelines* specify that development be planned to address current LFG impacts as well as possible future impacts. Although this LMP specifies that LFG extraction be maintained as a control measure, the qualified PE for new development must provide conservative recommendations that take into account the possibility that the LFG extraction system is turned off or inoperable for a period of time. Should LFG monitoring be a mitigation measure adopted by the qualified PE, an OMMP shall be developed which specifies monitoring methods and frequencies. The AEHD must approve of the OMMP prior to the start of the development work.

The LALF is unique in comparison with other former Albuquerque landfills in that it is the only landfill where active LFG extraction is occurring. At other landfills, a baseline monitoring period is acceptable with opportunities to adjust the frequency of monitoring based upon the establishment of baseline data. The LALF LFG extraction system has been successful at abating off site LFG migration and there are no plans in the immediate future to turn the system off. This may result in developers assuming that there will not be any long term LFG risk; however, installation and monitoring of LFG probes at developments within the LALF buffer zone should be acceptable only if the qualified PE acknowledges that the LFG controls maintained by the

COA directly impact (reduce) the LFG monitoring results. The sole reliance on LFG monitoring on adjacent properties as a mitigation measure should not be permissible, as site conditions could change if the LFG extraction system is turned off.

LFG monitoring probes off of the LALF are the property of individual property owner(s); however, they may be considered as supporting infrastructure to a larger, landfill-wide monitoring network. Thus, even if AEHD makes a determination at some point that LFG monitoring is no longer required at a particular probe, the AEHD may still require that the LFG probe be retained and not destroyed. AEHD should have access to all LFG probes in the event that AEHD decides to perform a landfill-wide monitoring event, or if it is determined that methane levels have reached significant or dangerous concentrations on an adjoining property and additional data are required to protect public safety. Access agreements and Right-to-Enter documents between this property owner and the COA should be negotiated during the planning process.

All data collected from private LFG monitoring probes must be reported to AEHD within 30 days of data collection, or a written request for extension and reason for the needed extension must be submitted to AEHD. The requirements for data collection and reporting must be specified in each property development plan. These requirements must be made part of any OMMP submitted by the developer during the development process.

Continuous internal LFG monitoring will be required for any development on the landfill where a building is constructed, unless a qualified PE makes a determination that other mitigation measures make continuous monitoring unnecessary. It is important that each development project be handled individually in terms of requirements for LFG monitoring. In the landfill buffer zone, monitoring will generally be required unless a determination is made by a qualified PE that monitoring is not a necessary part of LFG mitigation.

4.5 Criteria for Decreasing or Increasing LFG Monitoring Frequency

The consistent collection and analysis of LFG data from the LALF monitoring probes since the early 2000s has shown that the operation of the LFG extraction system has successfully mitigated the offsite migration of LFG. Nonetheless, if site conditions change, the following action plan shall be followed with regard to observations of LFG detections.

If the LFG extraction system is turned off for more than 72 hours, the monitoring frequency for the perimeter and off site probes shall be increased from semiweekly to weekly.

If methane is detected in LALF perimeter probes at levels exceeding the LEL (5% methane), the adjacent LFG extraction wells will be adjusted to increase flow. If conditions do not improve after one regularly scheduled monitoring event, extraction will be increased again and the probes with the exceedences and its neighboring probes will be monitored on a weekly frequency until levels drop below the action level for at least two weeks.

If methane is detected in LALF off site probes at levels exceeding 25% of the LEL (1.25% methane), the nearest LFG extraction wells will be adjusted to increase flow. If conditions do not improve after one regularly scheduled monitoring event, extraction will be increased again and the probes with the exceedences and its neighboring probes will be monitored on a weekly frequency until levels drop below the action level for at least two weeks.

If methane is detected in LALF off site probes at levels exceeding the LEL, the nearest LFG extraction wells will be adjusted to increase flow. Additionally, the COA will obtain access to structures in the vicinity of the exceedence and perform daily monitoring of building interiors, open utilities (conduits, sewers, etc.), and confined features (vaults, pull boxes, sheds, manholes). If LFG is detected above 10% of the LEL in any of the structures outside of the LALF, the COA Fire Department will be notified and safety officials will determine a course of action to mitigate risks. Employed mitigation measures may include forced air ventilation, evacuation of buildings, limiting access to infrastructure where exceedences of the action level are detected, etc. If conditions do not improve after one regularly scheduled monitoring event, extraction will be increased again and the probes with the exceedences and its neighboring probes will be monitored on a weekly frequency until levels drop below the action level for at least two weeks.

If increasing flow from localized LFG extraction wells does not reduce LFG levels to below the action levels specified above after six weeks. The AEHD shall investigate the reason for the LFG extraction system’s ineffectiveness. The installation of additional probes and/or LFG extraction wells shall be considered.

4.6 Installation of New Perimeter Monitoring Wells by AEHD

The COA may have the need to install or replace LFG probes. This need may be caused by a variety of scenarios, such as:

- Changes to the landfill cover or cap that reduces natural passive venting through the surface (e.g., increase in area covered by millings, placement of engineered paved area, construction of structure/slab, placement of liner over waste, etc);
- Detection of LFG outside of the landfill;
- New development constructed at the landfill boundary where a perimeter probe does not exist;
- Action levels previously presented in Section 4.5 of this document are exceeded; and/or

- An existing probe is damaged or removed, requiring replacement.

Each new LFG monitoring probe will be constructed as a cluster of three discrete well casings and screens constructed of 1.0-inch diameter schedule 80 PVC, with a 2.5-foot screen interval (the bottom 6 inches of the probe shall be blank casing). The screen interval will be machine-slotted with 0.20-inch wide openings. Each probe will be fitted with a laboratory-grade valve/sample port at the surface. The three well casings will be staggered in depth and be identified as deep, intermediate, and shallow.

Deep probe, labeled “D”, will be installed as follows:

- The screened interval shall be generally at the elevation consistent with the historic record of the bottom of the trash (which is documented at up to approximately 40 to 50 feet from the landfill surface). The actual total depth of the probe may vary from point to point based on the location’s surface elevation with regard to landfill’s surface elevation. The minimum depth of the boring will be 45 feet from the ground surface at the given location and the maximum depth from surface shall be 60 feet;
- The bottom of the probe will be set at the total depth of the boring with a 6-inch sump below the screen;
- The annular space from total depth to two feet above the screen will be filled with 3/8-inch pea gravel;
- The annular space from the pea gravel filter material to the base of the intermediate probe will have a bentonite seal installed and hydrated (minimum of 12 feet).

Intermediate probe, labeled “M”, will be installed with the screen interval spanning either the elevation consistent with the midpoint of the waste prism at the nearest portion of the LALF or at the elevation of the bottom of a subterranean structure (i.e. basement, elevator sump, parking garage, etc.). Construction will be as follows:

- Bottom of the probe will be set at the top of the bentonite seal placed above the filter pack for the deep probe;
- A 2.5 section of slotted screen shall be installed above the 6-inch sump.
- The annular space from the top of bentonite seal for the deep probe to 2 feet above top of intermediate screen will be filled with 3/8-inch pea gravel;
- The annular space from the pea gravel filter material for the intermediate probe to the base of the shallow probe will have a bentonite seal installed and hydrated (minimum of 12 feet).

Shallow probe, labeled “S”, will be installed at the same elevation as the bottom of the nearest utility trench or to be consistent with nearby or replaced probes; but the top of the screen shall be no shallower than 10 feet. Construction will be as follows:

- Bottom of probe shall be placed on top of annular seal placed above the intermediate probe screen section;
- The annular space from top of bentonite seal for intermediate probe to 2 feet above top of the shallow screen will be filled with 3/8-inch pea gravel;
- The annular space from the top of the shallow filter pack to within one foot of the surface will be a bentonite seal installed and hydrated; and
- The final foot of the annulus shall be filled with fast curing concrete.

The bentonite seal will consist of Wyoming “Hole Plug” bentonite 1/2-inch pellets. The bentonite should be installed and hydrated with 5 gallons of water for every 2.5 feet of bentonite. In an effort to ensure that enough bentonite material is placed into the soil boring annular space and no caving of the borehole occurs, the quantity of bentonite (by volume) required to fill the annulus should always be calculated and measured prior to emplacement. The volume of bentonite and filter gravel placed in the hole should be compared with depth measurements every two feet as the annulus is backfilled. All annular material shall be installed using tremie pipe.

A 2-foot by 2-foot by 9-inch concrete pad with a flush-mounted traffic-rated steel vault (12-inch diameter minimum) shall be used for completion of each LFG monitoring probe installation. In some instances a steel riser may be used to accommodate probe stick-ups where installed in landscaped areas or where vehicular traffic is not anticipated. Probes installed in steel risers will be protected with a minimum of three traffic bollards installed with a minimum of two feet of pipe below ground and four feet above the surface.

The depths of the screened intervals provided above may vary due to existing field conditions. The probe design shall be carefully prepared by a qualified professional; and shall account for lithologic conditions, consistency with adjacent probe design, and other site conditions. Probe construction diagrams must be completed for each LFG probe and any variations in the probe construction from the proposed specifications should be noted on the diagram.

4.7 LFG Monitoring Probes Installed by Private Entities

A qualified PE may install LFG monitoring probes as part of the LFG assessment process or recommend their installation as part of LFG risk mitigation measures for new development on the LALF or within its COA-designated landfill buffer zone. AEHD must approve plans for LFG monitoring probe construction before the probes are installed. Soil boring logs and construction diagrams for each LFG monitoring probe must be provided to AEHD. The design of LFG monitoring probes should be similar to that described in Section 4.6. The private property owner must monitor the LFG probe(s) at a frequency approved by AEHD. The required LFG monitoring frequency will vary with each property and may change over time, depending upon monitoring results. All LFG monitoring data must be collected on a schedule agreed to by each property owner and AEHD and the LFG monitoring data must be submitted to AEHD within 30 days of collection.

4.8 Surface Emissions Monitoring

The AEHD has performed surface emissions monitoring (SEM) at least once annually at the LALF for the past several years. SEM involves a walking transect of the entire landfill with LFG analyzers capable of detecting trace methane and hydrogen sulfide levels that are emitted from the landfill surface. SEM is a monitoring method that is applied at modern landfill to verify that the LFG extraction system is performing as designed. The AEHD employs this type of monitoring as a safety screening tool before the LALF is made available to the public during the AIBF. Because the landfill is not capped with an impermeable liner, there is the potential for LFG to escape the landfill through subsidence cracks or around penetrations. The SEM events help identify and mitigate direct conduits to waste before the public is exposed to LFG. SEM is recommended prior to any public COA-approved use of the LALF property.

4.9 General Monitoring Methodology

Field LFG measurements shall be performed with an LFG analyzer specifically designed and maintained for landfill use. The analyzer used at offsite/perimeter probes, on the landfill to screen LFG extraction wells during well field balancing events, and for flare station readings must be designed to simultaneously read methane, carbon dioxide, oxygen, and balance (nitrogen) in percentage levels. The analyzer shall be calibrated in the field the day of use using the manufacturer's recommended calibration gas. The LFG analyzer used for off site or perimeter probes shall be calibrated using a reference gas with no greater than 15% methane, while calibration of the analyzer for well field balancing or flare readings shall use a reference gas with methane concentration in the range of the expected LFG level and no greater than 50%. The calibration process shall include a zeroing process for each of the sensors. Acceptable LFG analyzers include Elkin Earthworks, LLC's Envision ENV900 series, CES Landtec's GEM™2000 or GEM™500, or an AEHD-approved equivalent.

The LFG analyzer used for monitoring structure interiors or for health and safety screening shall be capable of simultaneously detecting methane, oxygen, and hydrogen sulfide in parts per million levels. There are many confined space and hazardous entry meters that meet the proper specifications for this type of analyzer. Daily field calibrations with gas of the appropriate span level shall be performed when using LFG screening meters.

Lastly, SEM should be performed using a flame ionizing detector (FID) capable of detecting LFG in the ppm range. The FID shall be operated with ultrapure hydrogen and calibrated with methane gas in the approximate range of 500 parts per million. Acceptable manufacturers of FIDs that can be used at the LALF include CES Landtec's SEM 500, Photovac's MicroFID or DataFID, Thermo Environmental's TVA1000, Trimble's SiteFID, or AEHD-approved alternative.

All LFG analyzers shall be maintained to factory recommended standards and factory calibrated at specified intervals. The analyzers shall only be used and maintained by qualified technicians.

4.10 Minimum Standards for Emergency Evacuation of Structures

If methane is detected in a building at concentrations exceeding 10% of the LEL, then COA Emergency Response Personnel (Fire Department) must be notified. The Albuquerque Fire Department will be responsible for any required evacuation actions. If an OMMP is required for a particular property, then that document must clearly outline the notification procedures during an emergency. Each plan should clearly state that AEHD will be notified if sensors detect methane in a building no matter the concentration. It is the responsibility of each individual property owner to have a contingency plan in place, as part of its OMMP, in the event methane is detected.

4.11 Potential LFG to Energy Opportunities and Impacts on LFG Control

The LALF has frequently been the focus of attention with regards to developing a beneficial use of the extracted LFG. Most beneficial uses of LFG involve either the generation of electricity through combustion of the gas, or supplementing fuel used by equipment (e.g. boilers). In 2011, the AEHD commissioned an LFG to energy feasibility study for closed landfills in Albuquerque. The following is a summary of the findings for the LALF from the resulting report. The complete report is available in the AEHD's project file for public review.

The peak LFG generation at the former LALF occurred several decades ago. LFG collection data over the past ten years confirms a gradual decay in the LFG generation. This decay is mostly seen in the reduction of the average flow of viable (approximately 35% to 40% methane) LFG. This is an important factor in the consideration of LFG to energy projects that may rely on a fairly consistent delivery of LFG. Seasonal fluctuations in LFG production also need to be considered.

The relatively low Btu quality of the LFG from the LALF eliminates many LFG to energy technologies like internal combustion engines or LFG conversion to liquefied natural gas as economically viable alternatives. Of the typical LFG to energy technologies available, only electrical generation using a microturbine or direct gas use (e.g. boiler for general heating or hot water) are considered technically viable.

An EPA Landfill Methane Outreach Program LFG to energy feasibility study conducted in 1998 for the LALF showed that an electrical generation project would not be economically viable based on the quality of the gas, high capital costs, and the low average electricity sales rate. Despite the results of the assessment, the City elected to pursue an electrical generation pilot study using a microturbine installed at the landfill. The low Btu quality of the LFG created definite operating challenges, and high maintenance costs ultimately resulted in cancellation of the project. It is possible that improvements to the microturbine technology may allow for higher success when operating on low Btu gas; however, supporting data show that the economic benefit is not adequate to recover capital costs within the expected life of the equipment without some type of benefit from a credit(s) or incentive(s). A significant portion of the capital costs for a microturbine system are the LFG conditioning system components. Portions of the existing conditioning system may be useable if a replacement microturbine(s) unit(s) was pursued; however, the existing system is weathered from outdoor operation and the controls system is obsolete. Warranty programs for a microturbine may require a replacement of some or all of the pretreatment/microturbine system components.

The LFG to energy boiler system option may be technically and economically viable provided the existing LFG collection and treatment system can be used during the remaining life of the existing system and an end user is identified nearby (preferably within 1 mile) that is willing to retrofit their existing boiler to operate on LFG or to purchase a new boiler designed to run off LFG. In either option, the boiler should be capable of being dual fired (LFG and supplemental natural gas) due to the low flow rate and inconsistency of the LFG being produced. The advantage of this type of LFG to energy solution is that changes to the existing infrastructure and O&M procedures would be associated primarily with new equipment as the existing equipment must be replaced. The bulk of the capital costs would be associated with design and construction of a pipeline to convey the gas to the end user, a gas conditioning system, and retrofitting/purchasing a boiler to have dual-firing capability. The total equivalent straight pipe length would dictate what changes to the existing blower system may be needed to account for pipeline head losses.

Ideally, a direct end user would consume all of the gas generated by the landfill. This would eliminate the added expense of operating the existing enclosed ground flare and lost revenue from LFG that was being flared off. It is possible that seasonal fluctuations in LFG production may result in an inconsistent flow of LFG to the end user. If the end user requires a constant flow rate, excess LFG would have to be diverted to a flare. The existing enclosed ground flare requires a minimum of 150 scfm and 4.4 MMBtu/hr quality gas to operate. Smaller flare options are available, but at added capital cost.

Use of the LALF's LFG for energy generation is also constrained by the objectives of the existing LFG collection system as a mitigating measure for offsite LFG migration. The primary objective of the extraction system is to prohibit LFG from reaching developed properties surrounding the LALF. This objective had negative impacts on the previous microturbine pilot study attempted at the site, as the extraction system pulled from wells producing nominal methane quality for control purposes, when higher Btu gas could have been obtained by focusing on extraction only from wells where higher Btu LFG was being produced. Any future consideration regarding LFG to energy at the LALF must balance the City's obligation to maintain control of LFG migration with supply of LFG with minimum methane levels. This applies not only to electricity generation, but also to direct use applications.

5.0 GROUNDWATER CONTAMINATION CONTROL PLAN

Moisture passing through the LALF comes in contact with waste containing soluble chemicals including hazardous compounds. These compounds are subsequently conveyed to the water table. For this reason, the landfill has been identified as a contributing source of groundwater contamination. Since source removal by waste relocation is not feasible, the SVE/AI system was installed to remove the VOCs from the vadose zone soils beneath the landfill, thereby protecting groundwater from further contamination. The SVE/AI system also works to treat groundwater by reducing concentrations in the vadose zone above the water and thereby reducing the partial pressure, resulting in contaminants partitioning from the water into the soil gas for removal by the SVE system. The groundwater pump-and-treat system directly removes contaminants from the groundwater through ex situ treatment.

Operation of both treatment systems is necessary for controlling NMOCs from the landfill. The operation of the SVE/AI system is perhaps most critical, as it is responsible for protecting groundwater from further contaminant impacts. To maintain consistent system operation, routine maintenance of mechanical equipment and infrastructure is necessary.

5.1 Discharge Permit and Regulatory Compliance

The LALF’s remediation systems are operated and maintained in accordance with the requirements of NMED Ground Water Discharge Permit Number DP-1468 and the Stage 2 Abatement Plan. The COA maintains records of maintenance activities and reports on operations and monitoring results as specified in the permit. The OSE regulates the evacuation and reinjection of the groundwater through operation of the pump-and-treat system under their Groundwater Appropriations Permit (RG-79750). Copies of the listed permits and plan approvals are available for review at the AEHD’s office or at the regulatory agencies.

5.2 SVE/AI System O&M

The primary objectives associated with operation of the SVE/AI system include the following:

- Maintain extraction and injection flow rates and other operating parameters within acceptable operating ranges
- Monitor for, and remove, condensate from system collection points
- Inspect and maintain mechanical equipment and aboveground infrastructure
- Measure effluent vapor quality using field instruments and record wellhead parameters
- Collect vapor samples for laboratory analyses

SVE/AI O&M requirements are established at varying frequencies. Weekly system O&M will focus on mechanical components in the SVE building and includes recording system parameters like vacuum, pressure, injection temperature, flow, pressure drop across the particulate filter and condensate levels in the collection tank. During the weekly O&M visits, the blowers shall be turned off for oil checks, belt tension checks, and lubrication at grease points. The technician shall record how long the system is turned off for any reason, as accurate data regarding operation run time is important for calculation of contaminant discharge from the stack.

Monthly O&M activities shall include inspecting SVE and AI well completion assemblies for damage; measuring injection/ extraction flow rates and pressure/vacuum and adjusting these rates, if necessary, based on City-endorsed procedures; inspecting the condensate transfer pump, air fans, and condensate sumps and arranging for condensate removal, as needed; and cleaning and performing routine maintenance on the SVE building.

The effects of differential subsidence also impact the SVE/AI infrastructure causing damage to plumbing, well vaults, and even the metal building. Maintenance activities shall include performing repair on strained or damaged infrastructure. In 2011, the SVE building was lifted and placed on a footing and beam system that allows for minor leveling adjustments. The building shall be checked annually for subsidence impacts and leveled as necessary.

Expendable parts and supplies required for continued uninterrupted operation of the SVE/AI system will be stored on site (e.g., grease, lubricating oils, air filters, replacement belts, etc.). Used oil and other waste streams will be removed from the site as soon as practical and properly disposed of or recycled.

Non-routine or emergency repair services will be performed as soon as possible once identified.

5.3 SVE System Sampling and Monitoring Recommendations

All SVE system sampling and monitoring shall be performed in accordance with the schedule and methods established in the Discharge Permit and the Abatement Plan. Routine monitoring of system effectiveness shall include measuring VOC and LFG concentrations from all SVE wells on a monthly basis. Quarterly monitoring and sampling activities shall include collecting vapor samples from the SVE exhaust and sending the samples for laboratory analyses, and collecting field measurements of VOCs and LFG levels in vapor probes installed adjacent to the SVE and AI wells.

5.4 Groundwater Treatment System O&M

The primary objective of the groundwater remediation system is to prevent further migration of the dissolved contaminant plume. To ensure proper operation, when the system is running, site visits shall be made at least weekly to monitor and record system parameters. Spare parts (filter elements, desiccants, transducers, fuses, etc.) shall be retained onsite to help minimize downtime. The process logic control (PLC) in the pump skid building monitors and controls preinjection storage tank levels, wellhead pressures, mounding/drawdown in the injection well, filter vessel pressures, valve automation, V-Smart Valve (downhole flow control valve) actuation, and injection pump cycling. Data from the PLC shall downloaded and analyzed for trends in operational parameters, particularly injection well metrics. Out of range data or drifts in data trends shall initiate a maintenance response to avoid alarm shut downs.

The successful operation of the system requires rigorous maintenance of the injection well(s). Clogging of an injection well requires the commitment of time and resources to return the injection well to baseline conditions. To avoid clogging, a weekly backflush schedule during system operation shall be maintained. Backflushing will remove grit and debris from the void spaces and rearrange soil particles around the well screen. Mounding and drawdown data shall be analyzed and criteria for identifying when more aggressive development of an injection well shall be established.

All field measurements and summaries of O&M activities shall be recorded in a dedicated field log book or on field forms if applicable. These data will be maintained by the AEHD.

For the groundwater extraction system, weekly O&M tasks shall include inspecting the extraction well completions and well head assemblies; reading and recording extraction flow rates and comparing totalized volumes to flow meter volumes on the air stripper to confirm consistency; reading and recording pressure gauges at the wellheads; and verifying that transducer readings on the pump control panel are within nominal ranges and that there are no error indicators or alarm conditions; recording. Monthly tasks for this system shall include inspecting the desiccant pack in the transducer termination box and the desiccant splash-proof box and wiring connections; optimizing extraction flow rates to ensure optimal performance and balance with injection rates; and measuring and recording extraction well water levels. Twice each year, the transducer readings shall be verified by performing a 3-point check of pressure versus actual transducer depth, inspect the air vacuum/air release valves on conveyance piping, and clean out vault boxes.

Weekly O&M activities for the water treatment building and associated infrastructure shall include inspecting and replacing, as required, bag filters; recording air flow rate and pressure in the air stripper (while blower is running) and comparing readings to target levels and checking for creep in values (indicates clogging of holes in tray); recording flow rates and totalizer readings for stripper influent and effluent flows (while pumps are running); and inspecting the electronic metering pump for sequestering agent, recording settings, calibrating dosage rate to target, and adjusting dosage to match treatment rate. Once each month, it is necessary to inspect and service the air stripper blower and motor and perform routine maintenance on the equipment building and PTS tank. On a quarterly basis, the air stripper feed pump and discharge pump shall be inspected and serviced. The air stripper trays and wetted parts shall be cleaned semiannually (this may require carbonate removal efforts using acid washes) concurrent with testing system alarm interlocks. The flow meters in the treatment building shall be checked, cleaned, and calibrated annually. The blower motor assembly shall be lubricated every 11,500 hours of operation.

For the injection system and associated infrastructure, weekly activities shall include recording system metrics, inspecting the PLC and viewing/analyzing the trend pages (particular attention will be given to mounding and drawdown trends during injection and backflushing, respectively), and backflushing the injection well(s). To maintain the integrity of an injection well and minimize the potential for clogging, the extraction and treatment systems shall be temporarily turned off prior to backflushing and the water in the pre-injection storage tanks will be drained via injection. The injection well will then be backflushed to remove grit and rearrange fines in the aquifer around the well. Surge development will be performed when more aggressive correction is needed. On a monthly basis, routine maintenance shall be performed on the equipment building and pre-injection storage tanks, the injection pumps shall be inspected, and PLC data will be downloaded to a secure media for transfer to the AEHD. The strainers on the pressure relief valve will be cleaned quarterly and any residual air will be bled off. Twice each year, the injection pump motors shall be lubricated (when under constant use) and the system alarm interlocks shall be tested.

The groundwater remediation system presents a number of health and safety risks that shall be managed with proper procedures, engineering controls, and PPE. Expected risks include fluid under pressure, loud equipment, trip hazards, exposure to hazardous chemicals, high voltage, fall from heights, and confined spaces. Additionally, the system is located on property used for electrical generation. As a result, all work on the property is subject to the health and safety and environmental protection practices required by PNM.

5.5 Groundwater Treatment System Sampling and Monitoring Recommendations

Groundwater treatment system sampling and monitoring shall be performed in accordance with the schedule and methods established in the Discharge Permit and the Abatement Plan. This includes sampling of the pump-and-treat system's influent and effluent at a minimum of quarterly (as frequently as monthly after shut down or modifications to the system design or process). Samples shall be collected for laboratory analyses for VOCs (specifically for the COCs

[PCE, TCE, 1,1-DCE, and methylene chloride]), inorganic compounds (e.g., chloride), and general chemistry parameters (total dissolved solids, ph, conductivity, alkalinity, etc.). Discrete samples shall also be collected quarterly from each extraction well and analyzed for the same parameters.

Groundwater quality beneath and around the landfill shall continue to be monitored for as long as the landfill has the potential to contribute contaminants to the water table aquifer and/or as required by NMED regulations 20.6.2.4103 NMAC. Presently there are five monitoring wells that are sampled annually per the Abatement Plan (LALF05, LALF07, LALF08, LALF11, and LALF15). All other wells are sampled quarterly and include (LALF03, LALF04, LALF06, LALF09, LALF10, LALF12, LALF13, LALF14, LALF16, LALF17, LALF18, LALF19, Reeves2, Reeves4, Reeves5, and Reeves6). This schedule shall be maintained. At a minimum, samples shall be submitted to an environmental laboratory for analyses for the COCs, chloride, and total dissolved solid. The present list of analytes includes a larger list of VOCs, inorganic compounds, and general chemistry parameters. These additional parameters are useful in determining plume dynamics, changes in water chemistry, and conditions that may impact the efficiency of the remediation equipment. Water levels shall be measured monthly and monitored for changes in hydraulic gradient and impacts generated by the operation of the pump-and-treat remediation system.

Over time, it may be determined that adequate data have been collected to consider a reduction is sample frequencies at some locations. Changes to the monitoring and sampling program shall be pre-approved by the NMED. In the event that wells are required to be abandoned, repaired, replaced, or new wells drilled, work shall be performed under as specified in OSE's regulations pertaining to construction, repairs, and plugging of well (19.27.4 NMAC). This includes submitting permit applications and getting approval for the work prior to its commencement.

5.6 Action Levels for COCs

Groundwater quality is regulated by the NMED's Ground and Surface Water Protection regulations (20.6.2 NMAC); this includes the establishment of the WQCC standards. The US EPA also has separate drinking water standards that different than the WQCC standards. The Abatement Plan specifies that the lesser of the EPA drinking water standard or the WQCC shall be used as the cleanup standard for the COCs. The LALF remedial groundwater quality standards are 5 µg/L for PCE, TCE, 1,1-DCE, and methylene chloride. The AEHD also monitors for other daughter products of PCE degradation (i.e. vinyl chloride). Cleanup standards for these compounds are not documented in the Abatement Plan.

Since the SVE system was started, there is a general decrease in concentrations of the COCs in groundwater. Groundwater quality data will be monitored for changes in this trend. Consistent increases in contaminant concentrations over several quarters will be responded to by evaluating the operation of the remediation systems. If optimization of these systems does not abate the increase in concentrations, the AEHD shall evaluate the necessity of modifying or adding to the existing remediation infrastructure. Decisions regarding modifications shall include input from the NMED.

The Discharge Permit is specific with regard to the treatment efficiency of the air stripper unit. The concentrations of COCs in the effluent from the air stripper must not exceed the remedial groundwater quality standard established in the Abatement Plan (5 µg/L for all four compounds). Additionally, the Discharge permit specifies that chloride and total dissolved solids shall not exceed the WQCC standards of 250 milligrams per liter (mg/L) and 1,000 mg/L, respectively. In the event that these standards are exceeded in the system's effluent, the following actions shall be taken by the AEHD:

- Cease extraction and injection of groundwater.
- Notify NMED within 24 hours.
- Develop a corrective action plan to modify operations or equipment to achieve requisite efficiency.
- Upon restarting the system, collect samples weekly for a month, to confirm solution has been effective.

6.0 GUIDELINES FOR DEVELOPMENT

Decisions to approve various types of development on the LALF and within its associated landfill buffer zone are guided by the requirements of the *Interim Guidelines* (COA, 2004b). The *Interim Guidelines* provide a description of all required components of a development plan for properties on a landfill and/or within the buffer zone. *The Guidance for Compliance with the COA AEHD Interim Guidelines* is intended to assist developers and their agents through the COA's approval process (COA, 2004a).

6.1 Key Requirements of the *Interim Guidelines*

The *Interim Guidelines* (COA, 2004b) is the primary guidance document that describes the document submittal, approval, and certification process for development on a landfill or within a landfill buffer zone. The required documents for a development project within the landfill buffer zone must be stamped by a New Mexico PE who meets all AEHD requirements for rendering a qualified opinion on LFG issues. According to the *Interim Guidelines*, an LFG Assessment Report must accompany the Site Development Plan. The requirements of the LFG Assessment Report are presented in detail in the *Interim Guidelines*. The qualified PE is fully responsible for evaluating LFG risk and establishing any and all LFG mitigation measures. The AEHD maintains review authority over the qualified PE's findings and recommendations.

For construction within the buffer zone, LFG monitoring and mitigation measures (i.e., trench venting, conduit seals, passive ventilation systems, etc.) may be required. The primary potential avenues of LFG exposure are either their proximity to landfill waste material or the potential for transport along utility corridors or similar conveyances. AEHD has the primary responsibility to ensure that reports and plans submitted by the qualified PE meet all of the requirements of the *Interim Guidelines* prior to development approval.

6.2 Planning and Zoning On the Landfill and within the Buffer Zone

The LALF is located in the northern portion of Albuquerque on a parcel of land owned by the COA Parks and Recreation Department and is used by the AIBF for two weeks per year as the RV Parking Area. The landfill area is the southern portion of the Balloon Fiesta Park in the Albuquerque Geographic Information System (AGIS) Zone Atlas Pages C-16-Z and C-17-Z. The 1,000-foot landfill buffer zone extends into portions of AGIS Zone Atlas Pages C-16-Z, C-17-Z, D-16-Z and D-17-Z. The former Los Angeles Landfill is currently zoned SU-2 PARK (Special Use Park), as designated by the COA. Area zoning information is shown on Figure 3. The zoning designations within the landfill buffer zone, clockwise, starting from the north of the former Los Angeles Landfill are designated as follows:

- San Carlos Cemetery – SU-2 (Special Neighborhood Zone) or SU-2 ROS (Special Use Recreation and Open Space)
- Acquisition No. 120 Inc. – SU-2/HOSPITAL AND MEDICAL (Special Use Hospital) AND O-1 (Office and Institutional Zone) PERMISSIVE USES OR SU-2 C (Special Use Commercial)
- Balloon Fiesta Park – SU-2 (Special Neighborhood Zone) FOR BALLOON PARK MUSEUM AND RELATED USES
- Richfield Park – SU-2 (Special Neighborhood Zone) IP (Industrial Park Zone)or SU-2 C (Special Use Commercial)
- Clifford Industrial Park – SU-2 (Special Neighborhood Zone) M-1 (Light Manufacturing Zone) or SU-2 C (Special Use Commercial)
- Washington Business Park – SU-2 (Special Neighborhood Zone) M-1 (Light Manufacturing Zone) or SU-2 C (Special Use Commercial)
- Loop Industrial Park – SU-2 (Special Neighborhood Zone) M-1 (Light Manufacturing Zone) or SU-2 M (Special Use Manufacturing)
- General Mills – SU-2 (Special Neighborhood Zone) IP-EP (Industrial Park Zone) or SU-2 M (Special Use Manufacturing)
- Alameda Business Park – SU-2 (Special Neighborhood Zone) IP-EP (Industrial Park Zone) or SU-2 C (Special Use Commercial)
- MT Investment North – SU-2 M-1 or SU-2 C

6.3 Development on the Landfill

The landfill parcel is owned by the COA, so any development within the boundaries of the LALF will most likely be necessary infrastructure related to AIBF uses, or maintenance of the landfill itself. Other development purposes are discouraged. Development on the landfill has a significant potential to encounter LFG, as well as to be damaged by surface subsidence due to waste decomposition. Therefore, careful consideration must be given to historical and current data concerning the distribution of waste, the location of potential subsurface migration pathways, the locations of methane detections, and changes to the surface of the landfill when decisions are made concerning development and required mitigation.

6.3.1 Current Development on the Landfill

Current development on the LALF includes infrastructure directly related to the landfill, including the SVE building, flare station, and electrical, phone and natural gas utilities associated with these, as well as infrastructure related to use as the Balloon Fiesta RV Park including the check-in shed and water and electrical utilities for select RV parking spots.

6.3.2 Documentation of Actual Site Conditions

A qualified New Mexico-licensed PE must inspect development during construction to ensure that LFG mitigation measures have been implemented as planned. A Qualified PE must certify any waste excavation and removal from the property. As part of the certification process, the AEHD will require written and photographic documentation of the location and approximate volume of waste remaining (if any) after construction is complete from any contractor involved in the work. If the land over the landfill is developed, it is important that this information is transmitted to the AEHD so that the City can update its records regarding the areal extent of the waste and dimensional/physical characteristics of the waste. The precise limits and thicknesses of the waste prism are poorly understood and should be documented when encountered. It is required that contractors working on development within the boundaries of the LALF provide to AEHD all waste quantities, waste qualifications (plastic, green, etc.) waste removal manifests, and a figure (site plan and cross-section, stamped by Qualified PE) showing the past and current locations of waste.

6.4 Development within the Buffer Zone

The buffer zone at the LALF extends 1,000 feet from the edges of the landfill. The 1,000-foot buffer zone width was based upon known facts concerning the landfill, typical patterns of LFG migration, and potential future scenarios of development on the landfill itself. The buffer zone is designed to be protective of human health with regard to development and occupancy within 1,000 feet of a former landfill.

6.4.1 Current Development within the Buffer Zone

Currently there is a significant level of existing development within the buffer zone of the LALF. Buffer zone development includes the Balloon Fiesta Park itself, baseball fields at the Alameda Park, and various business and industrial park developments including office buildings and the General Mills production facility. Much of the existing infrastructure within the buffer zone was constructed prior to the promulgation of the *Interim Guidelines*, and site specific LFG mitigation measures on most properties are absent. Exceptions to this are the following development projects in the past eight years: the installation of buried utilities along Alameda Boulevard NE, improvements to the Alameda Boulevard/Balloon Museum Drive intersection, construction of the Little League ball fields west of the landfill, additions to the General Mills plant to the southwest, and development of several commercial lots (e.g. Dwight's Glass [4501 Alameda Boulevard NE] and Canberra Aquila [8401 Washington Place NE]).

6.4.2 Future Changes to the LFG Migration, Redesignating the Buffer Zone

The establishment of a buffer zone is designed to reduce potential future impacts associated with LFG migration. Due to the fact that existing development within the buffer zone is fairly extensive, the potential exists for a large number of people to be impacted if LFG migrates from the landfill. The LFG extraction system is designed to protect the infrastructure in the buffer zone, but LFG production is variable over time and dependent upon environmental variations such as moisture present in the landfill and atmospheric conditions. As additional infrastructure is constructed, the number of potential conduits for LFG migration will increase. For these reasons, it is important for the AEHD to closely control construction within the buffer zone because as the nature of LFG production at the LALF will change over time with development in the area.

6.4.3 Future Development and Development Restrictions and Requirements

Current and future development on the former landfill must comply with the *Interim Guidelines* (COA, 2004b) or subsequent landfill development ordinances that exist at the time of development. Other future development considerations are:

- Potential restriction of any building on buried landfill material (piers or landfill removal);
- Providing adequate drainage of surface water runoff away from landfill areas;
- Prohibition of engineered storm water retention and detention basins over and/or adjacent to landfill materials;
- Use of landscape practices that require little or no irrigation or providing means of prohibiting irrigation water from infiltrating and reaching buried landfill materials;
- Removal of landfill material beneath subsurface utilities or adequate design to account for settlement;
- Adequate design to control the migration of LFG away from the landfill and/or off the subject property; and
- Develop LFG mitigation measures that are protective of structures, utilities, and personnel.

6.5 Managing Future Land Use

Currently, development plans (building permits) for construction on or within a landfill buffer zone are referred by the COA Planning Department to AEHD for review. The review may be conducted by AEHD or a designated contractor. The initial review is to determine the location of the development relative to the landfill and buffer zone. If the development is within the landfill buffer zone, the developer is notified by AEHD of the need to comply with the *Interim*

Guidelines including submittal of an LFG Assessment Report. The AEHD then reviews the developer's LFG assessment and may approve the assessment or may request additional effort/design. Once the assessment is complete, the AEHD will review the plans for mitigation of LFG (if applicable) and approve once the requirements are met.

AEHD will continue to communicate with the COA Planning Department to track the current development plans for the area on the former Los Angeles Landfill or within the landfill buffer zone.

6.6 Operation, Maintenance, and Monitoring

If the recommendations by a New Mexico licensed PE in the LFG assessment include actions to be taken by the owner or its agent after the construction of LFG mitigation measures, or in lieu of constructing LFG mitigation measures, the owner/developer must submit an OMMP to the AEHD for approval during the development process. A typical OMMP contains monitoring procedures, regulatory requirements, engineering specifications, equipment lists, maintenance and inspection instructions, lists of contacts, safety and risk management protocols, and stipulations for ensuring that the information in the OMMP is kept current and technically accurate.

AEHD's objective in requiring the preparation and implementation of an OMMP is the protection of human health, the environment, and public and private property. For users and occupants of properties developed over a landfill or within a City-designated landfill buffer zone, the OMMP may provide the only available description of the LFG risks associated with the property and the ongoing requirements of the measures implemented to mitigate those risks. For this reason, AEHD views proper preparation and use of the OMMP as a critical LFG mitigation measure.

A proper OMMP should include the following content:

- Property description
- Property use description
- Description of the LALF and relationship to the development
- A plan showing the location of all existing and/or proposed LFG mitigation features at the site, inclusive of mitigation features not specifically covered under the OMMP (e.g., passive trench vent barriers).
- Summary of LFG conditions and risk
- Description of LFG mitigation measures employed at the facility

- Safety and risk management protocols including action levels, detailed response protocols, notification requirements, mitigation measures, evacuation procedures, measures to mitigate ignition sources, identification of key personnel, and reentry procedures
- Regulatory requirements and mitigation milestones
- Contact information for property owner, AEHD, Albuquerque Fire Department/emergency services, occupant, etc.
- Training requirements
- OMMP review and revision protocols
- LFG Monitoring Plan (as necessary)
- Variance from LFG assessment recommendations
- Maintenance Plan (as necessary)

6.7 Data Review by AEHD

AEHD will obtain and review data from private property owners, tenants, developers, or approved agent(s) that are required to collect data within the buffer zone. Data obtained may include data from LFG monitoring wells, data collected from passive and active LFG recovery systems; data from monitoring subsurface vaults and other collection points; and data from building alarms and the monitoring of interior air quality. The following will be included:

- A registered New Mexico PE will submit a report or equivalent correspondence to the AEHD to document that the LFG monitoring and mitigation systems in place are constructed and operating in accordance with engineering design plan specifications that were approved by the AEHD during the planning process;
- AEHD will require that LFG monitoring system operators provide monitoring results to the AEHD schedule developed by the qualified PE and approved by AEHD.
- AEHD may require building owners to install LFG monitoring alarms, and report records of alarms within 24 hours and monitoring of building interiors on a specified schedule;
- AEHD will require that operator inspection reports include maintenance or repair actions be submitted; and
- The AEHD may conduct periodic inspections of any LFG mitigation measures developed within the landfill buffer zone.

AEHD will review the information provided and may recommend additional LFG mitigation measures, if necessary. These measures may include the installation of passive venting systems, additional sensors in buildings, LFG concentration alarm systems, installation of additional LFG monitoring wells, and other miscellaneous LFG monitoring measures.

6.8 Data Management

All data collected at the LALF must be managed in an integrated manner. Data is maintained by AEHD as the agency for safety measures at the landfill. Data records should also be maintained by property owners; and should include records of interior methane gas alarms, records of LFG data collection within buildings, maintenance or calibration records for established LFG mitigation measures, data collected from LFG monitoring wells on landfill properties, data from passive LFG mitigation systems, and data from sumps and other collection points, as required. Data should also be maintained from perimeter monitoring wells by AEHD, on a similar basis. All data submitted to AEHD must include GPS coordinate data for the collection point, so that data can be compared with nearby data to identify trends or issues of concern. Data at the AEHD is maintained in a relational database so that any data of interest can be easily accessed and mapped as needed.

AEHD will review data when it is received to identify any unanticipated detections of LFG which may require immediate action.

7.0 UTILITY PLAN

The information in this section has been compiled from many different utility companies and sources. Due to restrictions on publicly available information regarding utility locations since September 11, 2001, utility locations listed here may be approximate, inaccurate, or missing.

7.1 Purpose and Use

The objective of the Utility Plan is to identify the locations of current and/or former subsurface trenches that might act as migration pathways for LFG. In addition, the Utility Plan provides a framework for understanding the potential impact of LFG mitigation on new utility corridors. The known subsurface utilities located on the LALF and within the buffer zone are shown on Plate 2.

There are two primary reasons for determining the locations of subsurface utilities. First, subsurface utility corridors may act as conduits for LFG migration away from the landfill. These factors may allow LFG to migrate away from the landfill substantial distances, potentially endangering off-site properties. Factors that may contribute to the movement of LFG along utility trenches are:

- use of non-native fill material that is more porous than native soils;
- uneven backfilling around the utility that results in bridging or incomplete compaction; and,
- backfill material surrounding a subsurface utility that may be less compact than native soil surrounding the trench.

Second, some subsurface utilities such as storm and/or sanitary sewers and water-supply pipelines may leak and hydrate the buried trash in the landfill. The addition of moisture to the underlying waste may accelerate the production of LFG, and thus should be minimized or eliminated.

The following sections of this LMP describe the methods used to identify the locations of subsurface utility lines and the types of subsurface lines that are known to be present under or near the former Los Angeles Landfill.

7.2 Existing Subsurface Utility Trenches

The following types of subsurface utility trenches have been identified on the landfill or within the buffer zone of the LALF:

- Storm sewer

- Sanitary sewer
- Potable water
- Natural gas
- Overhead and underground electric lines
- Underground communications lines
- Fiber optic lines

Most of these utilities were installed prior to the *Interim Guidelines* being promulgated and no LFG mitigation measures were incorporated in their installation. These utilities may have the potential to be LFG migration pathways. Should LFG be detected outside of the LALF property, these unmitigated utilities should be looked at first for LFG conveyance potential.

7.2.1 Subsurface Utility Research Methodology and Findings

During INTERA's involvement with the LALF maintenance, utility locations on the landfill have been recorded, and in some cases, permanently flagged on the ground. Existing utility lines are shown in Plate 2. These locations are considered herein for siting of facilities and pipelines related to subsurface remediation. Utility line locations within the buffer zone were obtained from the COA or by calling individual utility companies and requesting them.

7.2.2 Storm Sewer

ArcView shapefiles of subsurface storm sewer locations were obtained from the COA Stormwater Management Section on April 25, 2012. To the west of the landfill, an underground storm sewer pipe drains from Alameda Business Park into the North Diversion Channel along Vista Alameda. A storm sewer drain runs along the northern edge of Alameda Boulevard, and a network of drainages empties into the inlet channel to the North Diversion Channel to the south of the landfill.

7.2.3 Sanitary Sewer

ArcView shapefiles of potable water and sanitary sewer were obtained from the Albuquerque Bernalillo County Water Utility Authority on May 31, 2012. Sanitary sewer lines run along the streets in Alameda Business Park, Richfield Park, Clifford Industrial Park, and Washington Business Park. A sanitary sewer line runs north-south along the western edge of the landfill which connects to a line running east-west on the north side of Alameda Boulevard.

7.2.4 Potable Water

Potable water lines run along the streets and feed each building in Alameda Business Park, Richfield Park, Clifford Industrial Park, and Washington Business Park. They also run along the south side of Alameda Boulevard and north along Horizon Boulevard to feed the Balloon Fiesta Park and numerous potable water lines run east-west along Paseo del Norte. The COA Parks and Recreation Division maintains buried water lines that run down the center of the LALF from north to south and around the southwestern edge of the landfill. Water spigots daylight at the surface for connection of roll outs or direct connection by RVs. Water is supplied from the Washington Business Park near Gate 8 on the eastern side of the landfill.

The water line running along the southern side of Alameda has installed LFG mitigation measures including trench vent risers and bentonite trench plugs. Any additional development in this area will need to be approved by a qualified New Mexico-licensed Engineer, and care should be taken not to damage LFG mitigation measures currently in place.

7.2.5 Non-Potable Water

A non-potable water line runs along the southern side of Alameda Boulevard with a branch that heads north along Balloon Museum Drive and to Richfield Park (via Columbine Avenue). These lines supply irrigation water to the Balloon Fiesta Park and other industrial users in the North Interstate 25 Sector Plan area.

7.2.6 Natural Gas

ArcView shapefiles of natural gas lines were obtained from New Mexico Gas Company on June 22, 2012. Buried natural gas lines run along the streets and feed each building in Alameda Business Park, Richfield Park, Clifford Industrial Park, and Washington Business Park, as well as north along Horizon Boulevard to feed the Balloon Fiesta Park. The natural gas lines feed into the LALF from the southeastern portion of Washington Business Park, just south of the eastern side of Clifford Channel. The buried natural gas lines run diagonally across the southeastern edge of the landfill to the flare station.

7.2.7 Electric Lines

ArcView shapefiles of underground and overhead electric lines were obtained from PNM on June 22, 2012. Overhead high-power transmission lines run the length of the buffer zone, just east of the LALF, with a network of other overhead power lines running along Alameda Boulevard and just south of the landfill. Underground electric lines run along both sides of the streets and feed each building in Alameda Business Park, Richfield Park, Clifford Industrial Park, and Washington Business Park, as well as inside the Balloon Fiesta Park.

Underground electric lines enter the LALF near Gate 8 on the eastern side of the landfill and lead to a transformer box. During AIBF temporary power lines are laid on the ground surface to feed each RV parking spot. Underground electric lines also feed the SVE building and flare station from the eastern side of the landfill, just south of Clifford Channel. This line runs east-west to the SVE building and north-south to the flare station. There are street lights present on the landfill, but these no longer have electrical lines to them.

7.2.8 Communication Lines

A phone line enters the LALF from the southeastern portion of Washington Business Park, just south of the eastern side of Clifford Channel. The buried phone lines run east-west to the SVE building and north-south to the flare station.

7.2.9 Fiber Optic Lines

Exact locations of fiber optic lines were not given for security reasons. An image showing areas containing fiber optic lines was obtained from Time Warner Telecom on June 19, 2012. Fiber optic lines run east-west on Alameda Boulevard and north on Horizon Boulevard.

7.3 Future Utility Corridors

Plans for construction of new utility corridors within the LALF or within the buffer zone should account for the potential for LFG migration. These plans must include risk abatement measures which are adequate to address any potential existing and/or future risk from LFG migration.

Any portion of a new utility corridor construction plan dealing with LFG abatement measures shall be certified by a qualified PE as defined by the *Interim Guidelines*. This certification will be noted on plat/site development plans or building permits and reviewed and signed by designated AEHD staff or its designated consultant. The COA will not issue work orders for construction of public infrastructure within the landfill buffer zone until the required certifications and signatures are on the construction plans and AEHD signature approval has been obtained. The COA Planning Department will not issue a Certificate of Occupancy (CO) or a Certificate of Completion until the AEHD has verified that the risk abatement measures have been properly constructed (COA, 2004b).

New underground utilities should be constructed to prevent the migration of LFG into proposed structures. For example, new underground utilities should be designed to avoid contact with the landfill whenever possible, unless there is no reasonable alternative route. Any "wet" utilities should be prohibited over or adjacent to buried waste or designed to prevent fluids from entering this landfill. Utilities that are to be transferred to COA infrastructure as part of property development are prohibited from being placed over trash (as specified by the Planning Department). Exceptions to this ordinance have been obtained under rare conditions and only with very stringent design controls. Details of any proposed LFG barrier(s), such as utility corridor plugs or other proposed LFG mitigation measures to be installed within the landfill buffer zone, must be provided to AEHD for review. Design details may vary depending on whether utility lines are placed beneath hard surfaces such as asphalt (which may be resistant to LFG and water leakage) or soft surfaces such as turf (which may be more susceptible to LFG and water leakage).

8.0 PUBLIC AND RECREATIONAL USES

The COA's primary concern with regard to the former LALF is the protection of the public and the environment from risks associated with the landfill. The sole purpose of the installation and operation of the LFG extraction system was to protect properties and their occupants from the impacts of LFG that had migrated off site. Similarly, the SVE system and groundwater pump-and-treat system were installed to address adverse impacts to the environment and restore the contaminated groundwater to a useable resource.

The AEHD has been proactive about maintaining a safe work site and protecting its employees and contractors from the many occupational risks that are encountered at the LALF. Abatement of risks starts with establishing protocols and work practices that promote safety. Engineering controls are then used where applicable to further reduce exposure to hazardous conditions.

Over the past several years, there has been an increased interest in periodically opening the LALF for multi-purpose recreational uses. Opening the LALF to recreational use poses risks to the public and the existing infrastructure, and exposes the COA to liability associated with those risks. Identified risks include exposure to flammable/explosive gases, toxic compounds, simple asphyxiants, waste (including medical waste), and physical hazards, and damage to LFG and remediation system infrastructure. In the past, these risks have been mitigated by restricting access to the site to essential COA personnel and contractors, with the exception being public use during the annual AIBF. Public use of the LALF during the AIBF would not, however, be possible without extensive efforts by the COA and citizen volunteers each year to reduce site hazards.

Extending the opportunities for additional public access to the LALF requires the implementation of special protocols. In 2011, the AEHD developed a document that identified the risks pertaining to opening the LALF to public access and proposed measures to minimize those risks. The document was entitled *Former Los Angeles Landfill Public Access Plan* (INTERA, 2011) and is attached as Appendix G. The plan establishes safe working practices for COA employees and contractors, identifies how the COA addresses known hazards and risks in the preparation of the LALF for public use, and develops protocols for the COA to apply to all potential opportunities for public access to the LALF. The document specifies a requirement for potential recreational users to submit an Operation and Risk Management Plan that addresses how the user will address LALF risks. It also establishes what responsibilities both the COA and the user will be responsible for during preparation and execution of a planned public use event. Lastly, the plan identifies minimum guidelines and protocols that the public must follow when recreating on the LALF. Highlights from the plan are provided below.

In general, the LALF lacks the infrastructure to support recreational uses, and LALF O&M goals conflict with such uses. Use of the LALF during the annual AIBF has demonstrated that provided with the adequate resources and cooperation from numerous departments and entities, the risks associated with the LALF have so far been controlled. The success of this event is the product of months of prior planning and preparation. To ensure risk mitigation issues take priority over the success of the recreational use, the AEHD shall maintain site control for all recreational uses. This should include coordination with the AEHD and obtaining supervision of the event from AEHD personnel or a contractor trained to respond to the site hazards.

Planning for an event at the LALF should include notification to the AEHD at least four weeks prior to the event, submittal of an operation and risk management plan two weeks prior to the event, and negotiation of an agreement that may include monetary reimbursement to the AEHD for site preparation and event supervision. The user will be required to sign applicable liability waivers and agree to safety requirements imposed by the AEHD.

8.1 Operation and Risk Management Plan

The submittal of an operation and risk management plan by an event organizer must demonstrate an understanding of the site hazards and should include the following items and identify the responsible parties, where applicable:

- A description of the activity.
- A traffic/parking plan including the use of signage, attendants, and ground markings.
- A site security plan.
- A list of amenities that will be provided and removed (trash bins, toilets, lighting, etc.).
- A key contact list.
- An emergency response plan (evacuation procedures and EMS notification/access procedures).

8.2 COA Responsibilities

Prior to public access to the LALF, it is recommended that the following items be addressed. Use of the entire site may not be requested, in which case, site preparation may be limited to the area intended for use as long as adequate precautions are taken to ensure site control is maintained.

- Secure all vaults and LALF infrastructure in and adjacent to the intended area of use. This includes bolting down covers and erecting temporary safety fencing around features that convey LFG or where LFG could be encountered.
- Inspect the LALF for settlement cracks and make repairs where needed.

- Pick up waste that has surfaced from the LALF. Screen the area for medical waste and properly dispose of such waste.
- Address grading and drainage issues as necessary.
- Perform baseline LFG monitoring prior to public access. Continue monitoring for LFG as warranted based on the recreational use and the duration of use.
- Arrange for weed cutting and removal to mitigate fire and biological hazards.
- Open and close gates and maintain site control throughout the event.
- Repair and test water lines (as applicable).
- Turn off the SVE system as necessary and turn off the flare station in emergency conditions.
- Perform inspections daily (or at other appropriate intervals).

8.3 Organizer Responsibilities

The following items may be the responsibility of the event organizer. Some items may be provided by the COA based on negotiations with the AEHD and the Parks and Recreation Division.

- Provision of adequate security personnel.
- Provision, maintenance, and removal of sanitation facilities and garbage bins.
- Provision of lighting (including power).
- Provision of required utilities. Limited power and water hookups are available on site. These require inspection and maintenance by the COA prior to use. Repair services may be included in negotiated access fees. Use of existing electrical and water infrastructure requires provision of proper roll out cables and hoses by the organizer.
- Provision of traffic control including signage, ground markings, flagging, and attendants. Where possible, pedestrian traffic shall be kept separate from vehicular traffic. Employment of COA traffic police may be required if facility use includes foot access across Alameda Boulevard NE.
- Provision of security fencing or barriers if use is restricted to a limited portion of the LALF.
- Coordination with public emergency response agencies to develop an appropriate emergency response plan for the event.
- Provision of dust control measures (water is not available on-site for dust control).

8.4 Guidelines and Protocols for LALF Public Use

The following provisions must be acted upon and are considered conditions of public access. The AEHD and Albuquerque safety professionals have ultimate decision making control at the LALF. Public access can be denied at any time if conditions are found to be unsafe. Event coordinators shall abide by decisions and directives made by the COA.

- No fires, torches, fireworks, rockets, or pyrotechnics are allowed within the enclosed LALF property. Hot work (welding, brazing, grinding, etc.) must be approved by the AEHD. A hot work permit may be required.
- Barbeques may only be used with conditional approval and shall be no less than 2 ft above the ground surface.
- No digging of any kind into the landfill/ground surface shall be allowed. This includes spinning or repeated passes with tires designed with aggressive off-road tread.
- Removal of weeds and weed seeds shall be coordinated with the AEHD. The burning of weeds is prohibited.
- Placement of fill material may only be performed by the AEHD or by its contractors or other COA departments under AEHD supervision.
- Placement of temporary infrastructure shall be coordinated with the AEHD. The operation of heavy equipment on the LALF property is prohibited without AEHD direct supervision. This includes the use of backhoes, graders, compactors, trenchers, etc.
- No stakes, grounding rods, T-posts or other ground penetrations shall be allowed without coordination with the AEHD and spotting of buried infrastructure. Penetrations deeper than 4 ft will not be allowed.
- Tent camping or sleeping on the ground is not permitted on the LALF.
- The uncontrolled discharge of water to the LALF surface shall be prohibited.
- Any structure or facility brought onto the site shall be well vented. Air intakes should be at roof level or no more than 4 ft above the ground surface.
- No structures, facilities, or parking is allowed within 50 ft of the fence surrounding the enclosed ground flare and microturbine on the south end of the LALF.
- Erection of event tents shall be coordinated with the AEHD prior to delivery.
- No structures, facilities, or camping are allowed in Clifford Channel or along the west side of the LALF where storm water accumulates.
- No weapons are allowed on-site.
- Smoking is discouraged and adequate butt disposal receptacles shall be provided.

- Traffic of heavy vehicles shall be coordinated with the AEHD to protect buried infrastructure.
- Cables for electrical roll outs shall be protected from vehicle traffic. Trenching for cable runs is prohibited.
- Ground fault circuit interruption (GFCI) for RV hook ups shall be provided where required by electrical code.
- Electrical roll outs shall not be placed in standing water.
- All electrical connections and roll out preparations shall be inspected and approved by the COA's electrical inspector prior to use.
- Only qualified persons working under the supervision of a New Mexico-licensed contractor are permitted to work on electrical equipment and roll outs.
- Electrical equipment must be grounded in accordance with electrical codes. All electrical connections and devices shall be no less than 18 inches from the ground surface.
- Landfill infrastructure shall be protected from vehicular traffic. Tampering with LFG extraction wells, SVE sumps and wells, and any other LALF infrastructure is not permitted.
- Use of the LALF may require individuals or groups to sign liability waivers and/or forms of acknowledgement of terms of use.
- Hot air balloons shall not land at or take off from the LALF without explicit permission from the AEHD.
- In flight, hot air balloonists shall not pass within 100 ft (vertical or horizontal) of the enclosed ground flare at the south end of the LALF.
- Safety inspections by AEHD or Albuquerque Fire Department officials must be attended as requested.
- All materials brought onto the LALF shall be removed after use.

9.0 LONG-TERM LFG MONITORING AND MANAGEMENT

As the quality and quantity of the LFG generated by the LALF gradually decreases with time, it will be necessary to review this document to ensure that the changing conditions continue to be managed in a manner that protects human health, the environment, and the COA's operational objectives. Eventually, the existing LFG extraction system equipment may need to be modified to maintain operational efficiency. This may include resizing the extraction blower and the LFG flare. The AEHD management should consider these changing conditions if and when routine maintenance activities require the repair or replacement of existing infrastructure.

Eventually, it may be necessary to consider use of supplement fuel to maintain combustion of LFG or directly venting extracted LFG without treatment. When LFG production no longer supports active extraction, the existing LFG extraction wells could be modified to become passive vents. If these types of operational changes are implemented, increased monitoring frequencies may be necessary to ensure that LFG does not migrate off site. As a result additional perimeter or off site probes may be required.

Any future changes to the management protocols established in this document shall be based on sound scientific and engineering principals. Revisions to this document shall be made as necessary.

9.1 Long-Term LFG Monitoring Decision

Decisions concerning long-term LFG monitoring shall be made based upon the ongoing review of LFG data collected at the former Los Angeles Landfill. LFG data collected on a regular schedule and intermittently are both important for understanding changes that might occur in the distribution of subsurface LFG. If changes to the LFG extraction system operation are made, a temporary increase in the monitoring activity should be implemented which may include monitoring for LFG:

- In LFG monitoring probes;
- In sumps, utility vaults, and other low spots;
- As part of a recovery or other mitigation system; and
- Within the interior of buildings.

If LFG is detected at any of these types of monitoring locations at concentrations near the established action levels, then decisions must be made about what additional data may be needed to assess the location, potential migration, and potential impacts of the LFG.

Enough LFG monitoring data has been collected to establish predictable trends. In the future, the AEHD may elect to modify the monitoring schedule established in this plan. An example of a potential change in the monitoring plan maybe a reduction in the frequency of monitoring off site LFG probes if LFG is not detected in perimeter probes located between the waste and the offsite probe in question. Changes to the LFG monitoring plan established in this LMP shall only be implemented with AEHD review and approval.

9.2 Surface LFG Emissions Monitoring

If and when changes to the LFG extraction system operation are implemented, it may be necessary to include SEM to the LFG monitoring plan. The monitoring of surface emissions should be linked to the results of other types of LFG monitoring. If LFG is detected at the surface of the landfill, it may be an indicator that offsite migration of LFG is occurring or imminent. SEM may not be necessary across the entire landfill, but could be performed instead at designated points on the surface of the landfill.

SEM can be conducted by either using direct reading field instruments or by collecting samples for laboratory analysis. Collection of discreet samples for laboratory analyses has the benefit of providing data from a point in time or a representative sample over a period of time. Samples for laboratory analysis are typically collected using Summa canisters or an equivalent sample container. Summa canisters can be deployed in low-lying areas and deployed to collect ambient air samples if deemed necessary. The Summa canister samples can be analyzed for the presence of LFG.

10.0 REFERENCES

City of Albuquerque (COA). 2004a.Guidance for Compliance with the City of Albuquerque Environmental Health Department *Interim Guidelines for Development within City Designated Landfill Buffer Zones*. September.

————. 2004b. Interim Guidelines for Development within City Designated Landfill Buffer Zones. September.

Connell, S.D., Lucas, S.G., and Love, D.W. (Connel, et. al.), 2001. *Stratigraphy and Tectonic Development of the Albuquerque Basin, Central Rio Grande Rift*. Open-File Report 454B. New Mexico Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology. April 27 (Revised June 11, 2001).

Fox Consulting Engineers and Geologists (Fox), 1983. *Closure Plan, City of Albuquerque, Los Angeles Landfill*. August 8.

Hydro Geo Chem, 2003. Technical Memorandum: Field Tests at LALF During February and March, 2003. May 1.

INTERA Incorporated (INTERA), 2011. *Former Los Angeles Landfill Public Access Plan*. May.

International Technology (IT), 1996. *Landfill Gas Assessment of the Former Los Angeles Landfill, Final Technical Report*. March 22.

———. 1997a. *City of Albuquerque, Site Investigation and Preliminary Risk Assessment for the Los Angeles Landfill*. February.

———. 1997b. *Los Angeles Landfill, Perimeter Landfill Gas Extraction System Final Design*. May, 7.

——. 1998a. *City of Albuquerque As-Builts for the Landfill Gas Extraction System Located at the Former Los Angeles Landfill*. IT Project No. 771778. July.

——. 1998b. *Operation and Maintenance Manual for the Landfill Gas Extraction System Located at the Former Los Angeles Landfill*, Albuquerque, New Mexico. Prepared for City of Albuquerque Environmental Health Department. October.

Nelson, Terry, 1997. *Past and Present Solid Waste Landfills in Bernalillo County, New Mexico*. Water Resource Administration Professional Paper University of New Mexico. June 25.

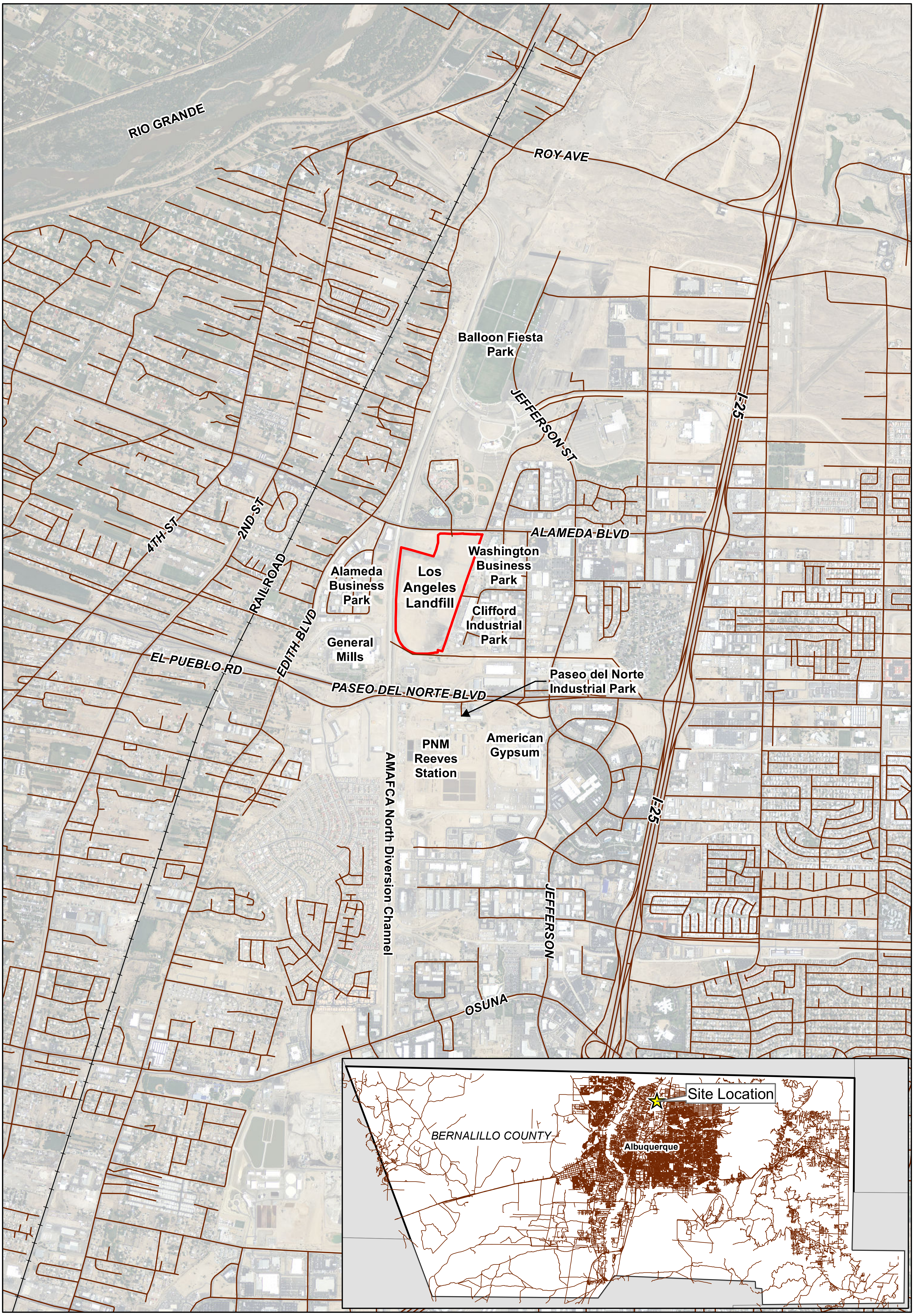
New Mexico Environment Department (NMED), 2004. Conditional Stage 2 Voluntary Abatement Plan Approval, Ground Water Pump and Treat and Enhanced Deep Soil Vapor Extraction, Former Los Angeles Landfill, Albuquerque, New Mexico. September 10.

Perennial Energy, Inc., 1997. *Operation & Maintenance Manual for an* [sic] *22mmBtu/h Enclosed Gas Flare Station for the Los Angeles Landfill, Albuquerque, New Mexico*. December.

Solid Waste Association of North America (SWANA), 2002. *Landfill Gas Operations and Maintenance, Manual of Practice*.

U.S. Environmental Protection Agency (EPA). 1986. Potential Hazardous Waste Site, Inspection Report. Prepared by Richard Rawlings. February 4.

FIGURES



N

0 1,000 2,000 4,000 Feet

INTERA

Sources:
Roads/Aerial (2011) – RGIS website

Figure 1
Site Location Map
COA - Los Angeles Landfill
Landfill Management Plan

Path: S:\Projects\COA-LAL_Los_Angeles_LF\GIS\MapDocuments\WO_11_LALF_LMP\LMP_Fig1_SiteMap.mxd

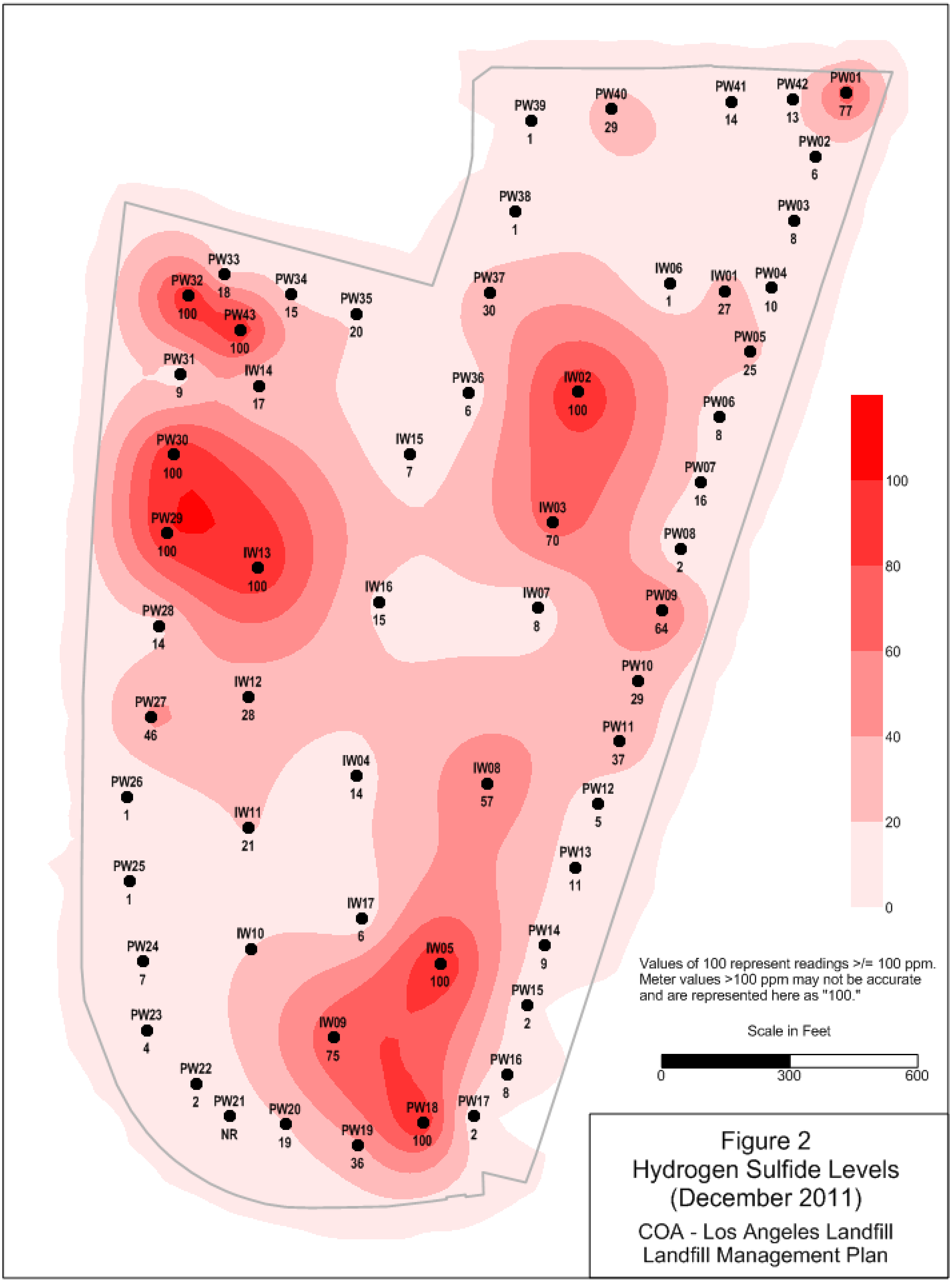
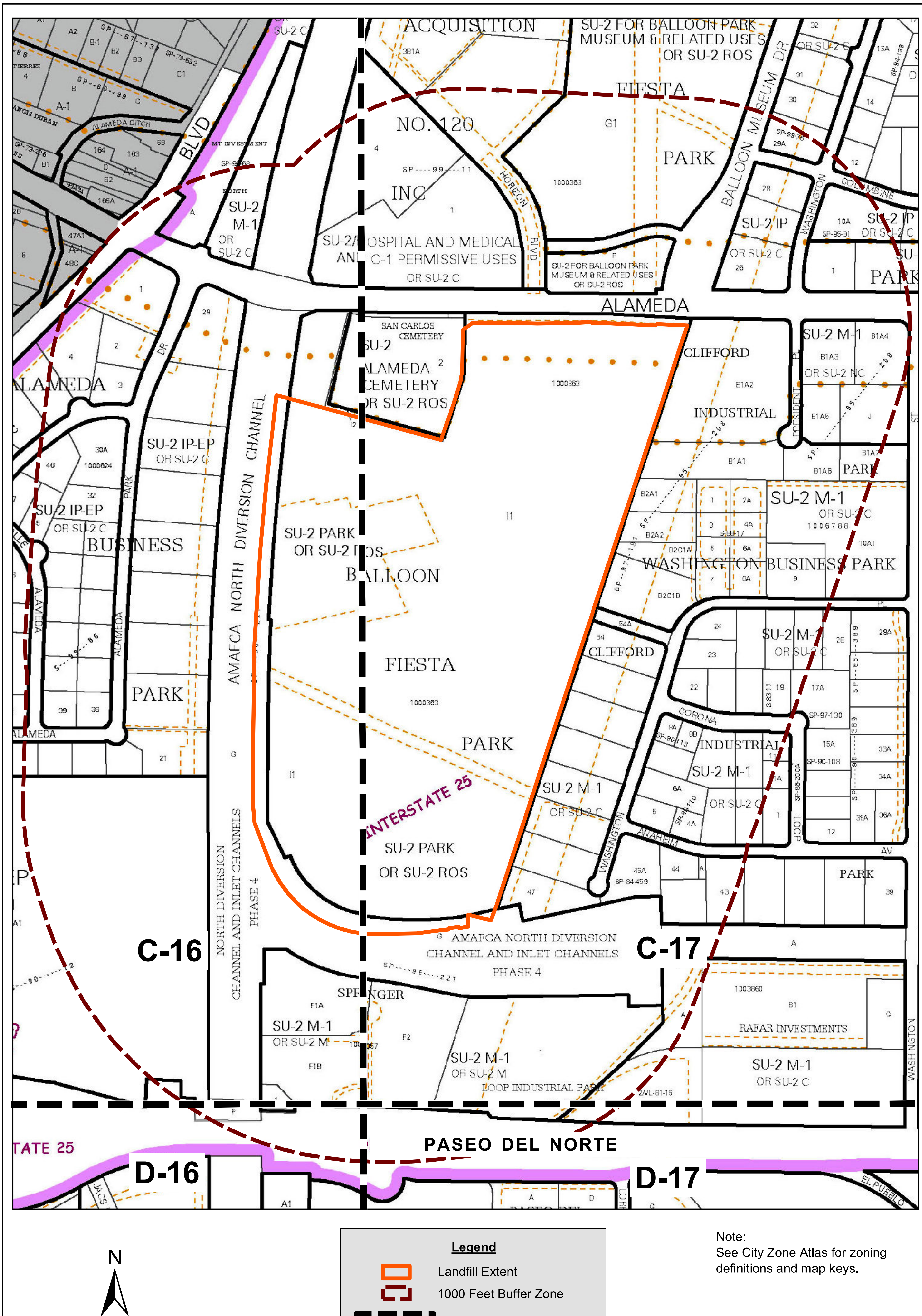


Figure 2
Hydrogen Sulfide Levels
(December 2011)
COA - Los Angeles Landfill
Landfill Management Plan



Legend

Landfill Extent

1000 Feet Buffer Zone

C-17 Zone Atlas Page

SU-2 M-1 Zoning Descriptions

22 Parcel Number

Note:
See City Zone Atlas for zoning definitions and map keys.

Sources:
Zone basemap – COA, zone atlas pages

Figure 3
Area Lot, Parcel and Zoning Information
COA - Los Angeles Landfill
Landfill Management Plan

S:\Projects\COA-LAL_Los_Angeles_LF\GIS\MapDocuments\WO_11_LALF_LMP\LMP_Fig3_zoneMap.mxd

N

0 80 160 320 Feet

Sources:
Aerial – COA GIS website, dated 2010

Legend

- GW Extraction System
- GW Injection System
- Extraction Well
- Injection Well
- Monitoring Well
- Production Well

Note:
Lines shown represent water conveyance piping. Power and instrumentation to extraction and injection wells follows the same pipe layout. See System Record Drawings for details. Piping locations are approximate.

Figure 4
Groundwater Pump-and-Treat System Layout Map
COA - Los Angeles Landfill
Landfill Management Plan

S:\Projects\COA-LAL_Los_Angeles_LF\GIS\MapDocuments\WO_11_LALF_LMP\LMP_Fig4_reeves.mxd

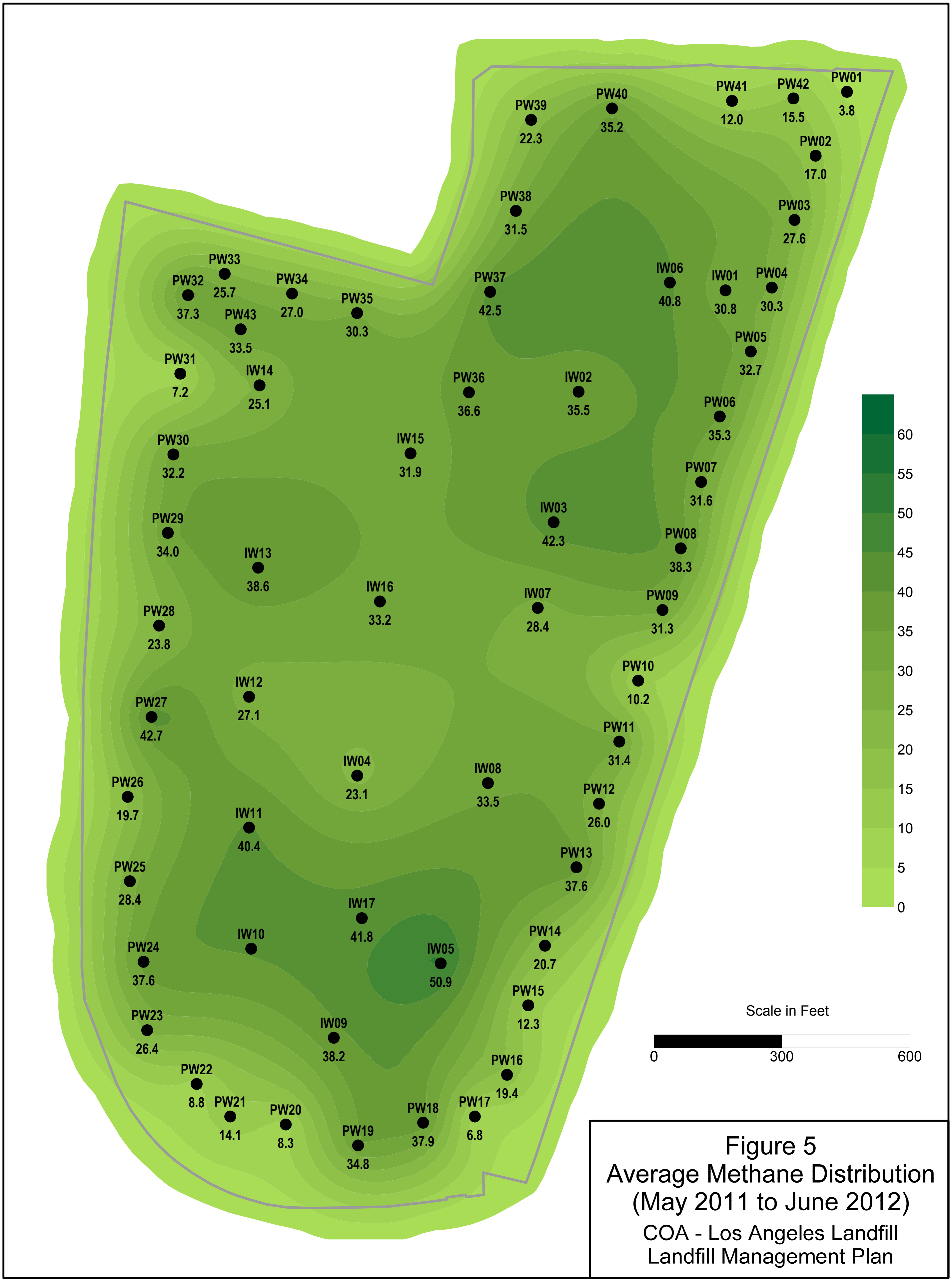


Figure 5
Average Methane Distribution
(May 2011 to June 2012)
COA - Los Angeles Landfill
Landfill Management Plan

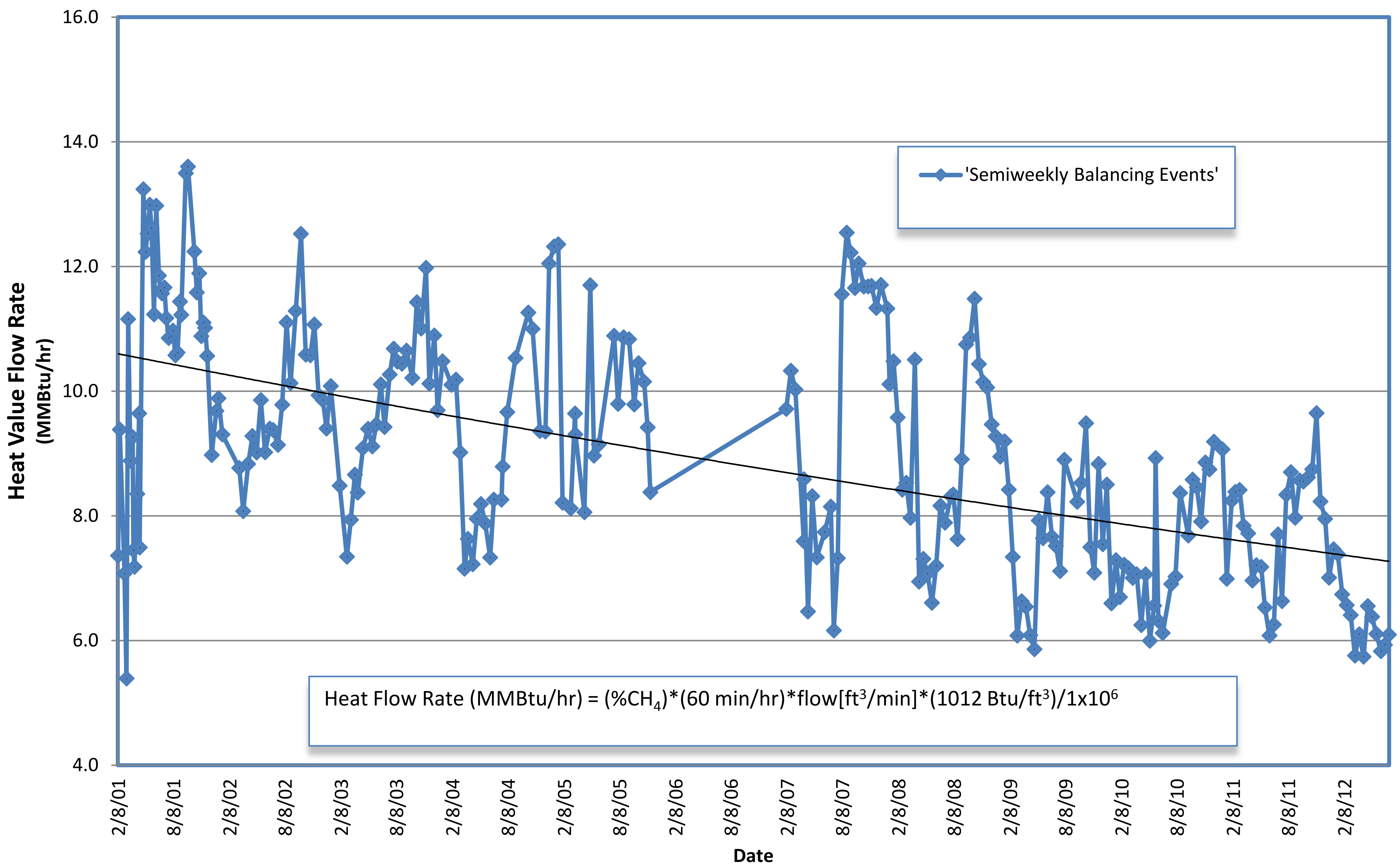


Figure 6
Los Angeles Landfill Gas Quality Data
Heat Flow Rate Vs. Time
2001 - 2012
COA - Los Angeles Landfill
Landfill Managment Plan

INTERA

N

0 250 500 1,000 Feet

Legend

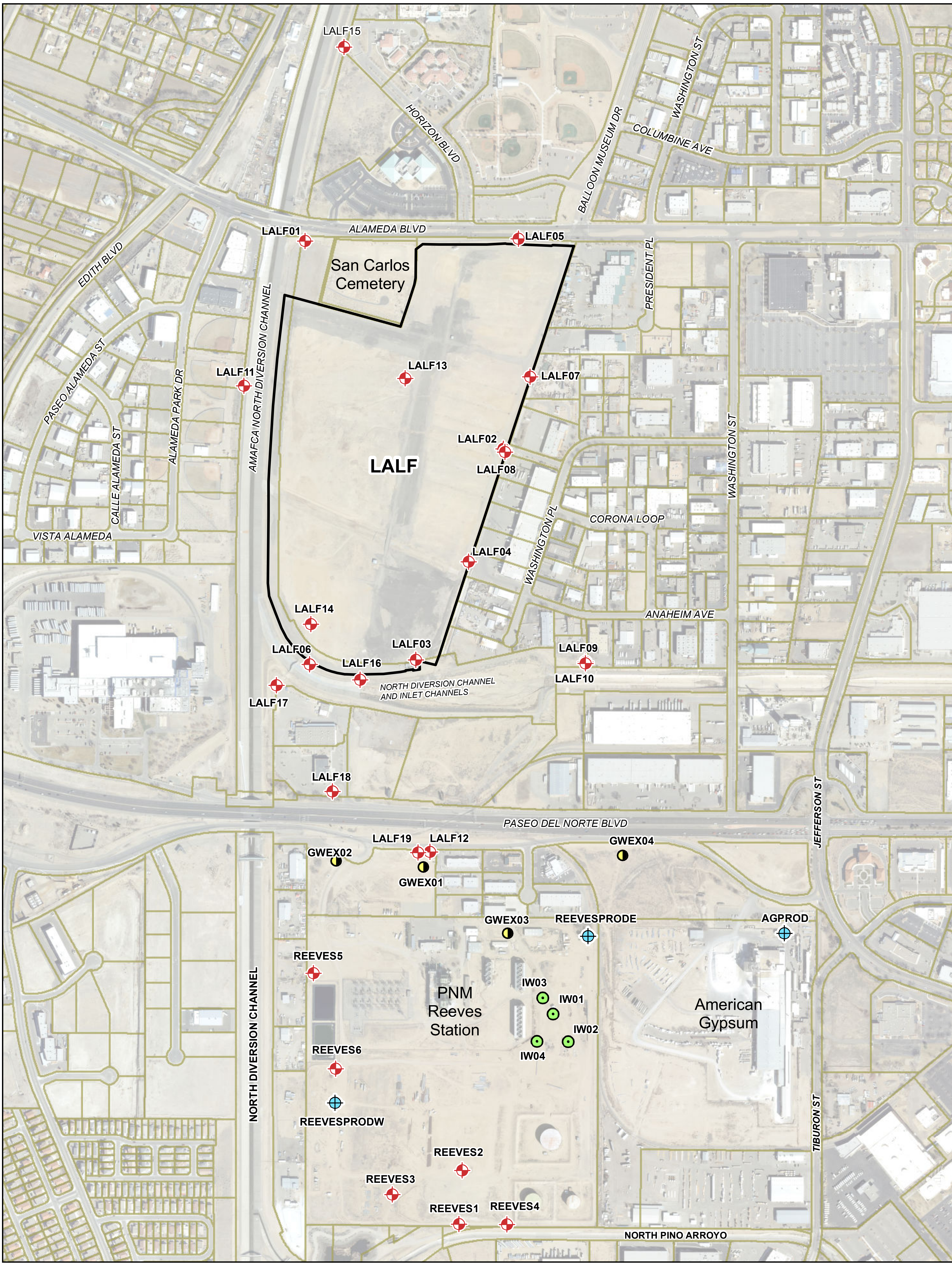
- LFG Probe
- Alameda Business Park (ABP) LFG Probe
- ABP Probe included in Quarterly LFG Monitoring
- Landfill Extent
- 1000 Feet Buffer Zone
- Parcel Boundary

INTERA

Sources:
Aerial – COA GIS website, dated 2010

Figure 7
COA Landfill Gas
Probe Location Map
COA - Los Angeles Landfill
Landfill Management Plan

S:\Projects\COA-LAL_Los_Angeles_LF\GIS\MapDocuments\WO_11_LALF_LMP\LMP_Fig7_GasProbes.mxd



N

0 300 600 1,200 Feet

Legend

- Extraction Well
- Injection Well
- Monitoring Well
- Production Well
- Landfill Extent
- Parcel Boundary

Figure 8
COA Groundwater Well Location Map
COA - Los Angeles Landfill
Landfill Management Plan

INTERA

Sources:
Aerial – COA GIS website, dated 2010

S:\Projects\COA-LAL_Los_Angeles_LF\GIS\MapDocuments\WO_11_LALF_LMP\LMP_Fig8_GWwells.mxd

PLATES

Legend

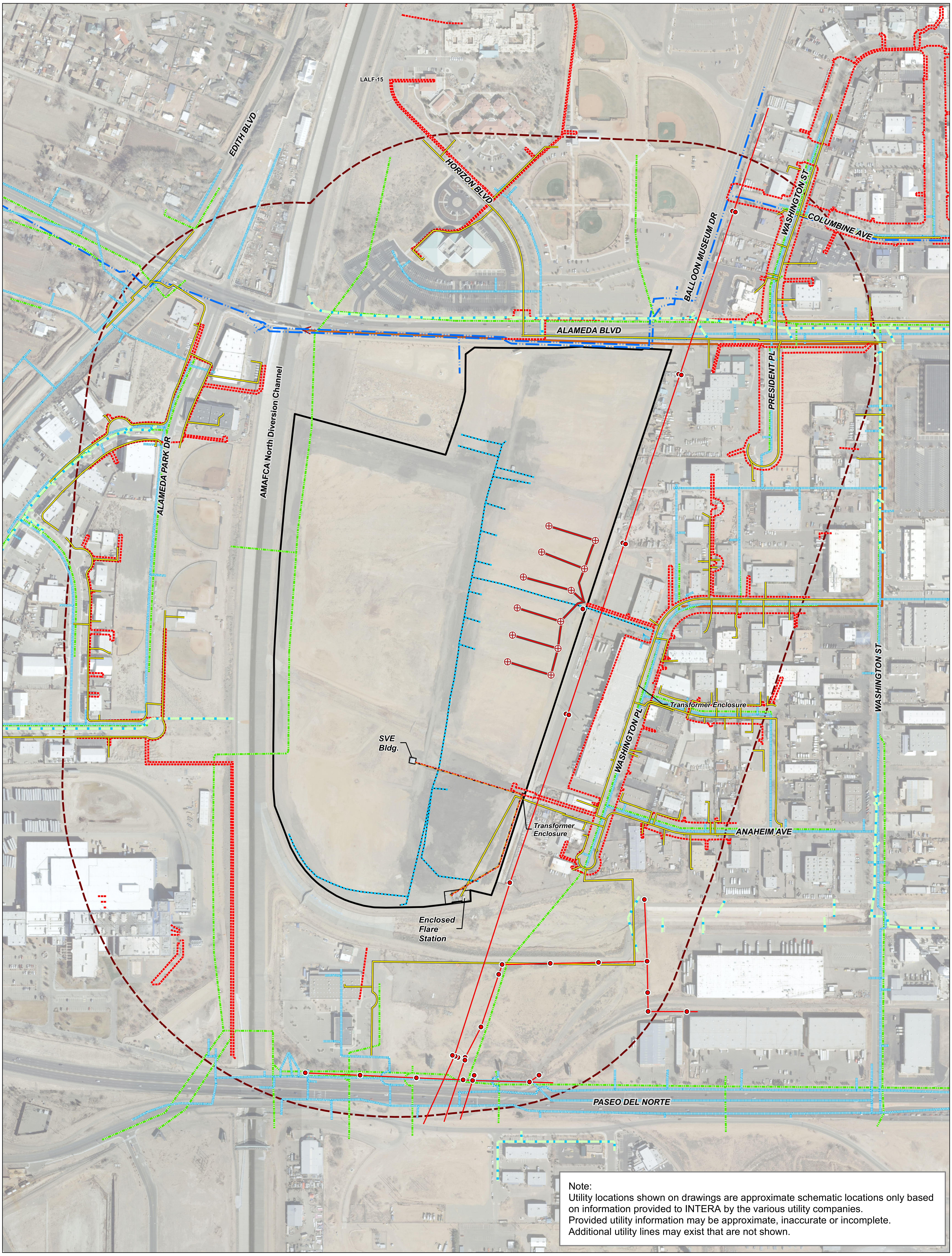
Landfill Extent	LFG Extraction Well
Underground LFG Pipe	Isolation Valve
Underground SVE Pipe	LFG Condensate Sump
Underground Air Injection Pipe	LFG Probe
Air Injection Well	Monitoring Well
SVE Condensate Sump	SVE Well

INTERA

Source(s):
Aerial – COA GIS website, dated 2010

Plate 1
Landfill Infrastructure Map
COA - Los Angeles Landfill
Landfill Management Plan

S:\Projects\COA-LAL_Los_Angeles_LF\GIS\MapDocuments\WO_11_LALF_LMP\LMP_Plate1_landfillMap.mxd



N

0 100 200 400 600 Feet

Legend

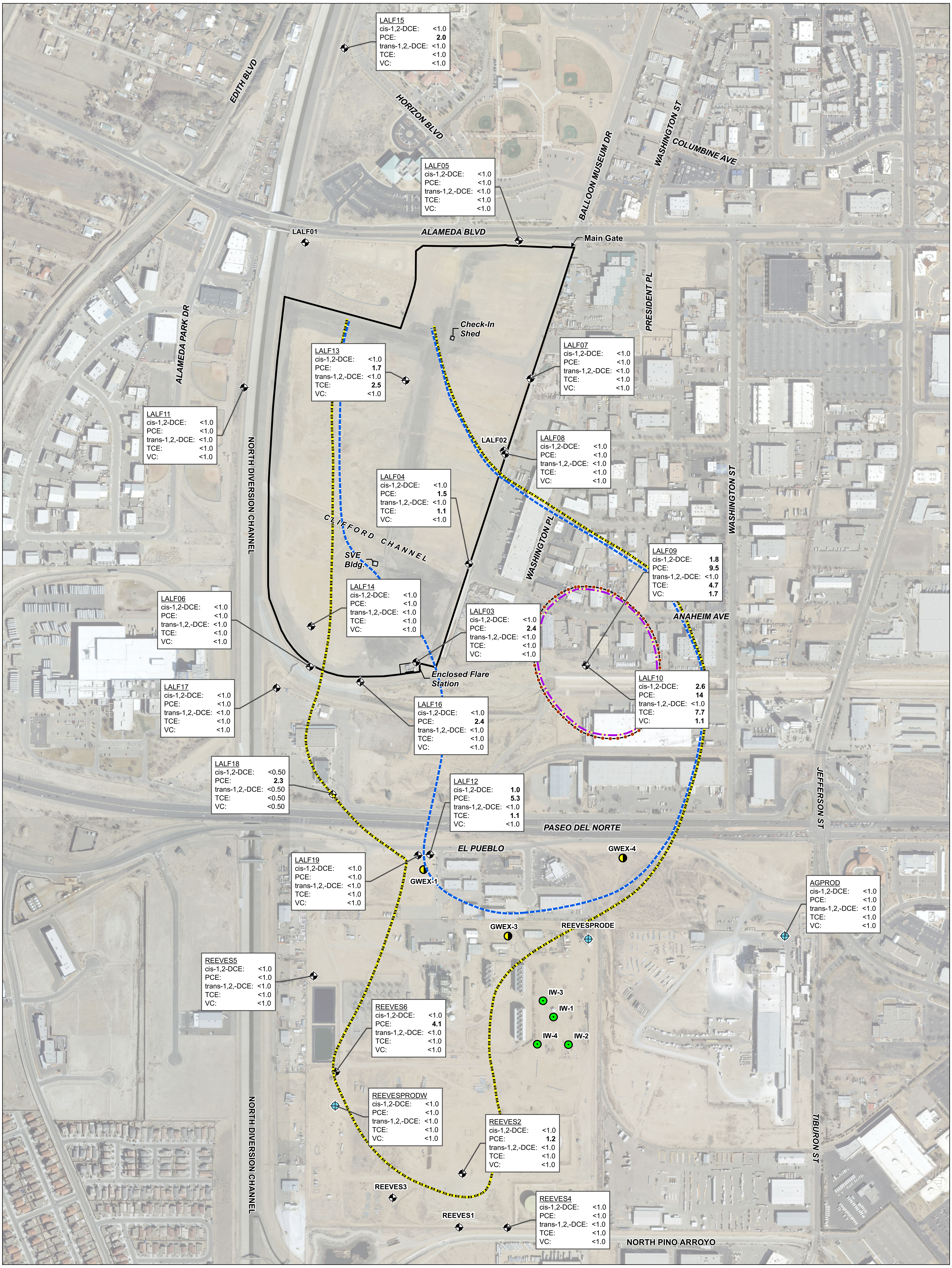
- Landfill Extent
- 1000 Feet Buffer Zone
- Underground Telephone Line
- Underground RV Electrical Line
- Fiber Optic Line
- Underground Electric Line
- Storm Sewer Line
- Natural Gas Line
- Non-Potable Water Line
- Potable Water Line for AIBF RVs
- Potable Water Line
- Sanitary Sewer Line
- Overhead Electrical Line
- Electrical Pole
- Electrical Panel

INTERA

Source(s): Aerial – RGIS GIS website, 2011;
Potable Water – COA, ABCWUA;
Sanitary Sewer and Non-Potable Water – ABCWUA;
Electric Line – PNM and COA;
Gas Line – NM Gas Company

Plate 2
Utility Map
COA - Los Angeles Landfill
Landfill Management Plan

S:\Projects\COA-LAL_Los_Angeles_LF\GIS\MapDocuments\WO_11_LALF_LMP\LMP_Plate2_utilitiesMap.mxd



N

0 130 260 520 780
Feet

Well ID	
cis-1,2-Dichloroethene:	result in ug/l
Tetrachloroethene:	result in ug/l
trans-1,2-Dichloroethene:	result in ug/l
Trichloroethene:	result in ug/l
Vinyl chloride:	result in ug/l

BOLD indicates value is above method detection limit.

Legend

Inferred Extent of Contaminant
- PCE
- TCE
- cis-1,2-DCE
- Vinyl Chloride

- Monitoring Well
- Production Well
- Extraction Well
- Injection Well
- Landfill Extent

INTERA

Source(s):
Aerial – COA GIS website, dated 2010

Plate 3
Inferred Extent of Select Groundwater Contaminants, May 2011 Annual Sampling Event
COA - Los Angeles Landfill
Landfill Management Plan

S:\Projects\COA-LAL_Los_Angeles_LF\GIS\MapDocuments\WO_11_LALF_LMP\LMP_Plate3_201105results.mxd

TABLES

TABLE 1

Extraction Well Well Field Balancing Data

May 24, 2011 to June 20, 2012

Landfill Management Plan, Former Los Angeles Landfill

Albuquerque, New Mexico

Extraction Well ID	24-May-11	8-Jun-11	22-Jun-11	6-Jul-11	19-Jul-11	2-Aug-11	17-Aug-11	31-Aug-11	15-Sep-11	27-Sep-11	12-Oct-11
IW01	3.1	3.1	13	7.9	NA	NaN	48.4	36.2	36.4	38.0	39.2
IW02	49.5	30.7	36.8	43.2	NA	51.8	35.5	34.5	39.5	35.2	35.7
IW03	38.5	46.4	50.8	53.8	52.1	51.1	42.4	40.2	40.7	41.1	40.8
IW04	28.5	8.9	21.4	33.7	21.0	23.0	18.2	20.4	24.8	27.5	30.4
IW05	50.4	51.6	51.5	50.3	50.3	51.3	54.6	51.4	52.9	53.4	54.3
IW06	40.5	36.9	42.2	43.1	43.9	44.3	46.5	43.9	44.1	43.4	44.1
IW07	34.1	31.0	26	28.5	31.8	33.9	35.2	34.9	35.3	33.1	34.6
IW08	36.8	28.1	32.6	1.4	35.0	31.2	32.9	35.3	38.5	37.3	42.2
IW09	35.5	35.0	32.3	33.6	35.6	42.8	41.1	39.1	41.2	41.3	43.2
IW11	32.5	35.5	38.4	33.1	38.7	43.2	46.5	46.3	48.4	46.3	47.3
IW12	26.4	28.8	25.6	25.9	24.5	26.3	26.0	28.7	31.7	34.7	38.2
IW13	36.0	33.7	37.3	36.7	37.5	38.2	42.4	41.0	43.7	43.4	45.1
IW14	19.2	22.4	24.4	26.6	23.5	27.9	31.2	31.0	30.9	30.9	31.2
IW15	33.4	26.8	29.6	31.2	34.1	30.2	38.0	33.0	35.0	33.3	32.7
IW16	35.7	27.1	30.6	34.5	35.4	31.5	31.1	32.3	34.5	35.9	35.7
IW17	43.9	42.3	37.2	37.0	36.9	38.4	42.0	39.9	42.1	42.5	43.6
PW01	0.0	4.1	6.6	14.0	4.0	5.3	17.4	7.3	12.5	7.6	5.4
PW02	17.4	17.2	18.4	19.4	19.2	21.2	21.3	17.6	18.6	17.9	17.4
PW03	21.4	0.1	0.2	0.1	28.2	30.6	35.2	35.2	34.5	33.3	32.9
PW04	26.4	29.3	33.9	37.1	NA	39.0	29.2	30.5	35.9	33.4	31.4
PW05	31.3	32.1	35.4	37.9	NA	41.9	39.2	33.2	35.3	35.3	36.7
PW06	32.8	31.9	34.3	36.9	38.8	43.7	39.2	35.8	36.4	35.0	37.0
PW07	3.0	2.2	1.1	0.7	18.3	49.9	41.9	38.7	38.6	38.0	38.8
PW08	33.5	46.2	48.7	58.8	44.2	41.1	33.3	33.5	38.5	37.3	37.8
PW09	28.7	27.8	29.5	32.0	31.0	29.9	25.7	27.9	30.7	29.1	28.9
PW10	6.6	5.7	5.6	5.9	7.2	9.1	10.1	10.0	10.0	9.7	9.7
PW11	32.8	38.6	24.4	36.5	24.6	35.6	21.6	36.8	25.3	40.3	22.6
PW12	32.1	0.7	0.1	0.0	0.0	33.6	23.4	36.5	31.3	25.3	38.3
PW13	36.9	34.4	33.6	33.8	34.4	37.2	38.7	40.0	40.9	40.2	42.4
PW14	17.9	15.8	5.6	11.3	4.9	21.7	14.8	21.9	25.5	16.8	21.5
PW15	18.5	0.1	3.5	10.0	12.2	20.4	19.5	13.5	14.3	13.0	15.6
PW16	25.6	21.8	14.6	28.2	31.9	41.1	34.8	28.2	24.9	16.0	21.9
PW17	5.7	0.1	0.1	5.3	0.0	31.0	3.3	0.3	15.4	6.4	8.2
PW18	39.2	36.7	31.4	41.3	41.9	46.8	43.9	37.6	40.7	38.3	41.1
PW19	20.0	52.9	10.9	31.3	51.0	31.3	56.3	21.2	57.8	21.9	36.3
PW20	6.8	6.2	3.1	5.8	9.2	14.7	16.6	14.3	16.1	14.8	14.6
PW21	13.0	11.9	6.8	10.1	11.1	18.5	15.7	17.8	20.5	16.3	16.2
PW22	4.4	4.9	4.4	5.9	5.6	9.6	7.5	11.4	15.6	12.0	14.9
PW23	24.1	28.7	15.7	33.1	12.0	38.4	21.1	30.3	47.0	21.1	31.0
PW24	33.0	39.5	38.4	41.2	25.1	42.4	37.4	32.7	49.9	32.5	37.0
PW25	22.7	31.3	35.2	23.6	21.2	35.7	21.1	25.8	38.2	25.2	30.0
PW26	19.1	14.5	16.8	13.9	20.9	25.0	37.2	34.0	37.0	33.9	36.0
PW27	41.4	40.5	39.2	41.0	40.8	43.7	47.2	46.0	49.1	46.3	47.5
PW28	22.8	21.2	19.2	21.8	23.1	25.7	31.6	36.6	30.5	36.3	31.5
PW29	25.1	38.3	28.1	37.8	29.0	43.5	32.5	39.7	36.3	35.3	34.7
PW30	21.7	39.5	30.6	46.0	26.7	43.6	21.0	43.7	32.3	48.2	28.2
PW31	4.1	4.9	5.3	7.1	10.2	11.5	11.6	13.4	14.6	13.0	11.3
PW32	33.2	38.6	42.2	39.2	41.1	39.7	40.0	39.5	40.3	39.3	37.8
PW33	16.6	20.6	26.4	25.7	29.0	32.1	32.1	32.1	33.6	33.8	33.6
PW34	24.9	30.0	32.3	30.9	34.7	25.9	27.5	29.1	30.8	28.6	26.7
PW35	42.2	36.8	39.2	40.7	40.0	39.5	39.5	36.6	37.5	32.7	23.7
PW36	52.5	33.6	34.7	36.3	37.2	38.9	39.6	37.7	38.6	37.5	38.4
PW37	42.6	40.5	43.7	42.8	42.6	45.7	45.6	44.6	45.7	45.2	45.4
PW38	30.6	30.1	34.6	39.7	35.9	37.7	29.8	32.9	37.6	32.4	30.6
PW39	20.3	19.2	22.3	25.3	26.4	31.4	18.8	25.3	31.9	24.1	21.5
PW40	41.6	32.7	35	36.1	36.2	38.6	36.1	34.4	36.1	34.4	33.5
PW41	8.9	9.5	11.5	13.9	15.5	19.4	19.0	17.4	17.7	17.4	16.8
PW42	14.7	14.0	14.1	15.3	16.2	18.5	17.1	15.7	20.0	17.4	16.1
PW43	25.5	32.6	38.8	31.2	39.0	34.3	37.7	35.5	37.0	37.5	38.4

TABLE 1
Extraction Well Well Field Balancing Data
May 24, 2011 to June 20, 2012
Landfill Management Plan, Former Los Angeles Landfill
Albuquerque, New Mexico

Extraction Well ID	26-Oct-11	9-Nov-11	22-Nov-11	7-Dec-11	20-Dec-11	4-Jan-12	18-Jan-12	1-Feb-12	16-Feb-12	29-Feb-12	14-Mar-12
IW01	40.7	40.8	34.5	32.3	33.0	31.2	36.1	28.5	34.0	28.9	30.4
IW02	44.9	29.5	20.3	31.3	39.5	28.0	40.3	28.7	23.5	29.1	42.0
IW03	47.8	41.1	39.9	42.9	43.5	40.7	42.3	39.6	40.1	41.4	39.9
IW04	28.8	25.4	24.7	31.0	32.5	31.7	23.9	8.4	12.1	21.7	19.2
IW05	55.1	57.6	54.0	52.6	51.7	55.5	54.7	53.1	54.0	53.1	25.3
IW06	46.9	44.6	39.9	41.5	40.7	38.6	38.6	36.9	35.8	38.0	36.8
IW07	38.9	31.5	25.5	28.2	28.8	23.1	27.4	24.3	24.3	23.8	24.8
IW08	42.2	35.2	35.8	36.6	37.3	33.0	31.4	30.0	28.6	38.0	27.4
IW09	46.5	46.0	42.1	42.1	41.4	40.7	38.7	36.9	37.6	36.6	30.0
IW11	49.6	53.0	57.3	37.1	31.5	28.3	43.1	51.0	34.0	42.0	21.4
IW12	46.0	37.5	32.8	31.0	29.8	26.7	25.0	25.5	26.1	22.7	22.9
IW13	49.4	37.8	37.8	40.6	40.4	38.0	38.9	37.1	34.6	36.3	35.3
IW14	26.8	24.3	26.9	27.2	30.0	22.1	23.6	26.2	29.0	24.5	24.7
IW15	33.1	31.8	34.3	33.5	30.7	29.4	30.6	29.8	31.6	29.1	30.1
IW16	36.9	32.8	33.9	35.9	35.8	35.1	35.9	34.8	34.1	31.3	29.2
IW17	46.8	47.8	46.8	47.0	48.2	41.4	47.1	46.8	48.9	41.2	33.1
PW01	0.8	10.0	0.8	2.3	8.6	0.3	0.7	0.0	0.3	0.0	0.0
PW02	17.0	18.0	17.2	17.8	17.4	16.9	16.6	15.7	15.6	15.6	15.6
PW03	32.9	32.5	31.3	30.6	30.4	32.1	28.9	29.0	28.8	29.2	28.9
PW04	30.0	36.8	19.0	26.5	30.4	32.7	37.0	23.3	25.9	25.9	26.8
PW05	39.4	38.9	29.9	39.9	35.1	32.1	35.1	33.3	41.7	33.8	29.7
PW06	40.2	39.7	33.2	37.9	38.6	37.2	38.3	33.8	34.9	34.5	33.2
PW07	40.1	38.6	37.2	39.5	37.7	34.2	35.6	36.0	36.4	36.6	35.3
PW08	41.3	35.6	32.6	39.2	36.8	35.0	37.1	36.8	37.6	39.3	35.1
PW09	31.2	26.7	23.1	32.6	29.4	34.0	33.0	35.3	40.0	41.8	41.6
PW10	10.0	6.9	8.0	9.3	9.9	10.1	10.6	11.0	11.0	11.3	11.6
PW11	35.9	40.5	21.7	36.8	28.0	40.3	23.7	39.3	21.5	37.5	21.6
PW12	31.6	30.9	34.6	25.9	33.8	20.3	27.4	27.9	30.3	27.8	28.0
PW13	43.5	42.8	41.8	39.8	39.3	36.3	37.8	36.5	36.3	34.4	32.7
PW14	44.5	42.0	32.2	30.2	14.0	12.0	25.7	13.2	17.3	14.6	22.3
PW15	22.2	24.3	17.4	13.0	11.0	14.6	16.4	14.3	15.1	13.9	11.3
PW16	38.0	27.0	6.2	15.5	16.5	15.3	24.1	11.9	13.0	11.2	11.6
PW17	40.9	8.6	3.4	6.0	3.3	2.9	7.2	0.7	0.2	2.7	1.2
PW18	48.1	38.5	35.2	40.0	39.3	36.3	40.3	36.5	35.2	34.6	32.4
PW19	47.9	18.3	45.4	40.7	35.5	15.0	46.6	16.5	41.0	14.9	34.4
PW20	20.5	15.4	8.8	8.2	6.4	5.9	5.2	4.0	3.6	4.0	2.1
PW21	28.9	21.0	16.5	NA	16.6	12.2	8.0	11.8	11.0	12.6	7.8
PW22	15.4	13.8	16.7	12.2	15.2	10.5	2.7	6.2	6.0	5.8	4.4
PW23	48.7	21.6	36.8	31.2	40.8	26.4	0.5	13.8	15.6	25.7	2.3
PW24	47.6	41.3	44.0	49.9	50.5	53.1	18.2	36.2	32.9	41.3	20.6
PW25	45.8	19.8	36.3	26.3	29.4	29.1	13.9	29.6	29.2	36.7	15.3
PW26	41.4	23.6	34.7	12.9	7.0	6.1	16.3	20.4	7.1	11.2	3.1
PW27	50.2	45.7	42.5	42.3	42.2	40.8	41.5	41.6	38.9	38.3	26.5
PW28	30.4	23.1	24.6	23.4	25.7	22.6	24.6	22.7	20.4	18.6	18.2
PW29	39.8	26.4	35.8	29.2	45.7	30.7	33.4	42.9	26.1	35.2	32.7
PW30	38.7	18.3	44.0	24.0	41.5	21.5	39.0	22.8	41.5	20.7	35.3
PW31	16.0	6.1	6.6	7.6	7.6	5.3	6.7	5.4	4.8	4.5	5.1
PW32	40.3	27.4	42.1	34.6	42.5	27.1	51.3	36.4	37.7	32.1	25.9
PW33	33.4	17.8	27.5	23.8	30.4	18.9	33.5	23.8	26.5	19.3	26.2
PW34	28.2	14.0	27.0	24.2	29.6	15.6	30.2	27.1	29.6	22.0	29.5
PW35	26.3	23.4	27.7	28.9	33.0	17.9	26.7	16.4	25.4	22.0	17.0
PW36	38.2	34.9	33.8	35.4	34.7	33.5	34.5	44.1	33.6	32.9	46.1
PW37	47.2	48.9	44.0	43.9	44.2	42.6	42.3	41.7	43.8	42.5	34.4
PW38	37.5	28.3	19.4	28.8	35.4	26.2	32.3	25.8	24.0	27.1	29.9
PW39	33.7	13.3	14.5	23.9	23.8	16.1	25.6	18.2	19.2	18.9	18.6
PW40	37.3	34.9	31.3	33.3	31.0	33.1	40.7	34.2	33.2	33.2	33.6
PW41	17.4	16.8	15.5	14.6	12.7	10.1	9.3	8.2	7.3	7.2	7.5
PW42	23.7	17.6	13.5	19.2	18.3	14.2	18.4	12.6	13.0	15.2	14.3
PW43	37.5	25.5	38.8	30.3	40.7	24.1	36.7	31.0	39.6	29.1	36.8

TABLE 1
Extraction Well Well Field Balancing Data
May 24, 2011 to June 20, 2012
Landfill Management Plan, Former Los Angeles Landfill
Albuquerque, New Mexico

Extraction Well ID	28-Mar-12	11-Apr-12	25-Apr-12	9-May-12	23-May-12	7-Jun-12	20-Jun-12	Average (May '11 to June '12)
IW01	36.4	30.4	31.9	33.3	33.4	38.7	31.7	30.8
IW02	25.9	35.8	29.3	38.7	40.7	30.0	45.1	35.5
IW03	39.5	35.1	34.2	38.6	42.2	40.1	40.7	42.3
IW04	16.3	19.4	21.3	24.4	23.6	24.1	23.9	23.1
IW05	50.2	49.0	49.7	49.2	47.3	47.4	45.1	50.9
IW06	37.2	37.8	37.8	40.5	40.1	38.5	39.5	40.8
IW07	22.2	23.1	19.1	22.7	31.8	23.1	24.0	28.4
IW08	31.8	42.7	33.4	34.0	38.1	31.6	32.0	33.5
IW09	35.3	35.9	36.0	37.0	35.8	36.1	33.8	38.2
IW11	42.5	44.0	31.7	35.5	37.8	37.0	39.2	40.4
IW12	18.5	19.9	21.3	21.2	20.4	20.9	21.2	27.1
IW13	39.6	39.8	36.1	35.2	41.4	33.8	33.5	38.6
IW14	16.4	17.8	20.5	21.2	18.6	24.5	25.8	25.1
IW15	26.2	30.2	33.6	36.2	31.6	31.8	34.5	31.9
IW16	32.7	32.8	26.7	28.8	35.8	32.9	33.9	33.2
IW17	40.0	40.9	42.7	40.6	37.7	37.1	33.7	41.8
PW01	0.0	0.0	0.0	0.0	1.0	0.1	0.0	3.8
PW02	15.4	14.8	14.4	15.2	14.8	14.9	14.9	17.0
PW03	29.9	28.7	30.3	32.2	30.6	31.8	31.9	27.6
PW04	27.1	31.7	25.6	25.4	28.7	33.6	35.7	30.3
PW05	27.6	32.3	25.1	0.0	24.0	26.1	33.6	32.7
PW06	30.1	36.2	30.0	31.6	35.8	26.3	31.8	35.3
PW07	34.1	30.1	32.2	37.2	36.1	34.6	32.5	31.6
PW08	35.9	31.0	32.6	42.1	36.7	36.4	37.5	38.3
PW09	38.1	27.4	26.5	29.9	28.4	37.3	30.4	31.3
PW10	12.2	12.3	13.3	14.7	14.2	14.6	14.7	10.2
PW11	28.6	32.2	34.5	37.0	26.4	32.7	33.0	31.4
PW12	37.6	26.6	32.0	32.7	36.7	21.3	27.7	26.0
PW13	42.1	37.4	37.0	36.2	36.1	33.3	33.4	37.6
PW14	17.5	27.6	19.4	19.9	33.3	19.3	18.3	20.7
PW15	11.6	10.1	9.0	0.8	6.0	3.8	2.3	12.3
PW16	15.3	16.1	15.2	9.2	16.9	6.6	2.7	19.4
PW17	3.1	13.3	3.0	2.7	21.3	0.9	0.4	6.8
PW18	38.3	38.2	36.7	34.1	37.2	31.5	28.7	37.9
PW19	53.5	24.2	55.0	19.4	49.3	15.4	45.8	34.8
PW20	5.2	7.1	6.8	5.2	5.7	2.9	1.9	8.3
PW21	16.0	17.2	14.4	12.2	15.8	8.3	6.0	14.1
PW22	6.5	6.6	8.1	8.1	7.5	6.8	6.7	8.8
PW23	27.9	31.4	32.1	27.9	36.8	16.3	28.5	26.4
PW24	36.0	35.2	33.6	34.8	40.1	29.0	38.4	37.6
PW25	33.0	29.6	27.3	28.3	36.2	19.7	28.2	28.4
PW26	13.9	17.7	8.0	11.0	13.8	17.1	18.8	19.7
PW27	62.5	39.4	35.3	37.7	39.2	28.8	60.8	42.7
PW28	18.9	20.7	18.9	18.9	19.7	20.0	19.6	23.8
PW29	28.5	43.4	24.4	34.4	31.9	40.6	25.7	34.0
PW30	15.5	29.6	39.5	20.8	30.8	44.4	23.2	32.2
PW31	3.1	3.5	3.2	3.0	4.4	4.1	5.1	7.2
PW32	36.8	34.4	36.1	33.0	37.3	39.0	35.9	37.3
PW33	15.1	19.3	22.0	19.4	22.6	25.9	24.8	25.7
PW34	13.4	26.0	27.4	25.8	31.1	31.3	29.7	27.0
PW35	20.4	32.6	34.0	23.4	32.8	37.7	25.7	30.3
PW36	31.3	32.1	30.7	36.2	34.6	34.0	36.9	36.6
PW37	41.8	39.4	38.7	39.5	38.3	37.1	36.8	42.5
PW38	28.6	31.9	32.4	36.2	36.1	28.0	33.5	31.5
PW39	18.6	24.1	21.3	25.1	24.8	16.2	25.3	22.3
PW40	32.6	33.4	32.5	42.5	35.4	32.0	42.0	35.2
PW41	7.2	6.9	6.7	7.5	8.7	8.5	9.0	12.0
PW42	13.3	14.0	11.9	12.9	14.0	11.8	13.3	15.5
PW43	23.6	32.2	34.4	27.0	31.4	34.9	30.3	33.5

TABLE 2
LALF Flare Data
Landfill Managment Plan
Former Los Angeles Landfill
Albuqeurque, New Mexico

Date	Methane (%)	Oxygen (%)	Flow (cfm)	Vacuum (in H_2O)	Heat Flow Rate (MMBtu/hr)	No. of LFG Wells Open to Extraction
2/8/01	47	NA	258	34	7.36	NA
2/14/01	47.7	NA	324	31	9.38	NA
3/1/01	43.8	NA	266	NA	7.07	NA
3/8/01	44.4	NA	200	NA	5.39	NA
3/13/01	50.2	NA	366	34	11.16	NA
3/21/01	46.6	NA	314	35	8.88	NA
3/28/01	45.4	NA	336	32	9.26	NA
3/30/01	42.6	NA	288	34	7.45	NA
4/3/01	45.5	NA	260	36	7.18	NA
4/12/01	45.1	NA	305	36	8.35	NA
4/18/01	45.9	NA	346	33	9.64	NA
4/20/01	43.3	NA	285	35	7.49	NA
5/2/01	49	NA	445	19	13.24	NA
5/9/01	46	NA	438	20	12.23	NA
5/16/01	43.9	NA	470	15	12.53	NA
5/23/01	43.4	NA	493	11.5	12.99	NA
5/29/01	41.4	NA	502	11	12.62	NA
6/6/01	37	NA	500	NA	11.23	NA
6/13/01	42.4	NA	504	NA	12.98	NA
6/22/01	41.1	NA	475	NA	11.85	NA
6/27/01	40.6	NA	471	NA	11.61	NA
7/2/01	41.6	NA	458	NA	11.57	NA
7/10/01	41.4	NA	464	NA	11.66	NA
7/16/01	40.8	NA	451	NA	11.17	NA
7/24/01	39.9	NA	448	NA	10.85	NA
7/30/01	39.3	NA	456	NA	10.88	NA
8/7/01	39.8	NA	454	NA	10.97	NA
8/15/01	38.2	NA	456	NA	10.58	NA
8/22/01	38.7	NA	452	NA	10.62	NA
8/30/01	41.4	NA	455	NA	11.44	NA
9/3/01	39.5	NA	468	NA	11.22	NA

TABLE 2
LALF Flare Data
Landfill Managment Plan
Former Los Angeles Landfill
Albuqeurque, New Mexico

Date	Methane (%)	Oxygen (%)	Flow (cfm)	Vacuum (in H_2O)	Heat Flow Rate (MMBtu/hr)	No. of LFG Wells Open to Extraction
9/18/01	42.1	NA	528	NA	13.50	NA
9/25/01	43.5	NA	515	NA	13.60	NA
10/16/01	40.4	NA	499	NA	12.24	NA
10/24/01	42.3	NA	451	NA	11.58	NA
11/1/01	40.8	NA	480	NA	11.89	NA
11/8/01	40.1	NA	447	NA	10.88	NA
11/15/01	39.4	NA	464	NA	11.10	NA
11/20/01	40.5	NA	448	NA	11.02	NA
11/27/01	38.5	NA	452	NA	10.57	NA
12/12/01	38.4	NA	385	NA	8.98	NA
12/27/01	37	NA	431	NA	9.68	NA
1/3/02	40.4	NA	403	NA	9.89	NA
1/16/02	38.8	NA	395	NA	9.31	NA
3/12/02	38	NA	380	NA	8.77	NA
3/25/02	38	NA	350	NA	8.08	NA
4/10/02	37.3	NA	390	NA	8.83	NA
4/24/02	37.1	NA	412	NA	9.28	NA
5/8/02	36.4	NA	408	NA	9.02	NA
5/22/02	38.2	NA	425	NA	9.86	NA
6/5/02	35.8	NA	415	NA	9.02	NA
6/20/02	36	NA	430	NA	9.40	NA
7/1/02	36	NA	429	NA	9.38	NA
7/17/02	34.6	NA	435	NA	9.14	NA
7/31/02	36.7	NA	439	NA	9.78	NA
8/14/02	40.1	NA	456	NA	11.10	NA
8/27/02	38	NA	439	NA	10.13	NA
9/13/02	41.4	NA	449	NA	11.29	NA
9/30/02	43.7	NA	472	NA	12.52	NA
10/16/02	39.9	NA	437	NA	10.59	NA
10/31/02	39.5	NA	441	NA	10.58	NA
11/13/02	42.4	NA	430	NA	11.07	NA

TABLE 2
LALF Flare Data
Landfill Managment Plan
Former Los Angeles Landfill
Albuqeurque, New Mexico

Date	Methane (%)	Oxygen (%)	Flow (cfm)	Vacuum (in H_2O)	Heat Flow Rate (MMBtu/hr)	No. of LFG Wells Open to Extraction
11/27/02	40.7	NA	402	NA	9.93	NA
12/11/02	41.3	NA	393	NA	9.86	NA
12/23/02	39.7	NA	390	NA	9.40	NA
1/6/03	40.5	NA	410	NA	10.08	NA
2/4/03	41.1	NA	340	NA	8.49	NA
2/28/03	38.4	NA	315	NA	7.34	NA
3/13/03	38	NA	344	NA	7.94	NA
3/26/03	39.3	NA	363	NA	8.66	NA
4/4/03	39.4	NA	350	NA	8.37	NA
4/21/03	39.8	NA	376	NA	9.09	NA
5/8/03	38.4	NA	403	NA	9.40	NA
5/22/03	38.1	NA	394	NA	9.11	NA
6/4/03	38.5	NA	405	NA	9.47	NA
6/19/03	38.9	NA	428	NA	10.11	NA
7/1/03	36.1	NA	430	NA	9.43	NA
7/18/03	38	NA	445	NA	10.27	NA
7/31/03	41.3	NA	426	NA	10.68	NA
8/12/03	37.1	NA	465	NA	10.48	NA
8/27/03	36.9	NA	466	NA	10.44	NA
9/11/03	37.4	NA	469	NA	10.65	NA
9/30/03	39.3	NA	428	NA	10.21	NA
10/15/03	40.3	NA	467	NA	11.43	NA
10/29/03	40.1	NA	452	NA	11.01	NA
11/14/03	41.1	NA	480	NA	11.98	NA
11/25/03	36.8	NA	453	NA	10.12	NA
12/11/03	40.5	NA	443	NA	10.89	NA
12/22/03	38.2	NA	418	NA	9.70	NA
1/7/04	38.1	NA	453	NA	10.48	NA
2/5/04	37.9	NA	439	NA	10.10	NA
2/20/04	38.3	NA	438	NA	10.19	NA
3/5/04	36.4	NA	408	NA	9.02	NA

TABLE 2
LALF Flare Data
Landfill Managment Plan
Former Los Angeles Landfill
Albuqeurque, New Mexico

Date	Methane (%)	Oxygen (%)	Flow (cfm)	Vacuum (in H_2O)	Heat Flow Rate (MMBtu/hr)	No. of LFG Wells Open to Extraction
3/19/04	31	NA	380	NA	7.15	NA
3/30/04	35.5	NA	354	NA	7.63	NA
4/15/04	36.5	NA	326	NA	7.23	NA
4/28/04	39.1	NA	335	NA	7.95	NA
5/12/04	39.1	NA	345	NA	8.19	NA
5/26/04	42	NA	309	NA	7.88	NA
6/11/04	35	NA	345	NA	7.33	NA
6/23/04	38	NA	358	NA	8.26	NA
7/18/04	35.8	NA	380	NA	8.26	NA
7/22/04	37.6	NA	385	NA	8.79	NA
8/6/04	39.4	NA	404	NA	9.67	NA
9/2/04	42.1	NA	412	NA	10.53	NA
10/14/04	44.8	NA	414	NA	11.26	NA
10/28/04	45.4	NA	399	NA	11.00	NA
11/21/04	41	NA	376	NA	9.36	NA
12/9/04	39	NA	395	NA	9.35	NA
12/21/04	44.1	NA	450	NA	12.05	NA
1/6/05	42.9	NA	473	NA	12.32	NA
1/20/05	43.3	NA	470	NA	12.36	NA
2/3/05	38.1	NA	355	NA	8.21	NA
3/2/05	39.8	NA	336	NA	8.12	NA
3/16/05	40	NA	397	NA	9.64	NA
3/17/05	42.7	NA	359	NA	9.31	NA
4/16/05	39.5	NA	336	NA	8.06	NA
5/5/05	51.8	NA	372	NA	11.70	NA
5/17/05	42.8	NA	345	NA	8.97	NA
6/2/05	40.6	NA	371	NA	9.15	NA
7/22/05	42.5	NA	422	NA	10.89	NA
8/4/05	38.6	NA	418	NA	9.80	NA
8/22/05	42.2	NA	424	NA	10.86	NA
9/9/05	37.8	NA	472	NA	10.83	NA

TABLE 2
LALF Flare Data
Landfill Managment Plan
Former Los Angeles Landfill
Albuqeurque, New Mexico

Date	Methane (%)	Oxygen (%)	Flow (cfm)	Vacuum (in H_2O)	Heat Flow Rate (MMBtu/hr)	No. of LFG Wells Open to Extraction
9/26/05	40.5	NA	398	NA	9.79	NA
10/10/05	40.4	NA	426	NA	10.45	NA
10/28/05	40	NA	418	NA	10.15	NA
11/9/05	38.4	NA	404	NA	9.42	NA
11/18/05	37.2	NA	371	NA	8.38	NA
2/6/07	43.6	0.7	367	19	9.72	35
2/21/07	45.0	0.6	378	17	10.33	30
3/8/07	43.8	1.2	377	17	10.03	25
4/4/07	42.4	1.3	295	27	7.59	16
4/5/07	42.6	1.0	332	22	8.59	16
4/18/07	40.8	1.3	261	-	6.47	13
5/2/07	42.8	1.0	320	23	8.32	21
5/17/07	39.6	1.4	305	25	7.33	15
5/31/10	41.3	1.2	356	18	8.93	25
6/12/07	39.1	1.8	326	22	7.74	22
7/2/07	37.8	1.7	355	17	8.15	23
7/12/07	30.2	2.0	336	20	6.16	21
7/25/07	32.5	1.8	371	14.5	7.32	25
8/7/07	41.1	1.5	463	13	11.55	34
8/23/07	43.4	1.2	476	10	12.54	38
9/5/07	42.2	1.3	477	11	12.22	38
9/19/07	40.5	2.5	474	12	11.66	35
10/1/07	41.0	1.1	484	11	12.05	39
10/18/07	41.1	1.8	468	13	11.68	36
11/1/07	39.1	2.5	492	10	11.68	35
11/12/07	40.7	1.8	473	12	11.69	25
11/28/07	40.5	1.4	461	15	11.34	27
12/13/07	42.0	1.2	459	14	11.71	31
1/3/08	40.2	0.7	464	15	11.33	34
1/10/08	39.0	2.3	427	19	10.11	20
1/23/08	40.9	2.6	422	-	10.48	20

TABLE 2
LALF Flare Data
Landfill Managment Plan
Former Los Angeles Landfill
Albuqeurque, New Mexico

Date	Methane (%)	Oxygen (%)	Flow (cfm)	Vacuum (in H_2O)	Heat Flow Rate (MMBtu/hr)	No. of LFG Wells Open to Extraction
2/6/08	38.2	2.7	413	21	9.58	20
2/21/08	36.4	3.7	381	24	8.42	22
3/5/08	44.6	0.6	315	32	8.53	20
3/19/08	42.2	1.0	311	33	7.97	11
4/2/08	42.1	0.4	411	25	10.51	18
4/16/08	43.0	0.4	266	27	6.95	14
4/30/08	43.0	0.7	280	26	7.31	20
5/14/08	42.2	0.2	276	27	7.07	16
5/28/08	43.0	0.2	253	28	6.61	18
6/11/08	42.5	0.2	279	24	7.20	17
6/25/08	38.3	3.4	351	13	8.16	17
7/10/08	35.8	3.7	363	12	7.89	18
7/30/08	38.8	3.3	353	12	8.32	21
8/6/08	38.7	3.4	355	13.5	8.34	20
8/20/08	36.3	4.0	346	15	7.63	18
9/3/08	38.1	3.0	385	9	8.91	35
9/17/08	44.6	1.9	397	6	10.75	36
9/30/08	44.6	1.4	401	6	10.86	28
10/15/08	48.0	0.9	394	7	11.48	26
10/29/08	43.4	1.2	396	7	10.44	31
11/12/08	43.4	1.1	385	9	10.15	31
11/25/08	43.6	1.3	380	10	10.06	31
12/10/08	42.6	2.0	366	14	9.47	29
12/23/08	43.4	1.4	352	13	9.28	31
1/7/09	40.5	1.7	364	13	8.95	34
1/21/09	41.5	1.7	365	13	9.20	32
2/4/09	41.9	1.8	331	16	8.42	27
2/17/09	38.5	2.2	314	18	7.34	26
3/4/09	44.5	0.4	225	33	6.08	18
3/18/09	42.0	0.7	260	25	6.63	18
4/1/09	43.1	0.0	250	27	6.54	21

TABLE 2
LALF Flare Data
Landfill Managment Plan
Former Los Angeles Landfill
Albuqeurque, New Mexico

Date	Methane (%)	Oxygen (%)	Flow (cfm)	Vacuum (in H_2O)	Heat Flow Rate (MMBtu/hr)	No. of LFG Wells Open to Extraction
4/15/09	43.2	0.8	232	30	6.09	16
4/29/09	42.9	0.5	225	29	5.86	17
5/13/09	39.2	2.6	333	13	7.93	32
5/27/09	36.8	2.5	342	13	7.64	30
6/11/09	40.0	2.4	345	12	8.38	29
6/25/09	36.7	2.6	344	12	7.67	25
7/8/09	37.3	3.2	332	15	7.52	23
7/22/09	36.5	3.3	321	16	7.11	19
8/5/09	42.0	0.4	349	13	8.90	23
9/16/09	40.2	0.1	337	14	8.23	18
9/29/09	41.2	0.6	341	14	8.53	24
10/15/09	46.5	0.4	336	14	9.49	22
10/29/09	39.2	0.0	315	16	7.50	20
11/11/09	42.6	1.3	274	23	7.09	14
11/25/09	43.3	0.2	336	15	8.83	31
12/9/09	42.7	0.1	291	21	7.54	19
12/22/09	41.8	0.1	335	14	8.50	31
1/6/10	41.0	0.7	265	27	6.60	18
1/21/10	43.5	0.5	276	19	7.29	26
2/3/10	41.0	0.0	269	25	6.70	24
2/17/10	40.7	0.2	292	20	7.22	27
3/3/10	40.8	0.4	289	25	7.16	24
3/17/10	41.8	1.1	276	27	7.01	22
3/30/10	41.1	0.4	283	21	7.06	26
4/14/10	40.20	0.32	256	26	6.25	27
4/28/10	38.64	0.03	301	20	7.06	25
5/12/10	38.13	0.32	259	25	6.00	22
5/26/10	39.00	0.00	277	27	6.56	23
6/9/10	40.17	0.24	259	24	6.32	20
6/23/10	33.16	0.40	304	20	6.12	20
7/21/10	38.43	0.14	296	19	6.91	20

TABLE 2
LALF Flare Data
Landfill Managment Plan
Former Los Angeles Landfill
Albuqeurque, New Mexico

Date	Methane (%)	Oxygen (%)	Flow (cfm)	Vacuum (in H_2O)	Heat Flow Rate (MMBtu/hr)	No. of LFG Wells Open to Extraction
8/4/10	36.05	0.30	321	16	7.03	17
8/19/10	39.60	0.11	348	11	8.37	22
9/1/10	15.9	12.4	295	19	2.85	16
9/15/10	36.9	0.0	343	13	7.69	25
9/29/10	39.7	0.0	356	10	8.58	33
10/13/10	39.7	0.0	351	11	8.46	29
10/27/10	38.2	0.1	341	14	7.91	18
11/10/10	41.8	0.1	349	12	8.86	37
11/23/10	40.8	0.2	353	12	8.75	35
12/8/10	44.0	0.2	344	15	9.19	30
1/5/11	40.8	0.2	366	15	9.07	23
1/19/11	42.8	0.0	269	26	6.99	38
2/4/11	42.3	0.1	321	15	8.24	28
2/16/11	41.1	0.1	336	17	8.39	31
3/2/11	42.0	0.1	330	16	8.42	27
3/15/11	38.9	0.2	332	18	7.84	25
3/30/11	39.0	0.2	326	18	7.72	28
4/13/11	37.6	0.1	305	20	6.96	27
4/26/11	38.3	0.4	310	18	7.21	27
5/12/11	37.9	0.1	312	18	7.18	22
5/24/11	38.0	0.2	283	23	6.53	22
6/8/11	31.0	0.3	323	17	6.08	23
6/22/11	32.1	0.4	321	18	6.26	22
7/6/11	39.4	0.1	322	17	7.70	25
7/19/11	33.0	0.1	331	17	6.63	24
8/2/11	41.0	0.0	335	15	8.34	32
8/17/11	41.3	0.0	347	14	8.70	33
8/31/11	39.3	0.1	334	15	7.97	31
9/15/11	42.0	0.1	336	16	8.57	37
9/27/11	40.7	0.1	346	15	8.55	36
10/12/11	41.5	0.1	342	15	8.62	35

TABLE 2
LALF Flare Data
Landfill Managment Plan
Former Los Angeles Landfill
Albuqeurque, New Mexico

Date	Methane (%)	Oxygen (%)	Flow (cfm)	Vacuum (in H_2O)	Heat Flow Rate (MMBtu/hr)	No. of LFG Wells Open to Extraction
10/26/11	42.0	0.0	343	15	8.75	35
11/9/11	42.6	0.0	373	11	9.65	26
11/22/11	41.2	0.0	329	18	8.23	31
12/7/11	40.3	0.0	325	18	7.95	26
12/20/11	37.6	0.0	307	18	7.01	34
1/4/12	36.7	0.0	335	17	7.47	22
1/18/12	37.2	0.0	327	18	7.39	23
2/1/12	34.8	0.0	319	21	6.74	23
2/16/12	33.8	0.0	320	18	6.57	23
2/29/12	31.6	0.0	334	22	6.41	21
3/14/12	36.2	0.1	262	27	5.76	17
3/28/12	38.5	0.4	261	28	6.10	22
4/11/12	39.4	0.2	240	30	5.74	20
4/25/12	38.0	0.1	284	22	6.55	20
5/9/12	38.5	0.1	273	24	6.38	23
5/23/12	38.1	0.0	264	26	6.11	26
6/7/12	36.5	0.0	263	25	5.83	21
6/20/12	37.0	0.1	264	25	5.93	21
7/3/12	36.5	0.0	275	24	6.09	25

Notes:

NA = Not Available

% = percentage of compound in landfill gas

cfm = cubic feet per minute

in H2O = inches of water

MMBtu/hr = million British thermal units per hour

TABLE 3
LFG Probe Construction Details
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, NM

Probe ID	Location	Nominal Diameter (inches)	Probe Depth/Screen Interval (feet)
	Los Angeles Landfill (inside perimeter)		
M01	west side of landfill	1	55
M02	northwest corner of landfill	1	50
M03	south of cemetery	1	50
M04	east of cemetery	1	46
M08	NE corner of landfill, near PW04	1.5	48
MW01	eastern edge of landfill, SE corner	0.5	shallow
		0.5	middle
		0.5	deep
MW02	east edge of landfill, south of LALF transformer	0.5	shallow
		0.5	middle
		0.5	deep
MW03	east edge of landfill, north of groundwater well LALF04	0.5	shallow
		0.5	middle
		0.5	deep
MW04	east edge of landfill, south of IV2/IV3/IV4	0.5	shallow
		0.5	middle
		0.5	deep
MW05	east edge of landfill, south of Gate 8	0.5	shallow
		0.5	middle
		0.5	deep
MW06	east edge of landfill, east of PW07	0.5	6
		0.5	23
		0.5	53
MW07	east edge of landfill, north of CS02	0.5	6
		0.5	23
		0.5	53
MW08	NE corner of LALF, near CS01	0.5	6
		0.5	23
		0.5	53
	Along Alameda Boulevard NE		
M11	lot west of cemetery	0.5	3.1 - 8.1
		0.5	20 - 25
		0.5	45 - 50
M12	NW corner of Balloon Museum & Alameda	0.5	5 - 8
		0.5	20 - 25
		0.5	50 - 55
	3711 Paseo Del Norte (OGB Arch. Millworks)		
M14	Tract F2 (vacant lot)	0.5	2 - 7
		0.5	40 - 45
		0.5	55 - 60

TABLE 3
LFG Probe Construction Details
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, NM

Probe ID	Location	Nominal Diameter (inches)	Probe Depth/Screen Interval (feet)
M15	Tract F1A, north end of tract, inside fenced yard	0.5	2 - 7
		0.5	40 - 45
		0.5	55 - 60
	North Diversion Channel		
M16	West of bike path	0.5	20 - 25
		0.5	35 - 40
		0.5	45 - 50
M17	West of bike path	0.5	20 - 25
		0.5	35 - 40
		0.5	45 - 50
	8801 Horizon Blvd. (Molina Health Care)		
M18	Parking lot on south side of building	0.5	3 - 8
		0.5	22 - 27
		0.5	45 - 50
	General Mills		
M19	East side of plant	0.5	5 - 10
		0.5	16 - 21
		0.5	55 - 60
	Washington Buisness Park		
E01	Lot 54	0.5	6
		0.5	23
		0.5	53
E02	Lot 50	0.5	6
		0.5	23
		0.5	53
	Alameda Business Park		
AM03	Lot 29	0.5	15.5 - 18
		0.5	31.5 - 34
		0.5	46.5 - 49
AM04	Lot 14	0.5	7 - 12
		0.5	30 - 35
		0.5	47 - 52
AM05	Lot 54	0.5	12 - 17
		0.5	31 - 34
		0.5	45 - 50
AM06	Lot 15	0.5	5 - 8
		0.5	21 - 24
		0.5	45 - 50
AM07	Lot 53	0.5	5 - 8
		0.5	25 - 30
		0.5	46 - 50

TABLE 3
LFG Probe Construction Details
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, NM

Probe ID	Location	Nominal Diameter (inches)	Probe Depth/Screen Interval (feet)
AM08	Lot 16	0.5	9 - 14
		0.5	30 - 35
		0.5	46 - 49
AM09	Lot 52	0.5	11 - 16
		0.5	29 - 32
		0.5	38 - 43
AM10	Lot 17	0.5	6 - 9
		0.5	28 - 33
		0.5	39 - 44
AM11	Lot 18	0.5	15 - 20
		0.5	32 - 35
		0.5	40 - 45
AM12	Lot 19	0.5	7 - 12
		0.5	27 - 32
		0.5	41 - 46
AM13	Lot 20	0.5	10 - 15
		0.5	31 - 36
		0.5	41 - 46
AM14	Lot 21	0.5	6 - 11
		0.5	30 - 35
		0.5	41 - 46
AM15	Lot 38	0.5	10 - 15
		0.5	25 - 30
		0.5	41 - 46
AM16	Lot 22	0.5	6 - 11
		0.5	21 - 26
		0.5	40 - 45
AM17	Lot 37	0.5	15 - 20
		0.5	31 - 34
		0.5	41 - 46
AM18	Lot 23	0.5	15 - 20
		0.5	31 - 35
		0.5	43 - 48
AM19	Lot 36	0.5	7 - 9
		0.5	29 - 33
		0.5	43 - 48
AM20	Lot 40	0.5	11 - 16
		0.5	30 - 33
		0.5	41 - 46
AM21	Lot 13	0.5	9 - 14
		0.5	37 - 32
		0.5	43 - 46

TABLE 3
LFG Probe Construction Details
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, NM

Probe ID	Location	Nominal Diameter (inches)	Probe Depth/Screen Interval (feet)
AM22	Lot 12	0.5	9 - 14
		0.5	32 - 37
		0.5	44 - 49
AM23	Lot 11	0.5	8 - 13
		0.5	32 - 37
		0.5	44 - 49
AM24	Lot 39	0.5	8 - 13
		0.5	29 - 34
		0.5	42 - 46
AM25	Lot 41	0.5	8 - 13
		0.5	26 - 31
		0.5	40 - 45
AM26	Lot 42	0.5	8 - 13
		0.5	26 - 31
		0.5	40 - 45
AM27	Lot 35	0.5	8 - 13
		0.5	26 - 31
		0.5	40 - 45
AM28	Lot 24	0.5	8 - 13
		0.5	23 - 28
		0.5	43 - 48
AM29	Lot 34	0.5	10 - 15
		0.5	23 - 28
		0.5	43 - 48
AM30	Lot 25	0.5	12 - 17
		0.5	24 - 29
		0.5	40 - 45
AM31	Lot 33	0.5	10 - 15
		0.5	32 - 35
		0.5	42 - 45
AM32	Lot 32	0.5	10 - 15
		0.5	32 - 35
		0.5	43 - 48
AM33	Lot 26	0.5	9 - 14
		0.5	32 - 35
		0.5	43 - 48
AM34	Lot 31	0.5	9 - 14
		0.5	26 - 31
		0.5	40 - 45
AM35	Lot 30	0.5	9 - 14
		0.5	28 - 33
		0.5	44 - 49

TABLE 3
LFG Probe Construction Details
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, NM

Probe ID	Location	Nominal Diameter (inches)	Probe Depth/Screen Interval (feet)
AM36	Lot 4	0.5	9 - 14
		0.5	30 - 35
		0.5	44 - 49
AM37	Lot 5	0.5	9 - 14
		0.5	24 - 29
		0.5	44 - 49
AM38	Lot 6	0.5	9 - 14
		0.5	31 - 36
		0.5	42 - 47
AM39	Lot 7	0.5	7 - 12
		0.5	24 - 29
		0.5	42 - 47
AM40	Lot 8	0.5	6 - 9
		0.5	20 - 25
		0.5	38 - 43
AM41	Lot 51	0.5	8 - 13
		0.5	24 - 29
		0.5	40 - 45
AM42	Lot 50	0.5	7 - 10
		0.5	24 - 29
		0.5	38 - 43
AM43	Lot 49	0.5	8 - 13
		0.5	24 - 29
		0.5	40 - 45
AM44	Lot 55	0.5	9 - 14
		0.5	26 - 31
		0.5	44 - 49
AM45	Lot 10	0.5	10 - 15
		0.5	26 - 31
		0.5	44 - 49
AM46	Lot 9	0.5	8 - 13
		0.5	24 - 29
		0.5	44 - 49
AM47	Lot 56	0.5	11 - 16
		0.5	27 - 32
		0.5	44 - 49
AM48	Lot 57	0.5	10 - 15
		0.5	27 - 32
		0.5	44 - 49
AM49	Lot 58	0.5	11 - 16
		0.5	30 - 35
		0.5	44 - 49

TABLE 3
LFG Probe Construction Details
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, NM

Probe ID	Location	Nominal Diameter (inches)	Probe Depth/Screen Interval (feet)
AM50	Lot 59	0.5	8 - 13
		0.5	25 - 30
		0.5	44 - 49
AM51	Lot 48	0.5	8 - 13
		0.5	22 - 27
		0.5	38 - 43
AM52	Lot 43	0.5	9 - 14
		0.5	24 - 29
		0.5	40 - 45
AM53	Lot 44	0.5	8 - 13
		0.5	24 - 29
		0.5	40 - 45
AM54	Lot 45	0.5	13 - 18
		0.5	26 - 31
		0.5	40 - 45
AM55	Lot 47	0.5	8 - 13
		0.5	22 - 27
		0.5	40 - 45
AM56	Lot 46	0.5	10 - 15
		0.5	30 -35
		0.5	41 - 46
AM57	Lot 27	0.5	8 - 13
		0.5	33 - 38
		0.5	45 - 50
AM58	Lot 28	0.5	12 - 17
		0.5	39 - 43
		0.5	51 - 54
AM59	Lot 29	0.5	8 - 13
		0.5	30 - 35
		0.5	54 - 59
AM60	Lot 1	0.5	10 - 15
		0.5	32 - 37
		0.5	56 - 59
AM61	Lot 2	0.5	10 - 15
		0.5	23 - 28
		0.5	49 - 54
AM62	Lot 3	0.5	10 - 15
		0.5	22 - 27
		0.5	43 - 48

TABLE 4
Groundwater Well Construction Data and Water Level Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SCREEN DIAMETER & MATERIAL	SCREEN INTERVAL (FEET)	TOTAL DEPTH (FEET)	DEPTH TO WATER (FEET)	STATE PLANE X-COORDINATE (FEET)	STATE PLANE Y-COORDINATE (FEET)	REFERENCE ELEVATION (FEET)	WATER ELEVATION (FEET)
LALF01	2" SS	101-141	146	105.72	1534581	1522588	5064.02	4958.30
LALF02	2" SS	110-150	155		1535813	1521295	5079.93	5079.93
LALF03	2" SS	135-175	180	138.83	1535269	1519983	5086.75	4947.92
LALF04	2" SS	113-153	158	131.91	1535597	1520594	5081.45	4949.54
LALF05	4" SS	108-148	153	124.02	1535907	1522601	5079.95	4955.93
LALF06	4" SS	115-155	160	130.64	1534595	1519945	5078.75	4948.11
LALF07	4" SS	120-160	165	134.28	1535979	1521743	5086.7	4952.42
LALF08	4" SS	206-216	221	134.86	1535822	1521275	5084.36	4949.50
LALF09	4" PVC	218-228	233	150.91	1536323	1519971	5093.56	4942.65
LALF10	4" PVC	140-180	185	146.15	1536323	1519962	5093.48	4947.33
LALF11	4" PVC	98-138	143	107.47	1534200	1521688	5062	4954.53
LALF12	4" PVC	129-169	174	138.21	1535355	1518790	5081.6	4943.39
LALF13	4" PVC	107-147	144.7	119.45	1535214	1521709	5072.75	4953.30
LALF14	4" PVC	105-145	150.1	124.05	1534617	1520206	5072.94	4948.89
LALF15	4" PVC	85-125	130.21	95.84	1534823	1523794	5068.35	4972.51
LALF16	4" PVC	130-170	175	138.28	1534923	1519860	5086.07	4947.79
LALF17	4" PVC	125-165	170	130.46	1534402	1519825	5078.22	4947.76
LALF18	4" PVC	118-158	163	122.54	1534750	1519164	5067.53	4944.99
LALF19	4" PVC	215-245	245	141.5	1535335	1518784	5080.69	4939.19
RSMW01	2" PVC	150-170	170	166.79	1535536	1516476	5093.22	4926.43
RSMW-2	2" PVC	148.5-168.5	168.5	161.85	1535556	1516810	5093.2	4931.35
RSMW-3	2" PVC	137-157	157	155.47	1535121	1516659	5085.93	4930.46
RSMW-4	2" PVC	156-176	176	170.88	1535835	1516473	5098.24	4927.36
RSMW-5	2" PVC	122-142	142	135.92	1534631	1518039	5076.12	4940.20
RSMW-6	2" PVC	128-148	148	143.61	1534772	1517440	5080.22	4936.61
IW-1	6" PVC	113-213	213		NA	NA	NA	NA
IW-2	6" PVC	115-215	215		NA	NA	NA	NA
IW-3	8" PVC	198-217 & 227-166	277	160.77	1536054	1517879	NA	NA
IW-4	8" PVC	196-216 & 225-264	275	163.88	1536017	1517643	NA	NA
GWEX02	6" Mild Steel	130-180	180	124.86	1534772	1518735	NA	NA
GWEX03	6" Mild Steel	150-220	220	146.22	1535837	1518286	NA	NA
GWEX04	6" Mild Steel	156-206	206	152.71	1536551	1518770	NA	NA

Notes:
Depth to water measurements are typically from the top of casing of the well.
Depth to water levels were measured on July 2, 2012 with a Solinist water level meter.
PVC = polyvinyl chloride
SS = stainless steel
NA = Not Available

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
LALF03	2/18/2004	7.1	2	1.1	< 0.17	< 0.3
	5/18/2004	8.3	2.2	1.4	< 0.14	< 0.17
	8/18/2004	8	2	1.1	< 0.14	< 0.17
	11/17/2004	6.6	2	1.1	< 0.14	< 0.17
	2/16/2005	7.1	2	1.4	< 0.14	< 0.17
	5/6/2005	8.4	2.2	1.3	< 0.23	< 0.19
	9/8/2005	6.5	2	1.9	< 0.23	< 0.19
	12/22/2005	9.9	2.9	2.6	< 0.23	< 0.19
	2/22/2006	8.5	2.1	1.5	< 0.19	< 0.24
	5/25/2006	4.5	3.3	2.6	< 0.19	< 0.24
	8/15/2006	4.5	1.9	1.3	< 0.19	< 0.24
	1/15/2007	4.4	1.5	1.4	< 0.24	< 0.24
	3/26/2007	7.2	2.1	1.6	< 0.24	< 0.24
	6/18/2007	6.7	2.1	1.5	< 0.24	< 0.24
	9/25/2007	7.7	1.7	2.8	< 0.24	< 0.24
	12/10/2007	5	4.4	1.5	< 0.24	< 0.24
	5/6/2008	4.4	2.2	1.50	< 0.23	< 0.49
	8/7/2008	4.8	1.8	1.70	< 0.23	< 0.49
	11/4/2008	6.1	2.1	1.60	< 0.23	< 0.49
	2/5/2009	5.4	2	1.90	< 0.36	< 0.58
	5/6/2009	5.4	1.7	1.4	< 0.36	< 0.58
	8/12/2009	4.6	1.6	1.30	< 0.36	< 0.58
	11/5/2009	4.2	1.2	1.30	< 0.36	0.20
	2/4/2010	4.9	1.2	<1.0	< 1.0	< 1.0
	5/7/2010	4	1.3	1.1	< 1.0	< 1.0
	8/5/2010	3.8	1	<1.0	< 1.0	< 1.0
	11/9/2010	3.6	1.1	1.1	< 1.0	< 1.0
	2/10/2011	3.3	1.2	1.3	< 1.0	< 1.0
	5/6/2011	2.4	<1	<1.0	< 1.0	< 1.0
	8/9/2011	3	1.1	1.2	< 1.0	< 1.0
	11/3/2011	2.9	<1	<1.0	< 1.0	< 1.0
	2/14/2012	3	1.1	<1.0	< 1.0	< 1.0
LALF04	2/16/2005	1.3	1.5	< 0.19	< 0.23	< 0.19
	9/1/2005	1.1	1.5	< 0.19	< 0.23	< 0.19
	11/21/2005	1.8	1.8	< 0.19	< 0.23	< 0.19
	2/9/2006	1.5	1.6	0.2	< 0.19	< 0.24
	5/25/2006	0.9	2.5	0.3	< 0.19	< 0.24
	8/15/2006	1	1.4	<0.19	< 0.19	< 0.24
	1/15/2007	1.7	1.7	0.3	< 0.24	< 0.24
	3/26/2007	2.2	2.2	0.5	< 0.24	< 0.24
	6/19/2007	2.2	2.2	0.4	< 0.24	< 0.24

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	9/24/2007	3.3	2.1	0.3	< 0.24	< 0.24
	12/10/2007	2.4	2.4	<0.27	< 0.24	< 0.24
	5/5/2008	3.60	7.00	0.40	< 0.23	< 0.49
	8/6/2008	2.30	2.30	0.50	< 0.23	< 0.49
	11/4/2008	3.00	2.50	0.70	< 0.23	< 0.49
	2/3/2009	2.60	2.40	0.70	< 0.36	< 0.58
	5/5/2009	2.6	2.2	0.4	< 0.36	< 0.58
	8/10/2009	2.1	2.1	0.3	< 0.36	< 0.58
	11/3/2009	2.50	1.80	0.40	< 0.36	< 0.58
	2/2/2010	1.9	1.4	< 1.0	< 1.0	< 1.0
	5/6/2010	1.8	1.6	< 1.0	< 1.0	< 1.0
	8/5/2010	1.8	<1.0	< 1.0	< 1.0	< 1.0
	11/4/2010	1.4	1.1	< 1.0	< 1.0	< 1.0
	2/9/2011	1.7	2.1	< 1.0	< 1.0	< 1.0
	5/5/2011	1.5	1.1	< 1.0	< 1.0	< 1.0
	8/9/2011	1.4	1.1	< 1.0	< 1.0	< 1.0
	11/2/2011	1.3	1.0	< 1.0	< 1.0	< 1.0
	2/3/2012	1.1	<1.0	< 1.0	< 1.0	< 1.0
LALF05	12/21/2005	0.3	0.4	< 0.19	< 0.23	< 0.19
	1/11/2007	< 0.22	< 0.22	< 0.27	< 0.24	< 0.24
	11/20/2007	< 0.22	< 0.22	< 0.27	< 0.24	< 0.24
	5/9/2008	< 0.25	< 0.18	< 0.21	< 0.23	< 0.49
	5/4/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/3/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
LALF06	2/10/2005	14.5	3	< 0.19	< 0.23	< 0.19
	5/12/2005	12.4	2.6	< 0.19	< 0.23	< 0.19
	9/7/2005	18.4	4	< 0.19	< 0.23	< 0.19
	11/21/2005	11.8	2.8	< 0.19	< 0.23	< 0.19
	2/9/2006	5.8	1.5	0.7	< 0.19	< 0.24
	5/31/2006	1.4	0.8	< 0.19	< 0.19	< 0.24
	8/16/2006	2.6	0.8	0.4	< 0.19	< 0.24
	1/16/2007	2.9	0.8	0.5	< 0.24	< 0.24
	3/26/2007	3.6	0.7	1	< 0.24	< 0.24
	6/21/2007	1.6	0.5	1.2	< 0.24	< 0.24
	9/26/2007	1.5	0.3	1.1	< 0.24	< 0.24
	12/12/2007	3.9	0.8	1.3	< 0.24	< 0.24
	5/7/2008	1.30	0.40	1.00	< 0.23	< 0.49
	8/7/2008	1.00	0.30	0.90	< 0.23	< 0.49
	11/4/2008	1.40	0.60	0.90	< 0.23	< 0.49
	2/3/2009	1.1	0.5	1.1	< 0.36	< 0.58
	5/6/2009	1.3	0.5	0.8	< 0.36	< 0.58

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	8/11/2009	2.10	0.50	< 0.28	< 0.36	< 0.58
	11/4/2009	1.30	0.3	0.70	< 0.36	< 0.58
	2/2/2010	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/5/2010	0.76	< 1.0	< 1.0	< 1.0	< 1.0
	8/3/2010	2.8	< 1.0	< 1.0	< 1.0	< 1.0
	11/2/2010	3.8	< 1.0	< 1.0	< 1.0	< 1.0
	2/9/2011	2.9	< 1.0	< 1.0	< 1.0	< 1.0
	5/4/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	8/9/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	11/2/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	2/8/2012	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
LALF07	11/16/2005	0.6	0.5	< 0.19	< 0.23	< 0.19
	1/12/2007	< 0.22	< 0.22	< 0.27	< 0.24	< 0.24
	11/20/2007	< 0.22	< 0.22	< 0.27	< 0.24	< 0.24
	5/5/2009	< 0.35	< 0.23	< 0.28	< 0.36	< 0.58
	5/4/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/4/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
LALF08	11/16/2005	0.5	0.5	< 0.19	< 0.23	< 0.19
	12/13/2006	0.3	<0.22	< 0.19	< 0.19	< 0.24
	11/20/2007	1.8	2.9	< 0.27	< 0.24	< 0.24
	5/7/2008	< 0.25	< 0.18	< 0.21	< 0.23	< 0.49
	5/5/2009	< 0.35	< 0.23	< 0.28	< 0.36	< 0.58
	5/5/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/4/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
LALF09	9/15/2005	6.3	3.9	0.9	< 0.23	< 0.19
	11/22/2005	7.3	4.1	1.2	< 0.23	< 0.19
	2/14/2006	7.7	5.4	1.1	< 0.19	< 0.24
	6/6/2006	7	4.3	1.7	< 0.19	< 0.24
	8/23/2006	8.1	5.1	0.9	0.2	< 0.24
	1/16/2007	9.2	5	1.2	0.3	< 0.24
	3/27/2007	11.2	5.3	0.8	0.2	< 0.24
	6/20/2007	10.2	6.4	1.6	< 0.24	< 0.24
	9/25/2007	13.4	4.9	2.2	< 0.24	< 0.24
	12/11/2007	8.3	5.3	1.4	< 0.24	< 0.24
	5/6/2008	8.40	<0.18	1.80	< 0.23	< 0.49
	8/7/2008	10.20	5.80	2.00	0.30	< 0.49
	11/4/2008	11.40	6.60	1.80	0.40	< 0.49
	11/4/2008	11.50	6.50	1.80	0.40	< 0.49
	2/5/2009	10.6	6.2	2	0.4	1.5
	5/7/2009	11.7	1.3	2	< 0.36	< 0.58

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	8/12/2009	10.50	6.30	1.90	< 0.36	1.30
	11/5/2009	8.90	4.30	1.90	0.30	1.30
	2/5/2010	10	4.5	1.4	< 1.0	< 1.0
	2/5/2010	10	4.5	1.5	< 1.0	< 1.0
	5/7/2010	9.2	4.9	1.4	< 1.0	< 1.0
	8/9/2010	9.5	4.2	1.4	< 1.0	< 1.0
	8/9/2010	9.8	4.1	1.4	< 1.0	< 1.0
	11/9/2010	9.6	4.6	1.8	< 1.0	< 1.0
	11/9/2010	9.8	4.3	1.7	< 1.0	< 1.0
	2/11/2011	10	5.5	1.9	< 1.0	< 1.0
	5/11/2011	9.5	4.7	1.8	< 1.0	1.7
	8/11/2011	9.2	5.2	1.7	< 1.0	1.0
	11/8/2011	8.6	4	1.7	< 1.0	< 1.0
	2/14/2012	9.2	5.7	1.9	< 1.0	1.2
LALF10	9/15/2005	15.8	9.1	2.6	0.3	< 0.19
	11/22/2005	16.1	9	2.4	< 0.23	< 0.19
	2/14/2006	15.8	10	2.4	0.4	< 0.24
	6/6/2006	15.2	8.6	3.3	0.5	< 0.24
	9/7/2006	14.7	13.3	2.3	< 0.19	< 0.24
	1/17/2007	18.2	9.2	2.7	0.4	< 0.24
	3/27/2007	20.9	10.5	2.6	0.4	< 0.24
	6/20/2007	17.2	10.6	2.8	0.3	< 0.24
	9/25/2007	23	8.2	4.7	0.3	< 0.24
	12/12/2007	16.4	10.2	3	0.3	< 0.24
	5/6/2008	13.60	9.50	3.40	0.40	< 0.49
	8/7/2008	16.20	9.30	2.60	0.40	< 0.49
	11/4/2008	18.60	11.10	3.10	0.60	< 0.49
	2/6/2009	16.50	9.80	3.00	0.60	< 0.58
	5/8/2009	18.7	10	2.9	< 0.36	< 0.58
	8/13/2009	16.60	10.20	3.00	< 0.36	< 0.58
	11/6/2009	13.50	6.80	2.90	0.40	0.70
	2/5/2010	15	7.1	2.5	< 1.0	< 1.0
	5/7/2010	15	9.5	2.6	< 1.0	< 1.0
	8/9/2010	15	6.7	2.2	< 1.0	< 1.0
	11/9/2010	15	7.4	2.6	< 1.0	< 1.0
	2/11/2011	15	8.5	2.8	< 1.0	< 1.0
	5/11/2011	14	7.7	2.6	< 1.0	1.1
	8/12/2011	14	8.2	2.5	< 1.0	< 1.0
	11/8/2011	12	6.6	2.5	< 1.0	< 1.0
	2/14/2012	14	9	2.7	< 1.0	< 1.0

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
LALF11	12/21/2005	0.2	0.6	< 0.19	< 0.23	< 0.19
	1/12/2007	< 0.22	< 0.22	< 0.27	< 0.24	< 0.24
	11/20/2007	0.5	0.4	< 0.27	< 0.24	< 0.24
	5/12/2008	0.40	< 0.18	< 0.21	< 0.23	< 0.49
	5/4/2009	0.6	0.3	< 0.28	< 0.36	< 0.58
	5/4/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/4/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
LALF12	5/18/2005	4	1.4	0.7	< 0.23	< 0.19
	8/18/2005	4.5	1.5	1	< 0.23	< 0.19
	12/21/2005	5.8	2	1.5	< 0.23	< 0.19
	2/16/2006	5.9	2.1	1.1	< 0.19	< 0.24
	5/24/2006	4.3	2.6	1.5	< 0.19	< 0.24
	9/6/2006	7.9	6.1	1.1	< 0.19	< 0.24
	12/6/2006	8.8	2.3	1.3	< 0.19	< 0.24
	4/11/2007	11.1	2.5	1.4	< 0.24	< 0.24
	7/23/2007	9.3	2.7	1.3	< 0.24	< 0.24
	10/31/2007	7.8	2.4	1.6	< 0.24	< 0.24
	1/25/2008	8.4	14.9	1.7	< 0.23	< 0.49
	5/8/2008	7.90	2.40	2.0	< 0.23	< 0.49
	8/8/2008	8.40	2.30	1.8	< 0.23	< 0.49
	11/6/2008	11.00	2.50	<0.21	1.30	< 0.49
	2/5/2009	9.60	2.60	1.90	< 0.36	< 0.58
	5/7/2009	10.2	2.3	1.8	< 0.36	< 0.58
	8/12/2009	9.30	2.30	1.80	< 0.36	< 0.58
	11/5/2009	7.70	1.60	1.70	< 0.36	0.40
	2/5/2010	8.5	1.6	1.1	< 1.0	< 1.0
	5/7/2010	8.5	1.8	1.4	< 1.0	< 1.0
	8/9/2010	7.1	1.3	1	< 1.0	< 1.0
	11/9/2010	7.5	1.5	1.3	< 1.0	< 1.0
	2/10/2011	7.7	1.6	1.4	< 1.0	< 1.0
	5/6/2011	5.3	1.1	1	< 1.0	< 1.0
	8/11/2011	6.4	1.5	1.1	< 1.0	< 1.0
	11/8/2011	5.1	1.2	<1.0	< 1.0	< 1.0
	2/13/2012	5.8	1.5	1	< 1.0	< 1.0
LALF13	5/10/2005	5.4	9.1	0.1	< 0.23	< 0.19
	9/8/2005	5.8	8.8	0.4	< 0.23	< 0.19
	11/16/2005	5	6.9	0.6	< 0.23	< 0.19
	2/8/2006	3.8	6	0.3	< 0.19	< 0.24
	5/25/2006	3.5	8.1	0.5	< 0.19	< 0.24
	8/15/2006	3.3	7.7	0.2	< 0.19	< 0.24
	1/15/2007	4.3	8.1	<0.27	< 0.24	< 0.24

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	3/27/2007	4.4	7.1	0.3	< 0.24	< 0.24
	6/19/2007	3.4	6.6	< 0.27	< 0.24	< 0.24
	9/25/2007	4.4	4.4	< 0.27	< 0.24	< 0.24
	12/11/2007	2.6	5.1	< 0.27	< 0.24	< 0.24
	5/6/2008	2.50	4.10	< 0.21	< 0.23	< 0.49
	8/6/2008	2.20	4.00	< 0.21	< 0.23	< 0.49
	11/3/2008	3.00	4.40	0.40	< 0.23	< 0.49
	2/5/2009	3.20	4.20	< 0.28	< 0.36	< 0.58
	5/7/2009	3.1	4	< 0.28	< 0.36	< 0.58
	8/13/2009	1.00	1.40	< 0.28	< 0.36	< 0.58
	11/6/2009	2.10	2.40	0.20	< 0.36	< 0.58
	2/5/2010	2.6	2.8	< 1.0	< 1.0	< 1.0
	5/6/2010	2	3.1	< 1.0	< 1.0	< 1.0
	8/5/2010	2	2.3	< 1.0	< 1.0	< 1.0
	11/4/2010	2.3	2.7	< 1.0	< 1.0	< 1.0
	2/10/2011	2.5	3.3	< 1.0	< 1.0	< 1.0
	5/6/2011	1.7	2.5	< 1.0	< 1.0	< 1.0
	8/10/2011	2.3	2.7	< 1.0	< 1.0	< 1.0
	11/3/2011	2.3	2.3	< 1.0	< 1.0	< 1.0
	2/8/2012	1.9	2.3	< 1.0	< 1.0	< 1.0
LALF14	2/8/2006	2.4	0.7	< 0.19	< 0.19	< 0.24
	5/31/2006	2.5	1.5	1.4	< 0.19	< 0.24
	8/16/2006	1.1	< 0.22	< 0.19	< 0.19	< 0.24
	1/15/2007	2.4	0.7	< 0.27	< 0.24	< 0.24
	3/27/2007	2.4	0.6	< 0.27	< 0.24	< 0.24
	6/19/2007	1.9	0.4	< 0.27	< 0.24	< 0.24
	9/25/2007	2.1	< 0.22	< 0.27	< 0.24	< 0.24
	12/10/2007	0.9	< 0.22	< 0.27	< 0.24	< 0.24
	5/6/2008	<0.25	0.30	< 0.21	< 0.23	< 0.49
	8/6/2008	0.60	< 0.18	< 0.21	< 0.23	< 0.49
	11/3/2008	0.60	0.30	< 0.21	< 0.23	< 0.49
	2/3/2009	0.60	< 0.23	< 0.28	< 0.36	< 0.58
	5/5/2009	<0.35	< 0.23	< 0.28	< 0.36	< 0.58
	8/10/2009	<0.35	< 0.23	< 0.28	< 0.36	< 0.58
	11/3/2009	0.40	0.10	< 0.28	< 0.36	< 0.58
	2/2/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/5/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	8/3/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	11/2/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	2/9/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/4/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	8/9/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	11/2/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	2/3/2012	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
LALF15	4/25/2006	0.5	0.4	< 0.19	< 0.19	< 0.24
	1/15/2007	4	1.1	0.2	< 0.24	< 0.24
	4/12/2007	2.5	0.6	< 0.27	< 0.24	< 0.24
	5/9/2008	<0.25	< 0.18	< 0.21	< 0.23	< 0.49
	5/5/2009	1	< 0.23	< 0.28	< 0.36	< 0.58
	5/5/2010	1.8	< 1.0	< 1.0	< 1.0	< 1.0
	5/5/2011	2	< 1.0	< 1.0	< 1.0	< 1.0
LALF16	2/9/2006	4.8	1	0.5	< 0.19	< 0.24
	6/1/2006	2.4	1.6	0.7	< 0.19	< 0.24
	8/23/2006	3.4	0.9	0.3	< 0.19	< 0.24
	1/16/2007	4.5	1.1	0.6	< 0.24	< 0.24
	3/28/2007	5	1	0.5	< 0.24	< 0.24
	6/20/2007	4.7	1.1	0.5	< 0.24	< 0.24
	9/26/2007	5.5	1	0.5	< 0.24	< 0.24
	12/12/2007	4.3	1.4	0.3	< 0.24	< 0.24
	5/7/2008	3.30	0.70	0.40	< 0.23	< 0.49
	8/7/2008	3.60	0.90	0.60	< 0.23	< 0.49
	11/4/2008	5.40	1.10	0.80	< 0.23	< 0.49
	2/3/2009	4.10	1.10	0.80	< 0.36	< 0.58
	5/6/2009	4.6	0.9	0.5	< 0.36	< 0.58
	8/11/2009	4.20	0.80	0.40	< 0.36	< 0.58
	11/3/2009	4.40	0.80	0.50	< 0.36	0.70
	2/4/2010	3.7	< 1.0	< 1.0	< 1.0	< 1.0
	5/7/2010	3.7	< 1.0	< 1.0	< 1.0	< 1.0
	8/3/2010	3	< 1.0	< 1.0	< 1.0	< 1.0
	11/4/2010	2.9	< 1.0	< 1.0	< 1.0	< 1.0
	2/10/2011	2.4	< 1.0	< 1.0	< 1.0	< 1.0
	5/6/2011	2.4	< 1.0	< 1.0	< 1.0	< 1.0
	8/11/2011	3.2	< 1.0	< 1.0	< 1.0	< 1.0
	11/3/2011	3.2	< 1.0	< 1.0	< 1.0	< 1.0
	2/13/2012	3.5	< 1.0	< 1.0	< 1.0	< 1.0
LALF17	9/15/2005	6	1.5	< 0.19	< 0.23	< 0.19
	11/21/2005	4.8	1.2	0.3	< 0.23	< 0.19
	2/14/2006	6.2	1.7	0.3	< 0.19	< 0.24
	6/1/2006	3	1.8	< 0.19	< 0.19	< 0.24
	9/7/2006	4.9	5.2	< 0.19	< 0.19	< 0.24
	1/17/2007	5.6	1.3	< 0.27	< 0.24	< 0.24

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	6/20/2007	4.4	1.3	< 0.27	< 0.24	< 0.24
	9/26/2007	5.1	1	< 0.27	< 0.24	< 0.24
	12/11/2007	3.9	1.3	< 0.27	< 0.24	< 0.24
	5/7/2008	4.30	1.00	< 0.21	< 0.23	< 0.49
	8/7/2008	4.10	1.00	< 0.21	< 0.23	< 0.49
	11/5/2008	4.10	1.10	0.30	< 0.23	< 0.49
	2/5/2009	3.00	0.80	< 0.28	< 0.36	< 0.58
	5/6/2009	2.7	0.6	< 0.28	< 0.36	< 0.58
	8/11/2009	2.40	0.40	0.60	< 0.36	< 0.58
	11/4/2009	1.90	0.40	< 0.28	< 0.36	< 0.58
	2/4/2010	1.5	< 1.0	< 1.0	< 1.0	< 1.0
	5/6/2010	1.5	< 1.0	< 1.0	< 1.0	< 1.0
	8/5/2010	1	< 1.0	< 1.0	< 1.0	< 1.0
	11/4/2010	1	< 1.0	< 1.0	< 1.0	< 1.0
	2/10/2011	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/6/2011	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	8/11/2011	1.1	< 1.0	< 1.0	< 1.0	< 1.0
	11/3/2011	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	2/9/2012	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
LALF18	9/15/2005	8.7	1.9	1	< 0.23	< 0.19
	11/22/2005	9.4	2.2	0.9	< 0.23	< 0.19
	2/22/2006	11.6	2.1	0.9	< 0.19	< 0.24
	6/6/2006	9.2	2.6	2.5	< 0.19	< 0.24
	9/18/2006	10	1.8	1.8	< 0.19	< 0.24
	1/17/2007	7	1.6	1	< 0.24	< 0.24
	3/28/2007	6.7	1.2	1.2	< 0.24	< 0.24
	6/19/2007	4.4	1.2	0.9	< 0.24	< 0.24
	9/26/2007	6.2	0.6	1	< 0.24	< 0.24
	12/12/2007	4	1.4	0.60	< 0.24	< 0.24
	5/9/2008	3.40	0.70	0.60	< 0.23	< 0.49
	8/8/2008	3.40	0.80	0.60	< 0.23	< 0.49
	11/5/2008	4.40	0.90	0.50	< 0.23	< 0.49
	2/3/2009	3.60	0.80	0.90	< 0.36	< 0.58
	5/6/2009	2.6	0.4	0.7	< 0.36	< 0.58
	8/12/2009	<0.35	<0.23	< 0.28	< 0.36	< 0.58
	11/4/2009	2.50	0.50	0.60	< 0.36	0.60
	2/4/2010	2	< 1.0	< 1.0	< 1.0	< 1.0
	2/4/2010	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/5/2010	2	< 1.0	< 1.0	< 1.0	< 1.0
	8/5/2010	2	< 1.0	< 1.0	< 1.0	< 1.0
	11/2/2010	2	< 1.0	< 1.0	< 1.0	< 1.0

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	2/9/2011	2.5	< 1.0	< 1.0	< 1.0	< 1.0
	5/5/2011	2.3	< 1.0	< 1.0	< 1.0	< 1.0
	8/10/2011	2.2	< 1.0	< 1.0	< 1.0	< 1.0
	11/3/2011	2	< 1.0	< 1.0	< 1.0	< 1.0
	2/8/2012	1.7	< 1.0	< 1.0	< 1.0	< 1.0
LALF19	8/18/2005	< 0.15	< 0.13	< 0.19	< 0.23	< 0.19
	12/21/2005	0.5	0.3	< 0.19	< 0.23	< 0.19
	2/16/2006	0.6	< 0.22	< 0.19	< 0.19	< 0.24
	5/24/2006	< 0.25	< 0.22	< 0.19	< 0.19	< 0.24
	9/18/2006	< 0.25	< 0.22	< 0.19	< 0.19	< 0.24
	1/17/2007	0.6	0.2	< 0.27	< 0.24	< 0.24
	4/11/2007	< 0.22	< 0.22	< 0.27	< 0.24	< 0.24
	7/23/2007	< 0.22	< 0.22	< 0.27	< 0.24	< 0.24
	10/31/2007	1.3	1.1	< 0.27	< 0.24	< 0.24
	1/25/2008	0.9	0.8	< 0.21	< 0.23	< 0.49
	5/8/2008	< 0.25	< 0.18	< 0.21	< 0.23	< 0.49
	8/8/2008	< 0.25	< 0.18	< 0.21	< 0.23	< 0.49
	11/6/2008	< 0.25	< 0.18	< 0.21	< 0.23	< 0.49
	2/2/2009	< 0.35	< 0.23	< 0.28	< 0.36	< 0.58
	5/4/2009	< 0.35	< 0.23	< 0.28	< 0.36	< 0.58
	8/3/2009	0.8	2.7	< 0.28	< 0.36	< 0.58
	11/3/2009	< 0.35	< 0.23	< 0.28	< 0.36	< 0.58
	2/2/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/4/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	8/3/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	11/2/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	2/8/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/3/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	8/8/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	11/2/2011	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	2/7/2012	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
REEVES2	4/15/2005	0.3	< 0.13	< 0.19	< 0.23	< 0.19
	8/17/2005	0.4	< 0.13	< 0.19	< 0.23	< 0.19
	12/1/2005	0.7	0.3	< 0.19	< 0.23	< 0.19
	3/1/2006	<0.25	< 0.22	< 0.19	< 0.19	< 0.24
	5/17/2006	0.5	0.3	< 0.19	< 0.19	< 0.24
	9/29/2006	0.3	< 0.22	< 0.19	< 0.19	< 0.24
	12/7/2006	0.7	< 0.22	< 0.19	< 0.19	< 0.24
	4/30/2007	0.8	< 0.22	< 0.27	< 0.24	< 0.24
	7/24/2007	0.9	< 0.22	< 0.27	< 0.24	< 0.24
	10/30/2007	0.8	< 0.22	< 0.27	< 0.24	< 0.24

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	1/28/2008	1	< 0.18	< 0.21	< 0.23	< 0.49
	5/13/2008	0.80	< 0.18	< 0.21	< 0.23	< 0.49
	8/13/2008	1.10	< 0.18	< 0.21	< 0.23	< 0.49
	11/6/2008	2.50	5.10	< 0.21	< 0.23	< 0.49
	2/6/2009	2.60	11.20	< 0.28	< 0.36	< 0.58
	5/8/2009	1.3	< 0.23	< 0.28	< 0.36	< 0.58
	8/13/2009	1.30	< 0.23	< 0.28	< 0.36	< 0.58
	11/9/2009	<0.35	< 0.23	< 0.28	< 0.36	< 0.58
	2/8/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	5/10/2010	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	8/11/2010	1.2	< 1.0	< 1.0	< 1.0	< 1.0
	11/11/2010	1.1	< 1.0	< 1.0	< 1.0	< 1.0
	2/18/2011	1.1	< 1.0	< 1.0	< 1.0	< 1.0
	5/10/2011	1.2	< 1.0	< 1.0	< 1.0	< 1.0
	8/12/2011	1.3	< 1.0	< 1.0	< 1.0	< 1.0
	11/11/2011	1.3	< 1.0	< 1.0	< 1.0	< 1.0
	2/9/2012	1.2	< 1.0	< 1.0	< 1.0	< 1.0
REEVES4	4/15/2005	2.6	0.1	< 0.19	< 0.23	< 0.19
	8/17/2005	3.3	<0.13	< 0.19	< 0.23	< 0.19
	12/2/2005	3.9	0.7	< 0.19	< 0.23	< 0.19
	3/1/2006	3.4	<0.22	< 0.19	< 0.19	< 0.24
	9/27/2006	3.3	<0.22	< 0.19	< 0.19	< 0.24
	12/7/2006	5.4	0.6	0.1	< 0.19	< 0.24
	4/30/2007	4.8	0.6	< 0.27	< 0.24	< 0.24
	7/23/2007	3.9	0.6	< 0.27	< 0.24	< 0.24
	10/30/2007	3.3	0.4	< 0.27	< 0.24	< 0.24
	1/28/2008	3.2	0.5	< 0.21	< 0.23	< 0.49
	5/13/2008	3.80	0.40	< 0.21	< 0.23	< 0.49
	8/13/2008	3.80	0.40	< 0.21	< 0.23	< 0.49
	11/6/2008	4.10	0.60	0.30	< 0.23	< 0.49
	2/6/2009	3.30	0.60	< 0.28	< 0.36	< 0.58
	5/8/2009	4.3	0.4	< 0.28	< 0.36	< 0.58
	8/13/2009	3.3	0.40	< 0.28	< 0.36	< 0.58
	11/9/2009	3	0.30	0.20	< 0.36	< 0.58
	2/8/2010	3	< 1.0	< 1.0	< 1.0	< 1.0
	5/10/2010	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	8/12/2010	1.6	< 1.0	< 1.0	< 1.0	< 1.0
	11/11/2010	1	< 1.0	< 1.0	< 1.0	< 1.0
	2/15/2011	1	< 1.0	< 1.0	< 1.0	< 1.0
	5/10/2011	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	8/15/2011	1.5	< 1.0	< 1.0	< 1.0	< 1.0

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	11/10/2011	1.3	< 1.0	< 1.0	< 1.0	< 1.0
REEVES5	4/19/2005	0.15	1.4	0.2	< 0.23	< 0.19
	8/17/2005	0.15	1.4	0.3	< 0.23	< 0.19
	12/2/2005	8.8	2	0.2	< 0.23	< 0.19
	3/1/2006	7.6	1.3	<0.19	< 0.19	< 0.24
	5/17/2006	7.1	1.4	0.4	< 0.19	< 0.24
	9/27/2006	5.4	1.1	<0.19	< 0.19	< 0.24
	12/7/2006	9.9	1.7	0.6	< 0.19	< 0.24
	4/30/2007	6.6	1.2	0.4	< 0.24	< 0.24
	7/24/2007	7.4	1.7	0.6	< 0.24	< 0.24
	10/30/2007	5.9	1.3	0.5	< 0.24	< 0.24
	1/28/2008	6.8	1.4	0.7	< 0.23	< 0.49
	5/13/2008	6.80	1.60	1.00	< 0.23	< 0.49
	8/13/2008	6.70	1.50	1.20	< 0.23	< 0.49
	11/6/2008	5.80	1.50	1.10	< 0.23	< 0.49
	2/6/2009	5.50	1.40	1.10	< 0.36	< 0.58
	5/8/2009	5.6	1.1	0.8	< 0.36	< 0.58
	8/13/2009	4.20	0.90	0.80	< 0.36	< 0.58
	11/9/2009	2.90	0.60	0.70	< 0.36	< 0.58
	2/8/2010	2.8	< 1.0	< 1.0	< 1.0	< 1.0
	5/11/2010	1	< 1.0	< 1.0	< 1.0	< 1.0
	8/12/2010	1.5	< 1.0	< 1.0	< 1.0	< 1.0
	11/12/2010	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	2/15/2011	1.1	< 1.0	< 1.0	< 1.0	< 1.0
	5/10/2011	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	8/15/2011	<1.0	< 1.0	< 1.0	< 1.0	< 1.0
	11/10/2011	1	< 1.0	< 1.0	< 1.0	< 1.0
	2/9/2012	1.5	< 1.0	< 1.0	< 1.0	< 1.0
REEVES6	4/15/2005	3.3	0.5	< 0.19	< 0.23	< 0.19
	8/17/2005	<0.15	0.6	< 0.19	< 0.23	< 0.19
	12/1/2005	4.1	1	0.4	< 0.23	< 0.19
	3/1/2006	2.9	0.5	< 0.19	< 0.19	< 0.24
	5/17/2006	3	0.8	0.2	< 0.19	< 0.24
	9/29/2006	2.6	<0.22	< 0.19	< 0.19	< 0.24
	12/7/2006	4.6	0.7	0.1	< 0.19	< 0.24
	4/30/2007	3.8	0.7	0.2	< 0.24	< 0.24
	7/24/2007	4	0.7	< 0.27	< 0.24	< 0.24
	10/30/2007	3.6	0.5	< 0.27	< 0.24	< 0.24
	1/28/2008	4	<0.18	< 0.21	< 0.23	< 0.49
	5/13/2008	3.80	0.50	< 0.21	< 0.23	< 0.49
	8/13/2008	3.10	0.50	< 0.21	< 0.23	< 0.49

TABLE 5
Groundwater Quality Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

WELL ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	VC (µg/L)
	11/7/2008	4.70	2.30	0.40	< 0.23	< 0.49
	2/6/2009	3.90	0.90	0.30	< 0.36	< 0.58
	5/8/2009	4	0.6	< 0.28	< 0.36	< 0.58
	8/13/2009	3.50	0.60	< 0.28	< 0.36	< 0.58
	11/9/2009	3.50	0.50	0.20	< 0.36	< 0.58
	2/8/2010	2.9	< 1.0	< 1.0	< 1.0	< 1.0
	5/10/2010	4.5	< 1.0	< 1.0	< 1.0	< 1.0
	8/11/2010	4.6	< 1.0	< 1.0	< 1.0	< 1.0
	11/11/2010	5.5	< 1.0	< 1.0	< 1.0	< 1.0
	2/15/2011	5.2	< 1.0	< 1.0	< 1.0	< 1.0
	5/10/2011	4.1	< 1.0	< 1.0	< 1.0	< 1.0
	8/12/2011	4.2	< 1.0	< 1.0	< 1.0	< 1.0
	11/11/2011	4.1	< 1.0	< 1.0	< 1.0	< 1.0
	2/9/2012	2.8	< 1.0	< 1.0	< 1.0	< 1.0

Notes:
PCE = Tetrachloroethene
TCE = Trichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
VC = vinyl chloride
µg/L = micgrograms per liter

TABLE 6
Groundwater Treatment System Efficiency Data
Landfill Management Plan
Former Los Angeles Landfill
Albuquerque, New Mexico

Sample ID	SAMPLE DATE	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2,-DCE (µg/L)	1,1-DCE (µg/L)	VC (µg/L)
Influent	2/27/2012	4.9	2.4	0.69	<0.50	2.0	<0.50
Effluent	2/27/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

Notes:

PCE = Tetrachloroethene

TCE = Trichloroethene

cis-1,2-DCE = cis-1,2-Dichloroethene

trans-1,2-DCE = trans-1,2-Dichloroethene

VC = vinyl chloride

µg/L = micrograms per liter

< = non detect or below the method detection limit

APPENDIX A

Waste Excavation Plan

WASTE EXCAVATION PLAN

LOS ANGELES LANDFILL GENERAL MAINTENANCE

Developed for:

City of Albuquerque
Environmental Health Department
Environmental Services Division

Developed by:

INTERA Incorporated
6000 Uptown Boulevard NE
Suite 220
Albuquerque, New Mexico 87110

July 2012

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

Maintenance activities at the City of Albuquerque's (City) former Los Angeles Landfill (LALF) occasionally require the excavation of waste from beneath or around landfill infrastructure. This Waste Excavation Plan (WEP) is prepared to cover maintenance activities in a manner that complies with applicable regulations. The former LALF is located on the south side of Alameda Boulevard NE, between the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) North Diversion Channel to the west and Washington Street businesses to the east. The south side of the landfill is bounded by an AMAFCA North Diversion Channel inlet structure for the Domingo Baca Channel (see Figure 1). The portion of the landfill that is planned for removal is located in the extreme northeast end of the site. It is anticipated that two edges of the proposed excavation area will be free of landfill waste, as established by the existing property boundary.

This WEP addresses the Albuquerque Environmental Health Department's (AEHD) and the New Mexico Environment Department (NMED) - Solid Waste Bureau's (SWB) requirements for establishing a plan and procedure for removing, transporting and disposing of the excavated waste in a safe and efficient manner. The content and supporting attachments have been provided to satisfy the NMED SWB's "Waste Excavation Checklist" requirements. A copy of the "Waste Excavation Checklist" is included as Attachment A.

1.1 WEP Approval Process

This document has been prepared to establish a plan and procedures for a contractor to use in preparation and implementation of maintenance work at the former LALF. The types of work that qualify for coverage of this WEP include the excavation around, or for the installation of, landfill infrastructure (e.g. extraction wells, piping, condensate sumps, utilities, etc.). Excluded from this WEP is the excavation of waste for development unrelated to landfill maintenance or for removal of more than 120 yards of waste during any one maintenance event. This WEP is designed to be a dynamic document and must be amended and submitted to the NMED SWB for review and approval prior to performing the work. The contractor for the improvement project must identify their subcontractors and key environmental staff and include the required information in this document (see Table 1, page 3). The amended WEP must then be submitted to the NMED SWB for final review and approval prior to implementation of the plan. The elements of this WEP that are intended to be completed after contractor selection include the following:

- Identification of contractor and contact information,
- Identification of person in charge of WEP implementation,
- Identification of Site Safety Officer and contact information,
- Identification of person performing (on site supervisor) waste excavation and backfilling,
- Identification of NMED SWB-approved waste hauler and contact information,
- Identification of landfill professional performing landfill gas monitoring, waste screening, and documentation,

- Site-specific Health and Safety Plan (Attachment C), and
- Proof of waste hauler registrations (Attachment E).

The above information shall be included in Table 1 on page 3 or included in the appropriate attachment to this document. Once Table 1 is updated and Attachments C and E are added, submit a hard copy of the document to Mr. Marco Bañales at the NMED SWB at 5500 San Antonio Drive NE, Albuquerque, NM 87109. SWB's approval is required prior to commencement with waste excavation.

1.2 Site Background

The LALF was a sand and gravel quarry prior to 1978. Between 1978 and 1983, residential and commercial waste, construction debris, septic waste, car-wash sludge, dead animals, and some industrial liquids were disposed of in the former quarry pit. Approximately 118 million cubic feet of waste were disposed of at the Site prior to closure (International Technology, 1996). The thickness of waste in the landfill ranges from 6 to 41 feet, and the Site covers approximately 77 acres (International Technology, 1996). Subsequent to placement, the waste was covered with native fill of varying thickness. At present, the landfill Site is vacant with controlled access, and is used every fall (September/October) for recreational vehicle parking during the Albuquerque International Balloon Fiesta.

In 1998, the City installed a landfill gas extraction system on the east side of the landfill to mitigate the potential for landfill gas to migrate beyond the property boundary of the landfill. In 2000, the landfill gas extraction system was expanded to include a total of 43 extraction wells around the entire perimeter of the landfill and 17 extraction wells installed across the interior area of the landfill. The extraction wells are connected via lateral pipes to a single header pipe that is generally installed along the edge of the property. Landfill gas is extracted from the landfill and destroyed by combustion through the operation of a blower system and an enclosed ground flare located at the southeast end of the site. Isolation valves, condensate sumps, and a condensate recovery/destruction system are supporting infrastructure to the existing landfill gas extraction system.

1.3 Site Hydrogeology

The LALF is underlain by alluvial materials deposited on the ancestral floodplain of the Rio Grande. The materials in the immediate vicinity of the LALF are characterized by unconsolidated alluvial sands and gravels with interbedded, discontinuous layers and lenses of silt and clay.

The Site is located approximately one mile east of the current river course. Its topography is flat with engineered storm drain channels in the area. The water table is located at approximately 100 - 150 feet (ft) below ground surface (bgs), is unconfined, and has a regional flow direction of south to southeast. The groundwater gradient is likely influenced by groundwater pumping at the

General Mills Plant to the southwest; the Reeves Power Station to the southeast; the Centex Property to the east; and Alpha Septic to the southeast of the Site.

TABLE 1
Summary of Primary Waste Excavation Roles and Responsible Personnel

Project Role	Responsible Personnel	Affiliation & Contact Number
Owner/Generator	Suzanne, P.E. – Principal Engineer	Albuquerque Environmental Health Department; (505) 768-2633 office, (505) 331-6677 cell
Contractor		
Waste Excavation Plan (Development)	Jim Joseph, P.E.	INTERA Incorporated; (505) 246-1600 office
Site Safety Officer		
Waste Excavation Project Manager		
Waste Excavation and Backfilling		
Waste Hauler		
Receiving Landfill Contact	Mark Dear, Cerro Colorado Landfill	City of Albuquerque – Solid Waste; (505) 228-2918
Landfill Gas Monitoring[(1)], Observation, & Site Excavation Management		
State Regulatory Agency	Marco Bañales	New Mexico Environment Department – Solid Waste Bureau; (505) 222-9589 office; (505) 670-8871 cell

[(1)] Includes continuous monitoring of the atmosphere within and around the excavation using a combustible gas indicator and a photoionizaiton detector.

1.4 Site Background

The LALF was a sand and gravel quarry prior to 1978. Between 1978 and 1983, residential and commercial waste, construction debris, septic waste, car-wash sludge, dead animals, and some industrial liquids were disposed of in the former quarry pit. Approximately 118 million cubic feet of waste were disposed of at the Site prior to closure (International Technology, 1996). The thickness of waste in the landfill ranges from 6 to 41 feet, and the Site covers approximately 77 acres (International Technology, 1996). Subsequent to placement, the waste was covered with native fill of varying thickness. At present, the landfill Site is vacant with controlled access, and is used every fall (September/October) for recreational vehicle parking during the Albuquerque International Balloon Fiesta.

In 1998, the City installed a landfill gas extraction system on the east side of the landfill to mitigate the potential for landfill gas to migrate beyond the property boundary of the landfill. In 2000, the landfill gas extraction system was expanded to include a total of 43 extraction wells around the entire perimeter of the landfill and 17 extraction wells installed across the interior area of the landfill. The extraction wells are connected via lateral pipes to a single header pipe that is generally installed along the edge of the property. Landfill gas is extracted from the landfill and destroyed by combustion through the operation of a blower system and an enclosed ground flare located at the southeast end of the site. Isolation valves, condensate sumps, and a condensate recovery/destruction system are supporting infrastructure to the existing landfill gas extraction system.

1.5 Site Hazards and Contaminants

The former LALF is actively producing landfill gas in most portions of the landfill. Landfill gas from municipal solid waste landfills can contain a variety of constituents; however, the component gases are methane, carbon dioxide, and nitrogen. Methane and carbon dioxide are simple asphyxiants (meaning they will displace oxygen). Methane is also a flammable and potentially explosive gas with a lower explosive limit (LEL) of 5 percent (by volume) in air and an upper explosive limit (UEL) of 15 percent. Secondary constituents in landfill gas are typically a very small percentage of the landfill gas mixture and may include volatile organic compounds (VOCs) and hydrogen sulfide.

Biweekly landfill gas extraction system balancing is routinely performed at the former LALF. The balancing activities maximize the amount of landfill gas being extracted from the landfill to run the enclosed ground flare. Landfill gas extraction well PW-1 is the closest perimeter well to the proposed excavation activities (approximately 40 ft to the west), and consistently has low average methane content (1.4 percent) and oxygen content (10.3 percent). Landfill gas extraction wells PW-2 and PW-42 are the next two closest wells to the proposed excavation area, and they have average methane content of 37.8 and 25.2 percent and oxygen content of 0.2 and 0.6 percent, respectively. Based on these data, hazardous gases may very well be encountered during excavation activities. The excavation contractor should address this issue in their health and safety plan (HASP) and continuous air quality monitoring will take place during excavation activities.

VOCs occur in the vadose zone and in ground water beneath the LALF Site. The VOCs are migrating downward from the landfill through the vadose zone via vapor transport, as well as migrating in dissolved form to ground water (NMED, 2004). Some VOCs occur in ground water at levels that exceed United States (US) Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCLs). VOCs which exceed MCLs include tetrachloroethene (PCE), trichloroethylene (TCE), 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), and methylene chloride (DCM). As these compounds exist in the ground water below the site, waste that may have contributed to the contamination may be encountered during excavation activities. Section 3.2 of this WEP provides a protocol for handling and disposal of hazardous and/or special waste.

2.0 PROJECT BACKGROUND

The LALF is subject to differential settlement due to the decomposition of the waste. Some areas of the landfill subside by over several feet per year, while other areas are more static with regard to elevation change. Because all of the landfill piping and most of the wellheads are buried to retain driving surfaces, the result of the uneven subsidence is stress on pipes, swales in the pipes, and condensate occlusion of the pipes. Frequent repairs are necessary at the landfill to maintain operation of the LFG collection system. When repairs require excavation, waste is often encountered and removed. Although regulations allow for excavation of waste in volumes less than 120 cubic yards without written approval from the NMED, as long as the waste excavation is related to maintenance activities, the AEHD has developed this document to help ensure that the excavation of waste is done in a safe and environmentally responsible manner.

In addition to complying with NMED-SWB requirements, construction activities are also subject to the City *Interim Guidelines for Development within a City Designated Landfill Buffer Zone (Guidelines).* The *Guidelines* specify that projects proposed over a landfill and/or within set distances from a landfill(s) are subject to review by the AEHD. Furthermore, the *Guidelines* establish that any development meeting the above criteria must be designed and constructed to protect the development from risks associated with landfill gas, and that the development shall not result in added risks to adjoining properties. A copy of the G*uidelines* is provided in Attachment B. Descriptions and details regarding the landfill gas mitigation measures to be implemented on the proposed infrastructure are not within the scope of this document.

3.0 WASTE EXCAVATION PLAN

Implementation of this WEP will be the responsibility of the contractor. Technical and landfill questions will be addressed to the AEHD, which is the department responsible for operating and maintaining the former LALF. The contractor will be responsible for providing personnel to perform on site project management, waste characterization, and monitoring of air quality within and adjacent to the work zones. Prior to submitting this WEP to the NMED SWB for review and approval the Contractor shall select and identify team members that are responsible for the tasks included in Table 1. These shall include the excavation contractor responsible for implementing the WEP procedures, the Site Safety Officer, and the waste hauler (which must have a Commercial Hauler Registration issued by the NMED SWB).

Prior to the commencement of excavation activities this WEP will be reviewed and approved by Mr. Marco Bañales NMED SWB. Table 1 on page 3 provides a summary of key personnel involved in the project and identifies project responsibilities. The table is interactive in the electronic version of this document and must be updated by the contractor prior to submitting to the NMED SWB.

Once this WEP has been submitted to the NMED SWB, the contractor will prepare a letter for the City to distribute to property owners of properties directly adjacent to or facing the excavation work and truck entrance/egress points. Property owners that will be contacted are included on Figure 1 along with the identification of the properties corresponding with the owner list.

Copies of the completed WEP will be submitted to:

Ms. Suzanne Busch, AEHD
The waste excavator contractor
The landfill professional/gas monitoring agent
Mr. Marco Bañales, NMED SWB

3.1 Health and Safety

Each subcontractor working on Site is responsible for reading, understanding, and following the health and safety requirements of this WEP. However, each subcontractor shall follow their own company's HASP for this project. The site-specific HASP that will be implemented by the contractor's personnel during the execution of the WEP **must be included in Attachment C prior to submittal for the WEP to the NMED SWB**. The HASP must address the following elements:

- Site description and scope of work;
- Idetification of roles and responsibilities;
- Identification of site hazards;
- A Hazard Communication Plan;

- Personal protective equipment (PPE) requirements;
- A respiratory protection plan;
- Landfill gas monitoring procedures;
- Excavation safety;
- Site control;
- Hot work; and
- Emergency contacts and procedures.

All onsite personnel working in the exclusion zone established around the waste excavation area shall be 40-hour Occupational Health and Safety Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) trained and required to wear Level D PPE. This includes but is not limited to a hard hat, safety glasses, safety vest, and steel toe boots. Also, those individuals who will be handling waste will need to wear chemical resistant gloves and be cleared to work while wearing a respirator if site conditions require upgrading to Level C PPE. Personnel cleared to wear respirators shall submit medical clearance and fit testing records to the AEHD two weeks prior to the excavation of waste.

An exclusion zone and contaminant reduction zone (CRZ) shall be established prior to commencement of excavation activities. The exclusion zone will be established during the work activities and may be dynamic based on site conditions and activities being performed. Typically, the exclusion zone will include any area where trash is exposed or where heavy equipment is being operated. The CRZ will include a buffer area between the exclusion zone areas outside of the traffic pattern of trucks and equipment. A first-aid station and decontamination equipment shall be set up outside of the CRZ in accordance with the site specific HASP. The first aid and decontamination stations shall maintain (as needed) a first-aid kit, eyewash station, drinking water, fire extinguisher, a spill response kit, brushes, buckets, alconox (or equal), deionoized water, tap water, garbage bags, and a tarp for decontamination activities.

Excavation and trench safety will be monitored and sloping requirements promulgated by the OSHA shall be enforced. It has been assumed that the trash in the excavation will have soil properties consistent with a Type C soil. OSHA requires that the maximum sloping in an excavation in Type C soil be 1.5:1. Because of the anticipated difficulties in working a surface comprised of exposed trash, the maximum slope of trash side walls will be 2:1.

The nearest hospital equipped with full service emergency room facilities is Women's Hospital located at 4701 Montgomery Blvd NE., Albuquerque, NM 87109. Their phone number is listed in Table 2 along with a list of other pertinent emergency contact numbers. Direction to the hospital can be found in Attachment D.

Table 2
Emergency Contact Phone Numbers

Entity	Number
Women's Hospital	(911) or (505) 764-6320
ABQ Fire Dept	(911) or (505) 242-2677
ABQ Police Dept	(505) 823-8888
Poison Information Center	(800) 432-6866
NM Poison Center	(505) 272-2222
NMED Hazardous Waste Bureau	(505) 8271566
NMED Solid Waste Bureau	(505) 827-0197
Albuquerque Environmental Health Department (Ms. Suzanne Busch, P.E.)	(505) 768-2633
EPA Region VI Emergency Response 24-hr Hotline	(214) 665-2222

3.2 On Site Monitoring, Waste Manifesting, and Certification

During the excavation of trash at the Site, a landfill professional provided by the contractor will be on Site at all times to monitor the types of waste being removed and monitor for landfill gasses. The landfill professional must have the following qualifications and experience:

- 8-Hour HAZWOPER Supervisor training (meeting OSHA requirements);
- Prior direct experience with waste excavation work;
- Knowledgeable in the operation, calibration, and maintenance of the air/landfill gas monitoring equipment being used;
- Be a "competent person" as defined by OSHA under 29 Code of Federal Regulations 1926.650(b) – Excavation/Construction;
- Be able to identify potentially hazardous waste or material that must be segregated for special disposal; and
- Be able to describe excavated material in terms of types of waste (with approximate percent of composition), organic content, and degree of decomposition.

The contractor must submit to the City project manager a summary of prior landfill excavation experience for the landfill professional prior to initiating excavation work.

Waste will be continuously monitored for materials unsuitable for disposal at the approved municipal solid waste landfill. Any liquids not exhibiting hazardous characteristics that are encountered may be blended with soil for disposal. Items unsuitable for disposal at the City's solid waste landfill consist of, but are not limited to, hazardous substances, asbestos containing materials, medical wastes, and batteries. Freezers and refrigerators encountered shall be inspected to identify if Freon is still present. If Freon is present it must be removed by a certified

Freon recycler prior to removal from the Site. Also, any suspicious items shall be set aside for possible testing and determination of suitable disposal. Representative samples of waste that may be suspected of containing or regulated chemicals will be screened with a photoionization detector (PID) for the presence of VOCs. If visual or field screening methods indicate evidence of possible hazardous waste, a representative sample of the trash will be collected and analyzed using laboratory methods selected by the landfill professional as applicable to the type of hazard suspected. Possible analyses may include EPA Method 8260 for VOCs, EPA Method 8081 for pesticides, EPA Method 8151 for chlorinated herbicides, EPA Method 8270 for semivolatiles, EPA Method 6010 for metals [mercury, arsenic, barium, cadmium, chromium, lead, selenium, and silver], EPA Method 600 for asbestos, or others. Based on the results of the sample analyses, the material will be classified as standard waste or hazardous/special waste. The receiving landfill – Cerro Colorado – does not require manifests for trash that is not hazardous or special waste. Costs for the specified analyses will be negotiated with the AEHD. If there is evidence of staining or hazardous waste encountered during excavation, the AEHD shall be informed and given the opportunity to make a determination on the need to collect discrete soil samples for characterization purposes before the excavation is backfilled.

Materials classified as requiring special handling shall be separated and retained in a designated area in labeled drums or other containers depending on the waste characteristics, quantity, and final disposal requirements. Staging of special and hazardous waste will be on double layer 6-mil visqueen sheeting bermed around the edges. Staged special/hazardous waste will be covered with 6-mil visqueen sheeting until proper disposal has been established. The costs and scope for additional testing and/or disposal will be negotiated with the City project manager. Types of waste encountered will be documented in a designated field notebook. Copies of the field notes will be transmitted to the City at the close of the project. Photo-documentation of waste material using digital media will be required. Photographs of typical waste material (household, construction/demolition, etc.) shall be taken as well as any special or hazardous waste.

3.2.1 Landfill Gas Monitoring

Landfill gas (methane, hydrogen sulfide, carbon monoxide, oxygen, and VOC) concentrations will be measured in the field using handheld equipment prior to commencement of excavation activities in order to obtain background landfill gas levels. During excavation and backfilling activities a combustible gas indicator (CGI) and a PID will be used to continuously monitor the work area for potential landfill gases. The data loggers on the instruments shall be used and the data downloaded daily. The CGI and PID will be calibrated daily and periodic readings shall be recorded in a designated field notebook or data form. Recommended action levels for methane, hydrogen sulfide, oxygen (reduced conditions), and VOCs are included in Table 3. Note that most components of landfill gas have vapor densities greater than air and will settle in low lying areas. Gases like methane and carbon dioxide displace oxygen and are simple asphyxiants. Monitoring oxygen levels is as important as monitoring for landfill gas.

Each truck that leaves the site will be weighed at the receiving landfill. A bill of lading will be supplied to the contractor that will document the amount of trash transported to the landfill and the amount of fill material that is brought to the site on the return trip. Copies of the bills of lading will be transmitted to the City project manager for confirmation, and the data will be included in closeout documentation.

Table 3
Landfill Gas Action Levels

Gas	Action Level	Response to Exceedance
Methane - Concentration	≥ 0.5% in air (≥ 5,000 ppmv)	Evacuate the exclusion zone until levels are below the action level. If the action level is exceeded in the CRZ, evacuate to the support zone. Evacuate the site if levels are exceeded in the support zone. Contact the AEHD and City project manager as well as the Albuquerque Fire Department if persistent exceedances are measured in the support zone.
Methane - Lower Explosive Limit (LEL)	≥ 10% of the LEL	Evacuate the exclusion zone until levels are below the action level. If the action level is exceeded in the CRZ, evacuate to the support zone. Evacuate the site if levels are exceeded in the support zone. Contact the AEHD and City project manager as well as the Albuquerque Fire Department if persistent exceedances are measured in the support zone.
Hydrogen Sulfide	≥ 10 ppm	Evacuate the exclusion zone until levels are below the action level. If the action level is exceeded in the CRZ, evacuate to the support zone. Evacuate the site if levels are exceeded in the support zone. Establish better engineering controls and/or prepare to implement a respiratory protection plan prior to reentry.
Oxygen	≤ 19.5%	Evacuate the exclusion zone until levels are above the action level. Establish better engineering controls and/or prepare to implement a respiratory protection plan prior to reentry.
Photoionization Detection	> 10%	Notify City project manager and AEHD. Inspect excavation and exposed waste for possible sources and evaluate whether samples are warranted for laboratory analyses. Proceed with work in Level D protection while further assessing conditions.
	>50%	Discontinue work and prepare to go to modified

		Level C respiratory protection. Confirm that hydrogen sulfide levels are not exceeded.[(A)]

(A) A PID detects any volatile organic compound with an ionization potential within the range of the lamp. A variety of compounds have been previously detected at the landfill; without knowing what compounds are resulting in PID readings, a conservative approach to respiratory protection is necessary.

During backfilling, clean fill will be placed in the excavation in 2 foot loose lifts. Each lift will be moisture conditioned (if needed) in order to achieve compaction. Onsite excavation equipment will be used to compact the fill. Non-vibratory compaction equipment may be used if compaction requirements cannot be attained using excavation equipment.

3.3 Site Security and Fencing

The LALF is currently fenced around the entire perimeter; all gates are locked during times of inactivity, with access restricted to City-approved personnel only. If some of the existing fencing needs to be removed during excavation activities, temporary fencing will be installed to ensure continued security at the LALF. Access to the excavation will be restricted to approved personnel. As an added safety feature the excavation shall have orange safety fencing placed around the perimeter of the excavation during non-working hours. The safety fence shall be set back two feet from the edge of the excavation. The contractor will be responsible for maintaining a secure work site and ensuring that the protection provided meets or exceeds initial conditions throughout the entire project duration.

3.4 Waste Excavation

The excavated trash will be taken to the COA Cerro Colorado Landfill in Bernalillo County. Documented approval of acceptance by the Cerro Colorado Landfill is required prior to the excavation of waste. The documentation shall be forwarded to the AEHD project manager and to the NMED-SWB. Both NMED-SWB and AEHD will be notified approximately 48 hours prior to beginning excavation activities.

Excavation activities will be accomplished using a track hoe/backhoe, front end loader, tamper or jumping-jack, and water truck. The excavation equipment will be used to remove the overburden and waste from the excavation and the front end loader will be used to load the hauling trucks. When possible the waste will be directly loaded into the haul trucks. However, if progress dictates that waste needs to be stockpiled in order to continue working then the waste will be stockpiled, either in the excavation itself or if there isn’t sufficient room within the excavation then the waste may be stockpile on a bermed plastic (6-mil) containment area outside of the excavation. Stockpiled material located outside of the excavation shall be covered with a 6-mil visqueen liner to prevent waste from blowing off Site.

The waste will be hauled by a trucking company approved by the NMED-SWB to haul waste (see Table 1). Proof of hauler registration shall be submitted to the AEHD and the NMED-SWB prior to excavation of the waste. A water truck may be used to keep the soils in and around the excavation damp so that excessive dust will not blow off Site due to excavation activities. Every attempt should be made not to over saturate the soils and not apply water directly to waste remaining in place. Silt fencing may also be used around the excavation in order to keep waste from blowing off Site. The contractor will perform daily pick up of wind blown trash from the property perimeter. More frequent trash pick up may be warranted if operating under breezy conditions. Excavation activities may need to be postponed if winds are excessive. Postponement of excavation activities will be at the discretion of the landfill engineer and/or the COA/AEHD.

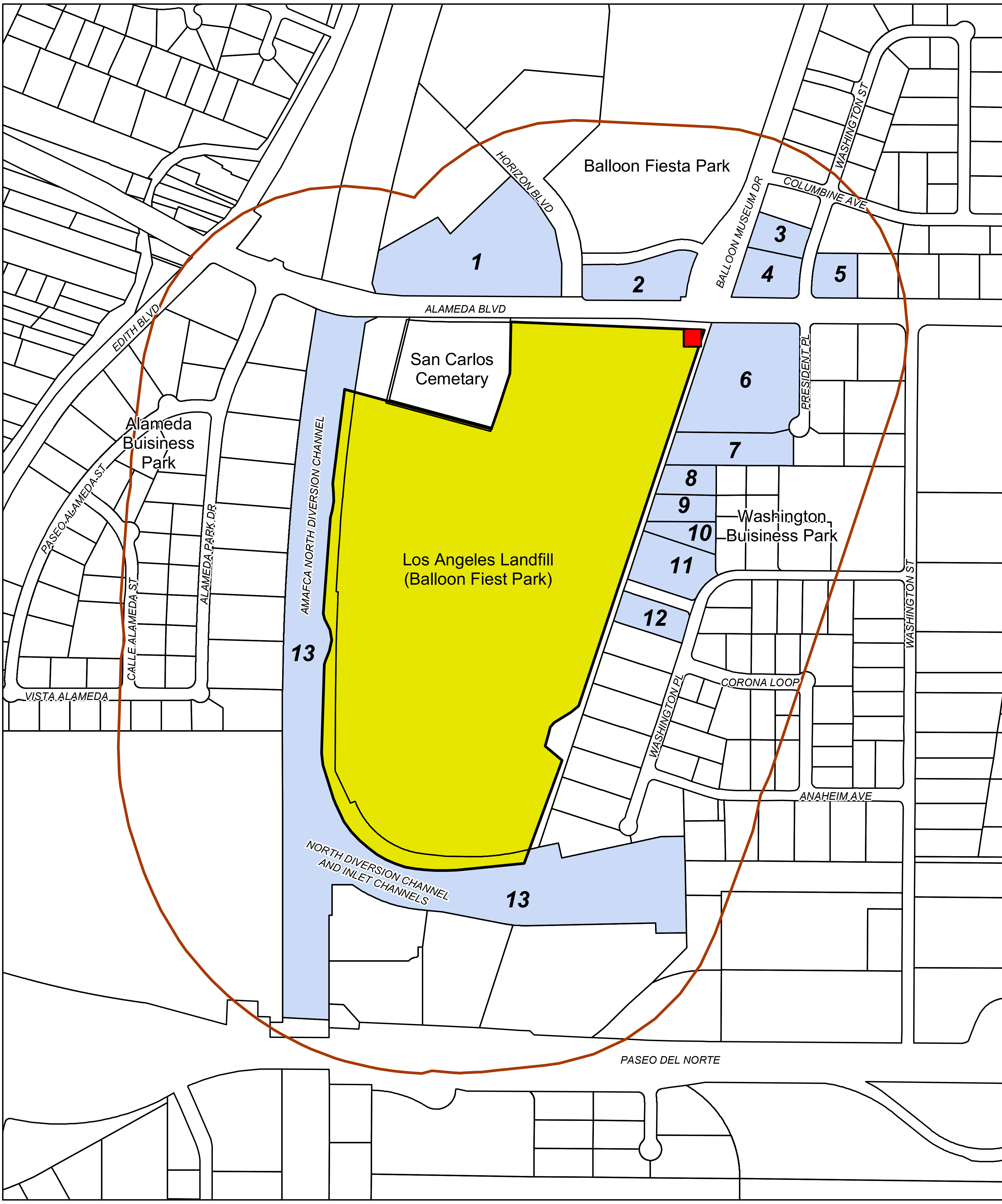
4.0 CLOSEOUT DOCUMENTATION

At the completion of field activities, the contractor will the following information and documentation to the AEHD:

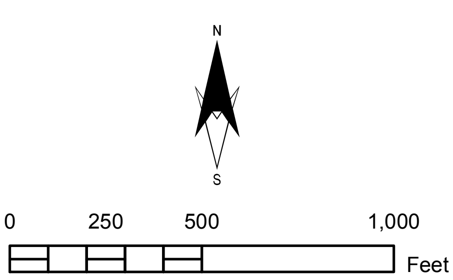
- Significant project dates and milestones;
- Volume of trash removed (attach copies of supporting trucking documents);
- Description of types and quantities of waste encountered including composition, organic content, and extent of decomposition;
- Summary of hazardous and special waste encountered as well as disposal documentation and laboratory analytical results;
- Photograph log showing project milestones and waste characterization;
- Volume of fill material imported and placed; and
- Summary of deviations from WEP and contract documents;

The closeout documents will be submitted to the AEHD project manager. Submittals will include hard copies as well as a compact disk containing the documentation in portable document format (pdf).

FIGURES



Source(s): Parcels, landfill extents – Bernalillo County GIS.



Property Ownership

1	WESTLAKE HORIZON BLVD LLC
2	CITY OF ALBUQUERQUE
3 & 4	ALBUQUERQUE INTERNATIONAL BALLOON FIESTA INC
5	D & T WEAKS LLC
6	MECHENBIER, MICHAEL & KATHLEEN RVCBL TRUST
7	RH EMMERSON AND SON LLC
8	BEATY, DANIEL J & REBECCA S
9	DOWNEY, ROGER ET.AL. TRUSTEES, IRR TRUST
10 & 11	BECKES, JEROME F.
12	G E WASHINGTON PLACE WAREHOUSE LLC, C/O GREER ENT INC
13	W/A LLC

Legend

- Project Location
- Landfill Buffer Zone
- Landfill Extent
- Property Owners that will be Notified in Writing

Figure 1
Site Location Plan

LALF Waste Removal
Albuquerque, New Mexico

INTERA

S:\Projects\COA-LAL_Los_Angeles_LF\GIS\MapDocuments\LA_fig1_04-09.mxd

ATTACHMENT A

WASTE EXCAVATION CHECKLIST

Waste Excavation Checklist

Background Summary

- Facility or project description, location and reason for the excavation

NMED Notification Prior to Commencement of Scheduled Activities

Schedule of Proposed Activities

Exploratory Pit Locations

- Plan view map with landfill boundaries, observations, objects encountered, soil vapor PID results (plan view with concentrations)

Waste Removal (Describe in Detail)

- How waste will be removed
- How stockpiling of waste will be avoided
- How, if necessary, temporarily stockpiled waste will be restricted from public access and covered, and what preventative measures will be taken to preclude soil or groundwater contamination
- Equipment to be used
- Screening equipment (if applicable)
- Type of trucks and owner(s)
- Protection mechanisms to prevent slope failure of the excavation (OSHA compliance)
- Dust control mechanisms (e.g., use of water, tarping, avoiding work at periods of high winds)
- Personnel that will be dedicated to monitoring excavation activities
- Type(s) of waste to be excavated or anomalies that will trigger cessation of excavation or monitoring

Air Monitoring

- Compliance with local laws/ordinances
- Types of air monitoring devices to be utilized, frequency of sampling
- Procedures to ensure worker safety during monitoring, sampling, and excavation activities

Personal Protective Equipment

- Required PPE to be used during excavation activities and protection levels, as appropriate

Hazard Assessment

- Chemicals and contaminants that may be encountered, potential health hazards, associated symptoms, and proposed response to such situations

Site Perimeter and Security

- Means of restricting or cordoning off excavated areas (during operations and at the end of each day)
- General site security procedures, to include description of exclusion zone(s) to be implemented

Letter from Landfill Acknowledging Acceptance of the Excavated Waste

Verification of Commercial Waste Hauler Registration for Hauler(s)

Work Limitations

- Anticipated days/hours of excavation activities, personnel shifts, weather conditions that would result in cessation of work

Emergency Contact Log and Directions & Route Map to Nearest Hospital

Key Project Personnel and Emergency Telephone Numbers

- Identification of the Site Safety Officer and other supervisory personnel
- Telephone numbers for nearby fire and police departments/substations, hospital(s), poison information center, NMED's 24-hour emergency reporting, and the local NMED Solid Waste Bureau's enforcement officer

******NOTE: All Waste Excavation Plans must address, but shall not necessarily be limited to, all of the items listed above.***

ATTACHMENT B

INTERIM GUIDELINES FOR DEVELOPMENT WITHIN CITY-DESIGNATED LANDFILL BUFFER ZONES

City of Albuquerque Interim Guidelines for Development within City Designated Landfill Buffer Zones (revised October 2005)

Through normal decomposition of buried refuse in former landfills, methane gas may be produced as a byproduct. If production of methane is significant, the landfill becomes pressurized forcing the methane gas out beyond the boundaries of the landfill. Methane generally follows the path of least resistance when it migrates. Typical areas it migrates through are utility corridors, existing gravel and/or sand deposits below the surface or areas where prior excavations have occurred and the fill was not properly compacted. Because methane may migrate onsite and to offsite areas surrounding a landfill, there is a potential danger to development and activities associated with development as the methane may enter buildings through utility corridors or other means. Trenching during construction activities associated with development also has the potential to expose workers to methane. Methane gas is explosive when the concentration in air reaches a certain level. Landfill gas may also be a health hazard due to other byproduct gases. As a result of the above concerns, these Interim Guidelines for Development (Interim Guidelines) within City of Albuquerque (City) Designated Landfill Buffer Zones are to be followed by all development within the City's jurisdiction. These guidelines apply to all active or inactive City designated landfill buffer zones of City and private permitted landfills, unpermitted landfills, and/or illegal dumpsites.

1. All development, whether it proceeds through the Environmental Planning Commission (EPC), Development Review Board (DRB), Design Review Committee (DRC) or the building permit process shall be subject to the Interim Guidelines if the property falls on top of or within a City designated landfill buffer zone. The Albuquerque Environmental Health Department Environmental Services Division or its consultant will review all documentation concerning development within each designated landfill buffer zone from professional engineers and the developers/owners/responsible parties to ensure that the Interim Guidelines have been followed.
2. Development projects will include input from a professional engineer, with expertise in landfills and landfill gas issues, to determine if landfill gas (including but not limited to methane) exists on the property in question and whether there is a potential for the migration of landfill gas to impact the property or other properties in the future.
3. If landfill gas is present at the property in question or there is a potential for the property to be impacted in the future, plans must include risk abatement measures, which are adequate to address any existing and/or future risk related to landfill gas. The portion of the construction plans dealing with landfill gas abatement measures shall be certified by a professional engineer with landfill gas experience, noted on plat/site development plans or building permits, reviewed and signed-off by designated Albuquerque Environmental Health Department Environmental Services Division staff or its designated consultant. Work orders for construction of public infrastructure will not be issued by the Public Works Department until the Albuquerque Environmental Health Department has verified that the risk abatement measures are properly detailed on infrastructure construction plans. Certificates of occupancy will not be issued by the City's Planning Department until the Albuquerque Environmental Health Department has verified that the risk abatement measures are properly detailed on the building permit plans and properly constructed.

The certification process shall include the following steps:

A. An assessment performed by the professional engineer, with expertise in landfills and landfill gas, to determine the current presence and/or potential for future presence and extent of landfill gas at the property. The scope of work undertaken concerning the assessment of landfill gases and/or the risk abatement measures at the property must be sufficient for the professional engineer to render an unqualified opinion concerning the current presence and/or potential for future presence and extent of landfill gases at the property, and the sufficiency of the risk abatement measures to eliminate any hazards or potential hazards associated with landfill gases.

B. A commitment by the owner/developer/responsible party to follow abatement measures and acknowledgment that the commitment is a condition of development approval. (In the case of a large corporation, the certification letter will be signed by a representative, who has the authority to commit the corporation to implement the risk abatement measures.)

C. Construction plans detailing the risk abatement measures shall be submitted with the building permit plans.

D. A stamped certification from a professional engineer licensed to practice in New Mexico certifying that the construction of the project has been completed in compliance with the risk abatement measures as detailed on original construction plans (any changes in the original design of the risk abatement measures shall be coordinated with the landfill gas professional engineer and Albuquerque Environmental Health Department prior to implementation of the change).

E. Copies of landfill certification documentation will be submitted to the Planning Department and maintained in its development files.

F. If a determination is made that there is no landfill gas existing at the property and there is no future risk from landfill gas, the assessment report shall state how such a determination was made and shall be certified by a professional engineer with landfill gas experience. The “no risk” certification process shall include the same steps outlined above.

G. Properties within City designated landfill buffer zones must note on the site plan/plats/as-builts the following disclosure statement:

H. “The subject property is located (near, on) a (former, existing) landfill. Due to the subject property being (near, on) a (former, existing) landfill, certain precautionary measures may need to be taken to ensure the health and safety of the public. Recommendations made by a professional engineer with expertise in landfills and landfill gas issues (as required by the most current version of the Interim Guidelines for Development within City Designated Landfill Buffer Zones) shall be consulted prior to development of the site.”

I. The Interim Guidelines are for the development process and are not intended to affect planning or administrative processes that are not associated with physical changes to sites on or within City designated landfill buffer zones other than to raise the awareness of procedures to be undertaken prior to development.

J. Any removal of landfill materials during development of the property must also be coordinated with the New Mexico Environment Department – Solid Waste Bureau.

K. The following City designated landfill buffer zones are:

- Atrisco LF-250 ft
- Coronado LF North Cell -250 ft
- Coronado LF Middle and South Cells -1000 ft
- Eubank LF- 1000 ft (Except those areas within Sandia Science and Technology Park Phase I area)
- Los Angeles LF-1000 ft
- Nazareth LF-500 ft
- Oakland Avenue Landfill – 1000 ft
- Riverside LF-1000 ft
- Russ Pitney LF-1000 ft
- Sacramento LF- 500 ft
- San Antonio LF- 1000 ft
- San Francisco Drive LF-1000 ft
- Seay Brothers LF-1000 ft
- South Broadway LF-1000 ft
- Southwest LF-1000 ft
- Swartzman LF-1000 ft
- W.W. Cox LF-1000 ft
- Yale LF – 1000 ft
- Private Permitted Landfills* – 1000 ft
- Private Unpermitted Landfills* – 1000 ft
- Illegal Dumpsites- 1000 ft

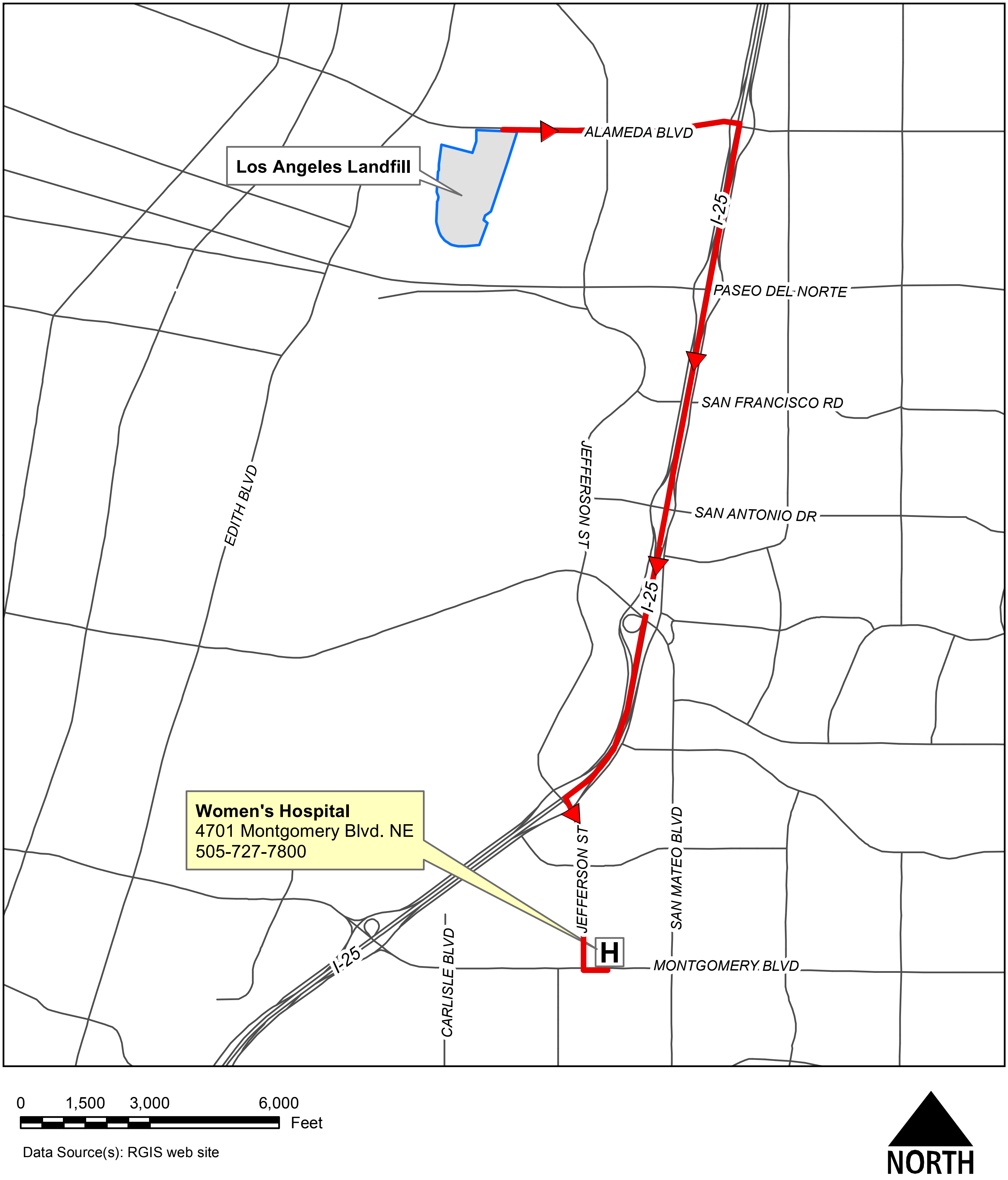
*Note – private permitted landfills have been permitted by the New Mexico Environment Department (NMED) Solid Waste Bureau, while private unpermitted landfills have not been permitted by the NMED Solid Waste Bureau.

ATTACHMENT C

SITE SPECIFIC HEALTH AND SAFETY PLAN

ATTACHMENT D

ROUTE TO WOMEN'S HOSPITAL
4701 MONTEGOMERY BLVD NE



Data Source(s): RGIS web site

INTERA

Hospital Route Map

ATTACHMENT E

WASTE HAULER'S REGISTRATION

APPENDIX B

LFG Extraction Well Details

Phase II Borehole Summary
Los Angeles Landfill

Well ID	Date Drilled	Depth Ft
IW-6	30-Jul	38
IW-7	30-Jul	41
IW-8	31-Jul	38
IW-9	1-Aug	33
IW-10	26-Jul	49.5
IW-11	27-Jul	54
IW-12	28-Jul	53
IW-13	28-Jul	23
IW-14	16-Aug	24
IW-15	28-Jul	40
IW-16	28-Jul	25
IW-17	29-Jul	54
PW-18	1-Aug	34
PW-19	3-Aug	22
PW-20	4-Aug	26
PW-21	3-Aug	33
PW-22	3-Aug	33
PW-23	7-Aug	17
PW-24	7-Aug	33

Well ID	Date Drilled	Depth Ft
PW-25	6-Aug	33
PW-26	6-Aug	23
PW-27	6-Aug	35
PW-28	5-Aug	39
PW-29	5-Aug	24
PW-30	5-Aug	32
PW-31	7-Aug	35
PW-32	6-Aug	27
PW-33	6-Aug	24
PW-34	6-Aug	24
PW-35	7-Aug	35
PW-36	7-Aug	42
PW-37	8-Aug	35
PW-38	8-Aug	30
PW-39	27-Jul	27
PW-40	27-Jul	35
PW-41	26-Jul	32
PW-42	28-Jul	33
PW-43	30-Jul	30

6" SDR 11 Extraction well
Casing

LANDFILL GAS RECOVERY WELL
AS-BUILT

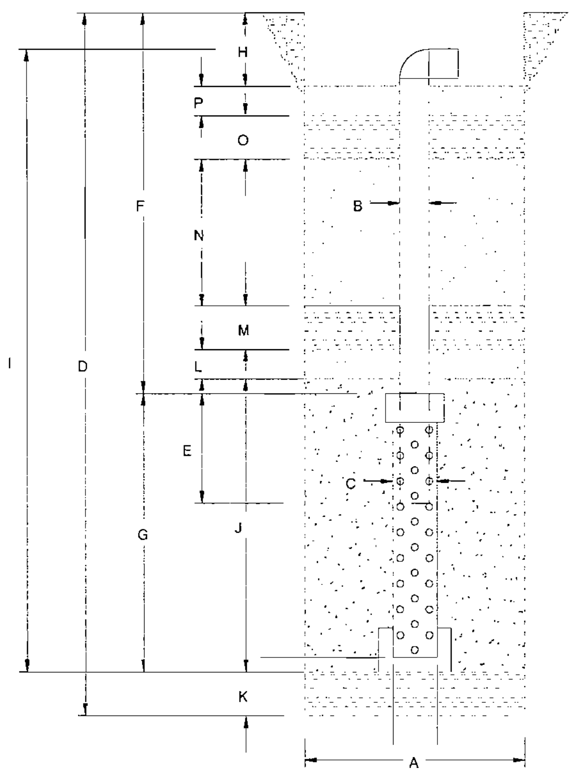
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 14, 1996

Well No.: I-1

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	38.0	FT.
E.	Solid Pipe Ext.*	5.0	FT.
F.	Solid Pipe B/G	21.0	FT.
G.	Perf. Pipe Lgth.	19.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	40.0	FT.
J.	Gravel Pack	20.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	6.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	2.0	FT.

Comments

* Length of 4" pipe to be scoped into 6-inch casing.

Casing set 0.5' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

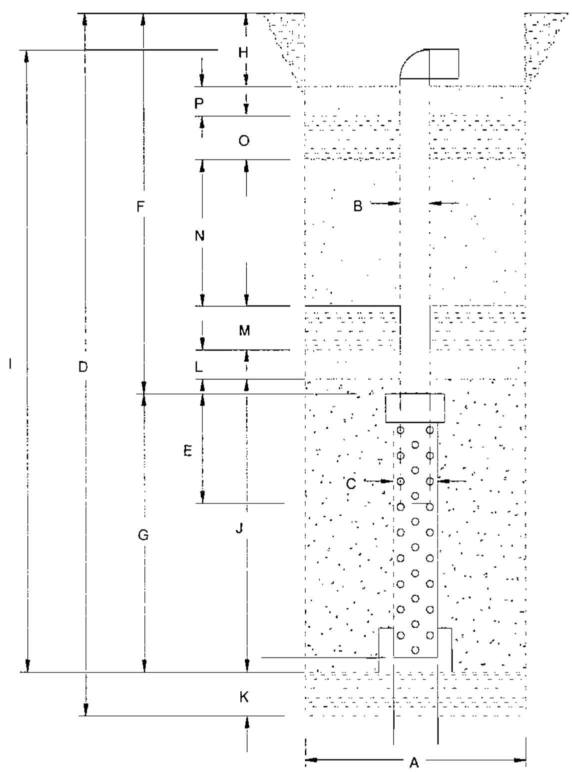
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 14, 1996

Well No.: I-2

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	30.0	FT.
E.	Solid Pipe Ext.*	5.5	FT.
F.	Solid Pipe B/G	17.0	FT.
G.	Perf. Pipe Lgth.	15.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	32.0	FT.
J.	Gravel Pack	17.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	2.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe to be scoped into 6-inch casing.

Casing set 2.5' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

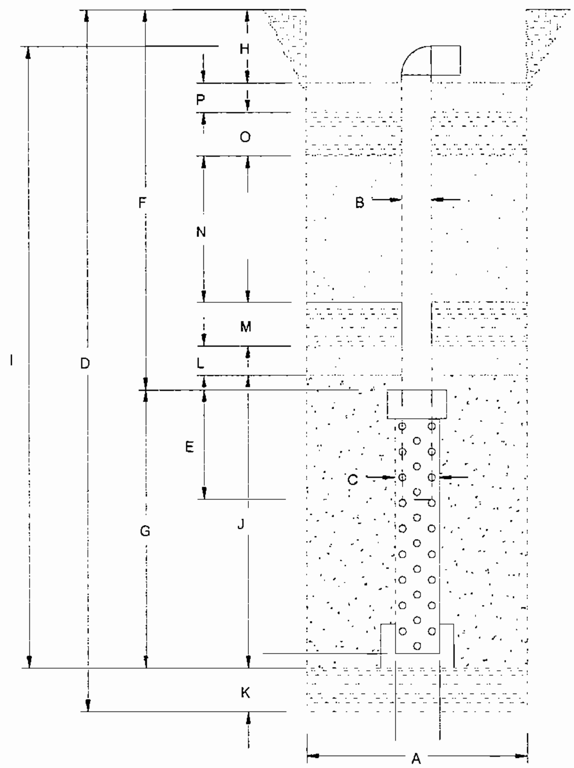
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 14, 1996

Well No.: I-3

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	36.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	20.0	FT.
G.	Perf. Pipe Lgth.	18.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	38.0	FT.
J.	Gravel Pack	18.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	7.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* includes 5 ft. of 4" pipe to be scoped into 6-inch casing.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

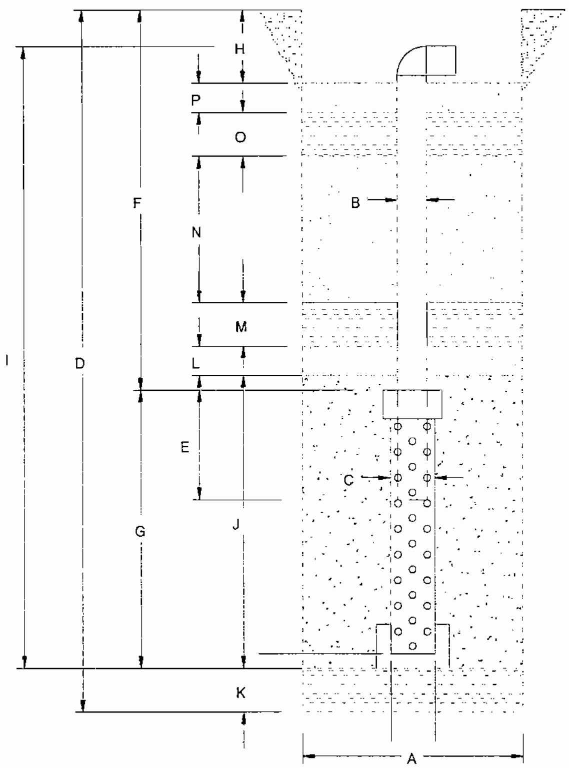
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 13, 1996

Well No.: I-4

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	29.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	16.0	FT.
G.	Perf. Pipe Lgth.	14.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	30.5	FT.
J.	Gravel Pack	15.5	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	3.5	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil**	0	FT.

Comments

* Length of 4" pipe to be scoped into 6-inch casing.

** Top of upper bentonite seal of lateral trench depth.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

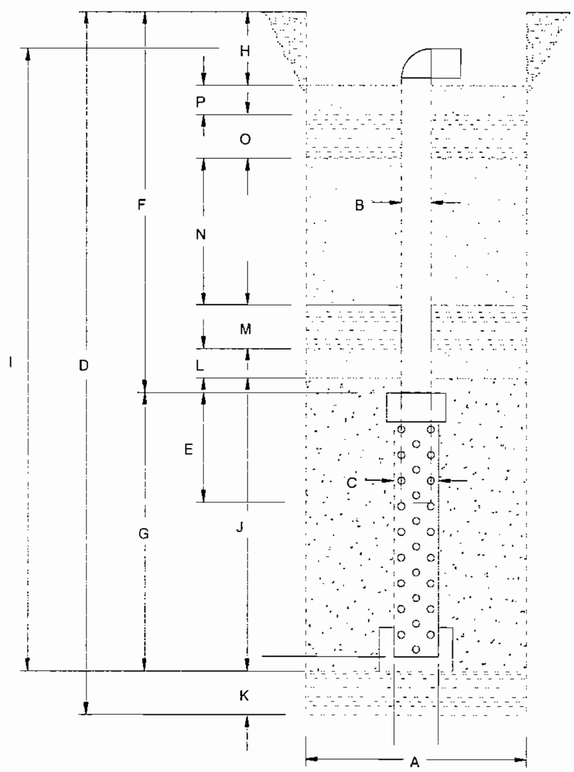
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 12, 1996

Well No.: I-5

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	36.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	20.0	FT.
G.	Perf. Pipe Lgth.	18.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	18.0	FT.
J.	Gravel Pack	20.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	7.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil**	0	FT.

Comments

* includes 5 ft. of 4" pipe to be scoped into 6-inch casing.

** Top off upper bentonite seal at lateral trench depth.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

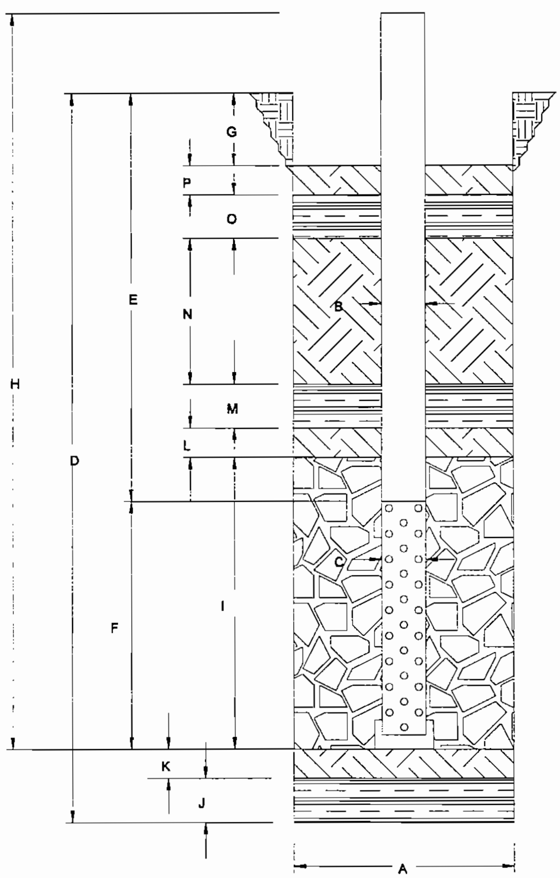
Client: City of Albuquerque

Drilling Date: July 28, 1999

Contractor: OWT Construction

Site: Los Angeles Landfill

Well No.: IW-6



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	38.0	FT.
E.	Solid Pipe B/G	18.0	FT.
F.	Perf Pipe Lgth.	18.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	38.0	FT.
I.	Gravel Pack	~20.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~7.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

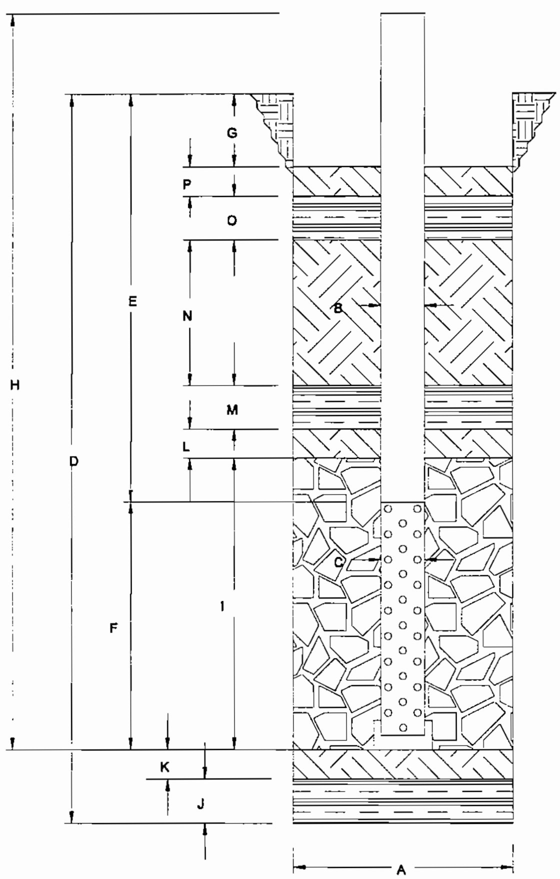
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 16, 1999

Well No.: IW-7

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	41.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	24.0	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	41.0	FT.
I.	Gravel Pack	25.5	FT.
J.	Bentonite Slurry	2.2	FT.
K.	Soil	1.5	FT.
L.	Soil	1.5	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	3.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

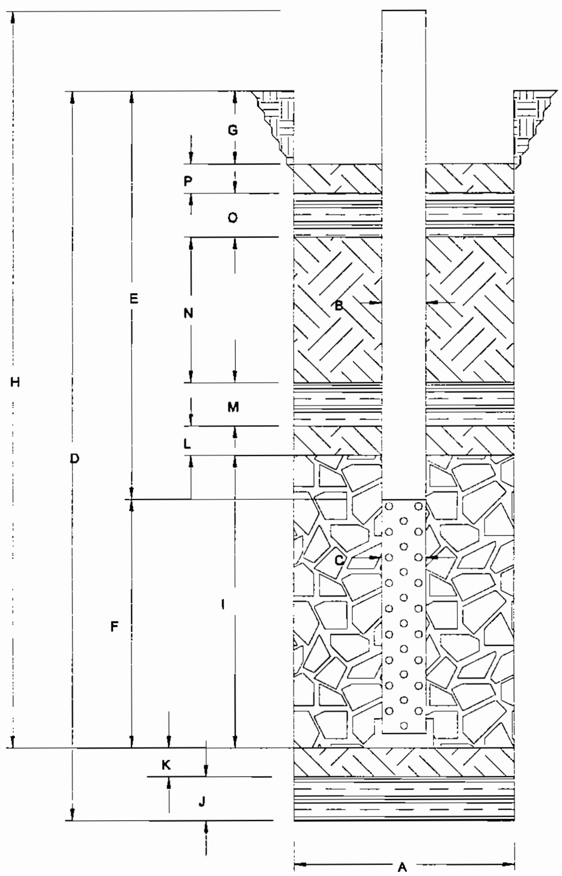
Client: City of Albuquerque

Drilling Date: August 17, 1999

Contractor: OWT Construction

Site: Los Angeles Landfill

Well No.: IW-8



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	38.0	FT.
E.	Solid Pipe B/G	17.0	FT.
F.	Perf Pipe Lgth.	21.0	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	38.0	FT.
I.	Gravel Pack	23.0	FT.
J.	Bentonite Slurry	1.5	FT.
K.	Soil	0.5	FT.
L.	Soil	0.8	FT.
M.	Bentonite Slurry	1.9	FT.
N.	Soil	2.2	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

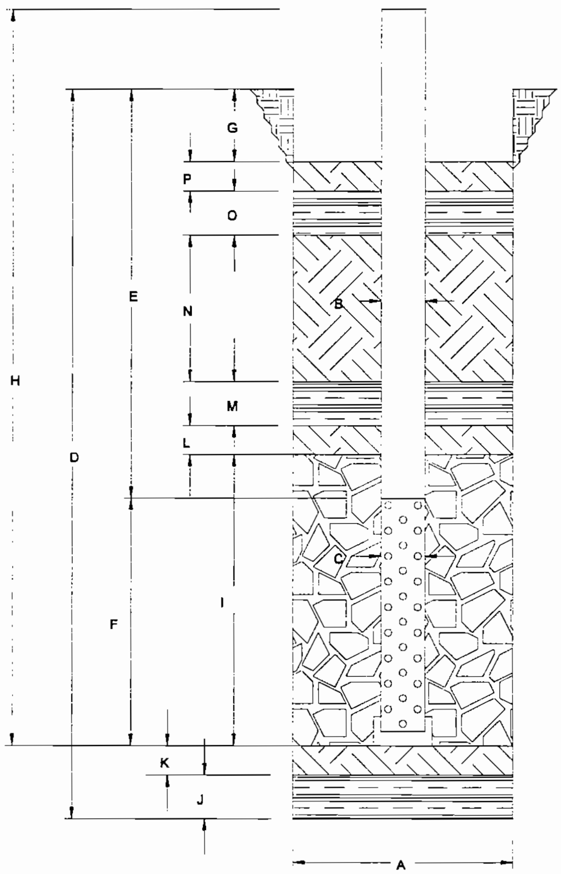
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 10, 1999

Well No.: IW-9

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	33.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	18.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	33.0	FT.
I.	Gravel Pack	~20.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

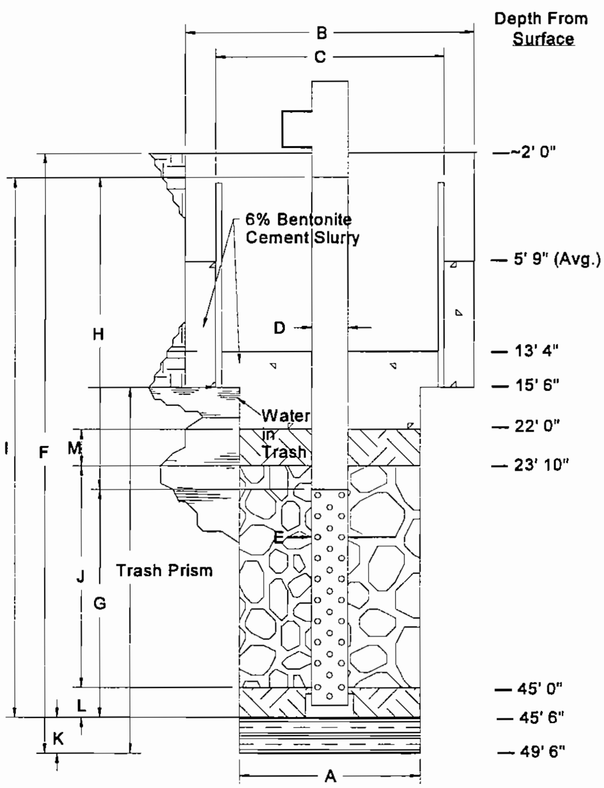
Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

Client: City of Albuquerque **Site:** Los Angeles Landfill

Drilling Date: August 18, 1999 **Well No.:** IW-10

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Upper Bore Dia.	50.0	IN.
C.	Sleeve Dia.	40.0	IN.
D.	Solid Pipe Dia.	6.0	IN.
E.	Perf. Pipe Dia.	6.0	IN.
F.	Bore Depth	49.5	FT.
G.	Solid Pipe B/G	26.0	FT.
H.	Perf Pipe Lgth.	19.5	FT.
I.	Tot. Pipe Lgth.	45.5	FT.
J.	Gravel Pack	21.2	FT.
K.	Bentonite Slurry	4.0	FT.
L.	Soil	0.5	FT.
M.	Soil	1.8	FT.

Comments

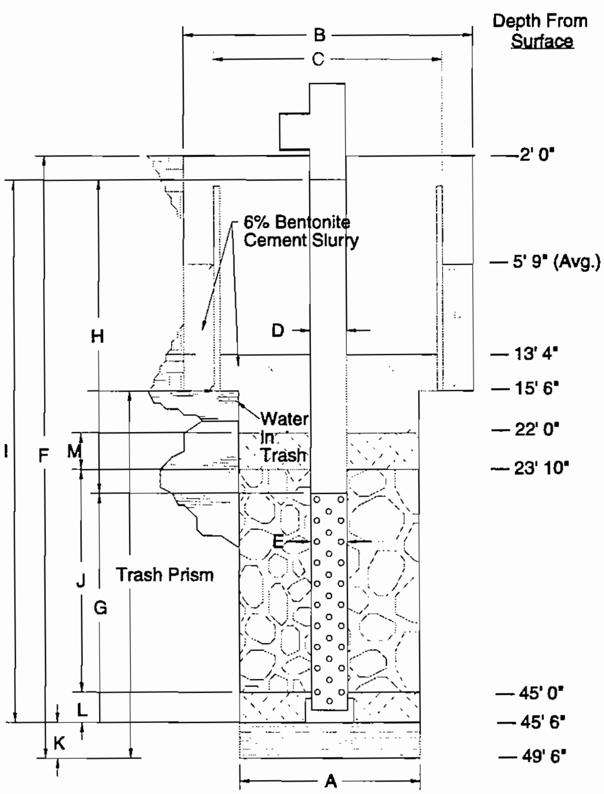
Casing set 4' above bottom of bore. Water inflow was observed in the trash layer from 15' 6" to 19' 6" depth. Bentonite-cement slurry within the metal sleeve was 8.7' thick (average). Bentonite-cement slurry in the annulus space between the metal sleeve and enlarged upper well bore was an average of 9.8' in thickness. Filled with clean backfill to top in bore and annulus.

LANDFILL GAS RECOVERY WELL
AS-BUILT

Client: City of Albuquerque **Site:** Los Angeles Landfill

Drilling Date: August 18, 1999 **Well No.:** IW-10

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Upper Bore Dia.	50.0	IN.
C.	Sleeve Dia.	40.0	IN.
D.	Solid Pipe Dia.	6.0	IN.
E.	Perf. Pipe Dia.	6.0	IN.
F.	Bore Depth	49.5	FT.
G.	Solid Pipe B/G	26.0	FT.
H.	Perf Pipe Lgth.	19.5	FT.
I.	Tot. Pipe Lgth.	45.5	FT.
J.	Gravel Pack	21.2	FT.
K.	Bentonite Slurry	4.0	FT.
L.	Soil	0.5	FT.
M.	Soil	1.8	FT.

Comments

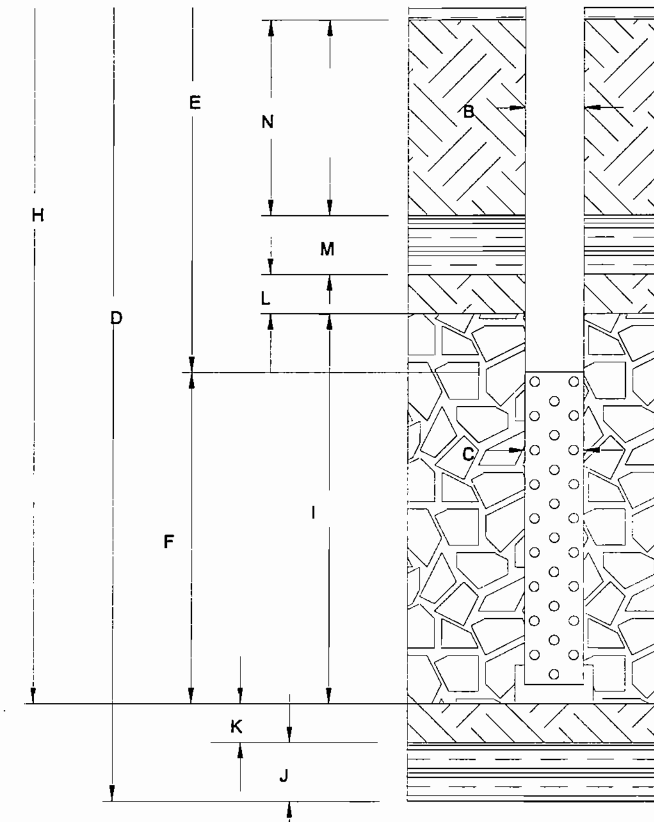
Casing set 4' above bottom of bore. Water inflow was observed in the trash layer from 15' 6" to 19' 6" depth. Bentonite-cement slurry within the metal sleeve was 8.7' thick (average). Bentonite-cement slurry in the annulus space between the metal sleeve and enlarged upper well bore was an average of 9.8' in thickness. Filled with clean backfill to top in bore and annulus.

LANDFILL GAS RECOVERY WELL
AS-BUILT

Client: City of Albuquerque **Site:** Los Angeles Landfill

Drilling Date: August 11, 1999 **Well No.:** IW-11

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	54.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	37.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	54.0	FT.
I.	Gravel Pack	~39.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~0.5	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

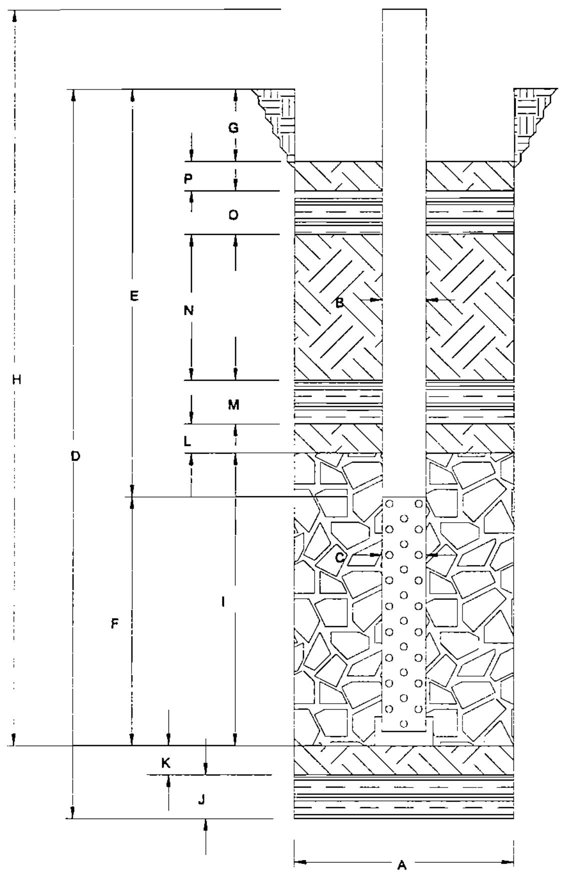
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 13, 1999

Well No.: IW-12

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	53.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	36.0	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	53.0	FT.
I.	Gravel Pack	37.5	FT.
J.	Bentonite Slurry	2.0	FT.
K.	Soil	0.8	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.1	FT.
N.	Soil	3.7	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

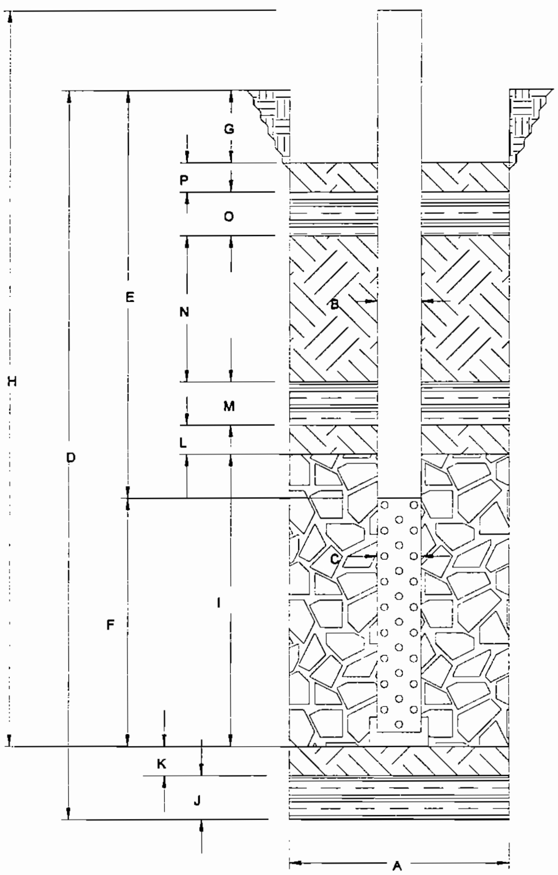
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 13, 1999

Well No.: IW-13

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	23.0	FT.
E.	Solid Pipe B/G	10.0	FT.
F.	Perf Pipe Lgth.	11.0	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	23.0	FT.
I.	Gravel Pack	13.1	FT.
J.	Bentonite Slurry	1.7	FT.
K.	Soil	0.5	FT.
L.	Soil	0.5	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	0.5	FT.
O.	Bentonite Slurry	0	FT.
P.	Soil	0	FT.

Comments

Casing set about 2.5' above bottom of bore. Only one bentonite seal above gravel pack.

LANDFILL GAS RECOVERY WELL
AS-BUILT

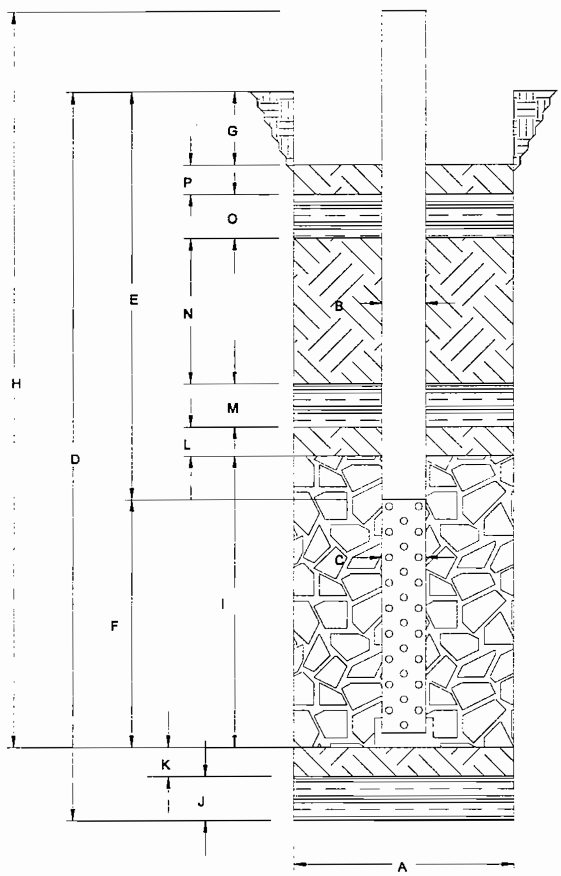
Client: **City of Albuquerque**

Site: **Los Angeles Landfill**

Drilling Date: **August 16, 1999**

Well No.: **IW-14**

Contractor: **OWT Construction**



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	24.0	FT.
E.	Solid Pipe B/G	10.0	FT.
F.	Perf Pipe Lgth.	12.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	24.0	FT.
I.	Gravel Pack	~14.5	FT.
J.	Bentonite Slurry	~1.5	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.3	FT.
N.	Soil	~1.5	FT.
O.	Bentonite Slurry	0	FT.
P.	Soil	0	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap. Only one bentonite seal above gravel pack as there was not enough depth for second bentonite seal.

LANDFILL GAS RECOVERY WELL
AS-BUILT

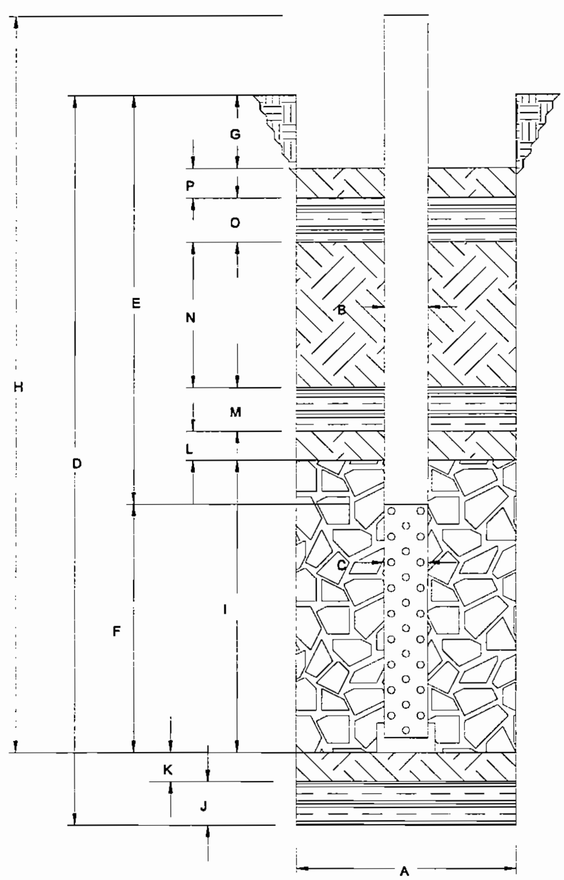
Client: City of Albuquerque

Drilling Date: August 13, 1999

Contractor: OWT Construction

Site: Los Angeles Landfill

Well No.: IW-15



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	40.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	23.0	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	40.0	FT.
I.	Gravel Pack	24.3	FT.
J.	Bentonite Slurry	2.0	FT.
K.	Soil	8.0	IN.
L.	Soil	0.5	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	4.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

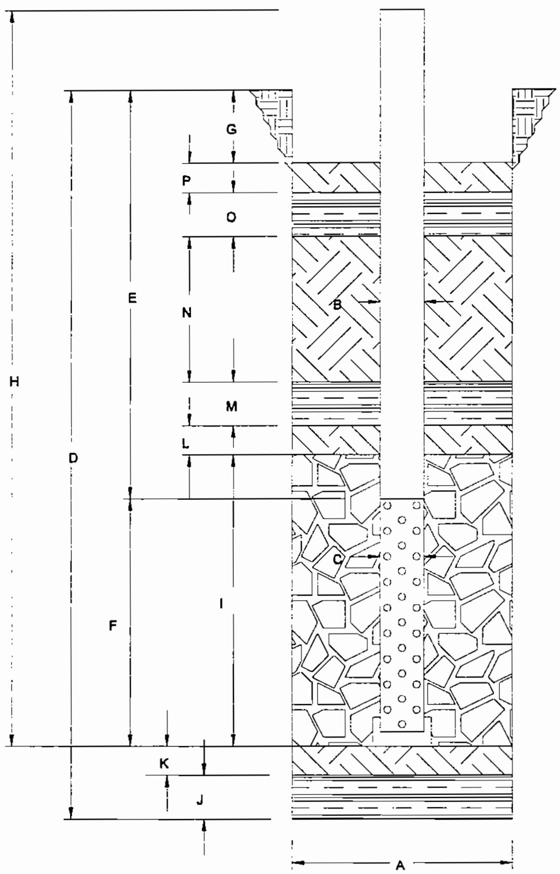
Client: City of Albuquerque

Drilling Date: August 13, 1999

Contractor: OWT Construction

Site: Los Angeles Landfill

Well No.: IW-16



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	25.0	FT.
E.	Solid Pipe B/G	10.0	FT.
F.	Perf Pipe Lgth.	13.0	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	25.0	FT.
I.	Gravel Pack	13.5	FT.
J.	Bentonite Slurry	2.0	FT.
K.	Soil	1.0	FT.
L.	Soil	2.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	0.5	FT.
O.	Bentonite Slurry	0	FT.
P.	Soil	0	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap. Only one bentonite seal above gravel pack as there was not enough depth for second bentonite seal.

LANDFILL GAS RECOVERY WELL
AS-BUILT

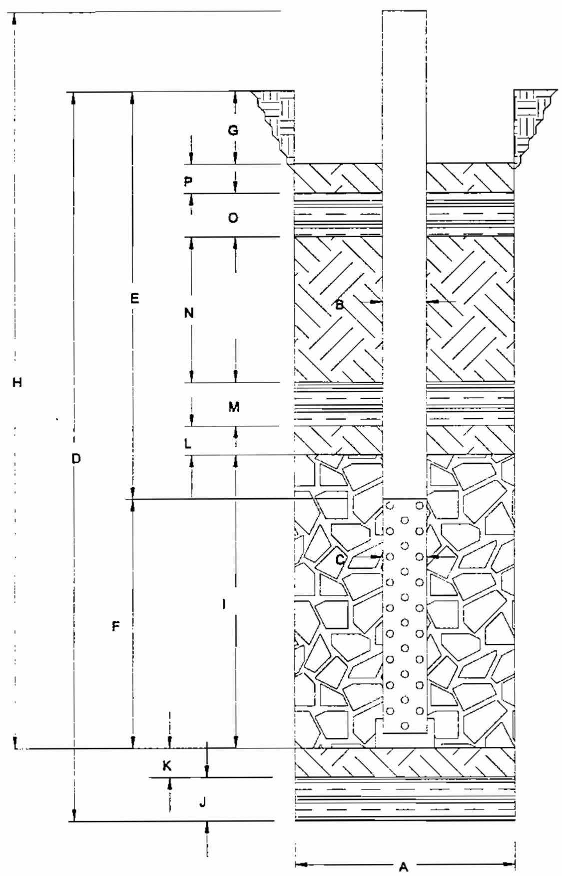
Client: City of Albuquerque

Drilling Date: August 12, 1999

Contractor: OWT Construction

Site: Los Angeles Landfill

Well No.: IW-17



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	54.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	37.0	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	54.0	FT.
I.	Gravel Pack	39.0	FT.
J.	Bentonite Slurry	2.0	FT.
K.	Soil	0.5	FT.
L.	Soil	0.5	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	4.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

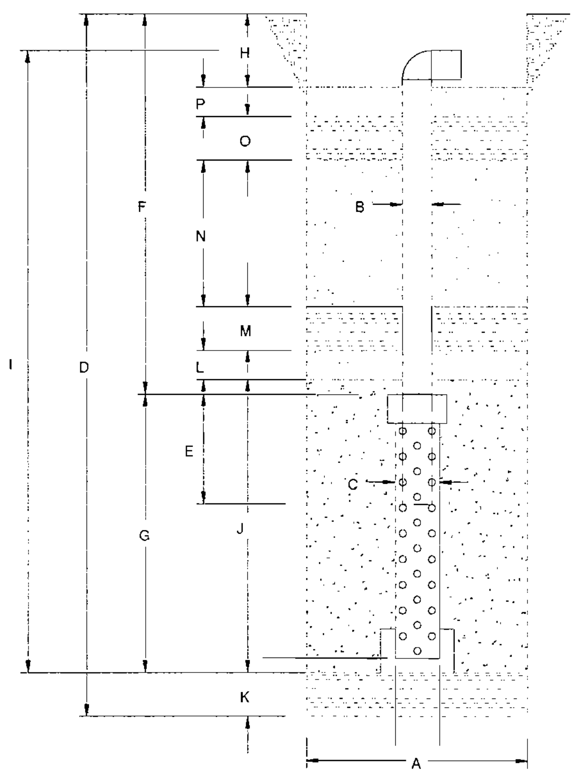
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 2, 1996

Well No.: P-1

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	13.0	FT.
E.	Solid Pipe Ext.*	6.5	FT.
F.	Solid Pipe B/G	7.5	FT.
G.	Perf. Pipe Lgth.	7.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	15.0	FT.
J.	Gravel Pack	8.5	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	0.5	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil**	0	FT.
O.	Bentonite Slurry	0	FT.
P.	Soil	0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

** Due to shallow bore only one bentonite seal placed above gravel pack.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

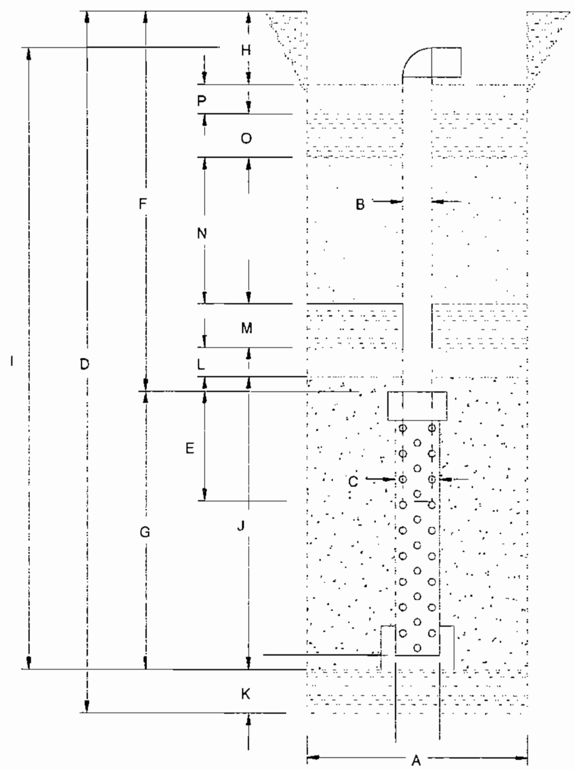
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 2, 1996

Well No.: P-2

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	35.5	FT.
E.	Solid Pipe Ext.*	5.0	FT.
F.	Solid Pipe B/G	20.0	FT.
G.	Perf. Pipe Lgth.	17.75	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	37.75	FT.
J.	Gravel Pack	19.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	7.5	FT.
O.	Bentonite Slurry	1.0	FT.
P.	Soil**	0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

** Top of upper bentonite seal at lateral trench depth.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

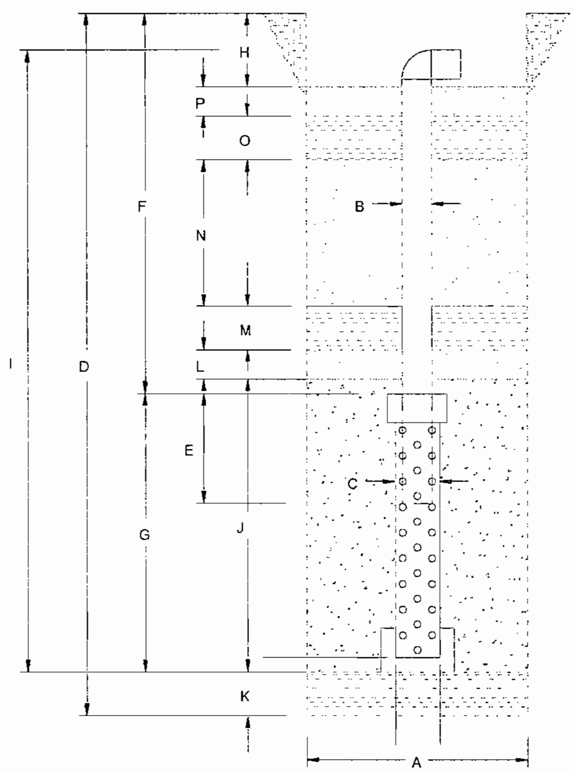
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 2, 1996

Well No.: P-3

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	36.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	20.0	FT.
G.	Perf. Pipe Lgth.	18.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	38.0	FT.
J.	Gravel Pack	20.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	6.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil**	0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

** Top of upper bentonite seal at lateral trench depth.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

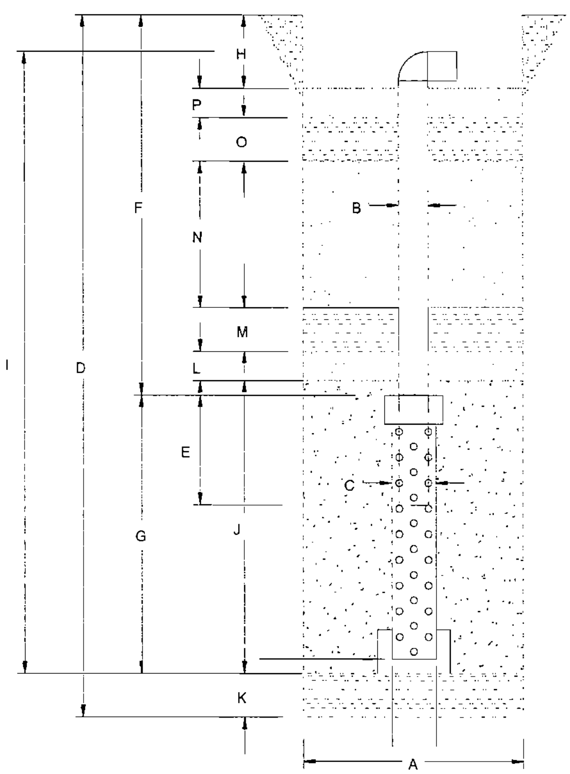
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 2, 1996

Well No.: P-4

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	29.0	FT.
E.	Solid Pipe Ext.	6.5	FT.
F.	Solid Pipe B/G*	16.0	FT.
G.	Perf. Pipe Lgth.	14.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	30.5	FT.
J.	Gravel Pack	16.5	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	2.5	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil**	0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

** Top of upper bentonite seal at lateral trench depth.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

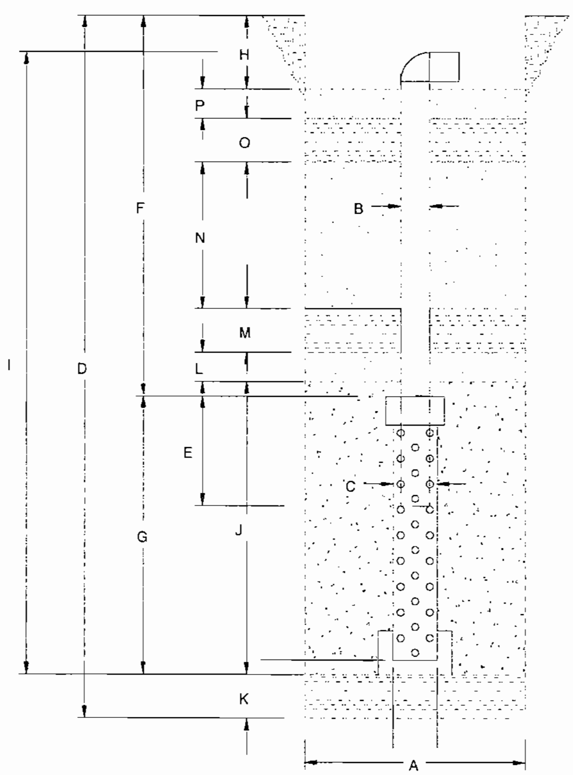
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 3, 1996

Well No.: P-5

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	35.0	FT.
E.	Solid Pipe Ext.*	4.0	FT.
F.	Solid Pipe B/G	19.5	FT.
G.	Perf. Pipe Lgth.	17.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	37.0	FT.
J.	Gravel Pack	19.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	5.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

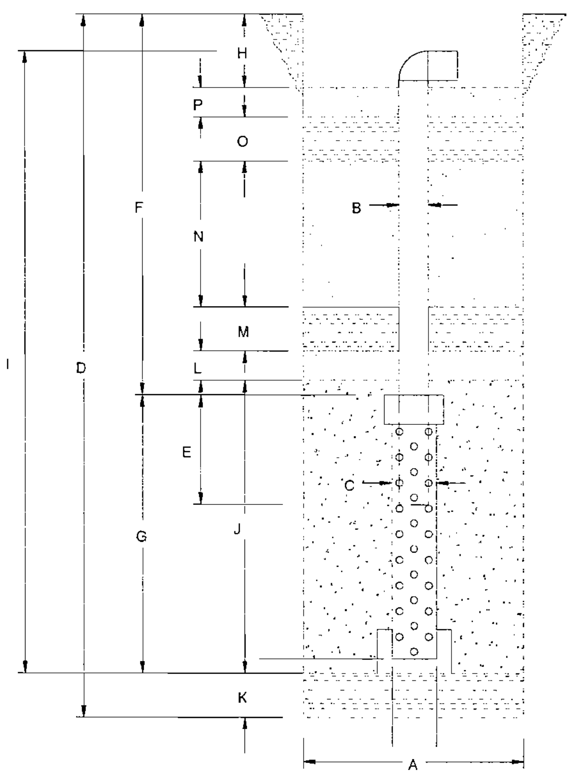
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 3, 1996

Well No.: P-6

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	33.0	FT.
E.	Solid Pipe Ext.*	5.5	FT.
F.	Solid Pipe B/G	17.0	FT.
G.	Perf. Pipe Lgth.	16.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	33.5	FT.
J.	Gravel Pack	18.5	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	4.5	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil**	0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

** Top of upper bentonite seal at lateral trench depth.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

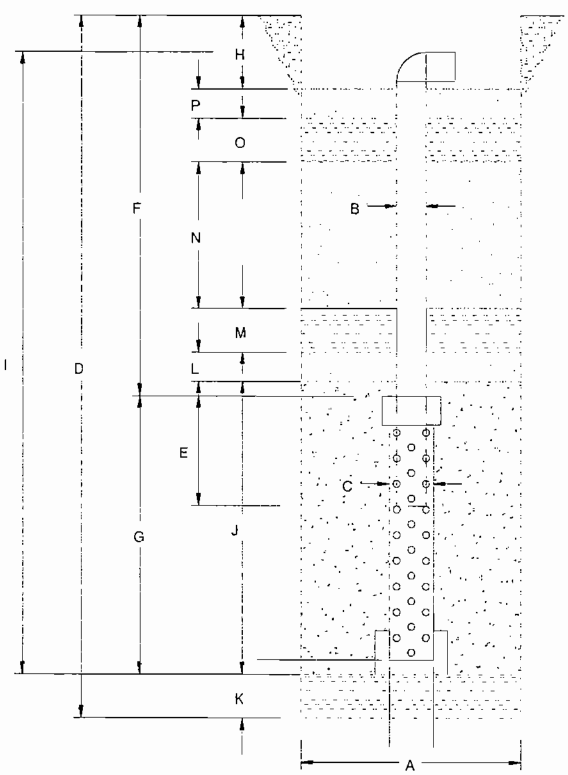
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 3, 1996

Well No.: P-7

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	34.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	19.0	FT.
G.	Perf. Pipe Lgth.	17.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	36.0	FT.
J.	Gravel Pack	19.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	4.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

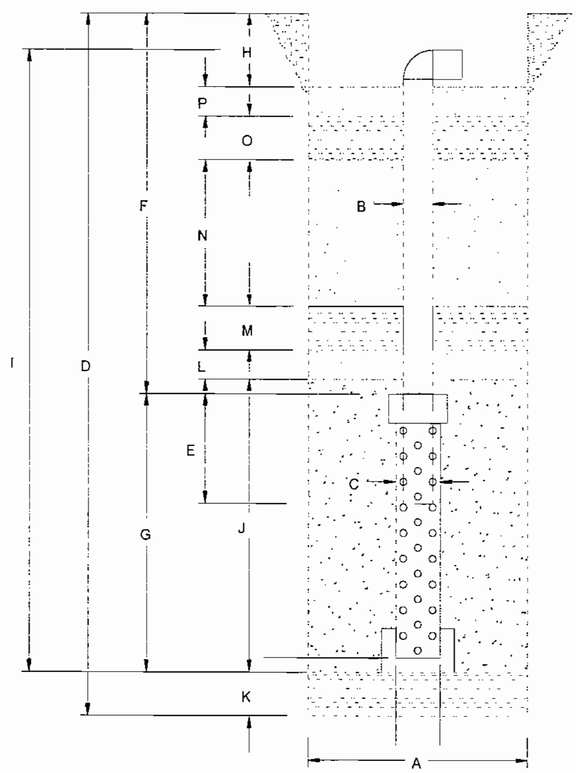
Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

Client: City of Albuquerque **Site:** Los Angeles Landfill

Drilling Date: June 3, 1996 **Well No.:** P-8

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	44.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	24.0	FT.
G.	Perf. Pipe Lgth.	22.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	46.0	FT.
J.	Gravel Pack	24.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	9.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

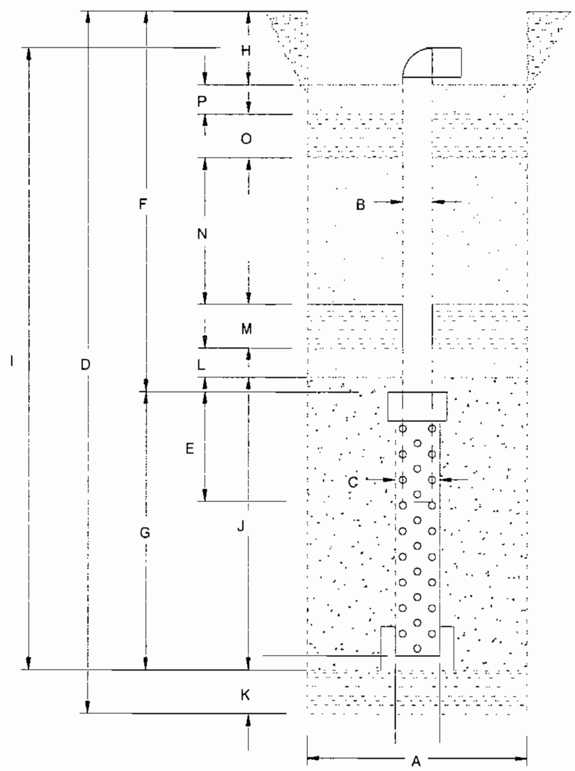
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 16, 1996

Well No.: P-9

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	44.0	FT.
E.	Solid Pipe Ext.*	6.0	FT.
F.	Solid Pipe B/G	24.0	FT.
G.	Perf. Pipe Lgth.	22.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	45.0	FT.
J.	Gravel Pack	24.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	9.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

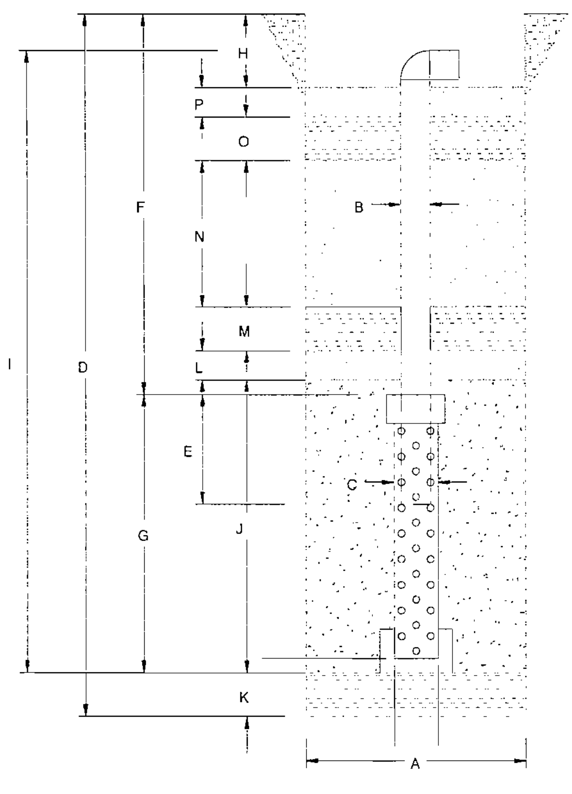
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 16, 1996

Well No.: P-10

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	47.0	FT.
E.	Solid Pipe Ext.*	6.5	FT.
F.	Solid Pipe B/G	25.5	FT.
G.	Perf. Pipe Lgth.	23.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	49.0	FT.
J.	Gravel Pack	25.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	11.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

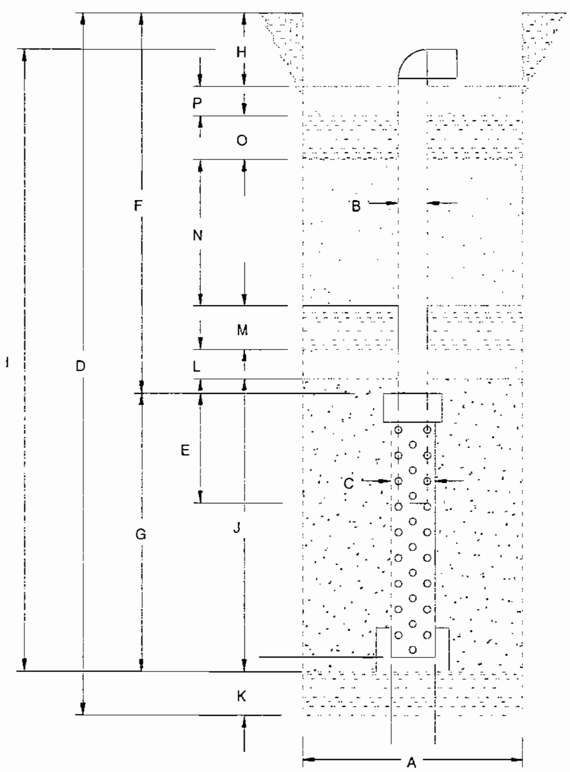
Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

Client: City of Albuquerque **Site:** Los Angeles Landfill

Drilling Date: June 4, 1996 **Well No.:** P-11

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	43.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	23.5	FT.
G.	Perf. Pipe Lgth.	21.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	45.0	FT.
J.	Gravel Pack	23.5	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	8.5	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

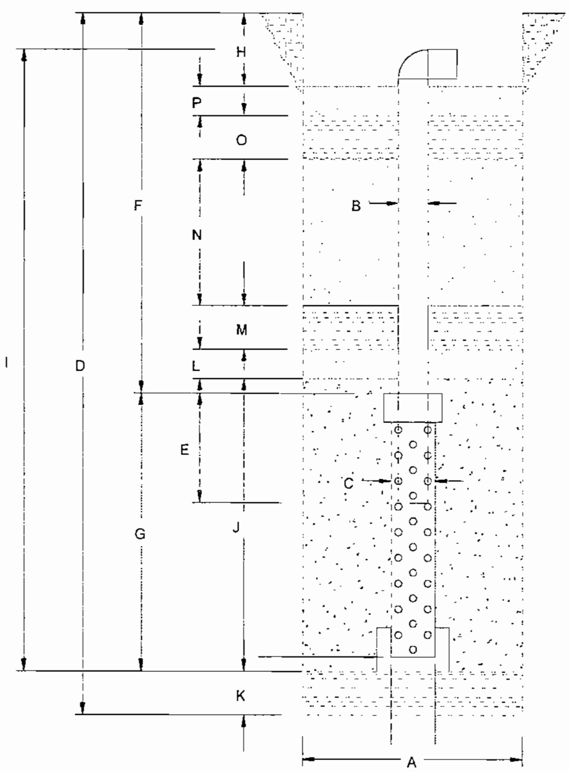
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 10, 1996

Well No.: P-12

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	43.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	23.5	FT.
G.	Perf. Pipe Lgth.	21.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	45.0	FT.
J.	Gravel Pack	23.5	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	8.5	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

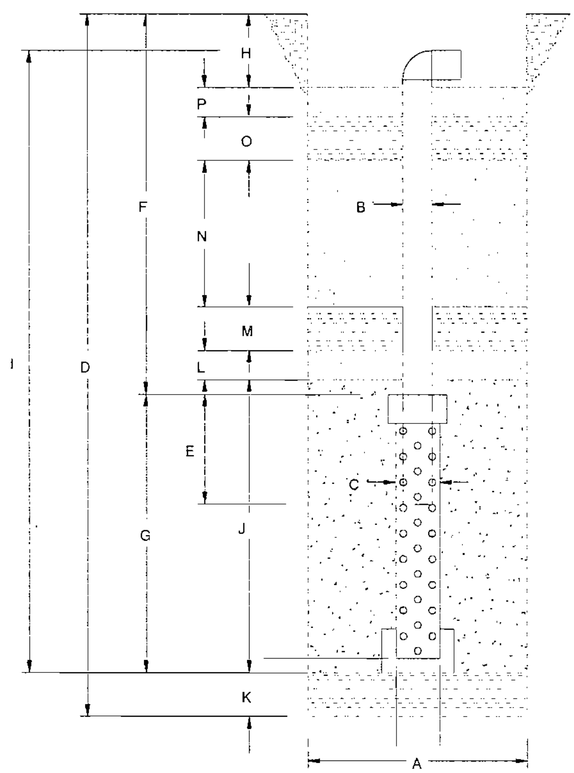
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 10, 1996

Well No.: P-13

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	38.5	FT.
E.	Solid Pipe Ext.*	5.0	FT.
F.	Solid Pipe B/G	21.0	FT.
G.	Perf. Pipe Lgth.	19.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	40.5	FT.
J.	Gravel Pack	21.5	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	6.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

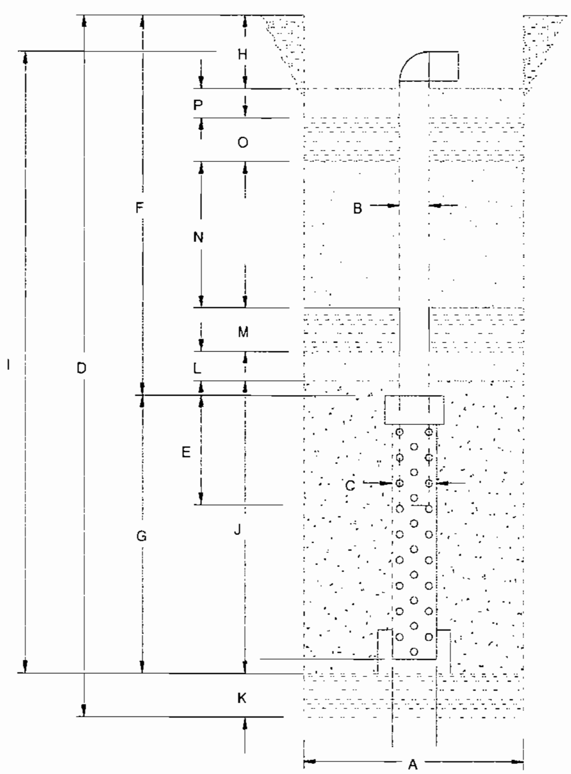
Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

Client: City of Albuquerque **Site:** Los Angeles Landfill

Drilling Date: June 11, 1996 **Well No.:** P-15

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	38.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	21.0	FT.
G.	Perf. Pipe Lgth.	19.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	40.0	FT.
J.	Gravel Pack	21.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	6.5	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	0.5	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

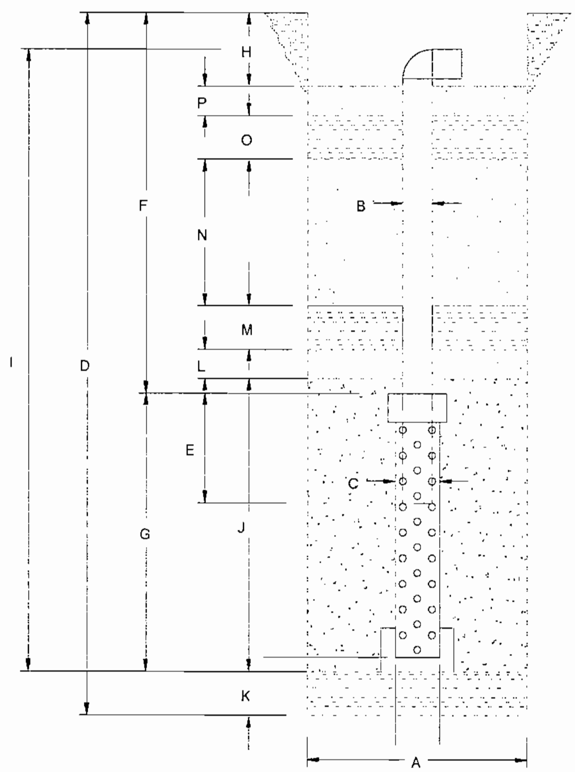
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 11, 1996

Well No.: P-14

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	41.5	FT.
E.	Solid Pipe Ext.*	5.0	FT.
F.	Solid Pipe B/G	22.5	FT.
G.	Perf. Pipe Lgth.	21.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	43.5	FT.
J.	Gravel Pack	23.5	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	7.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

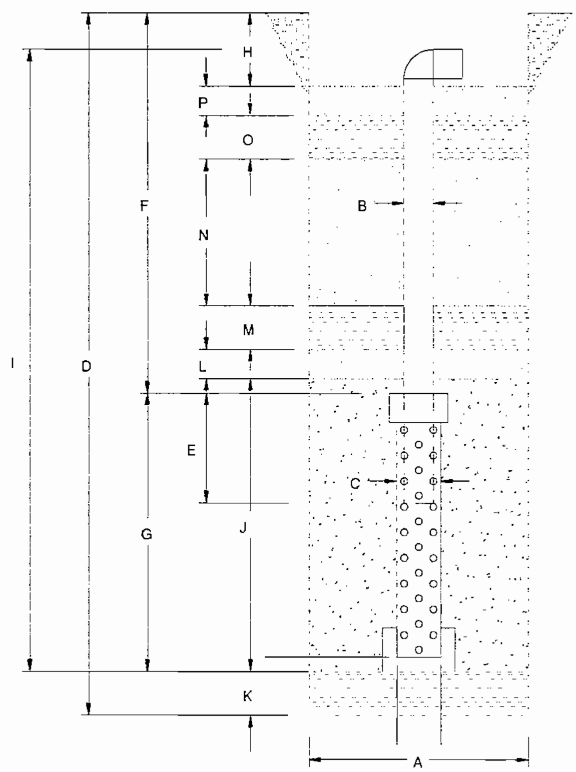
Comments

* Length of 4" pipe telescoped into 6-inch casing.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

Client: City of Albuquerque
Site: Los Angeles Landfill
Drilling Date: June 11, 1996
Well No.: P-16
Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	30.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	17.0	FT.
G.	Perf. Pipe Lgth.	15.0	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	32.0	FT.
J.	Gravel Pack	17.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	2.0	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

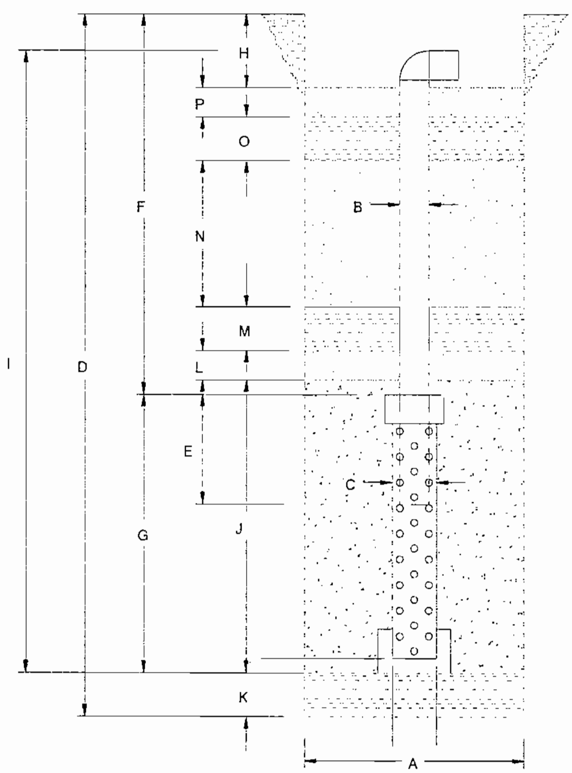
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: June 17, 1996

Well No.: P-17

Contractor: B.I. Drilling



SPECIFICATIONS

A.	Bore Size	2.0	FT.
B.	Solid Pipe Dia.	4.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	15.0	FT.
E.	Solid Pipe Ext.	5.0	FT.
F.	Solid Pipe B/G*	9.5	FT.
G.	Perf. Pipe Lgth.	7.5	FT.
H.	Depth to Elbow	3.0	FT.
I.	Tot. Pipe Lgth.	17.0	FT.
J.	Gravel Pack	8.0	FT.
K.	Bentonite Slurry	2.0	FT.
L.	Soil	0.5	FT.
M.	Bentonite Slurry	1.5	FT.
N.	Soil**	0	FT.
O.	Bentonite Slurry	0	FT.
P.	Soil	0	FT.

Comments

* Length of 4" pipe telescoped into 6-inch casing.

** Top of upper bentonite seal at lateral trench depth.

Casing set 2' above bottom of bore.

LANDFILL GAS RECOVERY WELL
AS-BUILT

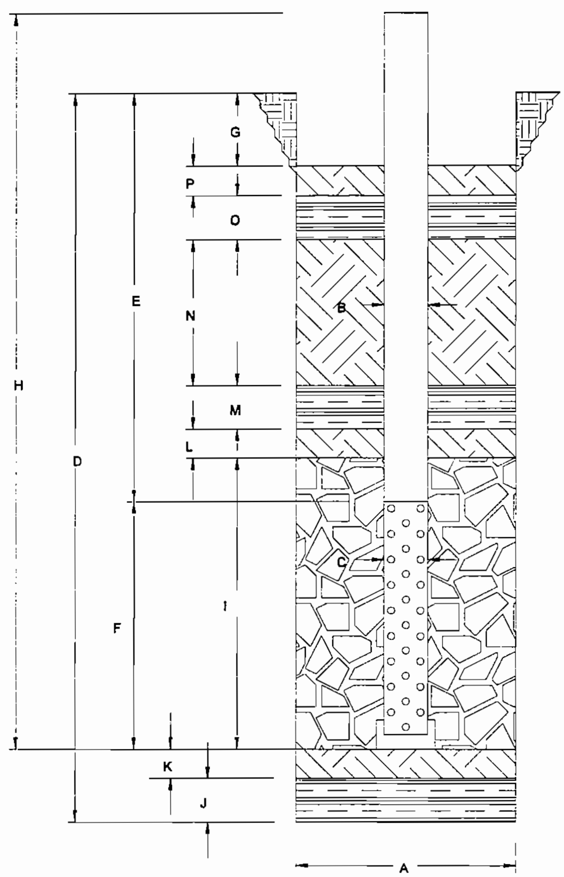
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 9, 1999

Well No.: PW-18

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	34.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	17.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	34.0	FT.
I.	Gravel Pack	~19.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5‘ above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

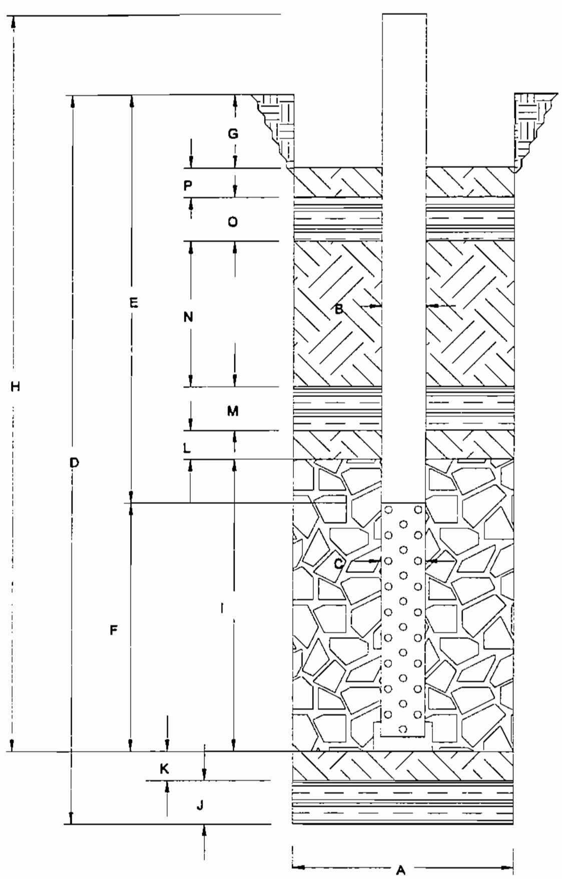
Client: City of Albuquerque

Drilling Date: August 9, 1999

Contractor: OWT Construction

Site: Los Angeles Landfill

Well No.: PW-19



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	22.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	5.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	22.0	FT.
I.	Gravel Pack	~7.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

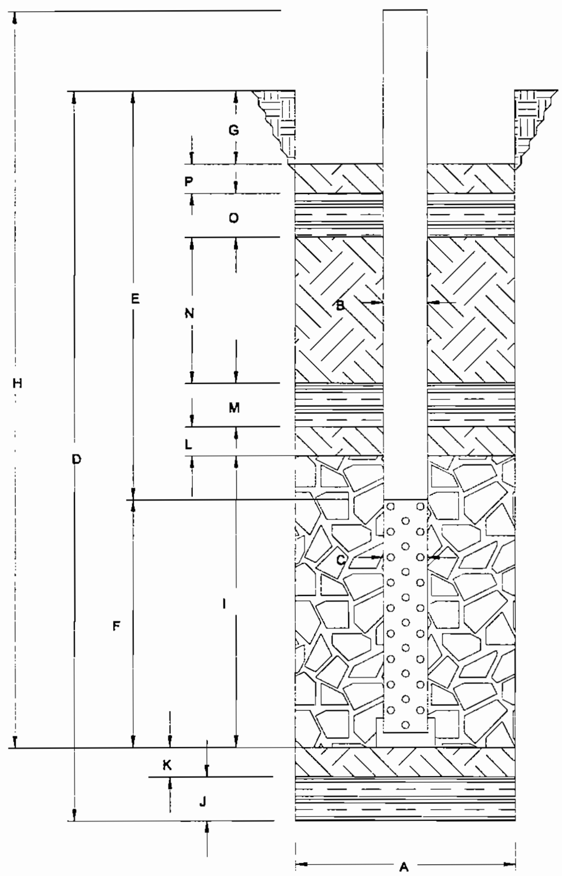
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 11, 1999

Well No.: PW-20

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	26.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	9.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	26.0	FT.
I.	Gravel Pack	~11.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

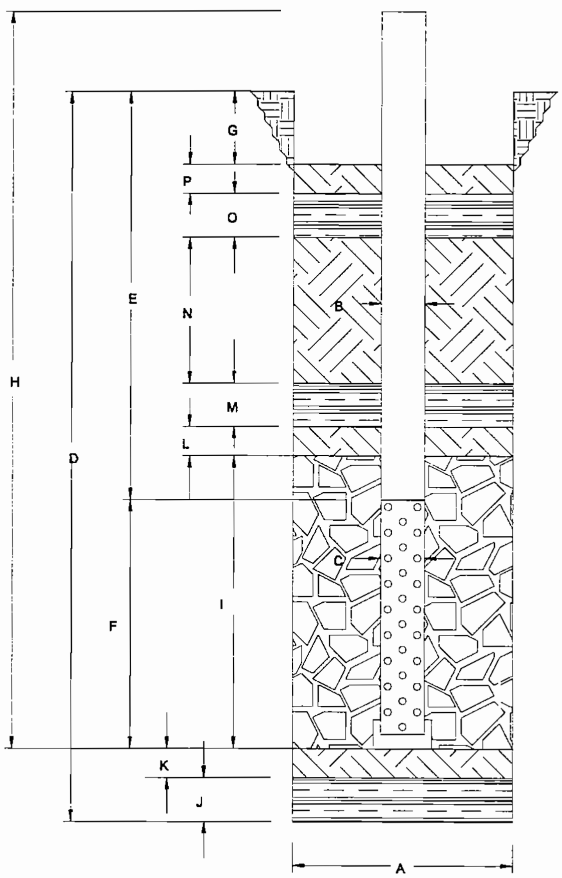
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 7, 1999

Well No.: PW-21

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	33.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	16.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	33.0	FT.
I.	Gravel Pack	~18.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

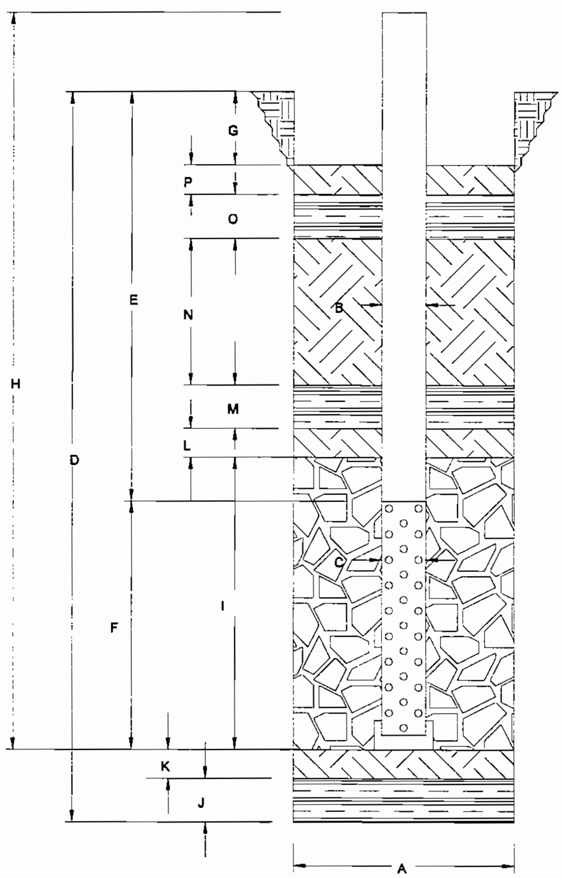
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 7, 1999

Well No.: PW-22

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	33.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	16.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	33.0	FT.
I.	Gravel Pack	~18.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5‘ above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

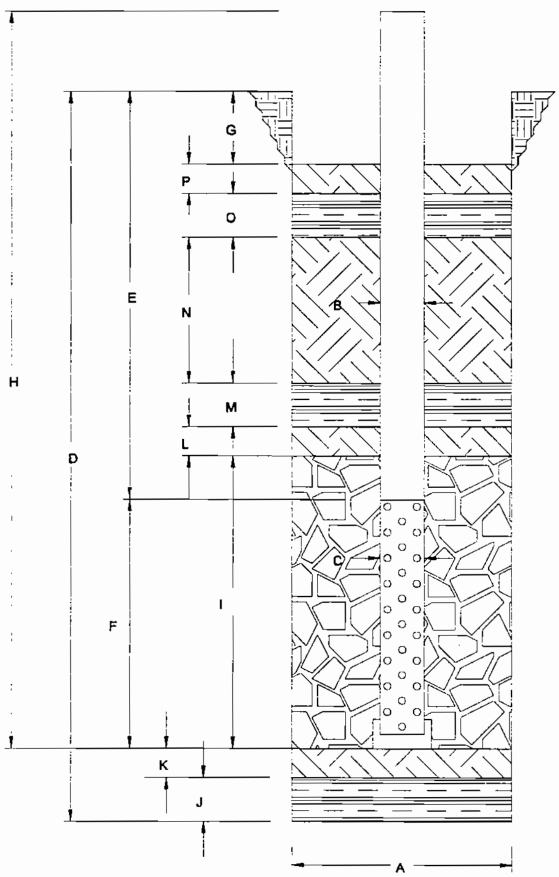
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 7, 1999

Well No.: PW-23

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	17.0	FT.
E.	Solid Pipe B/G	12.5	FT.
F.	Perf Pipe Lgth.	4.5	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	17.0	FT.
I.	Gravel Pack	~6.5	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

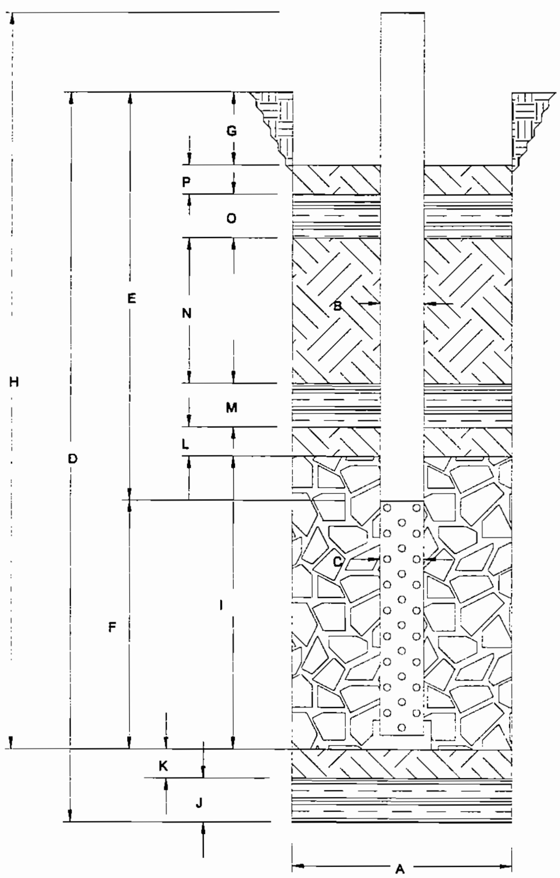
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 6, 1999

Well No.: PW-24

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	33.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	16.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	33.0	FT.
I.	Gravel Pack	~18.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

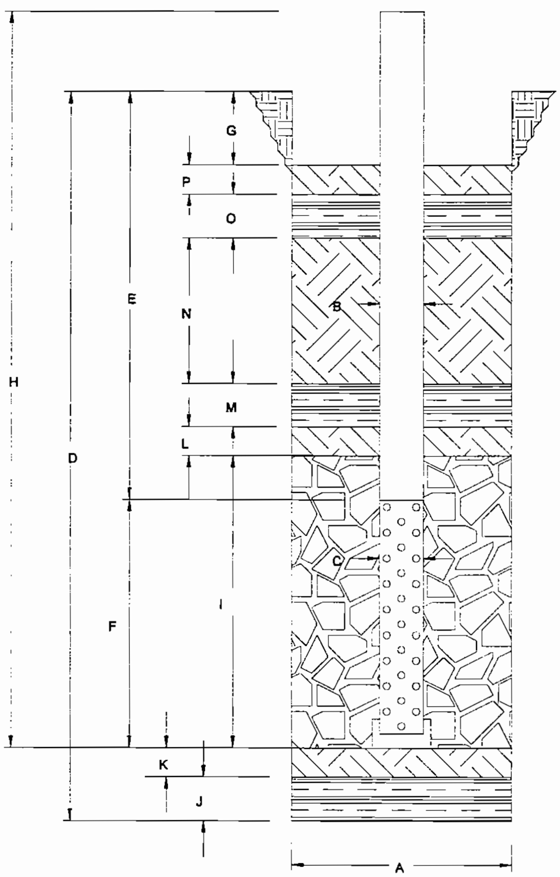
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 6, 1999

Well No.: PW-25

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	33.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	16.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	33.0	FT.
I.	Gravel Pack	~18.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

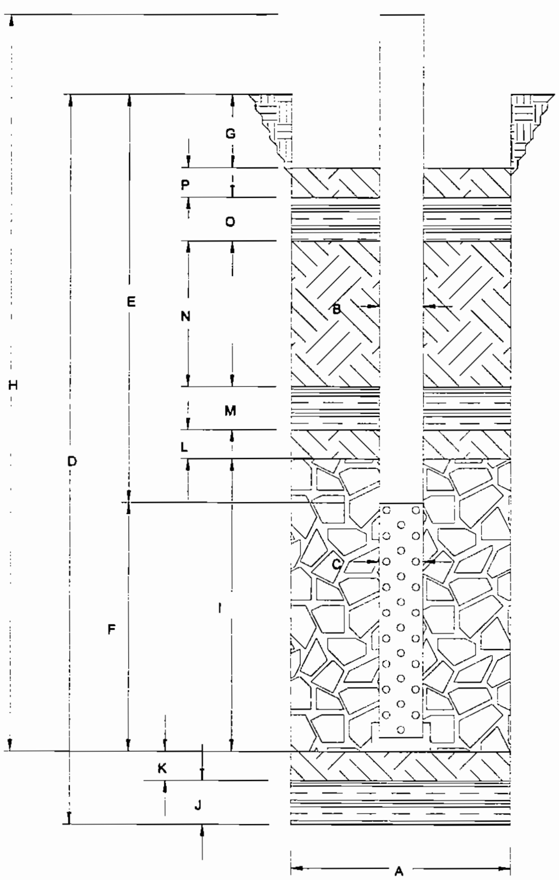
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 6, 1999

Well No.: PW-26

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	23.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	6.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	23.0	FT.
I.	Gravel Pack	~8.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

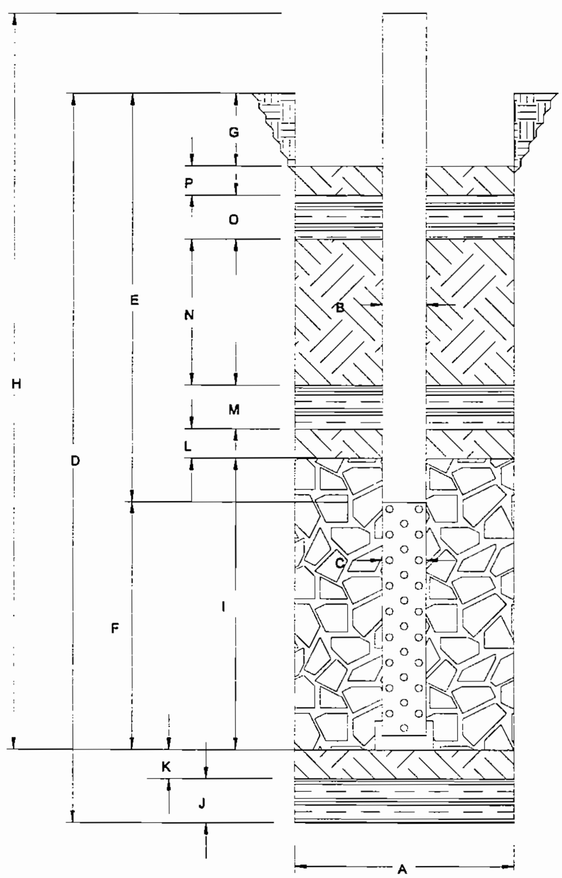
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 5, 1999

Well No.: PW-27

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	35.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	18.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	35.0	FT.
I.	Gravel Pack	~20.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

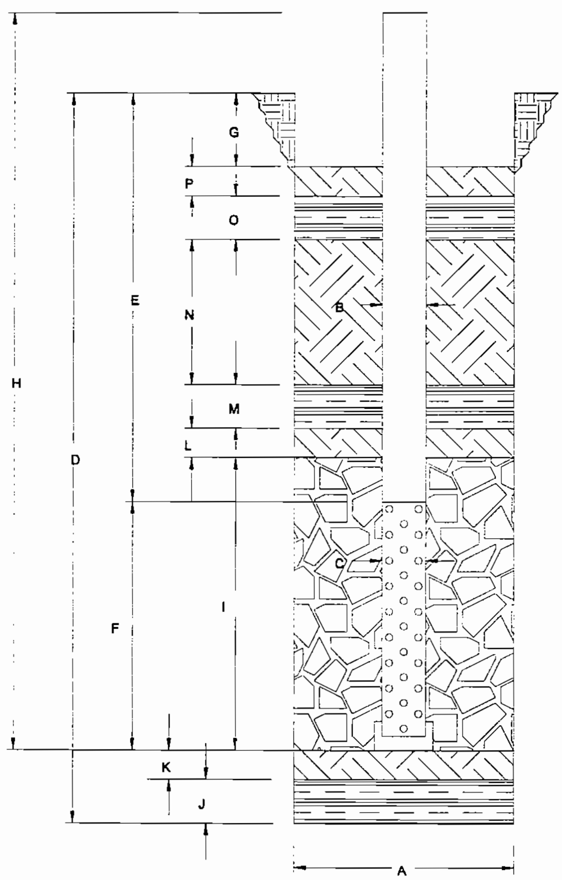
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 5, 1999

Well No.: PW-28

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	39.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	22.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	39.0	FT.
I.	Gravel Pack	~24.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

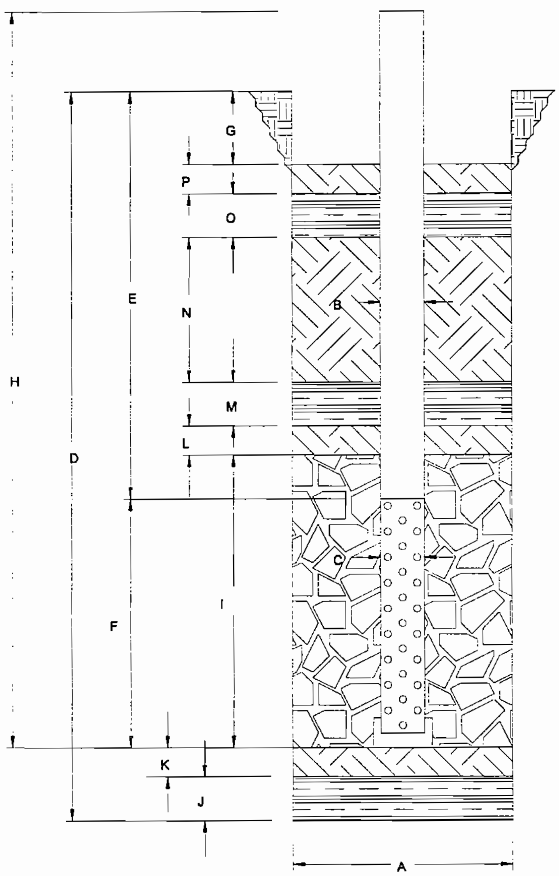
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 17, 1999

Well No.: PW-29

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	36.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	24.0	FT.
E.	Solid Pipe B/G	10.0	FT.
F.	Perf Pipe Lgth.	12.0	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	24.0	FT.
I.	Gravel Pack	14.4	FT.
J.	Bentonite Slurry	1.5	FT.
K.	Soil	0.3	FT.
L.	Soil	0.75	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	2.5	FT.
O.	Bentonite Slurry	0	FT.
P.	Soil	0	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap. Only one bentonite seal around gravel pack as there was not enough depth for the second bentonite seal.

LANDFILL GAS RECOVERY WELL
AS-BUILT

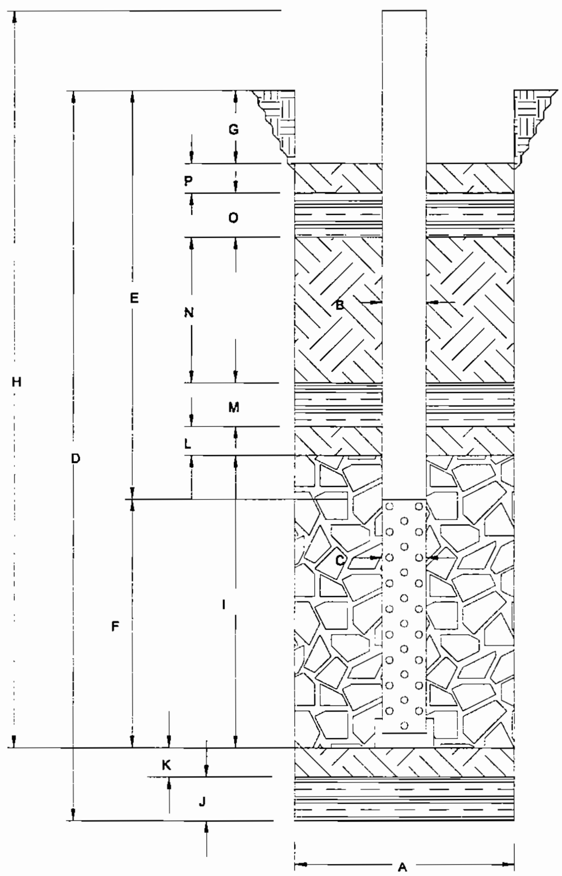
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 2, 1999

Well No.: PW-30

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	32.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	15.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	32.0	FT.
I.	Gravel Pack	~17.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

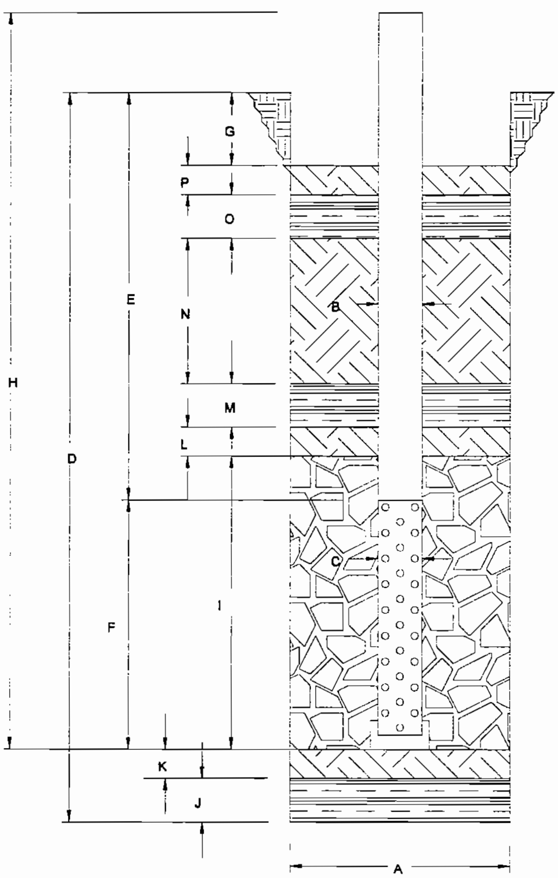
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 2, 1999

Well No.: PW-31

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	35.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	18.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	35.0	FT.
I.	Gravel Pack	~20.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

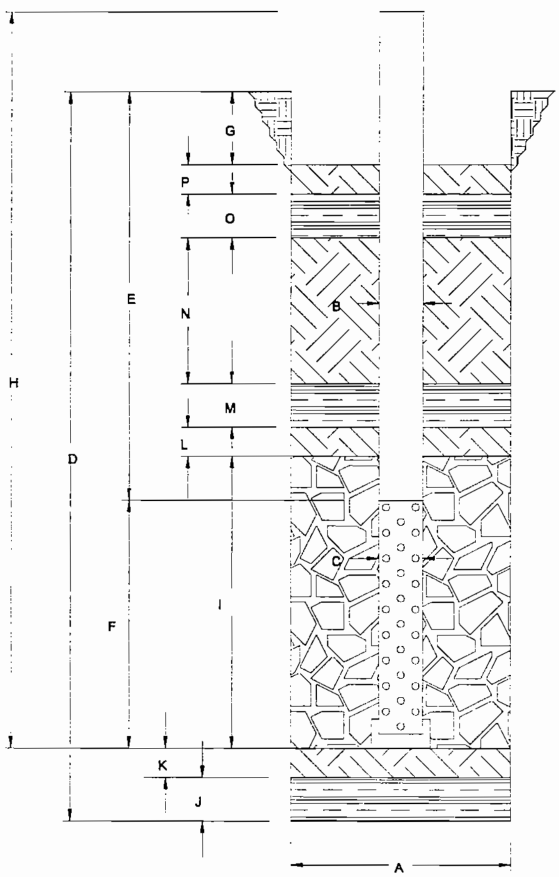
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: July 31, 1999

Well No.: PW-32

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	27.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	10.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	27.0	FT.
I.	Gravel Pack	~12.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

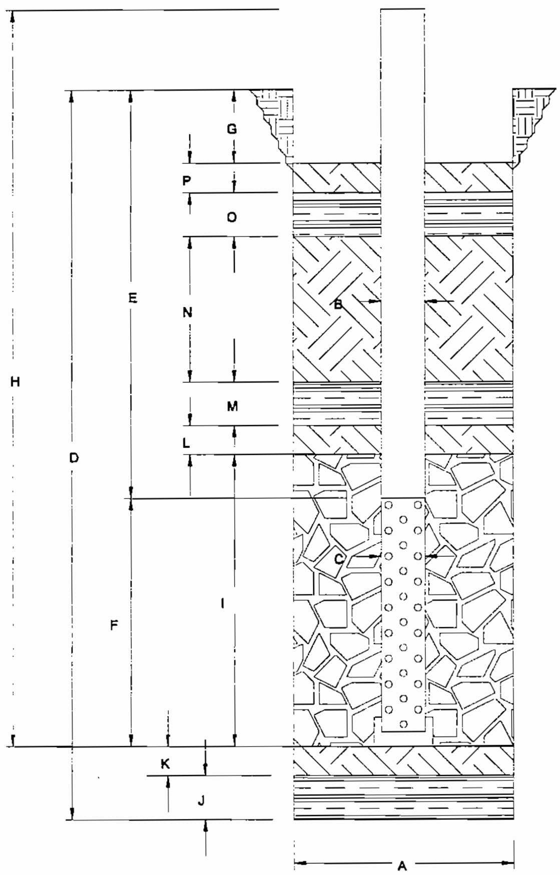
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: July 30, 1999

Well No.: PW-33

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	24.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	7.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	24.0	FT.
I.	Gravel Pack	~9.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

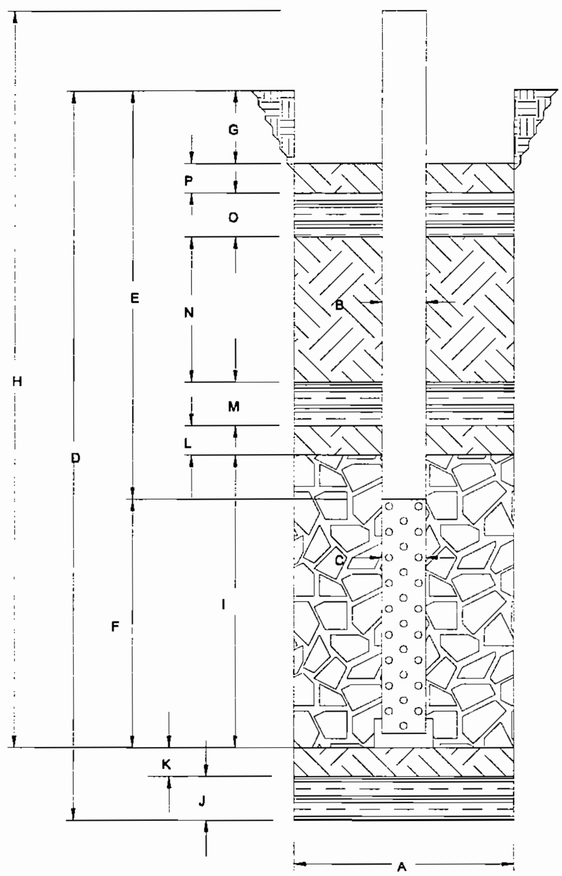
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: July 30, 1999

Well No.: PW-34

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	24.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	7.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	24.0	FT.
I.	Gravel Pack	~9.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

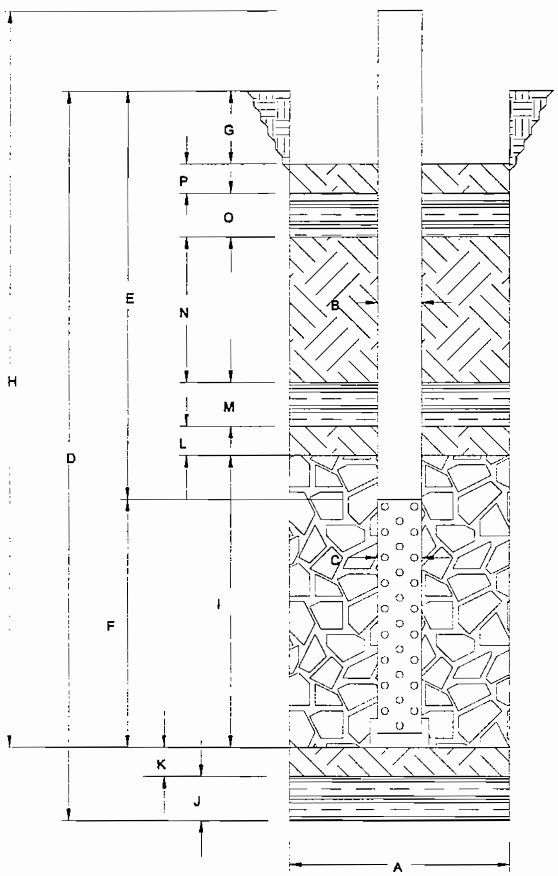
Client: City of Albuquerque

Drilling Date: July 30, 1999

Contractor: OWT Construction

Site: Los Angeles Landfill

Well No.: PW-35



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	35.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	18.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	35.0	FT.
I.	Gravel Pack	~20.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

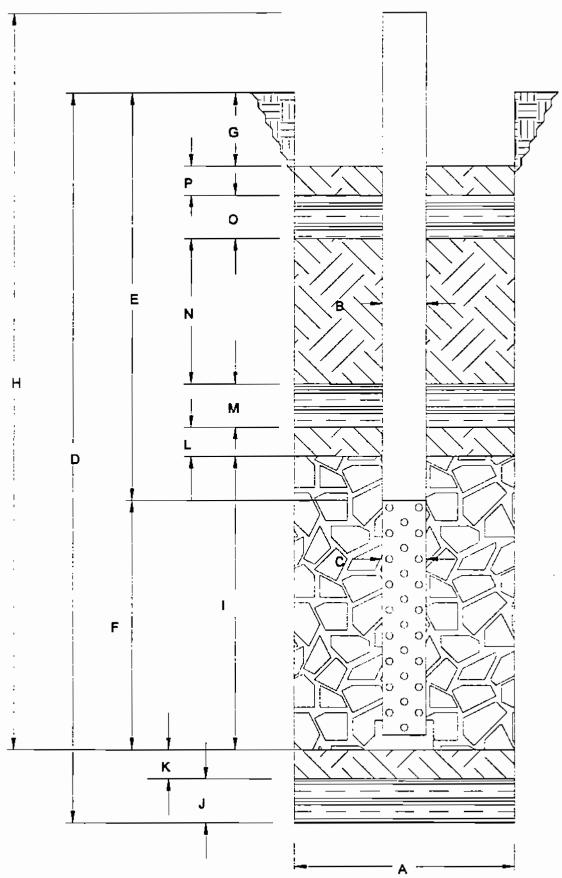
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: July 29, 1999

Well No.: PW-36

Contractor: OWT Construction



SPECIFICATIONS

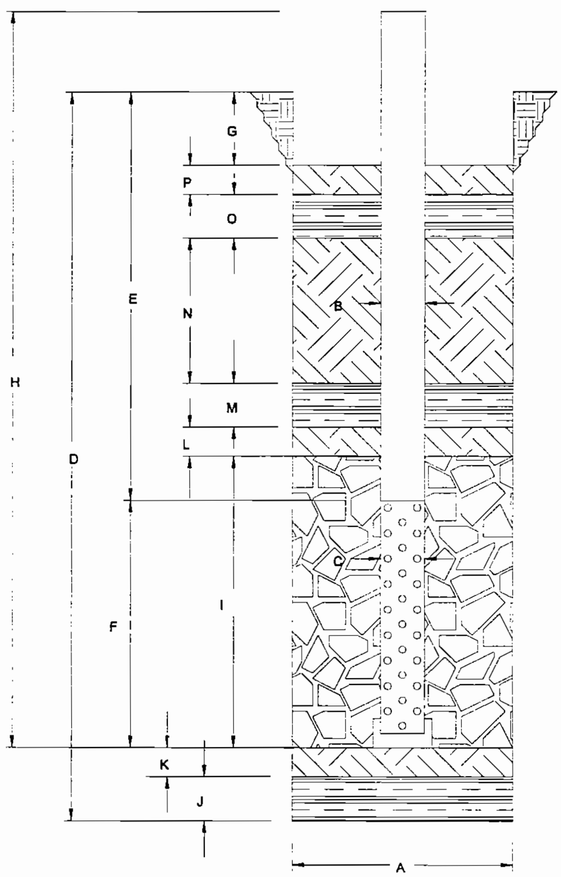
A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	42.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	25.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	42.0	FT.
I.	Gravel Pack	~27.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

Client: City of Albuquerque
Site: Los Angeles Landfill
Drilling Date: July 29, 1999
Well No.: PW-37
Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	35.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	18.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	35.0	FT.
I.	Gravel Pack	~20.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~7.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

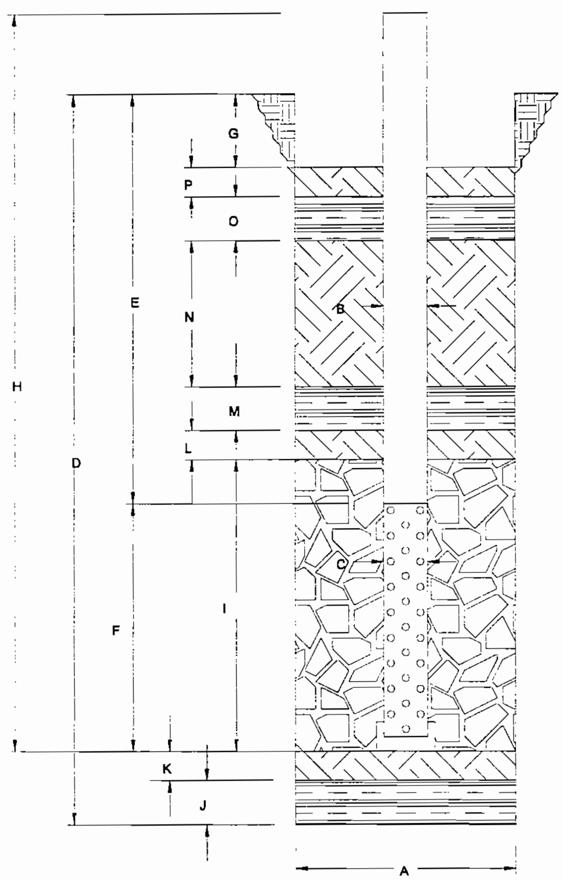
Client: City of Albuquerque

Drilling Date: July 27, 1999

Contractor: OWT Construction

Site: Los Angeles Landfill

Well No.: PW-38



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	30.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	13.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	30.0	FT.
I.	Gravel Pack	~15.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

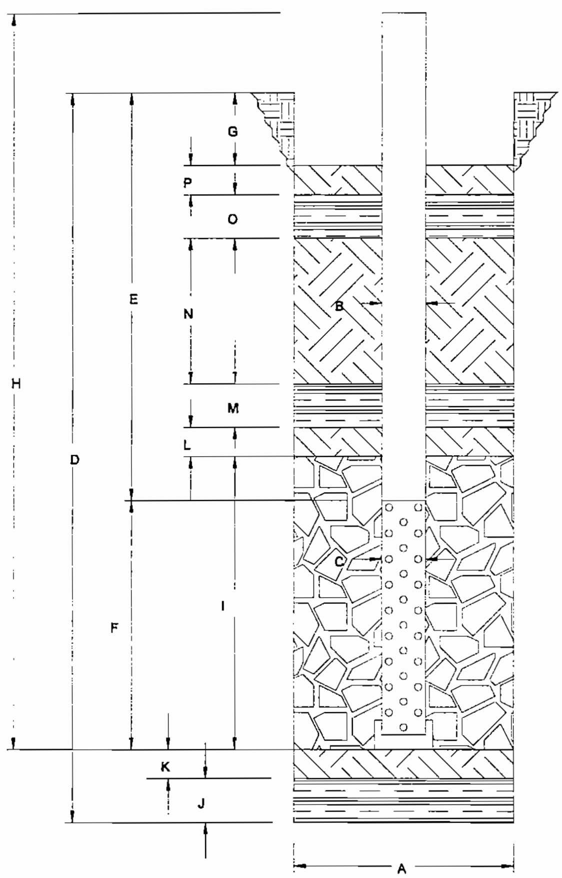
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: July 27, 1999

Well No.: PW-39

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	27.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	10.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	27.0	FT.
I.	Gravel Pack	~12.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

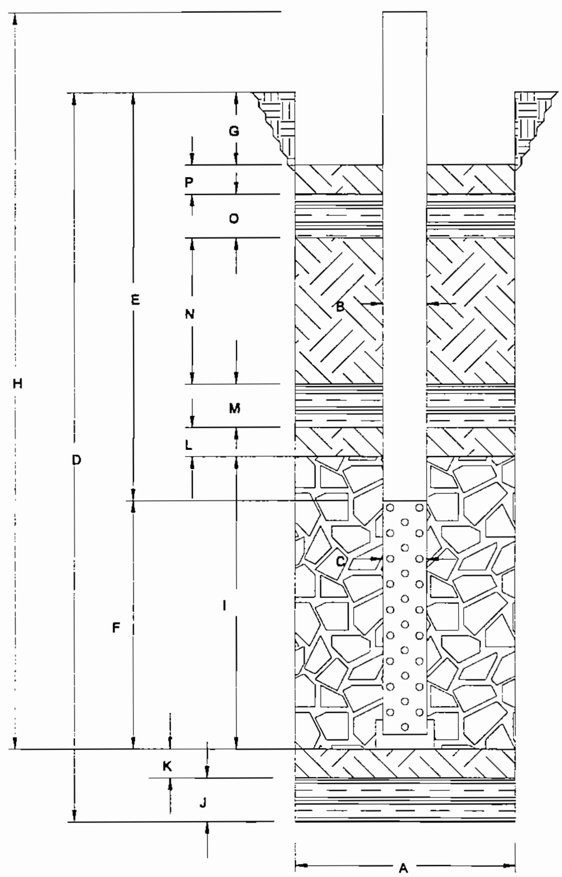
Client: City of Albuquerque

Drilling Date: July 26, 1999

Contractor: OWT Construction

Site: Los Angeles Landfill

Well No.: PW-40



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	35.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	18.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	35.0	FT.
I.	Gravel Pack	~20.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~4.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

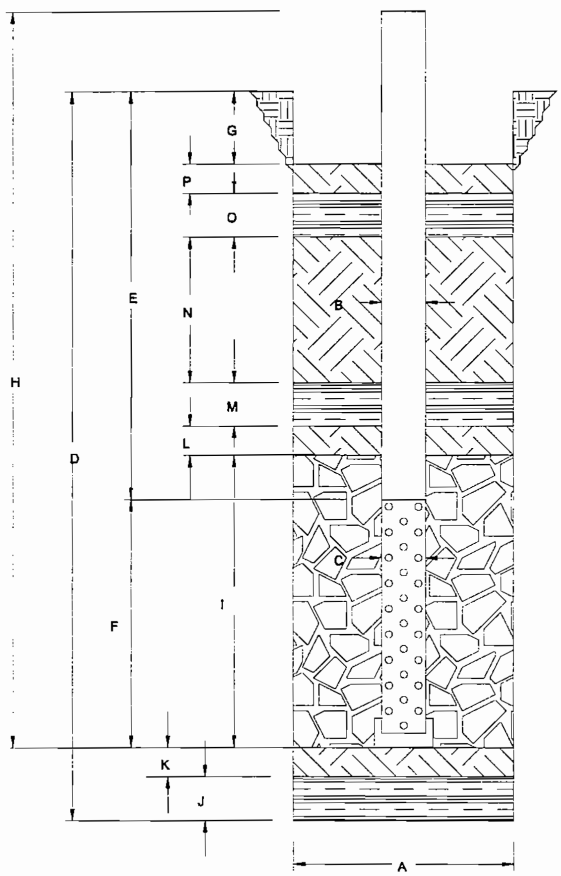
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: July 26, 1999

Well No.: PW-41

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	32.0	FT.
E.	Solid Pipe B/G	13.0	FT.
F.	Perf Pipe Lgth.	17.0	FT.
G.	Depth vault base	~3.0	FT.
H.	Tot. Pipe Lgth.	32.0	FT.
I.	Gravel Pack	~19.0	FT.
J.	Bentonite Slurry	~2.0	FT.
K.	Soil	~0.5	FT.
L.	Soil	~0.5	FT.
M.	Bentonite Slurry	~2.0	FT.
N.	Soil	~3.0	FT.
O.	Bentonite Slurry	~2.0	FT.
P.	Soil	~0.5	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

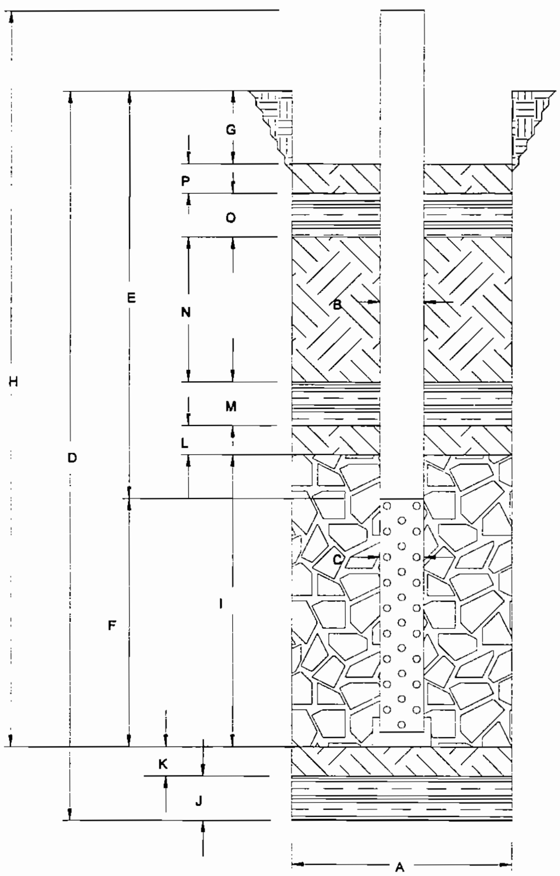
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 18, 1999

Well No.: PW-42

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	33.0	FT.
E.	Solid Pipe B/G	15.0	FT.
F.	Perf Pipe Lgth.	16.0	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	33.0	FT.
I.	Gravel Pack	17.8	FT.
J.	Bentonite Slurry	1.8	FT.
K.	Soil	0.5	FT.
L.	Soil	1.0	FT.
M.	Bentonite Slurry	2.3	FT.
N.	Soil	2.8	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.0	FT.

Comments

Casing set about 2.5' above bottom of bore. Bottom of casing closed off with 10" cap.

LANDFILL GAS RECOVERY WELL
AS-BUILT

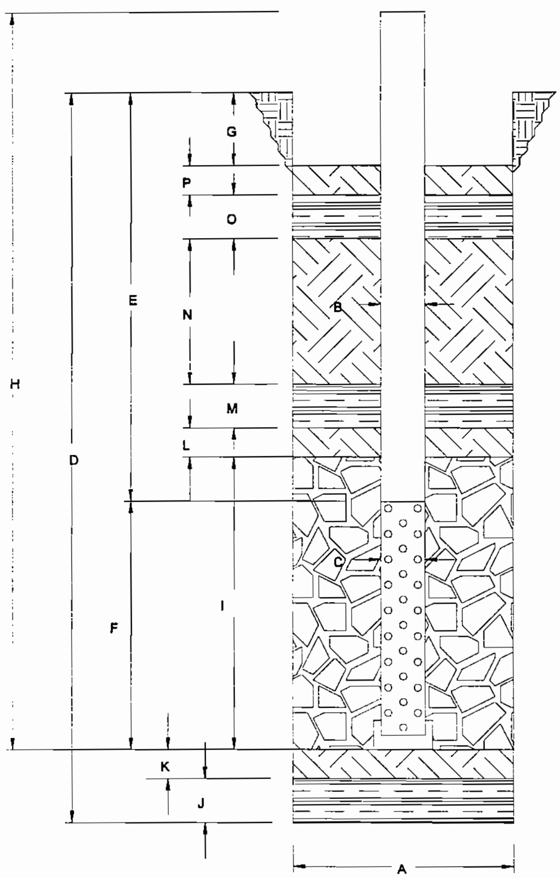
Client: City of Albuquerque

Site: Los Angeles Landfill

Drilling Date: August 20, 1999

Well No.: PW-43

Contractor: OWT Construction



SPECIFICATIONS

A.	Bore Size	3.0	FT.
B.	Solid Pipe Dia.	6.0	IN.
C.	Perf. Pipe Dia.	6.0	IN.
D.	Bore Depth	30.0	FT.
E.	Solid Pipe B/G	17.0	FT.
F.	Perf Pipe Lgth.	9.5	FT.
G.	Depth vault base	3.0	FT.
H.	Tot. Pipe Lgth.	26.5	FT.
I.	Gravel Pack	10.6	FT.
J.	Bentonite Slurry	6.0	FT.
K.	Soil	0.8	FT.
L.	Soil	0.7	FT.
M.	Bentonite Slurry	2.0	FT.
N.	Soil	3.7	FT.
O.	Bentonite Slurry	2.0	FT.
P.	Soil	1.3	FT.

Comments

Casing originally set at 6.5' and slipped 1' down when gravel pack was placed and unable to pull back up without damage to casing. Per client direction, boring extending 3.5' into native material below trash. .

ISO 9001 Compliant

CES
CASC ENVIRONMENTAL SERVICES, INC.

LANDTEC
LANDFILL CONTROL TECHNOLOGIES

Accu-Flo™
Series: 150, 200, 300 - Patent No 5,458,006
WELLHEAD
Landfill Gas Control

Choose Accu-Flo™ Wellheads for Optimum Landfill Gas Control, Accuracy and Dependability

Accu-Flo™ Helps Prevent LFG Migration, LFG Emissions & Subsurface Fires

Landfill owners and operators will appreciate **Accu-Flo's™** proven design that meets the special requirements of landfill gas (LFG) recovery for environmental compliance and energy production.

Accu-Flo™ wellheads developed by CASC Environmental Services - Landfill Control Technologies (CES-LANDTEC) provide operators with the gas extraction control necessary to meet more restrictive environmental and safety regulations thus preventing unnecessary and costly violations. **Accu-Flo™** helps maximize gas recovery, minimize surface emissions and subsurface migration, helps control hot spots and prevent subsurface fires.

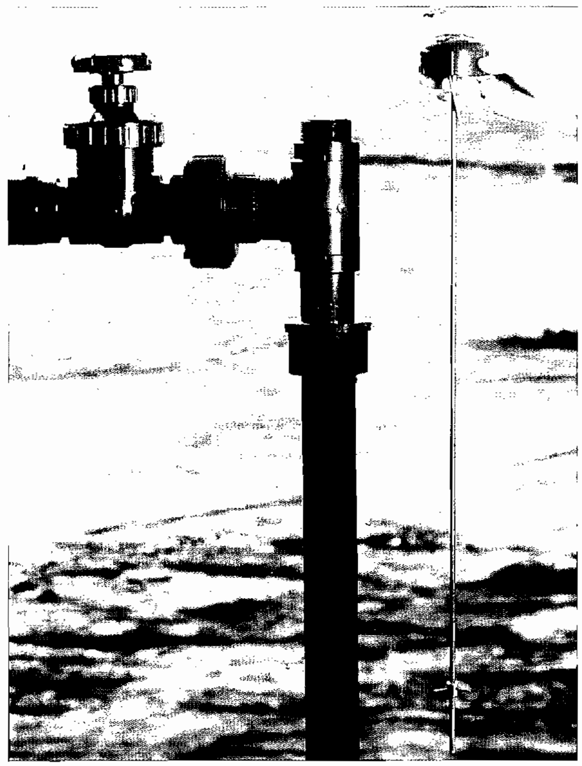
Simplified Data Collection

Accu-Flo™ simplifies the complexity of measuring wellhead data by incorporating key built-in features including a LFG flow measuring device, gas temperature gauge, quick-connect gas sample ports and a flow control gate valve.

The patented design also helps expedite the time required to obtain key wellhead data and determine necessary flow adjustments using either standard field instrumentation or CES-LANDTEC's GEM-500 unit which integrates the function of nine field instruments and a computer into one compact, portable, light weight, simple to operate unit.

Quick and Versatile Installation

The prefabricated **Accu-Flo™** assembly is factory tested and is shipped ready for immediate installation - eliminating the cost and uncertainties of field fabricated units. **Accu-Flo™** models are available for installation above or below ground on vertical wells or horizontal branch laterals in flows ranging from 1 to over 500 ACFM. The compact



patented design allows for installation in small 18" x 24" x 16" vaults.

CES-LANDTEC's Family of Compatible Components

Accu-Flo™ wellheads are one in a group of CES-LANDTEC's family of products designed to work together in an integrated landfill gas management program with other proven CES-LANDTEC products including: well-bore seals, condensate knock outs, automated pumping stations, instrumentation, condensate/leachate treatment, and landfill gas management software.

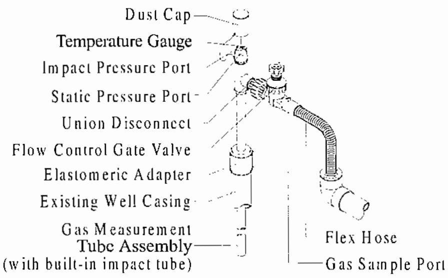
The versatile GEM-500 is designed to interact with **Accu-Flo™** wellheads. The unit analyzes and records the methane, carbon dioxide and oxygen composition of the gas stream, measures static and differential pressures, as well as gas temperature. It calculates Btu content and gas flow rates. One keystroke stores all the measured information from each wells which can then be downloaded to a personal computer.

CES-LANDTEC's Approach to Solving Specific Needs

All CES-LANDTEC products are designed to serve the specific needs of the solid waste industry. These products are based on a decade of corporate operating experience applying landfill gas management principles at multiple client sites. CES-LANDTEC products are backed by a clear and unconditional warranty that our customers can depend upon.

Accu-Flo™ offers Time-Saving, Multi-Functional Wellheads at Less Than Field Fabrication Prices

Vertical - Accu-Flo well casing configuration



Flow Accuracy and Reliability

The **Accu-Flo**™ system is designed to operate in the wet, abrasive environment typical of landfill gas and still provide exacting control and accurate flow measurements with high dependability and consistency.

A patented feature of the **Accu-Flo**™ design is the pre-calibrated gas measurement tube assembly (**Accu-Flo**™ body) which extends into a standard vertical or horizontal well casing or branch lateral, creating a compact installation.

The measurement tube assembly houses a modified stainless steel impact tube specifically designed by CES-LANDTEC for harsh landfill gas applications. Differential pressure readings between the impact tube and measurement tube are used to calculate flow.

To help protect the impact tube from condensate and particulate clogging, common with conventional designs such as Pitot tubes and Orifice plates, CES-LANDTEC uses an enlarged total pressure port opening and a separate protected static pressure port. Also, pre-calibration of the measurement tube with a pre-positioned impact tube eliminates the need to take time-consuming traverse measurements normally required for accuracy.

Key Accu-Flo™ Benefits

- Compact size
- Easy installation and maintenance
- Built-in gas flow measurement
- Built-in gas flow control gate valve
- Quick connect measurement ports

Key **Accu-Flo**™ Features:

Gas Flow Meter (impact tube design)- The gas measuring assembly incorporates a pre-positioned and modified impact tube within a pre-calibrated measurement tube (Accu-flo™ body). The assembly extends into a well casing or branch lateral to provide installation compactness.

Temperature Gauge – Provides gas flow temperature required for calculating accurate gas flow rates and defecting subsurface fires.

Gas Pressure Ports – Provides quick-connect, positive, sealing convenience when taking impact tube, static and differential pressure measurements.

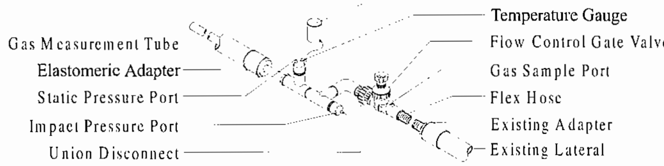
Flow Control Gate Valve – Provides controlled throttling of gas flow and positive shut-off. Incorporates durable PVC construction and inert seal materials

Gas Sample Port – Provides convenient, quick-connect gas sampling port immediately downstream of the flow control gate valve.

Adapter Bushing – Provides versatile mounting utilizing standard fittings or convenient **Accu-Flo**™ adapter kits.

Union Disconnect – Provides convenient removal of **Accu-Flo**™ assembly for inspection or periodic maintenance.

Horizontal - Accu-Flo Lateral



- High accuracy and repeatability of measurements
- Durable Materials: Sch. 80 PVC or PE housing and couplings, stainless steel impact tube, and polypropylene fittings, Elostomer couplings and PVC Flexible interconnects.

Standard Accu-Flo' Models

Model Size/Dia. Inches	Flow Rate SCFM	Pressure Drop (Inches H_2O)
150 1.5*	0-50+	0-50+
200 2.0"	5-75+	0.1 -3.5
300 3.0"	10-500+	0.1 -11.5

Specify vertical or horizontal design. Optional adapter kits are available for well casings up to 8" in diameter.

CES-LANDTEC-Ready To Help You

At CES-LANDTEC we take pride in the quality and experience built into our products. We are equally proud of our warranty and technical support, which back these products. As a Pacific Energy company, with a diversity of operating and regulatory experience in gas recovery, we can help you provide practical solutions to your landfill requirements

Expedite LFG Measurements with. Accu-FloTM and GEM-500

Please call our toll free West Coast

number 1-800-LANDTEC (8a.m. - 5p.m.) and ask for a sales engineer to discuss your landfill needs. We're here to help.

Additional Information

Detailed product specifications and installation drawings are available for all CES-LANDTEC's product including **Accu-Flo**™, Wellheads, LAPS™, Automated Pumping Stations, the KO™ line of condensate Knockouts, and Wellbore Seals.

CES-LANDTEC also has standard designs available for electrically driven LAPS and KO's with centrifugal or submersible pumps.

Brochures are available for our full line of landfill gas instrumentation including the Gem 500™ and GA 90™ gas monitors, and the SEM 500 surface Emissions as well as Datafield, the ultimate landfill gas data management software.

SWANA MEMBER

An involved and contributing member of the Solid Waste Association of North America.

CES CASC ENVIRONMENTAL SERVICES, INC.
LANDTEC LANDFILL CONTROL TECHNOLOGIES

937 South Via Lata, Suite 650
Colton, CA 92324
Phone (800) LANDTEC
(909) 783-3636

Western Sales Office
(800) 821-0496, Fax (909) 825-0591

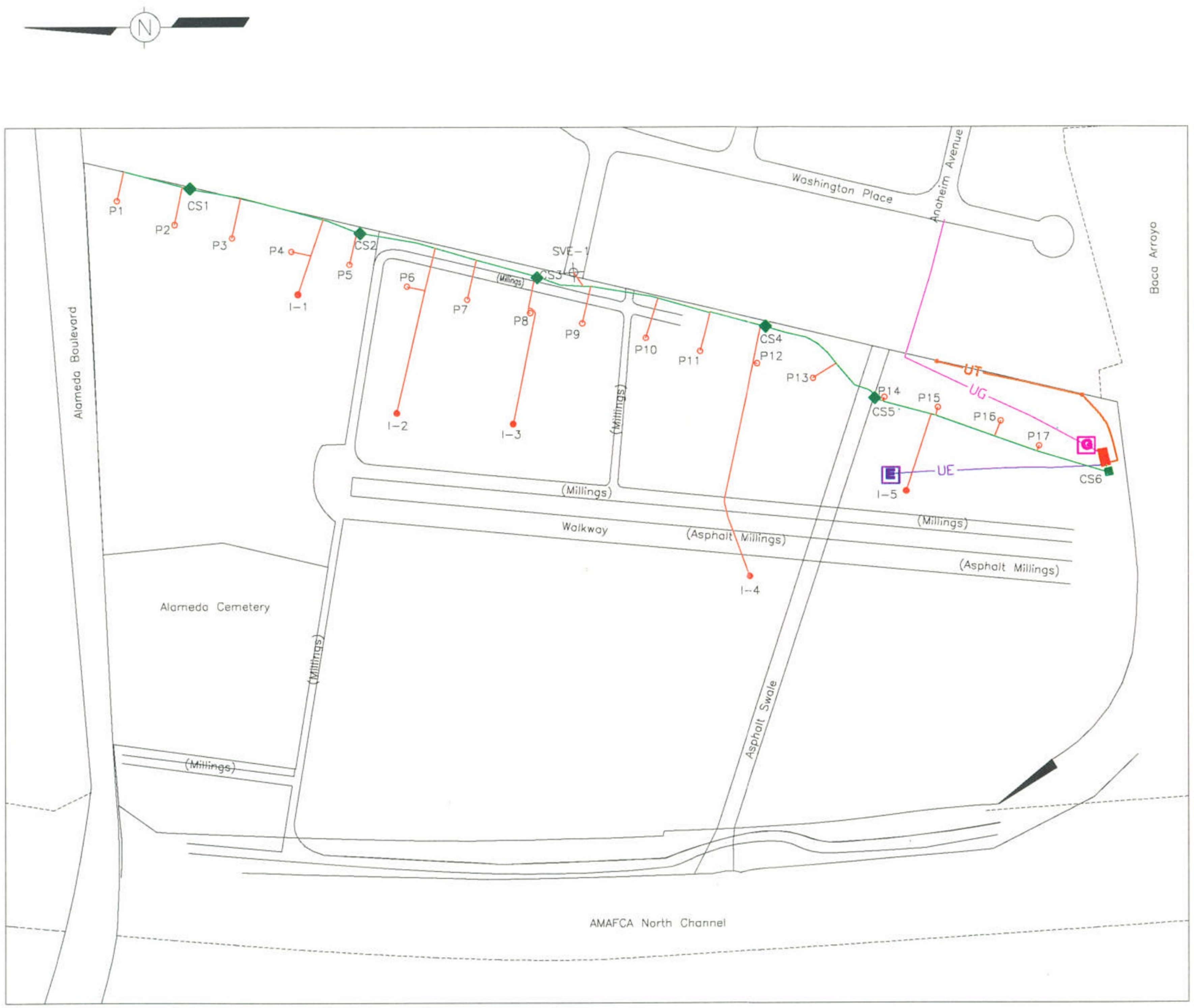
Eastern Sales Office
(800) 390-7745, Fax (301) 391-6546

Southern Sales Office
(800) 294-7795, Fax (404) 869-0103

APPENDIX C

LALF LFG Extraction System As Built Drawings

771778.09.00.00.00 B6



1. Refer to Figure 7 for the surveyed as-built features.

LEGEND:

- SVE-1
- Perimeter Landfill Gas Extraction Well
- Interior Landfill Gas Extraction Well
- Condensate Sump (CS)
- Treatment Unit Pad
- —UE— Underground Electrical
- —UG— Underground Gas
- —UT— Underground Telephone
- Landfill Gas Collection Header, 8-inch
- Lateral to Wells, 6-inch
- E 480 V Transformer & Meter
- G Gas Meter
- P- Perimeter Well
- I- Interior Well

0 250 FT

SCALE

FIGURE 1
GENERAL SITE AREA WITH SYSTEM AS-BUILT LAYOUT
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

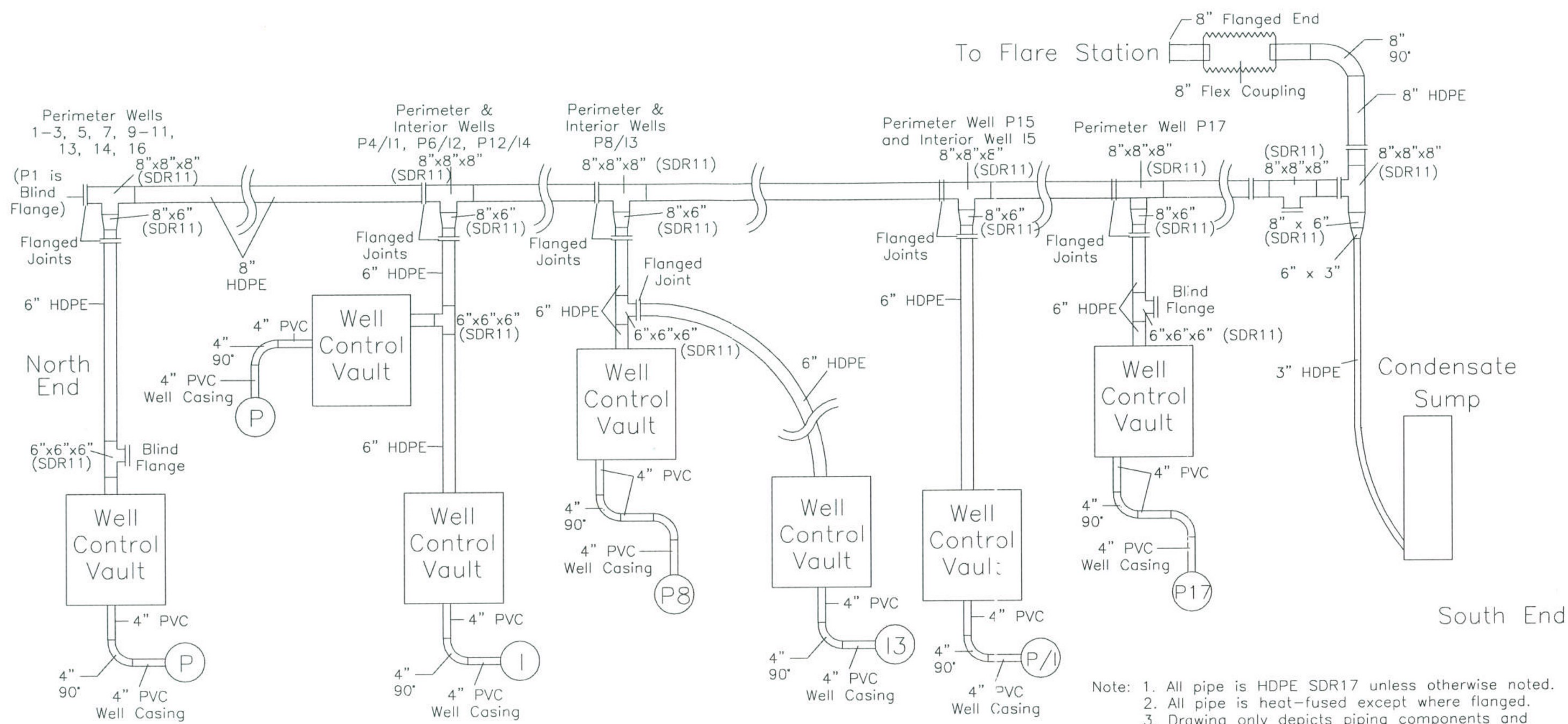
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

INTERNATIONAL TECHNOLOGY CORPORATION

DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: JMP	APPROVED BY: JMP
DATE: 04/07/98	SCALE: 1"=250'
PROJECT NO: 771778.09	DRAWING NO: 771778.09 B6

04/07/98

771778.09.00.00 B5



Note: 1. All pipe is HDPE SDR17 unless otherwise noted.
2. All pipe is heat-fused except where flanged.
3. Drawing only depicts piping components and materials, not orientation.

LEGEND

Symbol	Meaning
P	Perimeter Well
I	Interior Well
||	Flange
○	Extraction Well

FIGURE 2
HEADER AND LATERAL PIPING DETAIL
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

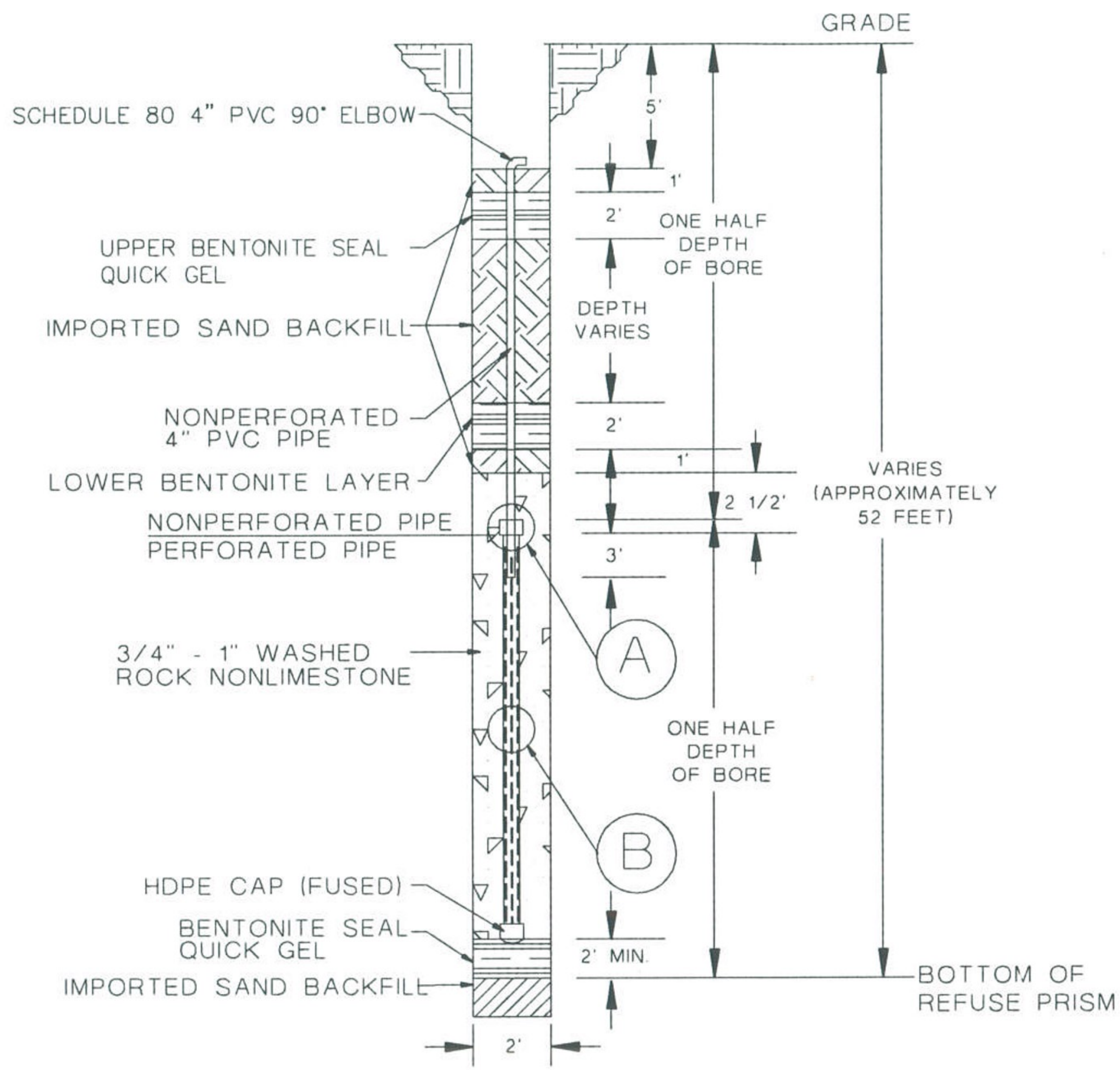
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

INTERNATIONAL TECHNOLOGY CORPORATION

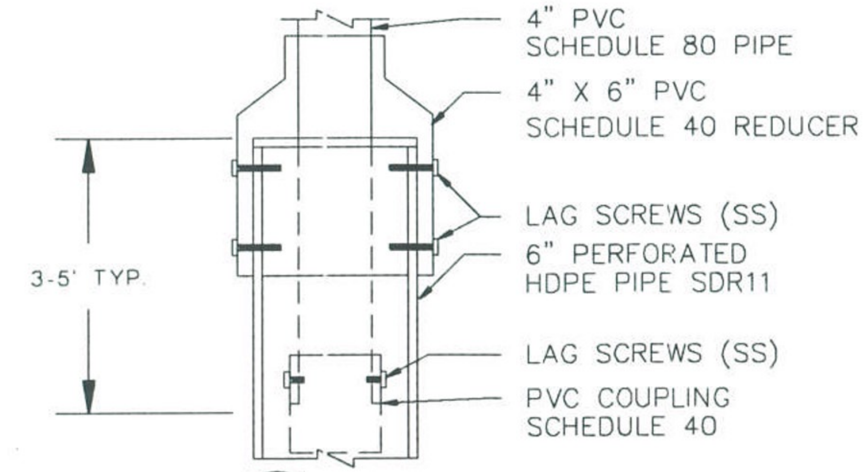
DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: JMP	APPROVED BY: JMP
DATE: 04/07/98	SCALE: NONE
PROJECT NO: 771778.09	DRAWING NO: 771778.09 B5

04/07/98

771778.09.00.00 B4



SINGLE COMPLETION LFG WELL

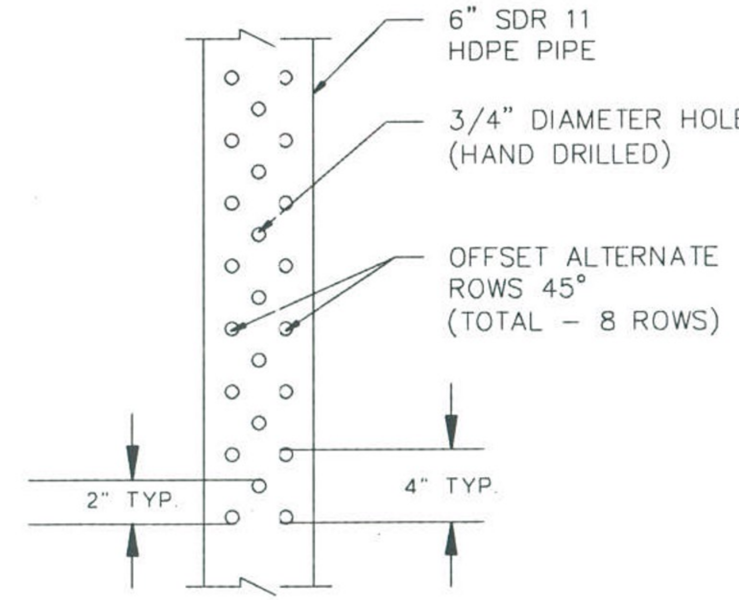


A SECTION VIEW

NOTES:

1. PVC GLUED TO PVC JOINTS.
2. REAMED LANDING ON REDUCER ALLOWS PVC PIPE TO SLIDE FREELY IN BUSHING.

TELESCOPING JOINT



B SECTION VIEW

PIPE PERFORATIONS

NOTES:

LEGEND:

FIGURE 3
TYPICAL WELL COMPLETION DETAIL
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

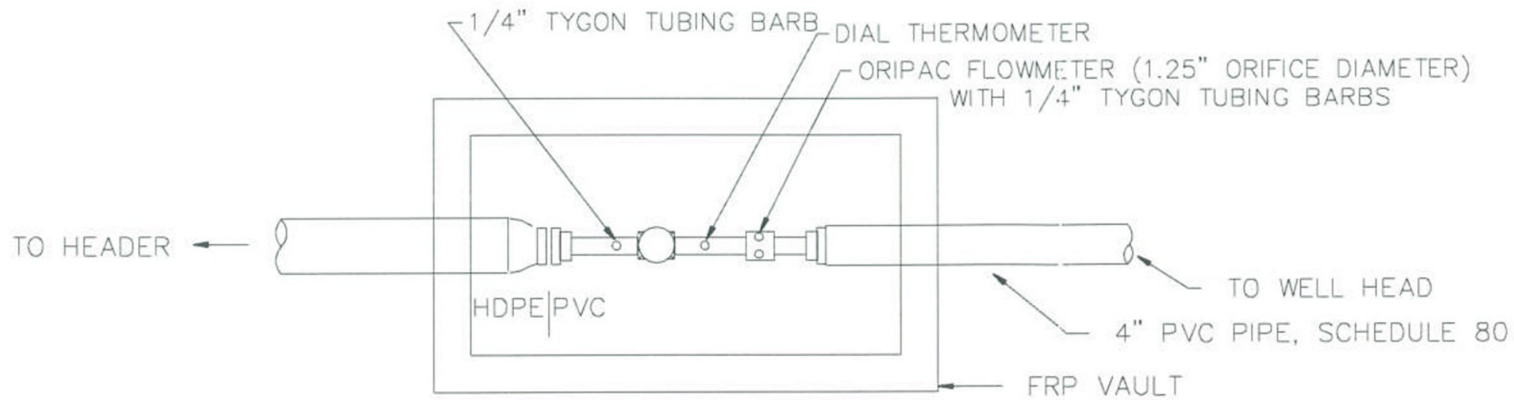
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

INTERNATIONAL TECHNOLOGY CORPORATION

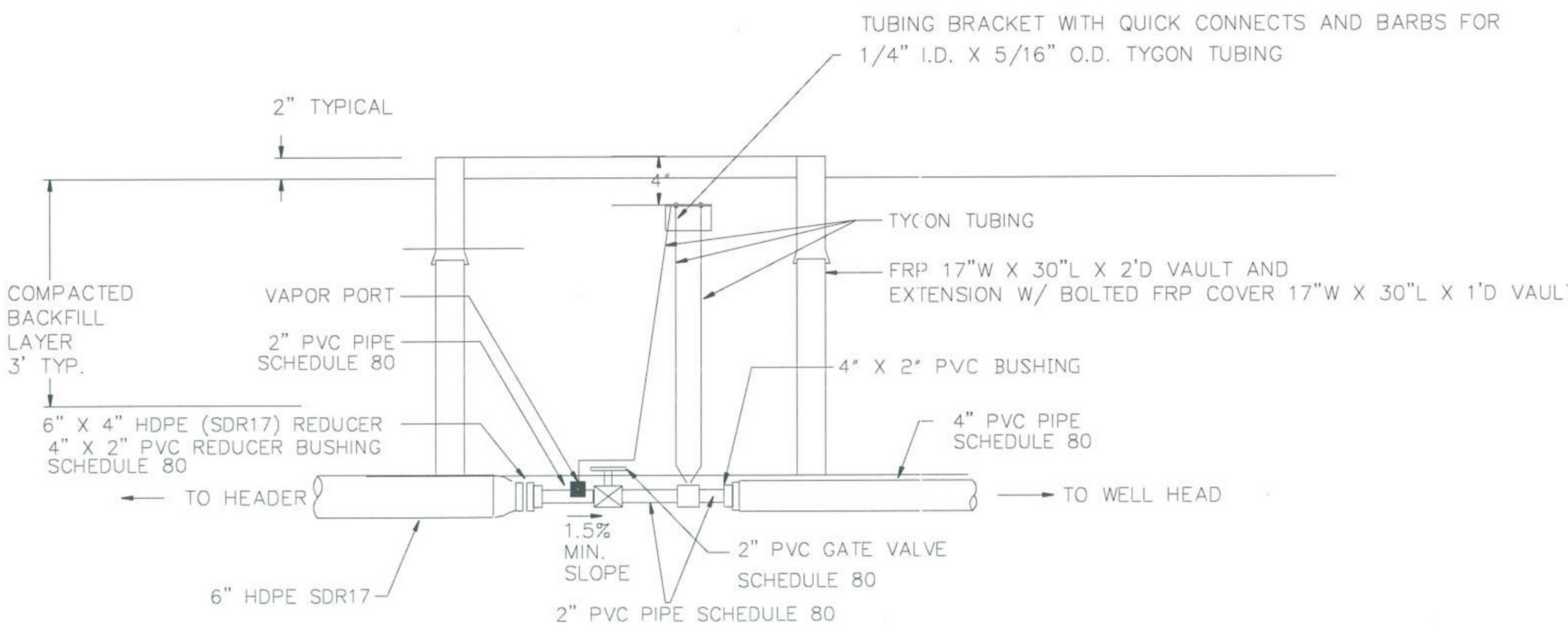
DESIGNED BY: DD	DRAWN BY: ZC
CHECKED BY: JMP	APPROVED BY: JMP
DATE: 04/07/98	SCALE: NONE
PROJECT NO: 771778.09	771778.09 B4

04/07/98

771778.09.00.00 B2



PLAN VIEW



SIDE VIEW

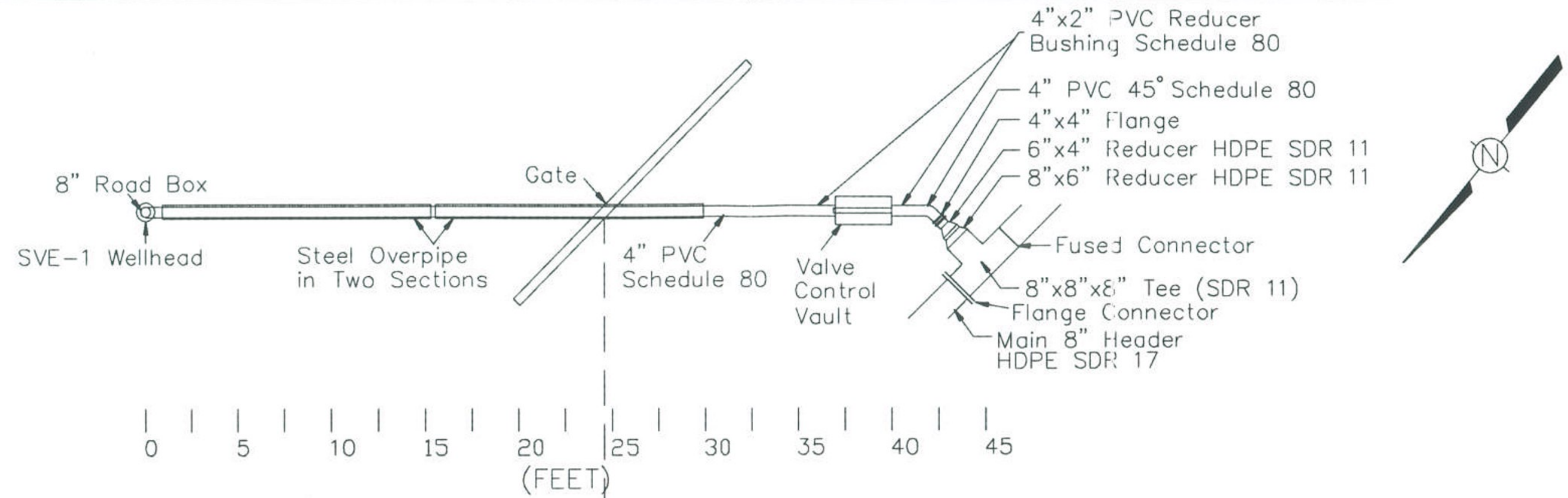
04/06/98

FIGURE 4
TYPICAL EXTRACTION WELL VAULT DETAIL
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

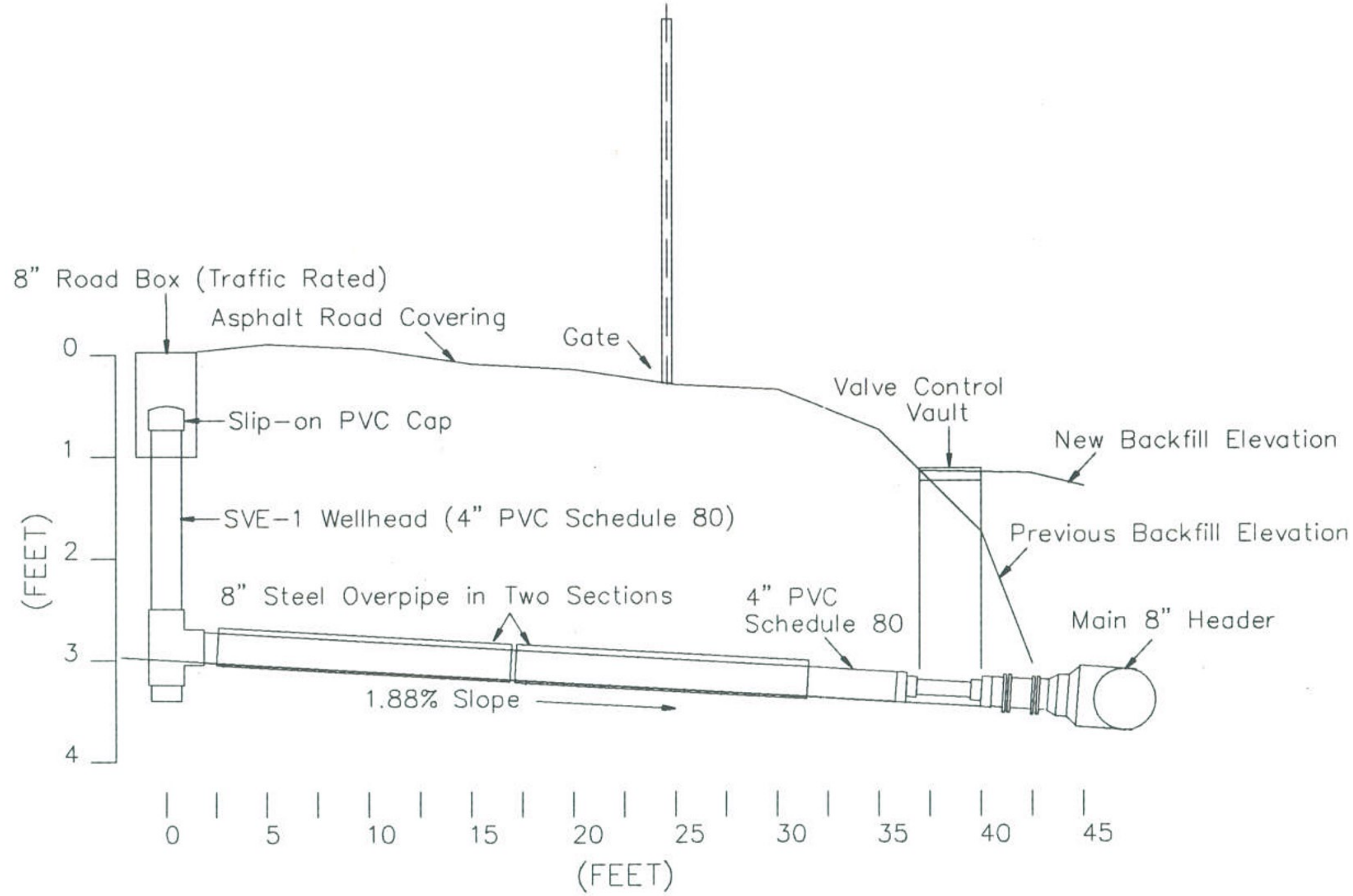
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

INTERNATIONAL TECHNOLOGY CORPORATION

DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: JMP	APPROVED BY: JMP
DATE: 04/06/98	SCALE: NONE
PROJECT NO: 771778.09	DRAWING NO: 771778.09_B2



SVE-1 LATERAL HEADER (PLAN)



SVE-1 LATERAL HEADER (ELEVATION)

FIGURE 5
SVE-1 LATERAL HEADER PLAN AND ELEVATION
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

INTERNATIONAL TECHNOLOGY CORPORATION

DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: JMP	APPROVED BY: JMP
DATE: 04/03/98	SCALE: NONE
PROJECT NO: 771778.09	DRAWING NO: 771778.09_B1

771778.09.00.00 B3

Swale Header Crossing at West Edge of Concrete Drainage Channel (Cross-Section)

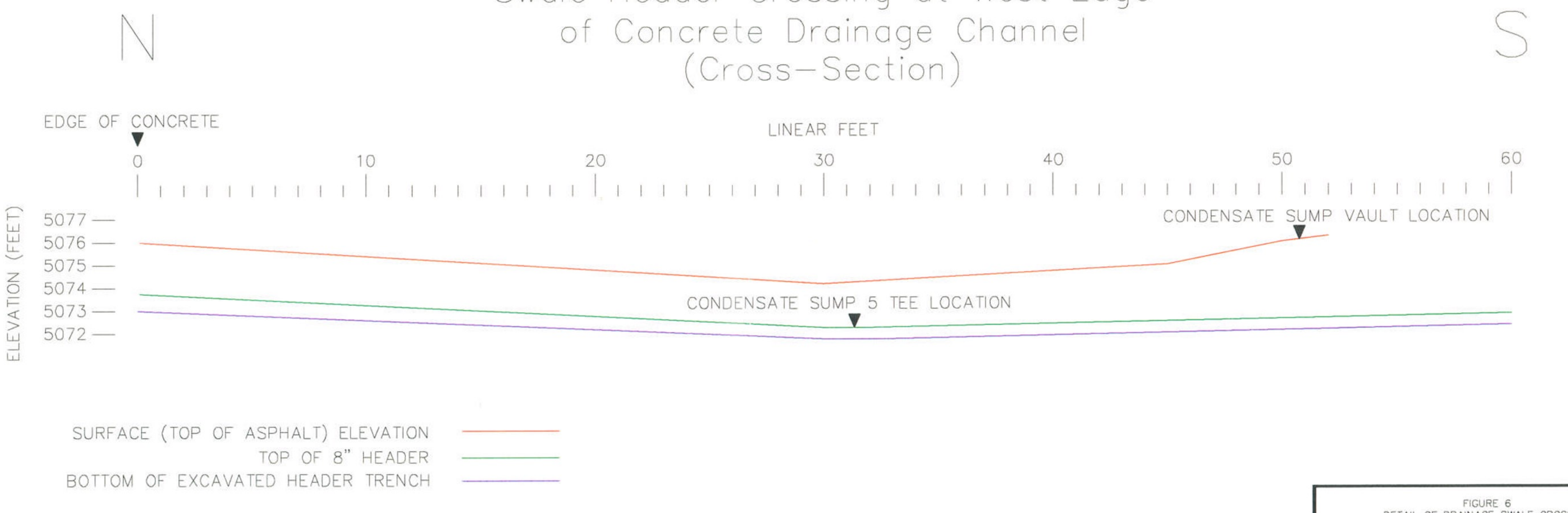


FIGURE 6
DETAIL OF DRAINAGE SWALE CROSSING
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

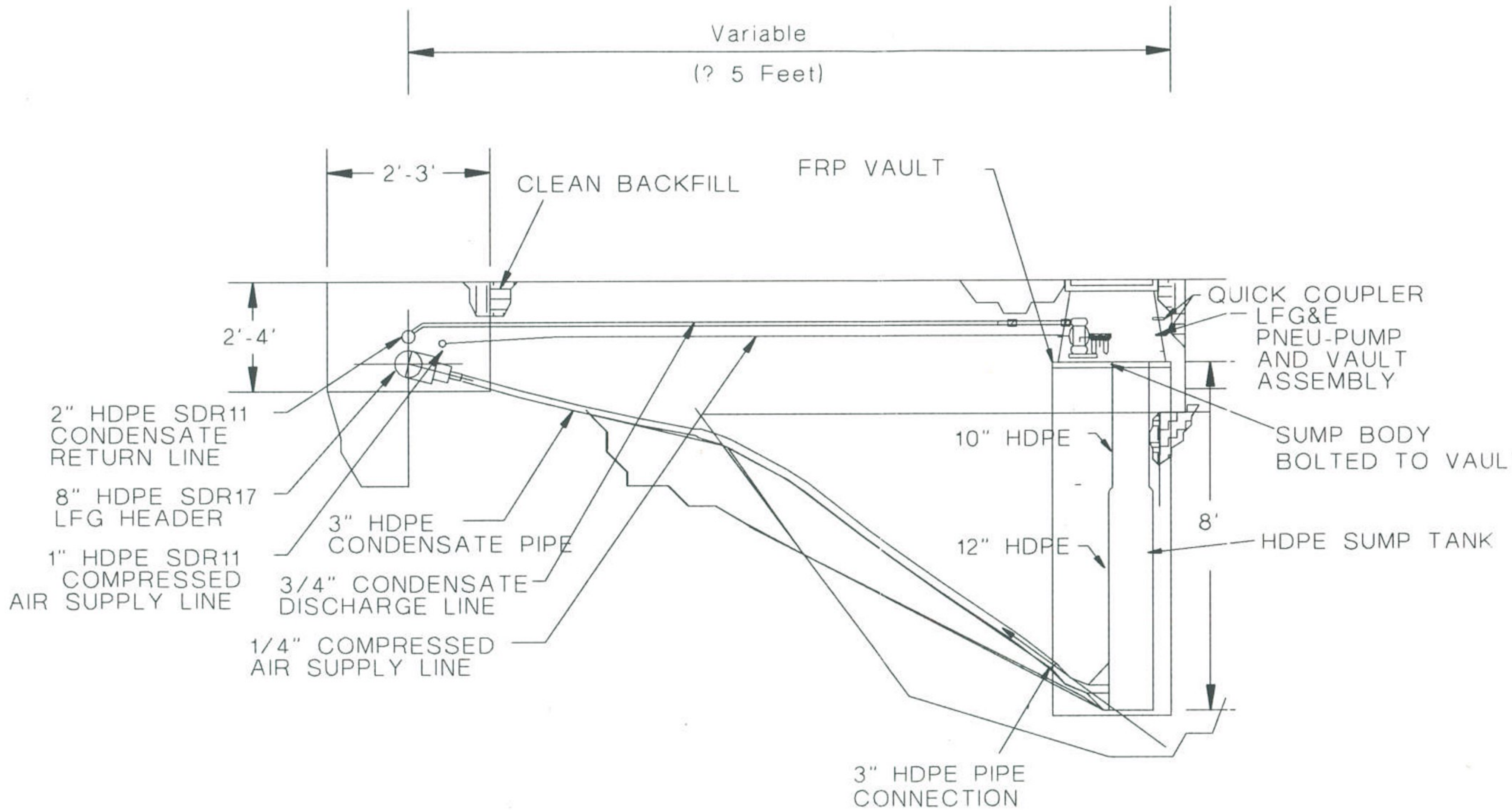
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

INTERNATIONAL TECHNOLOGY CORPORATION

DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: JMP	APPROVED BY: JMP
DATE: 04/06/98	SCALE: 1"=5'
PROJECT NO: 771778.09	DRAWING NO: 771778.09_B3

04/06/98

11/20/96



NOTES:

1. Condensate sump assembly is pre-fabricated by vendor (LFG&E).
2. Drawing is not to scale. All dimensions are shown.

FIGURE 8
CONDENSATE SUMP DETAIL AND HEADER CONNECTION
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

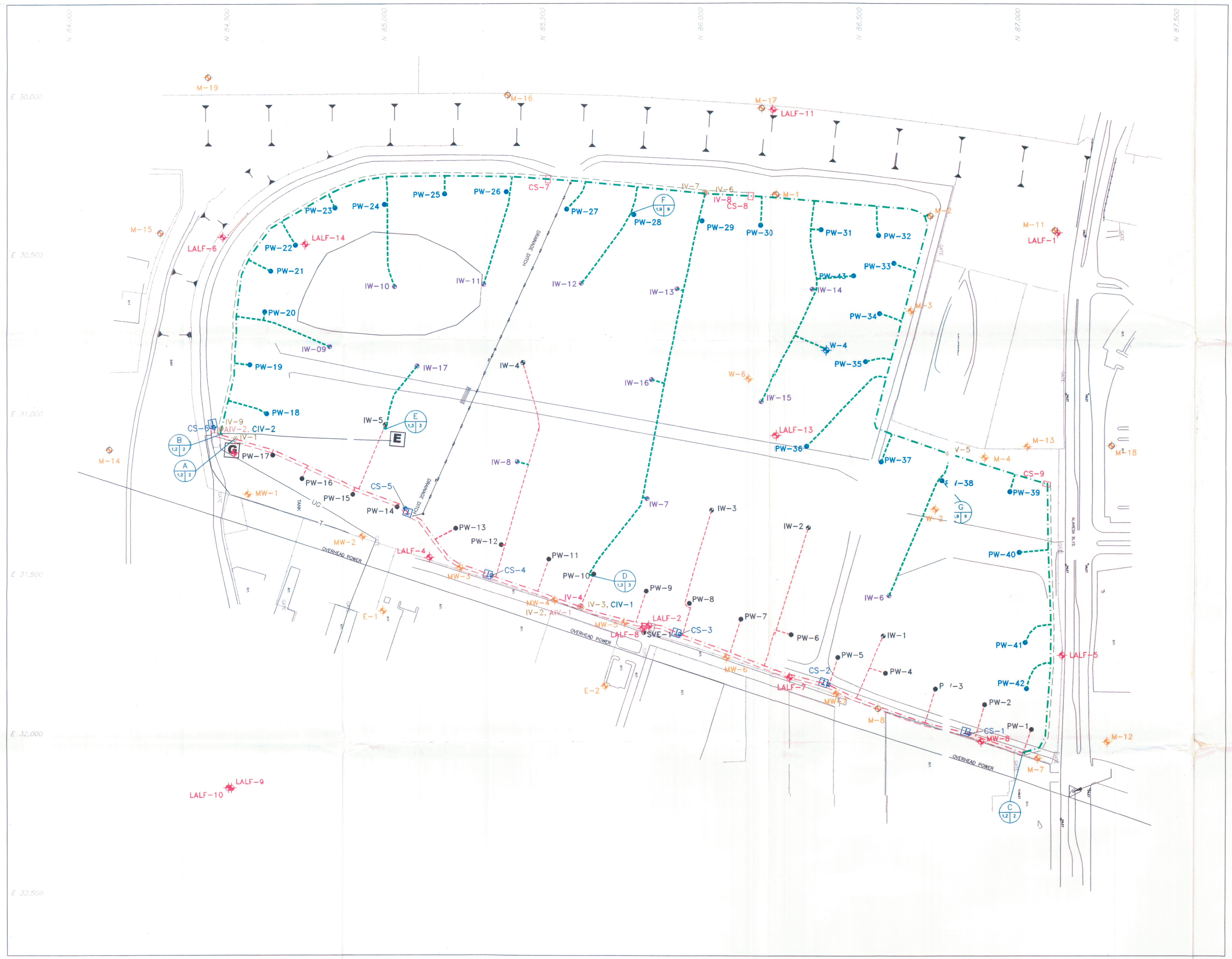
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

INTERNATIONAL TECHNOLOGY CORPORATION

DESIGNED BY: SM	DRAWN BY: ZC
CHECKED BY: JMP	APPROVED BY: JMP
DATE: 6/24/98	SCALE: NONE
PROJECT NO: 771778.09	DRAWING NO: B7

771778.09 B7

DRAWING NUMBER	OFFICE	X-REF	IMAGE
771778-D1	*Houston, Texas*	---	---



LEGEND:

Symbol	Description
PW-16 ●	PHASE I PERIMETER LANDFILL GAS EXTRACTION WELL
IW-3	PHASE I INTERIOR LANDFILL GAS EXTRACTION WELL
PW-35 ●	PHASE II PERIMETER LANDFILL GAS EXTRACTION WELL
IW-15	PHASE II INTERIOR LANDFILL GAS EXTRACTION WELL
SVE-1	PHASE I SOIL VAPOR EXTRACTION WELL
IV-6	ISOLATION VALVE-8" (PHASE II)
IV-4	ISOLATION VALVE-6" (PHASE II)
CIV-1	CONDENSATE LINE ISOLATION VALVE (PHASE II)
AIV-1	AIR LINE ISOLATION VALVE (PHASE II)
LALF-1	MONITORING WELLS
M-18, E-1, W-18, MW-1	METHANE WELLS
CS-1	CONDENSATE SUMP (PHASE I)
CS-7	CONDENSATE SUMP (PHASE II)
	PHASE II PIPING LAYOUT-8" HEADER
	PHASE II PIPING LAYOUT-6" LATERAL
	PHASE II AIR AND CONDENSATE LINE
	PHASE I PIPING LAYOUT-8" HEADER
	PHASE I PIPING LAYOUT-6" LATERAL
	PHASE I AIR AND CONDENSATE LINE
E	ELECTRICAL BOX AND UNDERGROUND LINE
G	GAS METER AND UNDERGROUND LINE
A 1,2 2	REFERENCE DETAILS IN ATTACHED DRAWINGS

SCALE
0 150 300 450 FEET

IT CORPORATION

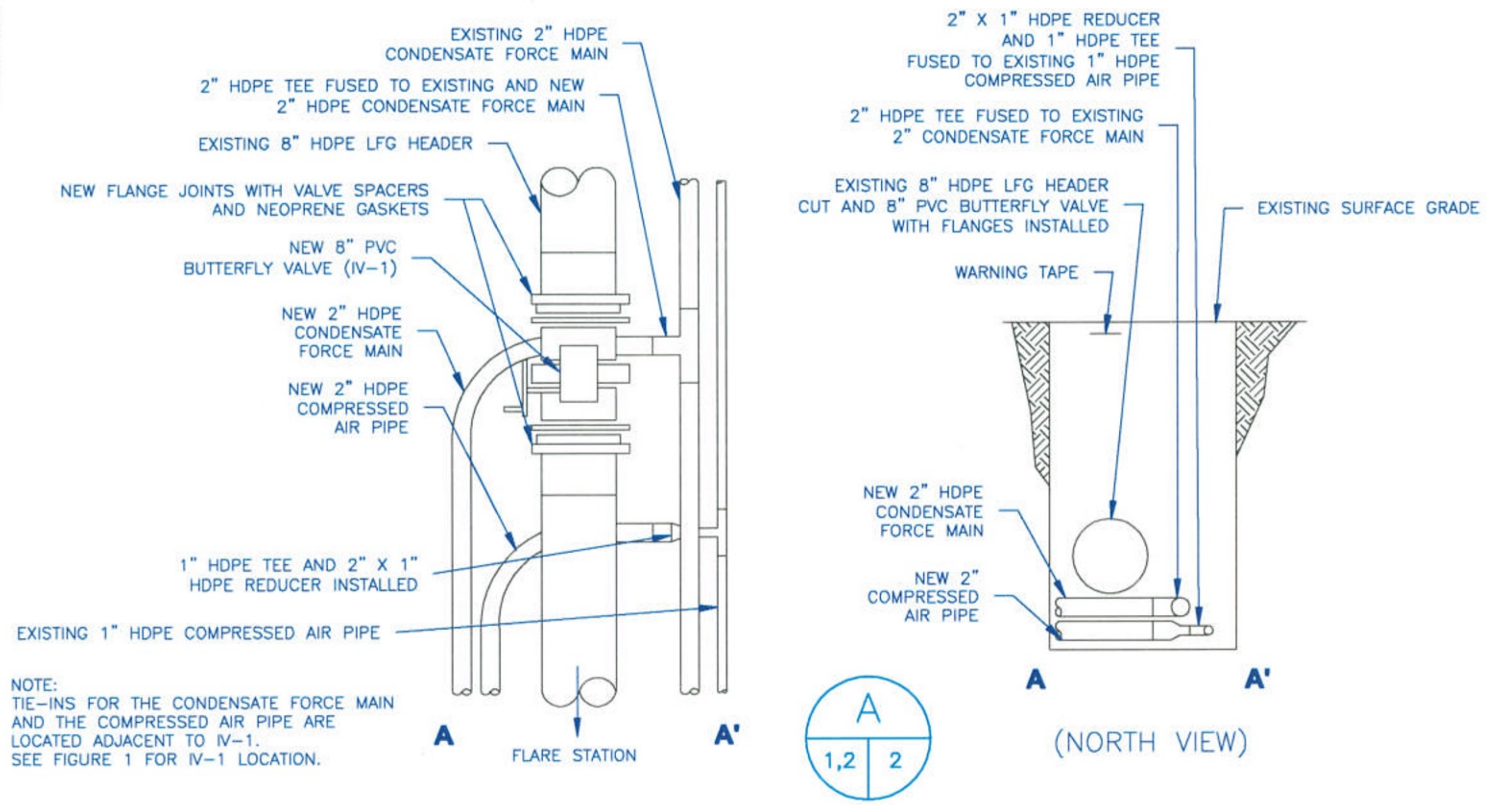
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT
ALBUQUERQUE, NEW MEXICO

GAS EXTRACTION WELLS, PIPING LAYOUT, AND MONITORING WELLS
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

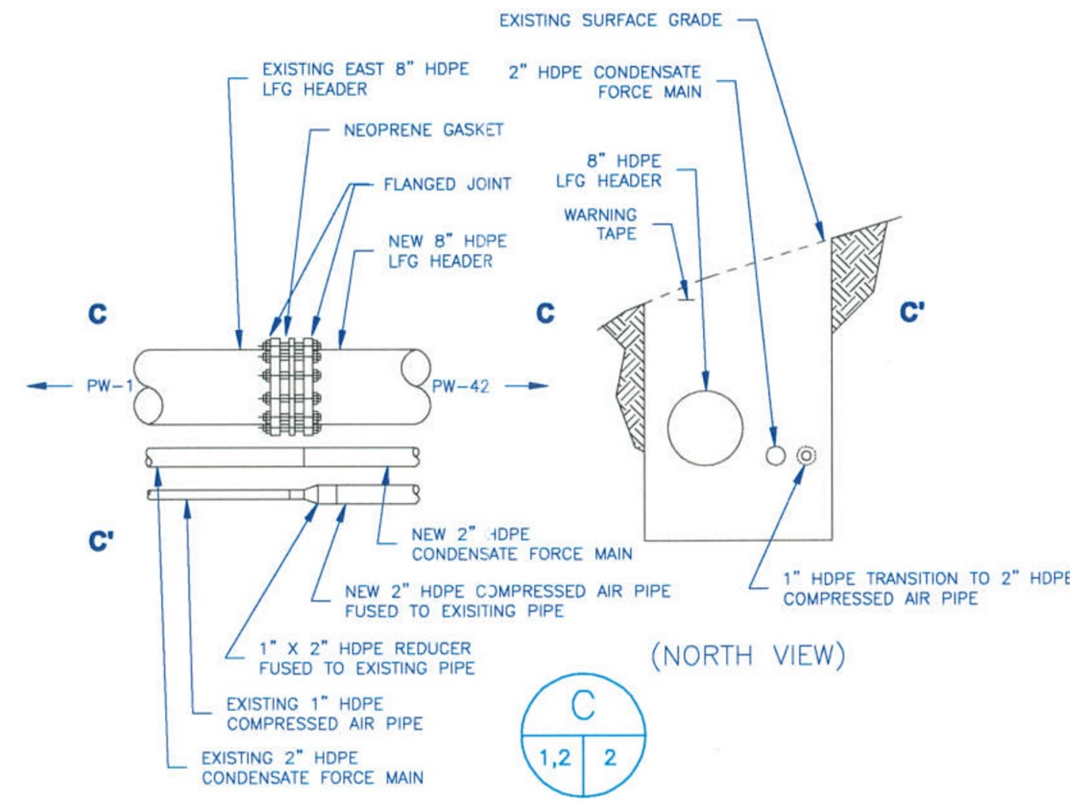
DESIGNED BY	S. TREBUIS	7/1/99	CHECKED BY	R. MCKINNEY
DRAWN BY	Z. CARPIO	4/5/00	APPROVED BY	[signature]
SCALE: AS SHOWN	DRAWING NO. 771778.23070000/D1	SHEET NO. 1	REVISION NO.	

PLOT DATE: 5/7/99
FORMAT REVISION 3/25/99

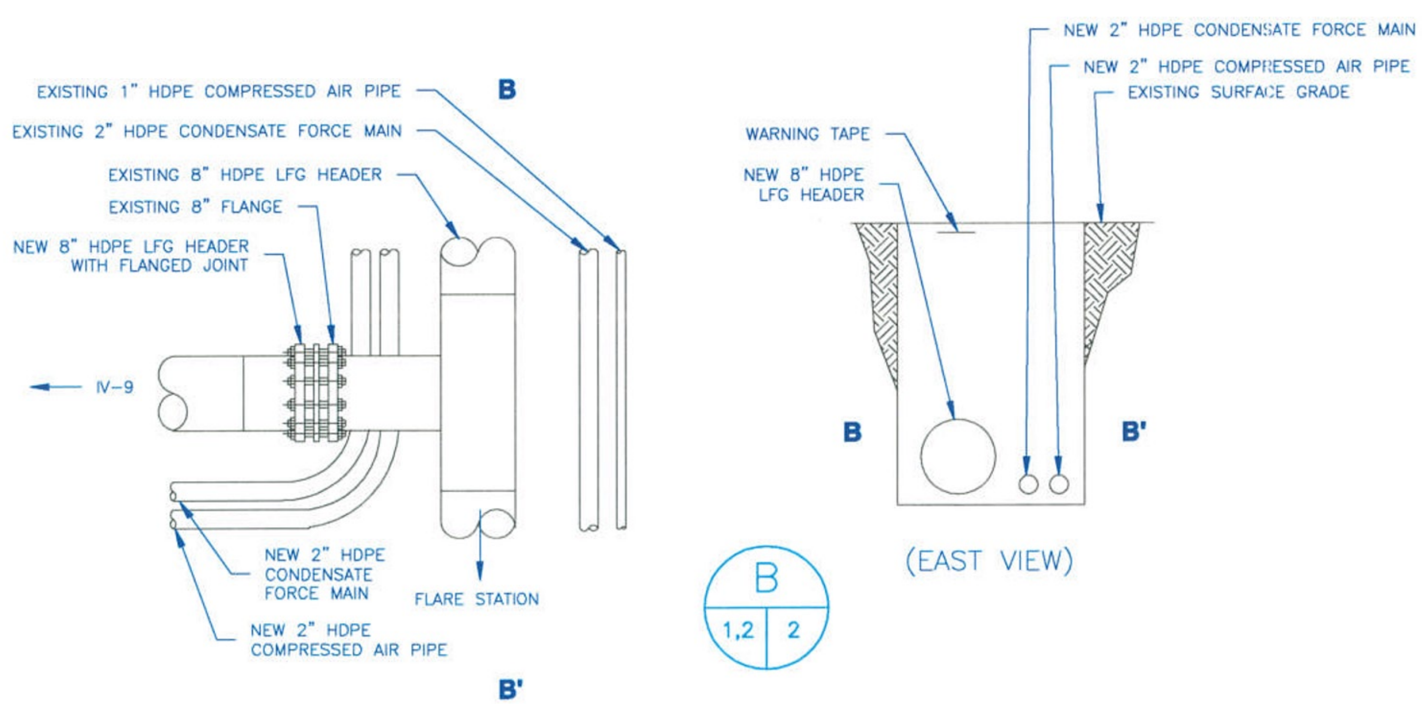
771778.23.07.00.00 B8



SOUTHEAST TIE-IN
(IV-1 NEAR FLARE)



NORTHEAST TIE-IN
(NEAR PW-1)



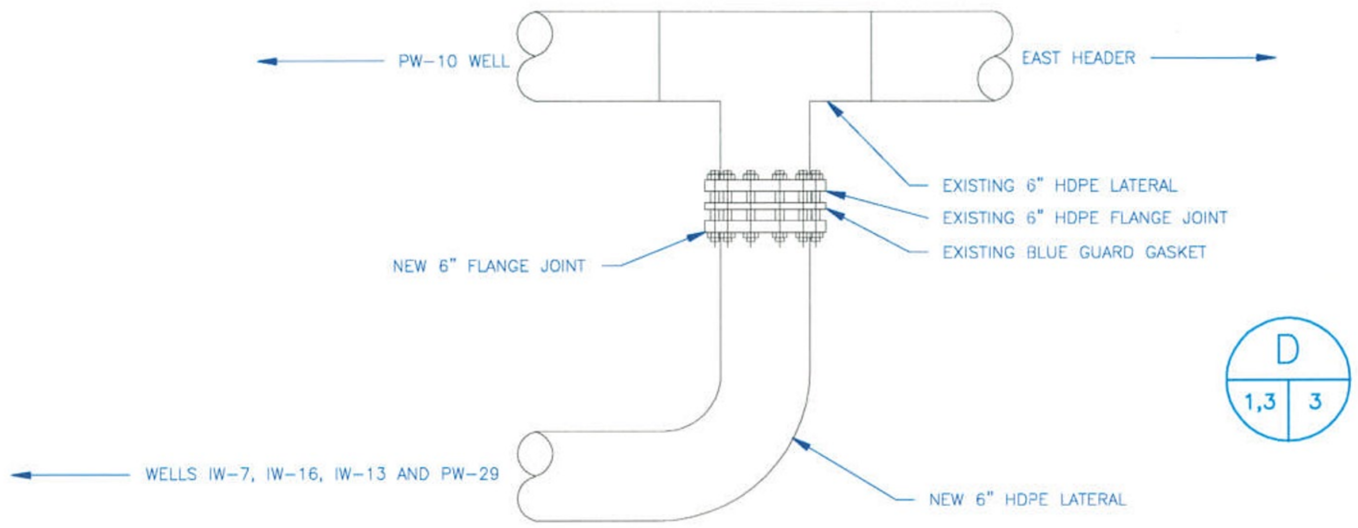
SOUTHEAST TIE-IN
(NEAR FLARE)

02/11/00

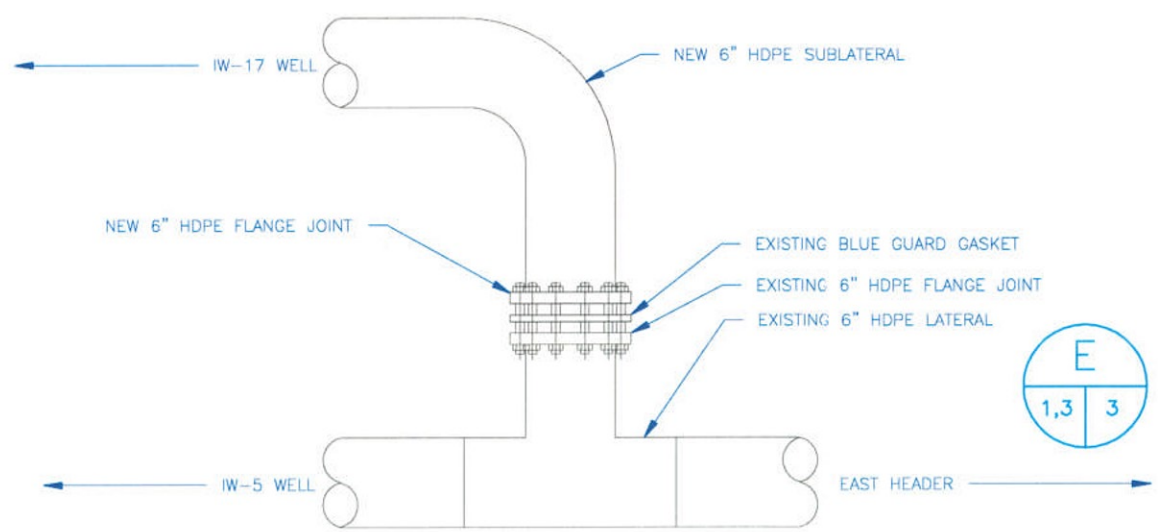
FIGURE 2 HEADER, AIR, AND CONDENSATE LINE TIE-INS LOS ANGELES LANDFILL ALBUQUERQUE, NEW MEXICO	
CITY OF ALBUQUERQUE ENVIRONMENTAL HEALTH DEPARTMENT	
DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: RM	APPROVED BY: ST
DATE: 02/11/00	SCALE: NONE
PROJECT NO: 771778.23.07	DRAWING NO: 771778.23.07_B8

IT CORPORATION
A Member of The IT Group

771778.23.07.00.00 B6



LATERAL TIE-IN TO PW-10 LATERAL
PLAN VIEW



IW-17 LATERAL TIE-IN TO IW-5 LATERAL
PLAN VIEW

FIGURE 3
LATERAL TIE-INS (IW-5 AND PW-10)
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

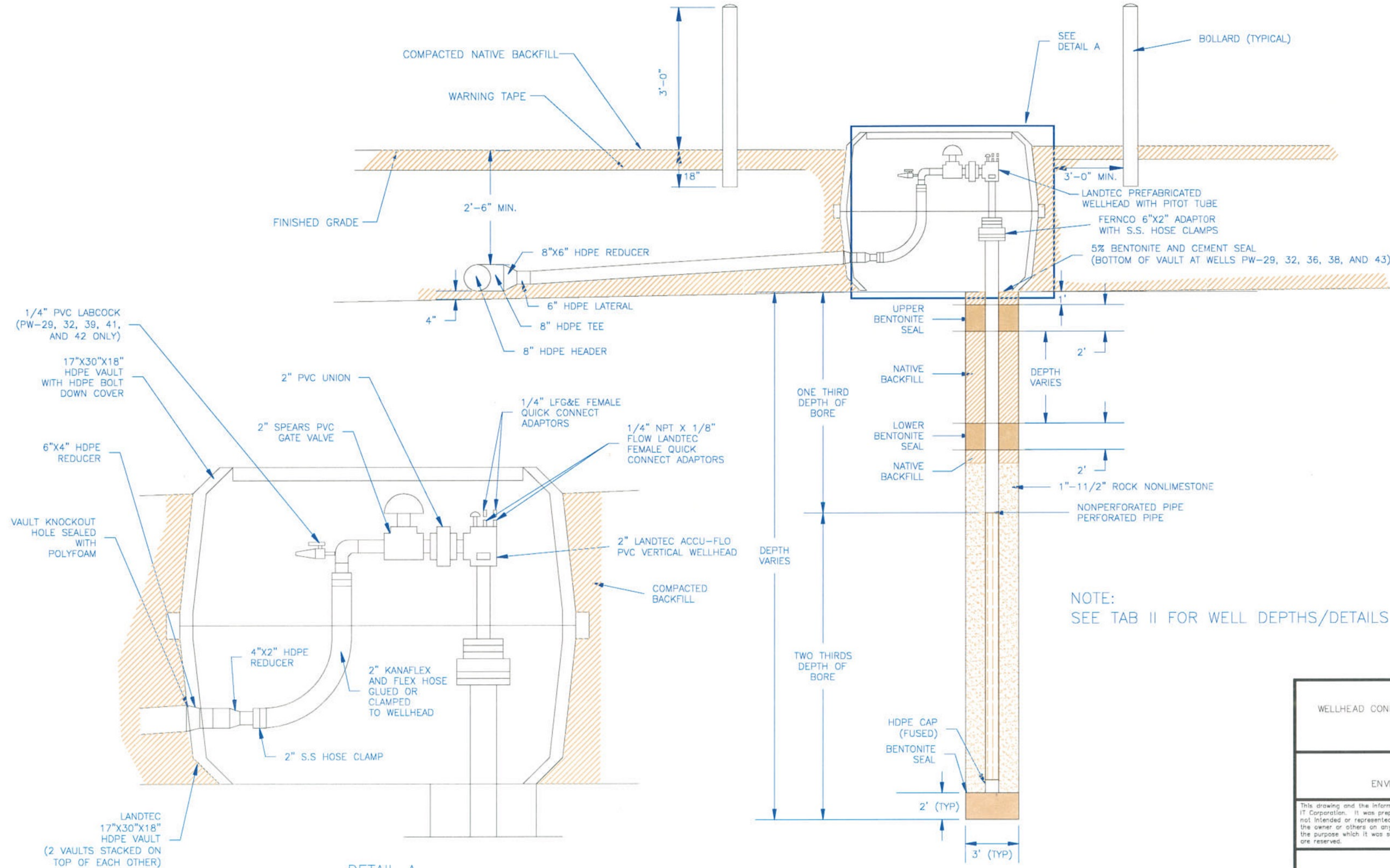
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

IT CORPORATION
A Member of The IT Group

DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: RM	APPROVED BY: ST
DATE: 02/10/00	SCALE: NONE
PROJECT NO: 771778.23.07	DRAWING NO: 771778.23.07_B6

02/10/00

771778.23.07.00.00 B3



DETAIL A

WELLHEAD CONNECTION
PW-23 TO 43, IW-6, 7, 11 TO 16)

FIGURE 4
WELLHEAD CONNECTION (PW-23 TO 43, IW-6, 7, 11 TO 16)
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

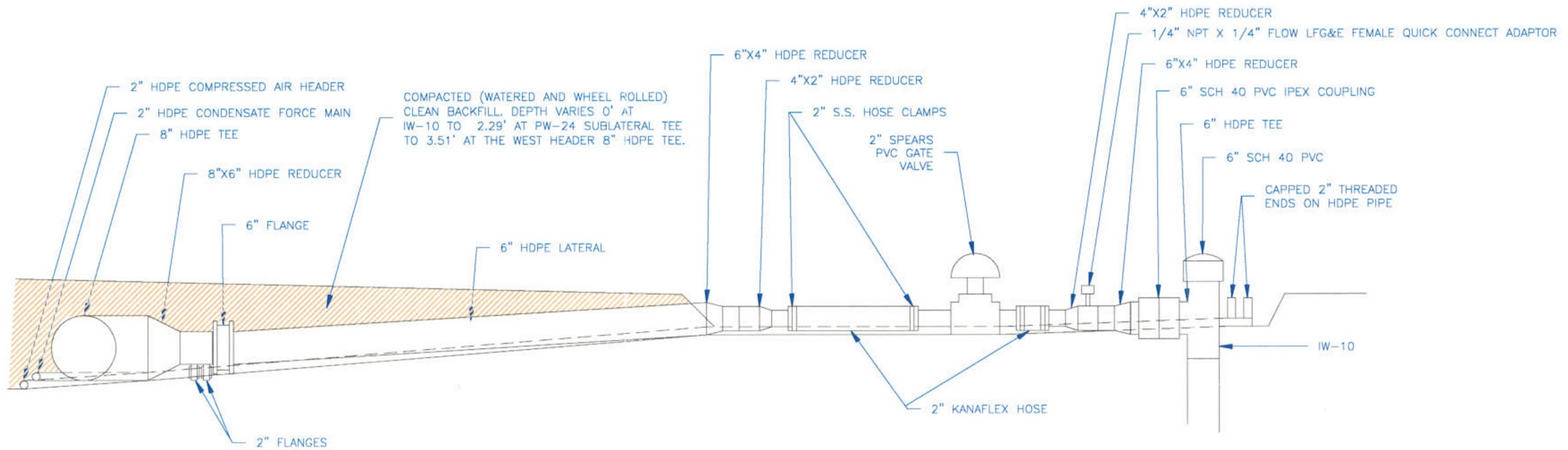
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

IT CORPORATION
A Member of The IT Group

DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: RM	APPROVED BY: ST
DATE: 02/01/00	SCALE: NONE
PROJECT NO: 771778.23.07	DRAWING NO: 771778.23.07_B3

02/01/00

771778.23.07.00.00 B2



WELLHEAD CONNECTION IW-10
NORTH VIEW

FIGURE 5
IW-10 WELLHEAD CONNECTION
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

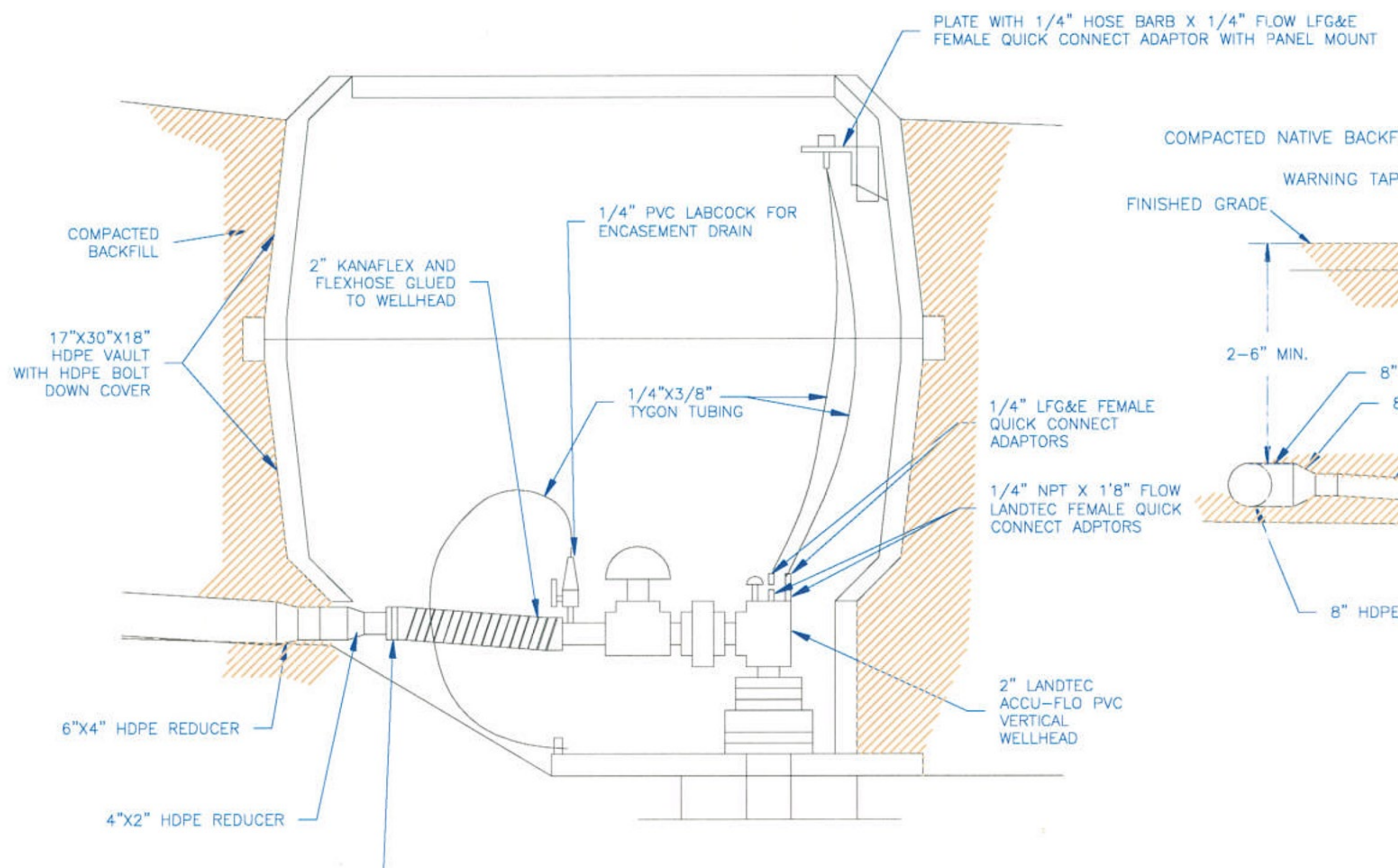
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

IT CORPORATION
A Member of The IT Group

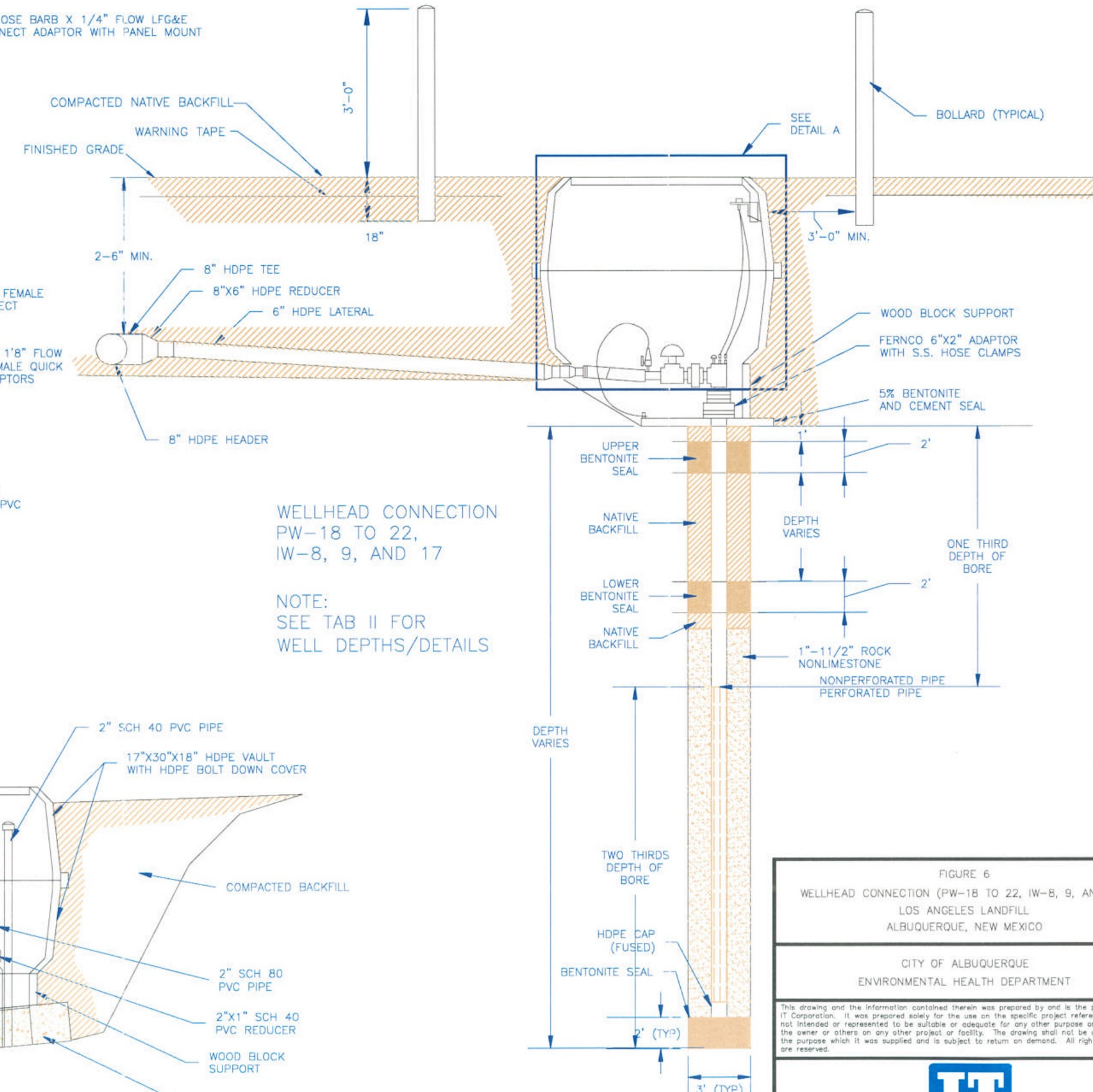
DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: RM	APPROVED BY: ST
DATE: 02/01/00	SCALE: NONE
PROJECT NO: 771778.23.07	DRAWING NO: 771778.23.07_B2

02/01/00

771778.23.07.00.00 B4

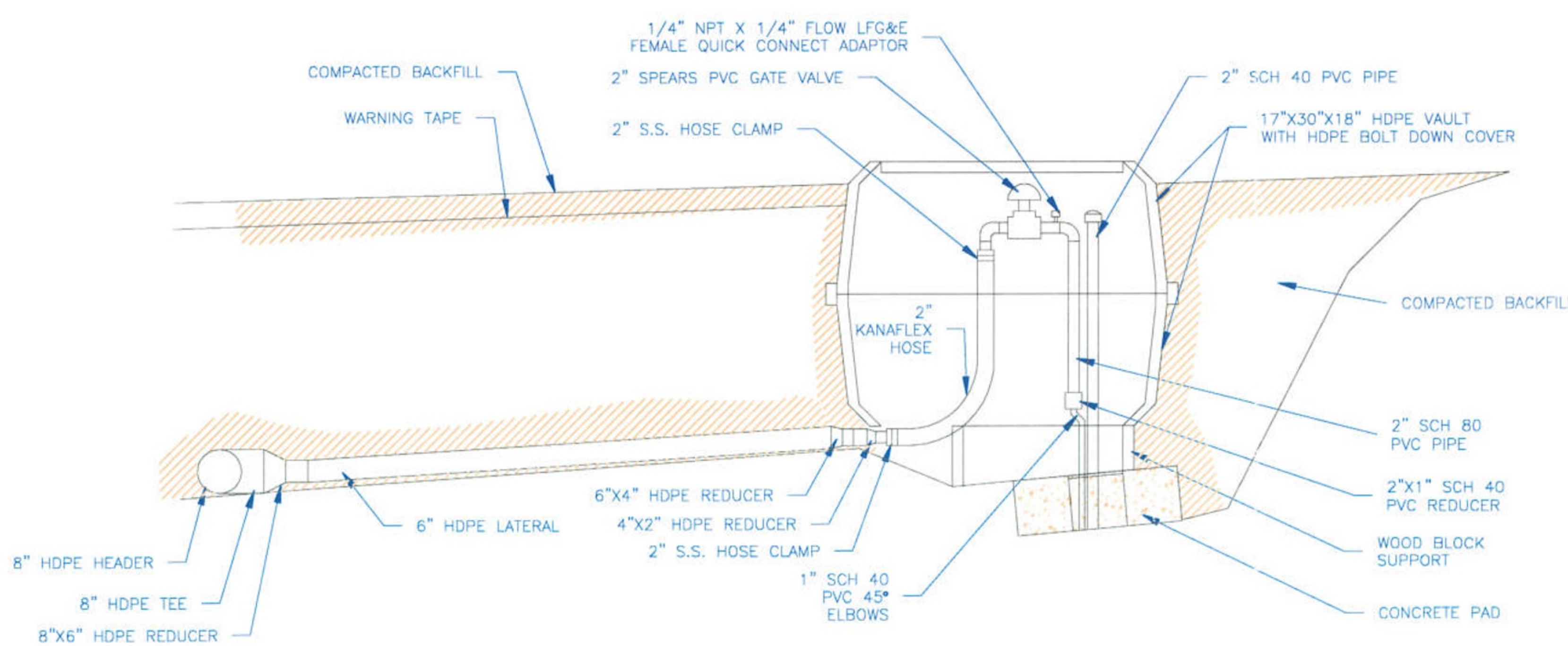


DETAIL A



WELLHEAD CONNECTION
PW-18 TO 22,
IW-8, 9, AND 17

NOTE:
SEE TAB II FOR
WELL DEPTHS/DETAILS



WEST VIEW

WELLHEAD CONNECTION W-4

02/01/00

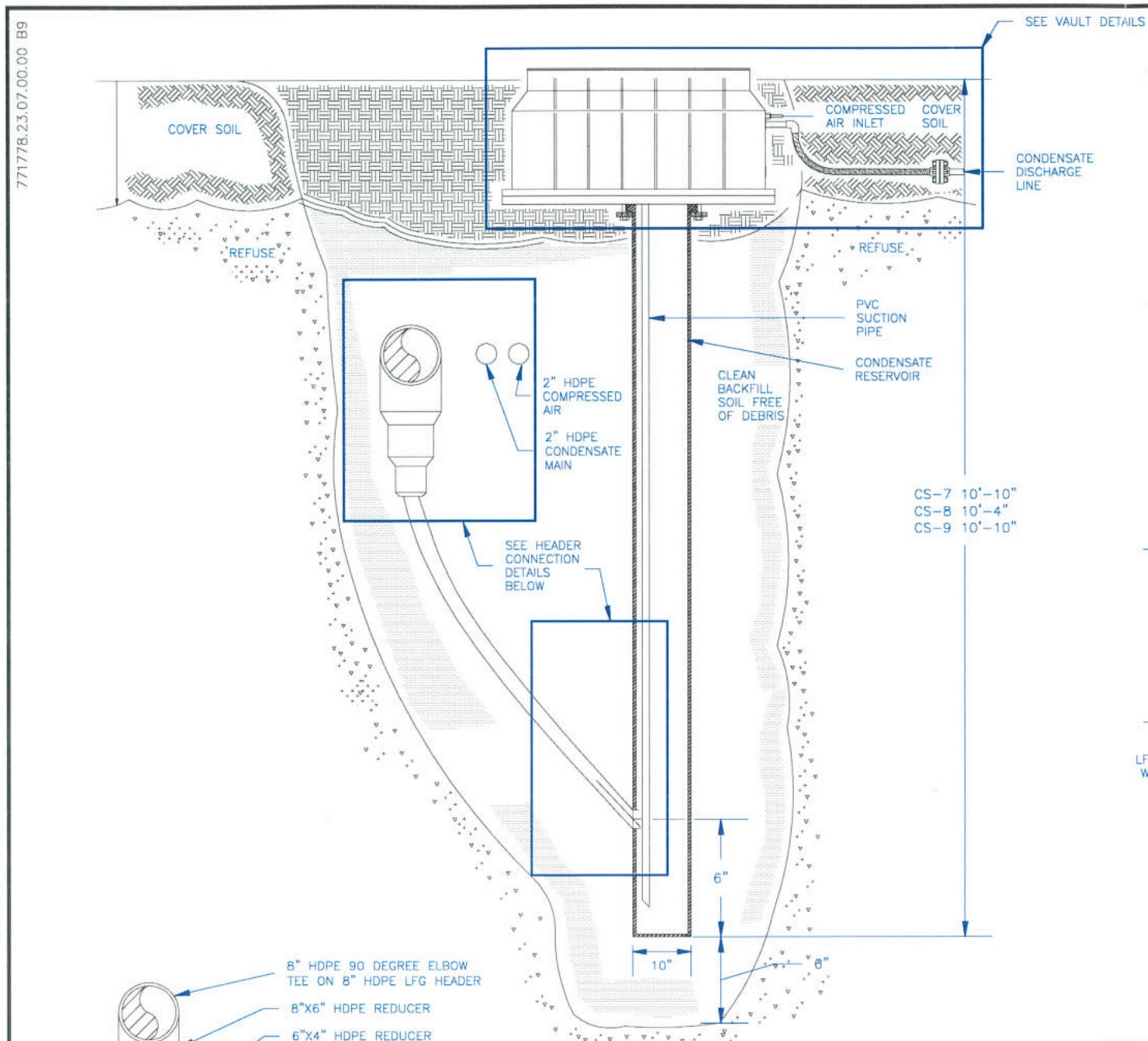
FIGURE 6
WELLHEAD CONNECTION (PW-18 TO 22, IW-8, 9, AND 17)
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

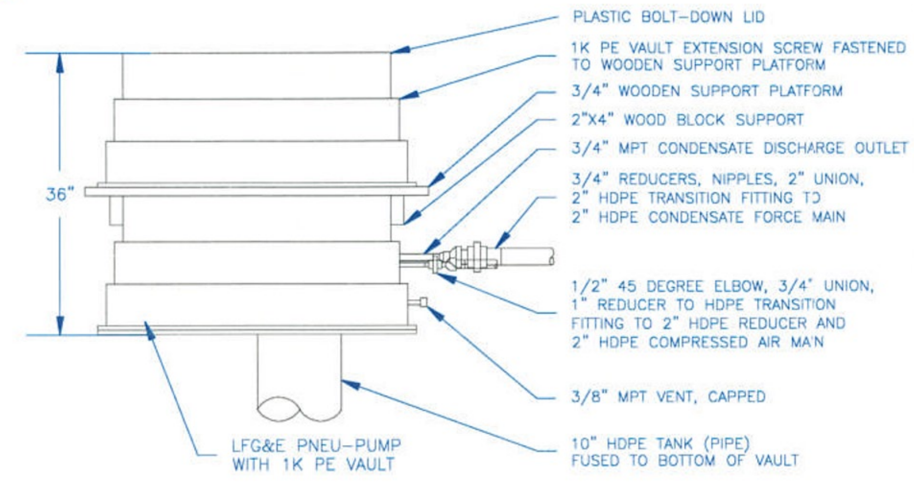
CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

IT CORPORATION
A Member of The IT Group

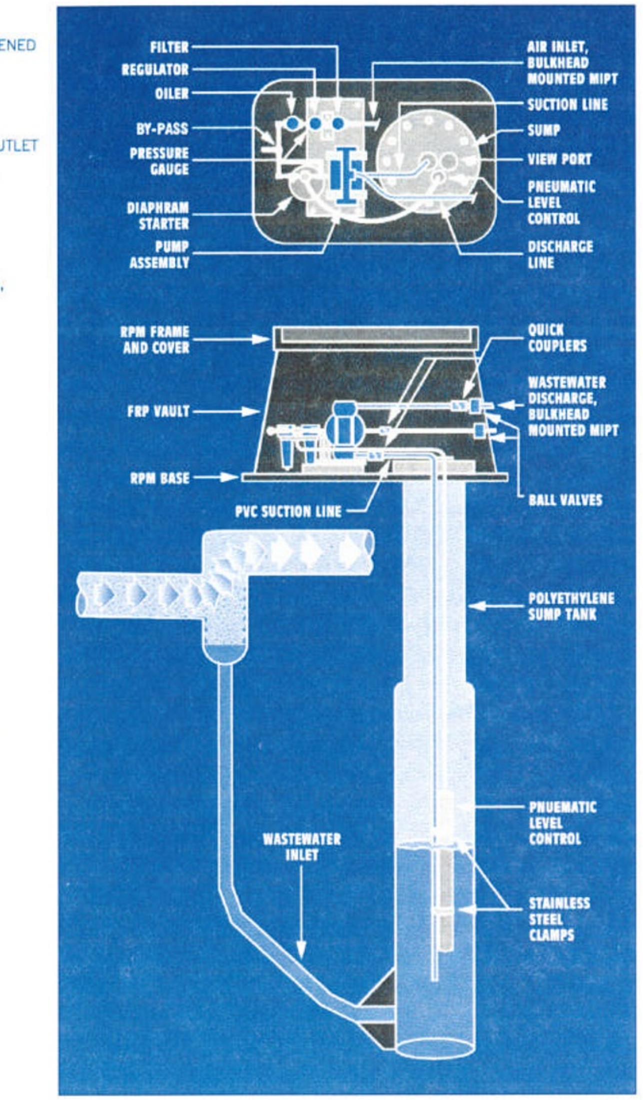
DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: RM	APPROVED BY: ST
DATE: 02/01/00	SCALE: NONE
PROJECT NO: 771778.23.07	DRAWING NO: 771778.23.07_B4

771778.23.07.00.00 B9

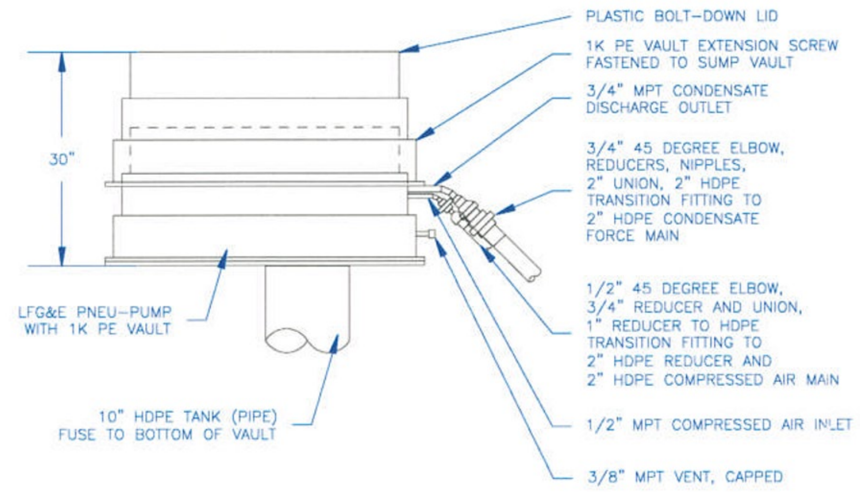




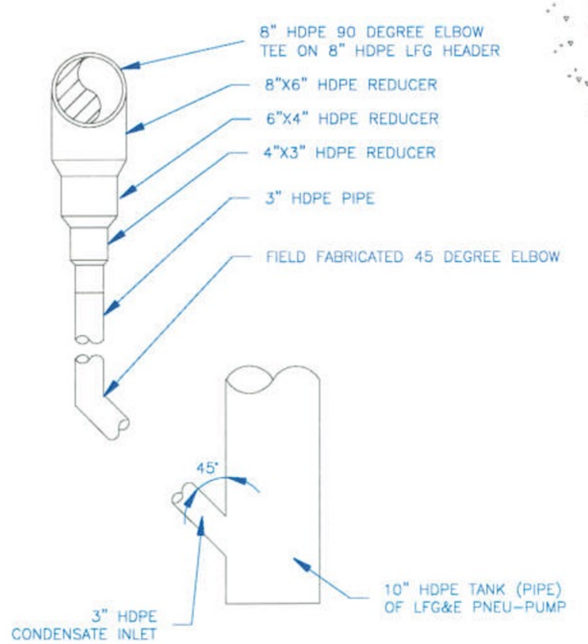
CS-7 VAULT DETAILS



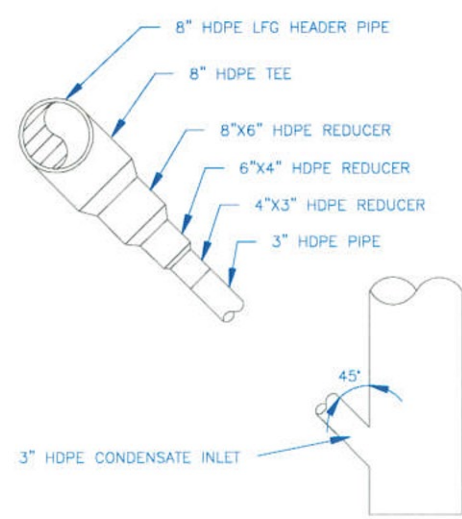
LFG&E PNEU-PUMP™



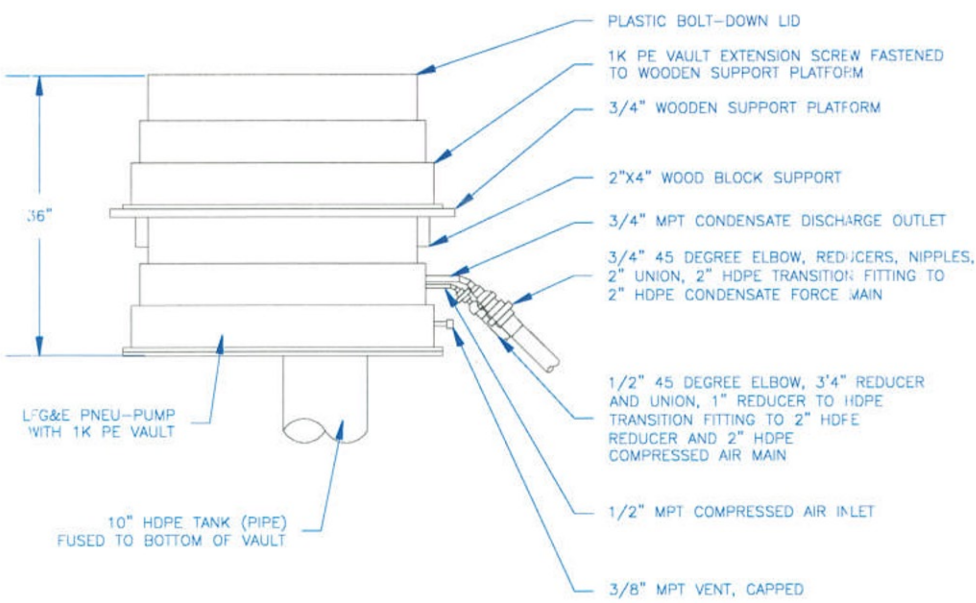
CS-8 VAULT DETAILS



CS-9 CONNECTION TO HEADER



CS-7 AND CS-8 CONNECTION TO HEADER



CS-9 VAULT DETAILS

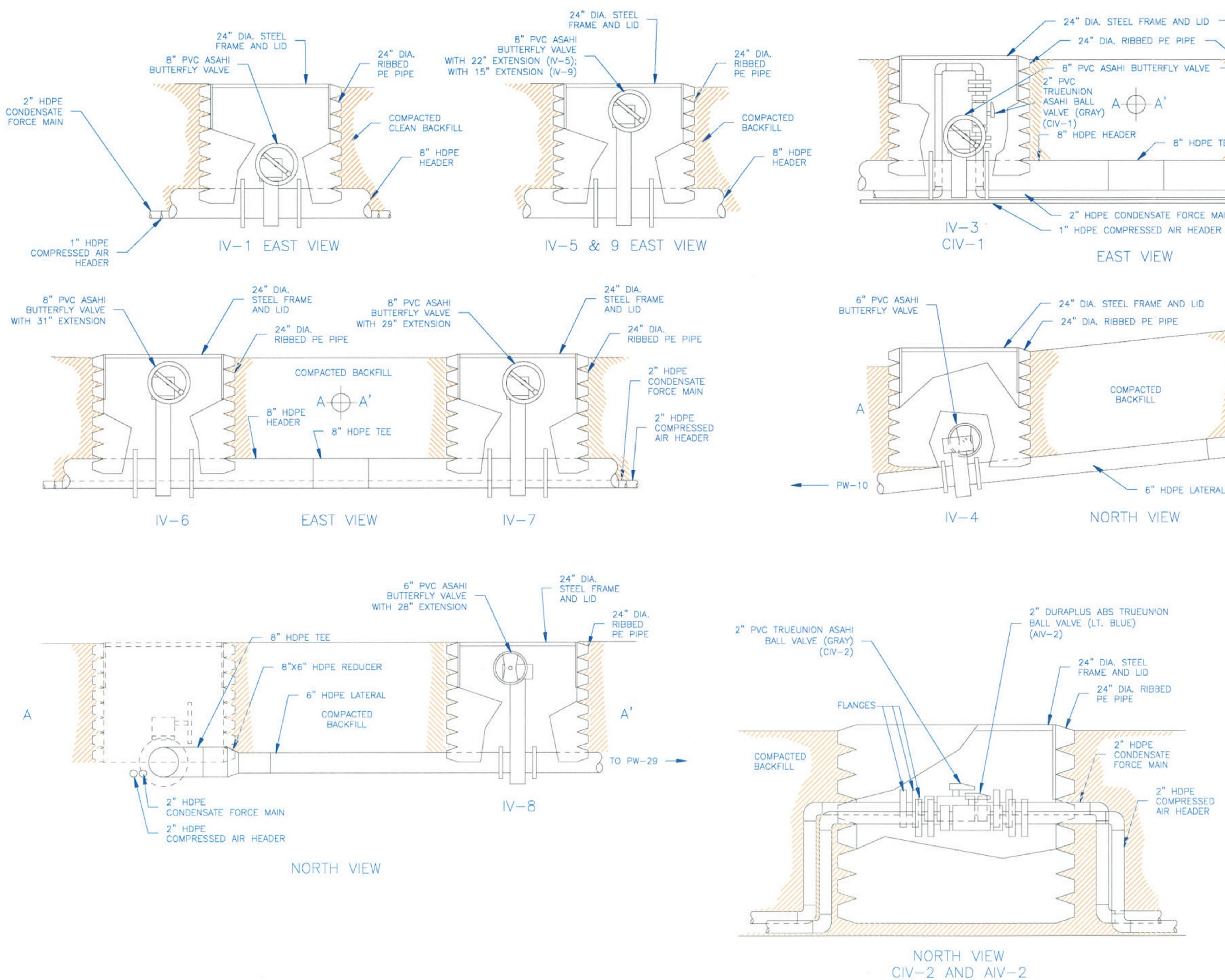
FIGURE 7
LFG&E PNEU-PUMP CONDENSATE SUMP
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

IT CORPORATION
A Member of The IT Group

DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: RM	APPROVED BY: ST
DATE: 02/22/00	SCALE: NONE
PROJECT NO: 771778.23.07	DRAWING NO: 771778.23.07_B9

02/22/00



771778.23.07.00.00 B1

01/31/00

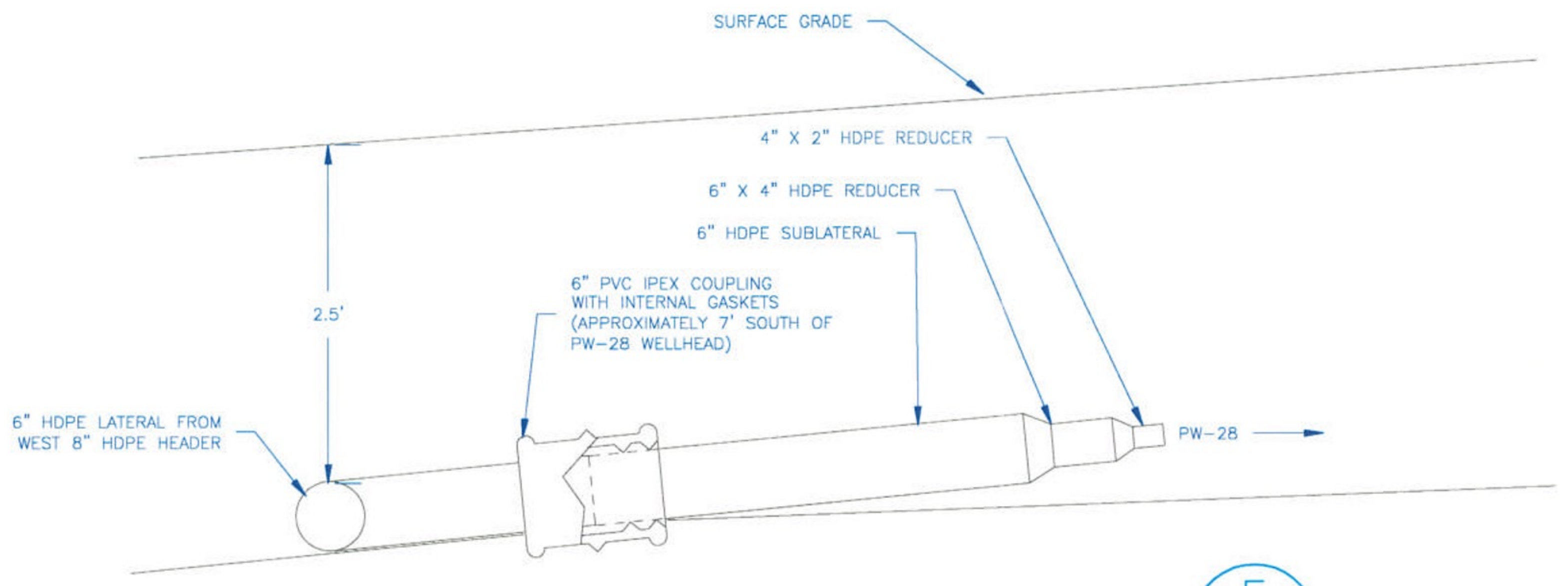
FIGURE 8
ISOLATION VALVES AND VAULTS
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

IT CORPORATION
A Member of The IT Group

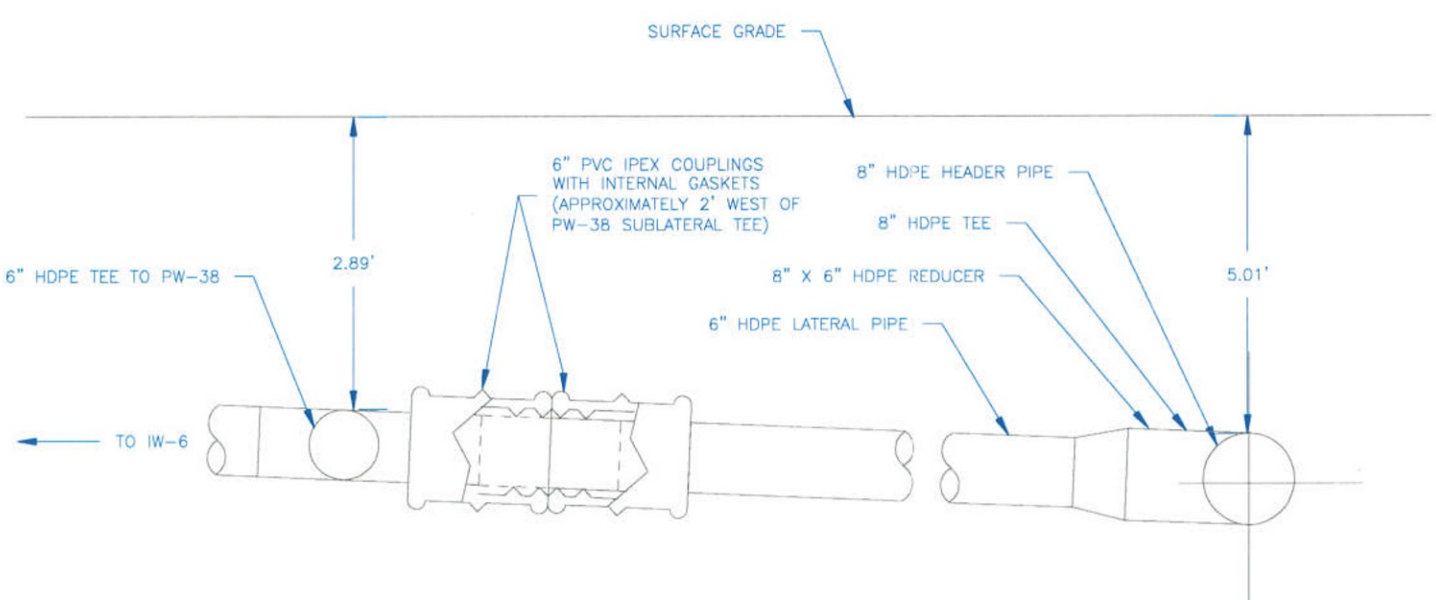
DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: RM	APPROVED BY: ST
DATE: 01/31/00	SCALE: NONE
PROJECT NO: 771778.23.07	DRAWING NO: 771778.23.07_B1

771778.23.07.00.00 B7



PW-28 SUBLATERAL CONNECTION DETAIL
WEST VIEW

F
1,9 | 9



PW-38 LATERAL CONNECTION DETAIL
SOUTH VIEW

G
1,9 | 9

02/11/00

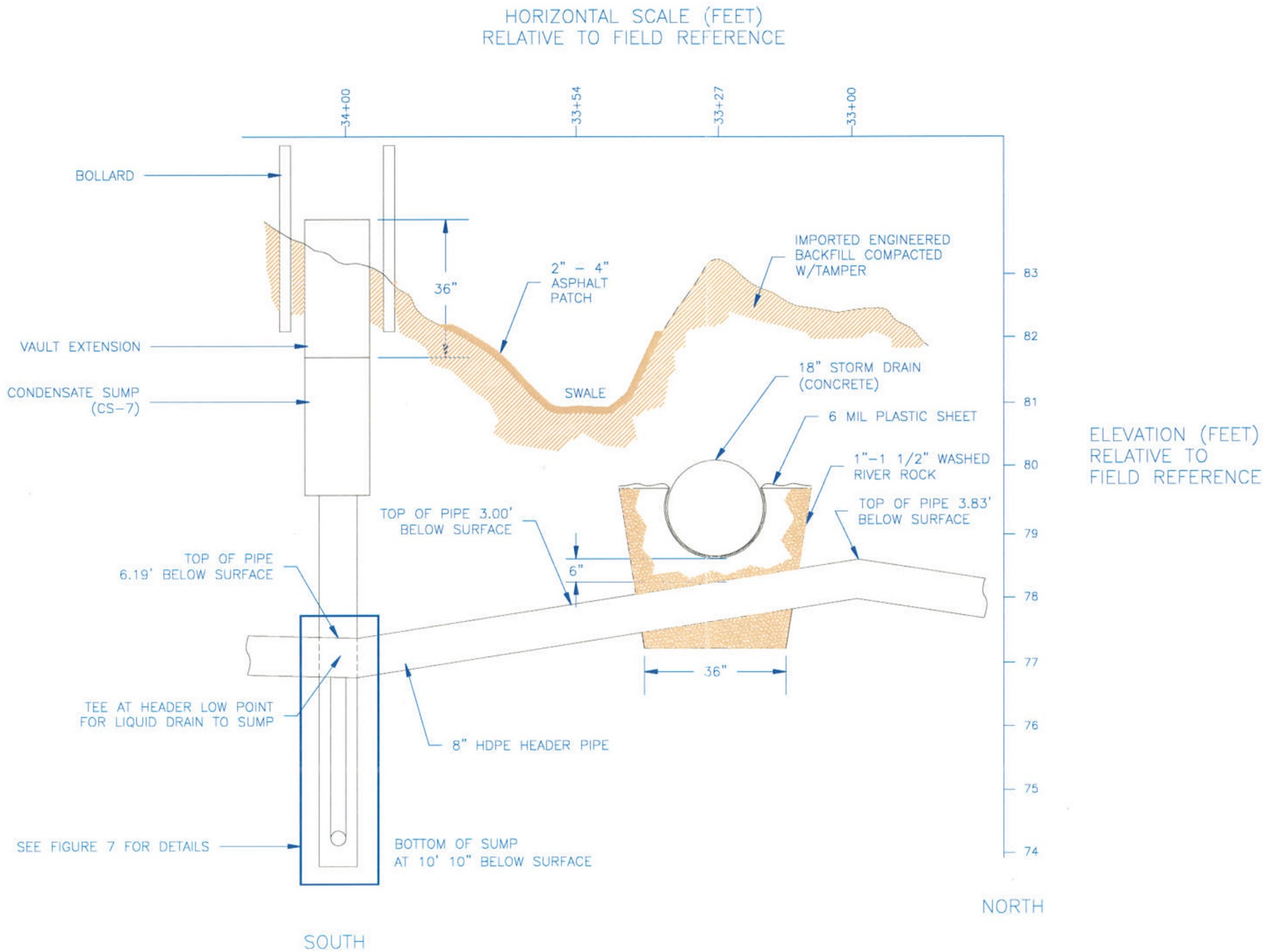
FIGURE 9
PW-28 AND PW-38 LATERAL CONNECTION COUPLER
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

IT CORPORATION
A Member of The IT Group

DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: RM	APPROVED BY: ST
DATE: 02/11/00	SCALE: NONE
PROJECT NO: 771778.23.07	DRAWING NO: 771778.23.07_B7

771778.23.07.00.00 B5



WEST VIEW

FIGURE 10
AMAFCA SWALE CROSS-SECTION
LOS ANGELES LANDFILL
ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE
ENVIRONMENTAL HEALTH DEPARTMENT

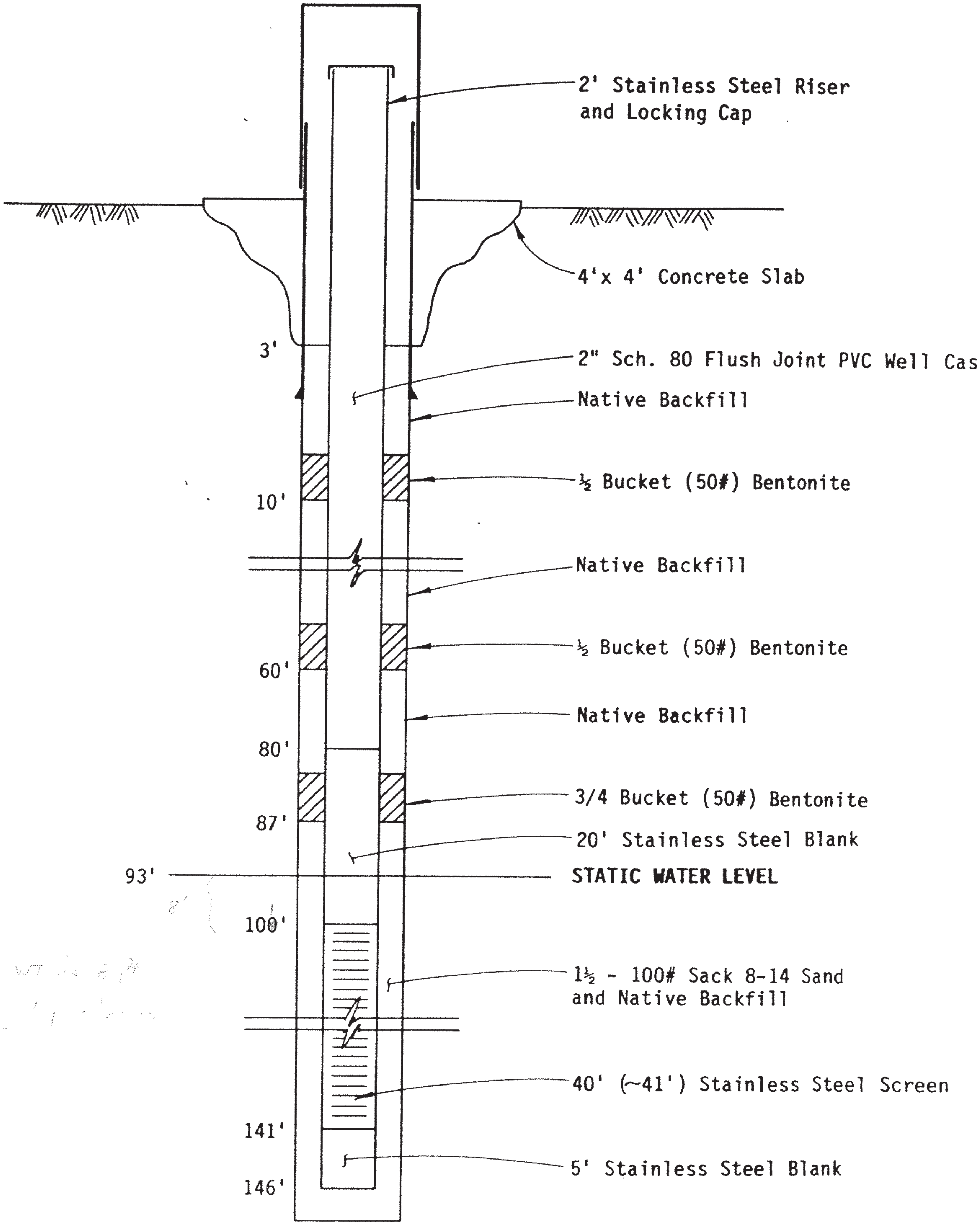
IT CORPORATION
A Member of The IT Group

DESIGNED BY: WN	DRAWN BY: ZC
CHECKED BY: RM	APPROVED BY: ST
DATE: 01/31/00	SCALE: NONE
PROJECT NO: 771778.23.07	DRAWING NO: 771778.23.07_B5

01/31/00

APPENDIX D

Groundwater Well Construction Details



MW-1

COMPLETION DIAGRAM

GCL

WELL LOGGING FORM

Client City of Albuquerque Well Number MW-1A

1/4 1/4 1/4 1/4 S 14 T 11N R 3E State New Mexico

County Bernalillo Contractor ATL

Spud Date 2/4/86 Completion Date

Logs Run Lithology Logged By Selke

Elevation Spud In (Fm.)

Remarks 1st Day, Start Drilling ≈ 1700 Rig & Tools Steam Cleaned
Driller - Ray Perkison, Asst. - Ron Rodriguez

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
0							0-12.0 Silty to Med Gr Sand, Mod Yellowish Brn (10 yr 5/4)
			1	0	5		w/med to coarse gravel (up to 3")-Local Minor
5							Increase in clay content - possibly some thin clay
			2	5	10		lenses
						10.0 (≈1720) 8602041720	
10			3	10	15		12.0-17.0 Fine-med gr Sand very pale orange (10 yr 8/2) to moderage
							yellowish brn (10 yr 5/4) w/minor gravel (up to 2")
15							
			4	15	20		17.0-45.0 Edith Gravel coarse qr pebble Gravel and fine
						20.0 (≈1740)	cobbles (<1/2' up to 4") Primarily composed of gray
20							quartzite
			5	20	25		
25							
			6	25	30		
30							
			7	30	35		
35							
			8	35	40		
40							
							2 minutes 45-50'

GCL

WELL LOGGING FORM

Client: City of Albuquerque   Well Number: MW-1A

___1/4 ___1/4 ___1/4 ___1/4 S 14 T 11N R 3E State: New Mexico

County: Bernalillo   Contractor: ATL

Spud Date: 2/4/86   Completion Date:

Logs Run: Lithology   Logged By: Gutierrez/Selke

Elevation: Spud In (Fm.):

Remarks:

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
45							45.0 -58.0 Very fine to fine gr Sand grayis orng
			10	45	50		(10 yr 7/4) 90+% Qtz sub-ang to sub-rnd, mod to well sor
50						50.0 (1010) BC 32/48/50(4")	1015 Drilling
			11	50	55		
55			12	55	60		≈1018
60							1023-1025 55.0 to 60.0 58.0- 110.0 Silty Sandy Clay
			13	60	65		
65			14	65	70		
70						70.0 (1105) BC35/48/50(5")	brown-buff silty clay w/small sand stringers
			15	70	75		clay ≈ 18% moist
75			16	75	80		easy drilling to 105'
80			17	80	85		
85			18	85	90		90-100 moist silt and sandy clay w/some sand stringers-easy drilling

GCL

WELL LOGGING FORM

Client: City of Albuquerque Well Number: MW-1A

___1/4 ___1/4 ___1/4 ___1/4 S 14 T 11N R 3E State New Mexico

County: Bernalillo Contractor: ATL

Spud Date: 2/4/86 Completion Date:

Logs Run: Lithology Logged By: Gutierrez/Selke

Elevation: Spud In (Fm.):

Remarks:

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
90							easy drilling from 90-105'
			19	90	95		silty sandy light brown clay - clayey snad, moist
95							
			20	95	100		
							silty clayey sand very moist light-dark brown
100			21	100	105		easy drilling no weight on drill since 80'
105							
			22	105	110		
							110' - 145 moist light brown silty and slightly clayey sand
110							medium to coarse gr w/some angular to sub rounded
			23	110	115		fragments
115							
			24	115	120		
120							
			25	120	125		
125							
			26	125	130		
130							
			27	130	135		

GCL

WELL LOGGING FORM

Client City of Albuquerquerque Well Number MW-1A

1/4 1/4 1/4 1/4 S 14 T 11N R 3E State New Mexico

County Bernalillo Contractor ATL

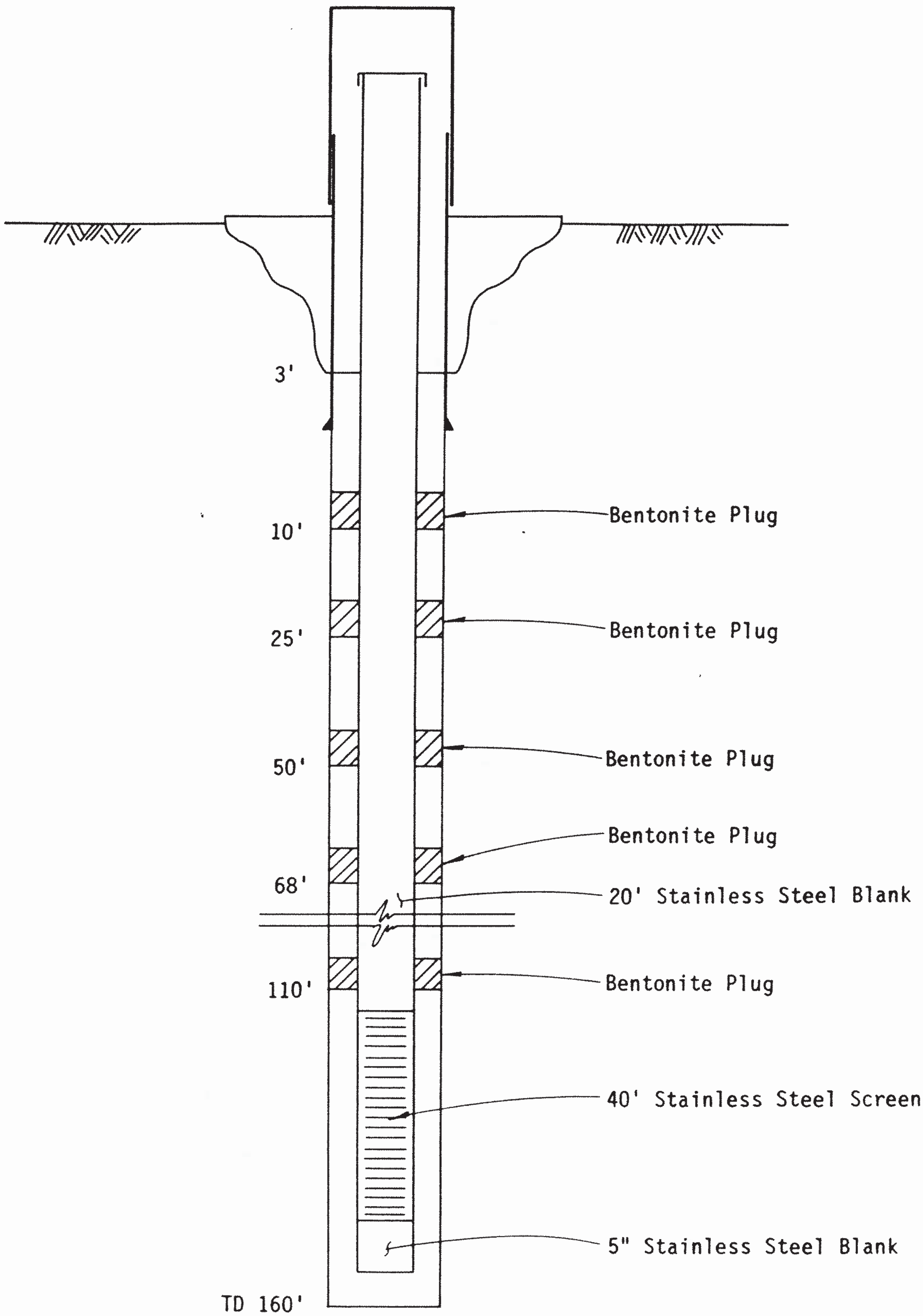
Spud Date 2/4/86 Completion Date

Logs Run Lithology Logged By Selke/Gutierrez

Elevation Spud In (Fm.)

Remarks

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
135							
			28	135	140		
140							
			29	140	145		
145							
150							
155							
160							
165							
170							
175							



COMPLETION DIAGRAM
MW-2

GCL

WELL LOGGING FORM

Client: City of Albuquerque — Well Number: MW 2

___1/4 ___1/4 ___1/4 ___1/4 S 14 T 11N R 3E State: New Mexico

County: Bernalillo — Contractor: PSI

Spud Date: 3-26 — Completion Date: 3-27-86

Logs Run: Lithology — Logged By: Nicholas

Elevation: ___ — Spud In (Fm.): ___

Remarks: Soil samples taken w/split spoon sampler at indicated intervals

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
0–18.0							0-18.0 Fine to med. grained silty sand, mod. yellowish brn. (10 yr. 5/4) w/minor gravel, med. to coarse grained and some trash, odor; strong
18.0–35.0							18.0-35.0 Edith gravel, (1/4" - 4" cobbles), w/ minor sand. Trash odor
35.0–50.0						8603261020 40'	35.0-50.0 Gravelly sand, fine to coarse grained sand, mod. yellowish brn. (10 yr. 5/4), w/minor amount of silt, w/gravel cobbles up to 4" Trash odor

WELL LOGGING FORM

Client City of Albuquerque Well Number MW 2

1/4 1/4 1/4 1/4 S 14 T 11N R 3E State New Mexico

County Bernalillo Contractor PSI

Spud Date 3-26 Completion Date 3-27-86

Logs Run Lithology Logged By Nicholas

Elevation Spud In (Fm.)

Remarks

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
45							
50							50.0-62.0 Sandy gravel, fine to coarse grained sand, mod. yellowish brn. (10 yr. 5/4), w/gravel cobbles 1/2" - 5". Trash odor
55							
60							62.0-70.0 Silty clay, 6" sand lense at 66" in split spoon
						8603261120 66'	
65							
70							70.0-75.0 Med. to coarse grained sand, dark yellowish brn. (10 yr. 4/2). Still a slight Trash odor.
75							75.0-90.0 Fine to Med. grained sand, dark yellowish brn. (10 yr. 4/2) w/a few 1" - 2" qtzite cobbles
80							
85							

GCL

WELL LOGGING FORM

Client City of Albuquerque Well Number MW 2

___1/4___1/4___1/4___1/4 S 14 T 11NR 3E State New Mexico

County Bernalillo Contractor PSI

Spud Date 3-26 Completion Date 3-27-86

Logs Run Lithology Logged By Nicholas

Elevation ______ Spud In (Fm.) ______

Remarks

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
90							91.0-115.0 Silty sandy clay w/minor amount moist gypsum, dark yellowish brn. (10 yr. 2/2), isolated sand lenses 1" - 3" thick, decreasing moisture at 100'
95							
100							
105							
110							1415 at 115'
115							115.0-120.0 Sandy clay, moist, moderate brn. (5 yr. 3/4)
120							120.0-165.0 Very fine, grained sand, wet, well sorted, moderate yellowish brn. (10 yr. 5/4)
125							
130							

GCL

WELL LOGGING FORM

Client: City of Albuquerque   Well Number: MW 2

___1/4 ___1/4 ___1/4 ___1/4 S 14 T 11N R 3E State New Mexico

County: Bernalillo   Contractor: PSI

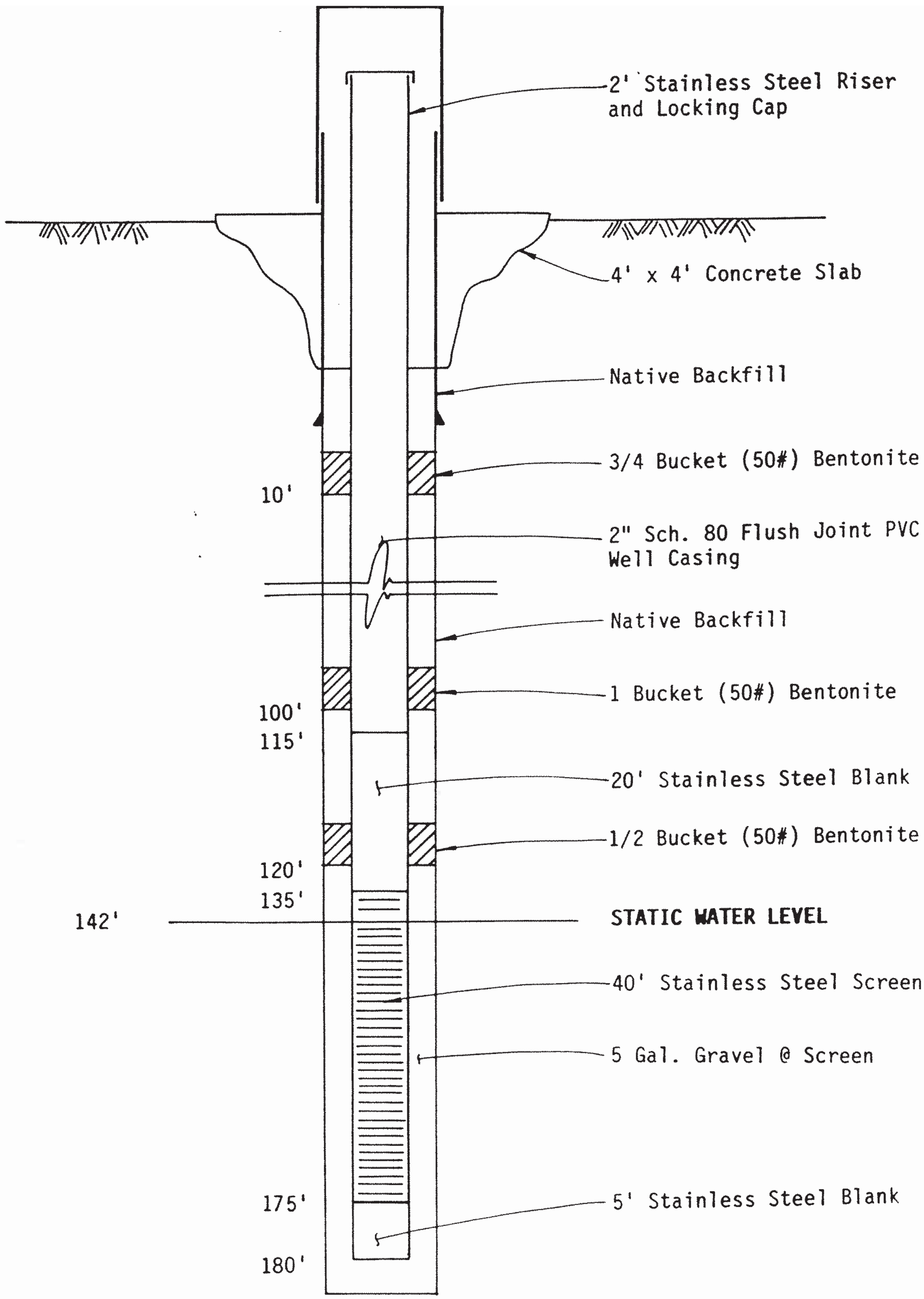
Spud Date: 3-26   Completion Date: 3-27-86

Logs Run: Lithology   Logged By: Nicholas

Elevation: ____   Spud In (Fm.): ____

Remarks

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
135							
140							
145							
150							
155							
160							
165							1525 165'
							TD 160'
170							
175							



COMPLETION DIAGRAM
MW-3

GCL

WELL LOGGING FORM

Client: City of Albuquerque — Well Number: MW 3

___1/4 ___1/4 ___1/4 ___1/4 S 14 T 11N R 3E State: New Mexico

County: Bernalillo — Contractor: PSI

Spud Date: 3-28-86 — Completion Date:

Logs Run: Lithology — Logged By: Nicholas/Larson

Elevation: — Spud In (Fm.):

Remarks: Began at 0900 No refuse in this hole
Soil samples taken w/split spoon sampler at indicated intervals

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
0							0.0-5.0 Gravelly sand, fine to coarse grained sand w/minor amount gravel cobbles up to 1", mod. brn. (5 yr. 4/4)
5							5.0-10.0 Gravelly clayey sand, fine to coarse grained sand w/ gravel cobbles up to 1", mod. yellowish brn. (10 yr. 5/
10							10.0-15.0 Sandy clay, clay w/fine to med. grained sand and a few small cobbles, mod. yellowish brn. (10 yr. 5/4)
15							15.0-40.0 Gravelly sand, med. to coarse grained sand w/gravel up to 2", mod. yellowish brn. (10 yr. 5/4) to mod. brn. (5 yr. 4/4) increasing percent of cobbles in size and quantity w/depth
20							
25							
30							
35							
40							40.0-80.0 Edith gravel, cobbles up to 5", localized sand

GCL

WELL LOGGING FORM

Client City of Albuquerque Well Number MW 3

1/4 1/4 1/4 1/4 S 14 T 11N R 3E State New Mexico

County Bernalillo Contractor PSI

Spud Date 3-28-86 Completion Date

Logs Run Lithology Logged By Nicholas

Elevation Spud In (Fm.)

Remarks Began at 0900 No refuse in this hole

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
45							
50							
55							
60							
65							
70							
75							
80							80.0-90.0
							Silty sand, fine to coarse grained sand, light
							olive gray
85							80' - 85' (5 y 5/2), (sand has oily (?) odor) to
							85' - 90', olive gray (5 y 3/2)

GCL

WELL LOGGING FORM

Client City of Albuquerque Well Number MW 3

1/4 1/4 1/4 1/4 S 14 T 11N R 3E State New Mexico

County Bernalillo Contractor PSI

Spud Date 3-28-86 Completion Date

Logs Run Lithology Logged By Nicholas

Elevation Spud In (Fm.)

Remarks Began at 0900, No refuse in this hole

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
90							90.0-125.0 Silty clay, w/localized very fine grained sand lenses, dark yellowish brn. (10 yr. 4/2), sand, moderate yellowish brn. (10 yr. 5/4) moist
95						8603281210 96'	
100							
105							
110							
115							
120						8603281350 121'	
125							125.0-130.0 Clayey silty sand, moderate brn. (5 yr. 3/4) to dark yellowish brn. (10 yr. 4/2) med. to coarse grained sand
130							130.0-140.0 Sand, very fine to fine grained sand, moderate

GCL

WELL LOGGING FORM

Page 4 of 4

Client City of Albuquerque **Well Number** MW 3

1/4 1/4 1/4 1/4 **S** 14 **T** 11N **R** 3E **State** New Mexico

County Bernalillo **Contractor** PSI

Spud Date 3-28-86 **Completion Date**

Logs Run Lithology **Logged By** Nicholas

Elevation **Spud In (Fm.)**

Remarks Began at 0900, No refuse in this hole

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
135							
140							140.0-145.0 Very fine sand, pale yellowish brn. (10 yr. 6/2), very well sorted. Water table - 142' - 143'
145							145.0-150.0 Very coarse sand, w/cobbles, mod. poor sorted, <5% silt, rounded, grayish, orange pink (5 yr. 7/2)
150							150.0-155.0 Fine sand, well sorted, rounder, w/pebbles (5 yr. 7/2)
155							155.0-165.0 Fine sand, well sorted, lt. brownish gray (5 yr. 6/1), 45% clay matrix
160							
165							165.0 Lt. brownish gray (5 yr. 6/1), fine to very fine sand, well sorted, <15% clay matrix
170							
175							

Borehole No. LALF9

Location: 11N.3E.14.341, Alameda Quad. (7.5'), Bernalillo County, north edge of Domingo Baca Ditch, at west end, above drop structure and flood basin discharging into main AMAFCA drainage channel. Site is adjacent to SW corner of property at 4432 Anaheim.

Elevation: 5090 ft (land surface estimate)

Drilling Dates: November 19-22, 1993

Drilling Equipment and Method: USBR Failing 1500 mud rotary; 7 7/8-in tricone rock bit, 4-in drill pipe

Driller: Rick Poel (USBR)

Drilling Foreman: Harold Nestor (USBR)

Hydrogeological Logging: John Hawley (NMBMMR) with Douglas Earp (City of Albuquerque, Environmental Health Dept.)

Depth (ft)	Lithologic Description
0-5	Fill, not sampled
5-10	Coarse loamy sand to sandy loam; brown (7.5YR5/4); 15-20% silt-clay, 70% med-crs sand, 10-15% granules; arkosic (Sandia suite), calcareous
10-20	Very coarse sandy clay loam; brown (7.5YR5/4); 30-40% silt clay, 30% med to vy crs sand, 30-40% granules; arkosic (Sandia Suite), calcareous
20-30	Pebbly sand; yellowish brown to brown (10-7.5YR5/4); 60-70% fine to vy crs sand, 30-40% granules to fine pebbles; mixed siliceous mineralogy slightly calcareous
30-40	Sandy pebble gravel; 40% sand (fine to vy crs), 60% granule to coarse pebble gravel; max clast ≤ 1-in; mixed siliceous clast lithology includes quartz, feldspar, and volcanic, plutonic, sedimentary (no limestone) lithic clasts
40-58	As above (30-40)
58-60	Sand and clay (inbedded?), brown (7.5YR5/4), calcareous
60-70	Sandy pebble gravel as above (30-58), with thin interbeds of brown sandy clay
70-80	Valley-fill over/basin-fill contact zone between 73 and 78 ft; sandy gravel with thin interbeds of silty clay loam, brown (10-7.5YR5/3); pumice definitely present in cuttings below 78 ft
80-90	Fine pebbly sand, slightly silty, brown (10YR and 7.5YR, 4 and 5/3); 10% silt, 90% sand to fine pebble gravel; pumiceous, mixed-siliceous mineralogy
90-95	Pumiceous silty clay, brown (7.5YR4-5/3), 10-15% pumice clasts (< 5mm)
95-103	silty clay, dark brown to brown (7.5YR4/3), with pinkish gray (7.5YR) fragments below 100 ft
103-113	Silty clay, brown (7.5YR5/3)
113-120	Interbedded sandy clay, and sand and fine pebble gravel; clay-brown (7.5YR5/3), sand-variegated brown (dominantly 10YR5/3); 50% silt-clay, and 50% sand and pebbles (< 0.5 inch); mixed siliceous clast lithologies, including quartz, feldspar, and volcanic, plutonic, and sedimentary (no limestone) lithic clasts

Depth (ft)	Lithologic Description
120-133	Sand and fine pebble gravel, with silty clay interbed; colors as above (113-120); 20-30% silt-clay, and 70-80% sand and pebbles; size and clast lithology as above (113-120); no pumice noted.
133-157	Pebbly sand; variegated brown (dominantly 10YR5/3); less than 5% silt-clay, 15-35% granule and pebble gravel (< 2 in?); clast lithology, as above (113-133)
157-170	Sandy clay, with pebbly sand interbeds; clay-brown (7.5YR5/3-4); 60% clay-silt-fine sand, 40% sand and pebble gravel (< 2 in?), mixed lithology, as above
170-180	Fine sandy clay, brown (7.5YR5/4); 95% clay-silt-fine sand, 5% med sand to pebble gravel
180-183	Sand and pebble gravel
183-190	Fine sandy clay; brown (7.5YR5/4); 75% clay-silt-fine sand, and 25% med sand to pebble gravel
190-200	Fine sandy clay, as above (170-180 ft)
200-202	Pebbly sandy clay, brown (7.5YR5/4); 60% clay-silt-fine sand, 40% med sand to pebble gravel
202-210	Sand and medium pebble gravel (?)
210-218	Sand and med to crs pebble gravel; dark brown to brown (10YR4/3); 10% silt-clay, brown (7.5YR5/4); clast lithology as above (113-133), max grain size ~ 1-in
218-220	Silty clay; brown (7.5YR5/4)
220-248	Sand and fine pebble gravel as above (210-218); with few (10% silty clay interbeds (230-240); bottom of hole (11/22/93, 10:10 am)

Supplemental Comments on Drilling History

Depth (ft)	Comments
0-22	9:45 - 10:30 am (11/19/93); drill collar hole
22-31	11:20 - 11:45 am; unconsolidated (soft), coarse sand to fine pebbles at 23 ft; bit chatter at 25 ft (coarse pebbles)
31-42	11:45 am - 12:15 pm; coarse gravel at 32 ft; fast drilling in sand, 40-42 ft
42-50	12:15 - 1:05 pm; bit chatter (gravel) at 42 ft
50-63	1:40 - 2:10 pm
57	1:50 pm; hard (clay?) at 58.5 ft
59.5	2:05 pm, bit chatter (gravelly sand)
63	2:10 - 2:55 pm; mixing mud
63-73	2:55 - 3:09 pm
73-83	3:09 - 3:15 pm; bit chatter (gravel sand bed) at 73, changing quickly to smooth drilling (sand or sandy clay)
83-95	3:15 - 4:00 pm; hard drilling (93-94 ft) through dense pumiceous clay
95-100	9:15 - 9:40 am (11/20/93); back in hole with no caving; slow drilling, hard fine-grained matter, with soft (sandy?) streaks
100-103	9:40 - 9:45 am; softer
103-110	10:35 - 11:05 am; soft (103.5-104.5 ft)
110-123	11:05 - 11:15 am; soft, with bit chatter in gravel at 112-113 ft
123-133	11:30 - 11:40 am; hard, poor circulation and sample recovery
133-143	11:40 - 11:50 am; good sample recovery, medium to coarse grained
143-150	12:30 - 12:42 pm; bit chatter below 143 ft, with thin smooth drilling (fine-grained) zones
150-160	12:42 - 1:00 pm; smooth drilling (sand?) below 151 ft; firmer (sandy clay), 157-160 ft
160-173	2:00 - 2:25 pm; mostly smooth-drilling, firm (sandy clay); bit chatter at 160 ft
173-183	2:25 - 2:35 pm
183-190	2:35 - 3:00 pm; hard, firm (600 psi bit pressure)
190-192	3:00 - 3:20 pm
192-203	3:20 - 3:36 pm; softer (300 psi bit pressure), soft zone at 194 ft
203-210	9:14 - 9:20 am (11/22/93); back in hole with little caving; bit chatter at 203 ft (gravel slough?)
210-220	9:20 - 9:33 am; smooth drilling (silty clay?), 218-220 ft
220-230	9:47 - 9:56 am; bit chatter
230-240	9:56 - 10:07 am
240-243	10:07 - 10:10 am; bottom of hole

Sampling Information
Sample interval 10-ft (5-ft or less in a few zones); sieve (fine to coarse fraction) and some wash bucket (fine to medium size) samples.

Borehole Geophysics
USGS-WRD (R.K. DeWees and Jim Bassler) Logging started at 11:48 am (239 ft) on November 22 and completed in afternoon; including resistivity, natural gamma, neutron-density, and caliper logs

Borehole No. LALF 9 (cont'd.)

Hydrogeologic Interpretations

Depth (ft)	Hydrostratigraphic Unit	Lithofacies
5-20	Distal Sandia piedmont; coalescent-fan alluvium (PA)	Vf
20-73	River-terrace deposits (VA-g)	Iv
73-78	Contact of river-terrace (Edith) gravel on Santa Fe Group (ancestral-river facies) in this 5 ft interval (VA-g/USF-2)	Iv/Ib
78-95	Upper Santa Fe Group (USF-2), ancestral-river — channel facies	Ib
95-120	Upper Santa Fe Group (USF-2), ancestral-river — interbedded floodplain and channel facies	III
120-157	Upper Santa Fe Group (USF-2) — channel facies	Ib
157-202(?)	Upper Santa Fe Group (USF-2), ancestral-river — interbedded floodplain (major) and channel (minor) facies	III
202(?)-243	Upper Santa Fe Group (USF-2), ancestral-river — channel facies	Ib

Borehole No. LALF 11

Location: 11N.3E.15.2444, Alameda Quad. (7.5'), Bernalillo County, west edge of main AMAFCA drainage channel, about 1100 ft south of Alameda Blvd.
Elevation: 5060 ft (land surface estimate)
Drilling Dates: December 6 and 7, 1993
Drilling Equipment and Method: USBR Failing 1500 mud rotary; 7 7/8-in tricone rock bit, 4-in drill pipe
Driller: Rick Poel (USBR)
Drilling Foreman: Harold Nestor (USBR)
Hydrogeological Logging: John Hawley (NMBMMR) with Douglas Earp (City of Albuquerque, Environmental Health Dept.)

Depth (ft)	Lithologic Description
0-5	Pebbly sand fill, not sampled
5-14	Pebble gravel and sand; less than 5% silt-clay, pinkish gray to light brown (7.5YR6/3), very calcareous; coarse pebbles to small cobbles 13-14 ft (Driller); mixed siliceous lithologies including quartz, feldspar, and volcanic, plutonic and sedimentary (no limestone) lithic clasts
14-15	Sandy to silty clay over/sand and pebble gravel, as above; clay-dark brown to brown (10YR-4/3-4, 5/3)
15-22	Coarse gravelly sand to sandy gravel, as above (5-14)
22-32	Pebbly sand; with interbedded sandy to silty clay, brown (7.5YR5/3); 40% clay-silt-fine sand; 60% sand and fine to medium pebble gravel; noted fragment of calcrete, pink (7.5YR7/3)
32-42	Silty clay, with interbedded pebbly sand; clay-brown (7.5YR5/4); as above (22-32), 60% silt-clay, 40% sand and fine-med pebble gravel
42-45	As above (32-42 ft) but finer grained; clay — light gray (10YR7/2-3); 70% silt-clay, 30% sand and fine-med pebble gravel
45-52	As above (42-45 ft); variegated, light gray (10YR7/2) and brown (7.5YR5/4); pumice noted in cuttings at about 50 ft
52-58	Fine pebbly (pumiceous) sand, with interbedded silty clay; light brownish gray, pale brown (10YR6/2-3); 30% silt-clay, 70% medium sand to fine pebbles; pumice clasts major component of coarse fraction
58-62	As above (52-58 ft, but finer; 40% silt-clay, 60% medium sand to fine pebbles; with variegated brown (7.5YR4/3) and light brownish gray (10YR6/2) zones; base of pumiceous interval
77-82	Silty clay, with fine sand; brown (7.5YR4/3) to reddish brown (5YR4/3); 90% silt-clay, 10% fine sand interbeds(?)
82-87	Clay, grayish brown to brown (10YR5/2 to 7.5YR5/3); hard; calcareous (?)
87-92	Silty clay, with interbedded sand and fine pebble gravel; silt-clay — brown (7.5YR5/3), with light yellowish brown (7.5YR6/4) mottles; calcareous?
92-110	Sand and coarse pebble gravel; brown (7.5-10YR5/3); with about 5% silty clay — reddish brown (5YR5/3), as above (71-92); coarse pebble gravel layer (< 2-in) 99-100 ft; mixed rounded, siliceous, igneous and sedimentary (no limestone), as above
110-115	Silty clay, interbedded with sand and pebble gravel, as above (92-110 ft); clay — brown (7.5YR5/3), sand-brown (7.5-10YR5/3); 75% silt-clay; 25% sand and pebbles

Borehole No. LALF 11 (cont'd.)

Depth (ft)	Lithologic Description
115-120	Sand and pebble gravel, with silty clay interbeds; colors as above (mostly 10YR5/3); 75%, sand and pebbles; 25% silt-clay
120-140	Sand and pebble gravel; brown (10YR5/3); < 5% brown (7.5YR5/3) sandy clay; composition as above; finer pebbly sand zone, 135-140 ft
140-147	As above (120-135); clay — grayish brown to dark grayish brown (10YR4-5/2); bottom of hole (12/7/93, 12:10 pm

Supplemental Comments on Drilling History

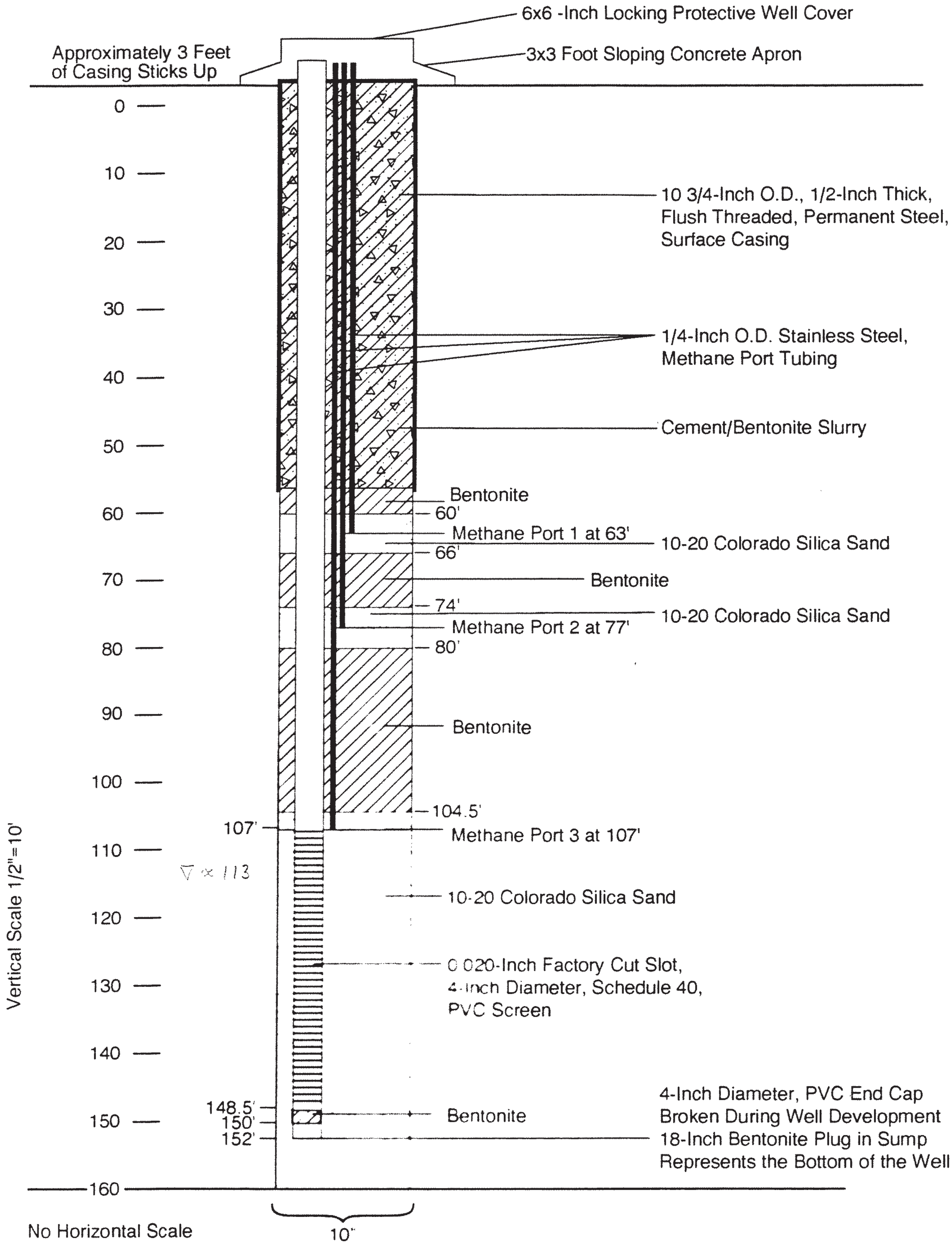
Depth (ft)	Comments
5-14	10:30 - 11:15 am (12/6/93); cobbly 13-14 ft
15-20	11:15 - 11:40 am; hard clay over sand and fine (< 3-in) gravel 14-15 ft
20-22	11:40 - 11:49 am; gravel (< 3-in) and sand; hole caving, had to use 10-ft "sub"
22-32	12:20 - 12:40 pm; fast, smooth drilling; pebbly sand and silty clay
32-42	1:45 - 1:55 pm; fast, smooth drilling; mostly soft silty clay; stop to mix mud (1:55 - 2:47 pm)
42-52	2:47 - 3:00 pm; as above; stiff clay at about 45 ft; softer at 50 ft, more sand (pumiceous)
52-62	3:00 - 3:15 pm
62-82	3:25-3:50 PM; hard, stiff clay at 76-77 ft (3:45 pm); softer at 79 ft, harder at 80 ft
82-92	9:50 - 10:15 am (12/7/93); stiff clay, 82-87 ft; softer below 87, with some bit clatter; sandy with some fine gravel
92-102	10:15-10:30 am; sand and fine gravel; strong bit chatter 99-100 ft
102-110	10:35 - 10:45 am; sand and fine gravel
110-115	10:45 - 10:50 am; harder, more clay
115-122	10:50 - 11:00 am; bit chatter 115 and 120 ft, more sand and gravel
122-130	11:05 - 11:20 am; bit chatter, mostly sand and fine gravel; minor silt-clay
130-140	11:20 - 11:35 am; as above (122-130 ft)
140-142	11:35 - 11:42 am; firmer at 140 ft (still sand?)
142-147	11:55 am - 12:10 pm; bottom of hole

Sampling Information
Sample interval 10-ft (5 ft or less in a few zones); sieve (fine to coarse fraction) and some wash bucket (fine to medium size) samples

Borehole Geophysics: None

Hydrogeologic Interpretations

Depth (ft)	Hydrostratigraphic Unit	Lithofacies
5-22	River-terrace deposits (VA-g) (Edith gravel of Lambert, 1968)	Iv
22-32	Contact of river-terrace sand and gravel (VA-g) on Santa Fe Group (ancestral-river facies, USF-2) in this interval	Iv/III
32-92	Upper Santa Fe Group (USF-2) ancestral-river — interbedded floodplain and channel facies (pumiceous, 50-62)	III
92-147	Upper Santa Fe Group (USF-2) ancestral-river — channel facies	Ib



LALF-13 Well Completion Detail
Los Angeles Landfill Site

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-13	COORDINATES:	DATE: 5/2/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/2/96
ENGINEER/GEOLOGIST: L.A. Hohweiler J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/17/96
DRILLING METHODS: Dual Case Percussion		PAGE: 1 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
				Landfill Cover: Sand, brn. gravel, cobbles			
10				Trash			
				Trash, fumes/steam from open hollow stem augers			
20							
30				Trash, High temperatures from augers, steam			
				Trash, hard drilling at 41 feet, broke through			
40							
				Brown, coarse, sub-angular, sand, moist, some gravel	SP		
50							

NOTES: Tagged reamed boring at 46.5 feet, fluid level dry

Figure 2-10
Lithologic Log of LALF-13
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-13	COORDINATES:	DATE: 5/2/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/2/96
ENGINEER/GEOLOGIST: L.A. Hohweiler J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/17/96
DRILLING METHODS: Dual Case Percussion		PAGE: 2 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
		50 -12"		Fill, trash, wood fragments–dry			Bottom of refuse at 52 ft.
				Dense, light brown, homogeneous, fine to coarse, angular, well graded, sand and fine to coarse gravel (up to 25mm dia.) subangular to well rounded, dry	SW		
55	Analytical and Moisture Sample	11/14/23	—	Hard, tan, homogeneous, clay-moist and little fine gravel	CL		Moisture sample collected Metals sample collected
60	Analytical Sample	50/4"	12	Vey dense, light brown, homogeneous, fine to medium, subangular to subrounded, poorly graded, clayey sand–moist	SC		
65		9/21/22/25	24	Dense, orange, black, white, homogeneous, fine to medium, angular, poorly graded, sand (clean)– moist, occasional coarse sand	SP		
70		14/26/ 30/35	18	Very dense, black, orange, white, homogeneous, fine to medium, angular, poorly graded, sand–moist, occasional fine gravel	SP		
75		11/13/ 18/19	18	Dense sand, as at 70 ft., Occasional reddish brown, homogeneous, low plasticity, silty clay up to 2 cm thick–clay mildly indurated	SP		
80		12/23/ 25/40 18"	18	Very dense, black & white homogeneous, fine to medium, subangular, poorly graded, sand (clean)–moist	SP		

NOTES:

Figure 2-10
Lithologic Log of LALF-13,
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-13	COORDINATES:	DATE: 5/16/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/2/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/17/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 3 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
85		20/27/ 28/50	18	Very dense, medium brown, homogeneous, fine, silty, clayey sand–wet	SM/ SC		No headspace or liner collected
90	Analytical Sample	17/12/ 14/18	24	Hard, medium brown, homogeneous, low-medium plasticity, slightly silty clay–wet	CL		Bioassessment sample
			18	Dense, medium brown, homogeneous, very fine, clayey sand–wet	SC		At 90' drillers note landfill gas odor from dual tube
95		51-6 50-6		Very dense, orange brown, homogeneous, fine, subangular-angular, poorly graded, sand (clean)–wet	SP		
100		7/16/ 24/22	24	Hard, dark brown, homogeneous, low plasticity, silty clay–moist	CL		All instruments zero in breathing zone
105		50/5	12	Very dense, orange brown, homogeneous, fine, angular, poorly graded, sand–damp	SP		
110					SP		

NOTES:

Figure 2-10
Lithologic Log of LALF-13,
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-13	COORDINATES:	DATE: 5/16/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/2/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/17/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 4 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
		4/12/20/ 50-4"	12	Very dense, orange brown, homogeneous, fine to medium, angular, poorly graded, sand and fine, subrounded gravel–moist, wet in cutting shoe	SP		▽ 5-17-96 ▼ 5-25-96
115		5/33/ 50-4"	24	Very dense, medium brown, homogeneous, very fine, poorly graded, clayey sand–wet	SC		Take bio-sample
120		5/35/50-4	24	Sand as at 115' with occasional cemented sand nodules	SC		
125		5/28/50	24	Very dense, medium brown, homogeneous, fine to coarse, angular, moderately graded slightly silty, sand–wet	SM		
130		3/12/ 14/23	24	Dense, brown, homogeneous, fine to coarse, angular, poorly graded, sand–wet	SP		
135		7/50/4"	24	Very dense, orange, black brown, homogeneous, fine to coarse, angular to subrounded, well graded, sand (clean)–wet and fine to coarse subrounded to rounded gravel	SW/ GW		
140		2/55	24	Sand as at 130'			

NOTES: Used 48 brass liners

▽ First encountered groundwater level

▼ Static groundwater level

Figure 2-10
Lithologic Log of LALF-13,
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

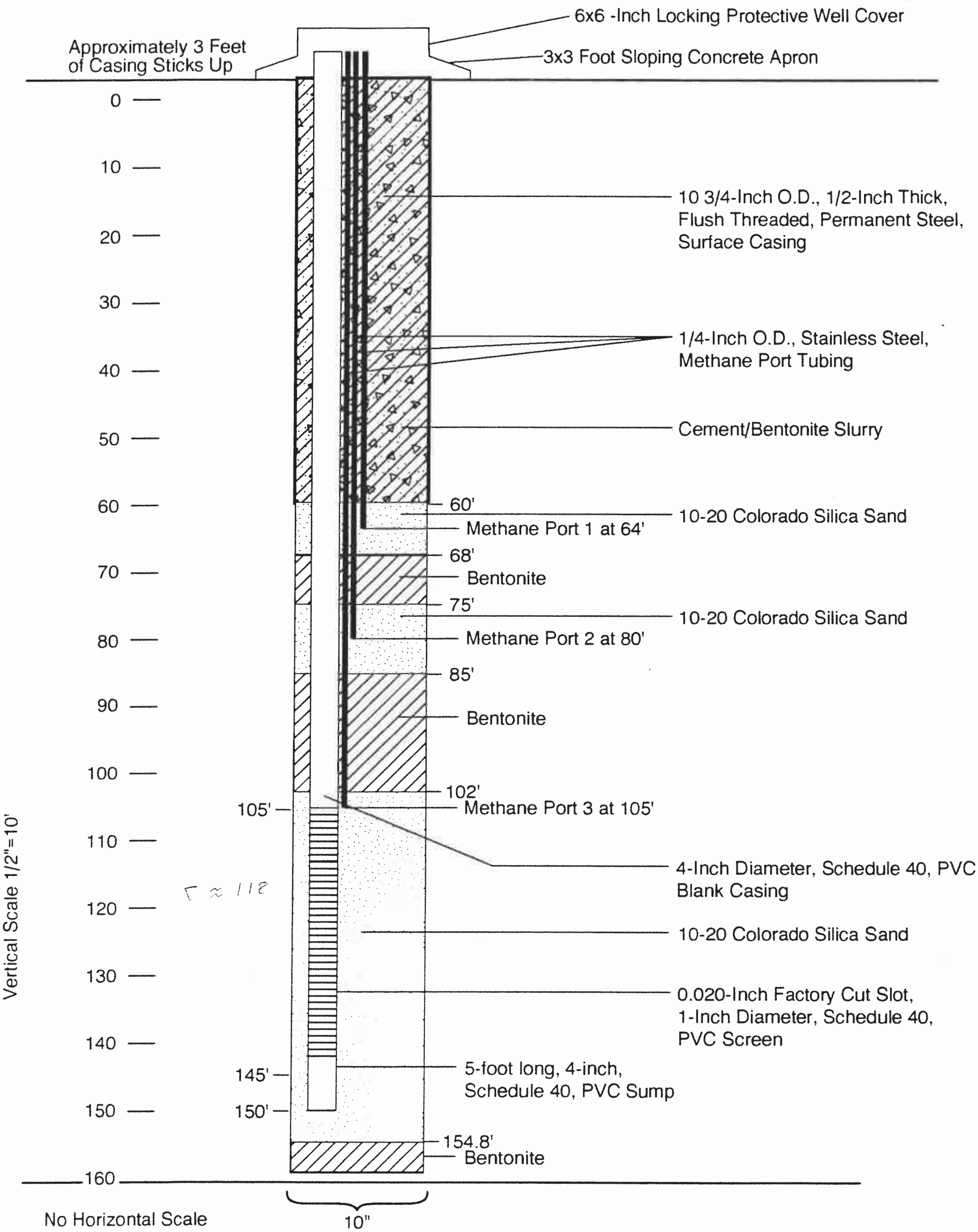
VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-13	COORDINATES:	DATE: 5/17/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/2/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/17/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 5 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
140				Very dense, orange black brown, homogeneous, fine to coarse, well graded subrounded, sand and subrounded, fine to coarse gravels–wet	SW/GW		
145				Brown, homogeneous, very fine clayey sand–wet	SC		
150				Same material noted by driller at cyclone	SC		
155							
160				Small lense of brown, sandy clay or clayey sand cyclone still producing water. Very thin and appears non-confining, no seal with dual tube	CL/SC		
165							
170				Black, orange brown, homogeneous, fine to medium angular to subrounded, poorly graded, silty sands, wet, logged from cyclone, flowing sands	SP/SC		

NOTES: Total depth of boring approximately 170'

Figure 2-10
Lithologic Log of LALF-13, Los Angeles Landfill



LALF-14 Well Completion Detail
Los Angeles Landfill Site

766926 02 08 00 00/ A15

6/24/96

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-14	COORDINATES:	DATE: 5/13/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/13/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/22/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 1 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
				Fil/Cover Material			
10				Fill/Trash			
				Trash			
20							
30				Trash, temperature increase in trash			
				Trash, steam inside augers			
40				Trash			
50							

NOTES:

Figure 2-11
Lithologic Log of LALF-14,
Los Angeles Landfill

766926.02.08.00.00 A9

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-14	COORDINATES:	DATE: 5/13/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/13/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/21/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 2 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
		15/35/ 50/4"		Refuse, compacted–moist			Bottom of refuse at 50 Ft.
50	Moisture Sample		12	Dense, light brown, homogeneous, very fine, poorly graded, clayey sand–moist.	SC		Moisture sample collected
55	Analytical Sample	14/37/38					Metals sample collected
60		6/17/ 22/26	18	Dense, light brown, homogeneous, fine to medium, angular to subangular, sand (clean)–moist	SP		
65		10/15/ 21/24	18	Dense, light brown, homogeneous, fine (angular) to coarse (subrounded), angular to subrounded, well graded sand, and fine, subrounded gravel–moist.	SW/GP		
70	Analytical Sample	10/13/ 17/24	18	Dense, brown white orange, homogeneous, fine to medium subangular to subrounded, poorly graded, sand and occasional fine, subrounded to coarse gravel–moist. Also 3"-thick of brown, homogeneous, non-plastic, silty clay in 3rd tube sampler (approximately 69')	SP/ ML		
		10/14/ 11/15	18	Sand and gravel as at 70', another 3-4" clay stringer at approximately 76'	SP/ ML		
75				Medium dense, medium brown, homogeneous, very fine, poorly graded, slightly clayey sand–moist	SC		
80		7/20/ 21/30	18		SP		

NOTES:

Figure 2-11
Lithologic Log of LALF-14,
Los Angeles Landfill

766926.02.08.00.00-A11

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-14	COORDINATES:	DATE: 5/13/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/13/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/21/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 3 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
				Dense, light brown, homogeneous, very fine, poorly graded, slightly silty sand–moist	SP		
85		10/27/ 21/14	18	Hard, brown, homogeneous, medium plastic, clay–moist	CL		
90		6/10/ 19/40	24	Very dense, brown, homogeneous, fine, poorly graded, sand–moist	SP		
95		12/10/ 7/50	18	Very dense, brown, homogeneous, fine (angular) to coarse (subrounded), poorly graded, sand–moist	SP		
100		18/33/ 50-4"	18	Same as at 95'–damp			
105	Analytical Sample	11/33/ 50-4"	18	Very dense, light brown, homogeneous, angular to subangular, poorly graded, silty sand and occasional subrounded coarse gravel–moist	SP		
110	Analytical Sample	19/50	12	Sand as at 105', no gravel–moist	SP		

NOTES:

Figure 2-11
Lithologic Log of LALF-14,
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-14	COORDINATES:	DATE: 5/13/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/13/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/21/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 4 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
							▽ 5-20-96
115		15/30/50	18	Very dense, orange, black, white, homogeneous, fine to medium, subangular to subrounded, poorly graded sand–wet	SP		Collect bio-assessment sample 15:50
		4/4/14/24	24				▼ 5-25-96
120		—	18	Orange, black, brown, homogeneous, fine to coarse angular to subrounded, well graded, sand and fine to coarse gravel–wet	SW/GW		
125		5/8/ 19/27	4	Sand and gravel as at 120', with subrounded gravel up to 5 cm diameter	SW/GW		
130		9/38/ 50/4	12	Very dense, orange, black, brown, homogeneous, fine to coarse, angular to subrounded, well graded sand and fine to coarse gravel–wet	SW/GW		Fine to coarse, subrounded to rounded gravels from Cyclone~130'
135		8/21/ 50/4	—	Sand and gravel as at 130'	SW		
140		10/15/ 50/4	—	Sand and gravel sample as at 130	SW		

NOTES: ▽ First encountered groundwater level
▼ Static groundwater level

Figure 2-11
Lithologic Log of LALF-14,
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

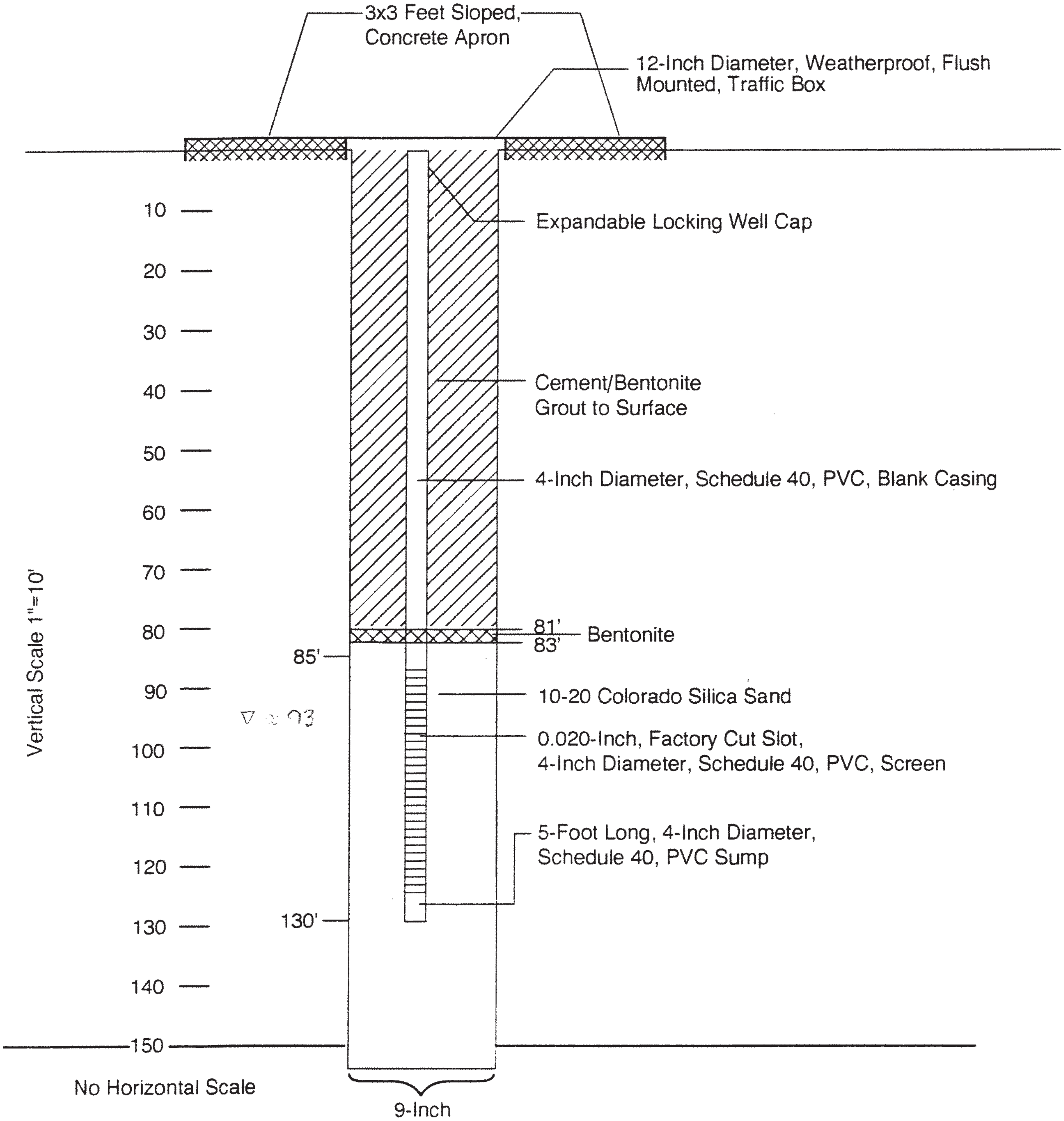
VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-14	COORDINATES:	DATE: 5/13/96
ELEVATION:	GWL: Depth N/A Date/Time N/A	DATE STARTED: 5/13/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth N/A Date/Time N/A	DATE COMPLETED: 5/21/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 5 OF 5

DEPTH (ft)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGIC SYMBOL	REMARKS
145		5/8/ 16/28	24	Sand and Gravel as at 130 feet, but dense	SP/GW		
150		6/21/ 50/4"	24	Very dense, orange, brown black, homogeneous, fine to medium, angular to subrounded, poorly graded, sand–wet	SP		Put head of water down–noted clay nodules from Cyclone softball size
155		11/20/ 38/50	24	Very stiff, brown, homogeneous, very fine, low plasticity, clayey sand or sandy clay–wet	SC/CL		
				Hard, brown, homogeneous, medium plastic clay– partially indurated–damp	CL		
				Total Depth Boring at 157'			

NOTES: 54 brass liner

Figure 2-11
Lithologic Log of LALF-14,
Los Angeles Landfill



LALF-15 Well Completion Detail
Los Angeles Landfill Site

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-15	COORDINATES:	DATE: 5/22/96
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 5/22/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth Date/Time	DATE COMPLETED: 5/23/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 1 OF 5

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGY	REMARKS
0				Top soil-sand, gravel, and vegetation, brown, homogeneous, fine to medium, poorly graded silty sand	SM		
5				Very stiff, medium brown, heterogeneous, non plastic, sandy clay with stringers of light brown, fine, clayey sand-damp, occasional subrounded, fine gravel	CL/SP		
10		7/7/6/10	18				
				Coarse gravel and cobbles, rounded blown up in cyclone at 12-13 feet			
15		11/17/13/13	12	Medium dense, brown, gray, white, homogeneous, fine to coarse, angular to subrounded, well graded, sand and subrounded, fine to coarse gravel-dry	SW/GP		
20		14/24/14/15	12	Medium dense, light brown, homogeneous, fine, angular, poorly graded sand-moist	SP		
25		2/1/26/32	12				
		6/34/50-4"	4	Very dense, orange, white, brown, homogeneous, fine to coarse, angular to subrounded, poorly graded sand and fine to coarse, subrounded gravel–moist	SP/GW		
30							

NOTES:

Figure 2-12
Lithologic Log of LALF-15,
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-15	COORDINATES:	DATE: 5/22/96
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 5/22/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth Date/Time	DATE COMPLETED: 5/23/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 2 OF 5

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGY	REMARKS
31				As at 25', not enough sample for headspace	SP		
35		9/14/14/15	12	Hard, grayish brown, homogeneous, non plastic silt-moist	ML		
40		9/11/13/15	24	Stiff brown, homogeneous, very fine, silty sand or sandy silt-moist	SM/ML		
45		4/6/20/18	18	Silt as at 35'	ML		
				Dense, orange, white, brown, homogeneous, fine to medium, angular, poorly graded sand-damp	SP		
50		15/24/27/25	18	Sand as at 45'-damp	SP		
55		10/24/26/24	18	Sand as at 45'-damp	SP		
60		10/50-4	—	Very dense, orange, white, brown, homogeneous, fine to coarse, angular to subrounded, well graded, sand and fine, rounded gravel-moist	SW/GP		

NOTES:

Figure 2-12
Lithologic Log of LALF-15,
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-15	COORDINATES:	DATE: 5/22/96
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 5/22/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth Date/Time	DATE COMPLETED: 5/23/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 3 OF 5

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGY	REMARKS
61				Hard, light brown, homogeneous, very fine, non plastic sandy silt-moist	ML		Moisture sample collected
65	Moisture Sample	7/11/16/22	18				
70		6/6/5/7	24	Very stiff, brown, homogeneous, medium plastic, silty clay-moist	CL		
75		6/18/25/33	24	Silty clay as at 70'	CL		
80		13/18/20/32	24	Hard, brown, heterogeneous, non plastic silt and very fine silty/clayey sand-moist	ML/SM		
85		7/18/19/18	18	Dense, orange, white, brown, homogeneous, fine to coarse, angular to subrounded, well graded sand and fine gravel-moist	SW/GP		
90		12/31/34/27	18	Very dense, orange, white, brown homogeneous, fine to medium, angular, poorly graded, sand-moist, damp in split-spoon sampling shoe	SP		

NOTES:

Figure 2-12
Lithologic Log of LALF-15,
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-15	COORDINATES:	DATE: 5/22/96
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 5/22/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth Date/Time	DATE COMPLETED: 5/23/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 4 OF 5

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGY	REMARKS
91							▽ 5-22-96
95	Analytical Sample	8/16/16/20	18	Dense, orange, white, brown, homogeneous, fine to coarse angular to subrounded, poorly graded sand-wet	SP		Metals sample collected ▼ 5-26-96
100		8/10/27/31	18	As at 95'	SP		
105		1/2/14/17	24	As at 95'	SP		
110		10/20/28/34	24	As at 95'	SP		
		3/22/50-4"	24	Very dense, orange, white, brown, gray, subangular to subrounded, well graded, fine to coarse sand and fine to coarse gravel-wet	SW/ GW		
115							
		3/7/19/30	12	Sand and gravel as at 115'			
120							

NOTES: ▽ First encountered groundwater level.
▼ Static groundwater level.

Figure 2-12
Lithologic Log of LALF-15,
Los Angeles Landfill

INTERNATIONAL TECHNOLOGY CORPORATION

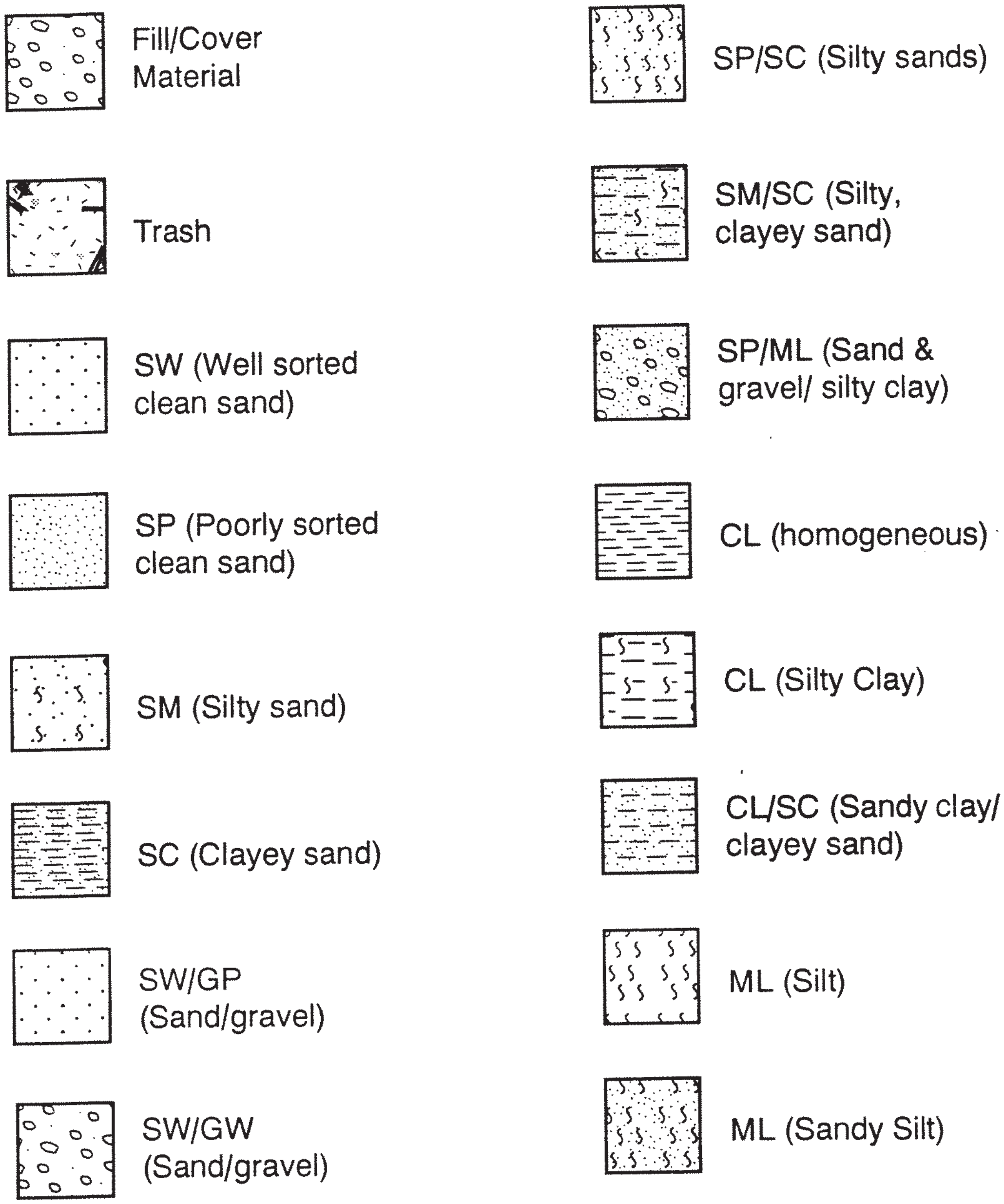
VISUAL CLASSIFICATION OF SOILS

PROJECT NUMBER: 766926.02.03.01.00	PROJECT NAME: Los Angeles Landfill	
BORING NUMBER: LALF-15	COORDINATES:	DATE: 5/22/96
ELEVATION:	GWL: Depth Date/Time	DATE STARTED: 5/22/96
ENGINEER/GEOLOGIST: J.S. Raugust	Depth Date/Time	DATE COMPLETED: 5/23/96
DRILLING METHODS: Dual Tube Percussion		PAGE: 5 OF 5

DEPTH (ft.)	SAMPLE TYPE & NO.	BLOWS ON SAMPLER/(6 in.)	RECOVERY (in.)	DESCRIPTION	USCS SYMBOL	LITHOLOGY	REMARKS
121					SW/ GW		
				As at 115'			
125		7/17/40/50-4"	24	Very dense, orange, white, brown, homogeneous, fine to coarse, angular to subrounded, well graded sand-wet	SW		
130		4/10/18/50-4"	24	Very dense, light brown, homogeneous, fine to medium, angular, poorly graded sand-wet	SP		
				As logged at 105'-with fine subrounded gravel -wet	SP/GP		
135							
140				Total depth 139 ft			
145							
150							

NOTES:

Figure 2-12
Lithologic Log of LALF-15,
Los Angeles Landfill



Lithologic Symbols Associated with Figures 2-10, 2-11, and 2-12, Lithologic Logs
Los Angeles Landfill

Project: Los Angeles Landfill | Boring: **LALF-19** | Pg. 1 of 5

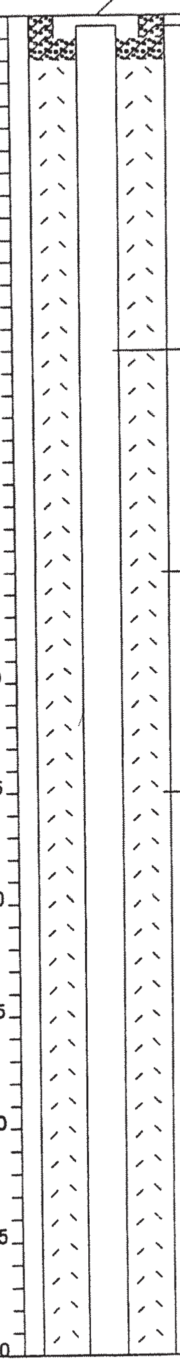
Drilling Co: Water Development Corp. | Drilling Method: Air Rotary | Date Started: 2/27/03

Location: | Sampler: | Date Completed: 2/27/03

Desc. of Meas Pt: | Logged by: B.Anderson

Land Surf. Elev: | Meas. Pt. Elev: | Reviewed by: C.Deatherage

WELL COMPLETION



Depth - FT.	Samples	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
0	G	LEAN CLAY WITH SAND - (5YR 3/3); sand is well graded, fine to coarse-grained; dry.	CL	0	20	80	D
5	G	SIMILAR TO ABOVE.	CL	0	20	80	D
10	G	SIMILAR TO ABOVE.	CL	0	20	80	D
20	G	WELL GRADED SAND - (5YR 5/4); trace gravels up to 1/4"; sand is well graded; dry.	SW	5	90	5	D
30	G	SIMILAR TO ABOVE.	SW	5	90	5	D
35	G	LEAN CLAY WITH SAND - (5YR 5/3); trace gravel up to 1/4"; sand is poorly graded, fine to medium-grained; moist.	CL	5	20	75	M
37	G	POORLY GRADED GRAVEL WITH SAND - (5YR 4/3); gravel up to 3/8", angular to sub-angular, to sub-rounded; sand is well graded; moist.	GP	65	30	5	M
40	G	SIMILAR TO ABOVE; gravel up to 1".	GP	65	30	5	M
50	G	SIMILAR TO ABOVE; increased gravel up to 2"; increased sand.	GP	55	40	5	M
57	G	SIMILAR TO ABOVE; gravel up to 1".	GP	55	40	5	M

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of LALF-19

Los Angeles Landfill
Albuquerque, New Mexico

Approved	Date	Revised	Date	Reference:	FIG.
TS	4/16/03			h:\753100	2a

HGC-WELL 753100.GPJ NEWPROJ.GDT 4/29/03

Project: Los Angeles Landfill | **Boring:** LALF-19 | Pg. 2 of 5

Drilling Co: Water Development Corp. | Drilling Method: Air Rotary | Date Started: 2/27/03

Location: | Sampler: | Date Completed: 2/27/03

Desc. of Meas Pt: | Logged by: B.Anderson

Land Surf. Elev: | Meas. Pt. Elev: | Reviewed by: C.Deatherage

WELL COMPLETION: 4" SCH 40 PVC Pipe; 9" Borehole; Cement with 4% Bentonite

Depth - FT.	DESCRIPTION	USCS Symbol	GR	SA	FI	Moisture
	WELL GRADED GRAVEL WITH SAND - (5YR 4/3); gravel is well graded; sand is poorly graded, fine to medium-grained; moist.	GW	55	40	5	M
	SILT WITH SAND - (5YR 3/3); sand is poorly graded, fine-grained; moist.	ML	0	25	75	M
65	WELL GRADED SAND WITH GRAVEL - (5YR 4/3); sand is well graded; moist.	SW	25	70	5	M
	POORLY GRADED SAND - (5YR 4/4); sand is poorly graded, fine to medium-grained; moist.	SP	0	95	5	M
70	WELL GRADED SAND - (5YR 4/4); trace gravel up to 3/8", sub-rounded; sand is well graded; moist.	SW	5	90	5	M
75	POORLY GRADED SAND - (5YR 4/3); sand is poorly graded; dry.	SP	0	95	5	D
80	LEAN CLAY - (5YR 5/2); sand is poorly graded, fine to medium-grained; dry.	CL	0	10	90	D
85	POORLY GRADED SAND - (5YR 5/4); sand is poorly graded, fine to medium-grained; dry.	SP	0	95	5	D
90	POORLY GRADED SAND - (5YR 5/3); sand is poorly graded, medium to coarse-grained; dry.	SP	0	100	0	D
110	POORLY GRADED SAND WITH SILT - (5YR 5/4); sand is poorly graded, fine to medium-grained; dry.	SP-SM	0	90	10	D
115	LEAN CLAY WITH SAND - (5YR 6/3); sand is poorly graded, fine to medium-grained; moist.	CL	0	25	75	M
	WELL GRADED SAND - (5YR 4/3); gravel is poorly	SW	5	80	15	M

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of LALF-19

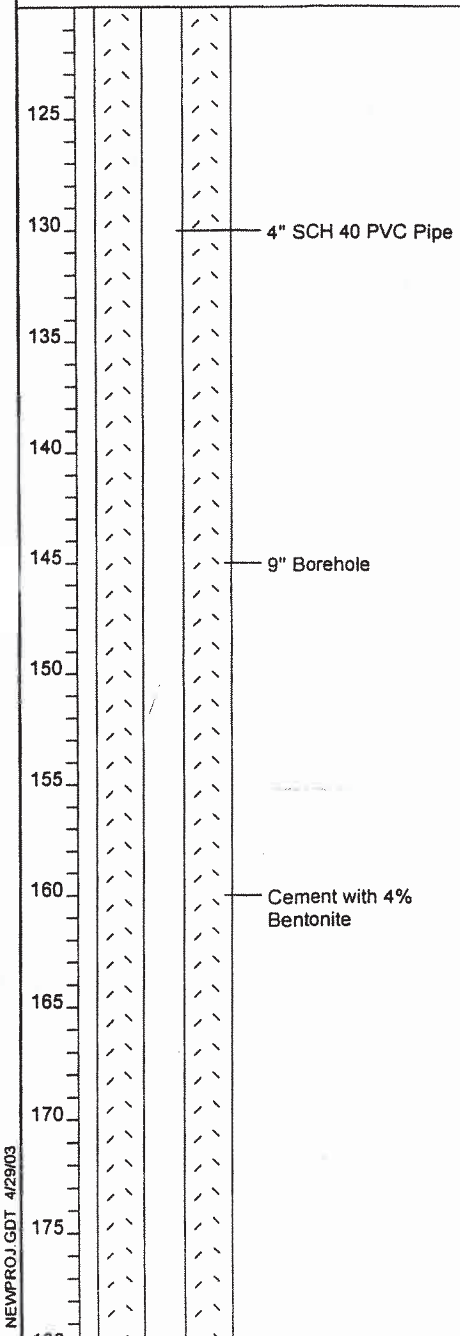
Los Angeles Landfill
Albuquerque, New Mexico

Approved	Date	Revised	Date	Reference:	FIG.
TS	4/16/03			h:\753100	2b

HGC-WELL 753100.GPJ WPROJ.GDT 4/29/03

Project: Los Angeles Landfill		Boring: **LALF-19**	Pg. 3 of 5
Drilling Co: Water Development Corp.	Drilling Method: Air Rotary	Date Started: 2/27/03	
Location:	Sampler:	Date Completed: 2/27/03	
	Desc. of Meas Pt:	Logged by: B.Anderson	
Land Surf. Elev:	Meas. Pt. Elev:	Reviewed by: C.Deatherage	

WELL COMPLETION



Depth - FT.	Samples	DESCRIPTION	USCS Symbol	GR (Estimated % of)	SA	FI	Moisture
120–122		graded up to 3/8", sub-rounded to sub-angular; sand is well graded; trace clay; moist.	SW	20	75	5	M
122–136	G	WELL GRADED SAND WITH GRAVEL - (5YR 4/4); gravel is poorly graded up to 1/2", sub-rounded to sub-angular; sand is well graded; moist.					
136–138	G	POORLY GRADED GRAVEL WITH SAND - (5YR 5/4); gravel up to 1/2", sub-rounded to sub-angular; sand is well graded; moist.	GP	25	70	5	M
138–139	G	POORLY GRADED GRAVEL WITH SAND - (5YR 4/3); gravel is poorly graded up to 2", angular to sub-angular; sand is well graded; wet.	GP	25	75	0	W
139–142	G	LEAN CLAY WITH SAND - (5YR 4/3); sand is well graded; wet.	CL	0	25	75	W
142–151	G	LEAN CLAY - (5YR 4/3); sand is poorly graded, fine-grained; wet.	CL	0	10	90	W
151–156	G	WELL GRADED GRAVEL WITH SAND - (5YR 4/4); gravel up to <1/2", angular; sand is well graded, rounded to sub-rounded; wet.	GW	65	30	5	W
156–158	G	WELL GRADED SAND - (5YR 4/4); gravel is poorly graded up to 3/4", sub-angular to sub-rounded; sand is well graded; wet.	SW	10	85	5	W
158–160	G	WELL GRADED SAND WITH CLAY - (5YR 4/3); sand is well graded; wet.	SW-SC	10	80	10	W
160–163	G	POORLY GRADED SAND - (5YR 5/4); sand is poorly graded, medium to coarse-grained; wet.	SP	0	95	5	W
163–166	G	POORLY GRADED SAND WITH GRAVEL - (5YR 5/3); gravel is poorly graded up to 1/2"; sand is poorly graded, medium to coarse-grained; wet.	SW	20	75	5	W
166–168	G	WELL GRADED SAND - (5YR 5/4); sand is well graded; wet.	SW	0	95	5	W
168–172	G	POORLY GRADED SAND - (5YR 5/4); sand is poorly graded, fine to medium-grained; moist.	SP	0	95	5	W
172–175	G	LEAN CLAY WITH SAND - (5YR 5/3); sand is poorly graded, fine to medium-grained; moist.	CL	0	25	75	M
175–180	G	SANDY LEAN CLAY - (5YR 5/3); gravel is poorly graded up to 1/2", sub-rounded to sub-angular; sand is well graded; moist.	CL	10	30	60	M

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of LALF-19

Los Angeles Landfill
Albuquerque, New Mexico

Approved	Date	Revised	Date	Reference:	FIG.
TS	4/16/03			h:\753100	2c

HGC-WELL GPJ NEWPROJ.GDT 4/29/03

Project: Los Angeles Landfill | **Boring:** LALF-19 | Pg. 4 of 5

Drilling Co: Water Development Corp. | Drilling Method: Air Rotary | Date Started: 2/27/03

Location: | Sampler: | Date Completed: 2/27/03

Desc. of Meas Pt: | Logged by: B.Anderson

Land Surf. Elev: | Meas. Pt. Elev: | Reviewed by: C.Deatherage

WELL COMPLETION (Depth - FT. 180–240):
- 4" SCH 40 PVC Pipe (185)
- 9" Borehole (190)
- Cement with 4% Bentonite (200)
- Bentonite Seal (210)
- 10-20 Silica Sand (215)
- 4" SCH 40 Mill Slot (0.02") Screen (225)

Depth - FT.	DESCRIPTION	USCS Symbol	GR	SA	FI	Moisture
	LEAN CLAY WITH SAND - (5YR 5/4); gravel is poorly graded up to 1/4", sub-rounded; sand is well graded; moist.	CL	5	25	70	M
185	LEAN CLAY - (5YR 4/4); sand is poorly graded, fine-grained; dry.	CL	0	10	90	D
190	WELL GRADED SAND WITH GRAVEL - (5YR 5/4); gravel is poorly graded up to 1", sub-rounded; sand is well graded; wet.	SW	25	70	5	W
	POORLY GRADED GRAVEL - (5YR 5/3); gravel is poorly graded up to 2", sub-rounded to sub-angular; trace coarse-grained sand; wet.	GP	5	95	0	W
195	LEAN CLAY WITH SAND - (5YR 5/4); sand is poorly graded, fine to medium-grained; wet.	CL	0	15	85	W
200	LEAN CLAY - (5YR 4/4); trace fine-grained sand; moist.	CL	0	5	95	M
205	LEAN CLAY WITH SAND - (5YR 4/3); sand is poorly graded, fine to medium-grained; moist.	CL	0	20	80	M
210	POORLY GRADED SAND - (5YR 5/3); sand is poorly graded, medium to coarse-grained; moist.	SP	0	100	0	M
	WELL GRADED SAND - (5YR 5/3); sand is well graded; wet.	SW	0	100	0	W
215	WELL GRADED SAND WITH GRAVEL - (5YR 4/4); gravel is poorly graded up to 3/8", sub-rounded; sand is well graded; wet.	SW	15	85	0	W
220	WELL GRADED SAND WITH GRAVEL - (5YR 4/4); gravel is poorly graded up to 1", sub-rounded to sub-angular; sand is well graded; wet.	SW	25	75	0	W
225	POORLY GRADED GRAVEL WITH SAND - (5YR 4/4); gravel up to 3/4", sub-rounded to sub-angular; sand is poorly graded, medium to coarse-grained; wet.	GP	30	70	0	W
230	WELL GRADED SAND WITH GRAVEL - (5YR 4/4); gravel is poorly graded up to 3/4", sub-rounded to sub-angular; sand is well graded; wet.	SW	15	80	5	W
235	WELL GRADED SAND WITH GRAVEL - (5YR 4/4); gravel is poorly graded up to 1", sub-rounded to sub-angular; sand is well graded; wet.	SW	15	80	5	W

Columns also present (blank): Blow Count, % Recovery, PID (ppm), Samples (G), Graphic Log.

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of LALF-19

Los Angeles Landfill
Albuquerque, New Mexico

Approved	Date	Revised	Date	Reference:	FIG.
TS	4/16/03			h:\753100	2d

HGC WELL 753100.GPJ NEWPROJ.GDT 4/29/03

Project: Los Angeles Landfill | **Boring:** LALF-19 | Pg. 5 of 5

Drilling Co:	Water Development Corp.	Drilling Method:	Air Rotary
Date Started:	2/27/03	Location:	
Sampler:		Date Completed:	2/27/03
Desc. of Meas Pt:		Logged by:	B.Anderson
Land Surf. Elev:		Meas. Pt. Elev:	
Reviewed by:	C.Deatherage		

Depth - FT.	WELL COMPLETION	Blow Count	% Recovery	PID (ppm)	Samples	Depth - FT.	Graphic Log	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
245	Endcap; 10-20 Silica Sand				G	245		WELL GRADED SAND - (5YR 4/4); trace gravel is poorly graded up to 3/8", sub-rounded; sand is well graded; wet.	SW	5	90	5	W
250						250		POORLY GRADED GRAVEL WITH SAND - (5YR 4/4); gravel is poorly graded up to 1", sub-rounded to sub-angular; sand is well graded; wet. T.D. = 250' bls	GP	55	40	5	W

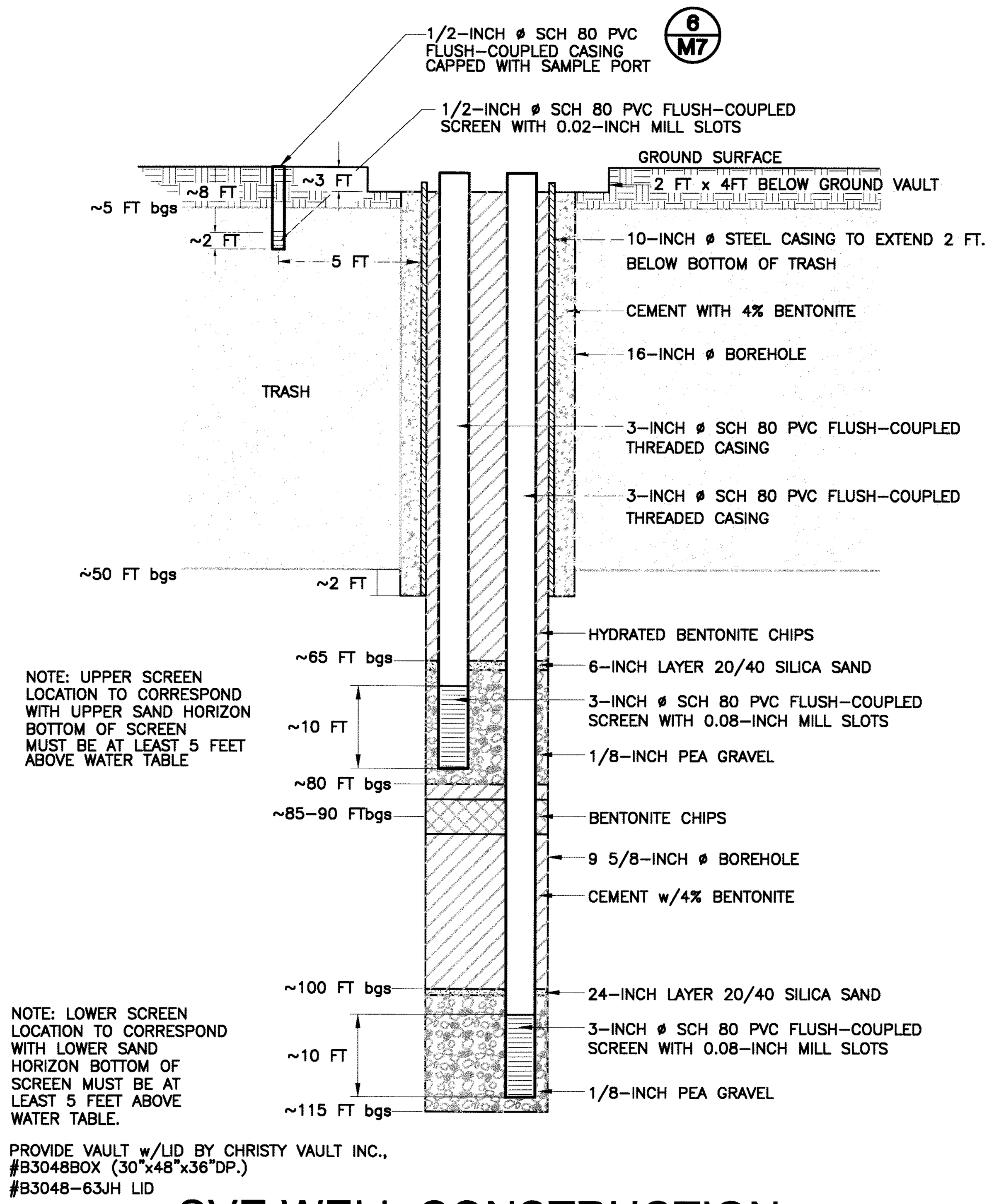
HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of LALF-19

Los Angeles Landfill
Albuquerque, New Mexico

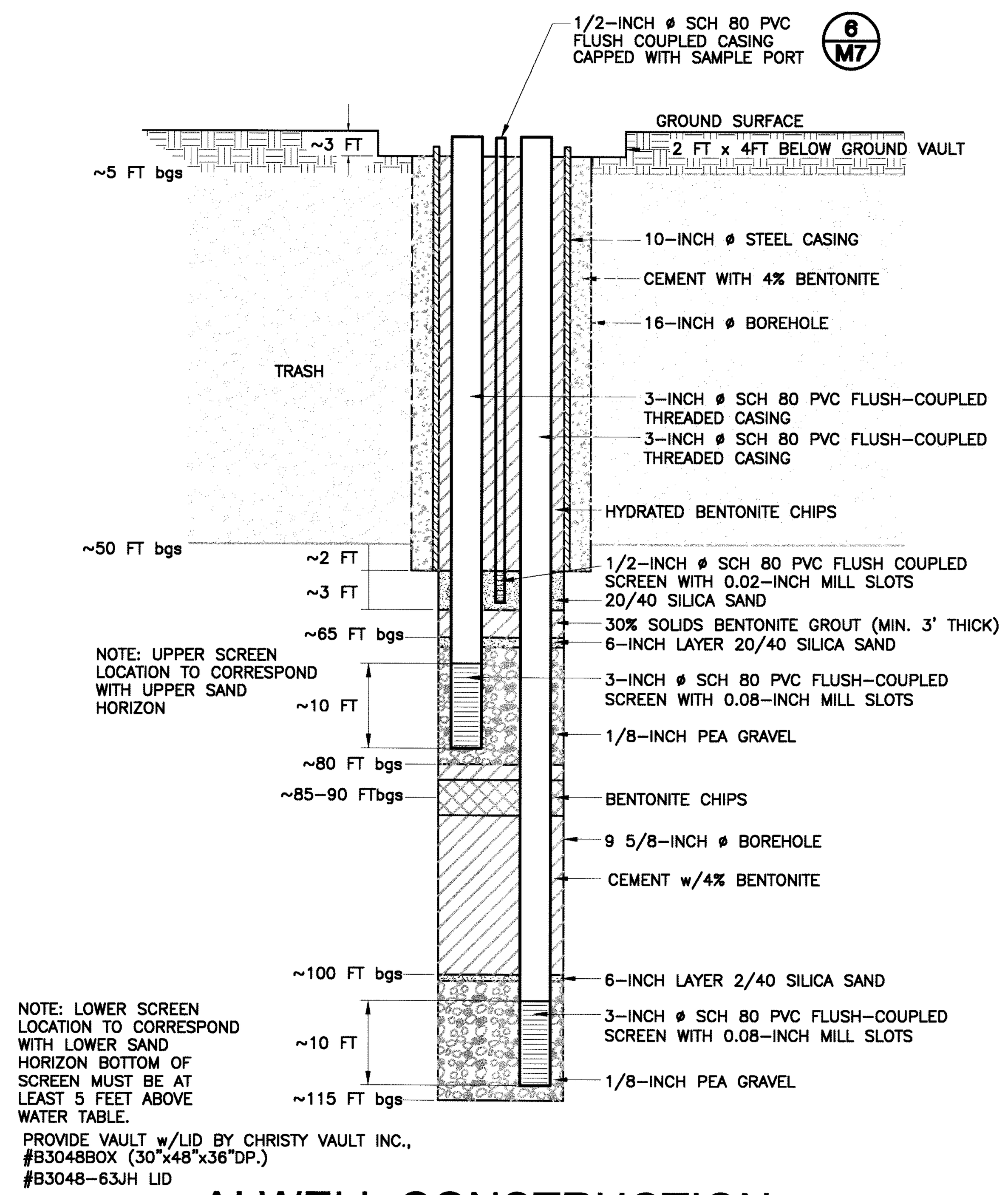
Approved	Date	Revised	Date	Reference:	FIG.
TS	4/16/03			h:\753100	2e

Groundwater Remediation Wells



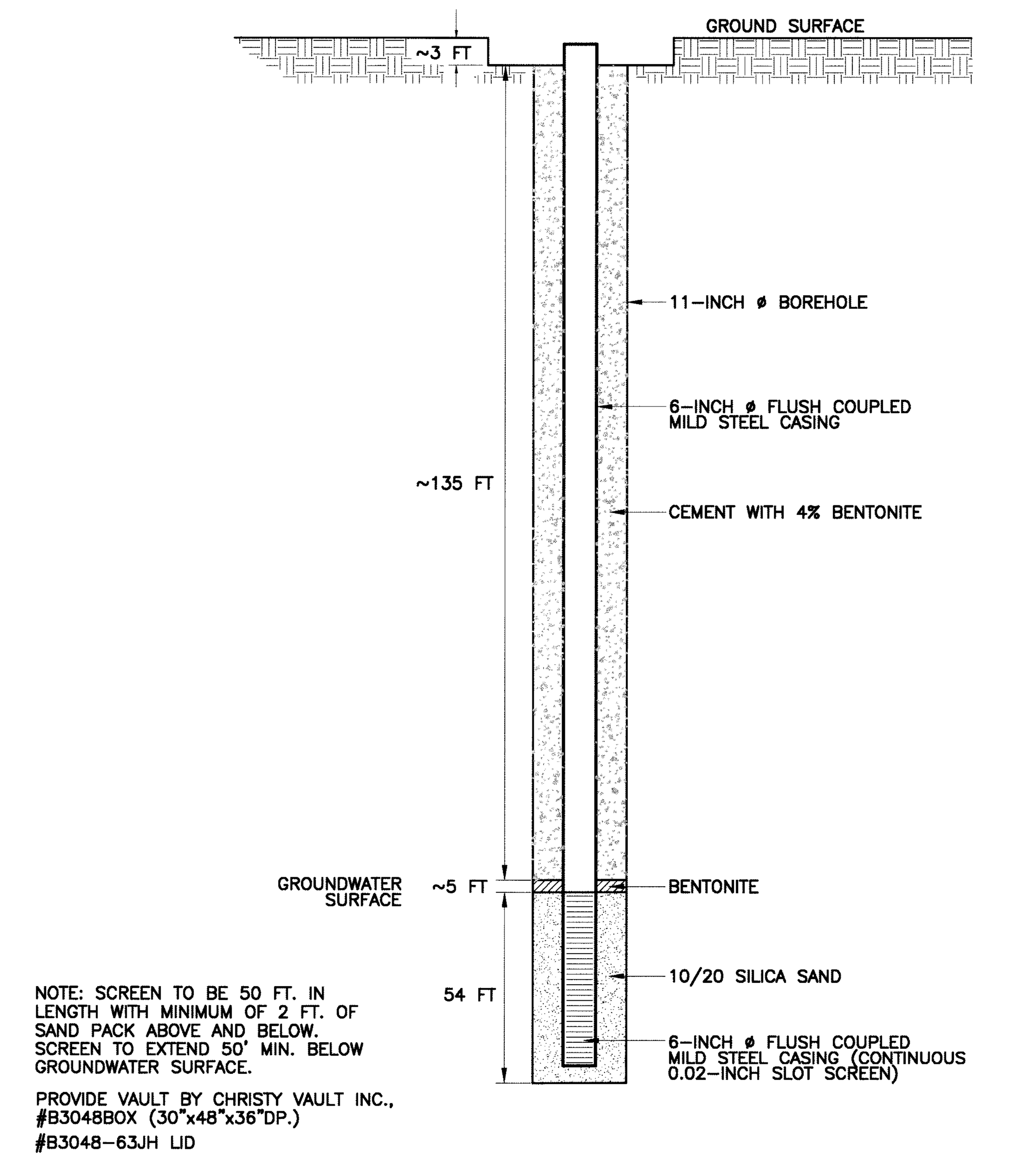
1 SVE WELL CONSTRUCTION

NTS



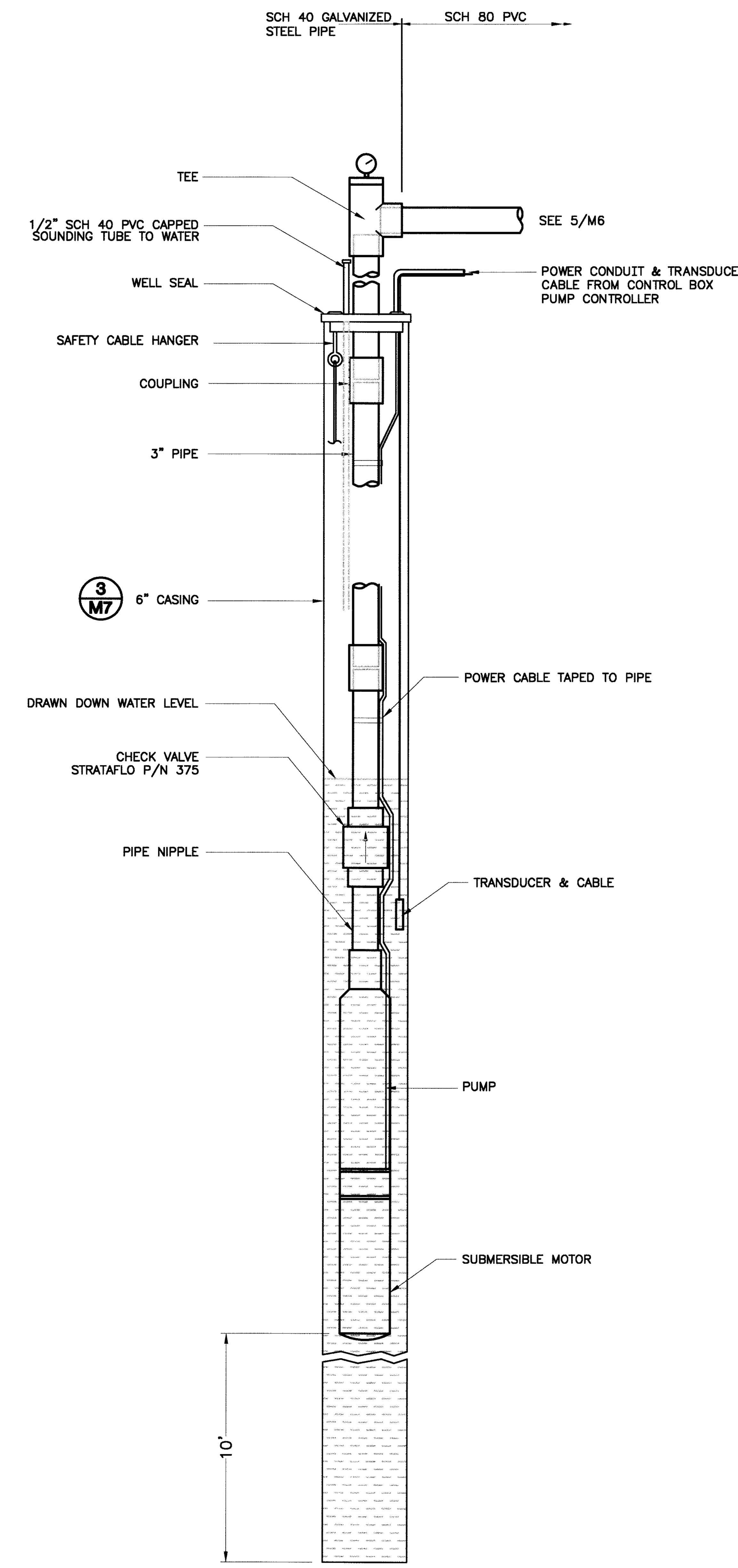
2 AI WELL CONSTRUCTION

NTS



3 EXTRACTION WELL CONSTRUCTION

NTS



SUBMERSIBLE PUMP PERFORMANCE SCHEDULE

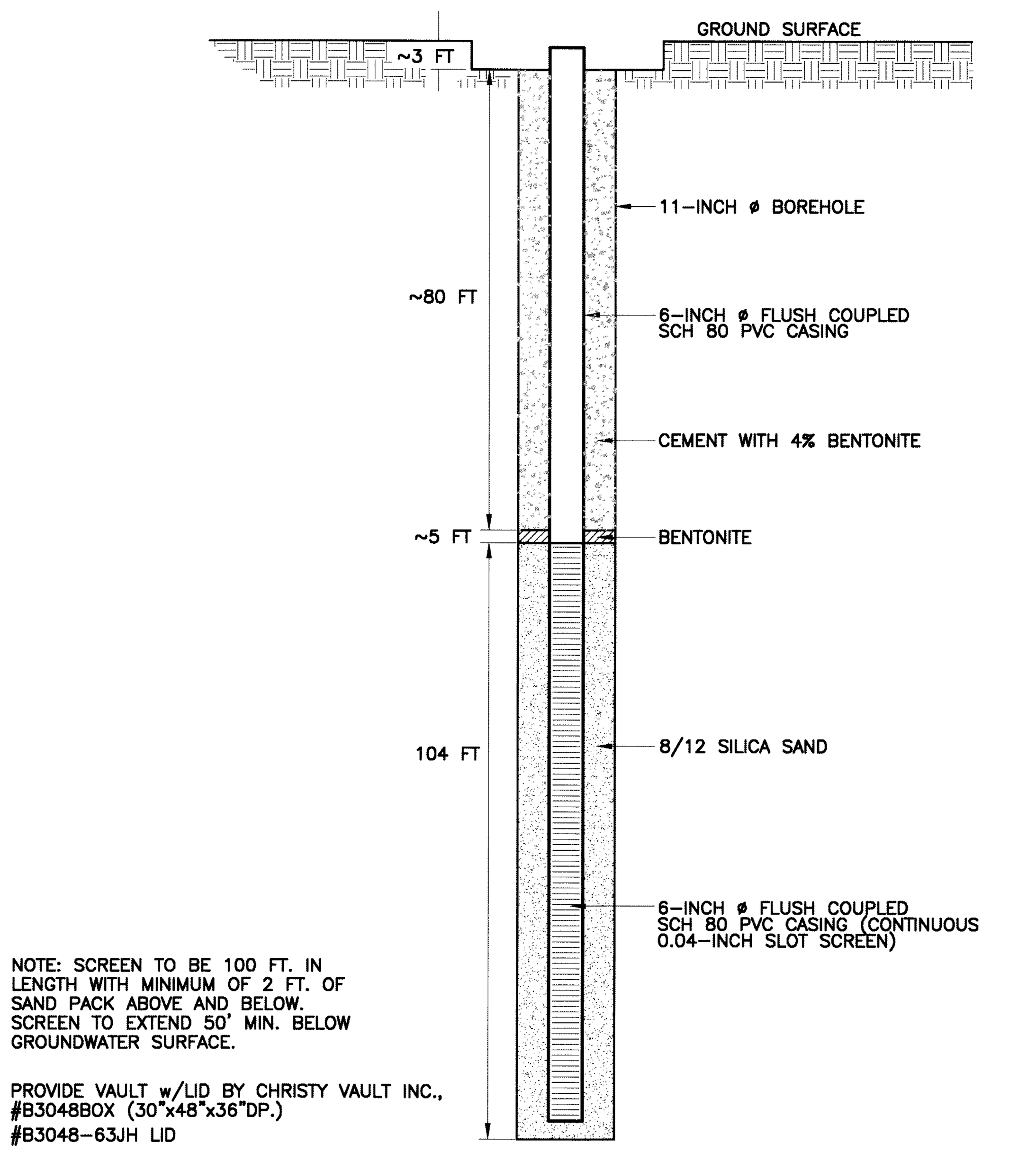
FLINT & WALLING "4F" SERIES (1)

MODEL (1) (2)	HP	STAGES	DISCHARGE PSI AT GRADE ELEV.	DEPTH TO PUMP SET IN FT./ CAPACITIES IN GPM		
				140'	160'	180'
75S75-12	7 1/2	10	0	118	112	106
			20 (1)	92	87	83
			40	82	77	72

NOTES:
1. BASIS OF DESIGN ONLY. PUMP SELECTION TO BE DETERMINED BY WELL PRODUCTION TESTING.
2. PROVIDE 460V/3PH MOTOR No. 137472 PROVIDE CONTROL BOX & MAGNETIC STARTER No. 139325.

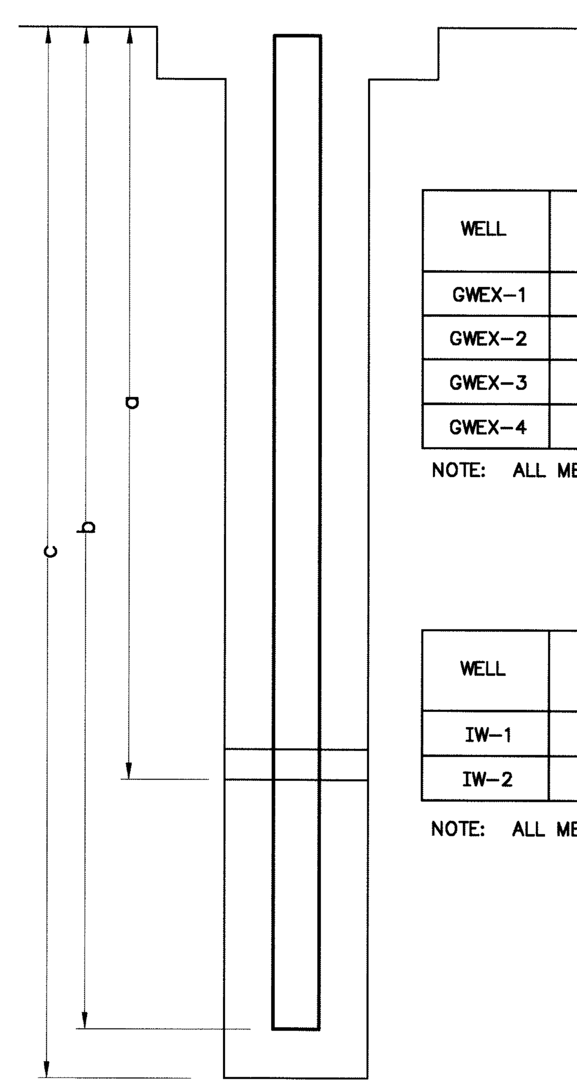
4 GROUNDWATER PUMP INSTALLATION

NTS



5 INJECTION WELL CONSTRUCTION

NTS



EXTRACTION WELLS

WELL	a SCREEN TOP	b CASING DEPTH	c BOREHOLE DEPTH
GWEX-1	125	185	187
GWEX-2	130	180	195
GWEX-3	150	220	225
GWEX-4	156	206	215

NOTE: ALL MEASUREMENTS IN FEET BELOW LAND SURFACE.

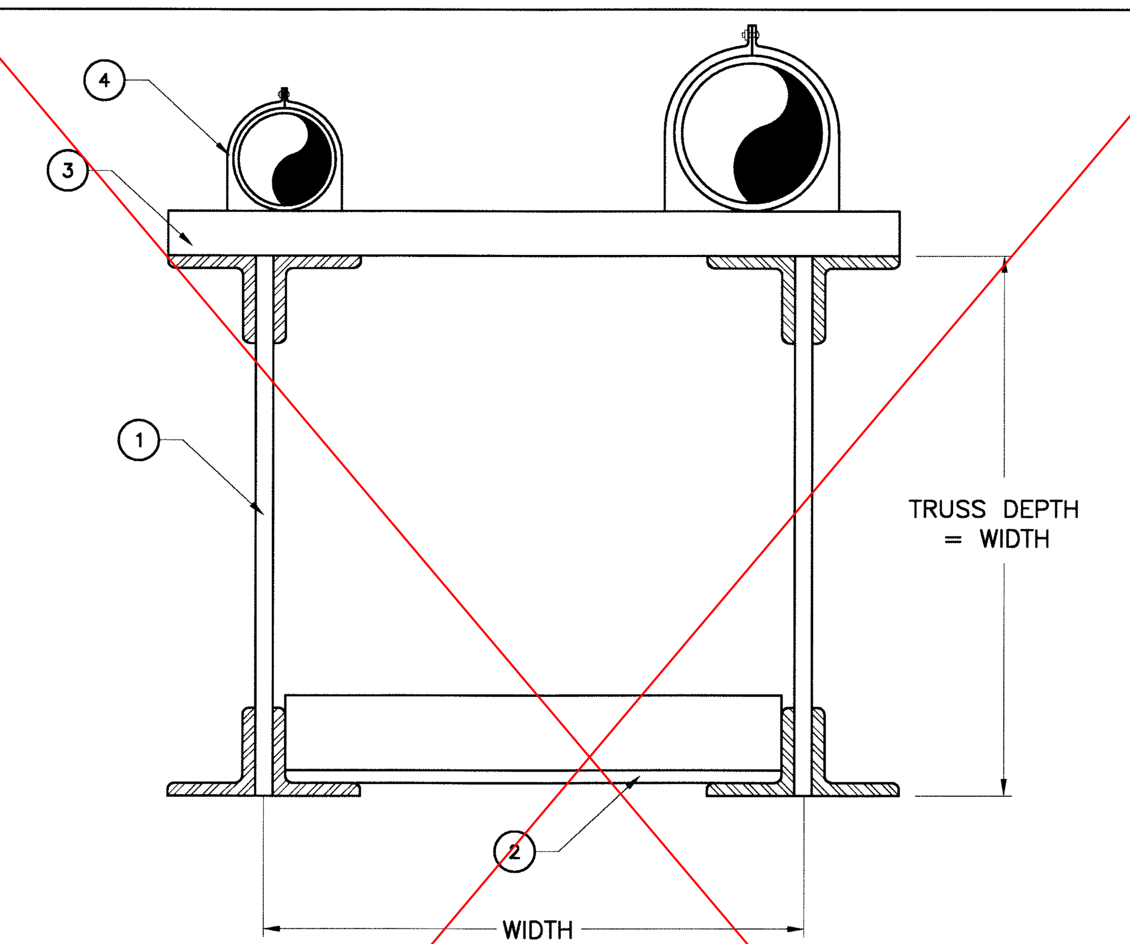
INJECTION WELLS

WELL	a SCREEN TOP	b CASING DEPTH	c BOREHOLE DEPTH
IW-1	113	213	225
IW-2	115	215	225

NOTE: ALL MEASUREMENTS IN FEET BELOW LAND SURFACE.

6 SVE SOIL GAS PROBE

NTS



KEYNOTES:
1. PROVIDE BRIDGE STRUCTURE USING 2 PRE-ENGINEERED TRUSSES AS SPAN MEMBERS. TRUSSES SIMILAR TO NUCOR-VULCRAFT "K" SERIES. FOR 48' SPAN, USE VULCRAFT "24K4".
2. CROSS BRACING OF AT LEAST 1½"x1½" ANGLE IRON, WELDED AT BOTTOM CHORD, BOTH SIDES, AND PERPENDICULAR TO TRUSS MEMBERS AT 4' O.C.
3. CROSS BRACING OF 1-5/8" 12 GA. STRUT, WELDED AT TOP CHORD, BOTH SIDES, AND PERPENDICULAR TO TRUSS MEMBER AT 4' O.C.
4. 4" AIR INJECTION AND 6" SVE PIPES, BOTH SCH. 80 PVC.

7 TRUSS SECTION - LALF

NTS

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
1	PDM	2/21/05	GEN'L REVISIONS
2	WT	12/12/05	AS-BUILTS
3	RZ	5/18/06	AS-BUILTS

		DATE
SCALE:	NONE	
DWG BY:	AGR	8/23/04
APPRV'D BY:	PDM	1/28/05

HYDRO GEO CHEM, INC.

CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

MECHANICAL DETAILS - 2

REFERENCE No. 7531027A

REVISION 1

DRAWING No. M7

K:\753100\AS-BUILTS 5-06\7531027a.dwg (alvinr) M7 18May2006 - 2:45 PM

HYDRO GEO CHEM, INC.

Boring No. **AI-1**

Geologic Boring Log

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mark Green Project No.: 753200

Site Plan at Boring Location:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	10 3/4"
Started, Time:	11:10	Date:	2/10/2005
Completed, Time:	12:09	Date:	2/18/2005
Casing Depth (Ft):	80 & 110		
Boring Depth (Ft):	112		
Screened Interval (Ft):	70-80 & 100-110		
Water Depth (Ft):		Date:	
Logged by:	W. Thompson	Date:	2/10/2005
Checked by:	R. Zimmerman	Date:	8/15/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		10	70	20	SM	10YR 5/4	S	SILTY SAND - yellowish brown; gravel up to 3" max diameter, sub to very well rounded, few cobbles to 6" max diameter; sand is coarse to very fine-grained, loose; dry.
5					Refuse	10YR 2/1	S	TOP OF REFUSE - black; decomposed, humic, soft, damp.
10					Refuse	10YR 2/1	S	Similar to above; very humic and soft.
								REFUSE - very well preserved, no visible decomposition, typical household refuse, newsprint, plastic, paper, glass, wood, metal, etc; damp.
15					Refuse			
			60	40	SM	10YR 6/4	S	SILTY SAND - light yellowish brown; sand is fine to very fine-grained, gritty flour-like texture, soft, loose, dry.
20								
25					Refuse		S	REFUSE - slightly decomposed, plastic, paper, wood, glass, etc.; damp.
30								
					Refuse	10YR 4/1	S	REFUSE - dark gray; some fine-grained sand and silt, 50% refuse, damp.
35								

Project Name: LA Landfill, NM		Project No.: 753200			Boring No.: AI-1			Sheet 2 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35								
			60	40	SM	10YR 5/2	S	SILTY SAND - grayish brown; sand is fine to very
40								fine-grained, soft, loose, damp.
45			70	30	SM	10YR 5/2	S	Similar to above.
50			95	5	SW	10YR 5/4	W	WELL GRADED SAND - yellowish brown; sand is
								medium to very fine-grained, well graded, loose,
								clean, damp.
								WELL GRADED SAND WITH GRAVEL - pale brown;
								gravel up to 1" max diameter, subangular to well
55		20	80		SW	10YR 6/3	N	rounded; sand is medium to fine-grained, well
								graded, loose, damp.
			5	95	CL	10YR 6/3	S	LEAN CLAY - pale brown; sand is fine-grained; soft,
			100		SW	10YR 6/4	N	plastic, moist.
								WELL GRADED SAND - light yellowish brown; sand
60								is medium to very fine-grained, well graded, loose,
								clean, moist.
65			100		SW	10YR 6/4	N	Similar to above; sand is coarse to very fine-grained.
70			100		SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; sand
								is medium to very fine-grained, well graded, clean,
								loose, moist.
75			100		SW	10YR 6/4	N	Similar to above.
80								
			30	70	CL	10YR 5/4	N	LEAN CLAY WITH SAND - yellowish brown; sand is
								very fine-grained; fines are clayey, very soft, slight
								to moderately plastic, moist.
85								

Project Name: LA Landfill, NM		Project No.: 753200					Boring No.: AI-1	Sheet 3 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85			5	95	CL	10YR 5/4	S	LEAN CLAY - yellowish brown; sand is very fine-grained; very soft, moderately plastic, moist.
90			5	95	CL	10YR 5/4	S	Similar to above; not as soft.
95				100	CL	10YR 5/4	S	LEAN CLAY - yellowish brown; similar to above, soft, not as plastic.
			80	20	SM	10YR 6/4	N	SILTY SAND - light yellowish brown; sand is fine to very fine-grained, soft, loose, moist.
100								
			95	5	SW	10YR 6/4	W	WELL GRADED SAND - light yellowish brown; sand is medium to very fine-grained, well graded, fairly clean, loose, moist.
105								
		20	80		SW	10YR 6/3	M	WELL GRADED SAND WITH GRAVEL - pale brown; gravel up to 1" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, loose, clean, moist.
110								
			75	25	SM	10YR 6/3	S	SILTY SAND - pale brown; sand is fine to very fine-grained, loose, moist.
115								TD = 112' bls.
120								
125								
130								
135								

HYDRO GEO CHEM, INC.

Boring No. **AI-2**

Geologic Boring Log

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mark Green Project No.: 753200

Site Plan at Boring Location:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	10 3/4"
Started, Time:	12:30	Date:	2/9/2005
Completed, Time:	15:09	Date:	2/21/2005
Casing Depth (Ft):	79 & 115		
Boring Depth (Ft):	127		
Screened Interval (Ft):	69-79 & 105-115		
Water Depth (Ft):	NA	Date:	
Logged by:	W. Thompson	Date:	2/9/2005
Checked by:	R. Zimmerman	Date:	8/15/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		20	65	15	SM	10YR 3/3	S	SILTY SAND WITH GRAVEL - dark brown; gravel up to 3" max diameter, subangular to well rounded, few cobbles to 10" max diameter; sand is coarse to very fine-grained, fairly well graded, loose, damp.
5								
					Refuse	10YR 2/1	S	REFUSE - black; humic, decomposed, wood, paper with plastic, glass, typical household refuse, strong acidic odor, moist.
10								
					Refuse			REFUSE - well preserved, newsprint dates to 1980, almost no visible decomposition, damp.
15								
20								
25								
			70	30	Refuse	2.5Y 4/1	S	REFUSE - dark gray; decomposed refuse with silt and fine-grained sand, dry, loose.
30					Refuse			REFUSE - no visible decomposition, primarily newsprint with some glass, wood, and metal shards, damp.
35								

Project Name: LA Landfill, NM					Project No.: 753200		Boring No.: AI-2 Sheet 2 of 3
Depth (Ft)	**Graphic Log**	**Estimated % GR**	**SA**	**FI**	**USCS Symbol**	**Munsell Color**	**HCl Rxn**	**Sample Description**
35								
			75	25	SM	10YR 6/2	M	SILTY SAND - light yellowish brown; bottom of refuse;
								sand is medium to very fine-grained, fairly well
								graded, loose, dry.
40			100		SW	10YR 7/2	W	WELL GRADED SAND - light gray; sand is medium
								to very fine-grained, well graded, dry, loose, clean.
								POORLY GRADED SAND - light gray; sand is fine
45			100		SP	10YR 7/2	W	to very fine-grained; similar to above.
		45	55		SW	10YR 6/2	W	WELL GRADED SAND WITH GRAVEL - light
								brownish gray; gravel up to 3" max diameter, sub to
								very well rounded; sand is coarse to fine-grained,
								well graded, loose, clean, dry.
50								
								LEAN CLAY WITH SAND - pale brown; sand is
								medium to very fine-grained, soft, moderately
55			20	80	CL	10YR 6/3	S	plastic, moist.
			100		SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; sand
								is medium to very fine-grained, well graded, loose,
								clean, damp.
60			100		SW	10YR 6/3	N	Similar to above; pale brown.
65								
70								
			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is very
								coarse to fine-grained, from 4 mm in diameter, well
								graded, loose, clean, damp.
75			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to very fine-grained, well graded, loose, clean, damp.
80								
			10	90	CL	10YR 4/6	S	LEAN CLAY - dark yellowish brown; sand is fine to
								very fine-grained, slight to moderate plasticity, soft,
								moist.
85								

Project Name: LA Landfill, NM		Project No.: 753200				Boring No.: Al-2		Sheet 3 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85				100	CL	10YR 4/6	S	LEAN CLAY - dark yellowish brown; moderately
								plastic, moist, soft.
90				100	CL	7.5YR 5/4	S	Similar to above; brown.
95								
				100	ML	7.5YR 5/4	S	SILT - brown; soft, moist, exhibits no plasticity.
100								
			90	10	SP-SM	10YR 6/4	W	POORLY GRADED SAND WITH SILT - light yellowish
								brown; sand is fine to very fine-grained, loose,
								damp, fairly clean.
105		5	95		SW	10YR 6/4	W	WELL GRADED SAND - light yellowish brown; gravel
								up to 1" max diameter, sub to well rounded; sand is
								medium to very fine-grained, well graded, loose,
								clean, slightly damp.
110		10	90		SW	10YR 6/4	W	WELL GRADED SAND - light yellowish brown; gravel
								up to 2" max diameter, sub to very well rounded;
								sand is medium to very fine-grained, well graded,
								loose, clean, slightly damp.
115			95	5	SP	10YR 6/4	W	POORLY GRADED SAND - light yellowish brown;
								sand is fine to very fine-grained, trace silt, loose,
								damp.
120								
125								
								TD = 127' bls.
130								
135								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. AI-3

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mark Green Project No.: 753200

Site Plan at Boring Location:

Well Registration:		
Drilling Equipment:	GEFCO Speedstar 50K - CH	
Drilling Method:	Air Rotary	
Bit Type:	Tricone	Size: 10 3/4"
Started, Time:	13:40	Date: 2/5/2005
Completed, Time:	15:15	Date: 2/28/2005
Casing Depth (Ft):	79 & 110	
Boring Depth (Ft):	119	
Screened Interval (Ft):	69-79 & 100-110	
Water Depth (Ft):	NA	Date:
Logged by:	W. Thompson	Date: 2/5/2005
Checked by:	R. Zimmerman	Date: 9/16/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		10	85	5	SW	10YR 5/2	S	WELL GRADED SAND - grayish brown; gravel up to 1" max diameter, sub to well rounded; sand is medium to fine-grained, well graded to minor silt fraction, moist, loose.
5								
					Refuse	10YR 2/1	S	REFUSE - black; top of refuse; black fibrous, decomposed refuse, humic, strong acidic odor, moist.
10					Refuse	10YR 2/1	S	Similar to above - very fibrous with partially decomposed wood.
15					Refuse	10YR 2/1	S	Similar to above.
					Refuse	10YR 7/1	N	REFUSE - light gray; not very well decomposed, readable newsprint, plastic, glass, wood, typical household refuse, damp. (Newsprint dated 1982)
20								
25					Refuse			REFUSE - overall a light brown; almost no visible decomposition, very readable newsprint, cardboard, plastic, glass, etc; damp.
			90	10	SW-SM	10YR 5/2	S	WELL GRADED SAND WITH SILT - grayish brown; sand is medium to very fine-grained, well graded through to silt, loose, slightly damp, strong acidic odor.
30								
35								

Project Name: LA Landfill, NM		Project No.: 753200			Boring No.: AI-3			Sheet 2 of 3
Depth (Ft)	Graphic Log	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Sample Description
		GR	SA	FI				
35			95	5	SP	10YR 5/2	S	POORLY GRADED SAND - grayish brown; sand is fine to very fine-grained, loose, fairly clean.
40			85	15	SM	2.5Y 4/1	S	SILTY SAND - dark gray; some decomposed refuse; sand is fine to very fine-grained; refuse consists of about 50% of mix, damp.
45					Refuse	2.5Y 5/3	S	REFUSE - light olive brown; fibrous, fluffy, 25% silt and fine-grained sands, damp, soft, strong acidic odor. 47' bls is bottom of refuse deposit.
					Refuse			
50		20	30	50	ML	2.5Y 4/1	S	SANDY SILT WITH GRAVEL - dark gray; small amount of refuse, glass, plastic, rubber; gravel up to 1 1/2" max diameter, subangular to well rounded; sand is medium to very fine-grained, soft, cohesive, slightly plastic, moist.
55			30	70	ML	10YR 5/6	S	SANDY SILT - yellowish brown; sand is fine to very fine-grained, soft, gritty, flour-like texture, damp.
			100		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; sand is medium to very fine-grained, fairly well graded, loose, clean, dry.
60								
65								
70		10	70	20	SM	10YR 6/2	M	SILTY SAND - light brownish gray; gravel up to 1" max diameter, subangular to well rounded; sand is coarse to fine-grained, primarily fine-grained, loose, dry.
75								
80			25	75	ML	7.5YR 5/4	S	SILT WITH SAND - brown; sand is fine to very fine-grained, soft, cohesive, damp.
85								

Project Name: LA Landfill, NM		Project No.: 753200		Boring No.: AI-3				Sheet 3 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85								
90			10	90	CL	7.5YR 5/4	S	LEAN CLAY - brown; sand is very fine-grained, soft, cohesive, slightly plastic, damp.
95			20	80	ML	7.5YR 6/4	S	SILT WITH SAND - light brown; sand is fine to very fine-grained, non-plastic, powdery, damp.
		50	35	15	GM	10YR 6/4	S	SILTY GRAVEL WITH SAND - light yellowish brown; gravel up to 2 1/2" max diameter, subangular to well rounded; sand is coarse to fine-grained, loose, dry.
100			100		SW	10YR 6/4	W	WELL GRADED SAND - light yellowish brown; sand is fine to very fine-grained, well graded, loose, clean, moist.
105			100		SW	10YR 6/4	W	Similar to above.
110								
			80	20	SM	10YR 5/4	W	SILTY SAND - yellowish brown; sand is fine to very fine-grained, soft, moist.
			20	80	ML	10YR 5/4	S	SILT WITH SAND - yellowish brown; sand is very fine-grained, cuttings mixed with balls of clay, moist, lean clay as thin interbeds, slightly cohesive, soft, moist.
115			90	10	SP-SM	10YR 5/4	N	POORLY GRADED SAND WITH SILT - yellowish brown; sand is fine to very fine-grained, soft, loose, damp.
120								TD = 119' bls.
125								
130								
135								

Project: Los Angeles Landfill | **Boring:** GWEX-1 | Pg. 1 of 4

Drilling Co: Water Development Corp.	Drilling Method: Air Rotary	Date Started: 3/2/03
Location:	Sampler:	Date Completed: 3/2/03
	Desc. of Meas Pt:	Logged by: B.Anderson
Land Surf. Elev:	Meas. Pt. Elev:	Reviewed by: C.Deatherage

WELL COMPLETION

- 6" Mild Steel Casing with Locking Metal Cap and 3 Bollards
- 6" Mild Steel Casing (15 ft)
- 11" Borehole (25 ft)
- Cement with 4% Bentonite (35 ft)

Samples (G) at approx. 10, 22–23, 27, 29–30, 33, 37–38, 40, 42–43, 44–45, 48 ft.

Depth - FT.	DESCRIPTION	USCS Symbol	ESTIMATED % OF GR	SA	FI	Moisture
0	LEAN CLAY WITH SAND - (5YR 3/3); sand is well graded, coarse to fine-grained; dry.	CL	0	20	80	D
20	WELL GRADED SAND - (5YR 5/4); trace gravels up 1/4", sub-rounded; sand is well graded; dry.	SW	5	90	5	D
25	POORLY GRADED GRAVEL WITH SAND - (5YR 4/4); gravel up to 3/8", sub-rounded; sand is well graded; dry.	GP	65	30	5	D
28	WELL GRADED SAND WITH GRAVEL - (5YR 5/3); gravel is poorly graded up to 3/4", sub-rounded to sub-angular; sand is well graded; dry.	SW	20	75	5	D
31	SIMILAR TO ABOVE.	SW	30	65	5	D
35	POORLY GRADED GRAVEL WITH SAND - (5YR 4/4); gravel up to 3/4", sub-rounded to sub-angular; sand is well graded; dry.	GP	70	25	5	D
38	WELL GRADED SAND WITH GRAVEL - (5YR 4/4); gravel is poorly graded up to 2", sub-rounded to sub-angular; sand is well graded; dry.	SW	20	80	0	D
41	WELL GRADED SAND WITH CLAY AND GRAVEL - (5YR 4/3); gravel is poorly graded up to 3/8", sub-rounded; sand is well graded; moist.	SW-SC	20	70	10	M
44	POORLY GRADED GRAVEL WITH SILT AND SAND - (5YR 5/4); poorly graded gravel up to 1-1/2", sub-rounded to sub-angular; sand is well graded; moist.	GP-GM	65	25	10	M
47	SANDY LEAN CLAY - (5YR 5/3); poorly graded gravel up to 1/4", angular; sand is well graded;	CL	10	30	60	M

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of GWEX-1

Los Angeles Landfill
Albuquerque, New Mexico

Approved	Date	Revised	Date	Reference:	FIG.
TS	4/16/03			h:\753100	3a

HGC-WELL 753100.GPJ NEWPROJ.GDT 1/26/06

Project: Los Angeles Landfill | **Boring:** GWEX-1 | Pg. 2 of 4

Drilling Co: Water Development Corp. | Drilling Method: Air Rotary | Date Started: 3/2/03

Location: | Sampler: | Date Completed: 3/2/03

Desc. of Meas Pt: | Logged by: B.Anderson

Land Surf. Elev: | Meas. Pt. Elev: | Reviewed by: C.Deatherage

WELL COMPLETION: 6" Mild Steel Casing; 11" Borehole; Cement with 4% Bentonite

Depth - FT.	DESCRIPTION	USCS Symbol	GR	SA	FI	Moisture
	moist.	CL	0	30	70	M
	SIMILAR TO ABOVE - (5YR 5/3); no gravel present.					
55	SIMILAR TO ABOVE; trace gravels up to 3/4", sub-angular.	CL	5	30	65	M
60	POORLY GRADED SAND WITH CLAY - (5YR 4/4); sand is fine to medium-grained; dry.	SP-SC	0	90	10	D
65	SIMILAR TO ABOVE; trace gravels up to 1/2", sub-rounded.	SP-SC	5	85	10	D
70	POORLY GRADED SAND - (5YR 4/3); trace gravel up to 3/4", sub-rounded; sand is medium to coarse-grained; dry.	SP	5	90	5	D
75	WELL GRADED SAND WITH GRAVEL - (5YR 4/4); gravel is poorly graded up to 1/2", sub-rounded to sub-angular; sand is well graded; dry.	SW	15	80	5	D
80	SIMILAR TO ABOVE; moist.	SW	10	85	5	M
	CLAYEY SAND - (5YR 4/3); sand is poorly graded, fine to medium-grained; moist.	SC	0	40	60	M
90	WELL GRADED SAND - (5YR 4/4); sand is well graded; moist.	SW	0	95	5	M
	POORLY GRADED SAND - (5YR 4/4); sand is poorly graded fine to medium-grained; moist.	SP	0	95	5	M
95	WELL GRADED SAND - (5YR 4/4); sand is well graded; moist.	SW	0	95	5	M
100						

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of GWEX-1

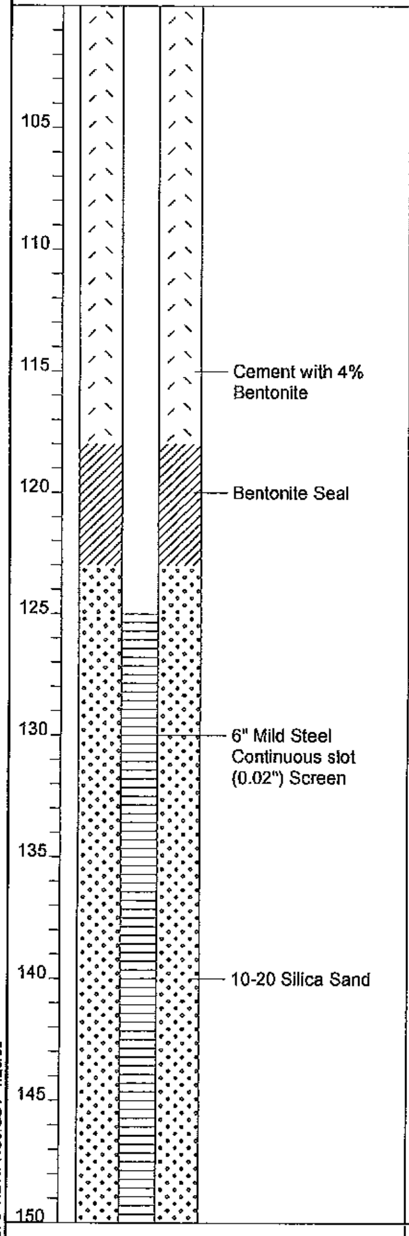
Los Angeles Landfill
Albuquerque, New Mexico

Approved	Date	Revised	Date	Reference:	FIG.
TS	4/16/03			h:\753100	3b

Project: Los Angeles Landfill — **Boring:** GWEX-1 — Pg. 3 of 4

Drilling Co:	Water Development Corp.	Drilling Method:	Air Rotary
Location:		Sampler:	
		Desc. of Meas Pt:	
Land Surf. Elev:		Meas. Pt. Elev:	
Date Started:	3/2/03	Date Completed:	3/2/03
Logged by:	B.Anderson	Reviewed by:	C.Deatherage

WELL COMPLETION



Depth - FT.	Samples	DESCRIPTION	USCS Symbol	GR	SA	FI	Moisture
100		WELL GRADED SAND WITH GRAVEL - (5YR 4/4); gravel is poorly graded up to 1/2", sub-rounded; sand is well graded; moist.	SW	15	80	5	M
105	G						
110	G	SIMILAR TO ABOVE; gravel up to 1".	SW	15	80	5	M
	G	POORLY GRADED SAND WITH CLAY - (5YR 4/4); sand is poorly graded, fine to medium-grained; moist.	SP-SC	0	90	10	M
115	G	CLAYEY SAND - (5YR 4/3); sand is poorly graded, fine to medium-grained; moist.	SC	0	75	25	M
120	G	SANDY LEAN CLAY - (5YR 4/3); sand is poorly graded, fine to medium-grained; moist.	CL	0	60	40	M
125	G	CLAYEY SAND - (5YR 4/4); sand is poorly graded, fine to medium-grained; moist.	SC	0	75	25	M
130	G	WELL GRADED SAND - (5YR 4/3); sand is well graded; moist.	SW	0	95	5	M
135	G	CLAYEY SAND WITH GRAVEL - (5YR 4/3); gravel is poorly graded up to 1/4"; sand is well graded; moist.	SC	20	60	20	M
	G	WELL GRADED SAND WITH CLAY AND GRAVEL - (5YR 4/4); gravel is poorly graded up to 1/2", sub-rounded to sub-angular; sand is well graded; moist.	SP-SC	15	75	10	M
140	G	POORLY GRADED GRAVEL WITH SAND - (5YR 4/4); gravel up to 1/2", sub-rounded to sub-angular; sand is poorly graded, medium to coarse-grained; moist.	GP	70	25	5	M
145	G	WELL GRADED SAND - (5YR 4/4); sand is well graded; moist.	SW	5	90	5	M
150							

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of GWEX-1
Los Angeles Landfill
Albuquerque, New Mexico

Approved	Date	Revised	Date	Reference:	FIG.
TS	4/16/03			h:\753100	3c

Project: Los Angeles Landfill | Boring: **GWEX-1** | Pg. 4 of 4

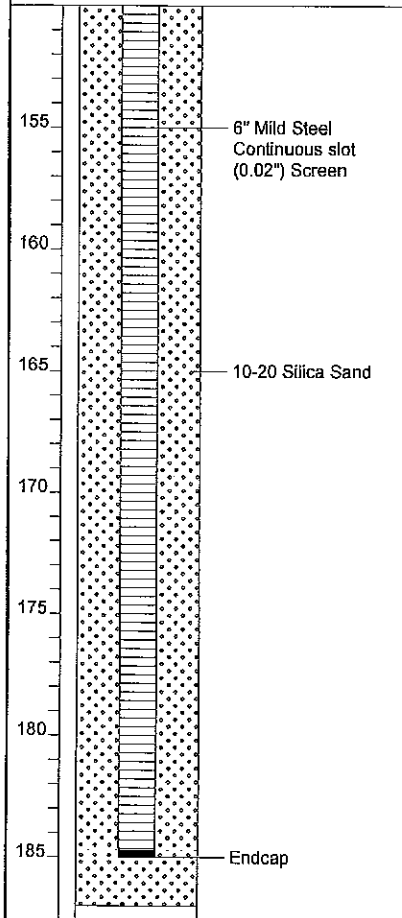
Drilling Co: Water Development Corp. | Drilling Method: Air Rotary | Date Started: 3/2/03

Location: | Sampler: | Date Completed: 3/2/03

Desc. of Meas Pt: | Logged by: B.Anderson

Land Surf. Elev: | Meas. Pt. Elev: | Reviewed by: C.Deatherage

WELL COMPLETION



DESCRIPTION	USCS Symbol	GR	SA	FI	Moisture
WELL GRADED SAND WITH GRAVEL - (5YR 4/4); gravel is poorly graded up to 1/2", sub-rounded to sub-angular; sand is well graded; moist.	SW	20	75	5	M
CLAYEY SAND - (5YR 4/3); sand is well graded; moist.	SC	10	70	20	M
WELL GRADED SAND WITH GRAVEL - (5YR 4/4); sand is well graded; moist.	SW	15	80	5	M
SANDY LEAN CLAY WITH GRAVEL - (5YR 4/3); gravel is poorly graded up to 1/2", sub-rounded; sand is well graded; moist.	CL	20	40	40	M
WELL GRADED SAND WITH CLAY AND GRAVEL - (5YR 4/4); gravel is poorly graded up to 3/8", sub-rounded; sand is well graded; moist.	SW-SC	30	60	10	M
LEAN CLAY WITH SAND - (5YR 4/4); gravel is poorly graded up to 1/4", sub-rounded; sand is well graded; wet.	CL	20	55	25	W
WELL GRADED SAND WITH GRAVEL - (5YR 4/3); gravel is poorly graded up to 1/2", sub-rounded to sub-angular; sand is well graded; wet.	SW	20	75	5	W
SIMILAR TO ABOVE.	SW	20	75	5	W
LEAN CLAY WITH SAND - (5YR 4/3); gravel is poorly graded up to 1/4", sub-rounded; sand is well graded; wet.	SW	20	55	25	W

T.D. = 187' bls

HYDRO GEO CHEM, INC.

Lithologic Log and Well Construction Details of GWEX-1

Los Angeles Landfill
Albuquerque, New Mexico

Approved	Date	Revised	Date	Reference:	FIG.
TS	4/16/03			h:\753100	3d

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. GWEX-2

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mike Daniels Project No.: 753200

Site Plan at Boring Location:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	10 3/4"
Started, Time:	13:25	Date:	3/29/2005
Completed, Time:	10:31	Date:	3/30/2005
Casing Depth (Ft):	180		
Boring Depth (Ft):	195		
Screened Interval (Ft):	130-180		
Water Depth (Ft):	128.77' bls	Date:	5/3/2005
Logged by:	W. Thompson	Date:	3/29/2005
Checked by:	R. Zimmerman	Date:	8/8/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0			90	10	SW-SM	10YR 6/4	S	WELL GRADED SAND WITH SILT - light yellowish brown; sand is medium to very fine-grained, well graded, loose, dry.
5		15	85		SW	10YR 6/3	N	WELL GRADED SAND WITH GRAVEL - pale brown; gravel up to 1/2" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, clean, loose, dry.
10								
15		35	65		SW	10YR 6/3	N	WELL GRADED SAND WITH GRAVEL - pale brown; gravel up to 3" max diameter, few cobbles up to 5" max diameter, sub to well rounded; sand is medium to fine-grained, well graded, loose, clean.
20		35	65		SW	10YR 6/3	N	Similar to above.
25			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium to fine-grained, well graded, clean, loose, dry.
30			100		SW	10YR 6/3	N	Similar to above.
		30	70		SW	10YR 6/3	N	WELL GRADED SAND WITH GRAVEL - pale brown; gravel up to 3" max diameter, sub to well rounded, few cobbles up to 12", mostly silicate, basalt, andesite, quartz, dry, loose, clean.
35								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: GWEX-2

Depth (Ft)	Graphic Log	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Sample Description
		GR	SA	FI				
35								
			60	40	SM	10YR 6/4	N	SILTY SAND - light yellowish brown; sand is very
								fine-grained, soft, loose, flour-like texture.
40			5	95	CL	2.5Y 5/3	S	LEAN CLAY - light olive brown; sand is trace, very
								fine-grained, soft, plastic, moist, cohesive.
45								
			10	90	ML	10YR 5/4	N	SILT - yellowish brown; sand is very fine-grained, soft,
								gritty flour-like texture, moist.
50			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is coarse
								to fine-grained, well graded, loose, clean, damp.
55			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to very fine-grained.
60			100		SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; sand
								is medium to fine-grained, well graded, loose, clean,
								moist.
65			100		SW	10YR 6/4	N	Similar to above.
70			80	20	SM	10YR 5/3	W	SILTY SAND - brown; sand is fine to very fine-grained,
								loose, soft, gritty texture, moist.
75			90	10	SW-SM	10YR 5/3	W	WELL GRADED SAND WITH SILT - brown, sand is
								fine to very fine-grained, well graded, loose, moist.
80			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to fine-grained, well graded, loose, clean, moist.
85								

Project Name: LA Landfill, NM   Project No.: 753200   Boring No.: GWEX-2

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85			100		SW	10YR 6/3	N	Similar to above.
90			95	5	SW	10YR 6/3	W	WELL GRADED SAND - pale brown; sand is fine to very fine-grained, well graded through to silt, soft, gritty texture, moist.
95			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is fine to very fine-grained, well graded, loose, clean, moist.
100			100		SW	10YR 6/3	N	Similar to above.
105			95	5	SW	10YR 6/4	W	WELL GRADED SAND - light yellowish brown; sand is fine to very fine-grained, well graded, loose, gritty flour-like texture, moist.
			100		SW	10YR 7/3	N	WELL GRADED SAND - very pale brown; sand is medium to very fine-grained, well graded, loose, clean, damp.
110								
115		10	90		SW	10YR 7/3	N	WELL GRADED SAND - very pale brown; gravel up to 2" max diameter, sub to well rounded; sand is coarse to fine-grained, well graded, loose, damp.
120		15	85		SW	10YR 7/3	N	Similar to above.
		90	10		GW		N	WELL GRADED GRAVEL - sand is coarse to fine-grained; gravel up to 2" max diameter, subangular to well rounded, well graded, loose, clean, damp.
125								
130			100		SW	10YR 5/3	N	WELL GRADED SAND - brown; sand is medium to fine-grained, well graded, loose, clean, wet, top of water table.
135								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: GWEX-2 Sheet 4 of 5

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
135		5	95		SW	10YR 5/3	N	Similar to above; gravel up to 1" max diameter, sub to well rounded, wet to saturated.
140		45	55		SW			WELL GRADED SAND WITH GRAVEL - mottled colors, grays, pinks, blacks, browns; gravel up to 2" max diameter, primarily <1", subangular to well rounded, sand is very coarse to medium-grained, well graded, loose, clean, saturated.
145		45	55		SW			Similar to above.
150		10	80	10	SW-SM	10YR 5/3	N	WELL GRADED SAND WITH SILT - brown; gravel up to 1" max diameter, sub to well rounded; clay-silt fraction as thin interbeds; sand is coarse to very fine-grained, loose, saturated.
155			85	15	SM	10YR 5/3	N	SILTY SAND - brown; sand is medium to very fine-grained, fairly well graded to silt, loose, saturated.
160			85	15	SM	10YR 5/3	N	Similar to above.
165			75	25	SM	10YR 6/3	W	SILTY SAND - pale brown; sand is very fine-grained, saturated.
170			10	90	ML	10YR 6/3	M	SILT - pale brown; sand is very fine-grained, creamy texture, saturated.
175								
			60	40	SM	10YR 6/3	M	SILTY SAND - pale brown; sand is fine to very fine-grained, saturated.
180								
185								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: GWEX-2

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
185			70	30	SM	10YR 6/3	M	Similar to above; few gravel up to 1/2" max diameter.
190			40	60	CL	10YR 6/3	N	SANDY LEAN CLAY - pale brown; sand is fine to very fine-grained, interbedded with clay, slightly plastic, saturated.
195				100	CL	10YR 6/3	M	LEAN CLAY - pale brown; slightly stiff, plastic, wet.
								TD = 195' bls.
200								
205								
210								
215								
220								
225								
230								
235								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. GWEX-3

Project Name:	Los Angeles Landfill, New Mexico		
Drilling Company:	WDC	Driller: Mike Daniels	Project No.: 753200

Site Plan at Boring Location:			
	Well Registration:		
	Drilling Equipment:	GEFCO Speedstar 50K - CH	
	Drilling Method:	Air Rotary	
	Bit Type:	Tricone	Size: 10 3/4"
	Started, Time:	8:10	Date: 3/24/2005
	Completed, Time:	11:03	Date: 3/25/2005
	Casing Depth (Ft):	220	
	Boring Depth (Ft):	225	
	Screened Interval (Ft):	150-220	
	Water Depth (Ft):	150.88' bls	Date: 5/2/2005
City and State:	Logged by:	W. Thompson	Date: 3/24/2005
Township, Range, Section:	Checked by:	R. Zimmerman	Date: 8/11/2005

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0			50	50	SM	10YR 5/4	S	SILTY SAND - yellowish brown; sand is very fine-grained,
								soft, moist.
5								
			40	60	ML	10YR 5/4	S	SANDY SILT - yellowish brown; sand is very fine-grained,
								soft, loose, moist.
10								
15			10	90	ML	10YR 5/4	S	SILT - yellowish brown; sand is very fine-grained, soft,
								cohesive, slightly plastic, damp.
20				100	ML	10YR 5/4	S	Similar to above.
25			100		SW	10YR 5/6	N	WELL GRADED SAND - yellowish brown; sand is medium
								to fine-grained, well graded, loose, damp.
30			100		SW	10YR 5/6	N	Similar to above.
		80	20		GW	10YR 5/3	N	WELL GRADED GRAVEL WITH SAND - brown, gravel up
								to 3" max diameter, sub to well rounded, few cobbles;
								sand is coarse to fine-grained, loose, damp.
35								

Project Name: LA Landfill, NM | Project No.: 753200 | Boring No.: GWEX-3 | Sheet 2 of 5

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35		90	10		GW	10YR 5/3	N	WELL GRADED GRAVEL - brown; similar to above.
								SILTY SAND - pale brown; gravel up to 1" max
40		20	80		SM	10YR 6/3	W	diameter, subangular to well rounded; sand is
								medium to very fine-grained, fairly well graded,
								loose, damp.
		90	10		GW	10YR 6/3	N	WELL GRADED GRAVEL - pale brown; gravel up to
								2" max diameter, sub to well rounded; sand is
45								coarse to fine-grained, loose, dry.
50			100		SP	10YR 6/4	N	POORLY GRADED SAND - light yellowish brown;
								sand is fine to very fine-grained, soft, loose.
55			10	90	ML	10YR 6/3	N	SILT - pale brown; sand is very fine-grained, soft,
								slightly plastic, moist.
60			100		SW	10YR 5/2	N	WELL GRADED SAND - grayish brown; sand is
								medium to very fine-grained, well graded, loose,
								damp.
65			100		SW	10YR 5/2	N	Similar to above.
70			100		SW	10YR 5/2	N	WELL GRADED SAND - grayish brown; sand is
								coarse to fine-grained, well graded, loose, clean,
								damp.
75			100		SW	10YR 5/2	N	WELL GRADED SAND - grayish brown; sand is very
								fine-grained, well graded, loose, clean, damp.
80			5	95	ML	10YR 5/3	M	SILT - brown; trace of fine-grained sand, soft, damp,
								slightly plastic.
85								

Project Name: LA Landfill, NM					Project No.: 753200		Boring No.: GWEX-3 Sheet 3 of 5

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85			10	90	ML	10YR 5/3	M	SILT - brown; sand is very fine-grained, soft, gritty
								texture, non-plastic, damp.
90			10	90	ML	10YR 5/3	N	Similar to above; slightly clayey, slightly plastic,
								moist.
95			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to fine-grained, well graded, loose, clean, damp.
100			100		SW	10YR 6/3	N	Similar to above.
105			100		SW	10YR 6/4	N	Similar to above; light yellowish brown.
110			100		SW	10YR 6/4	N	Similar to above.
			20	80	ML	10YR 5/4	S	SILT WITH SAND - yellowish brown; sand is very
115								fine-grained, soft, gritty texture, moist.
120			90	10	SP-SM	10YR 6/4	N	POORLY GRADED SAND WITH SILT - light yellowish
								brown; sand is fine to very fine-grained, loose, damp.
125			100		SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; sand
								is medium to very fine-grained, well graded, loose,
								clean, damp.
130		10	90		SW	10YR 5/4	M	WELL GRADED SAND - yellowish brown; gravel up to
								2" max diameter, sub to well rounded; sand is
								coarse to fine-grained, well graded, loose, clean,
								moist.
135								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: GWEX-3

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
135		15	85		SW	10YR 5/4	M	WELL GRADED SAND WITH GRAVEL - similar to above.
140		10	90		SW	10YR 5/3	N	WELL GRADED SAND - brown; gravel up to 3/4" max diameter, subangular to well rounded; sand is medium to very fine-grained, well graded, loose, clean, moist.
145		30	70		SW	10YR 5/3	N	WELL GRADED SAND WITH GRAVEL - brown; gravel up to 1 1/2" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, loose, clean, moist.
150		10	90		SW	10YR 5/3	N	WELL GRADED SAND - brown; gravel similar to above; sand is medium to fine-grained, well graded, loose, clean, very moist.
		25	25	50	CL	10YR 5/3	M	LEAN CLAY WITH SAND AND GRAVEL - brown; gravel up to 1 1/2" max diameter, sub to well rounded; sand is medium to very fine-grained, soft, sticky, plastic, wet.
155								
160		5	10	85	CL	10YR 5/3	S	LEAN CLAY WITH SAND - brown; gravel up to 1 1/2" max diameter, sub to well rounded; sand is very fine-grained, soft, plastic, cohesive, very moist.
165		5	10	85	CL	10YR 5/3	S	Similar to above.
170		5	10	85	CL	10YR 5/3	S	Similar to above.
			30	70	ML	10YR 5/3	W	SANDY SILT - brown; sand is fine-grained, soft, sticky, plastic, wet.
175								
180				100	ML	10YR 5/3	S	SILT - brown; soft, plastic.
185								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: GWEX-3 Sheet 5 of 5

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
185								
190								
			80	20	SM	10YR 5/3	M	SILTY SAND - brown; sand is medium to very fine-
								grained, well graded, sticky, saturated.
195								
200			85	15	SM	10YR 5/3	M	Similar to above.
205		90	10		GW	10YR 5/3	N	WELL GRADED GRAVEL - brown; gravel up to 1"
								max diameter, sub to very well rounded; sand is
								coarse to fine-grained, well graded throughout,
								loose, saturated, clean.
210		90	10		GW	10YR 5/3	N	Similar to above; gravel up to 2" max diameter.
215		50	50		GW	10YR 6/3	N	WELL GRADED GRAVEL WITH SAND - pale brown;
								gravel up to 2" max diameter, sub to very well
								rounded; sand is very coarse to medium-grained,
								well graded, loose, clean, saturated.
220			90	10	SW-SM	10YR 6/3	N	WELL GRADED SAND WITH SILT - pale brown; sand
								is medium to very fine-grained, well graded to silt,
								loose, saturated.
225			90	10	SW-SM	10YR 6/3	N	Similar to above.
								TD = 225' bls.
230								
235								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. GWEX-4

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mike Daniels Project No.: 753200

Site Plan at Boring Location:

City and State:
Township, Range, Section:

Well Registration:	
Drilling Equipment:	GEFCO Speedstar 50K - CH
Drilling Method:	Air Rotary
Bit Type:	Tricone — Size: 10 3/4"
Started, Time:	9:40 — Date: 4/6/2005
Completed, Time:	17:28 — Date: 4/6/2005
Casing Depth (Ft):	206
Boring Depth (Ft):	215
Screened Interval (Ft):	156-206
Water Depth (Ft):	155.43' bls — Date: 5/4/2005
Logged by:	W. Thompson — Date: 4/6/2005
Checked by:	R. Zimmerman — Date: 8/15/2005

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0			20	80	ML	10YR 6/4	S	SILT WITH SAND - light yellowish brown; sand is fine to very fine-grained, some coarse to fine-grained material at very surface, loose, gritty, flour-like texture, dry.
5								
10				100	ML	10YR 6/4	S	SILT - light yellowish brown; flour-like texture, loose, dry.
15			10	90	ML	10YR 6/4	S	SILT - light yellowish brown; sand is fine to very fine-grained, similar to above.
20			10	90	ML	10YR 6/4	S	Similar to above.
25				100	ML	10YR 6/4	S	SILT - light yellowish brown; flour-like texture, dry.
30			100		SW	10YR 7/2	N	WELL GRADED SAND - light gray; sand is coarse to fine-grained, well graded, loose, clean, dry.
35								

Project Name: LA Landfill, NM							Project No.: 753200	Boring No.: GWEX-4	Sheet 2 of 5
Depth (Ft)	**Graphic Log**	**Estimated %**			**USCS Symbol**	**Munsell Color**	**HCl Rxn**	**Sample Description**	
		GR	**SA**	**FI**					
35		60	40		GW	10YR 7/2	N	WELL GRADED GRAVEL WITH SAND - light gray;	
								gravel up to 2" max diameter, sub to well rounded,	
								crystalline quartz, some granitic material; sand is	
								very coarse to fine-grained, well graded, clean, loose,	
								dry.	
40		30	70		SW	10YR 7/2	N	WELL GRADED SAND WITH GRAVEL - light gray;	
								gravel up to 2" max diameter, subangular to well	
								rounded; sand is coarse to fine-grained, loose,	
								clean, dry.	
45		30	70		SW	10YR 7/2	N	Similar to above	
50		30	70		SW	10YR 7/2	N	Similar to above	
			60	40	SM	10YR 7/2	S	SILTY SAND - light gray; sand is very fine-grained,	
55								gritty, flour-like texture, loose, dry.	
60			100		SW	10YR 7/2	N	WELL GRADED SAND - light gray; sand is coarse to	
								fine-grained, primarily medium to fine-grained, well	
								graded, loose, clean, dry.	
65									
70		10	90		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; gravel	
								up to 1/2" max diameter, subangular to well	
								rounded; sand is coarse to fine-grained, well graded,	
								loose, clean.	
75			100		SW	10YR 7/2	N	WELL GRADED SAND - light gray; sand is coarse to	
								fine-grained, well graded, loose, clean, dry.	
80			100		SW	10YR 7/2	N	WELL GRADED SAND - light gray; sand is medium	
								to fine-grained, well graded, loose, clean, dry.	
85									

	Project Name: LA Landfill, NM				Project No.: 753200	Boring No.: GWEX-4		Sheet 3 of 5
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85			95	5	SW	10YR 7/3	N	WELL GRADED SAND - very pale brown; sand is fine to very fine-grained, loose, fairly clean, damp.
90			100		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; sand is coarse to fine-grained, well graded, loose, clean, damp.
95			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium to very fine-grained, well graded, loose, clean, moist.
100			100		SW	10YR 6/3	N	Similar to above.
105		5	95		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; gravel up to 1/2" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, loose, clean, damp.
110		5	95		SW	10YR 6/3	N	Similar to above.
115		5	95		SW	10YR 6/3	N	Similar to above.
				100	CL	10YR 5/4	S	LEAN CLAY - yellowish brown; slightly cohesive, soft, moist.
120								
			100		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; sand is fine to very fine-grained, well graded through limited range, loose, clean, moist.
125		5	95		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; gravel up to 1" max diameter, subangular to well rounded, sand is medium to fine-grained, well graded, loose, clean.
130								
135								

Project Name: LA Landfill, NM				Project No.: 753200			Boring No.: GWEX-4	Sheet 4 of 5
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
135		5	95		SW	10YR 6/2	N	Similar to above; sand is coarse to fine-grained.
140		10	90		SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; gravel up to 1" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, loose, clean, moist.
145		80	20		GW	10YR 6/2	N	WELL GRADED GRAVEL WITH SAND - light brownish gray; gravel up to 1" max diameter, sub-angular to well rounded; sand is coarse to fine-grained, well graded, loose, clean, damp.
150		10	85	5	SW	10YR 5/4	M	WELL GRADED SAND - yellowish brown; similar to above; small amount of clay represented as balls about 2" in diameter, soft, plastic, cohesive, very moist.
155			100		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; sand is coarse to fine-grained, well graded, loose, clean, wet. (at 156' cuttings are saturated.)
160		60	40		GW	10YR 5/4	N	WELL GRADED GRAVEL WITH SAND - yellowish brown; gravel up to 1" max diameter, subangular to well rounded; sand is coarse to very fine-grained, well graded throughout, loose, saturated, clean.
165		60	20	20	GM	10YR 5/4	M	SILTY GRAVEL WITH SAND - yellowish brown; similar to above; sticky, cohesive, soft, clay fraction saturated.
170			30	70	CL	10YR 6/3	M	SANDY LEAN CLAY - pale brown; sand is fine to very fine-grained, soft, sticky, saturated.
175			85	15	SM	10YR 6/3	M	SILTY SAND - pale brown; sand is fine-grained, loose, saturated.
180								
			40	60	ML	10YR 6/3	M	SANDY SILT - pale brown; loose, gritty, creamy texture, saturated.
185								

Project Name: LA Landfill, NM								Project No.: 753200 Boring No.: GWEX-4	Sheet 5 of 5
Depth (Ft)	Graphic Log	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Sample Description	
		GR	SA	FI					
185									
			90	10	SW-SM	10YR 6/3	W	WELL GRADED SAND WITH SILT - pale brown; sand	
								is coarse to fine-grained, well graded, loose,	
190								saturated.	
								SILTY SAND - pale brown; gravel up to 1/2" max	
195		5	80	15	SM	10YR 6/3	W	diameter, subangular to well rounded; sand is	
								coarse to very fine-grained, well graded, loose,	
								saturated.	
		10	90		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is	
								coarse to medium-grained, well graded through	
200								limited range, loose, clean, saturated.	
			95	5	SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium	
205								to very fine-grained, well graded, loose, saturated.	
								Similar to above; sand is coarse to very fine-grained;	
210			95	5	SW	10YR 6/3	N	gravel up to 3/8" max diameter (<2%).	
								WELL GRADED GRAVEL WITH SAND - pale brown;	
		70	30		GW	10YR 6/3	N	gravel up to 2" max diameter, subangular to well	
								rounded; sand is coarse to fine-grained, well graded	
								throughout, loose, clean, saturated.	
215		50	50		GW	10YR 6/3	N	Similar to above.	
								TD = 215' bls.	
220									
225									
230									
235									

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. IW-1

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mike Daniels Project No.: 753200

Site Plan at Boring Location:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	11"
Started, Time:	14:21	Date:	3/31/2005
Completed, Time:	11:10	Date:	4/1/2005
Casing Depth (Ft):	213		
Boring Depth (Ft):	225		
Screened Interval (Ft):	113-213		
Water Depth (Ft):	160.19' bls	Date:	4/26/2005
Logged by:	W. Thompson	Date:	3/31/2005
Checked by:	R. Zimmerman	Date:	8/15/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0			50	50	SM	10YR 6/4	S	SILTY SAND - light yellowish brown; sand is very fine-grained, soft, gritty, flour-like texture, dry.
5								
10			40	60	ML	10YR 6/4	S	SILT WITH SAND - similar to above.
		3	97		SW	10YR 7/2	N	WELL GRADED SAND - light gray; gravel up to 1" max diameter, sub to well rounded, trace only; sand is medium to fine-grained, well graded, loose, clean, dry.
15								
20		10	90		SW	10YR 7/2	W	WELL GRADED SAND - similar to above.
25		20	80		SW	10YR 7/3	N	WELL GRADED SAND WITH GRAVEL - very pale brown; gravel up to 2" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, loose, clean, dry.
30								
35								

	Project Name: LA Landfill, NM				Project No.: 753200		Boring No.: IW-1 Sheet 2 of 5
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35		3	97		SW	10YR 7/3	N	WELL GRADED SAND - very pale brown; trace gravel up to 1/2" in diameter, sub to well rounded; sand is medium to fine-grained, well graded, loose, clean.
40		3	97		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; similar to above.
45		5	95		SP	10YR 6/2	N	POORLY GRADED SAND - light brownish gray; sand is primarily fine-grained, loose, dry.
50		5	95		SP	10YR 6/2	N	POORLY GRADED SAND - similar to above.
								SILT WITH SAND - yellowish brown; sand is very fine grained, soft, gritty, flour-like testure; small clay
55			15	85	ML	10YR 5/4	S	balls contained in silt matrix, possibly from thin interbed, damp.
			100		SW	10YR 7/3	N	WELL GRADED SAND - very pale brown; medium to fine-grained sand, well graded, loose, clean, damp.
60								
65			100		SP	10YR 7/3	N	POORLY GRADED SAND - very pale brown; sand is fine to very fine-grained, loose, clean, damp.
70			100		SW	10YR 7/3	N	WELL GRADED SAND - very pale brown; sand is medium to fine-grained, well graded, loose, clean, damp.
75			100		SW	10YR 7/3	N	WELL GRADED SAND - similar to above.
80			100		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; sand is medium to fine-grained, well graded, loose, clean, damp.
85								

Project Name: LA Landfill, NM | Project No.: 753200 | Boring No.: IW-1 | Sheet 3 of 5

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85			95	5	SP	10YR 7/3	N	POORLY GRADED SAND - very pale brown; sand is fine to very-fine grained, loose, damp.
90		3	97		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; trace gravel to 1" max diameter, sub to well rounded; sand is medium to very fine-grained, well graded, loose, clean, damp.
95		3	97		SW	10YR 5/4	N	WELL GRADED SAND - similar to above.
100		10	90		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; gravel to 1" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, loose, clean, damp.
105			100		SW	10YR 6/2	N	WELL GRADED SAND - similar to above.
		25	75		SW	10YR 6/2	N	WELL GRADED SAND WITH GRAVEL - light brownish gray; gravel to 1" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, loose, clean.
110								
115		15	85		SW	10YR 6/2	N	WELL GRADED SAND WITH GRAVEL - similar to above.
120			80	20	SM	10YR 5/4	S	SILTY SAND - yellowish brown; sand is very fine-grained, slightly cohesive, moist.
125								
130			100		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; sand is medium to fine-grained, well graded, loose, clean, moist.
135								

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
135			100		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; sand is medium to fine-grained, well graded, loose, clean, moist.
			20	80	CL	10YR 4/3	N	LEAN CLAY WITH SAND - brown; sand is fine to very fine-grained, soft, moderately plastic, cohesive, moist.
140								
145		20	70	10	SW-SM	10YR 6/2	N	WELL GRADED SAND WITH SILT AND GRAVEL - light brownish gray; gravel to 1" max diameter, sub to well rounded; sand is coarse to fine-grained, loose, moist.
150								
155		70	20	10	GW-GM	10YR 6/2	N	WELL GRADED GRAVEL WITH SILT AND SAND - light brownish gray; gravel to 1" max diameter, subangular to well rounded; sand is coarse to fine-grained, sticky, wet.
			100		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; sand is medium to fine-grained, very well graded, loose, clean, wet.
160								
165			90	10	SW-SM	10YR 5/4	W	WELL GRADED SAND WITH SILT - yellowish brown; sand is medium to very fine-grained, well graded to silt fraction, loose, wet.
170			70	30	SM	10YR 4/3	W	SILTY SAND - brown; sand is medium to very fine-grained, sticky, cohesive, soft, slightly plastic, wet.
175			85	15	SM	10YR 4/3	W	SILTY SAND - brown; similar to above.
		20	55	25	SM	10YR 4/3	M	SILTY SAND WITH GRAVEL - brown; gravel to 2" max diameter, sub to well rounded; sand is coarse to fine-grained, sticky, cohesive, wet.
180								
			30	70	ML-CL	10YR 4/3	M	SANDY LEAN CLAY - brown: sand is fine to very fine-grained, moderately plastic, very soft, sticky, wet.
185								

Project Name: LA Landfill, NM		Project No.: 753200				Boring No.: IW-1		Sheet 5 of 5
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
185								
190			55	45	SM	10YR 4/3	M	SILTY SAND - brown; sand is fine to very fine-grained,
								soft, sticky, cohesive, wet.
			80	20	SM	10YR 4/3	W	SILTY SAND - brown; sand is very coarse to fine-
								grained, well graded, loose, sticky, cohesive,
								wet.
195		20	80		SW	10YR 4/3	N	WELL GRADED SAND WITH GRAVEL - brown;
								gravel to 1" max diameter, subangular to well
								rounded ; sand is coarse to medium-grained, well
								graded, loose, clean, wet.
200		15	85		SW	10YR 4/3	N	WELL GRADED SAND WITH GRAVEL - similar to
								above.
								WELL GRADED SAND WITH SILT - brown; gravel to
								1/2" max diameter, subangular to well rounded;
205		5	85	10	SW-SM	10YR 4/3	W	sand is coarse to fine-grained, well graded to silt,
								loose, wet.
		50	40	10	GW-GM	10YR 4/3	W	WELL GRADED GRAVEL WITH SILT AND SAND -
								brown; gravel to 2" max diameter, sub to well
								rounded; sand is coarse to very fine-grained, loose,
210								wet.
215			90	10	SW-SM	10YR 4/3	W	WELL GRADED SAND WITH SILT - brown; sand is
								coarse to fine-grained, well graded, loose, wet.
220			90	10	SP-SM	10YR 4/3	W	POORLY GRADED SAND WITH SILT - brown; sand
								is fine to very-fine grained, loose, wet.
		20	70	10	SW-SM	1-YR 4/3	W	WELL GRADED SAND WITH SILT AND GRAVEL -
225								brown; gravel to 2" max diameter, subangular to
								well rounded; sand is coarse to fine-grained, well
								graded to silt fraction, loose, wet.
								TD = 225' bls.
230								
235								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. IW-2

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC   Driller: Mike Daniels   Project No.: 753200

Site Plan at Boring Location:

City and State:
Township, Range, Section:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	10 3/4"
Started, Time:	14:28	Date:	3/17/2005
Completed, Time:	13:42	Date:	3/18/2005
Casing Depth (Ft):	215		
Boring Depth (Ft):	225		
Screened Interval (Ft):	115-215		
Water Depth (Ft):	166.13' bls	Date:	4/27/2005
Logged by:	W. Thompson	Date:	3/17/2005
Checked by:	R. Zimmerman	Date:	8/15/2005

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0			95	5	SW	10YR 6/4	S	WELL GRADED SAND - light yellowish brown; sand is fine to very fine-grained, well graded, trace silt, loose, fairly clean, dry.
5								
10			100		SW	10YR 7/2	W	WELL GRADED SAND - light gray; sand is medium to very fine-grained, some coarse-grained material up to 3/8" diameter (<3%), well graded, loose, clean, dry.
15			100		SW	10YR 7/2	W	Similar to above, no coarse-grained material.
20			100		SW	10YR 7/2	W	Similar to above, fiew gravel clasts (<1%) to 1" diameter, sub to very well-rounded.
25		5	95		SW	10YR 7/2	W	WELL GRADED SAND - light gray; sand is medium to very fine-grained, well graded; gravel up to 2" max diameter, sub to very well-rounded, clean.
30			100		SW	10YR 7/2	N	WELL GRADED SAND - light gray; sand is medium to very fine-grained, well graded, loose, clean, dry.
35								

Project Name: LA Landfill, NM		Project No.: 753200			Boring No.: IW-2			Sheet 2 of 5
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35			100		SW	10YR 7/2	N	Similar to above, slightly more coarse.
40		10	90		SW	10YR 7/2	M	WELL GRADED SAND - light gray; gravel up to 1"
								max diameter, sub angular to well-rounded; sand
								is coarse to fine-grained, fairly well graded, clean,
								loose.
45		10	90		SW	10YR 7/2	N	Similar to above, sand is medium to fine-grained.
								WELL GRADED GRAVEL WITH SILT - light gray;
		90	10		GW-GM	10YR 7/2	N	some dark gray silicates, quartz, cobbles are
								probable to about 4" max diameter, sub to well-
50			90	10	SP-SM	10YR 7/2	N	rounded, dry, clean.
								POORLY GRADED SAND WITH SILT - light gray;
								very fine-grained, soft, gritty, flour-like texture, damp.
55			90	10	SW-SM	10YR 6/4	N	WELL GRADED SAND WITH SILT - light yellowish
								brown; sand is medium to very fine-grained, well
								graded, loose, damp.
60			100		SW	10YR 7/1	N	WELL GRADED SAND - light gray; sand is coarse to
								fine-grained, very well graded, lots of quartz, loose,
								clean, dry.
65		15	85		SW	10YR 7/2	N	WELL GRADED SAND WITH GRAVEL - light gray;
				100	CL	10YR 5/3	S	gravel up to 1" max diameter, subangular to well
			10	90	ML	10YR 5/3	W	rounded; sand is coarse to very fine-grained, well
								graded, loose, clean, dry.
								66-67.5 LEAN CLAY - brown; soft, moderately plastic,
70								moist.
								67.5-75 SILT - brown; sand is very fine-grained, soft,
								slightly cohesive, damp.
75			95	5	SW	10YR 7/2	N	WELL GRADED SAND - light gray; medium to very
								fine-grained, well graded, loose, fairly clean, damp.
80			90	10	SP-SM	10YR 6/2	N	POORLY GRADED SAND WITH SILT - light brownish
								gray; sand is very fine-grained, soft, gritty texture,
								loose, damp.
85								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: IW-2

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85			90	10	SP-SM	10YR 6/2	N	POORLY GRADED SAND WITH SILT - light brownish gray; sand is very fine-grained, soft, gritty texture, loose, damp.
90			75	25	SM	10YR 7/3	N	SILTY SAND - very pale brown; sand is very fine-grained, gritty, flour-like texture, soft, damp.
95		5	95		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is coarse to fine-grained, well graded; few gravel pieces to 1/2" diameter, subangular to well rounded; loose, clean, damp.
100			100		SW	10YR 6/2	N	WELL GRADED SAND - light grayish brown; sand is medium to fine-grained, well graded, loose, clean.
105			100		SP	10YR 6/4	N	POORLY GRADED SAND - light yellowish brown; sand is fine to very-fine graded, loose, clean, damp.
			20	80	ML	10YR 5/4	N	SILT WITH SAND - yellowish brown; sand is fine to very fine-grained, soft, gritty texture, slightly cohesive, non-plastic, moist.
110								
			100		SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; sand is fine to very fine-grained, well graded, loose, clean, moist
115								
120			90	10	SW-SM	10YR 5/4	S	WELL GRADED SAND WITH SILT - yellowish brown; sand is medium to very fine-grained, well graded, cuttings contain balls of clay that are plastic, soft.
125				100	ML	10YR 5/4	S	SILT - yellowish brown; silt is soft, cohesive, slightly plastic, moist.
130				100	ML	10YR 5/4	S	Similar to above.
135								

Project Name: LA Landfill, NM								Project No.: 753200 Boring No.: IW-2 Sheet 4 of 5
Depth (Ft)	Graphic Log	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Sample Description
		GR	SA	FI				
135			90	10	SP-SM	10YR 6/3	N	POORLY GRADED SAND WITH SILT - pale brown;
								sand is fine to very fine-grained, soft, gritty texture,
								loose, moist.
140			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is fine to
								very fine-grained, well graded, loose, clean, dry.
145			100		SW	10YR 7/2	N	Similar to above - light gray.
150			100		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; sand is
								coarse to fine-grained, well graded, loose, clean,
								damp.
155			100		SW	10YR 6/2	N	Similar to above.
160			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to fine-grained, well graded, clean, loose, very moist.
								WELL GRADED GRAVEL WITH SILT AND SAND -
								yellowish brown; gravel is fine-grained up to 3/4"
165		60	30	10	GW-GM	10YR 5/4	W	max diameter, subangular to well rounded; sand is
								medium to very fine-grained, loose, wet.
			70	30	SM	10YR 5/4	W	SILTY SAND - yellowish brown; sand is very fine-
								grained, sticky, very soft, cohesive.
170			70	30	SM	10YR 5/4	N	Similar to above - sand is medium to very fine-grained.
			100		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; sand is
175								medium to fine-grained, well graded, loose, clean,
								wet.
180			100		SW	10YR 5/2	N	WELL GRADED SAND - grayish brown; sand is
								medium to very fine-grained, some coarse, fairly
								well graded, loose, wet.
185								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: IW-2

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
185			80	20	SM	10YR 5/2	W	SILTY SAND - grayish brown; sand is fine to very fine-grained, loose, wet.
190								
			90	10	SW-SM	10YR 5/2	N	WELL GRADED SAND WITH SILT - grayish brown; sand is medium to very fine-grained, fairly well graded to silt fraction, loose, wet.
195								
200		80	20		GW	10YR 5/2	N	WELL GRADED GRAVEL WITH SAND - grayish brown; gravel up to 2" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, loose, clean, wet.
205		80	20		GW	10YR 5/2	N	Similar to above.
210		80	20		GW	10YR 5/2	N	Similar to above.
215		90	10		GW-GM	10YR 5/2	N	WELL GRADED GRAVEL WITH SILT - grayish brown; gravel up to 2" max diameter, sub to very well rounded, crystaline, volanics; sand is coarse to medium-grained, loose, clean, wet.
			100		SW	10YR 5/2	N	WELL GRADED SAND - grayish brown; sand is fine to very fine-grained, well graded, loose, clean, flowing sand, wet.
220								
								TD = 225' bls.
225								
230								
235								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. SVE-1

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mark Green Project No.: 753200

Site Plan at Boring Location:

City and State:
Township, Range, Section:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	14 3/4"
Started, Time:	7:55	Date:	2/3/2005
Completed, Time:	11:00	Date:	2/17/2005
Casing Depth (Ft):	80 & 107		
Boring Depth (Ft):	109		
Screened Interval (Ft):	70-80 & 97-107		
Water Depth (Ft):		Date:	
Logged by:	W. Thompson	Date:	2/3/2005
Checked by:	R. Zimmerman	Date:	

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		25	55	20	SM	10YR 5/4	S	SILTY SAND WITH GRAVEL - yellowish brown; gravel up to
					Refuse			3" max diameter, sub to well rounded, crystalline; sand
								is coarse to very fine-grained, well graded to silt, moist.
					Refuse			1.5' TOP OF REFUSE - black; humic, glass, plastic,
								general household type materials.
5								3' REFUSE - well preserved, readable newsprint, cardboard,
								glass, plastic, wood, damp, strong acidic odor.
					Refuse			REFUSE - black; decomposed, humic, some plastic, wood,
10								fibers, glass, moist, strong acidic odor.
					Refuse	10YR 7/3		REFUSE - very light pale brown; well preserved newsprint
								dated 1976, almost no decomposition, plastic, glass,
								cardboard, typical household refuse, damp.
15								
20								
25								
			90	10	SP-SM	10YR 5/2	M	POORLY GRADED SAND WITH SILT - grayish brown;
								sand is fine-grained, loose, soft, dry.
30			90	10	SP-SM	10YR 5/2	M	Similar to above.
35								

Project Name: LA Landfill, NM		Project No.: 753200		Boring No.: SVE-1				Sheet 2 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35			90	10	SP-SM	10YR 5/2	M	Similar to above.
40			90	10	SP-SM	10YR 5/2	M	Similar to above.
45			100		SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; sand is medium to very fine-grained, well graded, loose, clean, damp.
50			100		SP	10YR 6/4	N	POORLY GRADED SAND - light yellowish brown; sand is fine-grained.
								SILTY SAND - brownish yellow; sand is very fine-grained, very soft, gritty, flour-like texture, moist,
55			80	20	SM	10YR 6/6	N	will hold together weakly when squeezed in hand.
			10	90	CL	10YR 6/3	S	LEAN CLAY - pale brown; sand is very fine-grained,
			50	50	SM	10YR 6/4	S	soft, moderately plastic, moderately cohesive, moist.
								SILTY SAND - light yellowish brown; sand is very fine-grained, gritty, flour-like texture, soft, damp.
60								
65			100		SP	10YR 6/2	N	POORLY GRADED SAND - light gray; sand is fine to very fine-grained, loose, clean, damp.
70			100		SW	10YR 7/3	N	WELL GRADED SAND - very pale brown; sand is medium to very fine-grained, well graded, loose, clean, damp.
75			100		SP	10YR 6/4	N	POORLY GRADED SAND - light yellowish brown; sand is fine to very fine-grained, clean, soft, loose.
								WELL GRADED SAND - light yellowish brown; sand is
80			100		SW	10YR 6/4	N	medium to very fine-grained, well graded, clean, loose.
			40	60	ML	10YR 5/4	S	SANDY SILT - yellowish brown; sand is very fine-grained, exhibits almost no plasticity, soft, moist.
85								

Project Name: LA Landfill, NM					Project No.: 753200		Boring No.: SVE-1	Sheet 3 of 3
Depth (Ft)	Graphic Log	Estimated %			USCS Symbol	Munsell Color	HCl Rxn	Sample Description
		GR	SA	FI				
85				100	CL	10YR 5/4	S	LEAN CLAY - yellowish brown; soft, cohesive, slight
								to moderate plasticity, moist.
90			20	80	CL	10YR 5/4	S	LEAN CLAY - yellowish brown; sand is very fine-
								grained, soft, slightly plastic, cohesive, moist.
95								
			75	25	SM	10YR 6/4	W	SILTY SAND - light yellowish brown; sand is fine to
								very fine-grained, soft, loose, damp.
100			90	10	SW-SM	10YR 6/4	W	WELL GRADED SAND WITH SILT - light yellowish
								brown; sand is medium to very fine-grained, loose,
								damp.
		15	85		SW	10YR 6/4	W	WELL GRADED SAND WITH GRAVEL - yellowish
								brown; gravel up to 1 1/2" max diameter, subangular
105		15	85		SW	10YR 6/4	W	to well rounded, crystalline; sand is coarse to fine-
								grained, well graded, loose, clean, damp.
								105' Similar to above.
								TD = 109' bls.
110								
115								
120								
125								
130								
135								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. SVE-2

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC   Driller: Mark Green   Project No.: 753200

Site Plan at Boring Location:

City and State:
Township, Range, Section:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	14 3/4"
Started, Time:	13:40	Date:	2/2/2005
Completed, Time:	10:14	Date:	2/16/2005
Casing Depth (Ft):	85 & 115		
Boring Depth (Ft):	117		
Screened Interval (Ft):	75-85 & 105-115		
Water Depth (Ft):	NA	Date:	
Logged by:	W. Thompson	Date:	2/2/2005
Checked by:	R. Zimmerman	Date:	9/15/2005

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		15	30	45	SM	10YR 4/3	S	Asphalt pavement to 8".
								SILTY SAND WITH GRAVEL - brown; gravel up to 2" max diameter, sub to very well rounded; sand is coarse to very fine-grained, poorly graded, cohesive, sticky, wet.
5								
								SANDY SILT - brown; sand is fine to very fine-grained, soft,
			40	60	ML	10YR 4/3	S	loose, damp.
			40	60	Refuse	10YR 4/1	S	TOP OF REFUSE - dark gray; refuse mixed with sandy silt,
10								soft, dark organic material, humic, moist.
					Refuse	10YR 2/2	W	REFUSE - very dark brown; loose mix of paper, wood,
15								plastic, some glass and organic humic material, strong acidic smell.
								REFUSE - light gray; very well preserved, little to no
					Refuse	10YR 7/2	N	decomposition, moist, strong acidic odor, newsprint dated to 1979, no native material or sand bedding present.
20					Refuse	10YR 2/1	N	REFUSE - black; humic organics, very composted material, some wood, fibrous material also present.
25								
30								
35								

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
Project Name: LA Landfill, NM					Project No.: 753200		Boring No.: SVE-2	Sheet 2 of 3
35								
40								
								BOTTOM OF REFUSE.
		10	85	5	SW	10YR 4/1	N	WELL GRADED SAND - dark gray; gravel up to 1 1/2"
45								max diameter, sub to very well rounded, crystalline;
								sand is medium to very fine-grained, fairly well
								graded, fairly clean, loose, moist.
			100		SW	10YR 4/3	N	WELL GRADED SAND - brown; sand is medium to
								very fine-grained, very well graded, clean, loose,
50								moist.
55								
60			70	30	SM	10YR 6/4	N	SILTY SAND - light yellowish brown; sand is very fine-
								grained, soft, moist.
65			70	30	SM	10YR 6/4	S	SILTY SAND - light yellowish brown; sand is fine to
								very fine-grained, thin clay stringers also evident,
								soft, moist.
70		20	80		SW	10YR 6/3	N	WELL GRADED SAND WITH GRAVEL - pale brown;
								gravel up to 1" max diameter, subangular to well
								rounded; sand is coarse to fine-grained, well graded,
								clean, loose, moist.
75								
80			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to fine-grained, well graded, loose, clean, moist.
85								

Project Name: LA Landfill, NM   Project No.: 753200   Boring No.: SVE-2   Sheet 3 of 3

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is coarse to fine-grained, well graded, loose, clean, moist.
90			30	70	CL	10YR 5/4	M	SANDY LEAN CLAY - yellowish brown; sand is fine to very fine-grained, fines are about 25% silt, the remainder as clay, very soft, moist.
95			80	20	SM	10YR 5/4	M	SILTY SAND - yellowish brown; sand is medium to very fine-grained, loose, moist.
100			10	90	ML	10YR 5/4	S	SILT - yellowish brown; sand is very fine-grained, soft, gritty flour-like texture, damp.
105			5	95	ML	10YR 4/6	S	SILT - dark yellowish brown; about 15% clay, very soft, very slight plasticity, moist.
110			95	5	SW	10YR 6/4	M	WELL GRADED SAND - light yellowish brown; sand is medium to very fine-grained, well graded, loose.
115			100		SW	10YR 6/4	W	Similar to above.
								TD = 117' bls.
120								
125								
130								
135								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. SVE-3

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC   Driller: Mark Green   Project No.: 753200

Site Plan at Boring Location:

City and State:
Township, Range, Section:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	14 3/4"
Started, Time:	10:50	Date:	2/2/2005
Completed, Time:	11:51	Date:	2/14/2005
Casing Depth (Ft):	85 & 120		
Boring Depth (Ft):	123		
Screened Interval (Ft):	75-85 & 110-120		
Water Depth (Ft):	NA	Date:	
Logged by:	W. Thompson	Date:	2/2/2005
Checked by:	R. Zimmerman	Date:	9/16/2005

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		5	70	25	SM	10YR 4/4	S	SILTY SAND - dark yellowish brown; gravel up to 1" max diameter, subangular to rounded; sand is medium to very fine-grained, soft, loose, damp.
5								
10		5	70	25	SM	10YR 4/1	S	Similar to above - dark gray.
					Refuse	10YR 2/1	W	10.5' TOP OF REFUSE - very dark brown; fairly well degraded, much wood, plastic, some paper, glass, household type refuse, mixed with humic decomposed organics, moist.
15								
					Refuse			REFUSE - much less degradation, clean newsprint, paper, plastic, fairly well preserved, foul acidic odor.
20					Refuse	10YR 6/4	N	REFUSE - light yellowish brown; cardboard, newsprint, some glass, plastic, general household refuse, almost no visually detectable decomposition, damp, sour acidic odor, newsprint dated 1979.
25			75	25	SM	10YR 4/4	S	SILTY SAND - dark yellowish brown; sand is fine to very fine-grained, loose, soft, damp.
					Refuse	10YR 6/4	N	REFUSE - light yellowish brown; cardboard, newsprint, some glass, plastic, general household refuse, almost no visually detectable decomposition, damp, sour acidic odor, newsprint dated 1979.
30								
			20	80	ML	10YR 5/4	S	SILT WITH SAND - dark yellowish brown; sand is very fine-grained, soft, dry, top of native material?
35								

Project Name: LA Landfill, NM		Project No.: 753200			Boring No.: SVE-3			Sheet 2 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35								
		50	30	20	GM	10YR 7/2	N	SILTY GRAVEL WITH SAND - light gray; gravel up to
								3" max diameter, subangular to very well rounded,
								primarily slight gray crystaline rocks; sand is coarse
40								to very fine-grained, well graded to silt, dry.
45			95	5	SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; sand is
								medium to fine-grained, well graded, loose, dry.
		10	85	5	SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; similar
								to above; gravel up to 2" max diameter, dry, loose.
50			90	10	SW-SM	10YR 6/3	N	WELL GRADED SAND WITH SILT - pale brown; sand
								is very fine-grained, soft, loose, slightly damp.
		REMAINING LOG COMPLETED BY DOUG EARP, CABQ						
55					SM			SAND AND GRAVEL - coarse sand with gravel,
								loose.
60			100		SW			COARSE SAND
				100	CL			CLAY
65								
			100		SM			SAND
70			100		SW			SAND - medium to fine-grained, clean.
75			80	20				SAND WITH CLAY STRINGERS - coarse through
								medium-grained, thin clay stringers.
80			100					SAND - coarse through medium-grained, clean.
85								

Project Name: LA Landfill, NM | Project No.: 753200 | Boring No.: SVE-3 | Sheet 3 of 3

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85		90	10					GRAVEL WITH SAND - to 1/2" diameter.
90		10	90					SAND WITH GRAVEL - coarse sand with gravel.
								CLAY
95								SANDY CLAY
100								SANDY CLAY
105		5		95				CLAY - some gravel, brown.
110			100					SAND - medium to fine-grained; damp.
115								
			100					SAND - reddish brown; medium to fine-grained; damp.
120			100					SAND - light brown; fine-grained; damp.
								TD = 123' bls.
125								
130								
135								

HYDRO GEO CHEM, INC.
Geologic Boring Log

Boring No. SVE-4

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC   Driller: Mark Green   Project No.: 753200

Site Plan at Boring Location:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	14 3/4"
Started, Time:	15:06	Date:	2/3/2005
Completed, Time:	9:17	Date:	2/24/2005
Casing Depth (Ft):	70 & 105		
Boring Depth (Ft):	107		
Screened Interval (Ft):	60-70 & 95-105		
Water Depth (Ft):	NA	Date:	
Logged by:	W. Thompson	Date:	2/3/2005
Checked by:	R. Zimmerman	Date:	9/16/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		10	80	10	SW-SM	10YR 4/3	S	WELL GRADED SAND WITH SILT - brown; gravel up to 2" max diameter, sub to very well rounded; sand is coarse to very fine-grained, well graded to silt, moist.
5					Refuse	10YR 2/1	S	5.5' TOP OF REFUSE - black; humic, sticky, very soft.
10								
15								
20					Refuse	10YR 2/1	S	Similar to above - not as decomposed, lots of plastic, wood fibers, some glass, typical household refuse, moist.
					Refuse			REFUSE - well preserved, paper, newsprint, cardboard, glass, very little decomposition, damp, strong acidic odor, newsprint dated 1984.
25								
30								
35								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: SVE-4 Sheet 2 of 3

Depth (Ft)	Graphic Log	GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35								
40								
45								
50			85	15	Refuse	10YR 5/1	M	BOTTOM OF REFUSE - SILTY SAND - gray; sand is very fine-grained, loose, soft, dry.
55								
		5	85	10	SW-SM	10YR 6/4	W	WELL GRADED SAND WITH SILT - light yellowish brown; sand is medium to very fine-grained, fairly well graded, loose, dry.
60			100		SP	10YR 6/4	N	POORLY GRADED SAND - light yellowish brown; sand is fine to very fine-grained, loose, clean, damp.
				100	ML	10YR 4/3	N	SILT - brown; soft, slightly cohesive, no plasticity, moist.
65								
70			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium to very fine-grained, well graded, loose, clean, moist.
			10	90	CL	10YR 5/4	M	LEAN CLAY - yellowish brown; sand is very fine-grained, soft, moderately plastic, moist.
75								
80			5	95	CL	10YR 5/4	M	LEAN CLAY - yellowish brown; trace fine-grained sand, slightly sticky, moderately plastic, moist.
85								

Project Name: LA Landfill, NM		Project No.: 753200				Boring No.: SVE-4		Sheet 3 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85			80	20	SM	10YR 5/4	W	SILTY SAND - yellowish brown; sand is very fine-
								grained, soft, moist.
			90	10	SP-SM	10YR 5/4	W	POORLY GRADED SAND WITH SILT - yellowish
90								brown; sand is fine-grained, loose, damp.
								WELL GRADED SAND WITH GRAVEL - pale brown;
								gravel up to 1 1/2" max diameter, sub to very well
		15	85		SW	10YR 6/3	N	rounded; sand is coarse to very fine-grained, well
								graded, loose, clean, damp.
95		10	90		SW	10YR 6/3	N	Similar to above - gravel up to 3/4" max diameter.
100			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to very fine-grained, well graded, loose, clean, moist.
								POORLY GRADED SAND - light brownish gray; sand
105			100		SP	10YR 6/2	N	is fine-grained, loose, moist, clean.
			100		SP	10YR 6/3	N	Similar to above - pale brown.
								TD = 107' bls.
110								
115								
120								
125								
130								
135								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. SVE-5

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mark Green Project No.: 753200

Site Plan at Boring Location:

Well Registration:		
Drilling Equipment:	GEFCO Speedstar 50K - CH	
Drilling Method:	Air Rotary	
Bit Type:	Tricone	Size: 14 3/4"
Started, Time:	15:04	Date: 2/4/2005
Completed, Time:	11:46	Date: 2/14/2005
Casing Depth (Ft):	65 & 105	
Boring Depth (Ft):	115	
Screened Interval (Ft):	55-65 & 95-105	
Water Depth (Ft):	NA	Date:
Logged by:	W. Thompson	Date: 2/4/2005
Checked by:	R. Zimmerman	Date: 9/16/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		5	75	20	SM	10YR 4/3	S	SILTY SAND - brown; gravel up to 2" max diameter, sub to very well rounded, crystalline; sand is coarse to very fine-grained, fairly well graded to silt, loose mix, moist.
					Refuse	10YR 2/1		TOP OF REFUSE - black; composted wood, paper, humic, soft, moist, some plastic, glass, etc.
5								
10								
15								
20								
25			60	40	SM	10YR 5/1	S	SILTY SAND - gray; sand is very fine-grained, mixed with refuse, dry.
30								
35								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: SVE-5

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35					Refuse	10YR 2/1		REFUSE - black; fibrous, humic, soft, acidic sour odor.
			90	10	SW-SM	10YR 4/2	M	WELL GRADED SAND WITH SILT - dark grayish
40								brown; sand is medium to very fine-grained, well
								graded to silt, loose, moist.
45			90	10	SW-SM	10YR 4/2	M	Similar to above.
50			90	10	SW-SM	10YR 4/2	M	Similar to above.
55			100		SW	10YR 5/4	W	WELL GRADED SAND - yellowish brown; sand is
								medium to very fine-grained, well graded, loose,
								clean, moist.
60			100		SW	10YR 5/4	W	Similar to above.
65		5	95		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown ; gravel up
								to 1/2" max diameter, sub to well rounded; sand is
								medium to fine-grained, loose, clean.
70			70	30	SM	10YR 5/3	N	SILT SAND - brown; sand is fine to very fine-grained,
								soft, sticky, cohesive, moist.
75			10	90	CL	10YR 5/3	M	LEAN CLAY - brown; sand is minor, very fine-grained,
								very soft, plastic, cohesive, moist.
80				100	CL	10YR 5/3	M	Similar to above.
			100		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; sand is
								medium to fine-grained, well graded, clean, loose,
85								damp.

Project Name: LA Landfill, NM				Project No.: 753200			Boring No.: SVE-5 Sheet 3 of 3

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85								
90			60	40	SM	10YR 5/4	M	SILTY SAND - yellowish brown; sand is fine to very fine-grained, soft, gritty texture, slightly sticky, moist.
95			90	10	SP-SM	10YR 5/4	W	POORLY GRADED SAND WITH SILT - yellowish brown; sand is fine to very fine-grained, loose, moist.
100			100		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; sand is medium to very fine-grained, well graded, loose, clean.
105			80	20	SM	10YR 6/4	M	SILTY SAND - light yellowish brown; sand is fine to very fine-grained, loose, moist.
110			10	90	ML	10YR 5/4	M	SILT - yellowish brown; sand is fine to very fine-grained soft, sticky, cohesive, slightly plastic, moist.
115			70	30	SM	10YR 5/4	M	SILTY SAND - yellowish brown; sand is very fine-grained, soft, gritty texture, loose, moist.
								TD = 115' bls.
120								
125								
130								
135								

HYDRO GEO CHEM, INC.

Boring No. SVE-6

Geologic Boring Log

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mark Green Project No.: 753200

Site Plan at Boring Location:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	14 3/4"
Started, Time:	9:40	Date:	2/7/2005
Completed, Time:	10:40	Date:	2/23/2005
Casing Depth (Ft):	122		
Boring Depth (Ft):	125		
Screened Interval (Ft):	70-80 & 112-122		
Water Depth (Ft):	NA	Date:	
Logged by:	W. Thompson	Date:	2/7/2005
Checked by:	R. Zimmerman	Date:	9/16/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		10	75	15	SM	10YR 4/2	S	SILTY SAND - dark grayish brown; gravel up to 1 1/2" max diameter, sub to very well rounded; sand is medium to very fine-grained, fairly well graded to silt, loose, moist.
					Refuse		W	4.5' REFUSE - partially decomposed paper, wood, household refuse, plastic, glass, etc.; loose, damp.
5								
					Refuse	10YR 4/4	W	REFUSE - dark yellowish brown; decomposed, humic, soft, fibrous, containing plastic, glass, some metal; damp.
10								
15								
								Bottom of Refuse at 20'.
20		5	90	5	SW	10YR 6/4	W	WELL GRADED SAND - light yellowish brown; gravel up to 2" max diameter, sub to well rounded; sand is medium to very fine-grained, well graded, loose, damp.
25		5	90	5	SP	10YR 6/2	N	POORLY GRADED SAND - light brownish gray; gravel up to 1/2" max diameter; sand is fine to very fine-grained, loose, dry.
30		10	85	5	SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; gravel up to 1 1/2" max diameter, sub to very well rounded; sand is coarse to very fine-grained, well graded, loose, dry.
35								

Project Name: LA Landfill, NM		Project No.: 753200			Boring No.: SVE-6			Sheet 2 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35		20	80		SW	10YR 6/3	W	WELL GRADED SAND WITH GRAVEL - pale brown; gravel up to 2" max diameter, subangular to well rounded; sand is coarse to very fine-grained, well graded, loose, dry.
40		30	70		SW	10YR 5/3	W	WELL GRADED SAND WITH GRAVEL - brown; gravel up to 1" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, loose, clean.
45			10	90	CL	10YR 4/3	S	LEAN CLAY - brown; sand is fine to very fine-grained; soft, moderately plastic, moist.
50								
			5	95	CL	10YR 4/3	M	LEAN CLAY - brown; trace organic soil; sand is very fine-grained; very soft, moist, slightly plastic.
55								
			90	10	SW	10YR 5/3	M	WELL GRADED SAND - brown; sand is fine to very fine-grained, fairly well graded to silt, loose, moist.
60			10	90	ML	2.5YR 6/4	S	SILT WITH SAND - light reddish brown; sand is very fine-grained; cohesive, slightly plastic, soft.
			95	5	SP	10YR 6/4	N	POORLY GRADED SAND - light yellowish brown; sand is fine to very fine-grained, loose, damp.
65			95	5	SP	10YR 6/4	N	Similar to above.
			100		SP	2.5Y 7/1	N	POORLY GRADED SAND - light gray; sand is medium to very fine-grained, mostly fine-grained, loose, damp
70		5	95		SP	2.5Y 7/1	N	Similar to above - gravel up to 1" max diameter, sub to well rounded.
			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium to very fine-grained, well graded, loose, damp.
75			100		SW	10YR 6/3	N	Similar to above; sand is fine to very fine-grained.
80			100		SP	10YR 6/3	N	POORLY GRADED SAND - sand is fine-grained, clean, loose.
85								

Project Name: LA Landfill, NM				Project No.: 753200		Boring No.: SVE-6		Sheet 3 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85				100	CL	10YR 4/4	M	LEAN CLAY - dark yellowish brown; soft, moderately plastic, moist.
90			5	95	CL	10YR 4/4	S	LEAN CLAY - similar to above; more stiff, less moist.
95			5	95	CL	10YR 4/4	S	Similar to above.
100			10	90	ML	10YR 5/4	N	SILT - yellowish brown; sand is fine to very fine-grained soft, gritty, flour-like texture, moist.
105			80	20	SM	10YR 5/4	W	SILTY SAND - yellowish brown; sand is fine to very fine-grained, loose, damp.
110			90	10	SP-SM	10YR 5/4	N	POORLY GRADED SAND WITH SILT - yellowish brown; sand is very fine-grained, loose, dry.
115			90	10	SP-SM	10YR 5/4	N	Similar to above.
120			90	10	SP-SM	10YR 6/4	N	POORLY GRADED SAND WITH SILT - light yellowish brown; similar to above.
125			95	5	SP	10YR 6/4	N	POORLY GRADED SAND - similar to above.
								TD = 125' bls.
130								
135								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. SVE-7

Project Name: Los Angeles Landfill, New Mexico			
Drilling Company: WDC	Driller: Mark Green	Project No.:	753200

Site Plan at Boring Location:			
Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	14 3/4"
Started, Time:	9:50	Date:	2/5/2005
Completed, Time:	15:03	Date:	2/25/2005
Casing Depth (Ft):	75 & 112		
Boring Depth (Ft):	115		
Screened Interval (Ft):	65-75 & 102-112		
Water Depth (Ft):	NA	Date:	
Logged by:	W. Thompson	Date:	2/5/2005
Checked by:	R. Zimmerman	Date:	9/16/2005

City and State:

Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		20	75	5	SW	10YR 5/4	W	WELL GRADED SAND WITH GRAVEL - yellowish brown; gravel up to 3" max diameter, few cobbles up to 5", sub to very well rounded; sand is very coarse to fine-grained, well graded, fairly clean, damp.
5								
10		20	75	5	SW	10YR 5/4	S	Similar to above - no cobbles, gravel up to 2" max diameter.
15		20	75	5	SW	10YR 5/4	S	Similar to above.
20		10	80	10	SP-SM	10YR 6/4	S	POORLY GRADED SAND WITH SILT - light yellowish brown; gravel up to 1" max diameter, sub to well rounded; sand is medium to fine-grained, primarily fine-grained, loose, damp.
25		5	90	5	SW	10YR 7/2	M	WELL GRADED SAND - light gray; sand is medium to very fine-grained, well graded, clean, loose, dry.
30		10	85	5	SW	10YR 5/3	N	WELL GRADED SAND - brown; gravel up to 1" max diameter, sub to very well rounded; sand is medium to very fine-grained, well graded, moist, lose, clean.
35								

Project Name: LA Landfill, NM | Project No.: 753200 | Boring No.: SVE-7 |

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35			100		SW	10YR 5/3	N	WELL GRADED SAND - brown; sand is medium to
								very fine-grained, clean, loose, moist.
40			70	30	SM	7.5YR 5/6	M	SILTY SAND - strong brown; sand is fine to very fine-
								grained, soft, slightly cohesive, moist.
45			20	80	ML	10YR 6/4	M	SANDY SILT - light yellowish brown; sand is very fine-
								grained, soft, moist, non-plastic.
				100	ML	10YR 6/4	M	SILT - light yellowish brown; soft, slightly plastic,
								cohesive, moist.
50								
55				100	CL	10YR 5/4	M	LEAN CLAY - yellowish brown; soft, moderately
								plastic, cohesive, moist.
60			100		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; sand is
								medium to fine-grained, well graded, loose, clean,
								damp.
65								
70			90	10	SP-SM	10YR 6/4	N	POORLY GRADED SAND WITH SILT - light yellowish
								brown; sand is fine to very fine-grained, fairly well
								graded, loose, moist.
75			20	80	ML	10YR 5/4	N	SILT WITH SAND - yellowish brown; sand is very fine-
								grained, soft, non-plastic, moist.
		5	90	5	SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to very fine-grained, well graded, loose, fairly clean,
80								moist.
85								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: SVE-7

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85			95	5	SW	10YR 6/3	W	Similar to above.
90			95	5	SW	10YR 6/4	M	WELL GRADED SAND - light yellowish brown; sand is
								coarse to very fine-grained, well graded, loose,
								moist, fairly clean.
95		10	80	10	SW-SM	10YR 6/4	W	WELL GRADED SAND WITH SILT - light yellowish
								brown; gravel up to 3/4" max diameter, sub to very
								well rounded; sand is coarse to very fine-grained,
								fairly well graded to silt, loose, moist.
100								
		40	60	10	SW-SM	10YR 6/4	M	WELL GRADED SAND WITH SILT AND GRAVEL -
								light yellowish brown; gravel up to 2 1/2" max
								diameter, sub to well rounded; sand is medium to
			70	30	SM	10YR 6/6	M	very fine-grained, loose, moist.
105								SILTY SAND - brownish yellow; sand is very fine-
								grained, soft, moist.
110			100		SP	10YR 6/4	W	POORLY GRADED SAND - light yellowish brown;
								sand is fine to very fine-grained, loose, clean, moist.
115			100		SP	10YR 6/4	W	Similar to above.
								TD = 115' bls.
120								
125								
130								
135								

HYDRO GEO CHEM, INC.
Geologic Boring Log

Boring No. SVE-8

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mark Green Project No.: 753200

Site Plan at Boring Location:			
Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	14 3/4"
Started, Time:	13:40	Date:	2/7/2005
Completed, Time:	16:12	Date:	2/24/2005
Casing Depth (Ft):	75 & 117		
Boring Depth (Ft):	120		
Screened Interval (Ft):	65-75 & 107-117		
Water Depth (Ft):	NA	Date:	
Logged by:	W. Thompson	Date:	2/7/2005
Checked by:	R. Zimmerman	Date:	9/16/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		10	80	10	SP-SM	10YR 4/6	S	POORLY GRADED SAND WITH SILT - dark yellowish brown; gravel up to 2" max diameter, sub to very well rounded; sand is coarse to very fine-grained, mostly fine-grained, moist.
					Refuse		S	TOP OF REFUSE - black, degraded household refuse, humic with glass shards, plastic, wood fibers, sticky, wet.
5								
10					Refuse		W	REFUSE - similar to above, not as decomposed, much wood fibers, partially decomposed newsprint and cardboard, damp.
15								
					Refuse		N	REFUSE - well preserved newsprint, wood, garden clippings, glass, plastic, etc., typical household refuse, damp, strong acidic odor.
20								
25								
30								
35								

Project Name: LA Landfill, NM		Project No.: 753200			Boring No.: SVE-8			Sheet 2 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35					Refuse	10YR 6/2	M	REFUSE - light brownish gray; 50% silt 50% slightly decomposed refuse, dry; newsprint dated 1982.
40					Refuse		N	REFUSE - almost no visible decomposition, typical household refuse, damp, strong acidic smell.
			25	75	ML	2.5Y 6/1	S	SILT WITH SAND - gray; sand is very fine-grained, soft
45								flour-like texture, dry.
50					Refuse			REFUSE - primarily wood fibers, dry, clean, no decomposition
55								
			95	5	SP	2.5Y 6/1	W	POORLY GRADED SAND - gray; bottom of refuse; sand is fine-grained, loose, dry.
60		5	95		SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; trace gravel up to 3/4" max diameter, subangular to well rounded; sand is medium to very fine-grained, well graded, loose, clean, damp.
65			100		SW	10YR 6/2	N	Similar to above; no gravel.
70			100		SW	10YR 6/2	N	Similar to above.
75		10	90		SW	10YR 5/4	N	WELL GRADED SAND - yellowish brown; gravel up to 1/2" max diameter, subangular to rounded; sand is coarse to fine-grained, well graded, loose, damp.
				100	CL	10YR 4/4	M	LEAN CLAY - dark yellowish brown; very soft, moderately plastic, moist.
80				100	CL	10YR 4/4	M	LEAN CLAY - dark yellowish brown; soft, plastic, moist.
85								

Project Name: LA Landfill, NM Project No.: 753200 Boring No.: SVE-8

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85				100	CL	7.5YR 5/4	S	LEAN CLAY - brown; soft, cohesive, slightly plastic, moist.
90				100	ML	7.5YR 5/4	S	SILT - brown; similar to above, less plastic.
				100	ML	10YR 6/4	S	SILT - light yellowish brown; soft, non-plastic, moist.
95								
			100		SP	10YR 6/4	N	POORLY GRADED SAND - light yellowish brown; sand is fine to very fine-grained, loose, moist, clean.
100			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium to very fine-grained, well graded, loose, clean, damp.
105		3	97		SW	10YR 6/3	N	Similar to above; gravel up to 3/4" max diameter, sub to well rounded.
110			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is fine to very fine-grained, well graded, loose, clean, moist.
			90	10	SP-SM	10YR 6/4	N	POORLY GRADED SAND WITH SILT - light yellowish brown; sand is fine to very fine-grained, loose, soft.
115			90	10	SP-SM	10YR 6/4	W	Similar to above.
			85	15	SM	10YR 6/4	N	SILTY SAND - light yellowish brown; sand is very fine-grained, soft, loose, gritty, flour-like texture, moist.
120			85	15	SM	10YR 6/4	N	Similar to above.
								TD = 120' bls.
125								
130								
135								

HYDRO GEO CHEM, INC.

Geologic Boring Log

Boring No. SVE-9

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC Driller: Mike Daniels Project No.: 753200

Site Plan at Boring Location:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	14 3/4"
Started, Time:	15:01	Date:	3/9/2005
Completed, Time:	13:31	Date:	3/15/2005
Casing Depth (Ft):	75 & 123		
Boring Depth (Ft):	125		
Screened Interval (Ft):	65-75 & 113-123		
Water Depth (Ft):	NA	Date:	
Logged by:	W. Thompson	Date:	3/9/2005
Checked by:	R. Zimmerman	Date:	9/16/2005

City and State:
Township, Range, Section:

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		10	85	5	SW	10YR 6/3	S	WELL GRADED SAND - pale brown; gravel up to 2" max diameter, sub to well rounded; sand is medium to very fine-grained, fairly well graded, fairly clean, loose, damp.
5								
10			100		SW	10YR 6/3	W	WELL GRADED SAND - pale brown; sand is medium to very fine-grained, well graded, clean, loose, dry.
		60	40		GW	10YR 6/3	W	WELL GRADED GRAVEL WITH SAND - pale brown; gravel up to 2" max diameter, subangular to well rounded; sand is coarse to fine-grained, well graded, clean, loose.
15		60	40		GW	10YR 6/3	W	Similar to above.
20		10	90		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; gravel up to 2" max diameter, sub to well rounded; sand is coarse to very fine-grained, well graded, clean, loose, dry.
25		10	90		SW	10YR 6/3	N	Similar to above.
30		5	95		SW	10YR 6/3		Similar to above; gravel up to 3/4" max diameter.
35								

Project Name: LA Landfill, NM		Project No.: 753200		Boring No.: SVE-9				Sheet 2 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35		10	90		SW	10YR 5/3	W	WELL GRADED SAND - brown; gravel up to 2" max
								diameter, subangular to well rounded; sand is coarse
								to fine-grained, well graded, loose, clean, damp.
40		30	70		SW	10YR 5/3	N	WELL GRADED SAND WITH GRAVEL - brown; gravel
								up to 2" max diameter, subangular to well rounded;
								sand is coarse to fine-grained, well graded, loose,
								clean, moist.
45		80	20		GP	10YR 5/3	N	POORLY GRADED GRAVEL WITH SAND - brown;
								gravel up to 3" max diameter, possible cobbles,
								subangular to well rounded; sand is coarse to fine-
			100		SW	10YR 5/3	N	grained, damp.
								WELL GRADED SAND - brown; sand is medium to
50			10	90	ML	10YR 6/4	M	fine-grained, well graded, loose, clean, damp.
								SILT - light yellowish brown; sand is very fine-grained,
								soft, gritty texture, non-plastic, damp.
55			95	5	SW	10YR 6/2	N	WELL GRADED SAND - light brownish gray; sand is
								medium to very fine-grained, well graded, loose, fairly
								clean, damp.
60			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to very fine-grained, well graded, loose, clean, damp.
65			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is fine to
								very fine-grained, well graded, loose, clean, damp.
70			100		SW	10YR 6/3	N	WELL GRADED SAND - pale brown; sand is medium
								to very fine-grained, well graded, loose, clean, damp.
75								
				100	ML	10YR 5/3	M	SILT - brown; some clay mix; soft, cohesive, slightly
								plastic.
80				100	CL	10YR 5/4	S	LEAN CLAY - yellowish brown; soft, cohesive, plastic.
85								

Project Name: LA Landfill, NM					Project No.: 753200		Boring No.: SVE-9	Sheet 3 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85				100	CL	10YR 5/3	S	LEAN CLAY - brown; similar to above.
			30	70	ML	7.5YR 5/4	S	SANDY SILT - brown; sand is very fine-grained, soft
90								texture, moist.
95			85	15	SM	7.5YR 5/4	M	SILTY SAND - brown; sand is very fine-grained, soft,
								gritty texture, damp.
			100		SP	7.5YR 6/4	W	POORLY GRADED SAND - light brown; sand is
								medium to very fine-grained, primarily fine-grained,
100			100		SP	7.5YR 6/4	W	poorly graded, loose, clean.
								Similar to above.
105			100		SW	10YR 6/2	W	WELL GRADED SAND - light brownish gray; sand is
								medium to fine-grained, well graded, loose, clean,
								damp.
110			95	5	SP	10YR 6/4	W	POORLY GRADED SAND - light yellowish brown;
								sand is very fine-grained, gritty, flour-like texture,
								loose, damp.
115			100		SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; sand is
								medium to very fine-grained, well graded, loose,
								clean, damp.
120			100		SW	10YR 6/4	N	Similar to above; <1% gravel up to 2" max diameter,
								sub to well rounded.
		5	95		SW	10YR 5/4	M	WELL GRADED SAND - yellowish brown; gravel up to
								3/4" max diameter, sub to well rounded; sand is
125								coarse to fine-grained, well graded, loose, clean,
								moist.
								TD = 125' bls.
130								
135								

HYDRO GEO CHEM, INC.
Geologic Boring Log

Boring No. SVE-10

Project Name: Los Angeles Landfill, New Mexico
Drilling Company: WDC   Driller: Mark Green   Project No.: 753200

Site Plan at Boring Location:

City and State:
Township, Range, Section:

Well Registration:			
Drilling Equipment:	GEFCO Speedstar 50K - CH		
Drilling Method:	Air Rotary		
Bit Type:	Tricone	Size:	14 3/4"
Started, Time:	8:00	Date:	2/9/2005
Completed, Time:	16:04	Date:	3/1/2005
Casing Depth (Ft):	80 & 115		
Boring Depth (Ft):	125		
Screened Interval (Ft):	70-80 & 105-115		
Water Depth (Ft):	NA	Date:	
Logged by:	W. Thompson	Date:	2/9/2005
Checked by:	R. Zimmerman	Date:	9/16/2005

Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
0		10	70	20	SM	7.5YR 4/6	S	SILTY SAND - strong brown; gravel up to 2" max diameter, subangular to very well rounded; sand is medium to very fine-grained, primarily fine-grained, soft, loose, damp.
5								
10			70	30	SM	7.5YR 4/6	S	SILTY SAND - strong brown; sand is fine to very fine-grained, soft, damp.
15								
20		20	75	5	SW	10YR 6/4	S	WELL GRADED SAND WITH GRAVEL - light yellowish brown; gravel up to 1 1/2" max diameter, sub to very well rounded, crystalline; sand is coarse to very fine-grained, well graded, loose, fairly clean, damp.
25		30	65	5	SW	10YR 6/3	M	WELL GRADED SAND WITH GRAVEL - pale brown; gravel up to 1" max diameter, subangular to well rounded; sand is coarse to very fine-grained, well graded, loose, dry.
30		10	90		SW	10YR 6/4	N	WELL GRADED SAND - light yellowish brown; gravel up to 1" max diameter, sub to very well rounded; sand is medium to very fine-grained, well graded, loose, clean.
35								

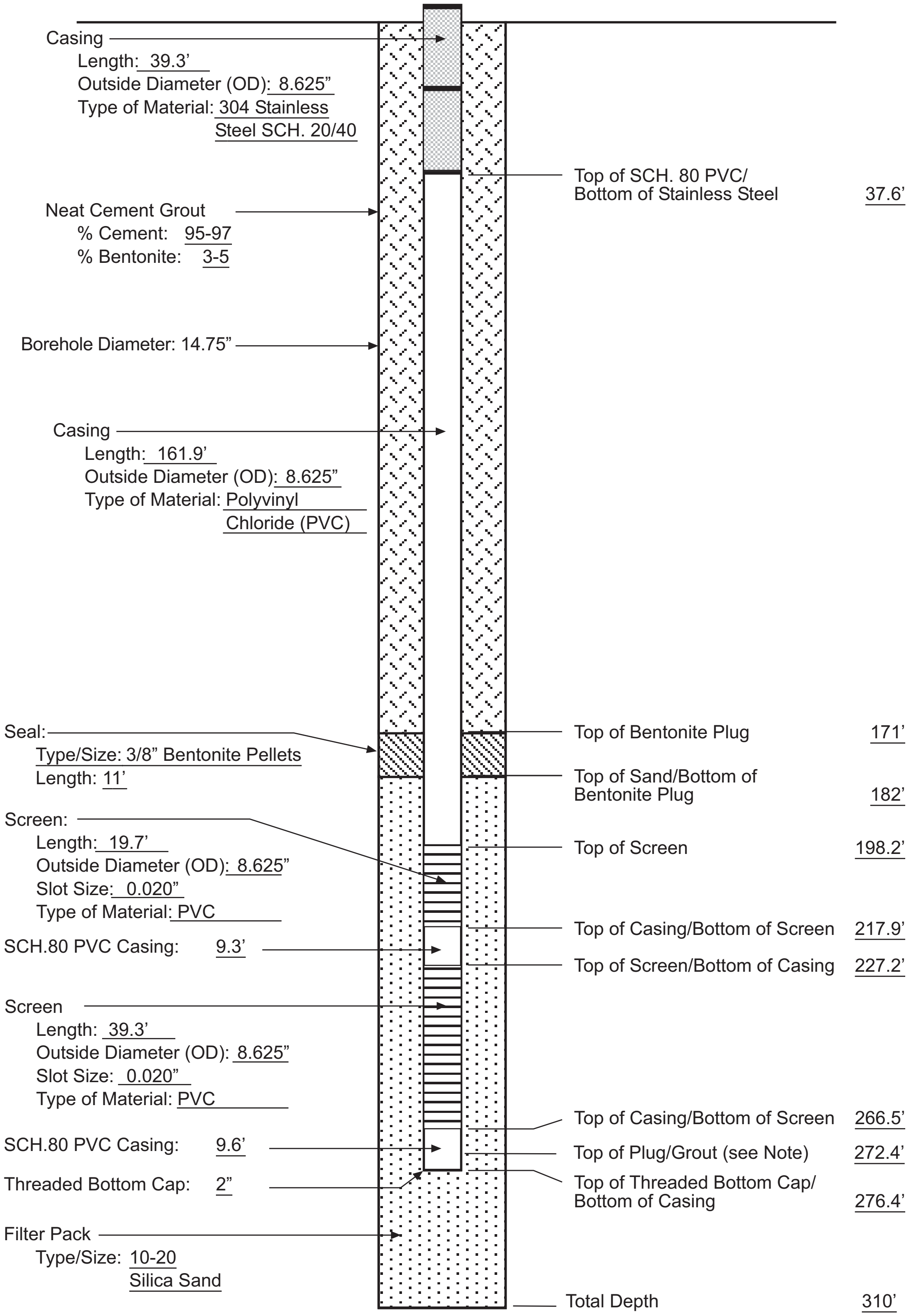
Project Name: LA Landfill, NM Project No.: 753200 Boring No.: SVE-10

Depth (Ft)	Graphic Log	Estimated % GR	Estimated % SA	Estimated % FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
35								
40		10	90		SW	10YR 6/4	N	Similar to above; gravel up to 2" max diameter.
45		40	50	10	SP-SM	10YR 6/2	W	POORLY GRADED SAND WITH SILT AND GRAVEL - light gray; gravel up to 2" max diameter, sub to well rounded; sand is fine to very fine-grained, dry.
			95	5	SW	10YR 7/2	W	WELL GRADED SAND - light gray; sand is medium to very fine-grained, loose, dry.
50		25	35	30	SM	10YR 4/4	S	SILTY SAND WITH GRAVEL - dark yellowish brown; gravel up to 2" max diameter, subangular to well rounded; sand is primarily fine to very fine-grained, sticky, slightly cohesive, moist.
55		20	50	30	SM	10YR 5/4	S	SILTY SAND WITH GRAVEL - yellowish brown; gravel up to 1" max diameter, sub to well rounded; sand is fine-grained, loose, moist.
60			10	90	ML	10YR 5/4	S	SILT - yellowish brown; sand is fine-grained, soft, slightly plastic.
65			100		SW	10YR 6/4	W	WELL GRADED SAND - light yellowish brown; sand is medium to very fine-grained, well graded, loose, clean, moist.
70			100		SW	10YR 6/4	N	Similar to above.
75			100		SW	10YR 6/4	N	Similar to above.
80			100		SW	10YR 6/4	N	Similar to above.
				100	CL	10YR 5/4	M	LEAN CLAY - yellowish brown; very soft, plastic, sticky, moist.
85								

Project Name: LA Landfill, NM					Project No.: 753200		Boring No.: SVE-10 Sheet 3 of 3
Depth (Ft)	Graphic Log	Estimated % GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description

Depth (Ft)	Graphic Log	GR	SA	FI	USCS Symbol	Munsell Color	HCl Rxn	Sample Description
85								
			70	30	SM	10YR 5/4	M	SILTY SAND - yellowish brown; sand is fine to very fine-grained, soft, loose, non-plastic, moist.
90								
			80	20	SM	10YR 5/4	M	Similar to above.
95								
			60	40	SM	10YR 5/4	M	Similar to above.
100			10	90	CL	10YR 5/4	S	LEAN CLAY - yellowish brown; sand is very fine-grained, very soft, sticky, cohesive, fairly plastic, moist.
			40	60	ML	10YR 5/4	W	SANDY SILT - yellowish brown; sand is fine to very fine-grained, soft, loose, moist, non-plastic.
105			95	5	SW	10YR 6/3	W	WELL GRADED SAND - pale brown; sand is medium to very fine-grained, well graded, fairly clean, trace silt, loose, moist.
110			100		SW	10YR 6/3	M	WELL GRADED SAND - pale brown; sand is medium to very fine-grained, well graded, clean, loose, damp.
115			100		SW	10YR 6/3	M	Similar to above.
			60	40	SM	10YR 5/4	S	SILTY SAND - yellowish brown; sand is very fine-grained, soft, gritty texture, damp.
120								
		15	75	10	SP-SM	10YR 5/4	N	POORLY GRADED SAND WITH SILT AND GRAVEL - yellowish brown; gravel up to 2" max diameter, sub to well rounded; sand is coarse to fine-grained, primarily fine-grained, loose mix, moist.
125								
								TD = 125' bls.
130								
135								

WELL CONSTRUCTION DETAIL

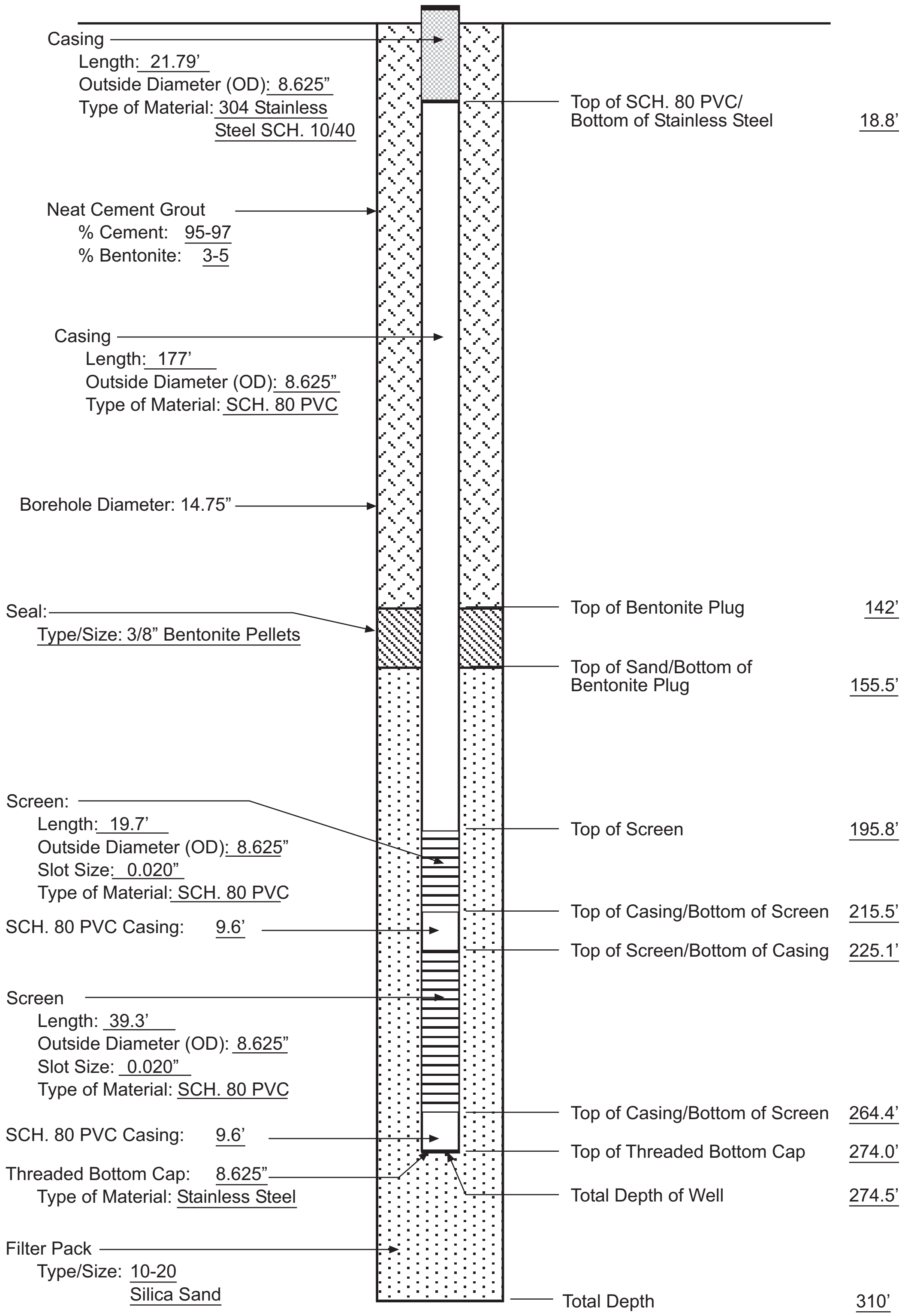


Note: The well endcap was damaged during development and the repair included installation of a 1' long solid PVC plug in the bottom of the well.

Project No.: COA-LAN-LA-06 Client: COA Site: Los Angeles Landfill	Well ID: IW-3
Well Location: PNM Reeves Station	Date Installed: 07/13/08
Contractor: WDC Exploration & Wells Method: Mud Rotary	Figure 3

T:\Projects\COA-LAL_Los_Angeles_LF\Graphics\IW-3_well-construction.fh10

WELL CONSTRUCTION DETAIL



Project No.: COA-LAN-LA-06 Client: COA Site: Los Angeles Landfill

Well ID: IW-4

Well Location: PNM Reeves Station

Date Installed: 10/10/08

Contractor: WDC Exploration & Wells Method: Mud Rotary

Figure 4

T:\Projects\COA-LAL_Los_Angeles_LF\Graphics\IW-4_well-construction.fh10

INTERA

LOG OF BORING : IW-3

(Page 1 of 4)

INTERA

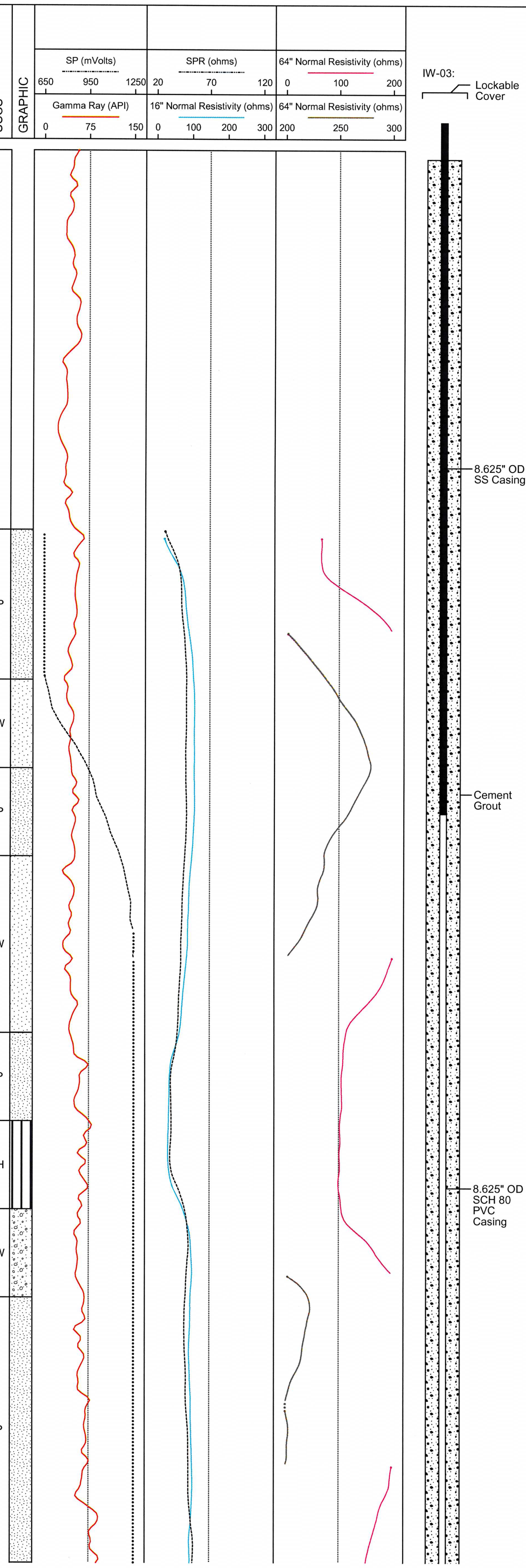
Date Started	: 07/08/08
Date Completed	: 07/13/08
Drilling Method	: Mud Rotary
Sampling Method	: Cuttings
Drilling Company	: WDC
Driller	: J. Jones
Depth to Water	: NA
Logged By	: L. Dalton
Borehole Diameter	: 14.75"

Project Name:
COA – Los Angeles Landfill

Project #: COA-LAN-LA-09

Notes:
1. DRAFT
2. Mineralogy % based on gravel/coarse sand content.

Depth in Feet	DESCRIPTION	USCS
0	No sample 0-21.5' bgs	
21.5	SAND, light brown, fine- to coarse-grained sand (predominately fine to medium), subangular to subrounded, (quartzite, mafics, quartz, feldspar)	SP
25	SAND, same as previous; (predominately medium grained)	SP
30	SAND, light brown, fine- to coarse-grained sand (predominately coarse), subrounded to rounded, (quartzite, mafics, quartz, feldspar)	SW
35	SAND, light brown, medium- to coarse-grained (predominately coarse grained), subangular to rounded, (quartzite, mafics, quartz, feldspar)	SP
40	SAND, light brown, fine- to coarse-grained sand (predominately fine to medium), subangular to rounded, (quartzite, mafics, feldspar, quartz)	SW
45	SAND, light brown, fine- to coarse-grained sand (predominately medium to coarse), subangular to rounded, (40% quartz/quartzite, 30% granite, 20% feldspar, 10% mafics)	SW
50	SAND, light brown, fine- to coarse-grained sand (predominately fine to medium), angular to rounded, (30% mafics, 30% granite, 25% quartz/quartzite, 15% feldspar)	SP
55	SILT, light brown, semi-elastic, low permeability	MH
60	GRAVEL, w/ Sand, light brown, medium- to coarse-grained sand (predominately coarse), subangular to rounded, fine gravel, (45% quartz/quartzite, 30% mafics, 15% feldspar, 10% granite)	GW
65	SAND, light brown, fine- to medium-grained sand (predominately medium), subangular to rounded	SP
70	SAND, w/ gravel, light brown, fine- to medium-grained sand (predominately medium), subrounded to rounded, fine gravel, angular to rounded, (35% mafics, 25% granite, 30% quartz/quartzite, 10% feldspar)	SP
75	No sample collected	SP
80		



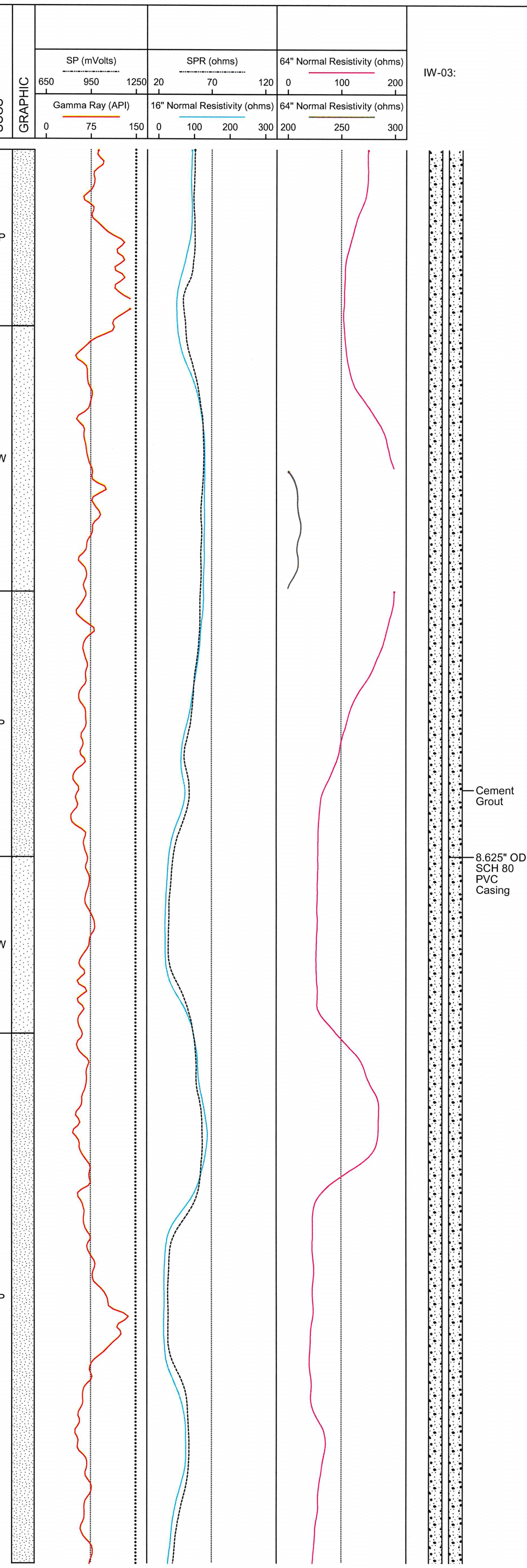
INTERA	LOG OF BORING : IW-3 (Page 2 of 4)	Date Started : 07/08/08 Date Completed : 07/13/08 Drilling Method : Mud Rotary Sampling Method : Cuttings Drilling Company : WDC	Driller : J. Jones Depth to Water : NA Logged By : L. Dalton Borehole Diameter : 14.75"

Project Name: COA – Los Angeles Landfill

Project #: COA-LAN-LA-09

Notes:
1. DRAFT
2. Mineralogy % based on gravel/coarse sand content.

Depth in Feet	DESCRIPTION	USCS
80	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to subrounded, fine gravel, subrounded and platty	SP
85	SAND, light brown, fine- to medium-grained sand, subangular to subrounded	SP
90	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, some fine gravel, angular to rounded, (55% vitric pumice, 35-40% quartz/quartzite, 5% mafics, <1% feldspar)	SW
95	SAND, same as previous; (40% mafics, 45% quartz/quartzite, 5-10% vitric pumice)	SW
100	SAND, same as previous; (35% mafics, 35% quartz/quartzite, 10% granite, 10% feldspar, <5% vitric pumice)	SW
105	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (35% mafics, 35-45% quartz/quartzite, 15% granite, <1% vitric pumice)	SP
110	SAND, same as previous; trace fine gravel, subrounded to rounded, (60% quartz, 20% granite, 20% mafics)	SP
115	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (55% mafics, 20% granite, 20% quartz/quartzite, 5% feldspar)	SP
120	SAND, w/ gravel, light brown, fine- to coarse-grained sand (predominately medium to coarse), subangular to rounded, fine gravel, angular to subrounded, (50% granite, 25% mafics, 20% quartz/quartzite, 5% feldspar)	SW
125	GRAVELLY SAND, light brown, coarse-grained sand, angular to rounded, 70% sand and 30% fine gravel, (40% granite, 40% mafics, 15% quartz,/quartzite, <5% feldspar)	SW
130	SAND, w/ trace Gravel, light brown, fine- to coarse grained sand (predominately medium), subangular to rounded, fine gravel, rounded, angular to rounded, (50% mafics, 25% granite, 20% quartz/quartzite, 5% feldspar)	SP
135	SAND, light brown, fine- to coarse grained (predominately medium), subangular to rounded, (40% quartz/quartzite, 30% granite, 25% mafics, <5% feldspar)	SP
140	SAND, trace Clay & Gravel, light brown, fine- to coarse-grained sand (predominately medium), clay lean w/ low to medium plasticity, fine gravel, angular to subrounded, (55% quartz/quartzite, 20% granite, 20% mafics)	SP
145	SAND, w/ some gravel, fine- to coarse-grained sand (predominately medium), subangular to rounded, fine gravel, angular to rounded, (45% quartz/quartzite, 30% mafics, 20% granite, 5% feldspar)	SP
150	SAND, w/ trace Gravel, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, fine gravel, subangular	SP
155	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to subrounded	SP
160		



LOG OF BORING : IW-3

INTERA

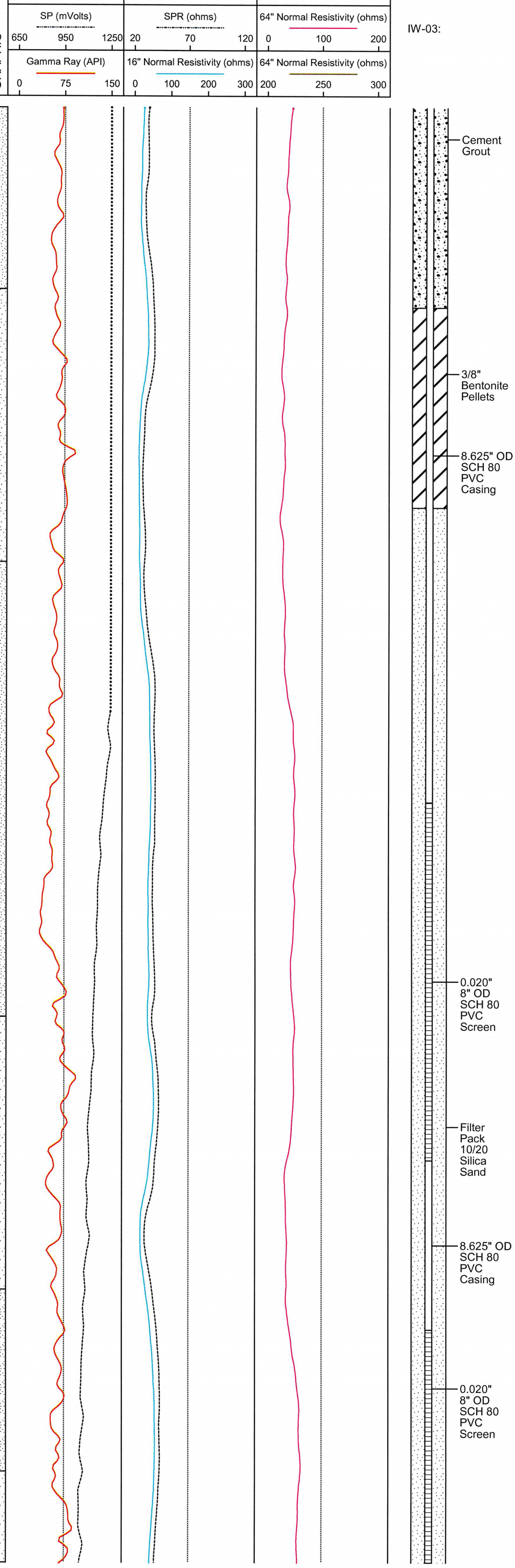
Date Started	: 07/08/08
Date Completed	: 07/13/08
Drilling Method	: Mud Rotary
Sampling Method	: Cuttings
Drilling Company	: WDC
Driller	: J. Jones
Depth to Water	: NA
Logged By	: L. Dalton
Borehole Diameter	: 14.75"

Project Name:
COA – Los Angeles Landfill

Project #: COA-LAN-LA-09

Notes:
1. DRAFT
2. Mineralogy % based on gravel/coarse sand content.

Depth in Feet	DESCRIPTION	USCS
160	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (75% quartz, 25% mafics, <1% feldspar)	SP
165	SAND, light brown, fine- to coarse-grained sand (predominately medium), subrounded to rounded, (70% quartz, 25% mafics, <5% feldspar, <1% mica)	SP
170	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (80% quartz, 18% mafics, 1-2% feldspar, <1% mica)	SW
175	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (80% quartz, 15% mafics, 5% feldspar)	SW
180	SAND, light brown, fined- to coarse-grained sand (predominately medium), subangular to rounded, (75% quartz, 20% mafics, 5% feldspar)	SW
185	SAND, light brown, fine- to medium-grained sand (predominately medium), subangular to rounded, (80% quartz, 20% mafics, <1% feldspar); few returns	SP
190	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (65% quartz, 30% mafics, 5% feldspar); few returns	SP
195	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (70% quartz, 30% mafics, <1% feldspar); few returns	SP
200	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (80% quartz, 20% mafics, <1% feldspar); few returns	SP
205	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (80% quartz, 15% mafics, <1% feldspar)	SP
210	SAND, light brown, fined- to coarse-grained sand (predominately medium), subangular to rounded, (70% quartz, 25% mafics, <5% feldspar, <1% mica); few returns	SW
215	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (80% feldspar, 20% mafics, <1% quartz); few returns	SW
220	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (80% quartz, 20% mafics, <1% feldspar); few returns	SW
225	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (65% quartz, 25% mafics, 5-10% feldspar); few returns	SP
230	SAND, light brown, fine- to coarse-grained (predominately medium), subangular to rounded, (35% quartz, 35% volcanics, 25% mafics, 5% feldspar)	SP
235	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (50% mafics, 40% quartz, 10% feldspar); few returns	SW
240		



INTERA

LOG OF BORING : IW-3

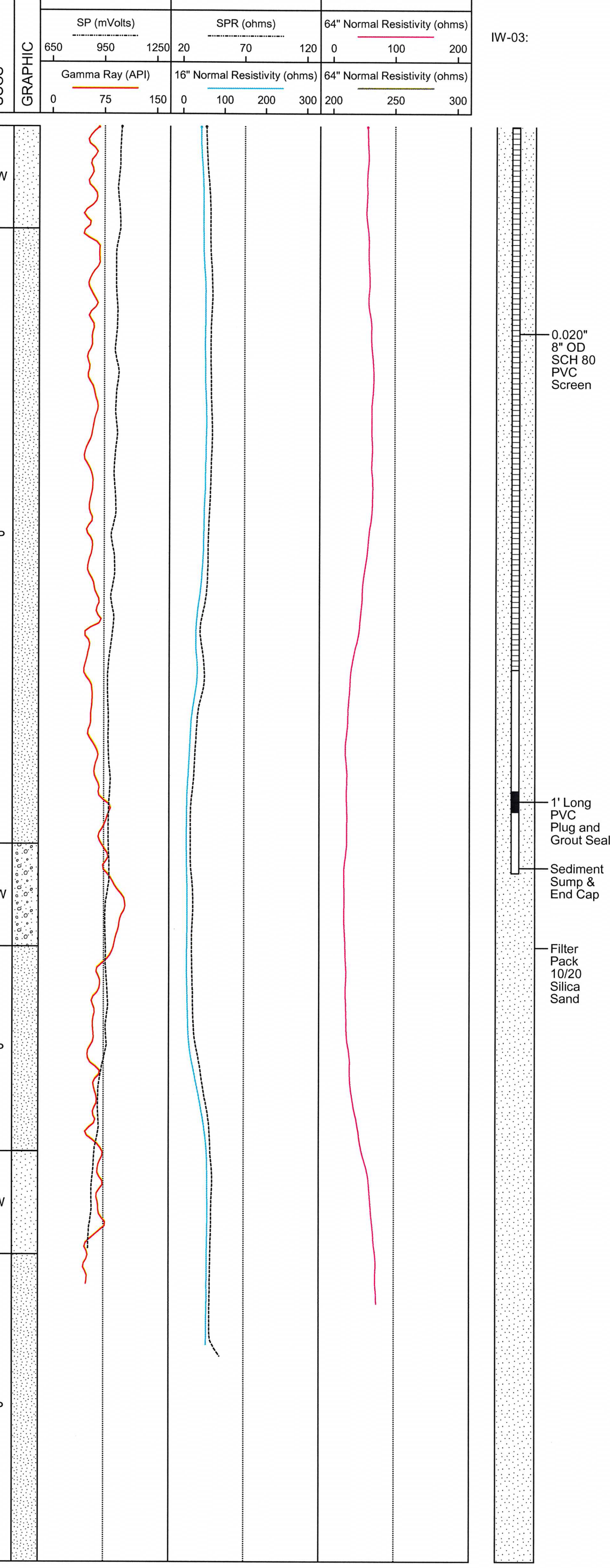
Date Started	: 07/08/08
Date Completed	: 07/13/08
Drilling Method	: Mud Rotary
Sampling Method	: Cuttings
Drilling Company	: WDC
Driller	: J. Jones
Depth to Water	: NA
Logged By	: L. Dalton
Borehole Diameter	: 14.75"

Project Name:
COA – Los Angeles Landfill

Project #: COA-LAN-LA-09

Notes:
1. DRAFT
2. Mineralogy % based on gravel/coarse sand content.

Depth in Feet	DESCRIPTION	USCS
240	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (80% quartz, 15-20% mafics, <5% feldspar); few returns	SW
245	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (70% quartz, 30% mafics, <1% feldspar); few returns	SP
250	SAND, light brown, fine- to medium-grained sand (predominately medium), subangular to rounded, (65% quartz, 30% mafics, 5% feldspar)	SP
255	SAND, light brown, fine- to coarse-grained sand (predominately medium), suangular to rounded, (80% quartz, 20% mafics, <1% feldspar); few returns	SP
260	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (60% quartz, 30-35% mafics, 5-10% feldspar)	SP
265	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (85% quartz, 10% mafics, 5% feldspar); few returns	SP
270	SAND, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (80% quartz, 10-15% mafics, <5% felspar); few returns	SP
275	SANDY GRAVEL, light brown, fine- to coarse-grained sand (predominately coarse), fine gravel (60%), angular to rounded, (80% quartz, 20% mafics, <1% feldspar)	GW
280	SAND, light brown, medium- to coarse-grained sand (predominately coarse), angular to rounded, (45% quartz, 35% mafics, 10% granite, 5% feldspar); few returns	SP
285	SAND, light brown, medium- to coarse-grained sand (predominately coarse), angular to rounded, (70% mafics, 20% granite, 10% quartz)	SP
290	SAND, light brown, fine- to coarse-grained sand (predominately coarse), subangular to rounded, (40% mafics, 30% quartz, 25% granite, 5% feldspar)	SW
295	SAND, w/ trace gravel, light brown, fine- to coarse-grained sand (predominately coarse), subangular to rounded, (75% quartz, 20% mafics, 5% feldspar)	SP
300	SAND, w/ trace gravel, light brown, fine- to coarse-grained sand (predominately medium), subangular to rounded, (90% quartz, 10% mafics, <1% feldspar), fine gravel, subangular, mafic	SP
310	Bottom of Boring at 310' bgs	



LOG OF BORING : IW-4

(Page 1 of 4)

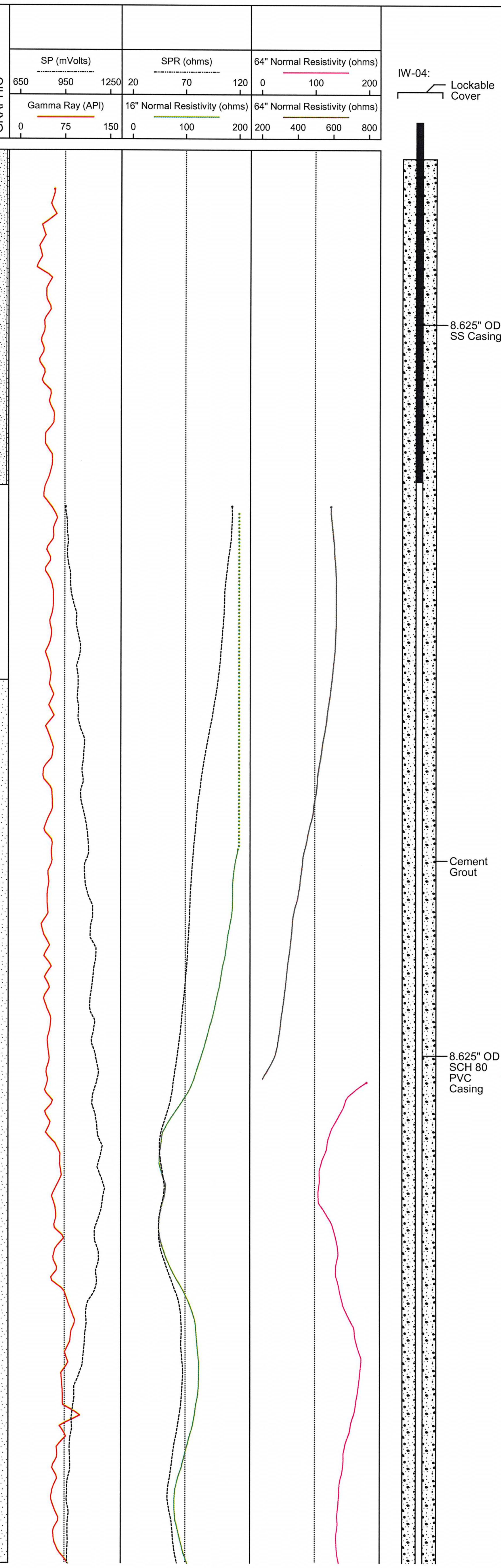
Date Started	: 10/06/08
Date Completed	: 10/10/08
Drilling Method	: Mud Rotary
Sampling Method	: Cuttings
Drilling Company	: WDC
Driller	: R. Muroz
Depth to Water	: NA
Logged By	: L. Dalton
Borehole Diameter	: 14.75"

Project Name:
COA – Los Angeles Landfill

Project #: COA-LAN-LA-09

Notes:
1. DRAFT
2. Mineralogy % based on gravel/coarse sand content.

Depth in Feet	DESCRIPTION	USCS
0	SILTY SAND, light brown (10YR 7/5), fine-grained sand, some medium-grained sand, some fine gravel, subangular to rounded, dry, (80% quartz, 10% feldspar, 10% mafics)	SM
~17	SILTY SAND, same as previous	SM
19	SAND, w/ Silt, medium-grained sand, some fine-grained sand, subangular to subrounded (85% quartz, 10% feldspar, 5% mafics)	SW/ SM
30	SAND, fine- to coarse-grained sand (predominately medium), subangular to subrounded, some silt, (60% quartz, 20% feldspar, 20% mafics)	SW
~37	SAND, same as previous; increased grain size begining at ~37' bgs	SW
40	SAND, fine- to coarse-grained sand (predominately coarse), subangular to subrounded, trace silt, (50% quartz, 30% mafics, 20% feldspar)	SW
~46	SAND, same as previous; increased grain size, rig chatter 46' to 57' bgs	SW
50	SANDY GRAVEL, medium- to coarse-grained sand, subangular to subrounded, fine gravel, subangular to rounded, (65% quartz/quartzite, 20% granite, 15% mafics)	SW
60	GRAVEL, w/ Sand, fine- to coarse-grained sand (predominately coarse), subangular to subrounded, fine gravel, angular to subrounded, (55% quartz/quartzite, 30% mafics, 15% granite)	SW
70	SAND, w/ trace Gravel, fine- to coarse-grained sand (predominately medium), subangular to subrounded, fine gravel, angular to subangular, (60% quartz, 20% feldspar, 20% mafics)	SW
~78	SAND, same as previous; increased gravel at 78' bgs	SW



LOG OF BORING : IW-4

(Page 2 of 4)

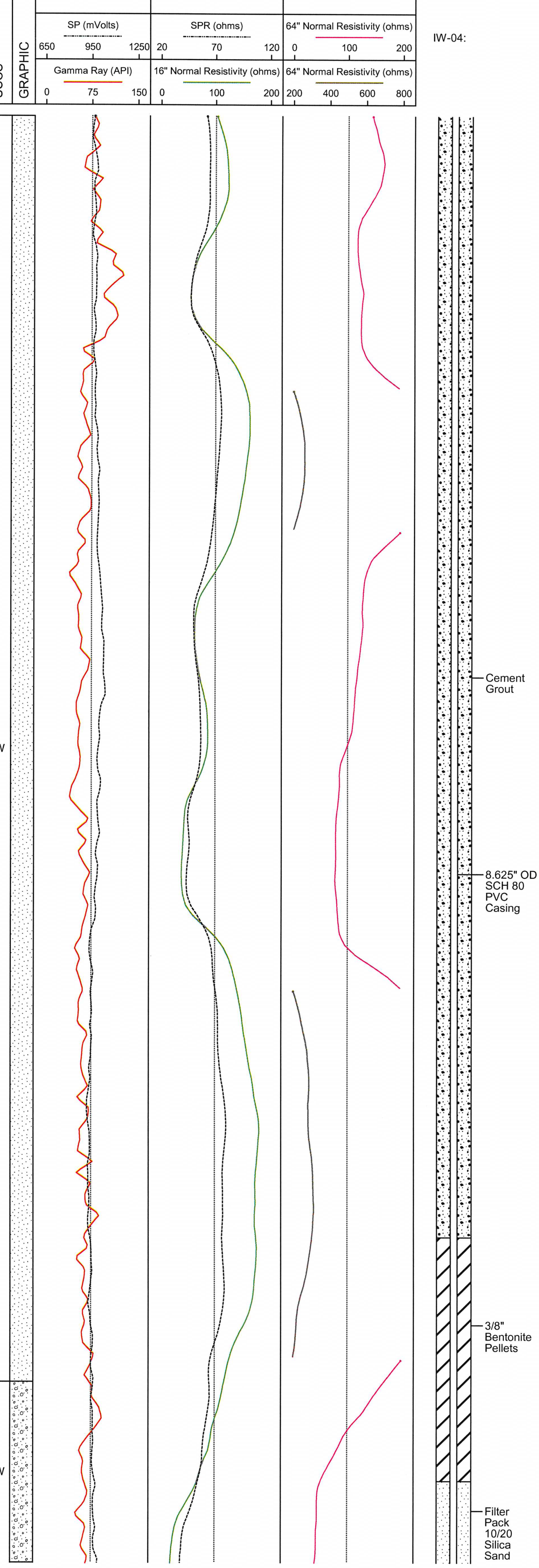
Date Started	: 10/06/08
Date Completed	: 10/10/08
Drilling Method	: Mud Rotary
Sampling Method	: Cuttings
Drilling Company	: WDC
Driller	: R. Muroz
Depth to Water	: NA
Logged By	: L. Dalton
Borehole Diameter	: 14.75"

Project Name:
COA – Los Angeles Landfill

Project #: COA-LAN-LA-09

Notes:
1. DRAFT
2. Mineralogy % based on gravel/coarse sand content.

Depth in Feet	DESCRIPTION	USCS
80	SAND, w/ trace Gravel, medium- to coarse-grained sand (predominately medium), subangular to subrounded, fine gravel, subangular, (70% quartz, 20% feldspar, 5-10% mafics)	SW
90	SAND, w/ trace rock fragments, fine- to coarse-grained sand (predominately medium to coarse), subangular to subrounded, rock fragments (pumice and claystone), tan, (55% quartz, 30% mafics, 15% feldspar)	SW
98	Rig chatter at 98' bgs	SW
100	SAND, fine- to coarse-grained sand (predominately fine to medium), subangular to subrounded, (50% quartz, 30% mafics, 20% feldspar)	SW
108	SAND, same as previous; gravel at 108' to 110' bgs	SW
110	SAND, w/ some gravel, fine- to coarse-grained sand (predominately fine), subangular to subrounded, fine gravel, angular to subrounded, (65% quartz, 30% mafics, 5% feldspar)	SW
120	SAND, w/ trace of gravel, fine- to coarse-grained sand (predominately medium to coarse), subangular to subrounded, fine gravel, subangular, (75% quartz, 20% mafics, 5% feldspar)	SW
130	SAND, medium- to coarse-grained sand (50/50), subangular to subrounded, (55% quartz, 30% mafics, 15% feldspar)	SW
140	SANDY GRAVEL, medium- to coarse-grained sand, subangular to round, fine gravel, angular to subrounded, (40% quartz/quartzite, 30% granite, 30% mafics)	SW
150	GRAVEL, w/ sand, medium- to coarse-grained sand, subangular to round, fine gravel, angular to subrounded, (40% granite, 30% quartz/quartzite, 30% mafics)	GW



LOG OF BORING : IW-4

(Page 3 of 4)

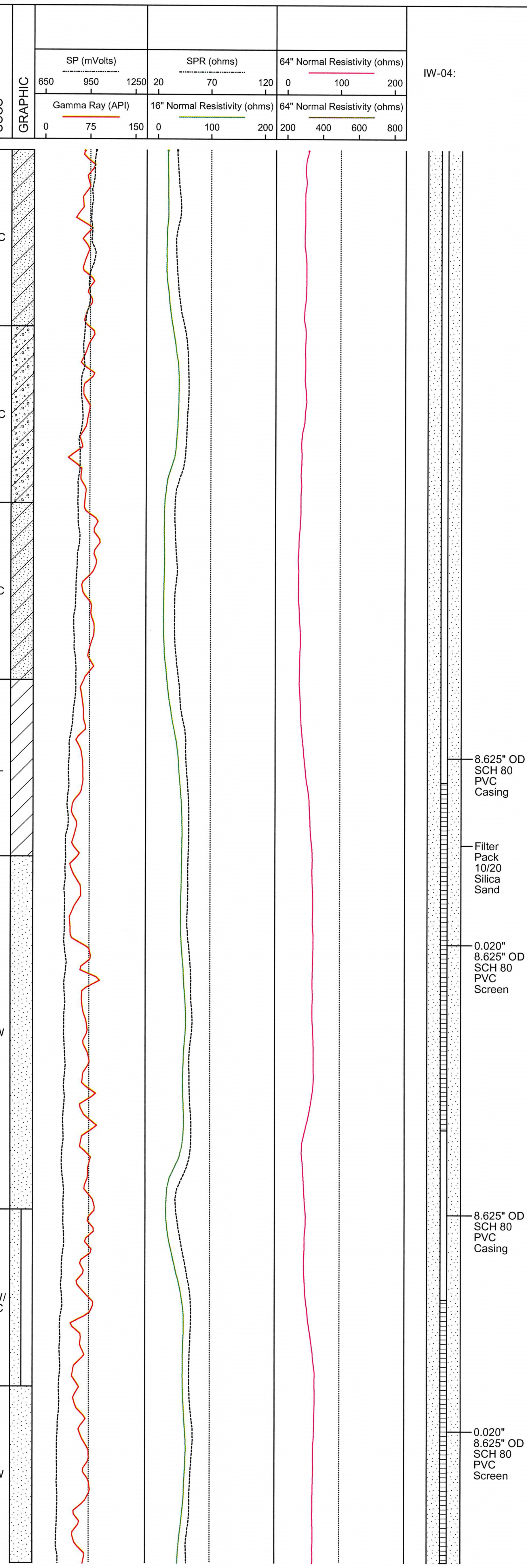
Date Started	: 10/06/08
Date Completed	: 10/10/08
Drilling Method	: Mud Rotary
Sampling Method	: Cuttings
Drilling Company	: WDC
Driller	: R. Muroz
Depth to Water	: NA
Logged By	: L. Dalton
Borehole Diameter	: 14.75"

Project Name: COA – Los Angeles Landfill

Project #: COA-LAN-LA-09

Notes:
1. DRAFT
2. Mineralogy % based on gravel/coarse sand content.

Depth in Feet	DESCRIPTION	USCS
160	CLAYEY SAND, w/ gravel, fine- to coarse-grained sand (predominately medium), subangular to round, fine gravel, angular to subrounded, medium plasticity, (65% quartz, 20% feldspar, 15% mafics)	SC
170	SANDY GRAVEL, w/ clay, fine- to coarse-grained sand (predominately medium to coarse), subangular to rounded, fine gravel, angular to rounded, medium plasticity, (40% quartz/quartzite, 40% mafics, 20% granite)	GC
176	Gravel lens at 176'-178' bgs	GC
180	CLAYEY SAND, w/ trace Gravel, fine- to coarse-grained sand (predominately medium to coarse), subangular to rounded, fine gravel, angular to subrounded, medium plasticity, (50% quartz, 40% mafics, 10% feldspar)	SC
190	SANDY CLAY, fine- to medium-grained sand (predominately fine), subangular to subrounded, medium plasticity, (55% quartz, 30% mafics, 15% feldspar)	CL
200	SAND, w/ trace Clay & Gravel, fine- to coarse-grained (predominately fine to medium), subangular to subrounded, fine gravel, subrounded, medium plasticty, (60% quartz, 30% mafics, 10% feldspar)	SW
210	SAND, w/ trace Clay, fine- to coarse-grained sand (predominately medium to coarse), subangular to rounded, medium plasticity, (45% quartz, 45% mafics, 10% feldspar)	SW
220	SAND, w/ some Gravel & Clay, (10YR 5/3), fine- to coarse-grained sand (predominately coarse), subangular to rounded, fine gravel, angular to rounded, medium plasticity, (50% mafics, 35% quartz, 15% fieldspar)	SW/SC
230	SAND, same as previous; no clay	SW



LOG OF BORING : IW-4

(Page 4 of 4)

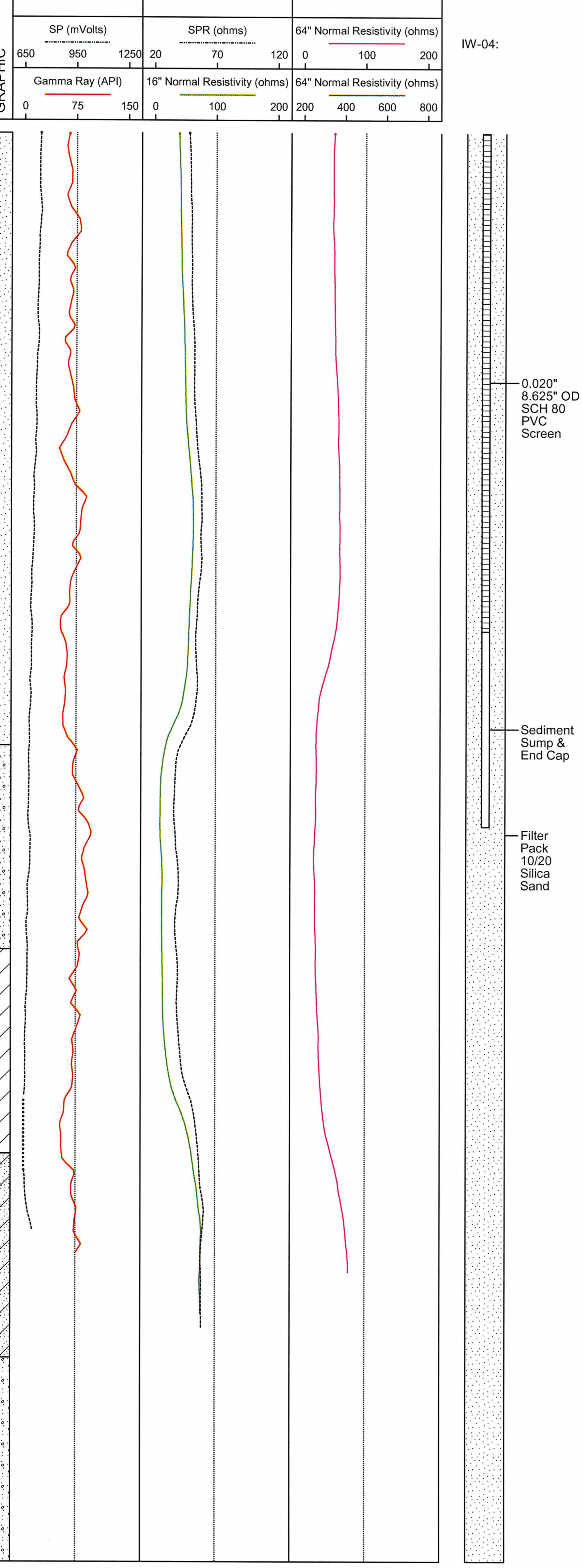
Date Started	: 10/06/08	Driller	: R. Muroz
Date Completed	: 10/10/08	Depth to Water	: NA
Drilling Method	: Mud Rotary	Logged By	: L. Dalton
Sampling Method	: Cuttings	Borehole Diameter	: 14.75"
Drilling Company	: WDC		

Project Name: COA – Los Angeles Landfill

Project #: COA-LAN-LA-09

Notes:
1. DRAFT
2. Mineralogy % based on gravel/coarse sand content.

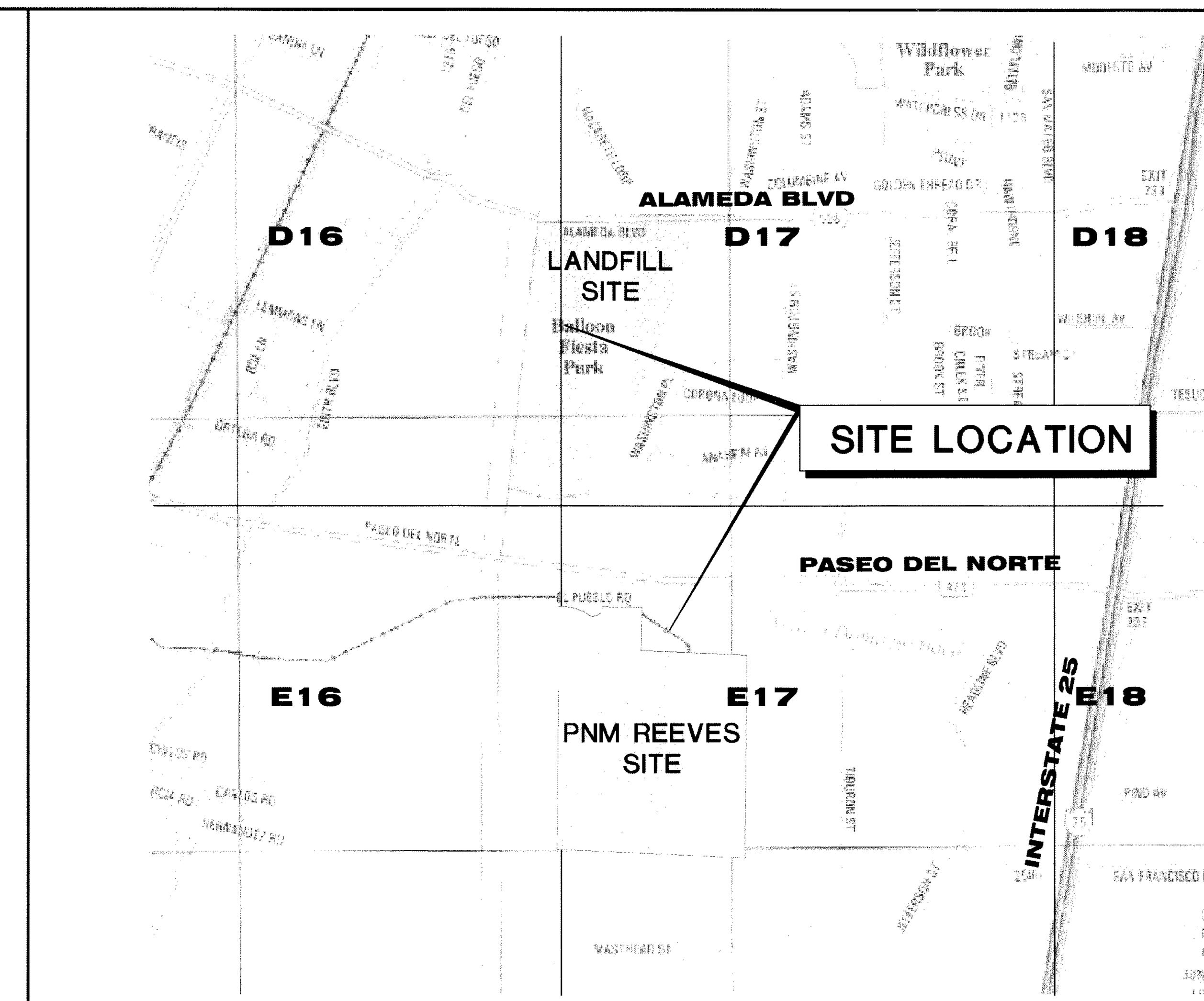
Depth in Feet	DESCRIPTION	USCS
240	GRAVELLY SAND, w/ trace clay, fine- to coarse-grained sand (predominately course), subangular to rounded, fine gravel, angular to rounded, medium plasticity, (55% quartz, 40% mafics, 5% feldspar)	SW
250	GRAVELLY SAND, same as previous; (50% quartz, 45% mafics, 5% feldspar)	SW
260	GRAVELLY SAND, same as previous; no clay, (60% quartz, 35% mafics, 5% feldspar)	SW
268	Gravel lens at ~268'-269' bgs	SW
270	SANDY GRAVEL, fine- to coarse-grained sand (predominately coarse), subangular to rounded, fine gravel, angular to rounded, (50% mafics, 45% quartz/quartzite, 5% granite)	GW
272	Clay layer begining at ~272' bgs	GW
280	SANDY CLAY, fine- to medium-grained sand, subangular to rounded, low to medium plastiticy, (75% quartz, 15% mafics, 10% feldspar)	CL
282	Rig chatter begining at 282' bgs	CL
290	CLAYEY SAND, w/ trace Gravel, medium- to coarse-grained sand (50/50), fine gravel, angular to subrounded, low to medium plasticity, (55% mafics, 35% quartz, 10% feldspar)	SC
300	GRAVEL, w/ Sand, medium- to coarse-grained sand (predominately coarse), angular to rounded, fine gravel, angular to rounded, (60% quartz/quartzite, 35% mafics, 5% granite)	GW
309	GRAVEL, same as previous; (65% quartz/quartzite, 30% mafics, 5% granite)	GW
310	Bottom of Boring at 310' bgs	



APPENDIX E

Remediation System As Built Drawings

"AS-BUILT" CONSTRUCTION PLANS
FOR
LOS ANGELES LANDFILL
GROUNDWATER REMEDIATION SYSTEMS
ALBUQUERQUE, NEW MEXICO
CITY PROJECT No. 728991



VICINITY MAP
D17 & E17

HEALTH AND SAFETY NOTE

THIS PROJECT IS BEING PERFORMED ON AND/OR NEAR THE FORMER CITY OF ALBUQUERQUE OWNED AND/OR OPERATED LOS ANGELES LANDFILL. THIS FORMER LANDFILL CONTAINS LANDFILL GAS WHICH CONSISTS OF VOLATILE ORGANIC COMPOUNDS, SOME OF WHICH CAN BE HARMFUL TO HUMANS, AND METHANE WHICH CAN EXPLODE GIVEN THE CORRECT CONDITIONS. THE LANDFILL CURRENTLY HAS A LANDFILL GAS EXTRACTION SYSTEM, WHICH IS DESIGNED TO REMOVE THE LANDFILL GASES AND BURN THEM AT A GROUND FLARE. THE LANDFILL GAS EXTRACTION SYSTEM WILL CONTINUE TO OPERATE DURING CONSTRUCTION OF THIS PROJECT; HOWEVER, THE OWNER CANNOT GUARANTEE THAT THE LANDFILL GAS EXTRACTION SYSTEM WILL OPERATE CONTINUOUSLY DURING THE DURATION OF THIS PROJECT AND/OR, EVEN WHEN OPERATING, THAT ALL LANDFILL GAS AT THE LANDFILL IS BEING COLLECTED BY THE EXTRACTION SYSTEM. THE LANDFILL GAS EXTRACTION SYSTEM MAY SHUTDOWN DUE TO NO FAULT BY THE OWNER. THE OWNER WILL MAKE EVERY ATTEMPT TO GET THE EXTRACTION SYSTEM OPERATING AS SOON AS POSSIBLE IF SHUT DOWN OCCURS. THE CONTRACTOR IS RESPONSIBLE FOR THE HEALTH AND SAFETY OF HIS/HER WORKERS. THE WORK DETAILED IN THIS PROJECT WILL REQUIRE THAT A HEALTH AND SAFETY PLAN BE PREPARED BY THE CONTRACTOR ACCORDING TO OSHA 1910.120.

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL ABIDE BY ALL LOCAL, STATE, AND FEDERAL LAWS, RULES, AND REGULATIONS WHICH APPLY TO THE CONSTRUCTION, INCLUDING WORKER HEALTH AND SAFETY ASPECTS, OF THESE IMPROVEMENTS.

2. ALL ELECTRICAL, TELEPHONE, CABLE TV, GAS AND OTHER UTILITY LINES, CABLES, AND APPURTENANCES ENCOUNTERED DURING CONSTRUCTION THAT REQUIRE RELOCATION, SHALL BE COORDINATED WITH THAT UTILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL NECESSARY UTILITY ADJUSTMENTS. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR DELAYS OR INCONVENIENCES CAUSED BY UTILITY COMPANY WORK CREWS. THE CONTRACTOR MAY BE REQUIRED TO RESCHEDULE HIS ACTIVITIES TO ALLOW UTILITY CREWS TO PERFORM THEIR REQUIRED WORK.

3. DISPOSAL SITE FOR ALL EXCESS EXCAVATION MATERIAL AND UNSUITABLE MATERIAL SHALL BE OBTAINED BY THE CONTRACTOR IN COMPLIANCE WITH APPLICABLE ENVIRONMENTAL REGULATIONS AND APPROVED BY THE PROJECT MANAGER. COSTS ASSOCIATED WITH TRANSPORTATION AND DISPOSAL OF NON-HAZARDOUS WASTE SHALL BE PAID BY THE CONTRACTOR AT NO ADDITIONAL COSTS TO THE CITY. THE CITY WILL COORDINATE AND PAY COSTS ASSOCIATED WITH TRANSPORTATION AND DISPOSAL OF HAZARDOUS WASTE.

4. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE EXISTING UTILITY LINES WITHIN THE CONSTRUCTION AREA. ANY DAMAGE TO EXISTING FACILITIES CAUSED BY CONSTRUCTION ACTIVITY SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE. NECESSARY REPAIRS SHALL BE APPROVED BY THE PROJECT MANAGER.

5. CONSTRUCTION ACTIVITY SHALL BE LIMITED TO THE PROPERTY AND/OR PROJECT LIMITS. ANY DAMAGE TO ADJACENT PROPERTIES RESULTING FROM THE CONSTRUCTION PROCESS IS THE RESPONSIBILITY OF THE CONTRACTOR. ANY COSTS INCURRED FOR REPAIRS SHALL BE THE COST OF THE CONTRACTOR.

6. OVERNIGHT PARKING OF CONSTRUCTION EQUIPMENT SHALL NOT OBSTRUCT DRIVEWAYS OR DESIGNATED TRAFFIC LANES. THE CONTRACTOR SHALL NOT STORE ANY EQUIPMENT OR MATERIAL WITHIN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT MANAGER THE LOCATION OF ALL CONSTRUCTION EQUIPMENT PARKING.

7. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR BARRICADING OR SURFACE DISTURBANCE PRIOR TO COMMENCING CONSTRUCTION.

8. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPLACE AT HIS EXPENSE ANY PROPERTY CORNERS DESTROYED DURING CONSTRUCTION. ALL PROPERTY CORNERS MUST BE REPLACED BY A REGISTERED LAND SURVEYOR.

9. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ANY DAMAGE TO EXISTING PAVEMENTS, PAVEMENT MARKINGS, CURB AND GUTTER, DRIVE PADS, WHEELCHAIR RAMPS, AND SIDEWALKS DURING CONSTRUCTION, APART FROM THOSE SECTIONS INDICATED FOR REMOVAL ON THE PLANS, AND SHALL REPAIR OR REPLACE PER COA STANDARDS, AT CONTRACTORS OWN EXPENSE.

10. LOCATIONS OF UTILITIES ARE APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL PERTINENT UTILITIES IN THE FIELD PRIOR TO COMMENCING WORK.

11. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SUPPORT ALL UTILITIES EXPOSED DURING CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR DAMAGE TO ALL UTILITIES, INCLUDING SERVICE LINES, EXTRACTION PIPE, MONITORING AND EXTRACTION WELLHEADS, WELL VAULTS, CONDENSATION SUMPS, AND ISOLATION VALVE VAULTS OR OTHER.

12. IF LANDFILL MATERIAL IS ENCOUNTERED DURING TRENCHING, IMMEDIATELY NOTIFY THE PROJECT MANAGER.

13. IF RESEEDING IS REQUIRED, WORK WILL BE PERFORMED BY THE CITY PARKS AND RECREATION DEPARTMENT AT CITY EXPENSE.

14. ALL EXCAVATION, TRENCHING, AND SHORING ACTIVITIES MUST BE CARRIED OUT IN ACCORDANCE WITH OSHA 29 CFR 1926.650 SUBPART P.

15. WHERE EXCAVATION OCCURS WITHIN 15 FEET OF LANDFILL GAS EXTRACTION PIPING, COMPACTION SHALL BE ACHIEVED THROUGH MANUAL MEANS ONLY. IF HAND TOOLS ARE USED TO POSITIVELY LOCATE AND EXPOSE EXISTING PIPES, A BACKHOE MAY BE USED FOR TRENCHING AND MECHANICAL TAMPERS MAY BE USED TO COMPACT BACKFILL.

DRAWING INDEX

SUFFIX "LALF" = LOS ANGELES LANDFILL SITE
SUFFIX "PNMR" = PNM REEVES SITE

DISCLOSURE STATEMENT:

THE SUBJECT PROPERTY IS LOCATED ON/NEAR A FORMER LANDFILL. DUE TO THE SUBJECT PROPERTY BEING ON/NEAR A FORMER LANDFILL, CERTAIN PRECAUTIONARY MEASURES MAY NEED TO BE TAKEN TO ENSURE THE HEALTH AND SAFETY OF THE PUBLIC. RECOMMENDATIONS MADE BY A PROFESSIONAL ENGINEER WITH EXPERTISE IN LANDFILLS AND LANDFILL GAS ISSUES (AS REQUIRED BY THE MOST CURRENT VERSION OF THE "INTERIM GUIDELINES FOR DEVELOPMENT WITHIN 1000 FEET OF LANDFILLS") SHALL BE CONSULTED PRIOR TO DEVELOPMENT OF THE SITE.

APPROVED FOR CONSTRUCTION BY:

MARCIA PINCUS, P.E. DATE
ENVIRONMENTAL HEALTH DEPARTMENT
CITY OF ALBUQUERQUE

AMAFCA RIGHT OF WAY NOTES:

1. AMAFCA FIELD ENGINEER SHALL BE NOTIFIED 48-HOURS PRIOR TO ANY WORK WITHIN THE AMAFCA ROW. TEL (505) 884-2215 JERRY LOVATO.
2. NO WORK WILL BE PERFORMED IN THE AMAFCA ROW BETWEEN MAY 15 AND OCTOBER 15 WITHOUT WRITTEN PERMISSION FROM AMAFCA.
3. ALL SUBGRADE, BACKFILL AND EMBANKMENT SHALL BE COMPACTED TO 95% (MODIFIED PROCTOR) WITHIN THE AMAFCA ROW TESTING REPORTS SHALL BE PROVIDED TO AMAFCA FIELD ENGINEER.
4. AMAFCA FIELD ENGINEER WILL BE NOTIFIED 48-HOURS PRIOR TO FINAL INSPECTION OF ANY FACILITIES WITHIN THE AMAFCA/ROW.
5. ALL DISTURBED GROUND AREAS SHALL BE REVEGETATED IN ACCORDANCE WITH CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, SECTION 1012, NATIVE GRASS SEEDING, AS CURRENTLY UPDATED.

APPROVED FOR CONSTRUCTION WITHIN AMAFCA RIGHT-OF-WAY BY:

JOHN KELLY, P.E. DATE
EXECUTIVE ENGINEER
ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY (AMAFCA)

NOTICE TO CONTRACTORS:

1. AN EXCAVATION/CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN THE CITY RIGHT-OF-WAY.

2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER CONTRACT SHALL, EXCEPT AS OTHERWISE STATED OR PROVIDED FOR HEREON, BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF ALBUQUERQUE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986 EDITION AS REVISED THROUGH UPDATE 7.

3. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL OBSTRUCTIONS IN THE AREA OF WORK. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE PROJECT MANAGER IMMEDIATELY SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

4. NOT LESS THAN FOURTEEN (14) WORKING DAYS PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT TO THE PROJECT MANAGER A DETAILED CONSTRUCTION SCHEDULE FOR APPROVAL.

5. GEODETIC SURVEY MONUMENTS: THE CITY OF ALBUQUERQUE, GEODETIC SURVEY, SHALL BE NOTIFIED NOT LESS THAN THREE (3) WORKING DAYS PRIOR TO STARTING WORK THAT WILL IMPACT ANY EXISTING ACS GEODETIC SURVEY MONUMENTS. ALL REFERENCING AND REPLACEMENT OF ACS MONUMENTS SHALL BE DONE BY THE CITY OF ALBUQUERQUE GEODETIC SURVEY. ANY ACS MONUMENTS DAMAGED OR DESTROYED DUE TO THE FAILURE OF THE CONTRACTOR TO NOTIFY AS STATED ABOVE SHALL BE REPAIRED OR REPLACED BY THE CITY OF ALBUQUERQUE, GEODETIC SURVEY, AT THE CONTRACTOR'S EXPENSE.

6. OTHER PERMANENT SURVEY MONUMENTS: CONTRACTOR SHALL NOTIFY THE PROJECT MANAGER NOT LESS THAN SEVEN (7) WORKING DAYS PRIOR TO STARTING WORK IN ORDER THAT THE ENGINEER MAY TAKE NECESSARY MEASURES TO ENSURE THE PRESERVATION OF SURVEY MONUMENTS. CONTRACTOR SHALL NOT DISTURB PERMANENT SURVEY MONUMENTS WITHOUT THE CONSENT OF THE PROJECT MANAGER AND SHALL NOTIFY THE PROJECT MANAGER AND BEAR THE EXPENSE OF REPLACING ANY THAT MAY BE DISTURBED WITHOUT PERMISSION.

7. CONTRACTOR SHALL RECORD ALL DATA ON ALL UTILITY LINES AND ACCESSORIES AS REQUIRED BY THE CITY FOR THE PREPARATION OF "AS CONSTRUCTED" DRAWINGS. CONTRACTOR SHALL NOT COVER UTILITY LINES AND ACCESSORIES UNTIL ALL DATA HAS BEEN RECORDED.

8. CONTRACTOR SHALL COORDINATE WITH THE CITY WATER SYSTEMS DIVISION (857-8200) SEVEN (7) WORKING DAYS IN ADVANCE OF ANY WORK THAT MAY AFFECT EXISTING PUBLIC WATER OR SEWER UTILITIES. EXISTING VALVES ARE TO BE OPERATED BY CITY PERSONNEL ONLY. CONTRACTOR SHALL CONTACT THE WATER SYSTEMS DIVISION SEVEN (7) WORKING DAYS PRIOR TO NEEDING VALVES TURNED ON OR OFF.

"AS BUILT"

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
△	WT	12/05/05	AS BUILTS

		DATE
SCALE:	NONE	
DWG BY:	AGR	8/23/04
APPRV'D BY:	PDM	8/23/04

HYDRO GEO CHEM, INC.

CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

COVER SHEET

REFERENCE No. 7531012A
REVISION 0
DRAWING No. 01

K:\753100\AS-BUILTS 12-05\7531012a.dwg (corlet) 01 16Dec2005 - 2:05 PM

ABBREVIATIONS:

(D) OR DEMO	DEMOLISH & REMOVE
(E)	EXISTING
(F) OR FUT	FUTURE
(N)	NEW
@	AT
ø OR DIA	DIAMETER
ABV	ABOVE
ACFM	ACTUAL CUBIC FT PER MINUTE
AI	AIR INJECTION
AIC	AMPS INSTANTANEOUS CURRENT
AMP	AMPERE
ASL OR AMSL	ABOVE (MEAN) SEA LEVEL
ASTM	AMERICAN STD. TEST METHOD
ATM	ATMOSPHERE
BLDG	BUILDING
BLS	BELOW LAND SURFACE
BLVD	BOULEVARD
BOD	BASIS OF DESIGN
BUSH	BUSHING
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CFM/H	CUBIC FEET PER MINUTE/HOUR
℄	CENTERLINE
COL	COLUMN
COA	CITY OF ALBUQUERQUE
CONC	CONCRETE
CONN	CONNECTION
CPVC	CHLORINATED POLYVINYL CHLORIDE
CS	CARBON STEEL
CTR	CENTER
CTRL	CONTROL
DR	DRIVE
E	EAST
EA	EACH
ELEV OR EL	ELEVATION
EQ	EQUAL (DIMENSION OR SPECIFICATION)
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
FIG	FIGURE
FL	FLANGE
FLA	FULL LOAD AMP
FT	FEET, FOOT
GA	GAGE
GAC	GRANULAR ACTIVATED CARBON
GAL	GALLON
GND	GROUND
GPM/H/D	GALLONS PER MINUTE/HOUR/DAY
H OR HT	HEIGHT
H20	WATER
HD	HEAD
HDPE OR HDLPE	HIGH DENSITY (LINEAR) POLYETHYLENE
HG OR Hg	MERCURY
HGC	HYDRO GEO CHEM, INC.
HP	HORSEPOWER
HR	HOUR
ICFM	INLET (ACTUAL) CUBIC FEET PER MINUTE
IN	INCH
LB	POUND
LFG	LANDFILL GAS
LPM/H	LITER PER MINUTE/ HOUR
MFG	MANUFACTURER OR MANUFACTURED
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN, MAX	MINIMUM, MAXIMUM
MW	MANWAY
N_2	NITROGEN
N	NORTH
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
F/MNPT	FEMALE/MALE NATIONAL PIPE TAPER (THREAD)
NTS	NOT TO SCALE
NW	NORTHWEST
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
P/N	PART NUMBER
PH	PHONE
PL	POWER LINE
PP	POWER POLE
PP	POLYPROPYLENE
PNM	PUBLIC SERVICE COMPANY OF NEW MEXICO
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH, GAGE
PVC	POLY VINYL CHLORIDE
QTY	QUANTITY
RD	ROAD
RED	REDUCER
REQ'D	REQUIRED
REF	REFERENCE, REFER TO
RGS	RIGID GALVANIZED STEEL
RND	ROUND
ROW	RIGHT OF WAY
RR	RAILROAD
S	SOUTH
SCFM/H	STANDARD CUBIC FEET PER MINUTE/HOUR
SCH	SCHEDULE
SG	SIGHT GLASS
SIM	SIMILAR
SOC	SOCKET JOINT
SPW	SPARGE WELL
SS	STAINLESS STEEL
STA	STATION
STL	STEEL
SVE	SOIL VAPOR EXTRACTION
TCAT	THERMAL CATALYTIC OXIDIZER
TD	TOTAL DEPTH
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE OR TEMPORARY
TOW	TOP OF WALL/FENCE
TR	TRENCH
TYP	TYPICAL
UG	UNDERGROUND
V	VOLT
VAC	VACUUM
VCP	VITRIFIED CLAY PIPE
VLV	VALVE
VMW	VAPOR MONITORING WELL
VRV	VACUUM RELIEF VALVE
W	WEST OR WIDTH
W.C.	WATER COLUMN
W/	WITH
W/O	WITHOUT
XING	CROSSING

SYMBOLS:

- WATER TABLE
- POWER POLE
- POWER POLE WITH SECURITY LIGHT
- POWER POLE WITH GUY WIRE
- POWER POLE WITH TRANSFORMER
- POWER LINE
- X — FENCE
- T — TEMPORARY FENCE
- PIPE SLOPE DIRECTION
- X / YY — DETAIL NUMBER / DRAWING NUMBER
- X/YY — DETAIL NUMBER/DRAWING NUMBER (IN TEXT NOTES)
- XYZ — PIPE CLASS CODE (REFER TO SECTION 15100, PIPING – GENERAL)

VALVES & FITTINGS:

NORMALLY OPEN

- BALL VALVE
- BUTTERFLY VALVE
- GATE VALVE
- CHECK VALVE
- PIPE REDUCER
- FLANGE
- UNION
- ELBOW DOWN
- ELBOW UP
- TEE UP
- TEE DOWN
- STRAINER
- STATIC MIXER
- ROTAMETER
- GAGE
- FLOW DIRECTION

NORMALLY CLOSED

- BALL VALVE
- BUTTERFLY VALVE
- GATE VALVE
- RELIEF VALVE
- MONITORING PORT

GENERAL NOTES:

A. NOT ALL ABBREVIATIONS AND SYMBOLS WILL APPLY TO THIS PROJECT.

B. EXISTING FEATURES & CONDITIONS ARE GENERALLY SHOWN IN A LIGHT OR SCREENED COLOR. NEW SCOPES OF WORK ARE GENERALLY SHOWN IN A DARK OR BOLD COLOR AND IN TEXT NOTES.

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
△	WT	3/14/05	AS BUILTS
△	RZ	5/18/06	AS BUILTS

SCALE:		DATE
DWG BY:	AGR	8/23/04
APPRV'D BY:	PDM	8/23/04

HYDRO GEO CHEM, INC.

CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

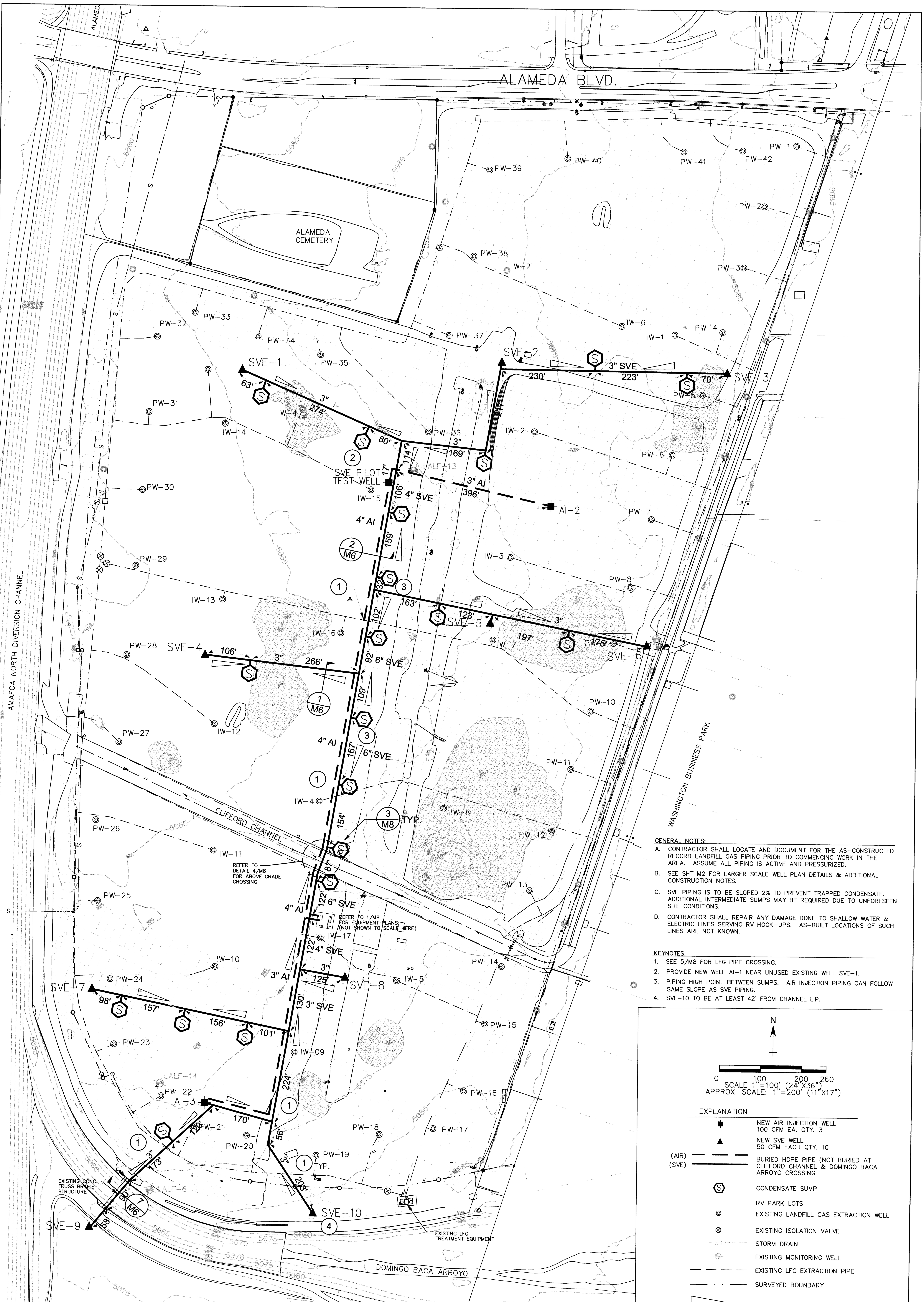
SYMBOLS AND ABBREVIATIONS

REFERENCE No. 7531014A

REVISION 0

DRAWING No. 02

K:\753100\AS-BUILTS 5-06\7531014A.dwg (alvinr) 02 18May2006 - 1:47 PM



GENERAL NOTES:

A. CONTRACTOR SHALL LOCATE AND DOCUMENT FOR THE AS-CONSTRUCTED RECORD LANDFILL GAS PIPING PRIOR TO COMMENCING WORK IN THE AREA. ASSUME ALL PIPING IS ACTIVE AND PRESSURIZED.

B. SEE SHT M2 FOR LARGER SCALE WELL PLAN DETAILS & ADDITIONAL CONSTRUCTION NOTES.

C. SVE PIPING IS TO BE SLOPED 2% TO PREVENT TRAPPED CONDENSATE. ADDITIONAL INTERMEDIATE SUMPS MAY BE REQUIRED DUE TO UNFORESEEN SITE CONDITIONS.

D. CONTRACTOR SHALL REPAIR ANY DAMAGE DONE TO SHALLOW WATER & ELECTRIC LINES SERVING RV HOOK-UPS. AS-BUILT LOCATIONS OF SUCH LINES ARE NOT KNOWN.

KEYNOTES:

1. SEE 5/M8 FOR LFG PIPE CROSSING.
2. PROVIDE NEW WELL AI-1 NEAR UNUSED EXISTING WELL SVE-1.
3. PIPING HIGH POINT BETWEEN SUMPS. AIR INJECTION PIPING CAN FOLLOW SAME SLOPE AS SVE PIPING.
4. SVE-10 TO BE AT LEAST 42' FROM CHANNEL LIP.

N

0 100 200 260
SCALE 1"=100' (24"X36")
APPROX. SCALE: 1"=200' (11"X17")

EXPLANATION

- NEW AIR INJECTION WELL 100 CFM EA. QTY. 3
- NEW SVE WELL 50 CFM EACH QTY. 10
- (AIR) (SVE) BURIED HDPE PIPE (NOT BURIED AT CLIFFORD CHANNEL & DOMINGO BACA ARROYO CROSSING
- CONDENSATE SUMP
- RV PARK LOTS
- EXISTING LANDFILL GAS EXTRACTION WELL
- EXISTING ISOLATION VALVE
- STORM DRAIN
- EXISTING MONITORING WELL
- EXISTING LFG EXTRACTION PIPE
- SURVEYED BOUNDARY
- SVE PIPE SLOPE DIRECTION

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
△	WT	12/12/05	AS-BUILTS

SCALE:	AS NOTED	DATE
DWG BY:	AGR	8/30/04
APPRV'D BY:	PDM	8/30/04

HYDRO GEO CHEM, INC.

CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

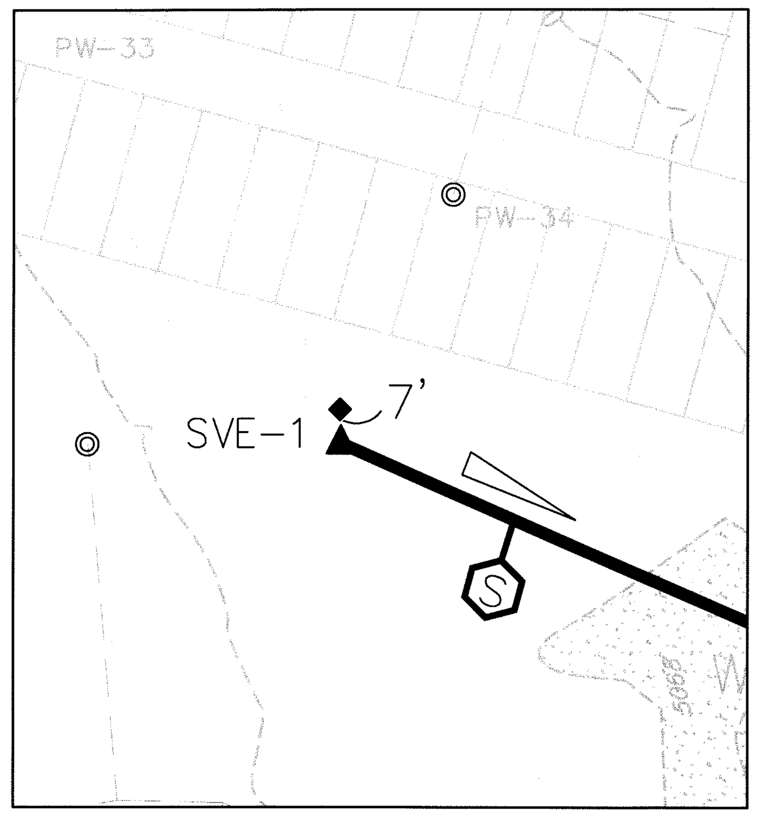
MECHANICAL PLAN - LALF

REFERENCE No. 7531015A

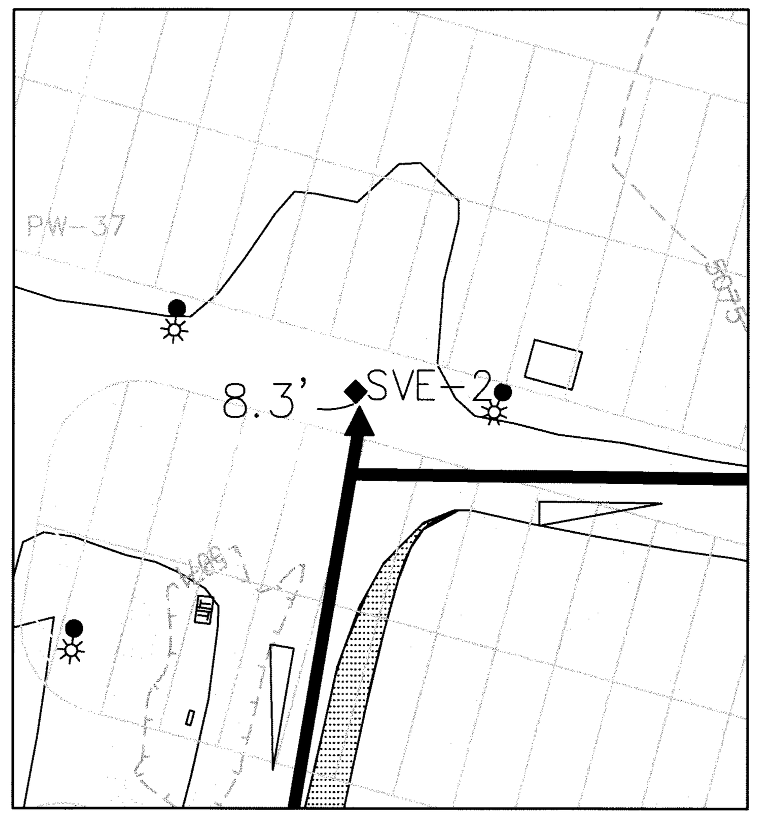
REVISION 1

DRAWING No. M1

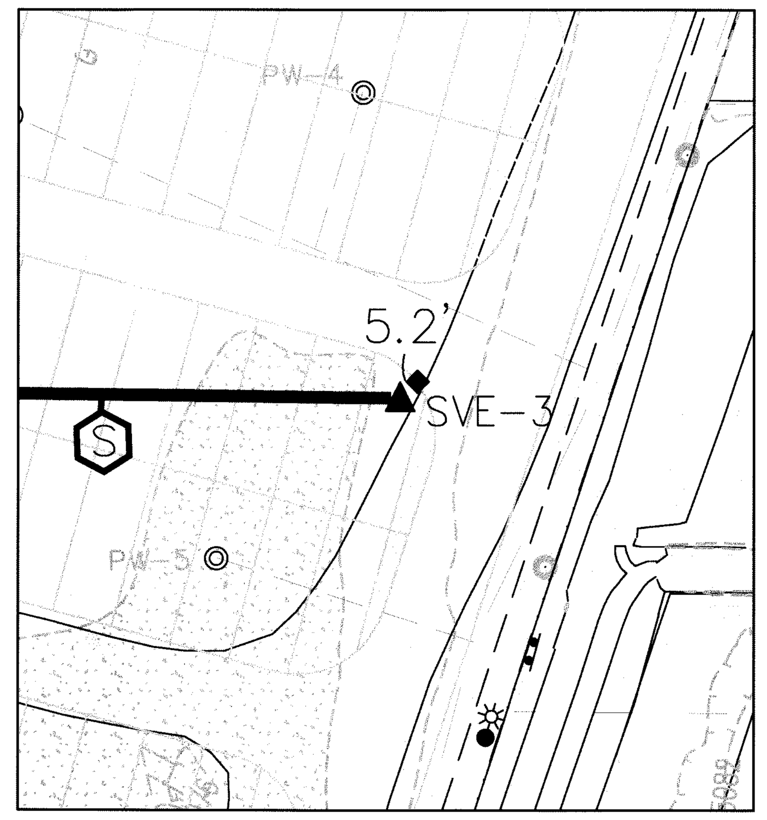
K:\753100\AS-BUILTS 7-05\7531015A.dwg (alvinr) M1 12Dec2005 - 11:19 AM



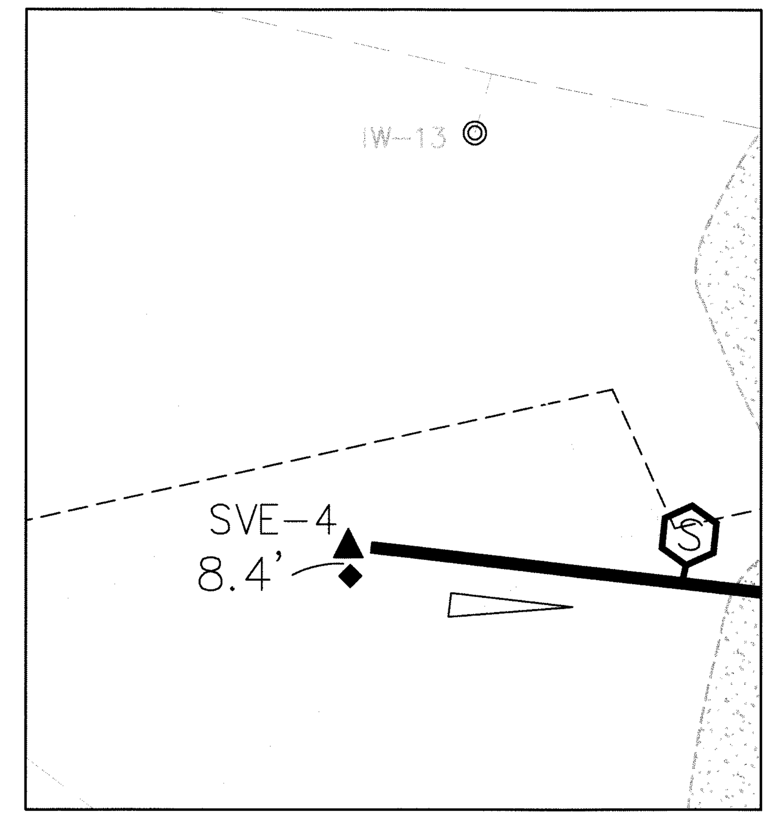
1 SVE-1 DETAIL
SCALE: 1"=50'



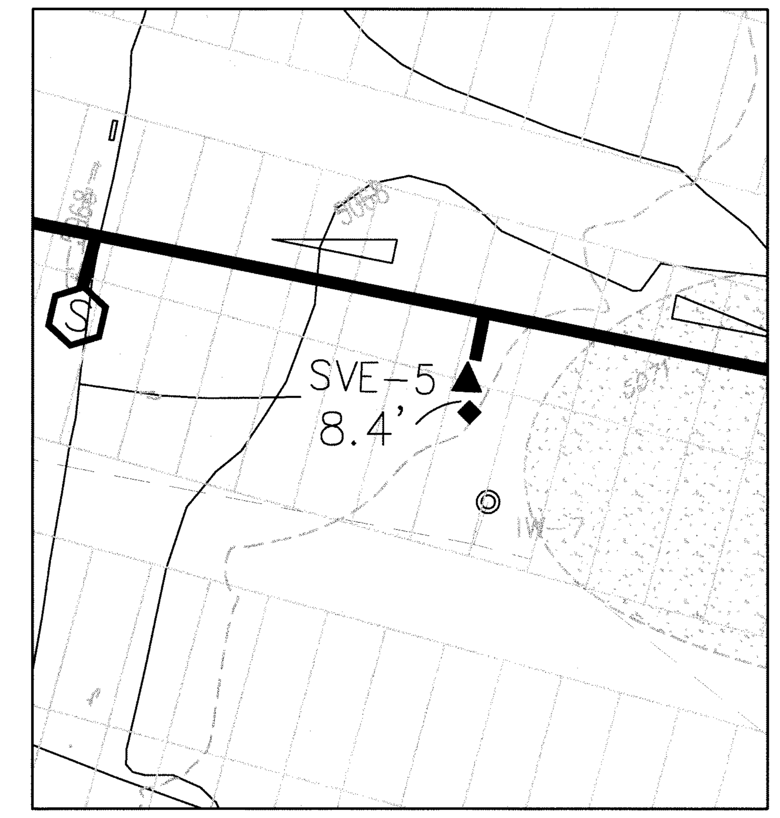
2 SVE-2 DETAIL
SCALE: 1"=50'



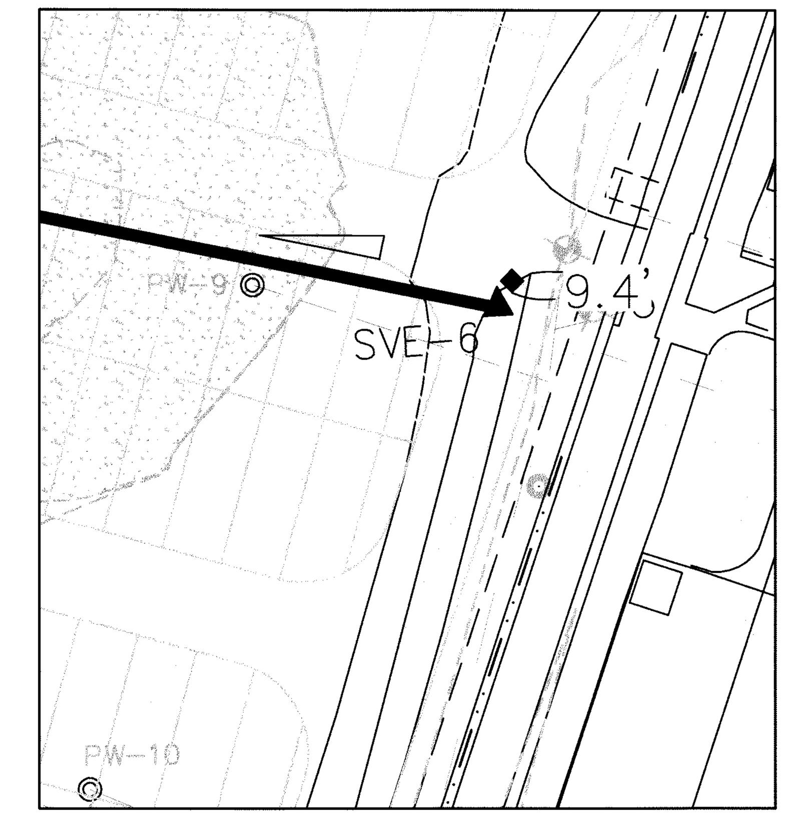
3 SVE-3 DETAIL
SCALE: 1"=50'



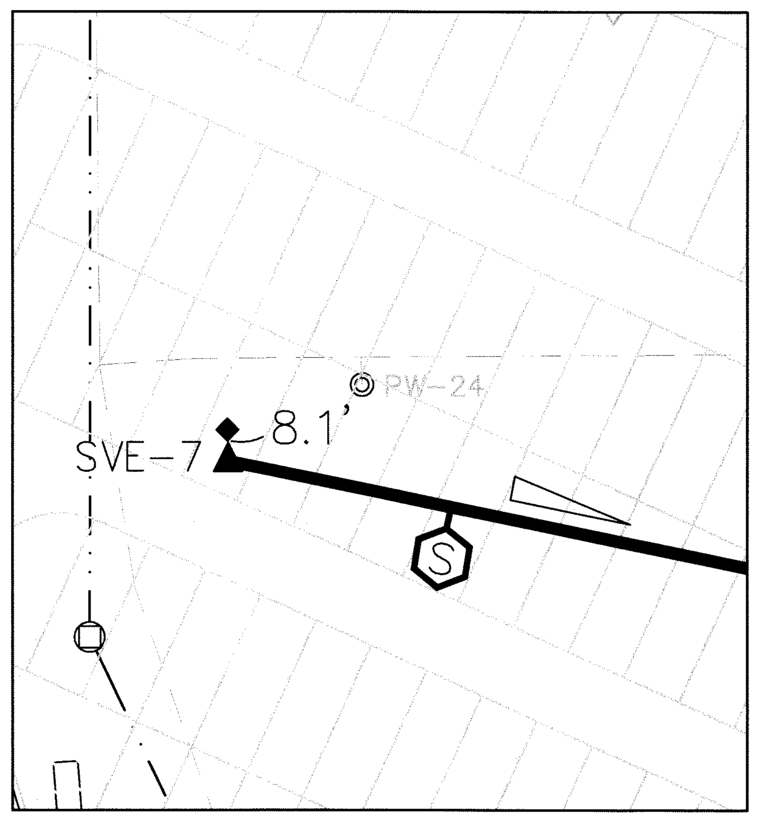
4 SVE-4 DETAIL
SCALE: 1"=50'



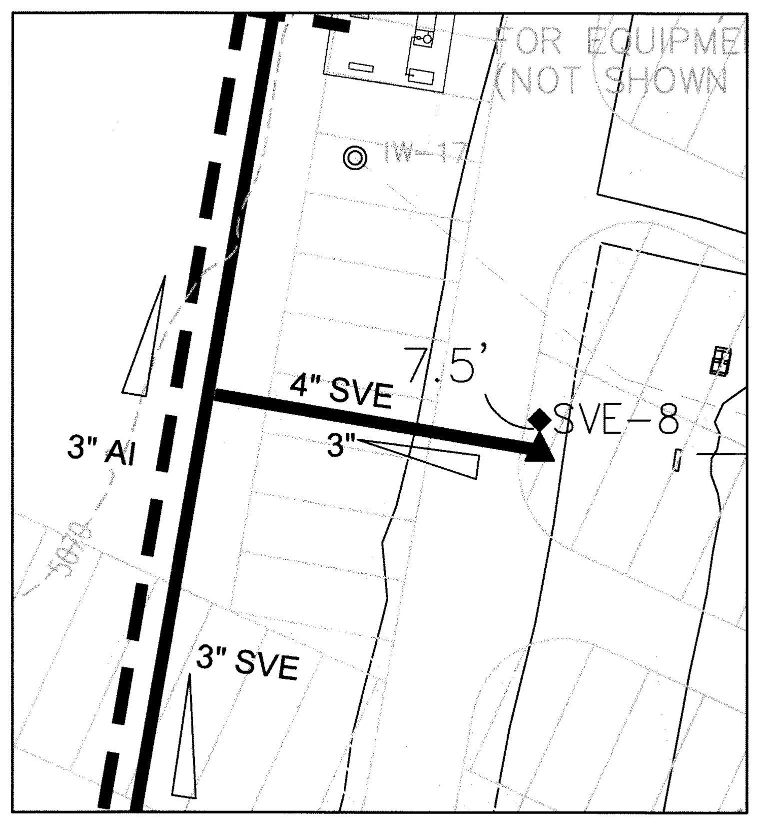
5 SVE-5 DETAIL
SCALE: 1"=50'



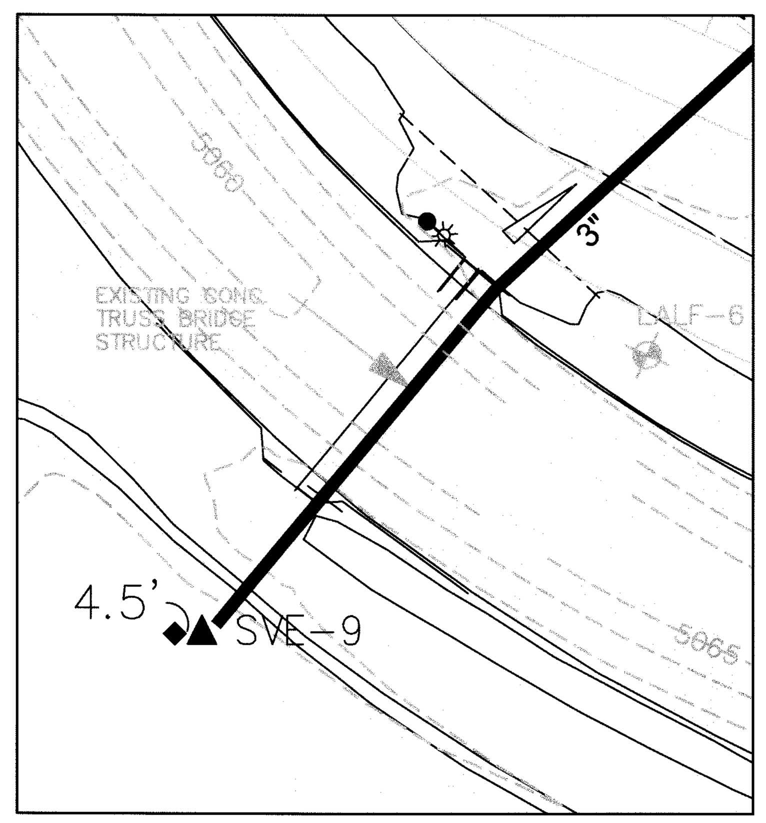
6 SVE-6 DETAIL
SCALE: 1"=50'



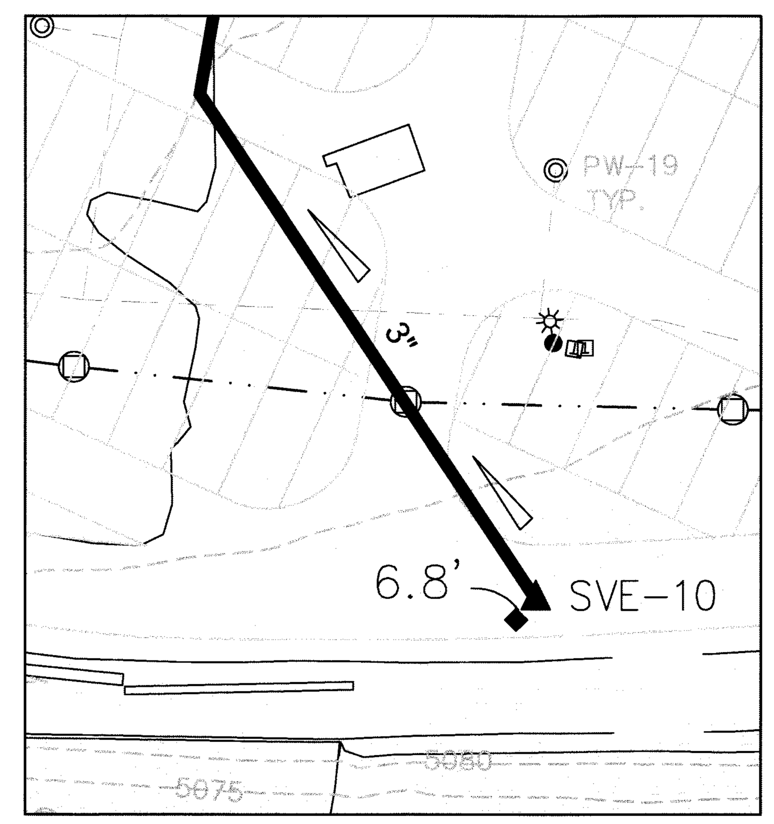
7 SVE-7 DETAIL
SCALE: 1"=50'



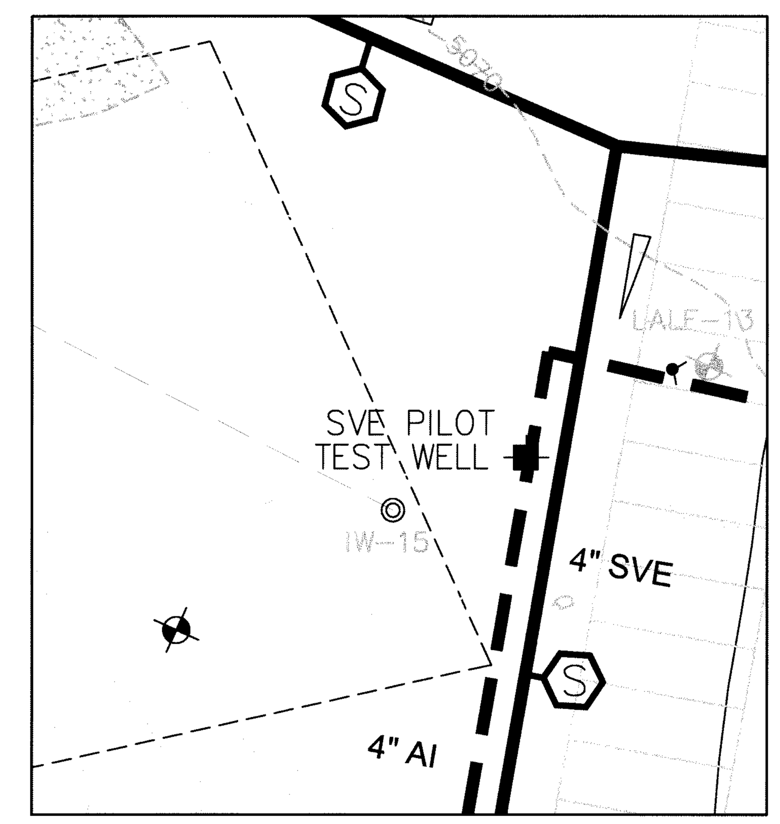
8 SVE-8 DETAIL
SCALE: 1"=50'



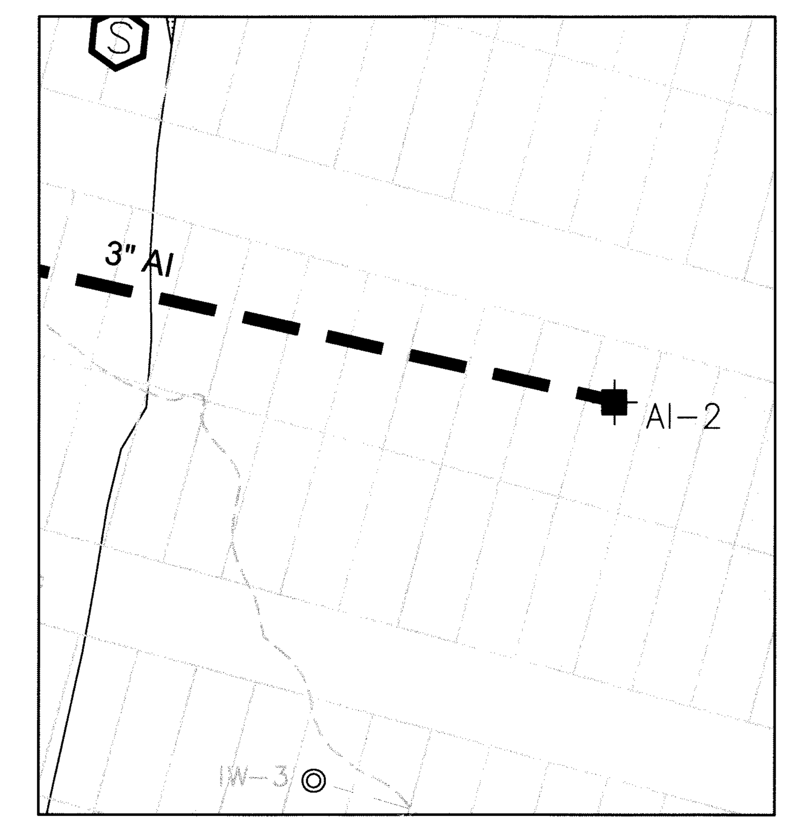
9 SVE-9 DETAIL
SCALE: 1"=50'



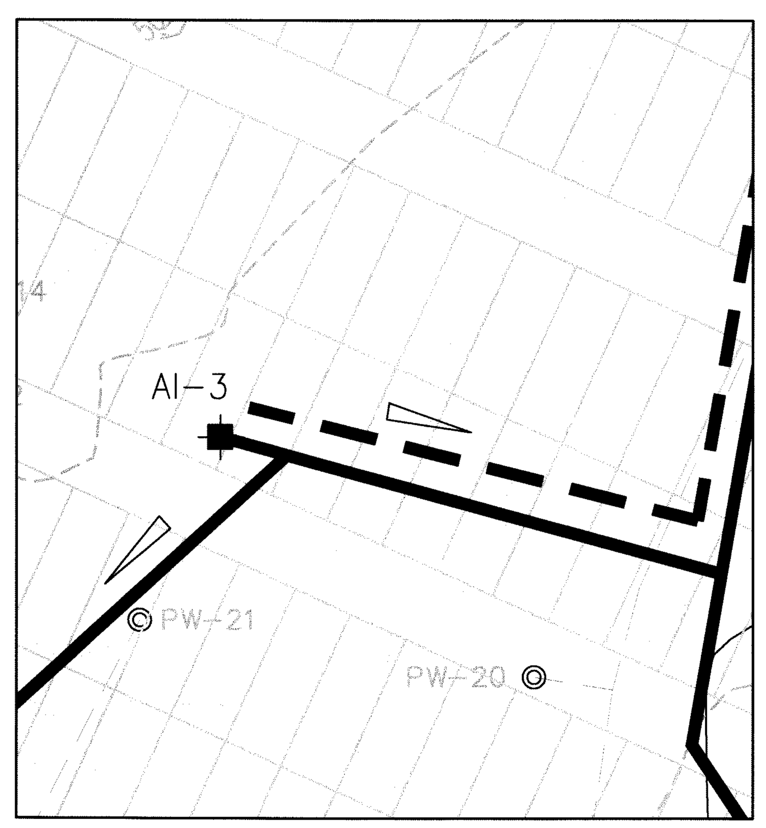
10 SVE-10 DETAIL
SCALE: 1"=50'



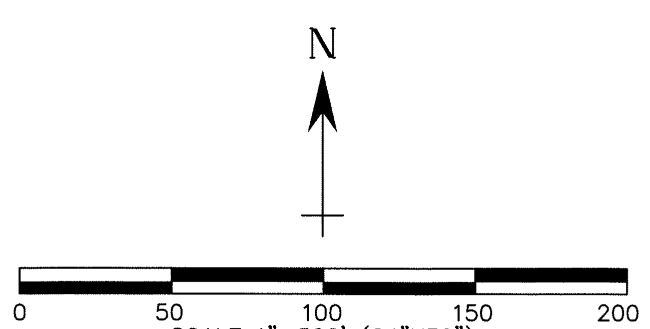
11 AI-1 DETAIL
SCALE: 1"=50'



12 AI-2 DETAIL
SCALE: 1"=50'



13 AI-3 DETAIL
SCALE: 1"=50'



SCALE 1"=500' (24"X36")
APPROX. SCALE: 1"=100' (11"X17")

EXPLANATION

- NEW AIR INJECTION WELL 100 CFM EA. QTY. 3
- NEW SVE WELL 50 CFM EACH QTY. 10
- SOIL GAS PROBE
- (AIR) (SVE) BURIED HDPE PIPE (NOT BURIED AT CLIFFORD CHANNEL & DOMINGO BACA ARROYO CROSSING
- SVE PIPE SLOPE DIRECTION
- CONDENSATE SUMP
- RV PARK LOTS
- EXISTING LANDFILL GAS EXTRACTION WELL
- EXISTING ISOLATION VALVE
- SD STORM DRAIN
- EXISTING MONITORING WELL
- EXISTING LFG EXTRACTION PIPE
- SURVEYED BOUNDARY
- EXISTING POWER POLE & SECURITY LIGHT

GENERAL NOTES

A. REFER TO SUPPLEMENTAL TECHNICAL SPECIFICATION SECTION 13120, WELL DRILLING AND WELL CONSTRUCTION, FOR SPECIAL REQUIREMENTS OF WORK PERFORMED WITHIN 15 FEET OF ANY LANDFILL GAS EXTRACTION WELL OR PIPING. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE HE DOES TO THE LFG SYSTEM.

B. BURIED TRASH IS PRESENT AT THE LALF SITE. REFER TO SECTION 13120 FOR SPECIAL DRILLING AND MATERIAL HANDLING REQUIREMENTS. CUTTINGS AND EXCAVATED MATERIAL MAY BE DETERMINED BY TESTING TO BE HAZARDOUS.

C. EVERY WELLHEAD REQUIRES DUAL COMPLETIONS. REFER TO DETAILS 3/M6 AND 4/M6.

D. REFER TO DETAIL 6/M7 FOR SOIL GAS PROBES.

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
1	PRM	2/21/05	VIEWPORT CHANGES
	WT	12/12/05	AS-BUILTS

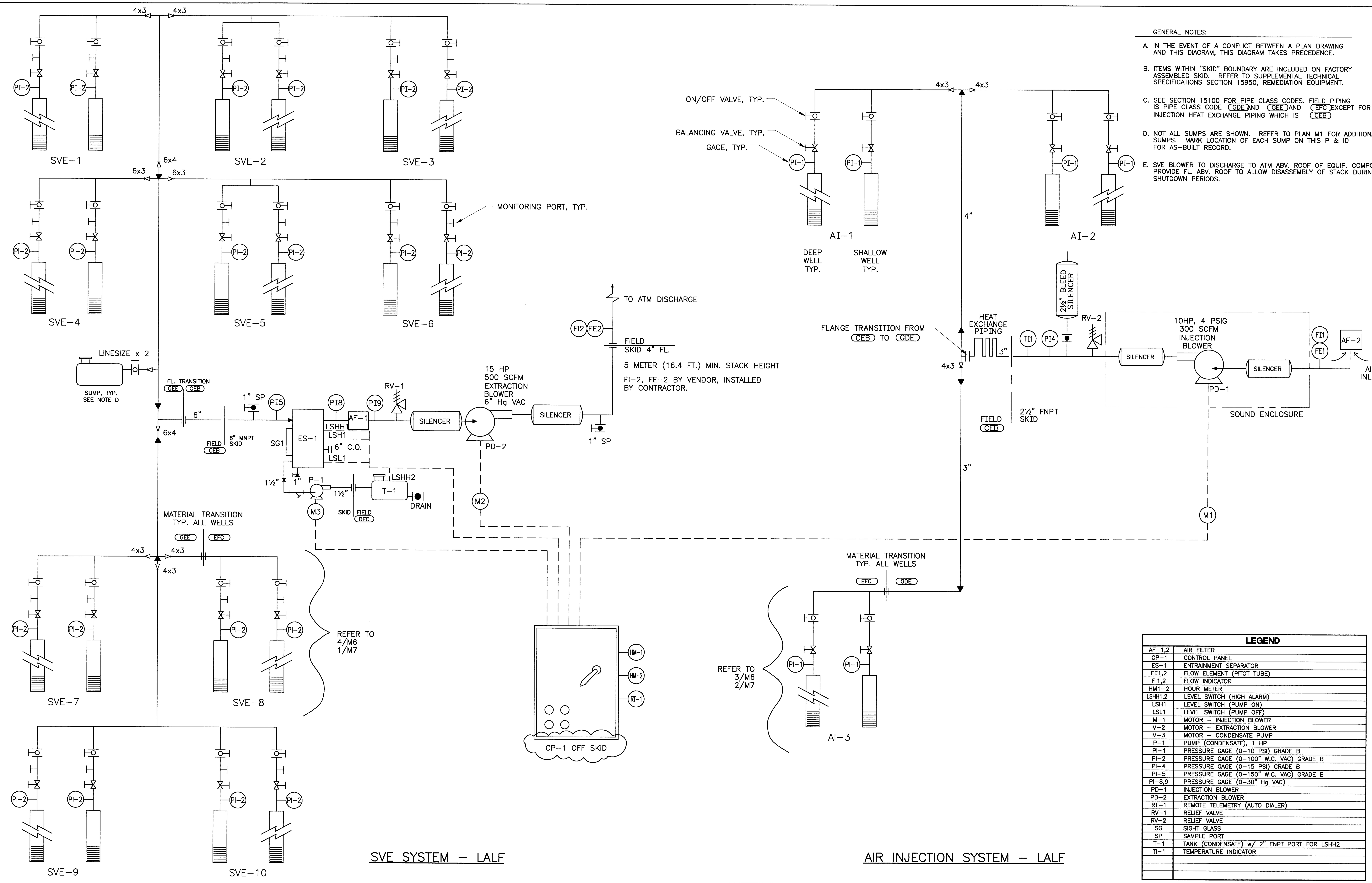
		DATE
SCALE:	AS NOTED	
DWG BY:	AGR	8/23/04
APPRV'D BY:	PM	8/23/04

HYDRO GEO CHEM, INC.

CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

WELL PLAN DETAILS - LALF

REFERENCE No. 7531031A
REVISION 1
DRAWING No. M2



GENERAL NOTES:

A. IN THE EVENT OF A CONFLICT BETWEEN A PLAN DRAWING AND THIS DIAGRAM, THIS DIAGRAM TAKES PRECEDENCE.

B. ITEMS WITHIN "SKID" BOUNDARY ARE INCLUDED ON FACTORY ASSEMBLED SKID. REFER TO SUPPLEMENTAL TECHNICAL SPECIFICATIONS SECTION 15950, REMEDIATION EQUIPMENT.

C. SEE SECTION 15100 FOR PIPE CLASS CODES. FIELD PIPING IS PIPE CLASS CODE (GDE) AND (GEE) AND (EFC) EXCEPT FOR AIR INJECTION HEAT EXCHANGE PIPING WHICH IS (CEB)

D. NOT ALL SUMPS ARE SHOWN. REFER TO PLAN M1 FOR ADDITIONAL SUMPS. MARK LOCATION OF EACH SUMP ON THIS P & ID FOR AS-BUILT RECORD.

E. SVE BLOWER TO DISCHARGE TO ATM ABV. ROOF OF EQUIP. COMPOUND. PROVIDE FL. ABV. ROOF TO ALLOW DISASSEMBLY OF STACK DURING SHUTDOWN PERIODS.

LEGEND	
AF-1,2	AIR FILTER
CP-1	CONTROL PANEL
ES-1	ENTRAINMENT SEPARATOR
FE1,2	FLOW ELEMENT (PITOT TUBE)
FI1,2	FLOW INDICATOR
HM1-2	HOUR METER
LSHH1,2	LEVEL SWITCH (HIGH ALARM)
LSH1	LEVEL SWITCH (PUMP ON)
LSL1	LEVEL SWITCH (PUMP OFF)
M-1	MOTOR – INJECTION BLOWER
M-2	MOTOR – EXTRACTION BLOWER
M-3	MOTOR – CONDENSATE PUMP
P-1	PUMP (CONDENSATE), 1 HP
PI-1	PRESSURE GAGE (0-10 PSI) GRADE B
PI-2	PRESSURE GAGE (0-100" W.C. VAC) GRADE B
PI-4	PRESSURE GAGE (0-15 PSI) GRADE B
PI-5	PRESSURE GAGE (0-150" W.C. VAC) GRADE B
PI-8,9	PRESSURE GAGE (0-30" Hg VAC)
PD-1	INJECTION BLOWER
PD-2	EXTRACTION BLOWER
RT-1	REMOTE TELEMETRY (AUTO DIALER)
RV-1	RELIEF VALVE
RV-2	RELIEF VALVE
SG	SIGHT GLASS
SP	SAMPLE PORT
T-1	TANK (CONDENSATE) w/ 2" FNPT PORT FOR LSHH2
TI-1	TEMPERATURE INDICATOR

REVISION HISTORY			
No.	BY	DATE	DESCRIPTION
△	PDM	2/21/05	SKID SUBMITTAL UPDATES
△	WT	12/05/05	AS-BUILTS
△	RZ	5/18/06	AS-BUILTS

SCALE:	NONE	DATE
DWG BY:	AGR	8/23/04
APPRV'D BY:	PDM	1/28/05

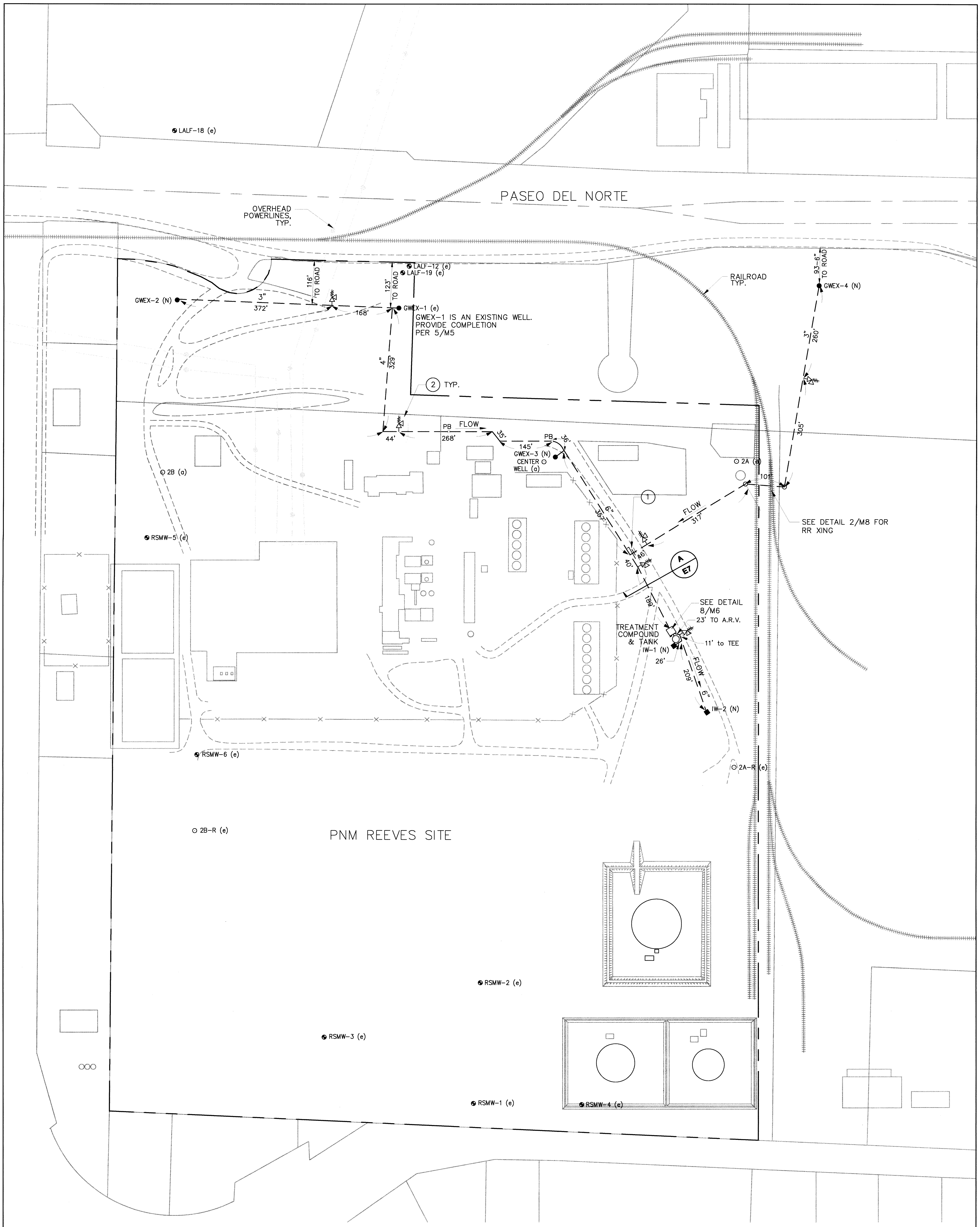
HYDRO GEO CHEM, INC.

CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

SVE & AIR INJECTION P&ID - LALF

REFERENCE No. 7531019A
REVISION 1
DRAWING No. M3

K:\753100\AS-BUILTS 5-06\7531019A.dwg (alvinr) M3 18May2006 – 2:00 PM



EXPLANATION

- GROUNDWATER MONITORING WELL
- ON-SITE PRODUCTION WELL
- GROUNDWATER EXTRACTION WELL (GWEX)
- INJECTION WELL (IW)
- BURIED PIPE (AND CONDUIT)
- (N) NEW
- (e) EXISTING
- (a) ABANDONED
- PROPERTY LINE, ASSUMED

GENERAL NOTES:

A. PROPERTY LINES SHOWN HEREIN DO NOT CONSTITUTE A LEGAL DESCRIPTION OF THE PROPERTY

B. THE WORK ON THIS SITE IS GREATER THAN 1,000 FT. FROM LOS ANGELES LANDFILL.

C. REFER TO 3/M7 FOR GWEX WELL COMPLETIONS AND 5/M7 FOR IW WELL COMPLETIONS.

D. PROVIDE 3 GROUNDWATER EXTRACTION WELLS AND 2 INJECTION WELLS. (A FOURTH GROUNDWATER EXTRACTION WELL, GWEX-1, ALREADY EXISTS. PROVIDE COMPLETION OF GWEX-1 PER 5/M6 AND 4/M7.)

KEYNOTES:

1. PROVIDE ISOLATION VALVE IN VAULT AT TEE BRANCH.

2. PROVIDE COMBINATION AIR VALVES AT HIGH POINTS. PROVIDE DEDICATED VAULTS IN PLACES WHERE VALVES CANNOT BE INCLUDED WITH VALVING OF OTHER VAULTS. INTERMEDIATE COMBINATION AIR VALVES NOT SHOWN ON THIS PLAN MAY BE REQUIRED DUE TO UNFORESEEN FIELD CONDITIONS. FINAL VALVE LOCATIONS MAY VARY FROM THOSE SHOWN HERE.

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
△	WT	12/12/05	AS BUILT'S

SCALE:	AS NOTED	DATE
DWG BY:	AGR	8/23/04
APPRV'D BY:	PDM	8/23/04

HYDRO GEO CHEM, INC.

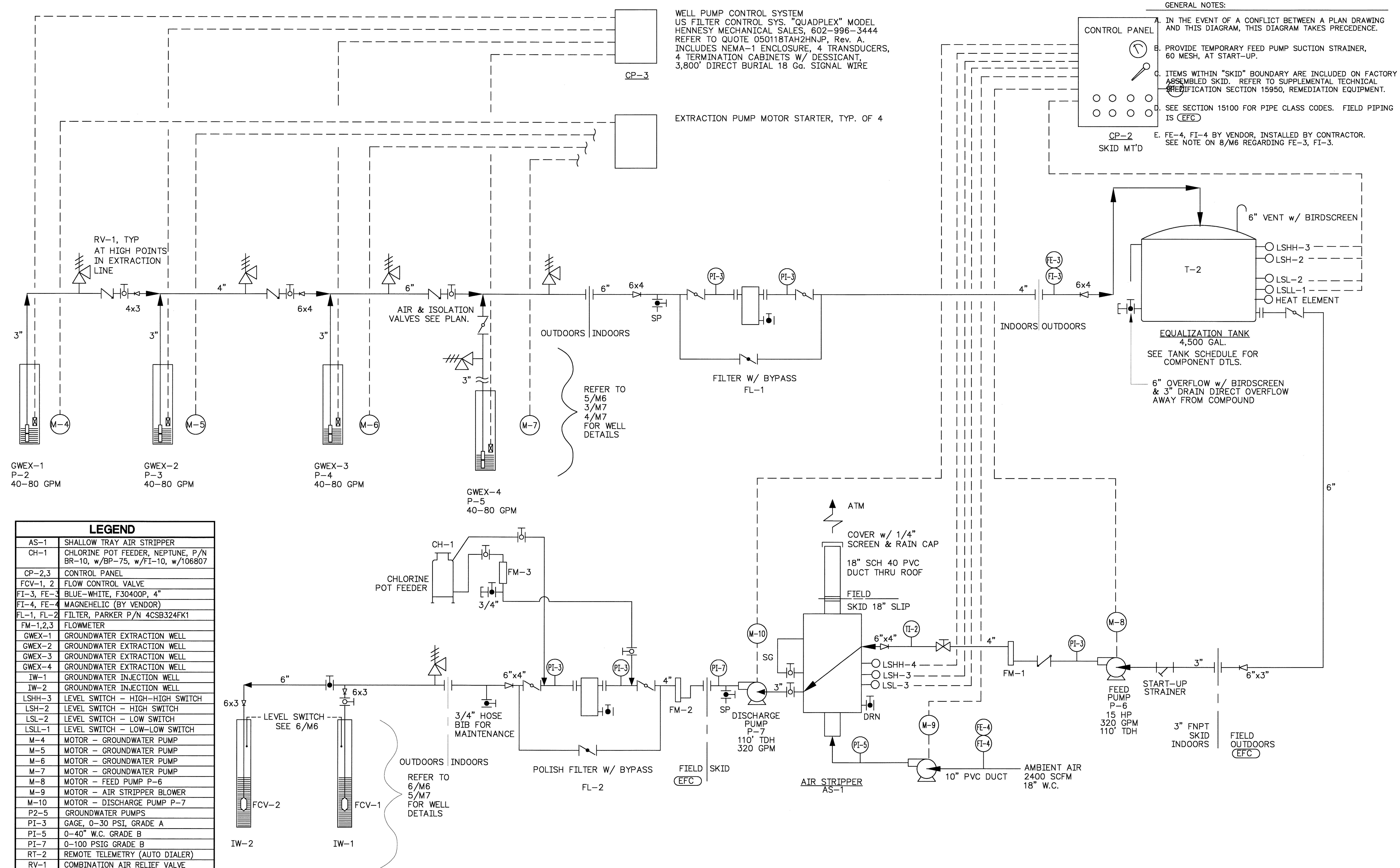
CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

MECHANICAL PLAN - PNMR

REFERENCE No. 7531017A

REVISION 0 DRAWING No. M4

K:\753100\AS-BUILTS 7-05\7531017a.dwg (alvinr) M4 12Dec2005 - 3:05 PM



GENERAL NOTES:

A. IN THE EVENT OF A CONFLICT BETWEEN A PLAN DRAWING AND THIS DIAGRAM, THIS DIAGRAM TAKES PRECEDENCE.

B. PROVIDE TEMPORARY FEED PUMP SUCTION STRAINER, 60 MESH, AT START-UP.

C. ITEMS WITHIN "SKID" BOUNDARY ARE INCLUDED ON FACTORY ASSEMBLED SKID. REFER TO SUPPLEMENTAL TECHNICAL SPECIFICATION SECTION 15950, REMEDIATION EQUIPMENT.

D. SEE SECTION 15100 FOR PIPE CLASS CODES. FIELD PIPING IS (EFC)

E. FE-4, FI-4 BY VENDOR, INSTALLED BY CONTRACTOR. SEE NOTE ON 8/M6 REGARDING FE-3, FI-3.

LEGEND

AS-1	SHALLOW TRAY AIR STRIPPER
CH-1	CHLORINE POT FEEDER, NEPTUNE, P/N BR-10, w/BP-75, w/FI-10, w/106807
CP-2,3	CONTROL PANEL
FCV-1, 2	FLOW CONTROL VALVE
FI-3, FE-3	BLUE-WHITE, F30400P, 4"
FI-4, FE-4	MAGNEHELIC (BY VENDOR)
FL-1, FL-2	FILTER, PARKER P/N 4CSB324FK1
FM-1,2,3	FLOWMETER
GWEX-1	GROUNDWATER EXTRACTION WELL
GWEX-2	GROUNDWATER EXTRACTION WELL
GWEX-3	GROUNDWATER EXTRACTION WELL
GWEX-4	GROUNDWATER EXTRACTION WELL
IW-1	GROUNDWATER INJECTION WELL
IW-2	GROUNDWATER INJECTION WELL
LSHH-3	LEVEL SWITCH - HIGH-HIGH SWITCH
LSH-2	LEVEL SWITCH - HIGH SWITCH
LSL-2	LEVEL SWITCH - LOW SWITCH
LSLL-1	LEVEL SWITCH - LOW-LOW SWITCH
M-4	MOTOR - GROUNDWATER PUMP
M-5	MOTOR - GROUNDWATER PUMP
M-6	MOTOR - GROUNDWATER PUMP
M-7	MOTOR - GROUNDWATER PUMP
M-8	MOTOR - FEED PUMP P-6
M-9	MOTOR - AIR STRIPPER BLOWER
M-10	MOTOR - DISCHARGE PUMP P-7
P2-5	GROUNDWATER PUMPS
PI-3	GAGE, 0-30 PSI, GRADE A
PI-5	0-40" W.C. GRADE B
PI-7	0-100 PSIG GRADE B
RT-2	REMOTE TELEMETRY (AUTO DIALER)
RV-1	COMBINATION AIR RELIEF VALVE
SG	SIGHT GLASS
SP	SAMPLE PORT
T-2	TANK
TI-2	TEMP INDICATOR

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
△	PDM	2/21/05	SKID SUBMITTAL UPDATES
△	WT	2/05/05	AS BUILT'S
△	RZ	6/18/06	AS BUILT'S

SCALE:	NONE	DATE
DWG BY:	AGR	8/23/04
APPRV'D BY:	PDM	1/28/05

HYDRO GEO CHEM, INC.

CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

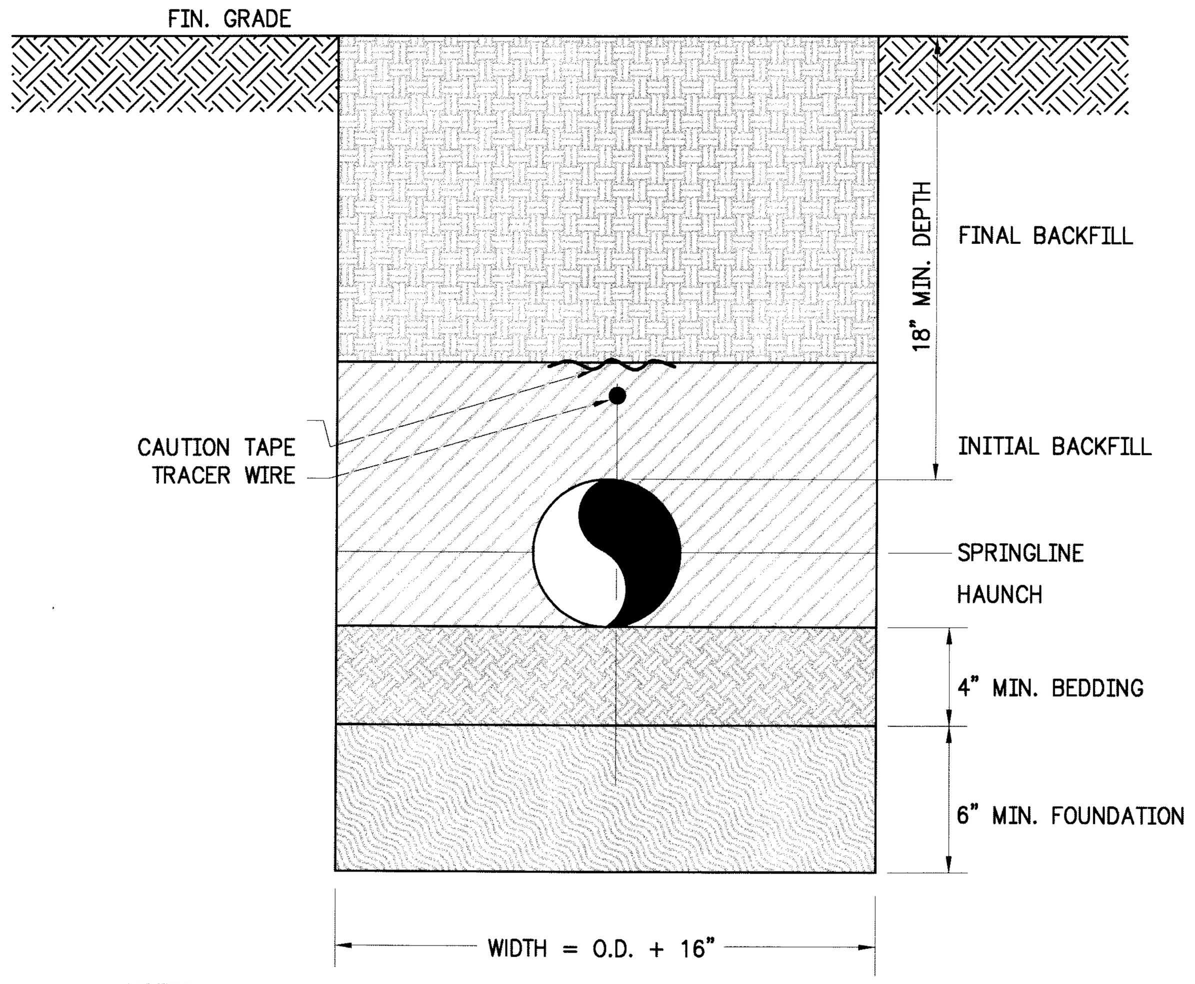
GROUNDWATER TREATMENT P&ID - PNMR

REFERENCE No. 7531020A

REVISION 1

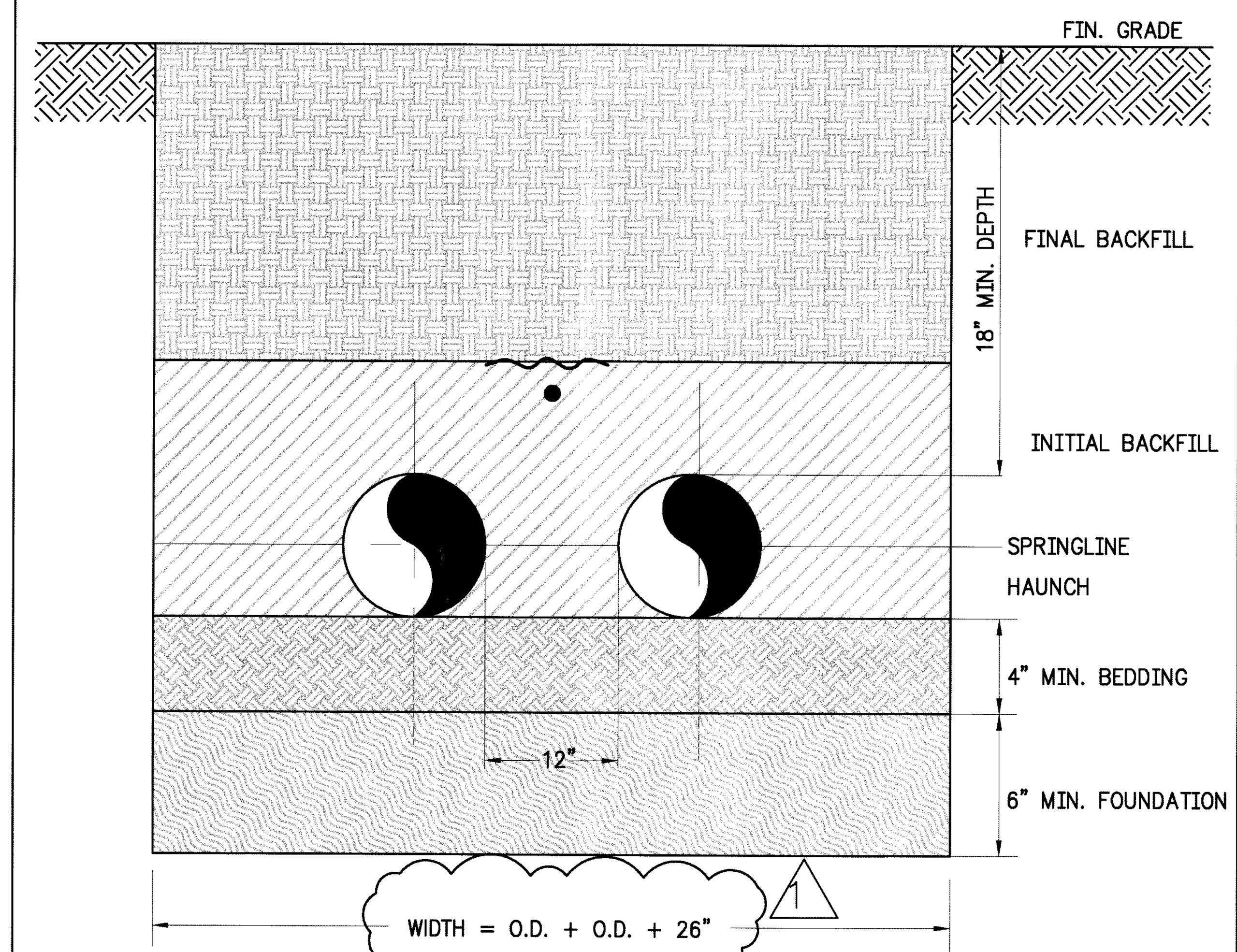
DRAWING No. M5

K:\753100\AS-BUILTS 5-06\7531020A.dwg (alvinr) M5 18May2006 - 3:19 PM



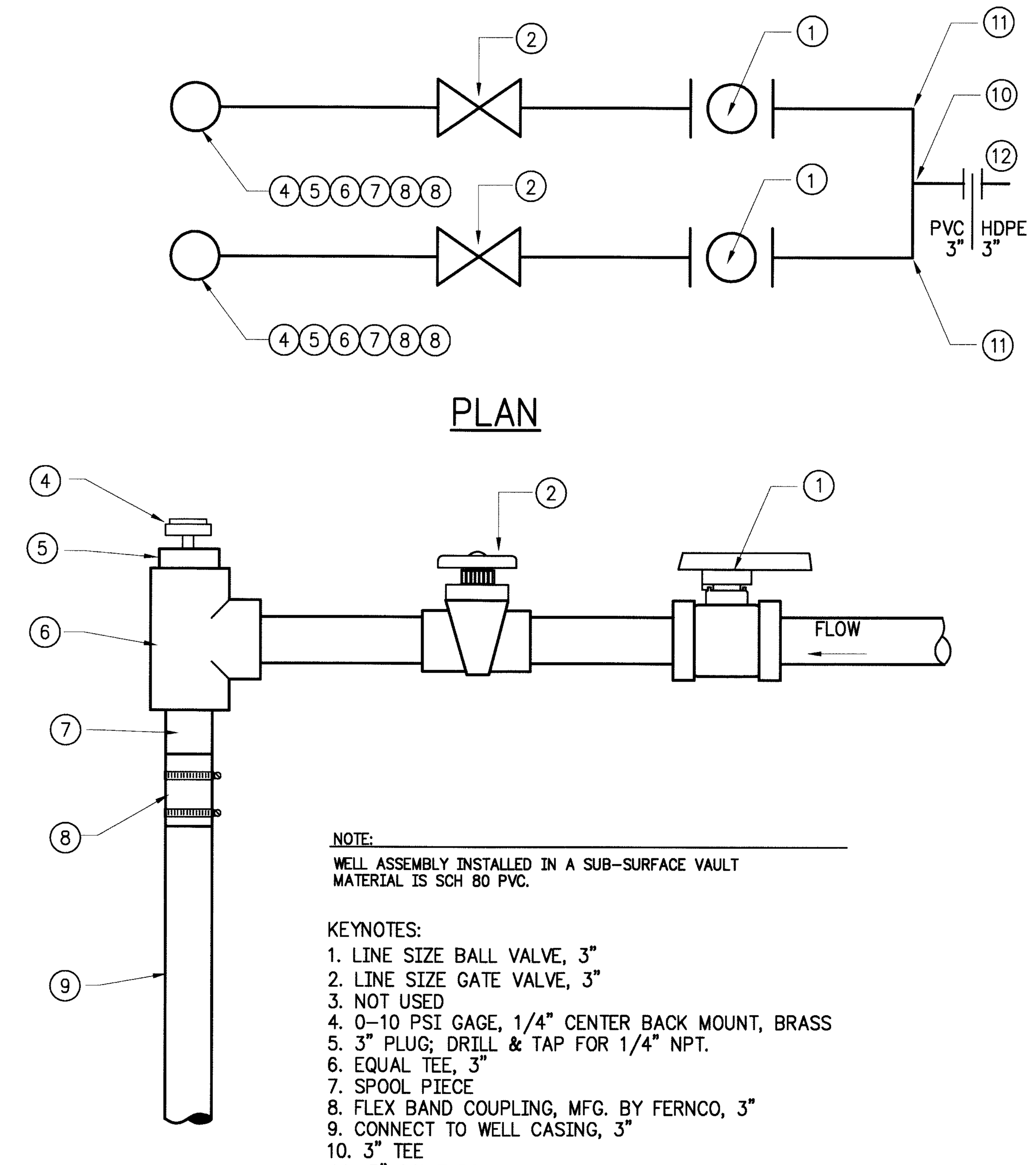
NOTES:
A. TRENCHING PER SECTION 15142–POLYETHYLENE PIPING SYSTEMS, AND THIS DETAIL.
B. DEPTH OF SVE PIPE WILL VARY DUE TO SLOPING REQUIREMENTS.
C. SEE ALSO 5/M8.
D. BEDDING AND HAUNCH MATERIALS MAY BE CLASS I, II OR III WITH MAX. PARTICLE SIZE OF 1.25". COMPACT TO 90% STANDARD PROCTER DENSITY IN 6" LIFTS.
E. INITIAL BACKFILL TO EXTEND MIN. 6" ABOVE PIPE CROWN.
F. SPECIAL NOTE: WITHIN AMAFCA RIGHT-OF-WAY, MIN. BURIAL DEPTH SHALL BE 3 FT. AND COMPACTION SHALL BE TO 95% STANDARD PROCTER DENSITY.

1 TRENCH DETAIL - SINGLE PIPE - LALF
NTS



NOTES:
A. TRENCHING PER SECTION 15142–POLYETHYLENE PIPING SYSTEMS, AND THIS DETAIL.
B. DEPTH OF SVE PIPE WILL VARY DUE TO SLOPING REQUIREMENTS.
C. SEE ALSO 5/M8.
D. BEDDING AND HAUNCH MATERIALS MAY BE CLASS I, II OR III WITH MAX. PARTICLE SIZE OF 1.25". COMPACT TO 90% STANDARD PROCTER DENSITY IN 6" LIFTS.
E. INITIAL BACKFILL TO EXTEND MIN. 6" ABOVE PIPE CROWN.

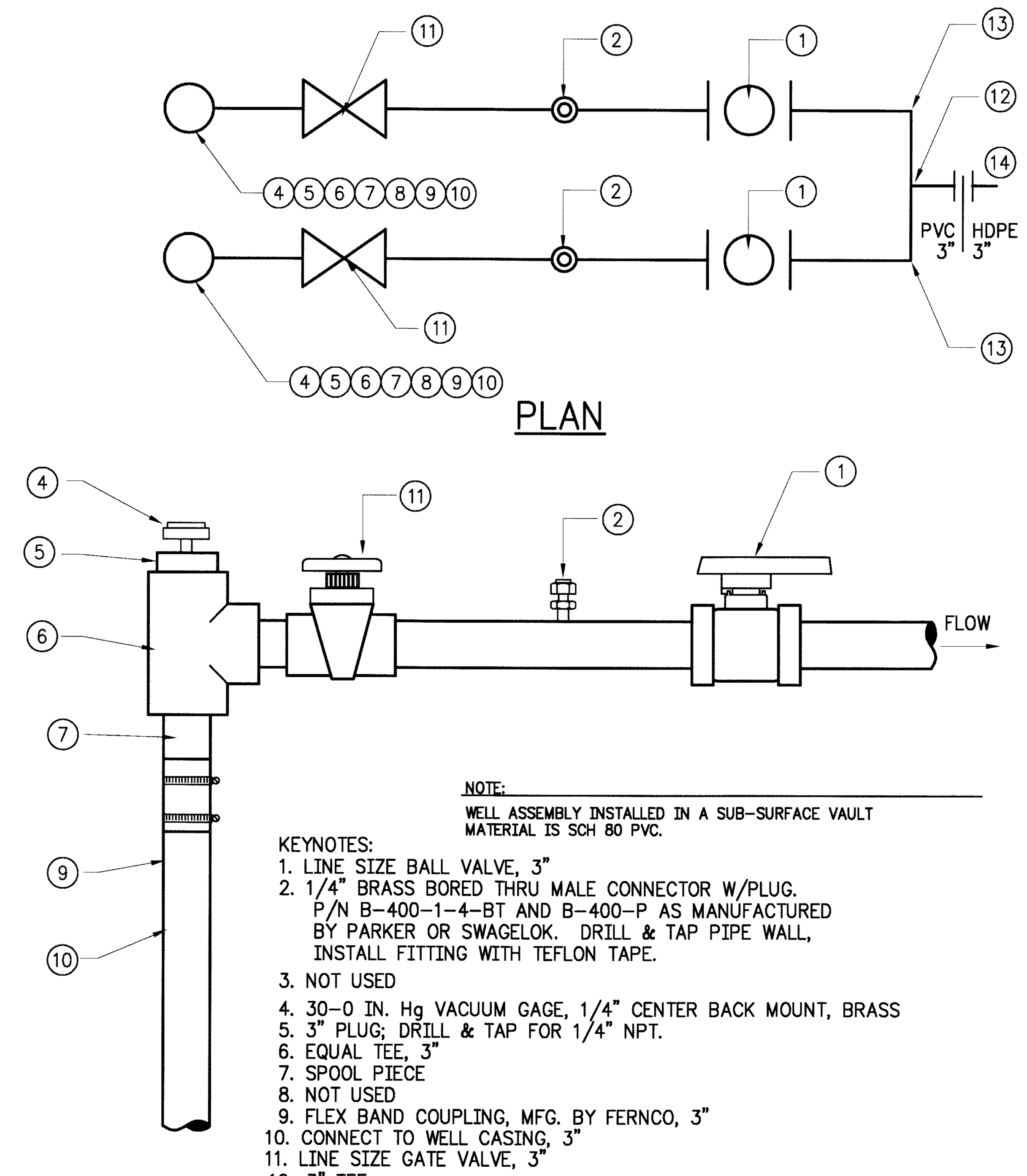
2 TRENCH DETAIL - MULTIPLE PIPES - LALF
NTS



NOTE:
WELL ASSEMBLY INSTALLED IN A SUB-SURFACE VAULT MATERIAL IS SCH 80 PVC.

KEYNOTES:
1. LINE SIZE BALL VALVE, 3"
2. LINE SIZE GATE VALVE, 3"
3. NOT USED
4. 0–10 PSI GAGE, 1/4" CENTER BACK MOUNT, BRASS
5. 3" PLUG; DRILL & TAP FOR 1/4" NPT.
6. EQUAL TEE, 3"
7. SPOOL PIECE
8. FLEX BAND COUPLING, MFG. BY FERNCO, 3"
9. CONNECT TO WELL CASING, 3"
10. 3" TEE
11. 3" 90° ELBOW
12. HDPE/PVC TRANSITION FITTING BY POLY-CAM, INC. OR EQ.

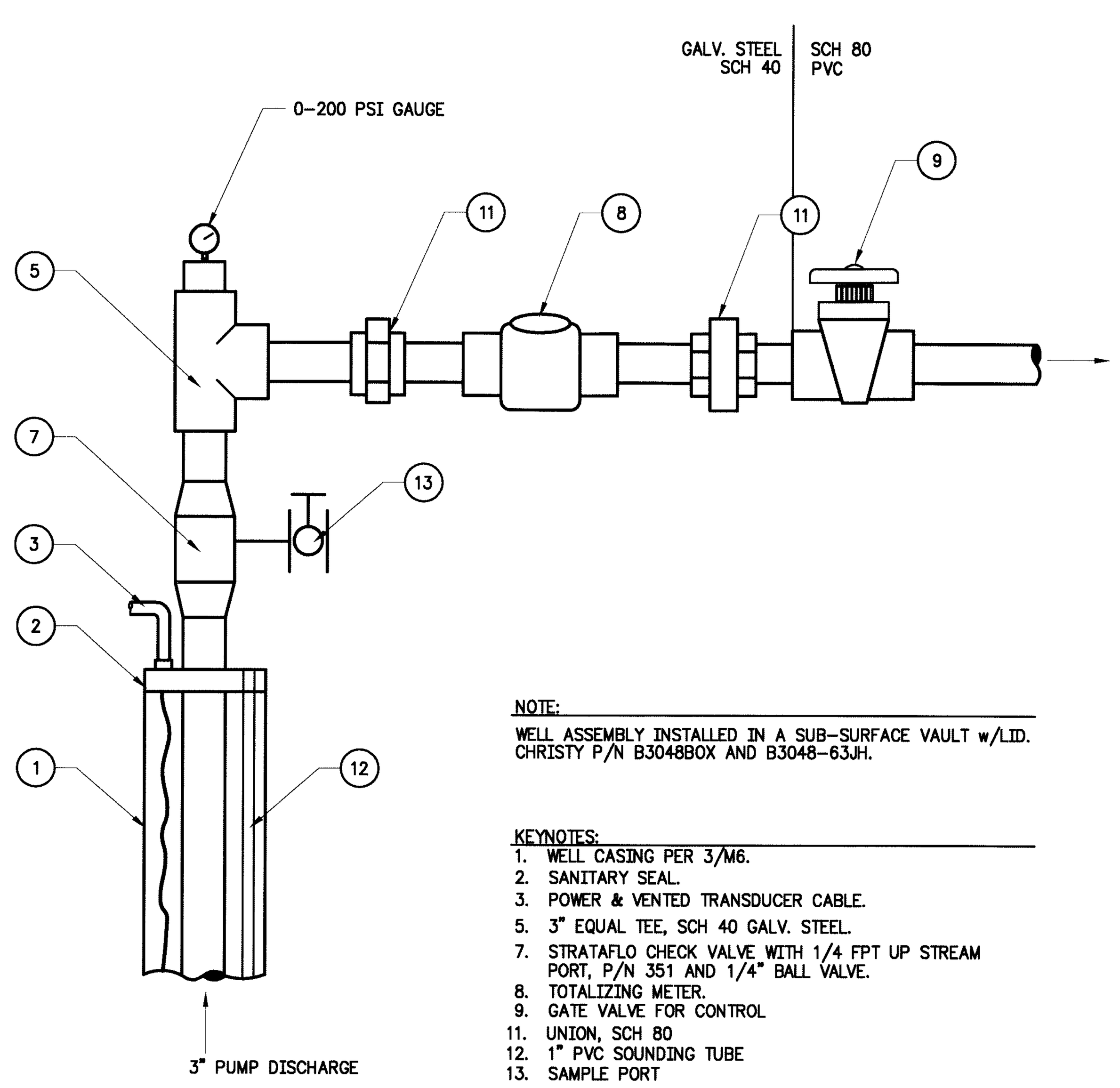
3 TYPICAL AIR INJECTION WELLHEAD
NTS



NOTE:
WELL ASSEMBLY INSTALLED IN A SUB-SURFACE VAULT MATERIAL IS SCH 80 PVC.

KEYNOTES:
1. LINE SIZE BALL VALVE, 3"
2. 1/4" BRASS BORED THRU MALE CONNECTOR W/PLUG. P/N B-400-1-4-BT AND B-400-P AS MANUFACTURED BY PARKER OR SWAGELOK. DRILL & TAP PIPE WALL, INSTALL FITTING WITH TEFLON TAPE.
3. NOT USED
4. 30–0 IN. Hg VACUUM GAGE, 1/4" CENTER BACK MOUNT, BRASS
5. 3" PLUG; DRILL & TAP FOR 1/4" NPT.
6. EQUAL TEE, 3"
7. SPOOL PIECE
8. NOT USED
9. FLEX BAND COUPLING, MFG. BY FERNCO, 3"
10. CONNECT TO WELL CASING, 3"
11. LINE SIZE GATE VALVE, 3"
12. 3" TEE
13. 3" 90° ELBOW
14. HDPE/PVC TRANSITION FITTING BY POLY-CAM, INC. OR EQ.

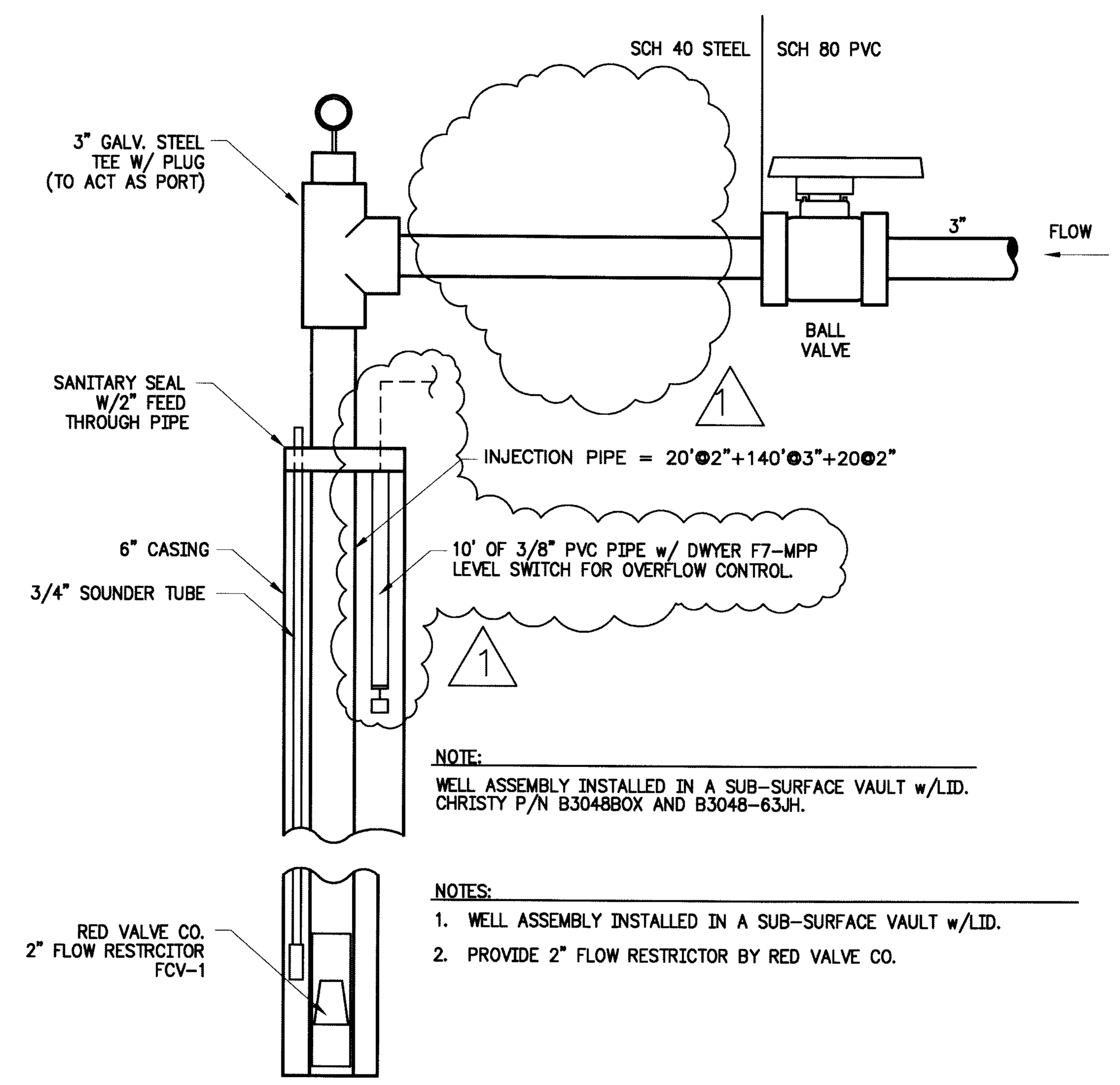
4 TYPICAL SVE WELLHEAD
NTS



NOTE:
WELL ASSEMBLY INSTALLED IN A SUB-SURFACE VAULT w/LID. CHRISTY P/N B3048BOX AND B3048-63JH.

KEYNOTES:
1. WELL CASING PER 3/M6.
2. SANITARY SEAL.
3. POWER & VENTED TRANSDUCER CABLE.
5. 3" EQUAL TEE, SCH 40 GALV. STEEL.
7. STRATAFLO CHECK VALVE WITH 1/4 FPT UP STREAM PORT, P/N 351 AND 1/4" BALL VALVE.
8. TOTALIZING METER.
9. GATE VALVE FOR CONTROL
11. UNION, SCH 80
12. 1" PVC SOUNDING TUBE
13. SAMPLE PORT

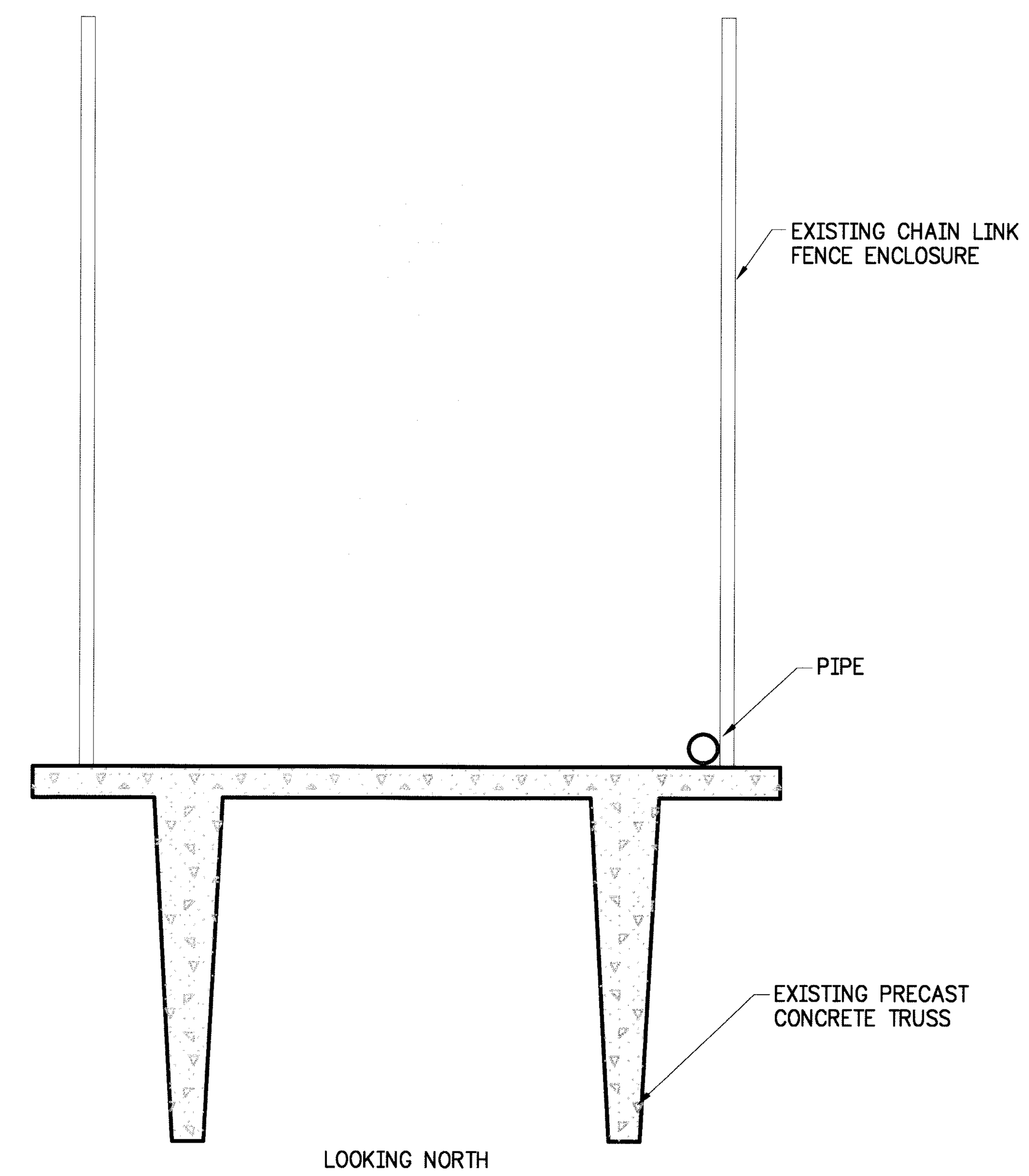
5 EXTRACTION WELL COMPLETION
NTS



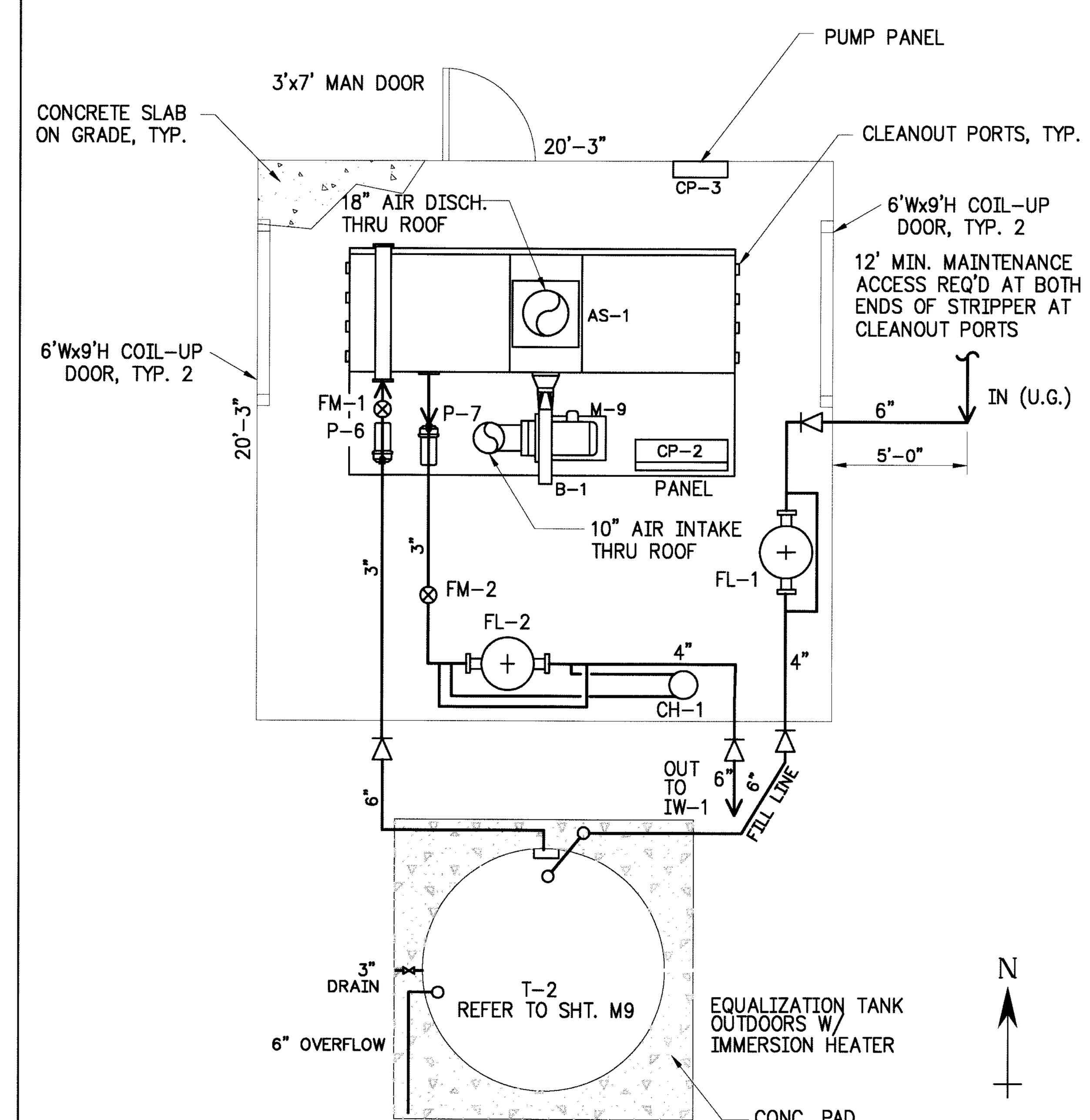
NOTE:
WELL ASSEMBLY INSTALLED IN A SUB-SURFACE VAULT w/LID. CHRISTY P/N B3048BOX AND B3048-63JH.

NOTES:
1. WELL ASSEMBLY INSTALLED IN A SUB-SURFACE VAULT w/LID.
2. PROVIDE 2" FLOW RESTRICTOR BY RED VALVE CO.

6 INJECTION WELL COMPLETION
NTS



7 CHANNEL CROSSING-SECTION
NTS



8 GWEX TREATMENT COMPOUND PLAN
NTS

REVISION HISTORY			
No.	BY	DATE	DESCRIPTION
1	PDM	2/21/05	REVISIONS PER SUBMITTALS
2	WT	12/05/05	AS-BUILTS
3	RZ	5/18/06	AS-BUILTS

SCALE:	NONE	DATE
DWG BY:	AGR	8/30/04
APPRV'D BY:	PDM	2/15/05

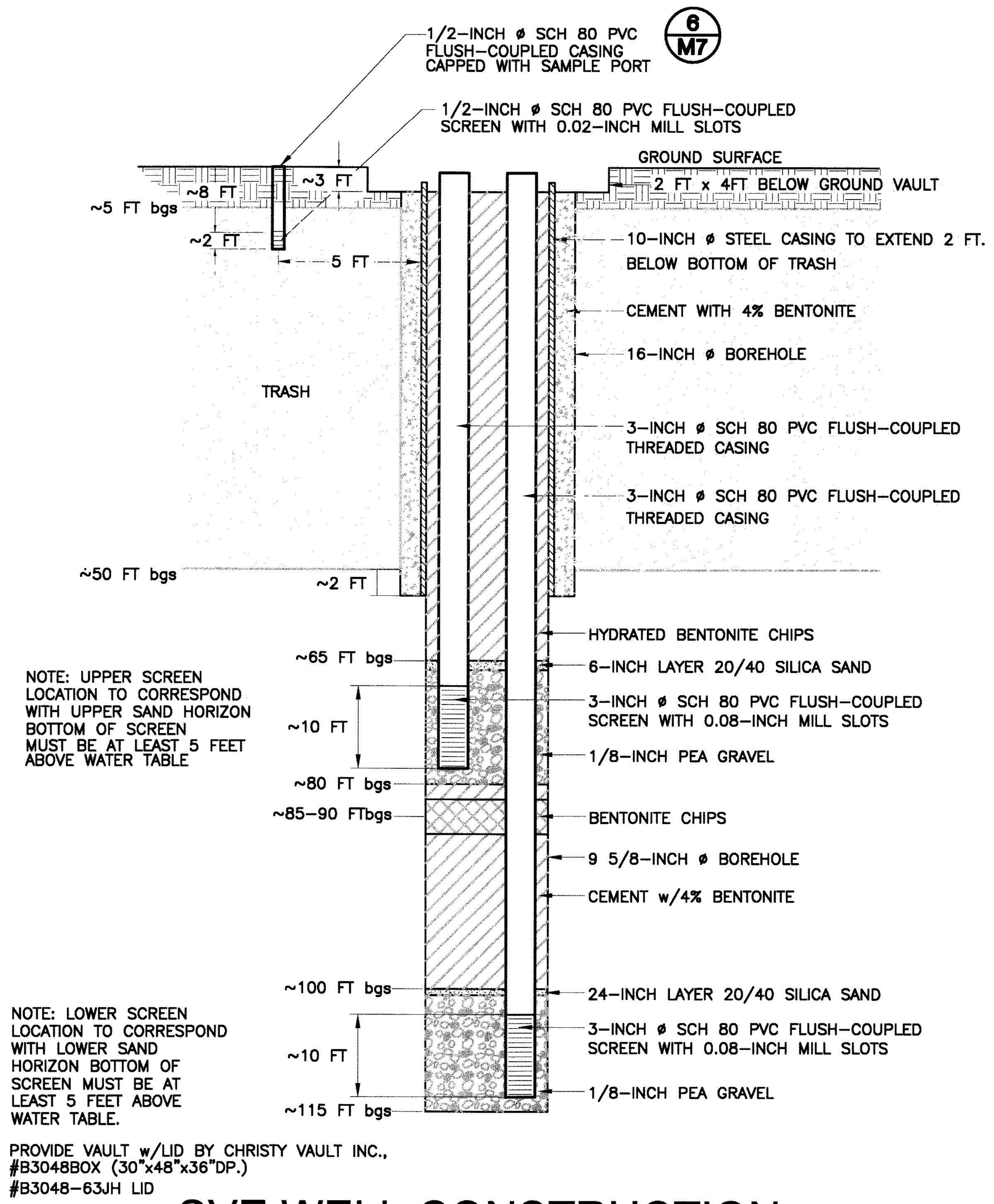
HYDRO GEO CHEM, INC.

CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

MECHANICAL DETAILS - 1

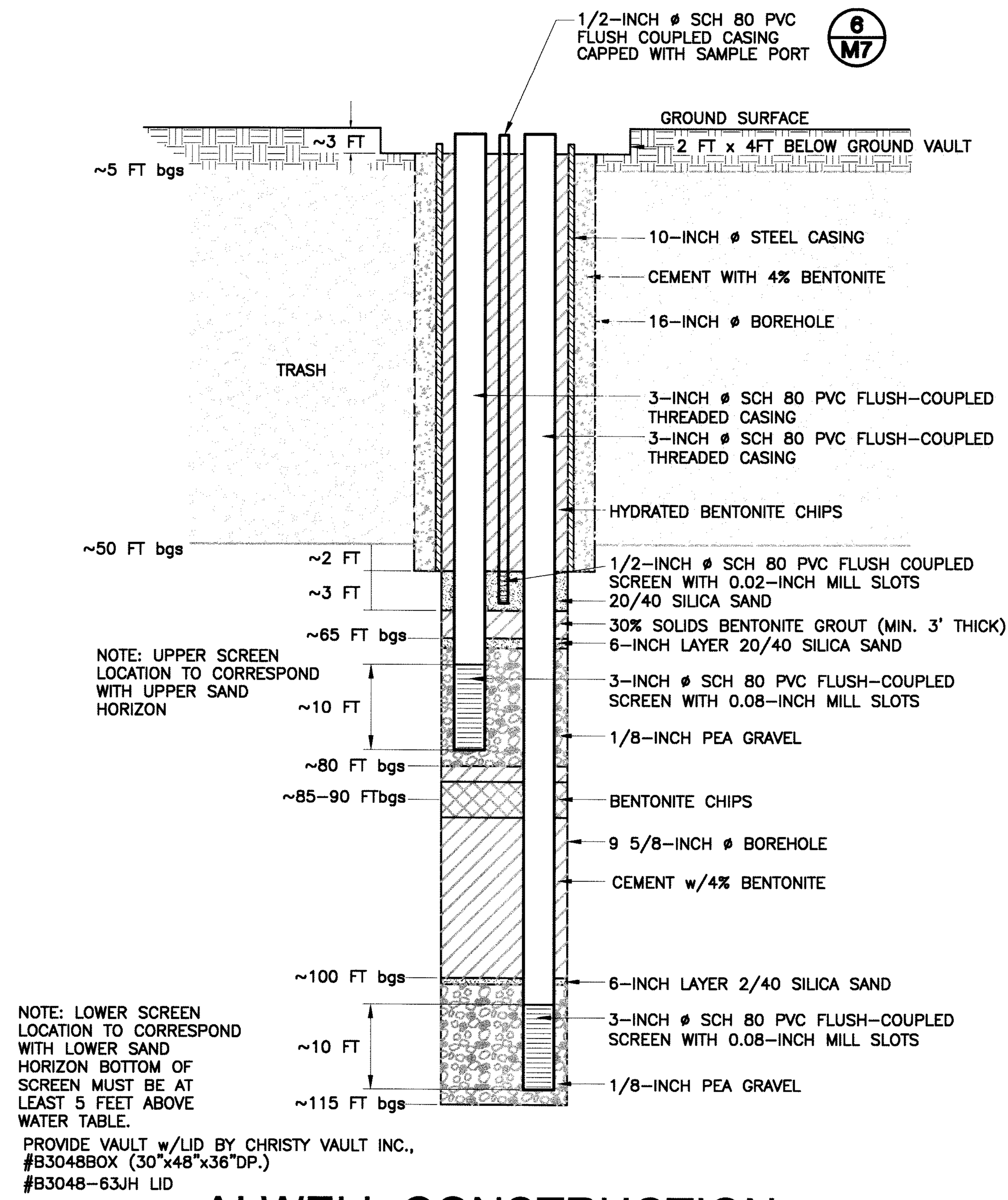
REFERENCE No. 7531021A
REVISION 1
DRAWING No. M6

K:\753100\AS-BUILTS 5-06\7531021A.dwg (alvinr) M6 18May2006 - 3:24 PM



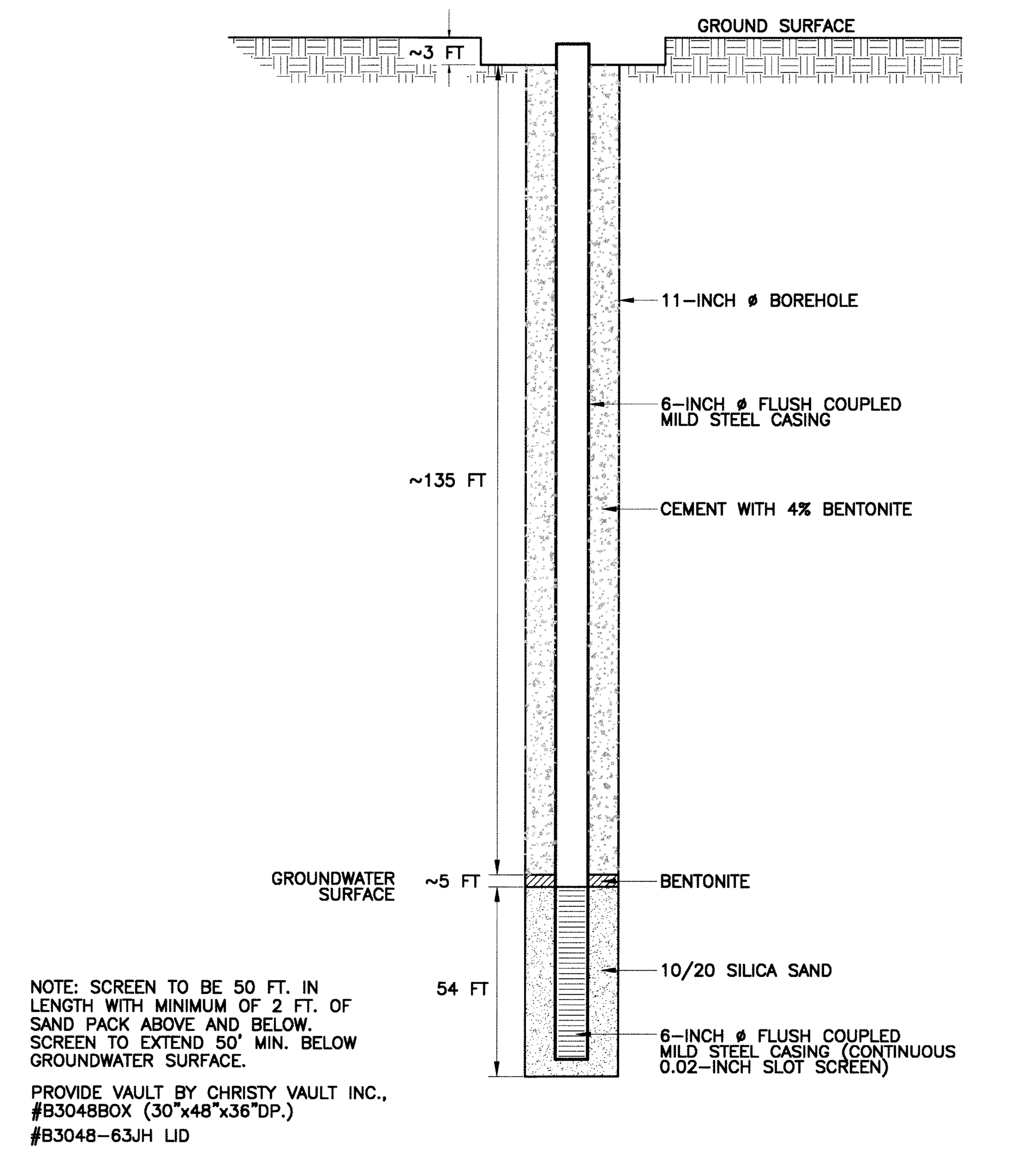
1 SVE WELL CONSTRUCTION

NTS



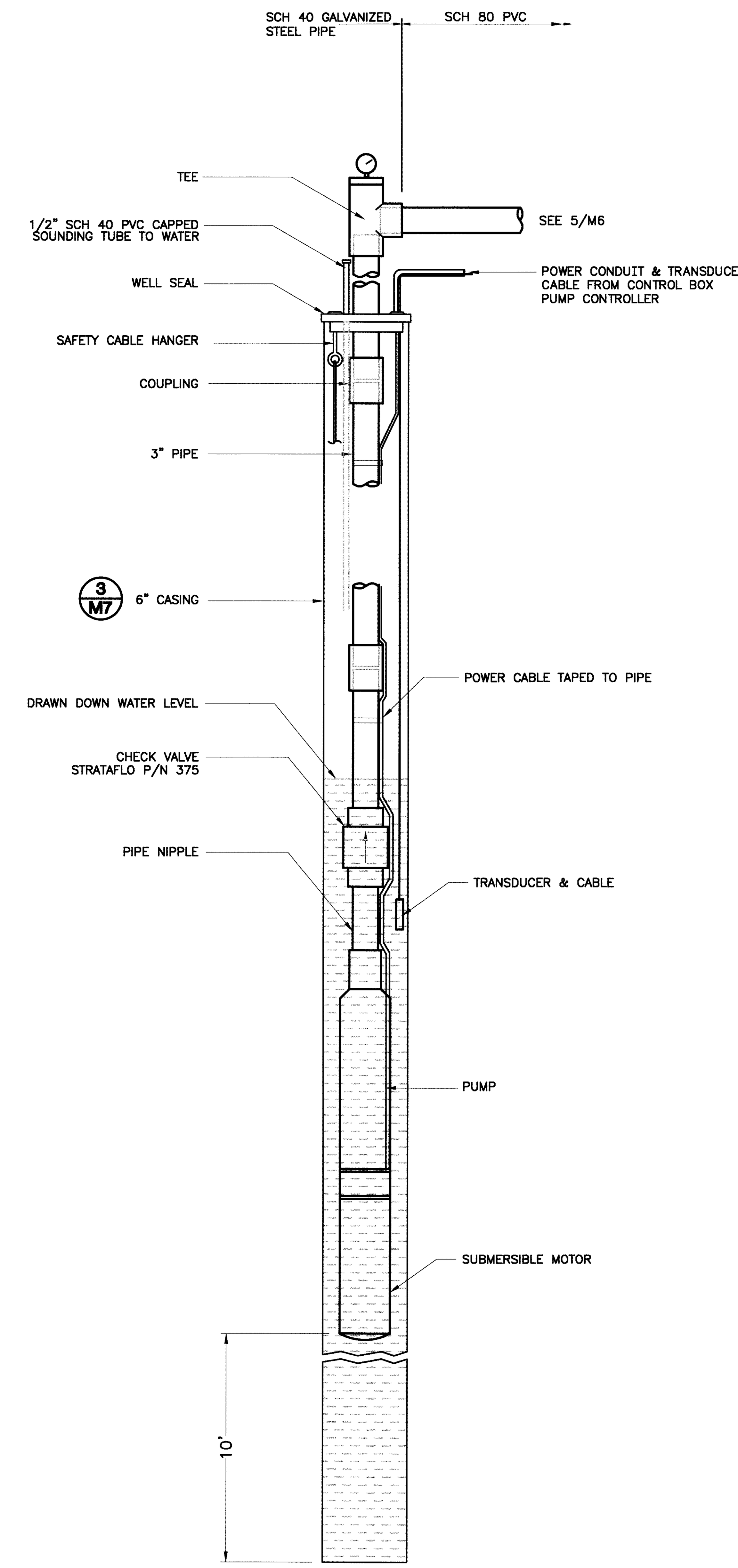
2 AI WELL CONSTRUCTION

NTS



3 EXTRACTION WELL CONSTRUCTION

NTS

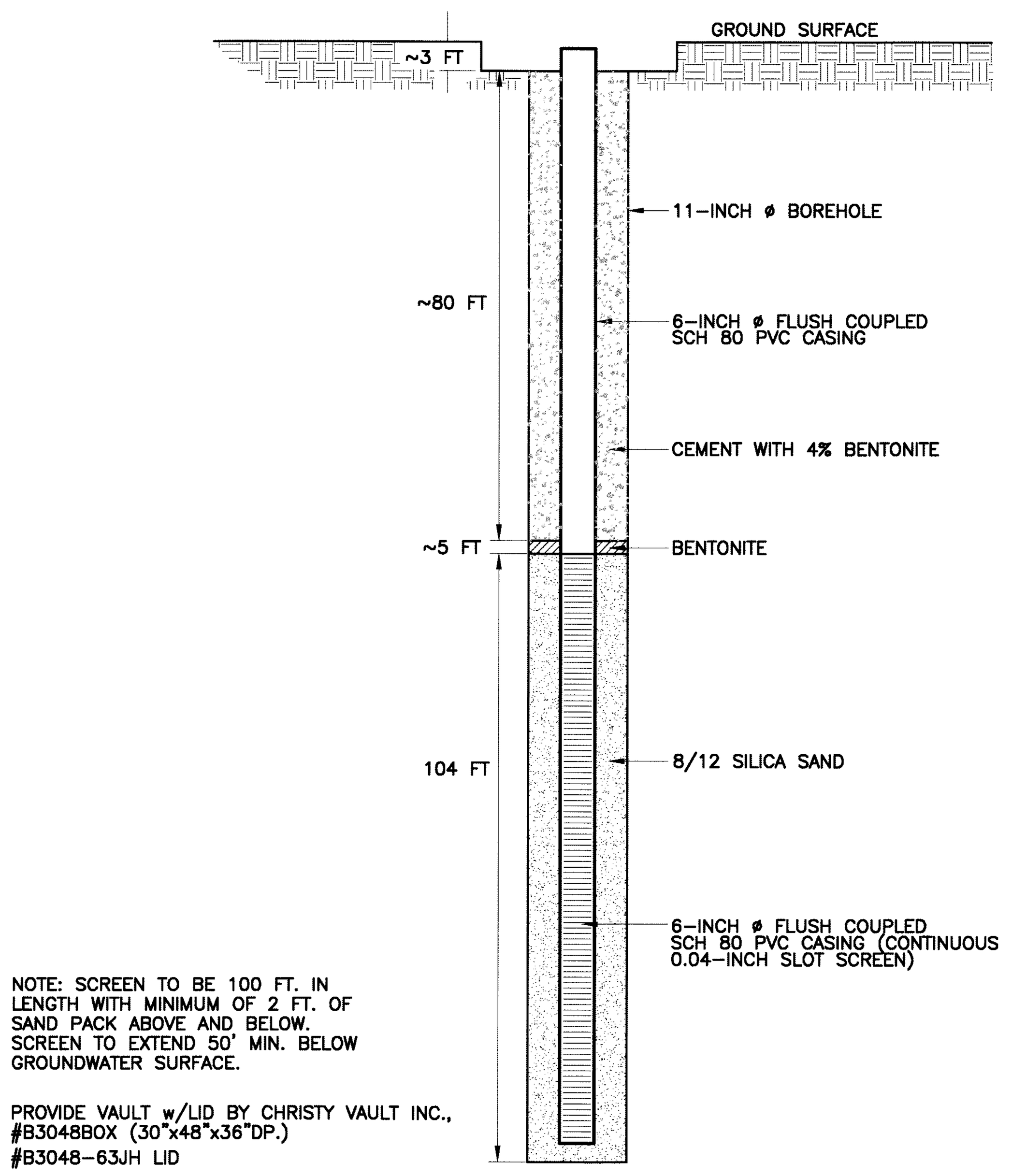


SUBMERSIBLE PUMP PERFORMANCE SCHEDULE						
FLINT & WALLING "4F" SERIES (1)						
MODEL (1) (2)	HP	STAGES	DISCHARGE PSI AT GRADE ELEV.	DEPTH TO PUMP SET IN FT./ CAPACITIES IN GPM		
				140'	160'	180'
75S75-12	7 1/2	10	0	118	112	106
			20 (1)	92	87	83
			40	82	77	72

NOTES:
1. BASIS OF DESIGN ONLY. PUMP SELECTION TO BE DETERMINED BY WELL PRODUCTION TESTING.
2. PROVIDE 460V/3PH MOTOR No. 137472 PROVIDE CONTROL BOX & MAGNETIC STARTER No. 139325.

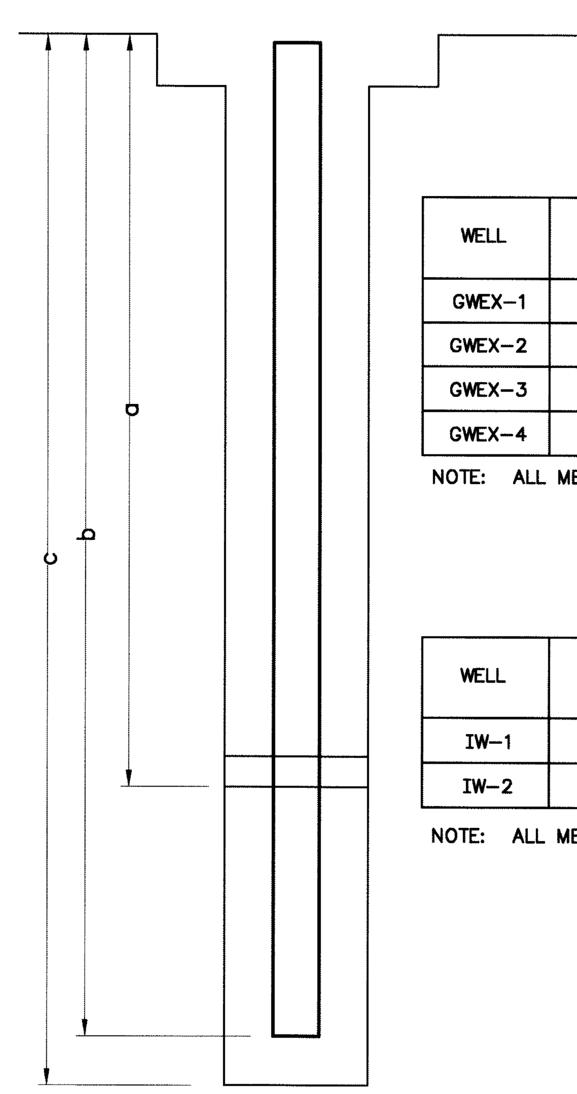
4 GROUNDWATER PUMP INSTALLATION

NTS



5 INJECTION WELL CONSTRUCTION

NTS



EXTRACTION WELLS

WELL	a SCREEN TOP	b CASING DEPTH	c BOREHOLE DEPTH
GWEX-1	125	185	187
GWEX-2	130	180	195
GWEX-3	150	220	225
GWEX-4	156	206	215

NOTE: ALL MEASUREMENTS IN FEET BELOW LAND SURFACE.

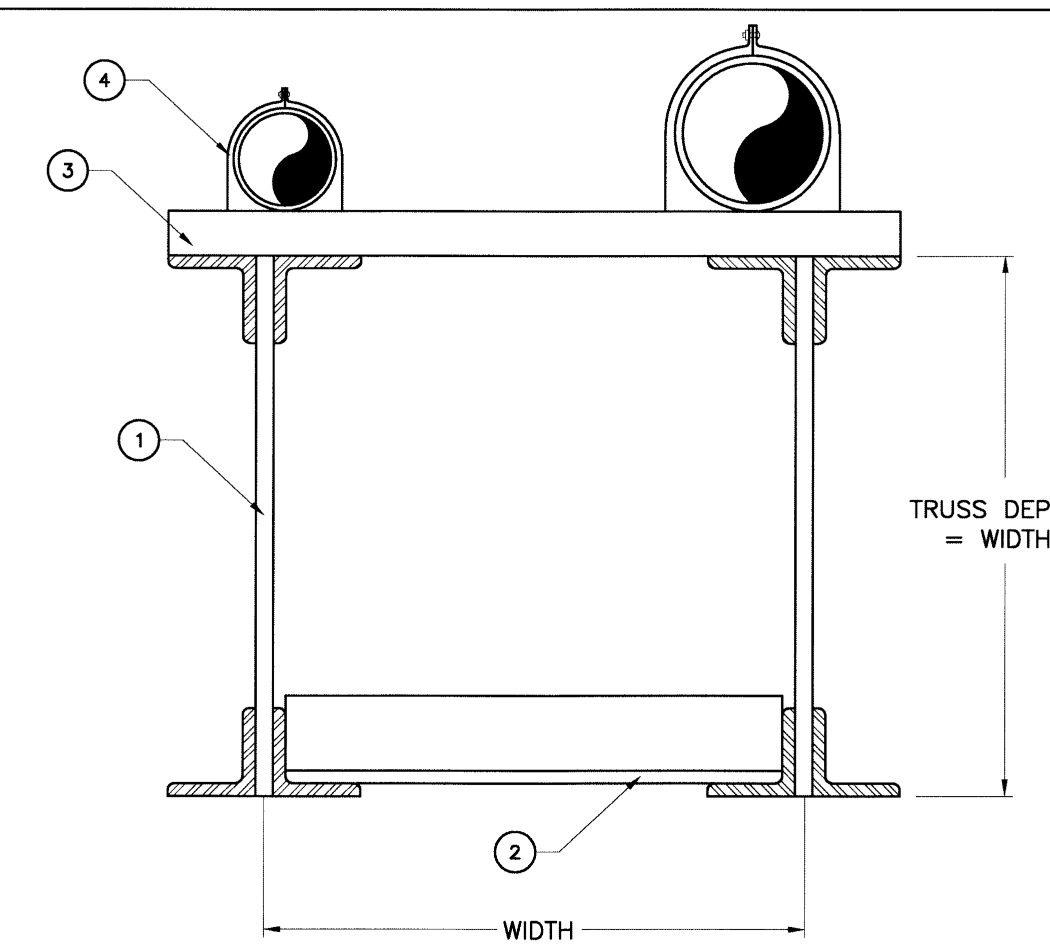
INJECTION WELLS

WELL	a SCREEN TOP	b CASING DEPTH	c BOREHOLE DEPTH
IW-1	113	213	225
IW-2	115	215	225

NOTE: ALL MEASUREMENTS IN FEET BELOW LAND SURFACE.

6 SVE SOIL GAS PROBE

NTS



KEYNOTES:

1. PROVIDE BRIDGE STRUCTURE USING 2 PRE-ENGINEERED TRUSSES AS SPAN MEMBERS. TRUSSES SIMILAR TO NUCOR-VULCRAFT "K" SERIES. FOR 48' SPAN, USE VULCRAFT "24K4".
2. CROSS BRACING OF AT LEAST 1½"x1½" ANGLE IRON, WELDED AT BOTTOM CHORD, BOTH SIDES, AND PERPENDICULAR TO TRUSS MEMBERS AT 4' O.C.
3. CROSS BRACING OF 1-5/8" 12 GA. STRUT, WELDED AT TOP CHORD, BOTH SIDES, AND PERPENDICULAR TO TRUSS MEMBER AT 4' O.C.
4. 4" AIR INJECTION AND 6" SVE PIPES, BOTH SCH. 80 PVC.

7 TRUSS SECTION - LALF

NTS

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
△	PDM	2/21/05	GEN'L REVISIONS
△	WT	12/12/05	AS-BUILTS
△	RZ	5/18/06	AS-BUILTS

		DATE
SCALE:	NONE	
DWG BY:	AGR	8/23/04
APPRV'D BY:	PDM	1/28/05

HYDRO GEO CHEM, INC.

CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

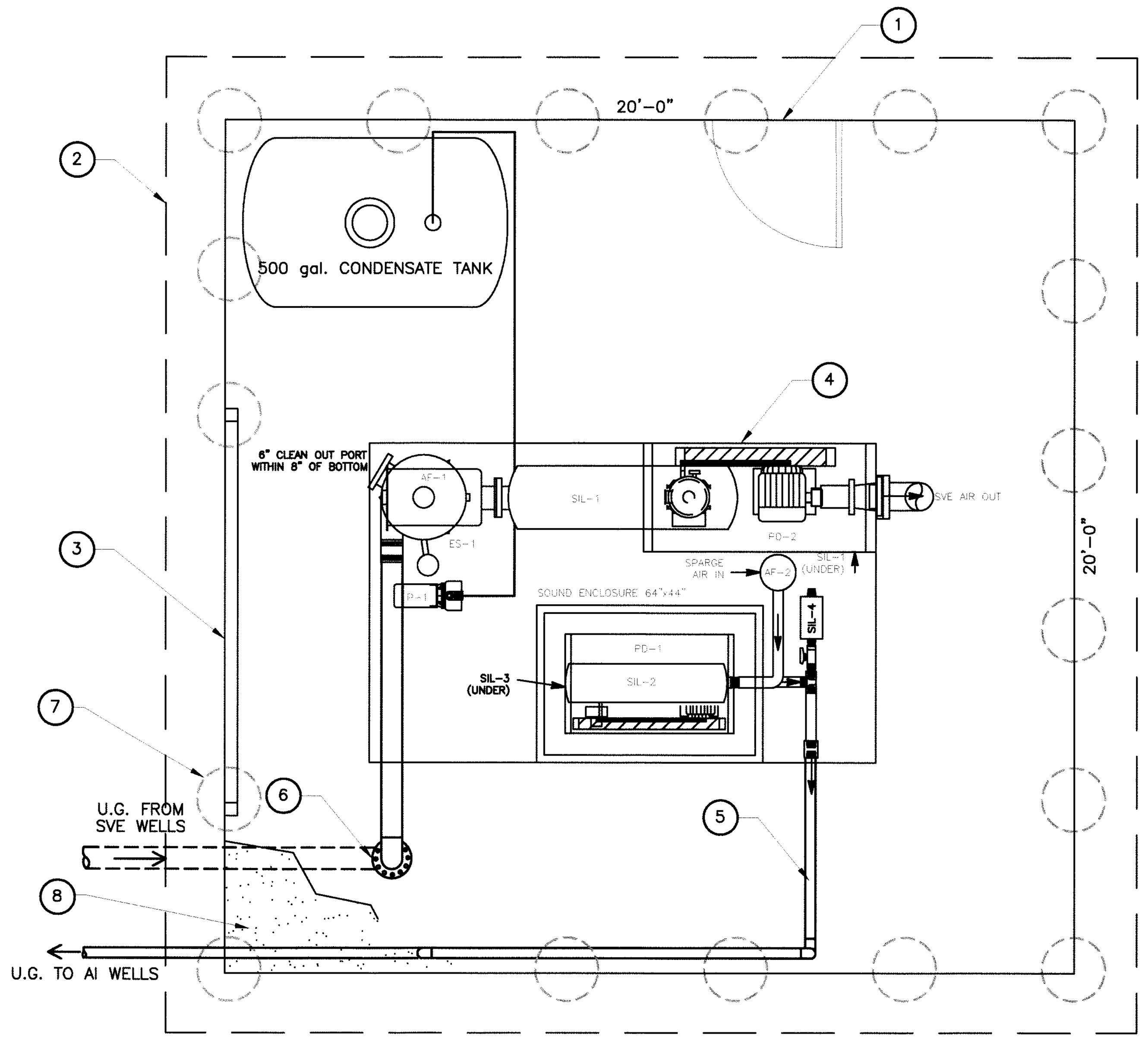
MECHANICAL DETAILS - 2

REFERENCE No. 7531027A

REVISION 1

DRAWING No. M7

K:\753100\AS-BUILTS 5-06\7531027a.dwg (alvinr) M7 18May2006 - 2:45 PM



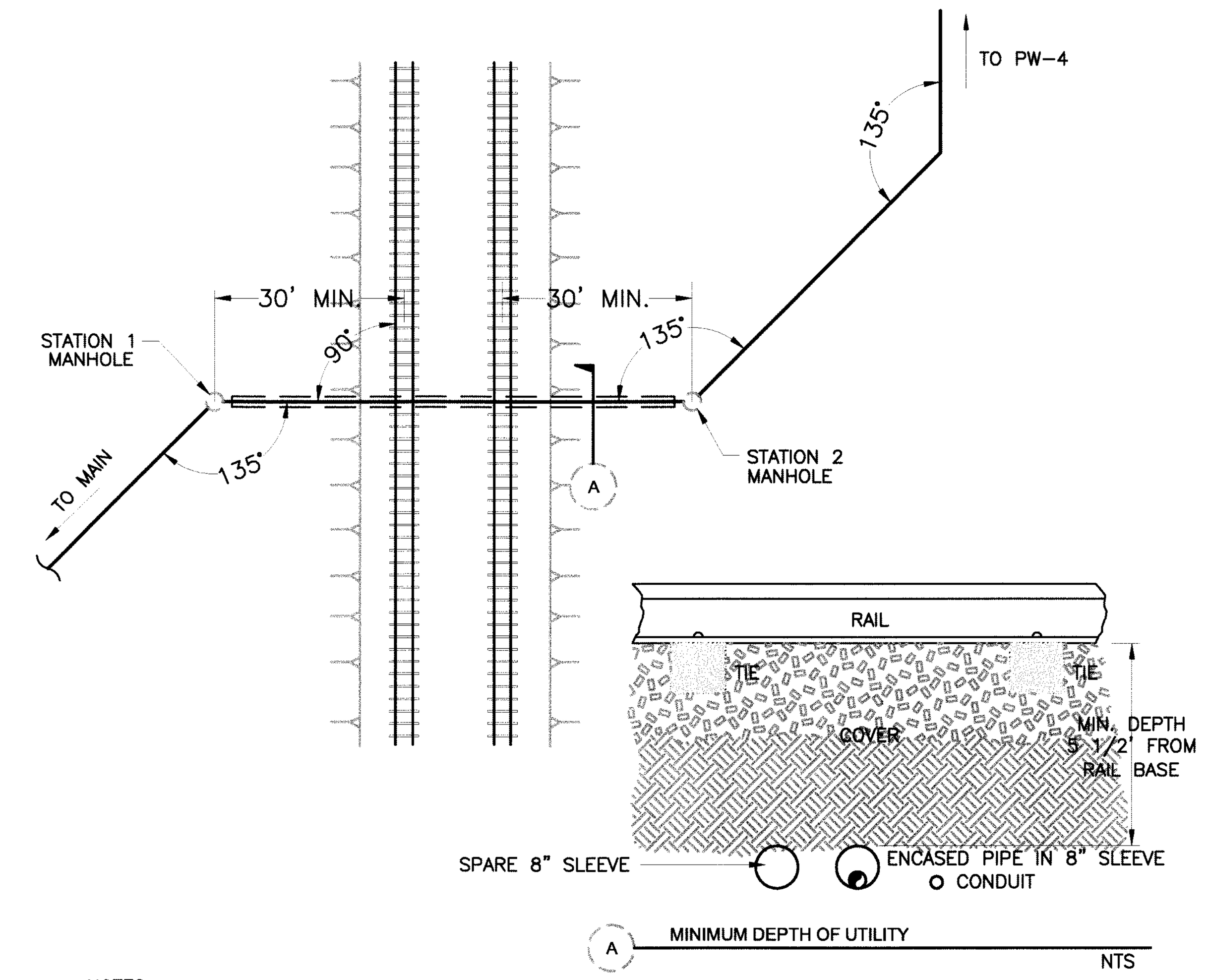
KEYNOTES:
1. MAN DOOR WITH LOCKSET.
2. 23' x 23' 60 MIL LLDPE LINER BY POLY-FLEX INC. BENEATH BUILDING. AVAILABLE FROM THE SNOW CO., ALBUQUERQUE, NM 505-345-3225
3. 9' W x 9' H COIL-UP DOOR.
4. 4" METAL SVE EXHAUST DUCT THRU ROOF.
5. STEEL HEAT EXHANGE PIPING.
6. FLANGE TRANSITION IN VERTICAL FROM HDPE TO PVC.
7. 18"ø x 18"ø DP. CONC. ANCHORS, @ 4' O.C.
8. -1" CRUSHED GRAVEL BASE, 6" MIN. DEEP.

N ←

0 1 2 3 4 5 10
SCALE IN FEET

1 LANDFILL TREATMENT COMPOUND

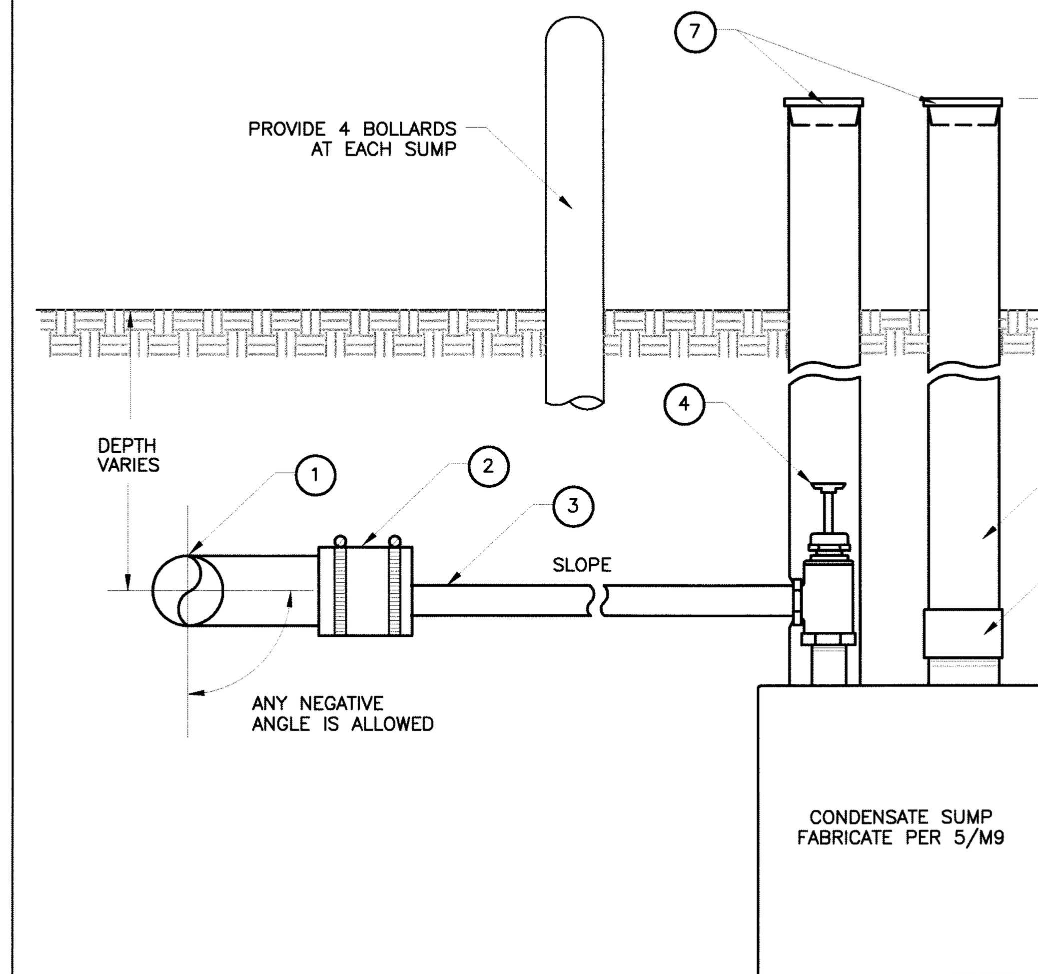
NTS



NOTES:
A. COMPLY WITH ALL R.R. CROSSING REQUIREMENTS FOR UNDERGROUND PIPELINE & ELECTRICAL UTILITIES PER SECTION 13100 BURLINGTON NORTHERN SANTA FE RAILWAY "UTILITY ACCOMMODATION POLICY."
B. METAL WATER PIPE CASING, SPARE SLEEVE, AND ELECTRICAL METAL CONDUIT SHALL EXTEND FROM STA. 1 TO STA. 2. PROVIDE MANHOLES AT BOTH STATIONS.
C. COATED METAL CASING SHALL BE OPEN AT BOTH ENDS. PROVIDE ACCESSIBLE EMERGENCY SHUT-OFF VALVES AT BOTH STATIONS.
D. PROVIDE OLDCASTLE PRECAST, UTILITY VAULT DIV., CHANDLER, AZ, MODEL 44-WA INCLUDING BASE #444-BW AND COVER #44-332P AT STATIONS 1 & 2.

2 R.R. CROSSING DETAIL - PNMR

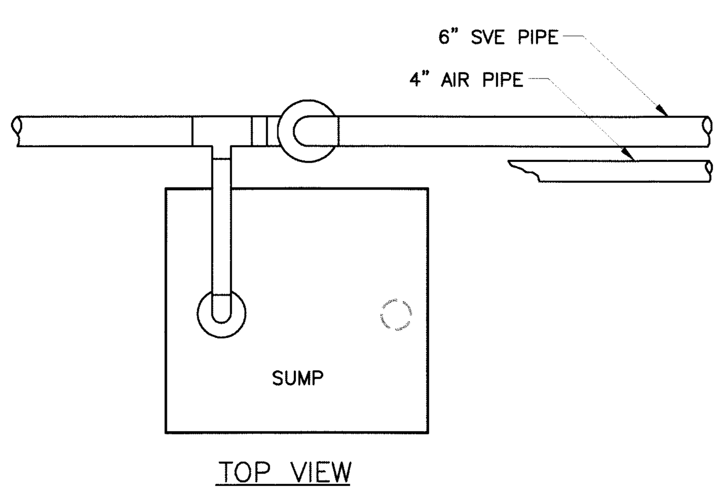
NTS



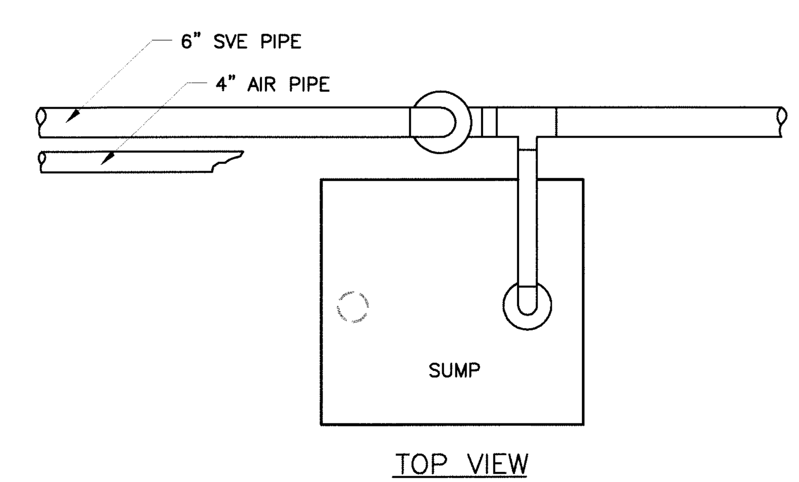
KEYNOTES:
1. EQUAL TEE, 6", 4", OR 3" IN BURIED & SLOPED SVE PIPING.
2. FERNCO ECCENTRIC REDUCER COUPLING, LINESIZE X 2".
   a. FOR 6" X 2" USE P/N 1056-62EB
   b. FOR 4" X 2" USE P/N 1056-42EB
   c. FOR 3" X 2" USE P/N 1056-32EB
3. 2" SCH. 80 PVC PIPE AND 2" SOC X MNPT ADAPTOR. SLOPE TOWARD SUMP, LENGTH AS REQUIRED.
4. 2" BRONZE ANGLE VALVE, NIBCO P/N T-381-WK. CUT HOLE IN RISER PIPE FOR 2" PIPE INLET TO VALVE. TO ASSEMBLE, INSERT PIPE INLET THROUGH HOLE SO RISER IS LOCKED INTO PLACE.
5. 6" SOC X FNPT PVC COUPLER.
6. 6" SCH. 40 PVC RISER, TYP. OF 2. RISER LENGTH AS REQUIRED.
7. 6" WELL SEAL, TYP. OF 2. MORRISON BROS. P/N 678XA-6".

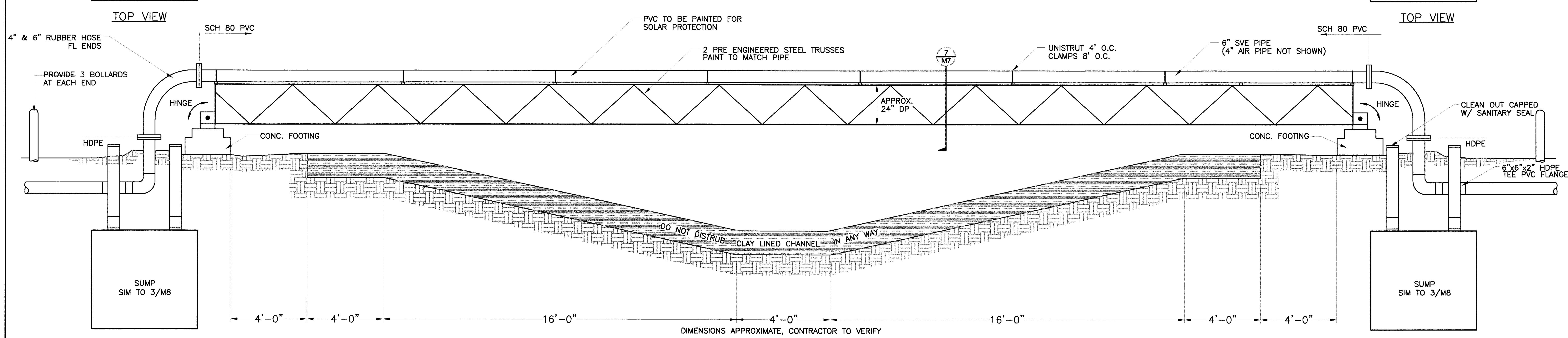
3 CONDENSATE SUMP - LALF

NTS



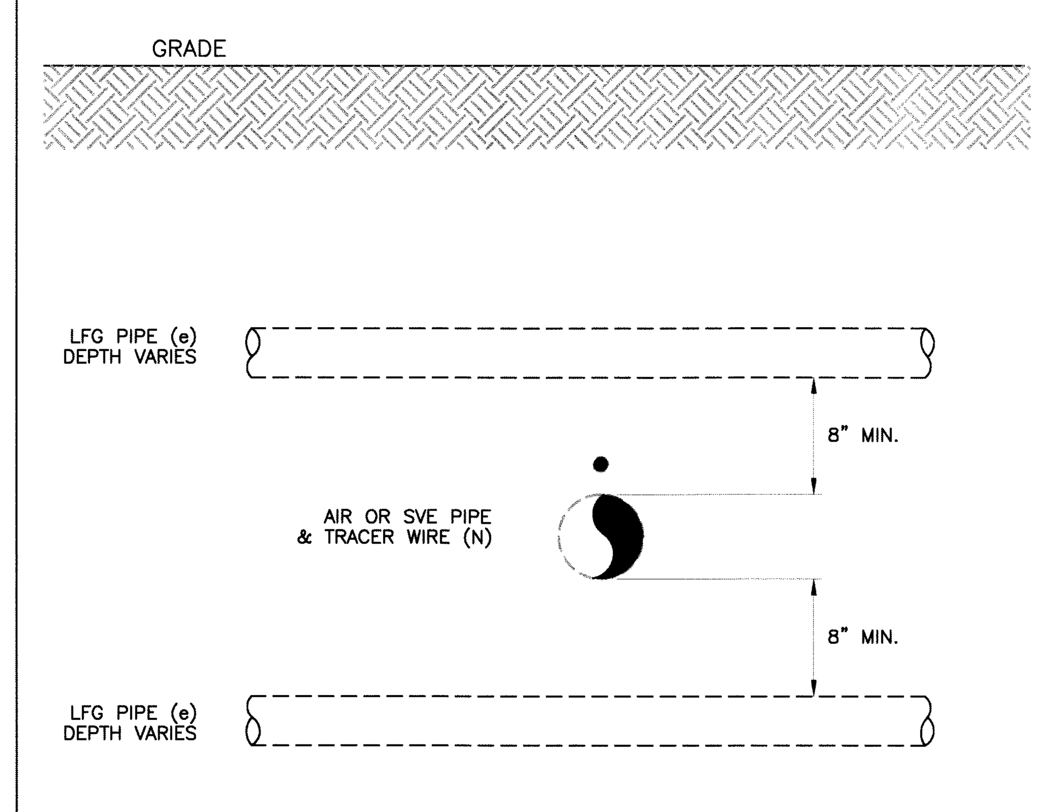
NOTES:
A. CONTRACTOR SHALL SUBMIT DETAILED SHOP DRAWINGS OF TRUSS ASSEMBLY PRIOR TO FABRICATION. INCLUDE DETAILS OF WELDMENTS, CONC. FOOTER, & MECHANICAL ANCHORING METHOD AT CONC. FOOTER. INCLUDE SUBMITTAL FOR RUBBER HOSE WITH INTERGRAL FLANGE ENDS.
B. CHANNEL'S CLAY LINER AND ITS KEYED JOINT EDGES (NOT SHOWN) ARE NOT TO BE DISTURBED IN ANY WAY. NO STRUCTURE MAY BE IN CONTACT WITH CLAY LINER.
C. TRUSS ASSEMBLY AND PIPING MUST BE REMOVABLE FROM ANCHORS SHOULD CLIFFORD CHANNEL REQUIRE MAINTENANCE.
D. TRUSS ASSEMBLY SHALL BE HINGED TO ACCOMODATE UNEVEN SETTLING.
E. COMPLETED TRUSS ASSEMBLY SHALL BE PRIMED WITH A RUST-INHIBITING PRIMER PRIOR TO PAINTING.





4 CLIFFORD CHANNEL CROSSING, LOOKING EAST - LALF

NTS



NOTE:
DETERMINE DEPTH OF LFG PIPE PRIOR TO ESTABLISHING INVERTS OF SLOPED PIPING.

5 LALF LFG XING

NTS

K:\753100\AS-BUILTS 7-05\7531029a.dwg (alvinr) M8 05Dec2005 - 3:07 PM

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
1 (triangle)	PRM	2/21/05	REVISIONS
	WT	12/05/05	AS BUILTS

		DATE
SCALE:	NONE	
DWG BY:	CD	8/23/04
APPRV'D BY:	PMD	8/23/04

HYDRO GEO CHEM, INC.

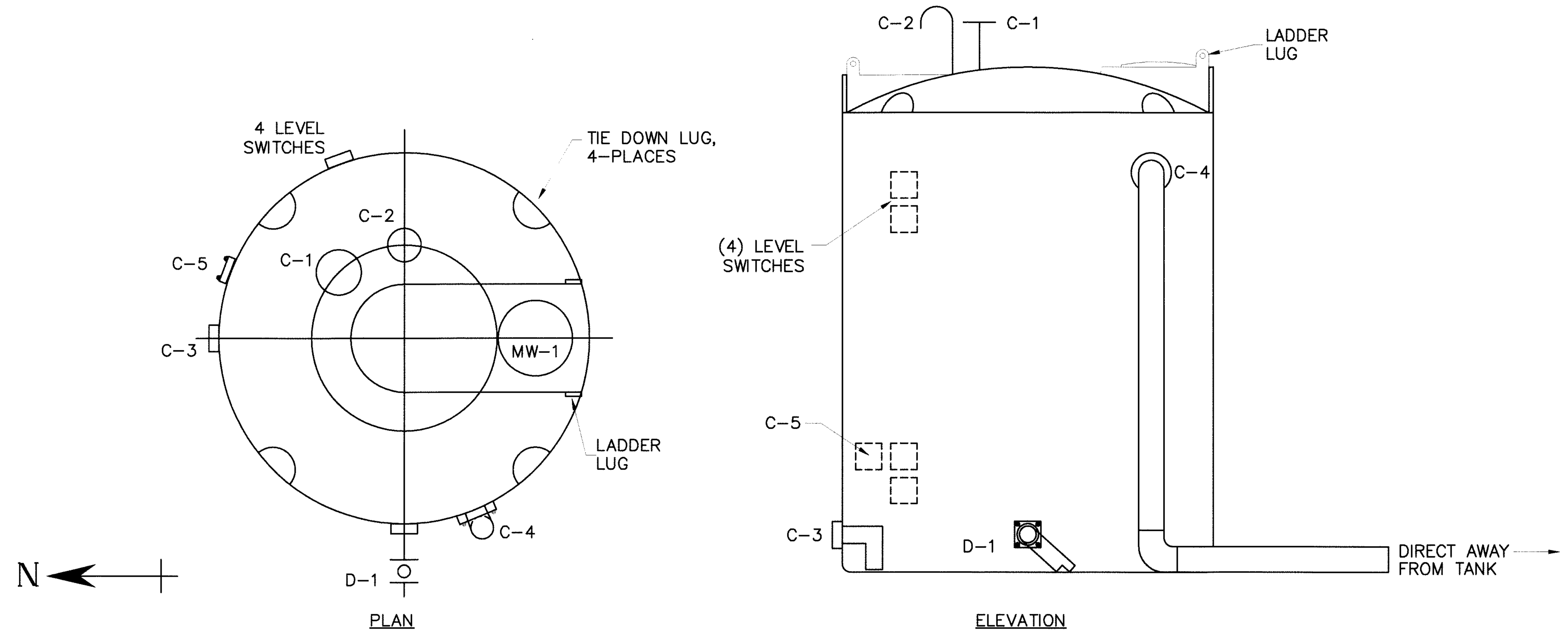
CITY OF ALBUQUERQUE - LOS ANGELES LANDFILL

MECHANICAL DETAILS - 3

REFERENCE No. 7531029A

REVISION 1

DRAWING No. M8



MARK	FITTING NAME	SIZE, INCHES	CONN. TYPE	FITTING MATERIAL	GASKET MATERIAL	REMARK
C-1	WATER INLET	6"	FL	PVC	BUNA OR EPDM	
C-2	VENT, U TYPE	6"	FNPT	PVC	BUNA OR EPDM	PROVIDE U-VENT WITH FINE BIRD SCREEN
C-3	WATER OUTLET	6"	FL	PVC	BUNA OR EPDM	PROVIDE PVC SIPHON TUBE
C-4	OVERFLOW	6"	FNPT	PVC	BUNA OR EPDM	DIRECT OVERFLOW AWAY FROM COMPOUND
C-5	IMMERISON HEATER	2"	FNPT	PVC	BUNA OR EPDM	INSTALL 18" UP FROM TANK BOTTOM (SEE NOTE A)
LSLL-1	LEVEL SWITCH	1"	FNPT	PVC	BUNA OR EPDM	TO ACTUATE ABOVE SUCTION LEVEL (SEE NOTE B)
LSL-2	LEVEL SWITCH	1"	FNPT	PVC	BUNA OR EPDM	(SEE NOTE B)
LSH-2	LEVEL SWITCH	1"	FNPT	PVC	BUNA OR EPDM	(SEE NOTE B)
LSHH-3	LEVEL SWITCH	1"	FNPT	PVC	BUNA OR EPDM	TO ACTUATE BELOW OVERFLOW (SEE NOTE B)
D-1	DRAIN	3"	FNPT	PVC	BUNA OR EPDM	PROVIDE 3" PVC DRAIN VALVE & PLUG, SIPHON TUBE
MW-1	MANWAY	REMARK	---	PE	BUNA OR EPDM	18" MINIMUM

NOTE: ANY BOLTS INSTALLED ON ANY TANK SHALL BE 316L STAINLESS STEEL

NOTES:

A.) IMMERSION HEATER: 5,000 WATT, 240VAC, TANK HEATER WITH 26 7/8" COPPER SHEATHED ELEMENT, 2" NPT MOUNTING, AND ADJUSTABLE THEROSTAT CONTROL (RANGE 60 DEG. F TO 250 DEG. F). VULCAN MODEL #AUW250-240 OR EQUAL.

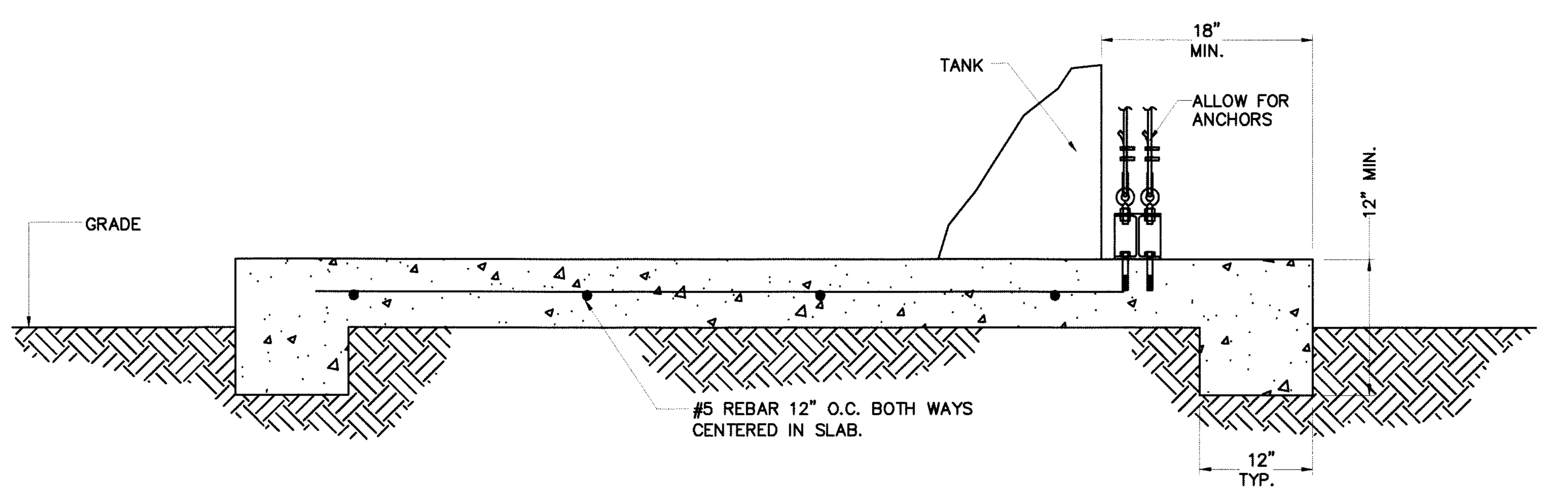
B.) LEVEL SWITCHES: NEMA 4 REATED SINGLE POINT LIQUID LEVEL SWITCHES, WITH BRASS HOUSING, 304SS FLOAT, ADJUSTABLE SWITCH POINT, 3/4" NPT MOUNTING, 230 PSIG MAX. WORKING PRESSURE, AND CONTACT RATING OF 1.5 AMPS AT 250 VAC, KOBOLD MODEL #NV-5103 OR EQUAL.

1 TANK FITTING SCHEDULE - T2 - PNMR

SITE	TANK TAG	CONTENTS	CONTENTS SPECIFIC GRAVITY	NOMINAL CAPACITY GAL.	DIAMETER FT./IN	HEIGHT FT./IN	MATERIAL	COLOR	NOTES
LALF	T-1	SVE CONDENSATE	1	550	5'-4"/64"	3'-10"/46"	HDLPE	NATURAL	2,3,5,7
PNMR	T-2	GROUNDWATER	1	4,500	8'-6"/102"	11'-9"/141"	HDLPE	NATURAL	1,2,3,4,5,6,7

NOTES
1. FLAT BOTTOMED, CLOSED TOP, ROUND VERTICAL INDUSTRIAL STORAGE TANK AS MFG. BY SNYDER-CROWN INDUSTRIAL PRODUCTS.
2. HDLPE = HIGH DENSITY LINEAR POLYETHYLENE.
3. TIE DOWN SUPPORT LUGS REQUIRED ON TANK FOR ANCHORING.
4. CONCRETE PAD AND EMBEDDED TIE DOWN ANCHORS REQUIRED.
5. TANKS SHALL BE PAINTED WITH A HEAVILY PIGMENTED, EXTERIOR WATER-BASED LATEX PAINT, OFF-WHITE COLOR, FOR UV EXPOSURE PROTECTION.
6. TANKS SHALL BE LEAK TESTED PRIOR TO ACCEPTANCE.
7. DIMENSIONS GIVEN ARE BASIS OF DESIGN ONLY, CONTRACTOR TO VERIFY.

2 TANK SCHEDULE - PNMR & LALF

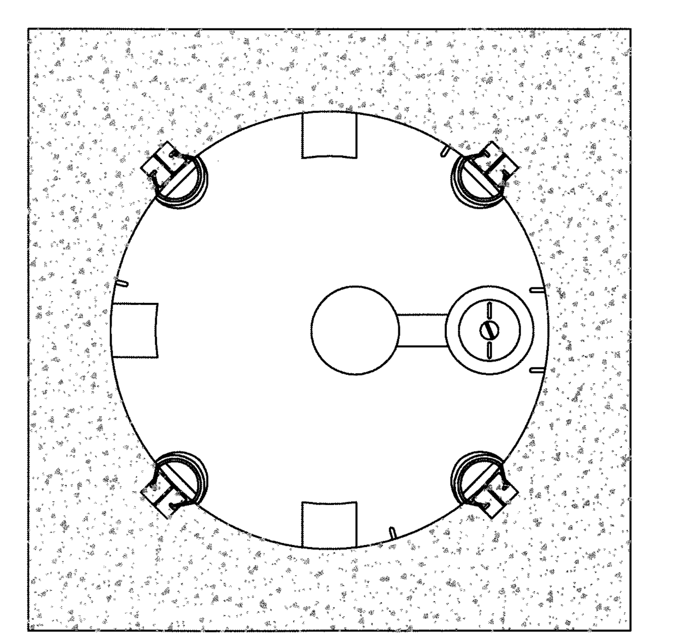


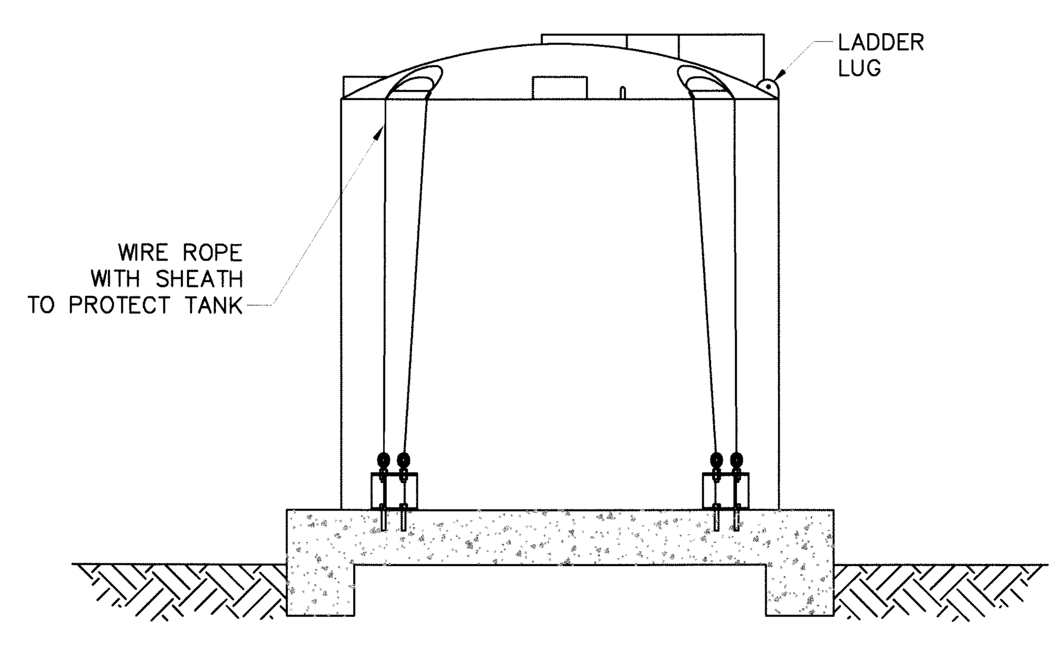
TYPICAL CROSS SECTION THRU CONCRETE PAD

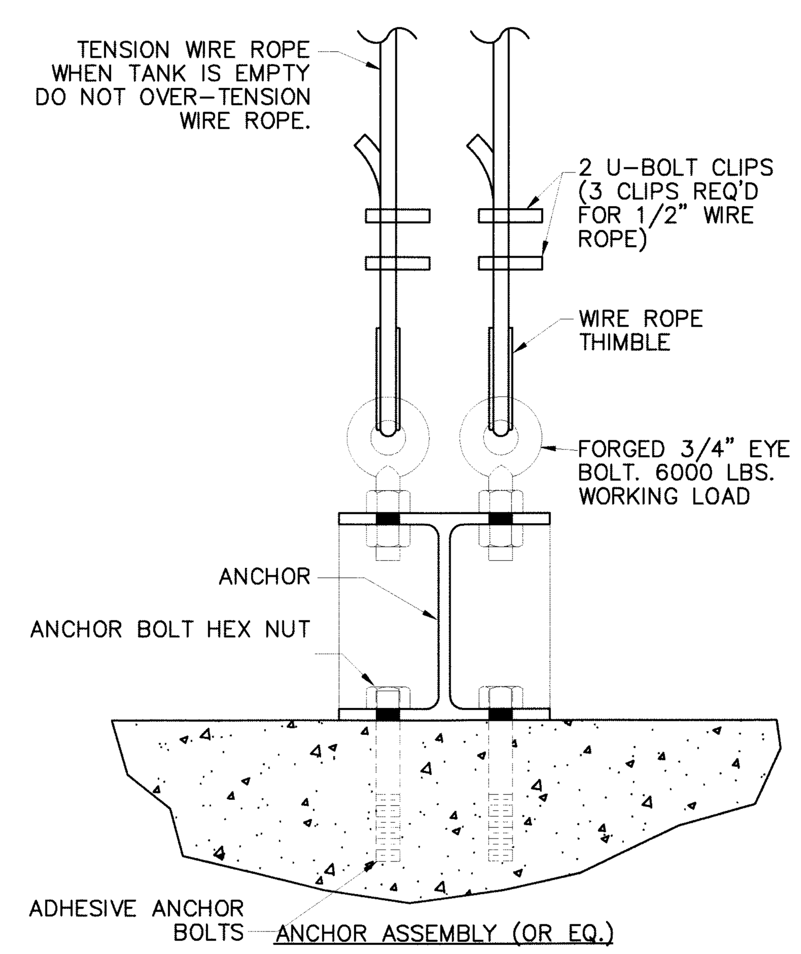
CONSTRUCTION NOTES:

1. CONCRETE PAD SHALL BE POURED IN PLACE ON FIRM COMPACTED NATIVE MATERIAL OR ON ENGINEERED FILL WHICH HAS BEEN COMPACTED AT LEAST TO THE REQUIREMENTS OF NOTE 4.
2. THE AREA UNDER THE PAD SHALL BE EXCAVATED TO THE REQUIRED GRADE, OR TO A DEPTH NECESSARY TO REACH FIRM, UNDISTURBED MATERIAL, WHICHEVER IS DEEPER. THE MATERIAL CAN BE CONSIDERED FIRM IF IT CANNOT BE PENETRATED BY THUMB EXCEPT WITH MODERATE EFFORT.
3. IF FIRM MATERIAL HAS NOT BEEN REACHED WITHIN A DEPTH OF 3 FEET, EXCAVATE 3 FEET BEYOND THE PERIMETER OF THE PAD AND BACKFILL THE ENTIRE EXCAVATED AREA TO THE REQUIRED GRADE AND TO THE REQUIREMENTS OF NOTE 4.
4. IN CASE IT HAS BEEN NECESSARY TO EXCAVATE DEEPER THAN THE REQUIRED GRADE TO REACH FIRM MATERIAL, BACKFILL TO THE REQUIRED GRADE IN ONE OF THE FOLLOWING WAYS:
   A. BACKFILL WITH CLEAN, NON-EXPANSIVE SOIL COMPACTED TO 90% OF MAXIMUM DENSITY. SOIL SHALL BE PLACED IN LAYERS NOT MORE THAN 8 INCHES THICK BEFORE COMPACTION. MAXIMUM DENSITY AND IN-PLACE DENSITY IS TO BE DETERMINED BY ASTM D-1556 AND D-1557 RESPECTIVELY.
   B. BACKFILL WITH SOIL-CEMENT SLURRY CONSISTING OF ONE SACK OF PORTLAND CEMENT PER CUBIC YARD OF CLEAN NATIVE SOIL OR SAND.
5. CONCRETE SHALL BE DESIGNED TO ATTAIN A STRENGTH OF 2,500 LBS. PER SQ. INCH (PSI) AT 28 DAYS. SLUMP FOR CONCRETE PLACEMENT SHALL NOT EXCEED 3 INCHES .
6. THE SURFACE OF THE PAD SHALL BE LEVEL AND FLAT. WOOD-FLOAT OR LIGHT BROOM FINISH THE TOP OF THE SLAB. FINISH ALL EXPOSED EDGES WITH A FINISHING TOOL. VERTICAL EDGES SHALL HAVE A 3/4 INCH CHAMFER. MOIST CURE CONCRETE FOR AT LEAST 7 DAYS AFTER POURING.
7. THE AREA 3 FEET DEEP AND 12 INCHES HORIZONTALLY AROUND THE PAD SHALL BE FREE OF ALL FOREIGN SUBSTRUCTURES.

3 CONCRETE PAD DETAIL - PNMR





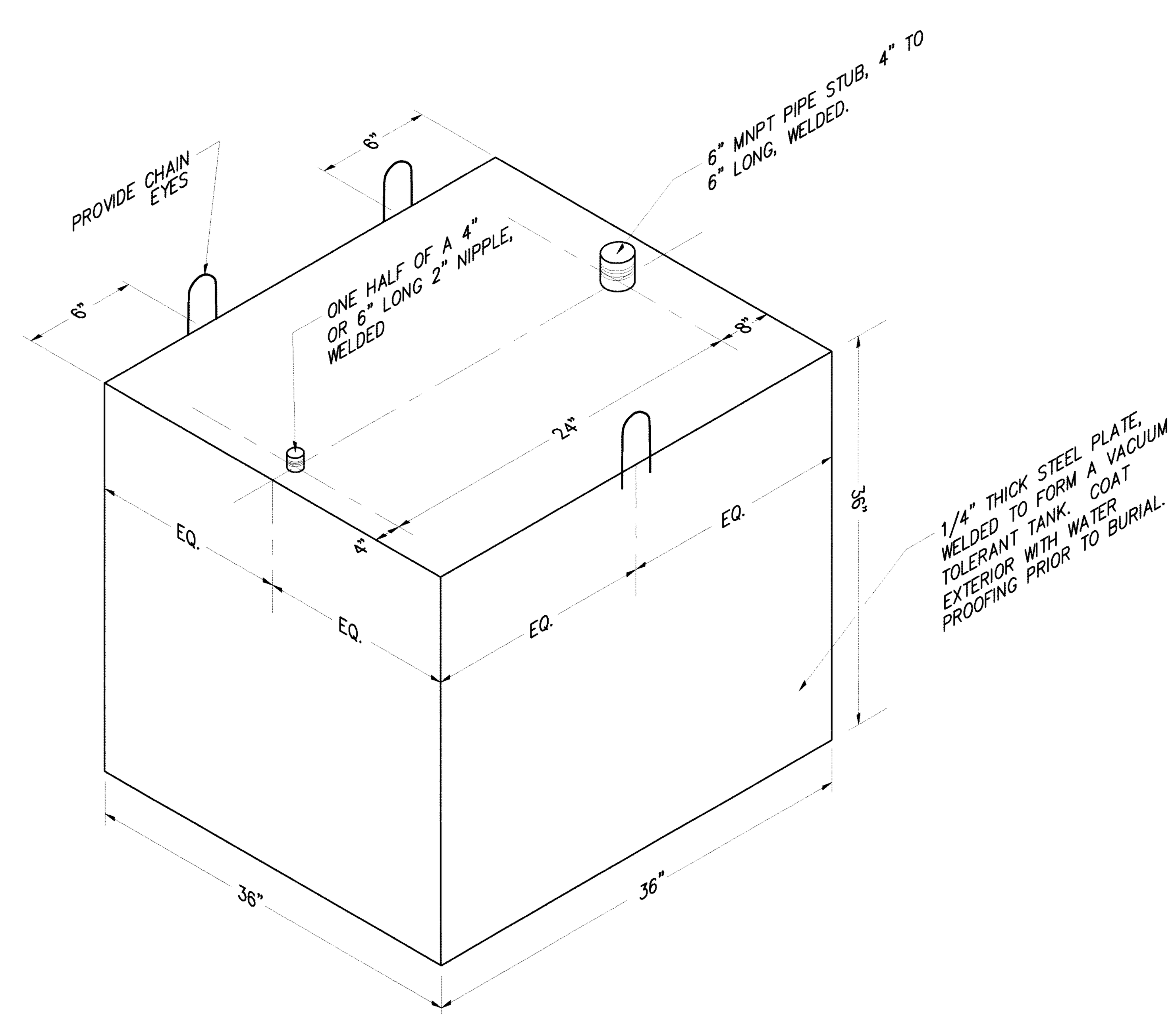


NOTES

A. PROVIDE WIND RESTRAINT SYSTEM RECOMMENDED BY TANK MANUFACTURER. INSTALL PER MANUFACTURER'S DIRECTIONS.

B. TANK PORTS AND FITTINGS MAY HAVE SPECIFIED COMPASS ORIENTATION RELATIVE TO MAGNETIC OR PLAN NORTH. CONFIRM TANK ORIENTATION WITH PIPING DRAWINGS PRIOR TO SETTING TANK.

4 WIND TANK RESTRAINT DETAIL - PNMR



5 CONDENSATE/SUMP TANK

REVISION HISTORY			
No.	BY	DATE	DESCRIPTION
1	PDM	2/21/05	REVISIONS
	WT	12/05/05	AS-BUILTS

SCALE: NONE		DATE
DWG BY:	AGR	8/23/04
APPR'V'D BY:	PDM	1/28/05

HYDRO GEO CHEM, INC.

CITY OF ABUEQUERQUE - LOS ANGELES LANDFILL

MECHANICAL DETAILS - 4

REFERENCE No. 7531030A

REVISION 1

DRAWING No. M9

K:\753100\AS-BUILTS 7-05\7531030A.dwg (alvinr) M9 05Dec2005 - 3:10 PM

DRAWING ABBREVIATIONS

ABBR.	MEANING
ACB	AIR CIRCUIT BREAKER
AL	ALUMINUM
AC	ALTERNATING CURRENT
AWG	AMERICAN WIRE GAUGE
A	AMPERE
ANN	ANNUNCIATOR
ANSI	AMERICAN NATL. STANDARDS INSTITUTE
AF	AUDIO FREQUENCY
AIC	AMPS INTERRUPTING CAPACITY
AUTO	AUTOMATIC
AUX	AUXILIARY
BKR	BREAKER
BTU	BRITISH THERMAL UNITS
BLDG	BUILDING
CP	CANDLEPOWER
CKT	CIRCUIT
MCM	CIRCULAR MILS, THOUSANDS
CR	CONTROL RELAY
CCW	COUNTER CLOCKWISE
CT	CURRENT TRANSFORMER
CU	COPPER
CUST	CUSTOMER
(°) DEG	DEGREE
DM	DEMAND METER
DC	DIRECT CURRENT
DWG	DRAWING
EL	ELEVATION
ENGR	ENGINEER
EST	ESTIMATE
F	FAHRENHEIT
FCC	FEDERAL COMMUNICATIONS COMMISSION
(') FT	FOOT
FC	FOOT CANDLE
FREQ	FREQUENCY
FM	FREQUENCY MODULATION
UHF	FREQUENCY, ULTRA HIGH
VHF	FREQUENCY, VERY HIGH
GEN	GENERATOR
GOV	GOVERNOR
GRD	GROUND
Hz	HERTZ
HIPOT	HIGH POTENTIAL TEST
HV	HIGH VOLTAGE (100 TO 242kV)
HP	HORSEPOWER
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
(") IN	INCH
INTLK	INTERLOCK
JB	JUNCTION BOX
kVAR	KILOVAR
kV	KILOVOLT
kVA	KILOVOLT-AMPERE
kW	KILOWATT
kWH	KILOWATT HOUR
LV	LOW VOLTAGE (0 TO 600V)
MAN	MANUAL
MCC	MOTOR CONTROL CENTER
MV	MEDIUM VOLTAGE (1 TO 73kV)
MWH	MEGAWATT-HOUR
MH	MANHOLE
MTG	MOUNTING
NEC	NATIONAL ELECTRICAL CODE
NEG	NEGATIVE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NESC	NATIONAL ELECTRIC SAFETY CODE
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
NO	NUMBER
OCB	OIL CIRCUIT BREAKER
PH	PHASE
PNL	PANEL
POS	POSITIVE
PR	PAIR
PT	POTENTIAL TRANSFORMER
PF	POWER FACTOR
PRI	PRIMARY
PB	PUSHBUTTON

ABBR.	MEANING
RF	RADIO FREQUENCY
kVAR	REACTIVE KILOVOLT AMPERE
VAR	REACTIVE VOLT AMPERE
RECP	RECEPTACLE
RECT	RECTIFIER
RTD	RESISTANCE TEMP. DETECTOR
RPM	REVOLUTIONS PER MINUTE
RMS	ROOT MEAN SQUARE
SHD	SHIELDED
SPEC	SPECIFICATION
STD	STANDARD
SUBSTN	SUBSTATION
SW	SWITCH
SPST SW	SINGLE POLE SING. THROW SWITCH
SPDT SW	SINGLE POLE DBL. THROW SWITCH
DPST SW	DOUBLE POLE SING. THROW SWITCH
DPDT SW	DOUBLE POLE DBL. THROW SWITCH
SWGR	SWITCHGEAR
SYM	SYMMETRICAL
SYN	SYNCHRONOUS
TACH	TACHOMETER
TELE	TELEPHONE
TEMP	TEMPERATURE
TB	TERMINAL BLOCK
TD	TIME DELAY
TW	TWISTED
TYP	TYPICAL
PU	PER UNIT
V	VOLT
VA	VOLTAMPERE
VCB	VACUUM CIRCUIT BREAKER
VM	VOLTMETER
W	WATT
WHM	WATTHOUR METER

CABLE IDENTIFICATION

4-1/C 500 MCM, 5kV
FOUR SINGLE-CONDUCTOR 500 MCM CABLES, 5kV INSULATION CLASS

1-3/C 250 MCM + G
ONE THREE-CONDUCTOR 250 MCM CABLE WITH INSULATED GROUND

RACEWAY LAYOUT SYMBOLS

- EXPOSED CONDUIT RUN, NEW
- EXPOSED CONDUIT RUN, EXISTING
- EMBEDDED CONDUIT RUN
- CONDUIT, CAPPED
- CONDUIT RUN STUBBED DOWN
- CONDUIT RUN STUBBED UP
- CONDUIT WITH HASH MARKS DESIGNATING NUMBER OF CONDUCTORS; GROUND WIRE REQUIRED (NOT SHOWN) LONG HASH MARK – NEUTRAL WIRE SHORT HASH MARK – HOT WIRE
- DRIVEN GROUND ROD
- EMBEDDED BARE GROUND WIRE
- FLEX CABLE
- (B 3|18) LIGHTING FIXTURE IDENTIFICATION SYMBOL: B = FIXTURE TYPE (SEE FIXTURE SCHEDULE FOR TYPE), 3 = CIRCUIT NUMBER, 18 = MOUNTING HEIGHT TO BOTTOM OF FIXTURE.
- DUPLEX RECEPTACLE, 15 AMP, 125 VOLT, 3-WIRE W/ GROUND: 3 = CIRCUIT NUMBER. MOUNT 18" ABOVE FINISHED FLOOR (UNO). WP = WEATHER PROOF GFI = GROUND FAULT INTERRUPTER
- POWER RECEPTACLE, 60 AMP, 480 VOLT, 3-WIRE, 4-POLE GROUNDING TYPE. MOUNT 36" ABOVE FINISHED FLOOR (UNO)
- (T) OUTLET FOR THERMOSTAT
- OUTLET FOR TELEPHONE
- (PE) PHOTOELECTRIC CONTROL UNIT
- SWITCH, 1 POLE

INDUCTION MOTOR: RATING > 75 H.P. @ 1/8 = 1'-0" SCALE

(C-24) CONDUIT IDENTIFICATION TAG
C = CONDUIT
n = CONDUIT NUMBER

CABLE CIRCUIT IDENTIFICATION CODE

EXAMPLES:
C-3010-2
- SEQUENCE OF CABLES
- EQUIPMENT NO.
- TYPE OF CIRCUIT
  - C – CONTROL
  - J – INSTRUMENTATION OR COMMUNICATION
  - P – POWER
  - F – FIBER/COMMUNICATION

I/O ADDRESS LEGEND

EXAMPLES:

- (DI) DCS DIGITAL INPUT — I/O ADDRESS
- (I) DCS DIGITAL OUTPUT — I/O ADDRESS

R12 S07
- SLOT: 07
- RACK: 12

DEVICE LOCATION SYMBOL LEGEND:

- ■ – DEVICE LOCATED IN PLC/DCS CABINET
- ○ – DEVICE LOCATED IN SWITCHGEAR OR MCC CUBICLE
- □ – DEVICE LOCATED IN FIELD AND/OR TBX TERMINAL BLOCK.
- ◇ – DEVICE LOCATED IN AUX./VENDOR CONTROL PANEL
- Ø – TERMINAL LOCATED IN PLC/DCS CABINET
- ⊠ – TERMINAL LOCATED IN SWITCHGEAR OR MCC CUBICLE
- ○ – TERMINAL LOCATED ON RELAY OR INSTRUMENT DEVICE
- ⊠ – TERMINAL LOCATED IN AUX./VENDOR CONTROL PANEL

WIRE LABELING LEGEND:

[0805-01]
- ROW-WIRE NUMBER DESIGNATION
- SHEET ROW DESIGNATION
- LAST 2 DIGITS DRAWING NUMBER

POWER AND ONE-LINE DIAGRAM SYMBOLS

- CIRCUIT BREAKER, BOLTED TYPE WITH OVERLOAD & MAGNETIC DEVICES
- (M) METER
- SWITCH, SINGLE THROW
- CIRCUIT BREAKER, DRAWOUT TYPE WITH OVERLOAD & MAGNETIC DEVICES
- (E) DISCONNECT SWITCH, ELECTRICALLY OPERATED
- SURGE ARRESTOR W/ GROUND, METAL OXIDE VARISTOR TYPE
- (G) DISCONNECT SWITCH, GANG OPERATED
- CAPACITOR
- FUSED DISCONNECT SWITCH HEAVY DUTY W/ CURRENT LIMITING FUSE
- SEPARABLE CONNECTORS
- DRAWOUT ASSEMBLY WITH BLADES FOR FEEDER CIRCUIT GROUNDING
- CONTACTOR, AIR BREAK NORMALLY OPEN
- CONTACTOR, AIR BREAK NORMALLY CLOSED
- MOTOR STARTER CONSISTING OF LINE DISCONNECT, CURRENT LIMITING FUSE SIZE CONTACTOR SIZE AND DRAWOUT ASSEMBLY
- CONTACTOR, VACUUM TYPE
- GROUND
- TRANSFORMER, DELTA-WYE CONNECTED WITH SECONDARY RESISTANCE GROUNDED
- THERMAL OVERLOAD
- FUSE, GENERAL
- (3) CURRENT TRANSFORMERS, 3 SHOWN – ONE PER PHASE
- FUSED CUTOUT
- CURRENT TRANSFORMER, ZERO SEQUENCE
- (HP) MOTOR
- GENERATOR
- (HP) SEPARATELY EXCITED DIRECT-CURRENT GENERATOR OR MOTOR
- METAL ENCLOSED BUSWAY
- THYRISTOR (SEMICONDUCTOR CONTROLLED RECTIFIER)
- LIQUID RHEOSTAT
- (A) ALARM
- STRESS CONE – AS APPLIED ON HIGH VOLTAGE CABLE
- (I) INTERLOCK
- (K) KEY INTERLOCK

ELEMENTARY & INTERCONNECTION DIAGRAM SYMBOLS

- HORN
- RECTIFIER DIODE
- TRANSIENT PROTECTOR
- GROUND
- THERMOCOUPLE
- 2-WAY SELECTOR SWITCH
- 3-WAY SELECTOR SWITCH
- CONTROL OR INSTRUMENT CONDUCTOR
- TWISTED SHIELDED PAIR CABLE (TW SHD)
- CONNECTED WIRES
- WIRES NOT CONNECTED
- SEPARATOR CONNECTOR
- RESISTOR
- SPACE HEATER
- FUSE (FAST BLOW)
- FUSED DISCONNECT
- 3-POLE DISCONNECT SWITCH (GANGED)
- START — PUSHBUTTON, NO MOMENTARY CONTACT
- STOP — PUSHBUTTON, NC MOMENTARY CONTACT
- FLOW SWITCH, NO CLOSES ON INCREASE IN FLOW
- FLOW SWITCH, NC OPENS ON INCREASE IN FLOW
- FLOW SWITCH, NO CLOSES ON DECREASE IN FLOW
- FLOW SWITCH, NC OPENS ON DECREASE IN FLOW
- LIMIT SWITCH, NO DIRECTLY ACTUATED
- LIMIT SWITCH, NC DIRECTLY ACTUATED
- LIMIT SWITCH, HELD OPEN
- LIMIT SWITCH, HELD CLOSED
- LEVEL SWITCH, NO CLOSES ON RISING LEVEL
- LEVEL SWITCH, NC OPENS ON RISING LEVEL
- LEVEL SWITCH, NO CLOSES ON FALLING LEVEL
- LEVEL SWITCH, NC OPENS ON FALLING LEVEL
- PRESSURE SWITCH NO, CLOSES ON RISING PRESSURE
- PRESSURE SWITCH, NC OPENS ON RISING PRESSURE
- PRESSURE SWITCH, NO CLOSES ON FALLING PRESSURE
- PRESSURE SWITCH, NC OPENS ON FALLING PRESSURE
- TIME-DELAY SWITCH, NO W/ TIME-DELAY (OOX)
- TIME-DELAY SWITCH, NC WITH TIME-DELAY (XXO)
- TIME-DELAY SWITCH, NO W/ TIME-DELAY OPENING (OXO)
- TIME-DELAY SWITCH, NC WITH TIME-DELAY CLOSING (XOX)
- TEMPERATURE SWITCH, NO CLOSES ON RISING TEMPERATURE
- TEMPERATURE SWITCH, NC OPENS ON RISING TEMPERATURE
- TEMPERATURE SWITCH, NO CLOSES ON FALLING TEMPERATURE

ARROW INDICATES THE DIRECTION OF SWITCH OPERATION FOR DELAYED ACTION.
(XXO)
- RESET
- TIMING
- TIMED OUT

- TEMPERATURE SWITCH, NC OPENS ON FALLING TEMPERATURE
- PULL CORD, EMERGENCY
- ZERO SPEED SWITCH
- SOLENOID
- RELAY CONTACT, NO
- RELAY CONTACT, NC
- (DI) DIGITAL INPUT — ADDRESS
- (I) DIGITAL OUTPUT — ADDRESS
- (AI) ANALOG INPUT — ADDRESS
- (AO) ANALOG OUTPUT — ADDRESS
- RELAY OR TIMER COIL
- (A) PILOT LIGHT OR INDICATING LIGHT. LETTER INDICATES COLOR:
  - A-AMBER
  - B-BLUE
  - R-RED
  - W-WHITE
  - G-GREEN
- 3 — NUMBER ON TOP INDICATES WIRE NUMBER
- (A) — NUMBER ON BOTTOM IN PARENTHESIS INDICATES TERMINAL NUMBER

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
0	CH	01.21.05	ISSUED FOR CONSTRUCTION

SCALE:	NONE	
DWG BY:	JG	01.21.05
APPRV'D BY:	CRH	01.21.05
CLIENT APPROVED BY:	INITIALS	DATE

ISSUED FOR CONSTRUCTION
APPROVED ________ DATE ________

HANLON & ASSOCIATES, INC.
A NEVADA CORPORATION
284-C EAST LAKE MEAD DRIVE, #150
HENDERSON, NEVADA 89015-5582
(702) 564-4940

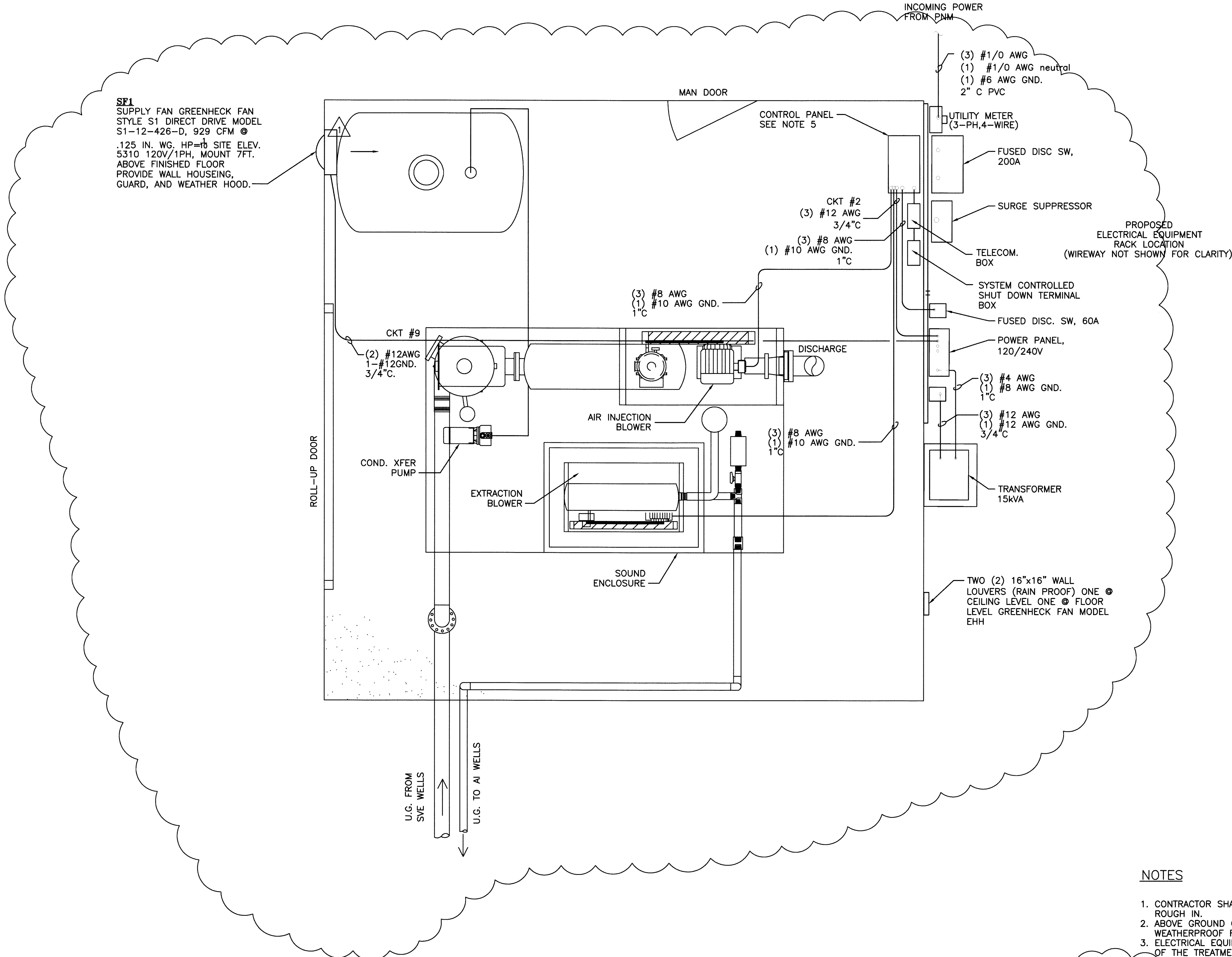
HANLON ENGINEERING & ASSOCIATES, INC.
AN ARIZONA CORPORATION
TUCSON, ARIZONA (520) 326-0062
PHOENIX, ARIZONA (480) 223-0360
VANCOUVER, B.C. (604) 224-1514

HYDRO GEO CHEM, INC.

ALBUQUERQUE - LOS ANGELES LANDFILL
LALF
ELECTRICAL
SYMBOLS AND ABBREVIATIONS

PHASE II

REFERENCE No. 09903E00RB
REVISION | DRAWING No.



LALF TREATMENT COMPOUND

PLAN VIEW

SCALE: 1/2" = 1'-0"

NOTES

1. CONTRACTOR SHALL VERIFY LOCATION OF EQUIPMENT PRIOR TO ROUGH IN.
2. ABOVE GROUND CONDUIT SHALL BE RIGID GALVANIZED STEEL WITH WEATHERPROOF FITTINGS.
3. ELECTRICAL EQUIPMENT RACK TO BE BOLTED TO EXTERIOR WALL OF THE TREATMENT COMPOUND BUILDING.
4. CONDUITS BETWEEN ELECTRICAL EQUIPMENT RACK AND SEPERATELY MOUNTED EQUIPEMENT SHALL BE PVC-COATED, FLEXIBLE LIQUID-TIGHT CONDUIT.
5. CONTROL PANEL SHALL BE SHIPPED LOOSE + FIELD INSTALLED.

1

ISSUED FOR CONSTRUCTION

APPROVED ____________ DATE ______

HANLON & ASSOCIATES, INC.
A NEVADA CORPORATION
284-C EAST LAKE MEAD DRIVE, #150
HENDERSON, NEVADA 89015-5582
(702) 564-4940

HANLON ENGINEERING & ASSOCIATES, INC.
AN ARIZONA CORPORATION
TUCSON, ARIZONA (520) 326-0062
PHOENIX, ARIZONA (480) 223-0360
VANCOUVER, B.C. (604) 224-1514

REVISION HISTORY			
No.	BY	DATE	DESCRIPTION
1	CH	03.04.05	UPDATE BACKGROUND

SCALE: 1/2"=1'-0"		
DWG BY:	FEH	8.23.04
APPRV'D BY:	CRH	8.23.04
CLIENT APPROVED BY:	INITIALS	DATE

HYDRO GEO CHEM, INC.

ALBUQUERQUE - LOS ANGELES LANDFILL

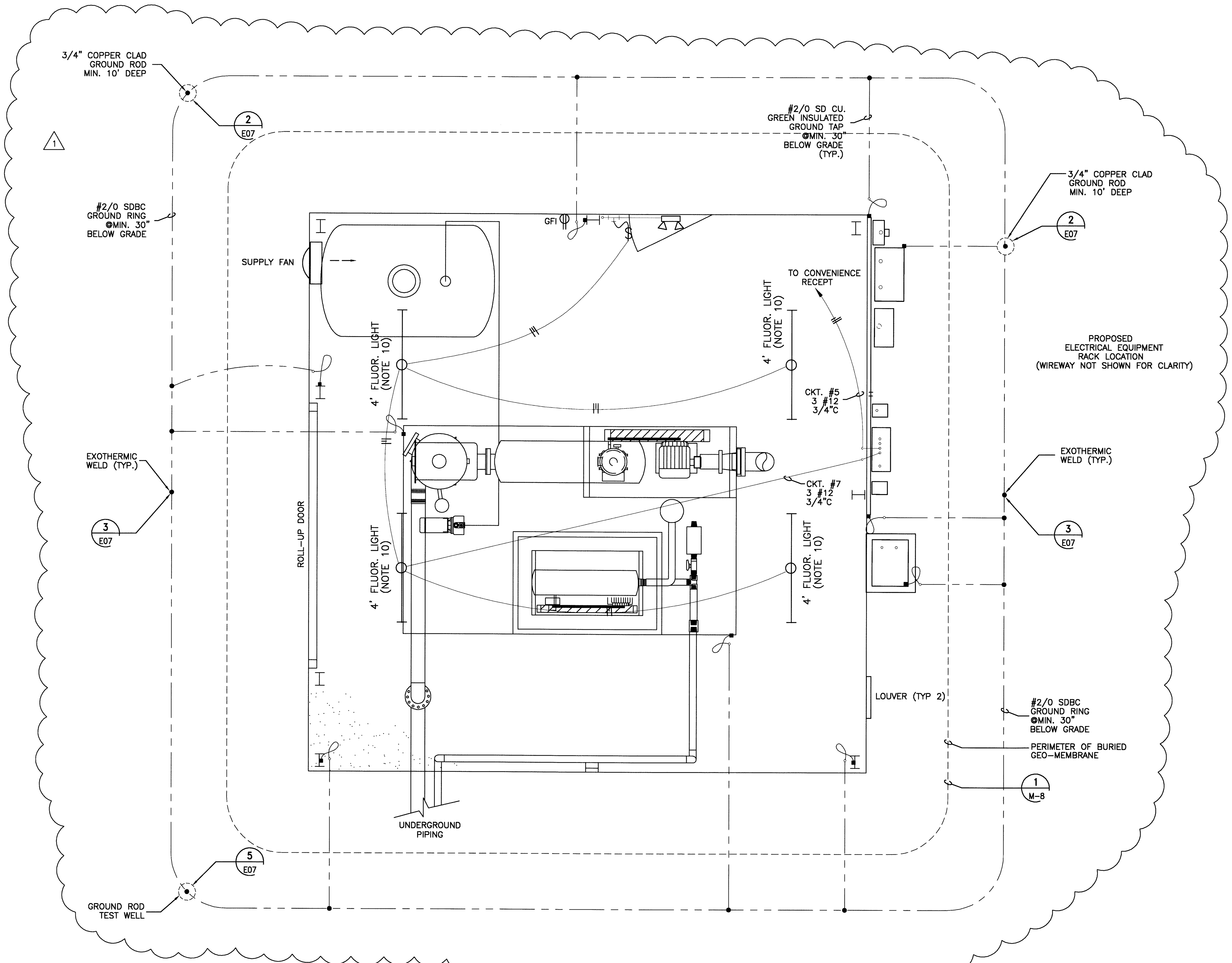
LALF ELECTRICAL SITE POWER PLAN

PHASE II

REFERENCE No. 09903E01RB

REVISION 1

DRAWING No. E01



LALF TREATMENT COMPOUND

PLAN VIEW

SCALE: 1/2" = 1'-0"

NOTES:

1. INSTALL GROUND RING CONDUCTORS A MIN. OF 2'-6" BELOW GRADE OR FINISHED FLOOR, PER N.E.C. 250-81 OUTSIDE OF MEMBRANE PERIMETER
2. GROUND RODS (3/4"X10') SHALL BE DRIVEN TO A MIN. OF 1'-6" BELOW GRADE. WITH APPROPRIATE GROUND ROD DRIVING SLEEVE, PER N.E.C. 250-83.
3. ALL CONDUCTORS IN MAIN GROUND LOOP SHALL BE #2/0 STRANDED, SOFT DRAWN, BARE COPPER. ALL CONDUCTORS TAPPING MAIN LOOP TO EQUIPMENT SHALL BE #2/0 STRANDED, SOFT DRAWN, GREEN INSULATED COPPER.
4. CONTRACTOR SHALL PROVIDE GROUND GRID SYSTEM TO ACHIEVE A MAX. OF 25 OHMS TO EARTH, PER N.E.C. 250-84.
5. INSTALL 1" PVC CONDUIT AS A SLEEVE WHENEVER GROUND WIRE IS REQUIRED TO PENETRATE A SLAB OR GRADE. EXTEND PVC CONDUIT 6" ABOVE GRADE OR SLAB, UNLESS OTHERWISE NOTED.
6. USE AN EXOTHERMIC HEAVY DUTY PROCESS OF WELDING COPPER TO COPPER OR COPPER TO STEEL FOR ALL CONNECTIONS TO THE GRID SYSTEM, AS CALLED FOR ON THE DRAWINGS. REMOVE SCALE AND CLEAN SURFACE THOROUGHLY BEFORE APPLYING EXOTHERMIC PROCESS. SURFACES AND MATERIAL MUST BE THOROUGHLY DRY.
7. GROUND METAL BUILDING COLUMNS AT THREE PLACES.
8. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO ROUGH-IN.
9. CONDUCTORS FROM GROUND RING TO BUILDING SHALL BE ROUTED ABOVE BURIED GEO-MEMBRANE, AND APPROX. 6" BELOW GRADE ABOVE MEMBRANE.
10. CROUSE-HINDS #NFL4232/120 - (2) 32W-T8 LAMPS (OR EQUAL).

ISSUED FOR CONSTRUCTION

APPROVED __________ DATE ______

HANLON & ASSOCIATES, INC.
A NEVADA CORPORATION
284-C EAST LAKE MEAD DRIVE, #150
HENDERSON, NEVADA 89015-5582
(702) 564-4940

HANLON ENGINEERING & ASSOCIATES, INC.
AN ARIZONA CORPORATION
TUCSON, ARIZONA (520) 326-0062
PHOENIX, ARIZONA (480) 223-0360
VANCOUVER, B.C. (604) 224-1514

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
1	CH	03.04.05	UPDATE BACKGROUND

SCALE: 1/2"=1'-0"		
DWG BY:	FEH	8.23.04
APPRV'D BY:	CRH	8.23.04
CLIENT APPROVED BY:	INITIALS	DATE

HYDRO GEO CHEM, INC.

ALBUQUERQUE - LOS ANGELES LANDFILL

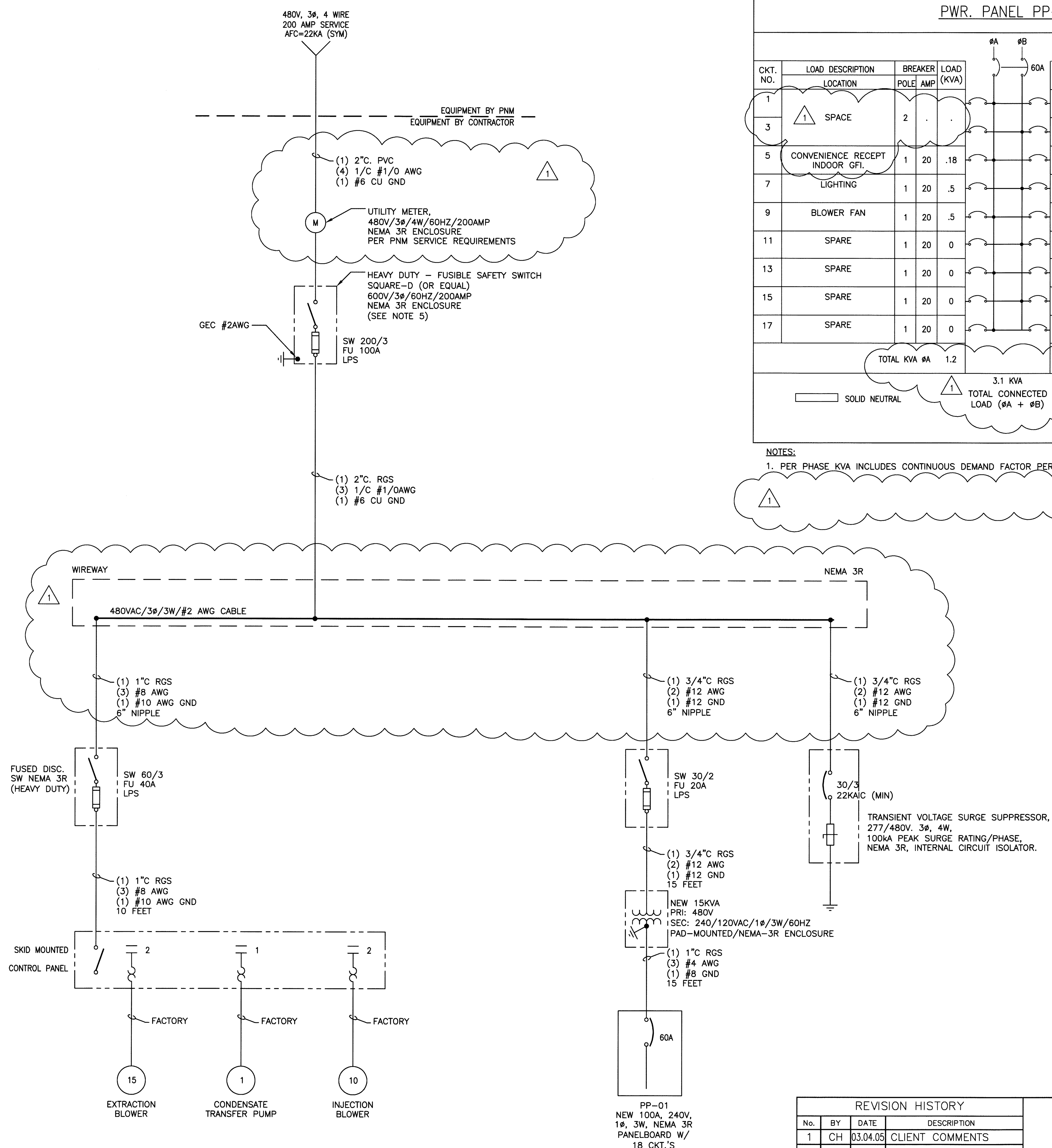
LALF ELECTRICAL LIGHTING & GROUNDING PLAN

PHASE II

REFERENCE No. 09903E02RB

REVISION 1

DRAWING No. E02



PANELBOARD: 120/240VAC, 1ø, 3W
LOCATION: LALF TREATMENT COMPOUND
SOURCE: PNM-"HOLD", CKT. G

PWR. PANEL PP-01

Main: øA, øB, 60A

CKT. NO.	LOAD DESCRIPTION / LOCATION	BREAKER POLE	BREAKER AMP	LOAD (KVA)	LOAD (KVA)	BREAKER AMP	BREAKER POLE	LOAD DESCRIPTION / LOCATION	CKT. NO.
1, 3	SPACE	2	.	.	1.2	20	1	CONTROL PANEL	2
					0	20	1	SPARE	4
5	CONVENIENCE RECEPT INDOOR GFI.	1	20	.18	.18	20	1	CONVENIENCE RECEPT. WP GFI	6
7	LIGHTING	1	20	.5	.5	20	1	LIGHTING	8
9	BLOWER FAN	1	20	.5	0	20	1	SPARE	10
11	SPARE	1	20	0	0	20	1	SPARE	12
13	SPARE	1	20	0	0	20	1	SPARE	14
15	SPARE	1	20	0	0	20	1	SPARE	16
17	SPARE	1	20	0	0	20	1	SPARE	18
	TOTAL KVA øA			1.2	1.9	TOTAL KVA øB			

SOLID NEUTRAL — 3.1 KVA TOTAL CONNECTED LOAD (øA + øB) — GROUND BUS

NOTES:

1. PER PHASE KVA INCLUDES CONTINUOUS DEMAND FACTOR PER NEC-220.

LOAD CALCULATIONS:

EXTRACTION BLOWER 15HP, 3ø	= 28.3kVA
DRAIN PUMP-1 HP, 1ø	= 1.2kVA
INJECTION BLOWER-10HP, 3ø	= 28.3kVA
PP-01 (FULLY LOADED)	= 3.1kVA
TOTAL CONNECTED: LOAD	= 60.9kVA
LOAD CURRENT LOAD	= (60.9KVA/.48 x √3) = 73A

ABBREVIATIONS:

AFC	AVAILABLE FAULT CURRENT
AIC	AMPERES INTERUPTING CAPACITY
LPS	DESIGNATES BUSSMAN CLASS RK1 FUSE TYPE
MPZ	MINI POWER ZONE (TRANSFORMER/PANEL COMBO)
PD-XXX	POWER DISTRIBUTION PANEL – TAGNUMBER
TBD	TO BE DETERMINED
UNO	UNLESS NOTED OTHERWISE
GEC	GROUNDING ELECTRODE CONDUCTOR

NOTES:

1. ALL FUSES SHALL BE CLASS RK RATED FOR 200,000RMS SYMMETRICAL AMPERES SHORT CIRCUIT CURRENT, SIZED AS SHOWN.
2. FAULT CURRENT CALCULATIONS BASED ON ETAP 4.7.0 PROGRAM.
3. ALL CABLE LENGTHS SHALL BE VERIFIED BY CONTRACTOR (APPROX. LENGTHS SHOWN).
4. ALL EQUIPMENT THIS DRAWING IS NEW AND SHALL BE PROVIDED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
5. PROVIDE HEAVY DUTY SAFETY SWITCH – FUSIBLE WITH NEUTRAL AND SHALL BE SUITABLE AS SERVICE ENTRANCE EQUIPMENT. (INCLUDING GROUND LUG KIT).
6. ALL CONDUIT AND CABLE SIZES ARE MINIMUM ALLOWABLE TRADE SIZES.
7. DESIGN PER 2002 NEC (CITY OF ALBUQUERQUE ADOPTED CODE).
8. ALL CONDUCTORS TO BE 90 DEG.C RATED.
9. ALL ELECTRICAL EQUIPEMENT TO BE UL LISTED AND LABELED.

ISSUED FOR CONSTRUCTION
APPROVED ________ DATE ______

HANLON & ASSOCIATES, INC.
A NEVADA CORPORATION
284-C EAST LAKE MEAD DRIVE, #150
HENDERSON, NEVADA 89015-5582
(702) 564-4940

HANLON ENGINEERING & ASSOCIATES, INC.
AN ARIZONA CORPORATION
TUCSON, ARIZONA (520) 326-0062
PHOENIX, ARIZONA (480) 223-0360
VANCOUVER, B.C. (604) 224-1514

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
1	CH	03.04.05	CLIENT COMMENTS

SCALE:	NONE	DATE
DWG BY:	FEH	8.23.04
APPRV'D BY:	CRH	8.23.04
CLIENT APPROVED BY:	INITIALS	DATE

HYDRO GEO CHEM, INC.

ALBUQUERQUE - LOS ANGELES LANDFILL

LALF
ELECTRICAL
SINGLE LINE WIRING DIAGRAM

PHASE II

REFERENCE No. 09903E03RB
REVISION 1
DRAWING No. E03

PNM REEVES SITE

PLAN VIEW
SCALE: N.T.S.

TREATMENT COMPOUND

PLAN VIEW
SCALE: 3/8"=1'-0"

NOTES

1. CONTRACTOR SHALL VERIFY LOCATION OF EQUIPMENT PRIOR TO ROUGH IN.
2. UNDERGROUND CONDUIT SHALL BE PVC SCH. 40 AT MIN. 36" BELOW FINISHED GRADE WITH TAPE WRAPPED RGS SWEEPS AND RISERS. (SEE DETAIL 7/E07)
3. ABOVE GROUND CONDUIT SHALL BE RIGID GALVANIZED STEEL WITH WEATHERPROOF FITTINGS.
4. LEVEL SWITCHES: NEMA 4 RATED SINGLE POINT LIQUID LEVEL SWITCHES, WITH BRASS HOUSING, 304SS FLOAT, ADJUSTABLE SWITCH POINT, 3/4" NTP MOUNTING, 230psig MAX WORKING PRESSURE, AND CONTACT RATING OF 1.5A AT 250Vac, KOBOLD MODEL #NV-5103 OR EQUAL
5. IMMERSION HEATER: 5000W, 240Vac TANK HEATER WITH 26 7/8" COPPER SHEATHED ELEMENT. 2" NPT MOUNTING AND ADJUSTABLE THERMOSTAT CONTROL (RANGE 60°F TO 250°F) VULCAN MODEL #AUW250-240 OR EQUAL.

ISSUED FOR CONSTRUCTION
APPROVED ____________ DATE ______

REVISION HISTORY			
No.	BY	DATE	DESCRIPTION
1	CH	03.04.05	BACKGROUND UPDATE

SCALE:	1"=80'	
DWG BY:	FEH	8.23.04
APPRV'D BY:	CRH	8.23.04
CLIENT APPROVED BY:	INITIALS	DATE

HYDRO GEO CHEM, INC.

HANLON & ASSOCIATES, INC.
A NEVADA CORPORATION
284-C EAST LAKE MEAD DRIVE, #150
HENDERSON, NEVADA 89015-5582
(702) 564-4940

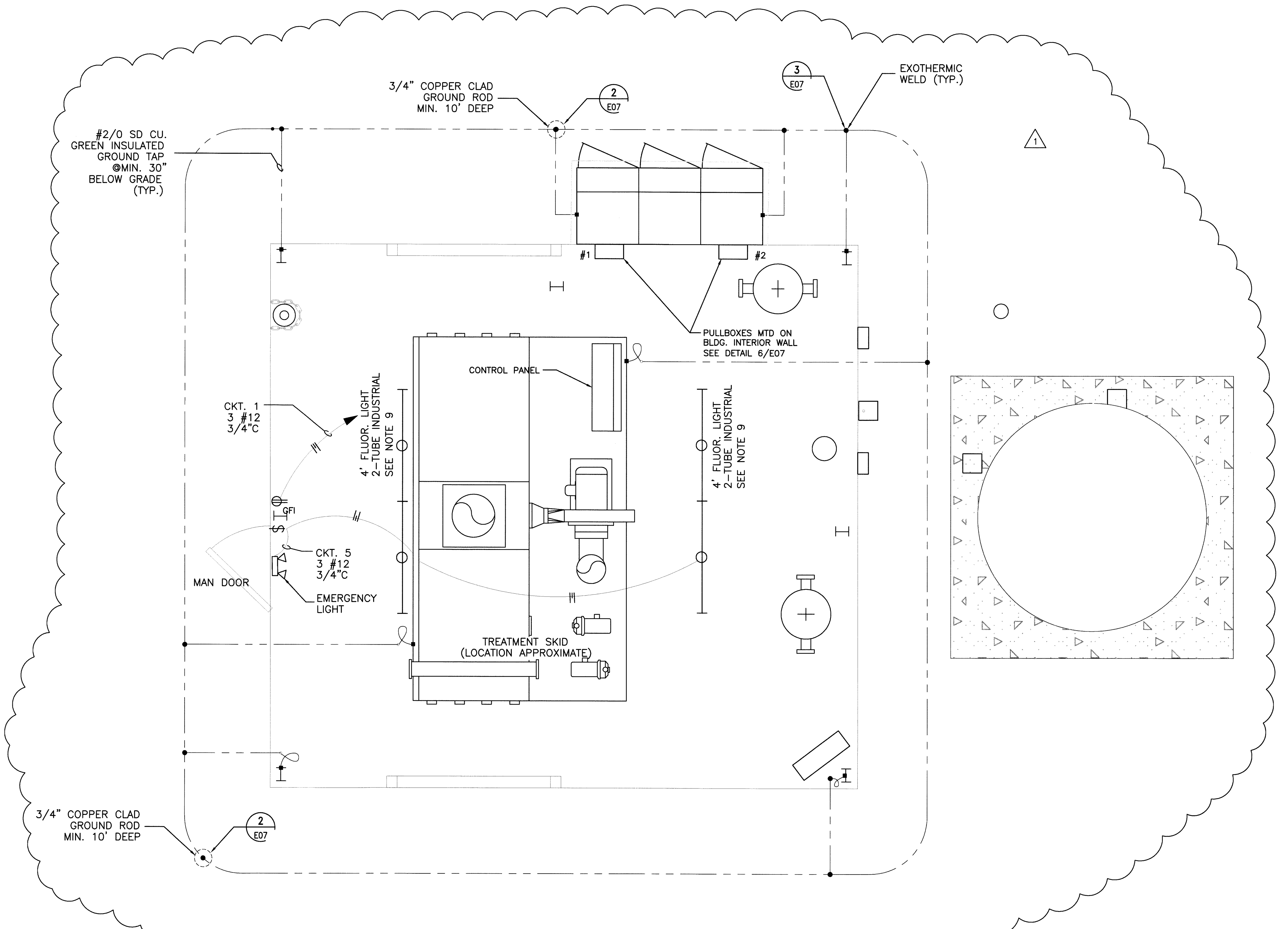
HANLON ENGINEERING & ASSOCIATES, INC.
AN ARIZONA CORPORATION
TUCSON, ARIZONA (520) 326-0062
PHOENIX, ARIZONA (480) 223-0360
VANCOUVER, B.C. (604) 224-1514

ALBUQUERQUE - LOS ANGELES LANDFILL

PNM REEVES
ELECTRICAL
SITE POWER PLAN

PHASE II

REFERENCE No. 09903E04RB
REVISION 1
DRAWING No. E04



NOTES:

1. INSTALL GROUND CONDUCTORS A MIN. OF 2'-6" BELOW GRADE OR FINISHED FLOOR.
2. GROUND RODS (3/4"X10') SHALL BE DRIVEN TO A MIN. OF 1'-6" BELOW GRADE. WITH APPROPRIATE GROUND ROD DRIVING SLEEVE
3. ALL CONDUCTORS IN MAIN GROUND LOOP SHALL BE #2/0 STRANDED, SOFT DRAWN, BARE COPPER. ALL CONDUCTORS TAPPING MAIN LOOP TO EQUIPMENT SHALL BE #2/0 STRANDED, SOFT DRAWN, GREEN INSULATED COPPER.
4. CONTRACTOR SHALL PROVIDE GROUND GRID SYSTEM TO ACHIEVE A MAX. OF 25 OHMS TO EARTH.
5. INSTALL PVC CONDUIT AS A SLEEVE WHENEVER GROUND WIRE IS REQUIRED TO PENETRATE A SLAB OR GRADE. EXTEND PVC CONDUIT 6" ABOVE GRADE OR SLAB, UNLESS OTHERWISE NOTED.
6. USE AN EXOTHERMIC HEAVY DUTY PROCESS OF WELDING COPPER TO COPPER OR COPPER TO STEEL FOR ALL CONNECTIONS TO THE GRID SYSTEM, AS CALLED FOR ON THE DRAWINGS. REMOVE SCALE AND CLEAN SURFACE THOROUGHLY BEFORE APPLYING EXOTHERMIC PROCESS. SURFACES AND MATERIAL MUST BE THOROUGHLY DRY.
7. NOT USED
8. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO ROUGH-IN.
9. LIGHT FIXTURE SHALL BE SUITABLE FOR WET LOCATIONS.

ISSUED FOR CONSTRUCTION
APPROVED ____________ DATE ________

HANLON & ASSOCIATES, INC.
A NEVADA CORPORATION
284-C EAST LAKE MEAD DRIVE, #150
HENDERSON, NEVADA 89015-5582
(702) 564-4940

HANLON ENGINEERING & ASSOCIATES, INC.
AN ARIZONA CORPORATION
TUCSON, ARIZONA (520) 326-0062
PHOENIX, ARIZONA (480) 223-0360
VANCOUVER, B.C. (604) 224-1514

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
1	CH	03.04.05	BACKGROUND UPDATE

SCALE:	1/2"=1'-0"	DATE
DWG BY:	FEH	8.23.04
APPRV'D BY:	CRH	8.23.04
CLIENT APPROVED BY:	INITIALS	DATE

HYDRO
GEO
CHEM, INC.

ALBUQUERQUE - LOS ANGELES LANDFILL

PNM REEVES
ELECTRICAL
LIGHTING & GROUNDING PLAN

PHASE II

REFERENCE No. 09903E05RB
REVISION 1
DRAWING No. E05

PANELBOARD: 120/240VAC, 1Ø, 3W
LOCATION: GWEX TREATMENT COMPOUND
SOURCE: 25 KVA

PWR. PANEL PP-01

CKT. NO.	LOAD DESCRIPTION / LOCATION	BREAKER POLE	BREAKER AMP	LOAD (KVA)	ØA / ØB	LOAD (KVA)	BREAKER AMP	BREAKER POLE	LOAD DESCRIPTION / LOCATION	CKT. NO.
1	CONVENIENCE RECPT. GFI	1	20	.2		1.2	20	1	AIR STRIPPER PANEL	2
3	PUMP CONTROLLER	1	20	.3		0	20	1	SPARE	4
5	LIGHTING	1	20	.5		0	20	1	SPARE	6
7	AREA HEATING	2	40	7.6		0	20	1	SPARE	8
9						5.0	30	2	TANK IMMERSION HEATER	10
11	HEAT TRACE	1	20	.5						12
13	SPARE	1	20	0		0	20	1	SPARE	14
15	SPARE	1	20	0		0	20	1	SPARE	16
17	SPARE	1	20	0		0	20	1	SPARE	18
	TOTAL KVA ØA			7.8		7.5			TOTAL KVA ØB	

100A

15.3 KVA TOTAL CONNECTED LOAD (ØA + ØB)

SOLID NEUTRAL   GROUND BUS

NOTES:
1. PER PHASE KVA INCLUDES CONTINUOUS DEMAND FACTOR PER NEC-220. (1)
2. ALL 20A CIRCUITS USE #12 AWG. USE #10AWG FOR 30A CIRCUIT. USE #8AWG FOR 40A CIRCUIT.

LOAD CALCULATIONS:

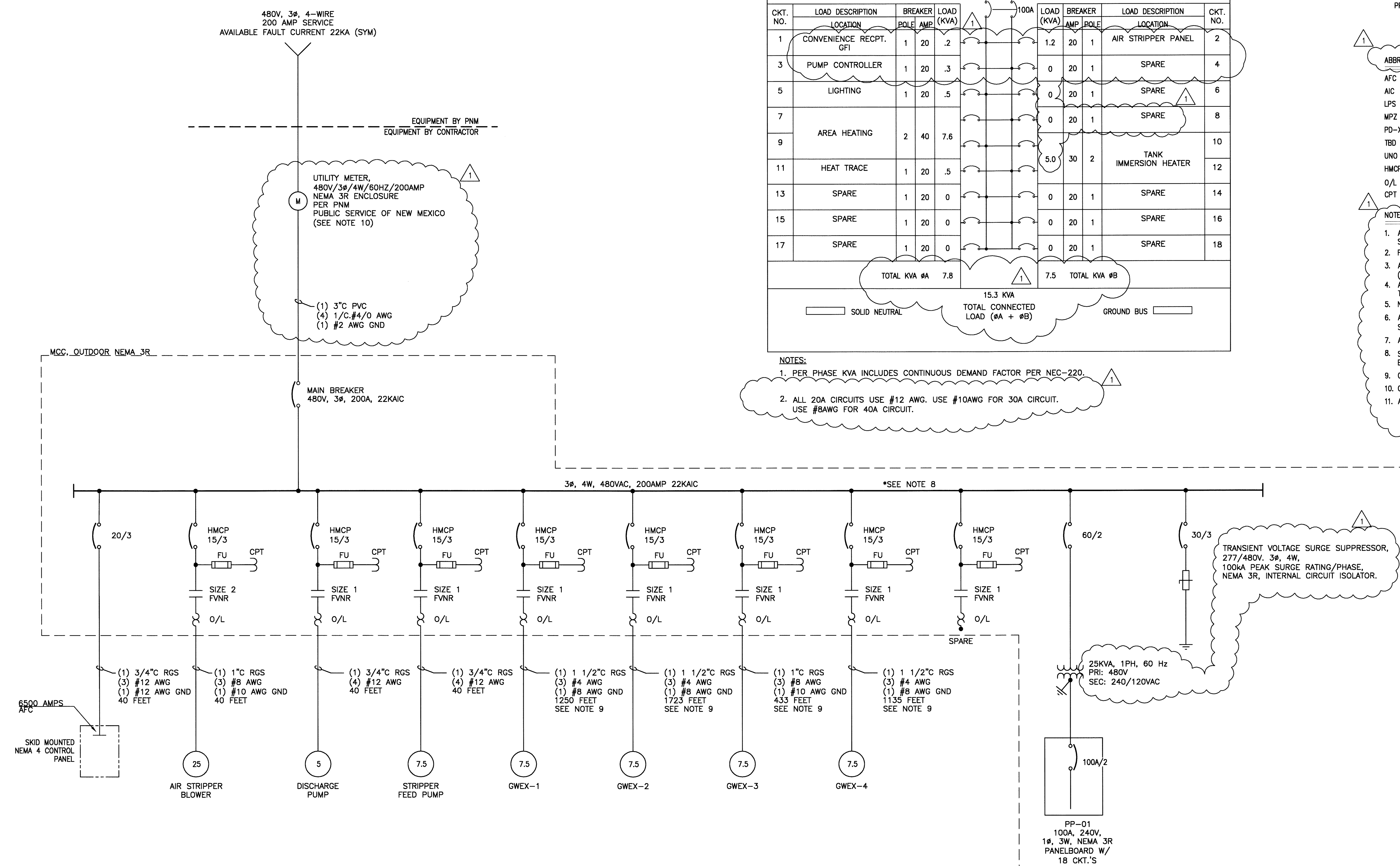
CONTROL PANEL, 480V, 3Ø, 10A = 8.3kVA
AIR STRIPPER BLOWER-25HP, 3Ø = 28kVA
DISCHARGE PUMP-5HP, 3Ø = 7.9kVA
STRIPPER FEED PUMP-7.5HP, 3Ø = 11.5kVA
GWEX-1 THRU 4-(4)7.5HP, 3Ø = 46.0kVA
PP-01 (FULLY LOADED) = 25.0kVA

TOTAL CONNECTED: LOAD = 126.7kVA
LOADS CURRENT=(127KVAx1000)/(480x√3)=153AMPS

ABBREVIATIONS:

AFC	AVAILABLE FAULT CURRENT
AIC	AMPERES INTERUPTING CAPACITY
LPS	DESIGNATES BUSSMAN CLASS RK1 FUSE TYPE
MPZ	MINI POWER ZONE (TRANSFORMER/PANEL COMBO)
PD-XXX	POWER DISTRIBUTION PANEL - TAGNUMBER
TBD	TO BE DETERMINED
UNO	UNLESS NOTED OTHERWISE
HMCP	MOTOR CIRCUIT PROTECTOR
O/L	OVERLOAD PROTECTION
CPT	CONTROL POWER TRANSFORMER

NOTES:
1. ALL FUSES SHALL BE CLASS RK RATED FOR 200,000RMS SYMMETRICAL AMPERES SHORT CIRCUIT CURRENT, SIZED AS SHOWN.
2. FAULT CURRENT CALCULATIONS BASED ON ETAP 4.7.0
3. ALL CABLE LENGTHS SHALL BE VERIFIED BY CONTRACTOR (APPROX. LENGTHS SHOWN).
4. ALL EQUIPMENT THIS DRAWING IS NEW AND SHALL BE PROVIDED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
5. NOT USED.
6. ALL CONDUIT AND CABLE SIZES ARE MINIMUM ALLOWABLE TRADE SIZES. DESIGN PER 2002 NEC (CITY OF ALBUQUERQUE ADOPTED CODE).
7. ALL CONDUCTORS TO BE 90 DEG.C RATED, THHN-2 OR EQUAL.
8. STARTERS REQUIRE CPTS HAND/OFF/AUTO SWITCHES, START/STOP PUSH BUTTONS, AND RED RUNNING LIGHT.
9. CONDUCTORS ARE SIZED FOR VOLTAGE DROP.
10. CONTRACTOR TO VERIFY METER ARRANGEMENT MEETS UTILITY REQUIREMENTS.
11. ALL ELECTRICAL EQUIPMENT SHALL BE UL LABELED AND LISTED.



ISSUED FOR CONSTRUCTION
APPROVED ________ DATE ______

HANLON & ASSOCIATES, INC.
A NEVADA CORPORATION
284-C EAST LAKE MEAD DRIVE, #150
HENDERSON, NEVADA 89015-5582
(702) 564-4940

HANLON ENGINEERING & ASSOCIATES, INC.
AN ARIZONA CORPORATION
TUCSON, ARIZONA (520) 326-0062
PHOENIX, ARIZONA (480) 223-0360
VANCOUVER, B.C. (604) 224-1514

REVISION HISTORY			
No.	BY	DATE	DESCRIPTION
1	CH	03.04.05	CLIENT COMMENTS

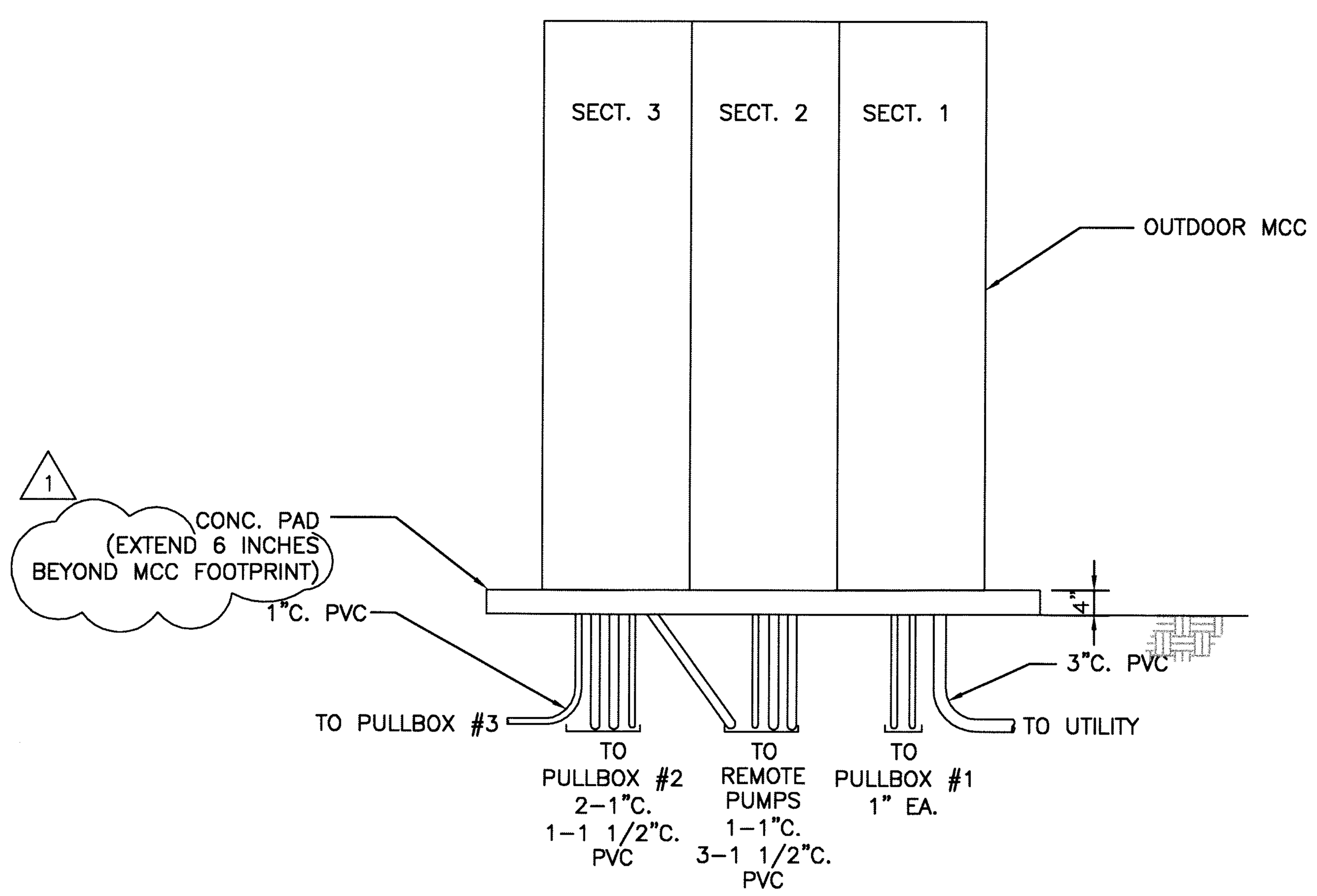
SCALE:	NONE	DATE
DWG BY:	FEH	8.23.04
APPRV'D BY:	CRH	8.23.04
CLIENT APPROVED BY:	INITIALS	DATE

HYDRO GEO CHEM, INC.

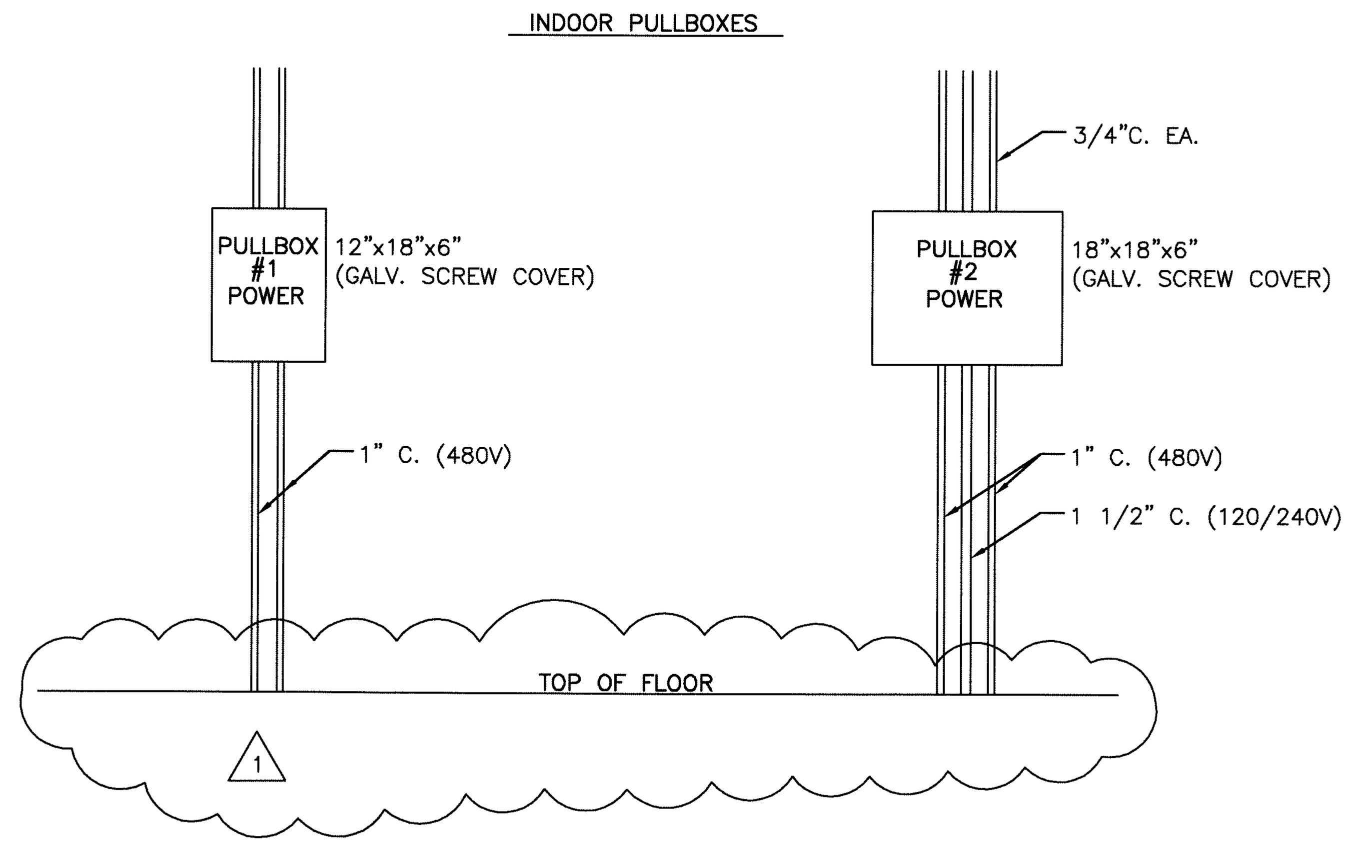
ALBUQUERQUE - LOS ANGELES LANDFILL
PNM REEVES
ELECTRICAL
SINGLE LINE WIRING DIAGRAM

PHASE II

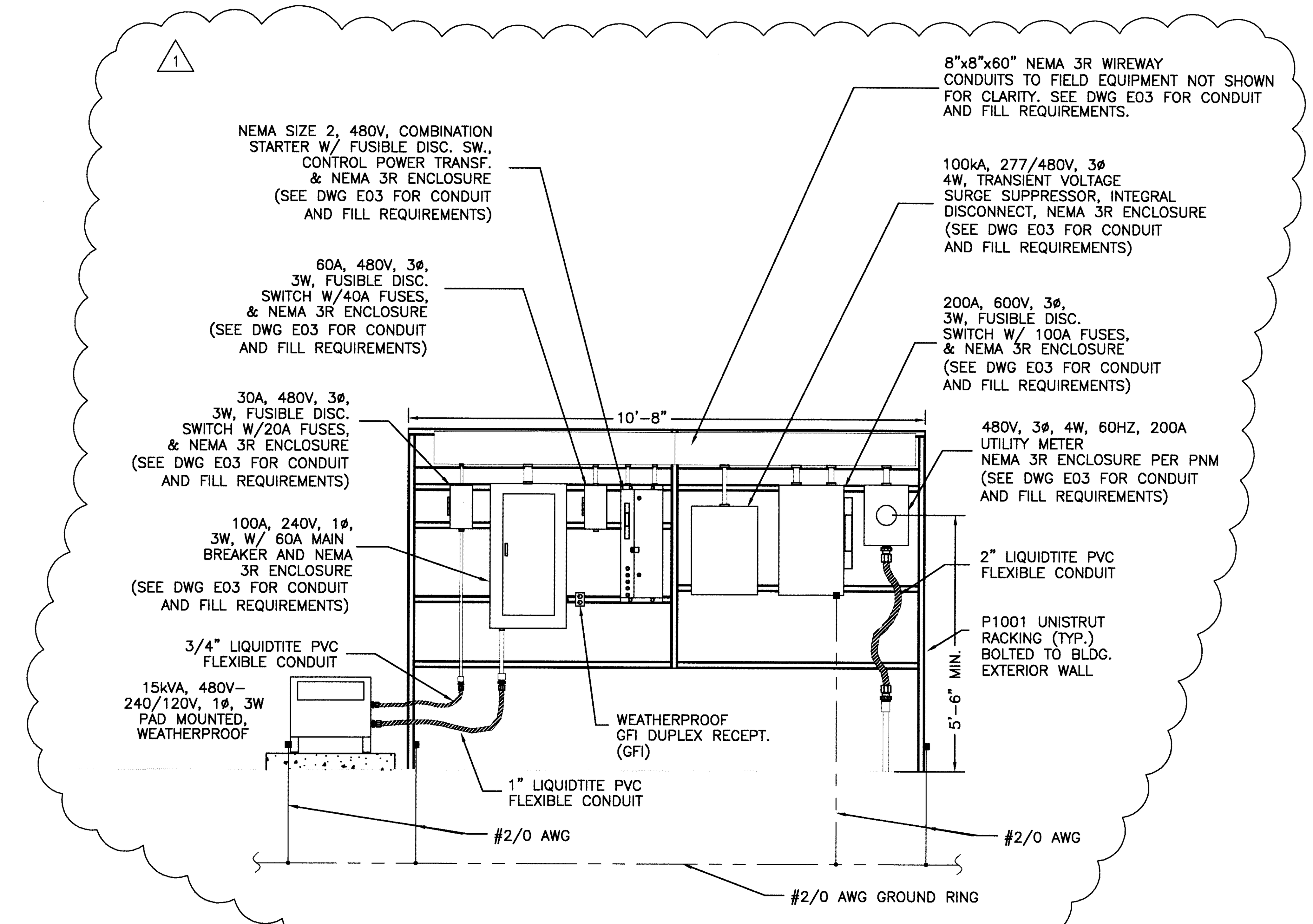
REFERENCE No. 09903E06RB
REVISION 1
DRAWING No. E06



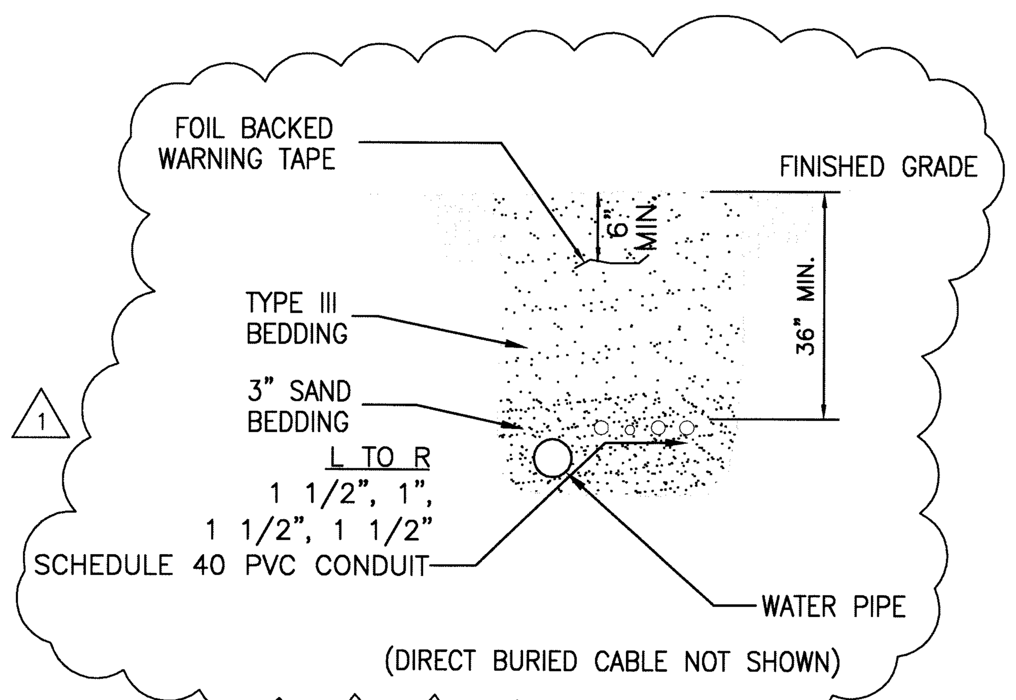
DETAIL–PNMR 1/E04
SCALE: 1/2" = 1'-0"



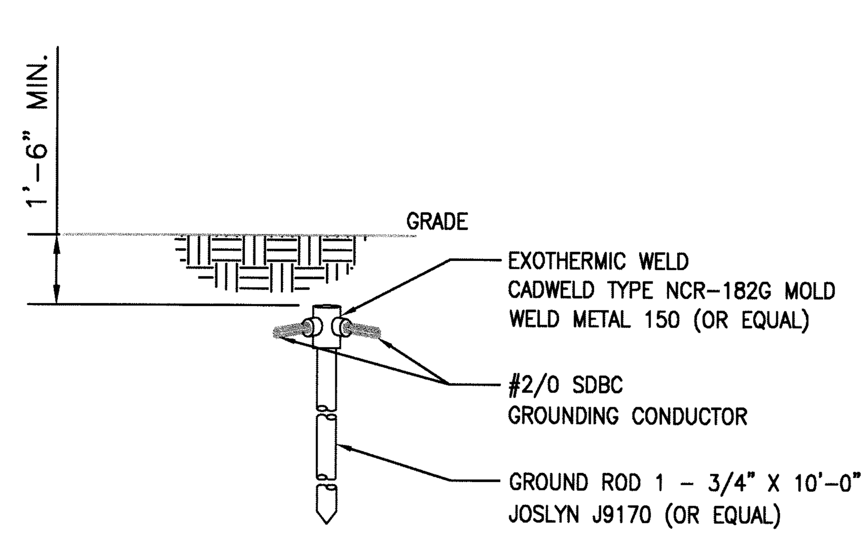
DETAIL–PNMR 6/E04
SCALE: 1/2" = 1'-0"



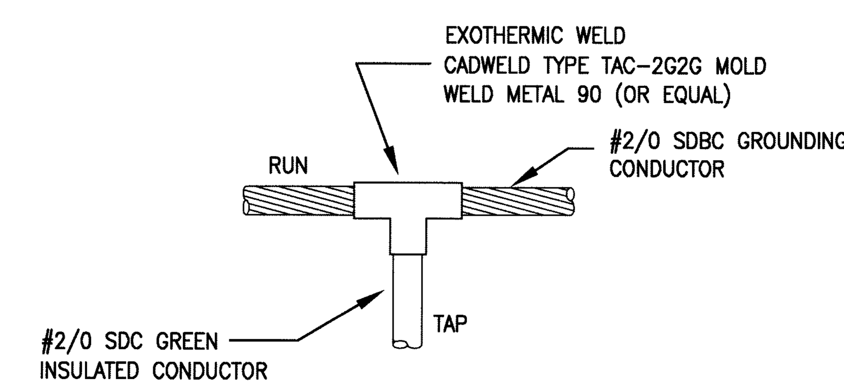
DETAIL–LALF 4/–
SCALE: 1/2" = 1'-0"



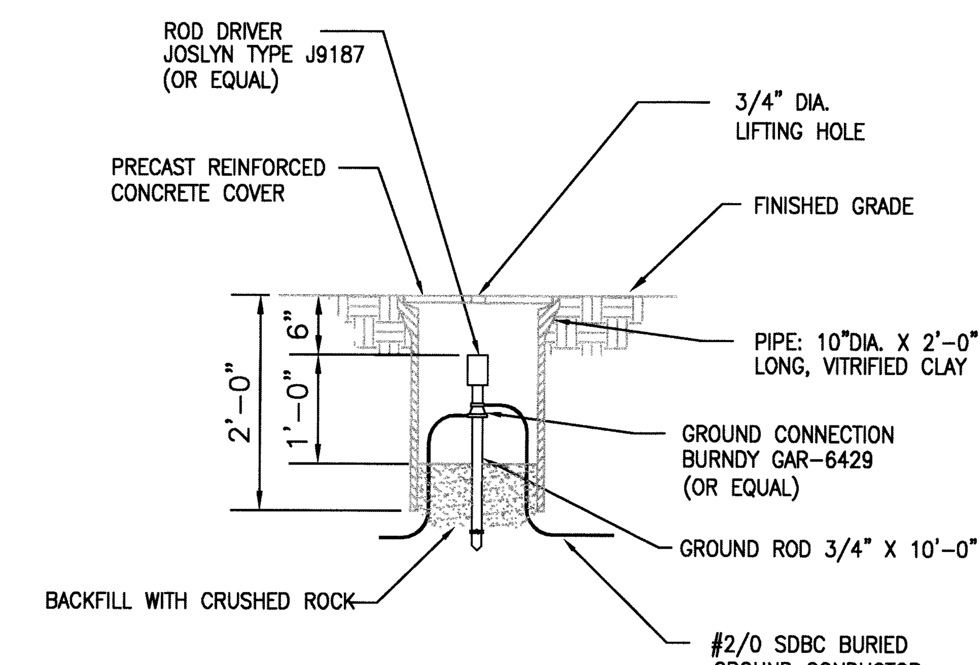
SECTION–PNMR A/E04
SCALE: N.T.S.



DETAIL–TYP. 2/–
SCALE: 1/8" = 1'-0"

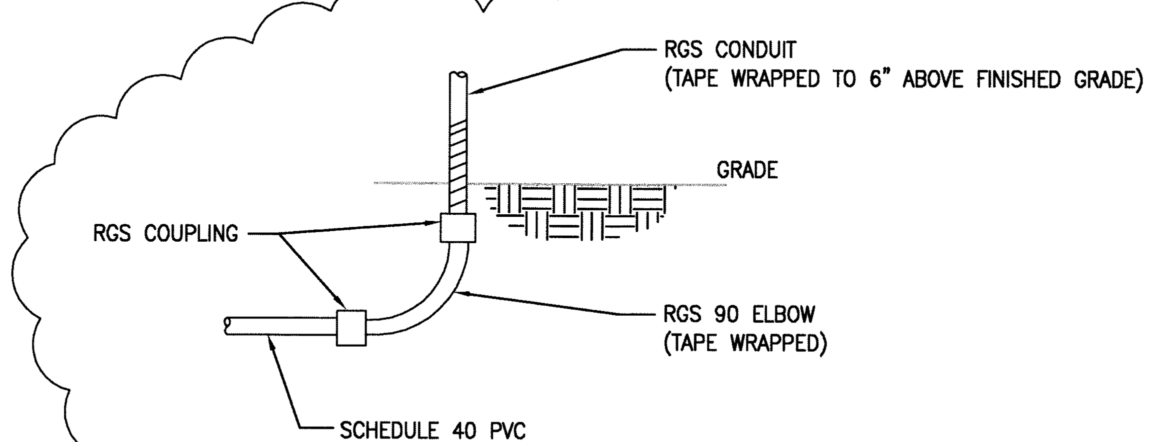


DETAIL–TYP. 3/–
SCALE: 1/8" = 1'-0"

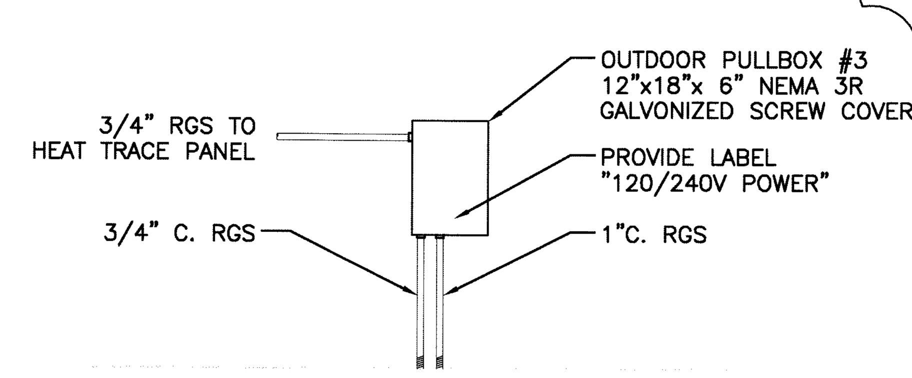


NOTE:
TOP OF GROUND TEST WELL SHALL BE INSTALLED EVEN WITH FINISHED GRADE.

DETAIL–LALF 5/–
SCALE: 1/8" = 1'-0"



DETAIL–TYP 7/–
SCALE: N.T.S.



DETAIL–PNMR 8/E04
SCALE: N.T.S.

ISSUED FOR CONSTRUCTION
APPROVED ______ DATE ______

HANLON & ASSOCIATES, INC.
A NEVADA CORPORATION
284-C EAST LAKE MEAD DRIVE, #150
HENDERSON, NEVADA 89015-5582
(702) 564-4940

HANLON ENGINEERING & ASSOCIATES, INC.
AN ARIZONA CORPORATION
TUCSON, ARIZONA (520) 326-0062
PHOENIX, ARIZONA (480) 223-0360
VANCOUVER, B.C. (604) 224-1514

REVISION HISTORY

No.	BY	DATE	DESCRIPTION
1	CH	03.04.05	CLIENT COMMENTS

		DATE
SCALE:	NONE	
DWG BY:	FEH	8.23.04
APPRV'D BY:	CRH	8.23.04
CLIENT APPROVED BY:	INITIALS	DATE

HYDRO GEO CHEM, INC.

ALBUQUERQUE - LOS ANGELES LANDFILL

PNM REEVES & LALF
ELECTRICAL
SECTIONS & DETAILS

PHASE II

REFERENCE No. 09903E07RB
REVISION 1
DRAWING No. E07

APPENDIX F

Enclosed Ground Flare O&M Details and Spare Parts List

MAINTENANCE SCHEDULE

FREQUENCY		CHECK
Daily	**A.**	**Fill out the Daily Flare Station Data Log**
	B	**Visually inspect unit – repair any breaks, leaks, and loose wires.**
	C.	**Follow all Manufacturers Recommendations in Section 6**
	D.	**Test Lamps by pushing the lamp test button.**
	E.	**Check Compressor oil level at sight glass per Section 9.**
	F.	**Check Lubrications on airliners**
	G.	**Check Air Dryer Gauges & Condensate Discharge.**
Weekly	**A.**	**Check Air Dryer oil remover filter if it is red, replace. Clean coils with compressed air.**
Two Months	**A.**	**Grease Blower per Blower Manufacturer instructions.**
Three Months	**Shut the flare down and perform the following procedures:**	
	A.	**Check ignitor gap – Verify that the ignitor gap is between 3/32" & 1/8". Regap as necessary. Verify that the spark is at the tip of the ignitor.**
	B.	**Inspect Ignitor Wiring – Examine the wire which runs between the ignition transformer on the flare and the ignitor plug in the pilot assembly for frayed, heat damaged or worn insulation.**
	C.	**Check pilot – With the "FLARE STATION" switch in the "TEST" position turn the pilot switch to the "TEST" position. Verify that the pilot lights and displays at least 3VDC on UV Sensor. Return the "PILOT" switch to the "AUTO" position. Check pilot gas pressure with a manometer for 7" WC.**
	D.	**Check Thermocouple Voltage – After the flare has been off for at least 1 hour, open the breaker, then open the control panel and the swing panel. Locate the Thermocouple Terminal Blocks TB-TC. Measure the voltage between the red and yellow wires of TE-501 through TE-503 and convert that voltage to temperature using the "K" type thermocouple chart in the back of TAB 6. The readings should be within 25º F of ambient temperature. Call PEI if a greater discrepancy exists. Close the swing panel and the enclosure door, then close the disconnect.**

E. **Check FV-301 – With the "FLARE STATION" switch in the "TEST" position, turn the "Shutdown Valve" switch to the "OPEN" position. As the valve opens, verify the "OPEN" lamp lights. After the valve has reached the full open position, turn the valve switch to the "CLOSE" or "AUTO" position and verify that the valve closes in less than 2 seconds. Return the valve switch to the "AUTO" position.**

F. **Check Blower – With the "FLARE STATION" switch in the "TEST" position, turn the "BLOWER" switch to "TEST" position. Verify that the blower contactor closes properly (i.e. without chattering, etc.) And the blower starts smoothly. After the blower has reached maximum speed, turn the "BLOWER" switch to the "AUTO" position and verify that the blower stops properly.**

G. **Check all components against the "Setpoint Sheet" in this manual to make sure they haven't been changed.**

H. **Zero out the pressure, delta pressure, and vacuum gauges by closing off the valves in the gas lines to the gauges and opening the valves in the tees to atmosphere. Adjust the zeroing screw until the needle points to zero.**

I. **To calibrate the Flow and Pressure Transmitter refer to Section7, <u>Manufacturer's Literature</u>, Tab 20.**

J. **Remove the 8" blind flange inspection port on the demister and remove any debris that has collected.**

K. **If the pressure drop across the demister reaches two times its original value, open up the top of the demister and pull out the element. There are two rods at the top that are attached to the demister element that make it easy to do this. Hose the element down with high pressure water and put it back in the demister container.**

L. **Put the Temperature controller (YIC-1) man/auto Temp in manual mode which is "0" and Increase and decrease the output (YIC-1) Man Louver Out SP to 100% then 0% and make sure the louvers go all the way closed then all the way open respectively. Adjust the linkage if need be.**

M. **Test the high Temperature shutdown while the flare is operating by turning the thermocouple switch (TES-1) to "OFF" position. This will give the system an open thermocouple signal (2424º F), the unit should shutdown on high temperature after 10 sec.**

N. **Test the blower fail (overload) shutdown by pulling out the reset button on the motor starter. The system should stop immediately. Do not forget to reset it by pushing it in again.**

O. **Test the pilot fail shutdown by turning off the propane and starting the system. The system should shut down after YIC-1 Pilot On Timer Setpoint times out.**

P. **Test the flame fail shutdown by closing the manual inlet valve while the system is running and after the pilot has turned off. The system should shutdown in a few seconds.**

Q. **Test the low temperature shutdown by putting (YIC-1)man/auto Temp to "0" and man Louver Out SP to 100%, the louvers open until the flare temperature drops below 1300º F or lower than wherever you have the low temp setpoint. It takes whatever YIC-1 low flare Temp Shutdown and Timer Setpoints are before the system will shutdown.**

Annually **Shut the Flare down and perform the following checks:**

A. **Look for Arcing contactor points – Check the switches, and the contractor.**

B. **Re-Torque all Electrical Connections – The most critical areas to re-torque are the Thermocouple leads, and main power leads in main disconnect and motor starters.**

C. **Check for Loose Bolts on the structure and at the Flanges.**

RECOMMENDED SPARE PARTS LIST

FOR FLARE STATION

Qty.	Device	Manufacturer	Part #	Ref. Des.
1	Thermocouple	Noral	OCO704 P9 (3/4) U=24”	TE-501..503
1	Ignitor	Auburn	I-64-3	IGN-1
1	Ignition Transformer	Honeywell	O624A1014	E/E-1
3	Fuse	Gould	TRS80R, 80 amp	FU-1..3
2	Fuse	Gould	TRS30R, 30 amp	FU-4,5
2	Fuse	Gould	TRS50R, 50 amp	FU-6,7
1	UV Scanner	Honeywell	C7012E1112	BE-501
1	Flame Signal Amp	Honeywell	R7847C1005	BS-1
1	Flame Switch	Honeywell	RM7895A1014	BS-1
1	UV Display	Honeywell	S7800S1001	YIC-3
1	Louver Actuator Motor	Honeywell	M7284A1004	FCV-401,402
1	Digital Input Modual	KOYO	D2-08NA-1	DI-1,2
1	Analog Input Module	KOYO	F2-08AD1	AI-1
1	Analog Output Module	KOYO	F2-02DA-1	AO-1
1	Relay Module	KOYO	D2-04TRS	RM-1,3
1	Coalescer Filter	Aircel	Coalescer Filter	DR-401

*** Refer to TAB3, Service Policy, and Tab 8, Parts & Service**

APPENDIX G

LALF Public Access Plan

FORMER LOS ANGELES LANDFILL
PUBLIC ACCESS PLAN

Prepared for:

City of Albuquerque Environmental Health Department
Environmental Services Division
P.O. Box 1293
Albuquerque, New Mexico 87103

Prepared by:

INTERA

6000 Uptown Boulevard NE, Suite 220
Albuquerque, New Mexico 87110

May 2011

Table of Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,2-DCE	1,2-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane
ACGIH	American Conference of Governmental Industrial Hygienists
AEHD	City of Albuquerque Environmental Health Department
AIBF	Albuquerque International Balloon Fiesta
AMAFCA	Albuquerque Metropolitan Arroyo Flood Control Authority
CFR	Code of Federal Regulations
COA	City of Albuquerque
EDC	1,2-dichloroethane
FID	flame ionization detector
Freon™ 11	trichlorofluoromethane
Freon™ 12	dichlorodifluoromethane
Freon™-113	1,1,2-trichloro-2,2,1-trifluoroethane
Freon™ 114	1,2-Dichloro-1,1,2,2-tetrafluoroethane
ft	foot/feet
ft^3	cubic foot/feet
GFCI	ground fault current interruption
H_2S	hydrogen sulfide
HASP	health and safety plan
HELP	Hydrologic Evaluation of Landfill Performance (modeling software)
HP	horsepower
IDHL	immediately dangerous to health and life
INTERA	INTERA Incorporated
IT	International Technology Corporation
LALF	former Los Angeles Landfill
LEL	lower explosive limit
LFG	landfill gas
MEK	methyl ethyl ketone
MMBtu	million British thermal units
NIOSH	National Institute of Occupational Safety and Health

NMOC	non-methane organic compound
O&M	operation and maintenance
OSHA	U.S. Occupational Safety and Health Administration
PCE	tetrachloroethene
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RV	recreational vehicle
scfm	standard cubic feet per minute
SVE	soil vapor extraction
TCE	trichloroethylene
TWA	time weighted average
UEL	upper explosive limit
VOC	volatile organic compound

1.0 INTRODUCTION AND BACKGROUND

At the request of the City of Albuquerque (COA) Environmental Health Department (AEHD), INTERA Incorporated (INTERA) has prepared this public access plan for the former Los Angeles Landfill (LALF). This document has been prepared to address the increased interest in periodically opening the LALF for multi-purpose recreational uses. Opening the LALF to recreational use poses risks to the public and the existing infrastructure, and exposes the COA to liability associated with those risks. Identified risks include exposure to flammable/explosive gases, toxic compounds, simple asphyxiants, waste (including medical waste), and physical hazards, and damage to landfill gas (LFG) and remediation system infrastructure. In the past, the above risks have been mitigated by restricting access to the site to essential COA personnel and contractors, with the exception being public use during the annual Albuquerque International Balloon Fiesta (AIBF). Public use of the LALF during the AIBF would not, however, be possible without extensive efforts by the COA and citizen volunteers each year to reduce site hazards.

Extending the opportunities for additional public access to the LALF may require changes to current operating practices and implementation of special protocols. This public access plan identifies the risks that pertain to opening the LALF to public access and proposes measures to minimize those risks.

2.0 HISTORY OF THE LALF

The LALF comprises a 77-acre parcel located in northeast Albuquerque at 4300 Alameda Boulevard NE. It is bounded to the north by Alameda Boulevard NE and San Carlos Cemetery, to the east by Washington Business Park and Clifford Industrial Park, to the south by Domingo Baca Arroyo, and to the west by the North Diversion Channel (Albuquerque Metropolitan Arroyo Flood Control Authority [AMAFCA]). It is located approximately 2.8 miles east of the Rio Grande and approximately 1 mile west of Interstate 25. Figure 1 shows the location of the LALF in northeast Albuquerque.

The LALF is located on the first river terrace east of Edith Boulevard. The geology at this location is comprised of middle and upper Pleistocene fluvial terrace deposits consisting largely of pebbly to cobbly sand and gravel (Connell et al., 2001). This river terrace has been used for sand and gravel mining for decades and is still mined at several locations in Albuquerque. Before its use as a landfill, the property was operated as a commercial sand and gravel quarry by Springer Corporation. The COA purchased the property and used it as one of two COA municipal waste landfills from 1978 to 1983 (International Technology Corporation [IT], 1997a).

Nelson (1997) indicates that the waste depth was 25 to 47 feet (ft), while other sources indicate that the average thickness of waste was 6 to 41 ft (IT, 1996). The variable thickness was likely due to the variability in the depth of the quarry pits, although it has been reported that prior to accepting waste, the quarry pits were cut down and leveled (IT, 1997a). The waste stream was reported to include residential, commercial, and construction and demolition waste. Septic waste, car wash sludge, dead animals, and some industrial liquids (i.e., waste printer's ink) were also reported to have been accepted at the LALF (IT, 1997a). There was reportedly no official waste screening plan implemented to keep hazardous materials out of the landfill (Nelson, 1997), and no designated liquid disposal cells were established (IT, 1997a). Industrial waste was accepted with little or no documentation kept of the generators of the waste or types of industrial waste accepted. A 1986 EPA inspection report indicated that improperly disposed industrial waste was accepted at the LALF at an approximate rate of 200,000 pounds per year (EPA, 1986). Medical waste has been observed during maintenance work performed at the LALF, and hazardous compounds (mostly chlorinated solvent residuals and daughter products) have been detected in LFG and vapor and groundwater samples collected from below the landfill.

In 1983, the former LALF was closed with an approximate volume of 118 million cubic feet (ft^3) of waste (IT, 1998b). Closure was completed by covering the surface with approximately 3 ft of soil. No liner was installed beneath the waste, and the cover does not appear to be an engineered cap. During a 1983 study by Fox Consulting Engineers and Geologists, the thickness of the cap was reportedly between 1 and 11 ft (IT, 1997a); however, annual fill and grading events have added significant amounts of fill to some sections of the LALF and a current cap thickness estimate is not maintained. The original closure plan called for a final grade over the site of 2% and seeding to minimize erosion. This portion of the closure plan, however, was not implemented (Nelson, 1997).

Closure activities also included the installation of six leachate monitoring wells (two completed with added LFG probes) and ten methane observation wells (Fox, 1983).

In 1984, the LALF property was transferred to the COA Parks and Recreation Department. From 1984 to 1995, the LALF was used as a launching site for the AIBF (IT, 1997a), and from 1996 through 2010, the LALF has been used for parking and recreational vehicle (RV) accommodations during the AIBF.

In 1995, methane gas was detected in the Washington Business Park to the east of the LALF (IT, 1997a). Subsequently, monitoring and testing of the structures and utilities around the LALF were initiated. These monitoring efforts eventually led to the installation of an LFG collection system at the LALF, the installation of off-site LFG probes, the installation of 19 groundwater monitoring wells, and construction of a remediation system (soil vapor extraction [SVE] and groundwater pump-and-treat) to address non-methane organic compound (NMOC) impacts to soil and groundwater.

2.1 Historical Investigations and LFG Control

Since the landfill closure work in 1983, many site investigations, LFG abatement actions, and subsurface remediation efforts have been performed at the LALF. This section will highlight some of the important work that has been completed, specifically with regard to characterization and LFG generation, collection, and management.

A hydrogeologic study was performed in 1987 that included the installation of groundwater monitoring wells and development of a groundwater model. Additional wells were installed by the COA between 1989 and 1991 (IT, 1997a).

In the summer of 1995, the former Gas Company of New Mexico detected elevated methane levels during routine leak detection surveillance of gas lines in the Washington Business Park. Subsequent analyses indicated that the detected methane was not a Gas Company product (IT, 1996).

The COA responded by monitoring for methane in occupied structures and subsurface utilities where it was found at elevated levels in some utility valve boxes and manholes. Further monitoring and investigations performed by the COA and IT identified that LFG was the source of the elevated methane levels. In 1996, IT submitted a report entitled, *City of Albuquerque, Landfill Gas Assessment of the Former Los Angeles Landfill, Final Technical Report*, which documented the results of the studies. IT determined through monitoring and a soil vapor survey that LFG was not found in ambient spaces in occupied buildings; however, exterior utility and surface crack monitoring found methane concentrations of over 400% of the lower explosive limit (LEL) (greater than 20% methane). A direct-push soil gas survey was conducted across the surface of the LALF and into the Washington Business Park. The results showed maximum methane levels of over 60% methane in the landfill. Hydrogen sulfide (H_2S) levels exceeded 1,000 parts per million (ppm) in several locations below the landfill surface with a maximum H_2S level of 8,000 ppm measured in a sample collected near the center of the landfill (the occupational exposure limit for H_2S is 10 ppm). The following volatile organic compounds (VOCs) (chlorinated compounds and petroleum hydrocarbons) were detected in LFG samples submitted for laboratory analyses (note that the analyte list was limited to just 16 NMOCs):

- 1,1-Dichloroethene (1,1-DCE)
- 1,2-Dichloroethene (total)
- 1,1,1-Trichloroethane
- 1,1,2-Trichloroethane
- Benzene
- Chloroform
- Ethylbenzene
- Tetrachloroethene (PCE)
- Toluene
- Trichloroethene (TCE)
- Total Xylenes

Based on LFG collection pilot testing performed between 1995 and 1996, a conceptual design for a perimeter LFG collection system was provided in the 1996 IT report.

On behalf of the COA, IT conducted site investigation activities and a preliminary risk assessment during 1995 and 1996. The results of the investigation were provided in a report entitled, *Site Investigation and Preliminary Risk Assessment of the Los Angeles Landfill*, dated February 1997. The objective of the assessment work was related to determining the source of the groundwater contamination that was discovered under and downgradient of the LALF. The assessment included an extensive look at former landfill operations, local geology/hydrogeology, LFG composition, and geochemistry of groundwater. These topics were critical to the mitigation design process for the groundwater remediation system that was eventually installed.

The investigation included modeling leachate migration using "Hydrologic Evaluation of Landfill Performance" (HELP) modeling software. The results indicated that leachate was not likely to migrate beneath the landfill based on closure assumptions and existing conditions at the time. IT's investigation resulted in a site conceptual model that indicated groundwater contamination resulted not from leachate reaching groundwater, but from the migration of VOC-laden vapors (later studies provided evidence that leachate likely did reach groundwater).

A risk assessment included in the 1997 IT investigation report identified 1 metal and 11 chemical compounds that were considered contaminants of concern in groundwater. These included manganese; dichlorodifluoromethane; 1,1-DCE; 1,1-dichloroethane (1,1-DCA); 1,2-dichloropropane; 1,1,2-trichloro-2,2,1-trifluoroethane (Freon^{TM}-113); methylene chloride; TCE; PCE; toluene; 1,1,1-trichloroethane (1,1,1-TCA); and trichlorofluoromethane (Freon^{TM} 11).

The risk assessment identified a municipal well approximately 3.1 miles south of the LALF as the closest receptor to the landfill-derived groundwater contamination. This was the only route of exposure identified with regard to human contact with the contaminants of concern; however, since the source of the contaminants of concern is the LALF, exposure to these chemicals may also be expected through contact with, or inhalation of, LFG, vapors collected from beneath the landfill through the SVE system, and contact with liquid condensate.

The 1997 IT investigation report combined the results of the 1996 Landfill Gas Assessment (IT, 1996) with additional investigation work. The results of the direct-push soil gas readings were presented. Copies of the LFG concentration contour maps (methane, H_2S, TCE, and PCE) from the report are included in Appendix A. Vapor samples collected from the vadose zone beneath the landfill had detectable concentrations of the groundwater contaminants of concern in addition to a variety of other VOCs. A list of VOCs detected over time at the LALF is included in Section 4.1.2 of this report (Table 2).

In May 1997, IT submitted the final design for the LALF perimeter LFG extraction system, including the design specification, drawings, contract documents, and engineer's estimate of construction costs for a perimeter LFG collection system. The design was for phase one of the construction, which was for installation of infrastructure along the east edge of the LALF. The key components of the design included 17 perimeter extraction wells, 5 extraction wells on the interior portion of the landfill, 5 condensate sumps, isolation valves, header and lateral piping, and an enclosed ground flare at the south end of the landfill (IT, 1997b).

The first phase of construction of the perimeter LFG extraction system was completed by IT in 1998. Significant Phase I system components included:

- An 8-inch nominal diameter buried header system.
- 6-inch nominal diameter buried lateral piping.
- 4-inch diameter LFG extraction wells.
- Pre-assembled horizontal wellhead assemblies installed below ground in flush-mounted vaults.
- Pre-fabricated condensate sumps.
- A skid-mounted enclosed ground flare system that included the following elements:
  - Enclosed ground flare with a 22-million British thermal units (MMBtu) per hour rating.
  - An automatic condensate destruction system.
  - A condensate knockout vessel.
  - A 20-horsepower (HP), 150 to 1,000 standard cubic feet per minute (scfm) blower.
  - An air compressor and dryer for the condensate recovery system.
  - A control system with an alarm autodialer (IT, 1998a).

The operational goals for the LFG extraction system were identified as:

- Removal of LFG from the adjacent Washington Business Park.
- Control of off-site subsurface migration along the eastern edge of the LALF.
- Maintenance of an anaerobic state within LFG-generating areas of the landfill.
- Conformance with environmental regulatory compliance requirements (IT, 1998b).

In 1999, a claim was filed by a real estate developer for damages caused by methane contamination of his property. The claim included damages to the property to the west of the former LALF in the Alameda Business Park. The COA responded by paying for damages and, ultimately, purchasing property from the developer to prevent future development (North Wind, 2007). Concurrent with the settlement, the LFG extraction system was expanded to include infrastructure on the west side of the LALF to control offsite migration.

Phase I construction of the LFG extraction system included flanged ends on the header that allowed for later expansion. In 1999 and 2000, the remainder of the LFG extraction system was installed. The Phase II expansion included connecting the header system on the east side of the

LALF with an additional section of header that circumnavigated the entire south, west, and north edges of the LALF, creating a complete loop. The header system expansion connected an additional 24 perimeter and 11 interior LFG extraction wells. Additionally, nine isolation valves, three condensate sumps, two air line isolation valves, and two condensate line isolation valves were installed during Phase II work. One of the installed laterals connected the header on the east and west sides of the LALF about midway between the north and south ends. Isolation valves installed at each point on the header where the crossing lateral connected provided added flexibility in operating the LFG extraction system and the ability to isolate sections of the landfill from extraction (useful in system optimization or when performing system repairs).

As in Phase I, the new infrastructure was constructed below grade where feasible. The extraction wellheads were upgraded to pre-fabricated vertical wellheads that allow some flexibility for dealing with subsidence issues. A drawing showing the Phase II (final) system layout, including recent upgrades, is included as Figure 2. The infrastructure installed during Phases I and II is still operational as of the date of this document, and few substantial changes have been made. Since 2000, minor improvements and maintenance actions to the LFG extraction system have been documented and are on file with the AEHD.

In 2006, the COA installed a microturbine at the LALF as a pilot project to obtain a beneficial use from the collected LFG. The microturbine pilot project uses the LFG to generate electricity. The microturbine was installed adjacent to the enclosed ground flare at the south end of the LALF. High voltage power lines return generated power from the microturbine to the utility grid. The skid-mounted pilot project system includes the following components:

- An inlet moisture separator
- A condensate pump
- A blower
- A gas/gas and gas/water heat exchanger
- A packaged chiller
- A control panel with remote system control
- A granular activated carbon filter vessel
- The microturbine (model MT 70)

2.2 SVE System Installation

Additional site investigation work to further characterize the extent and magnitude of the persistent contamination of groundwater beneath and downgradient of the LALF was performed in 2001. Vapor samples collected from LFG extraction wells and existing soil gas probes were found to contain the VOCs previously identified as contaminants of concern as well as additional VOCs that are included in Table 2 in Section 4.1.2 of this document. Most of the compounds detected are associated with either refrigerants or the production of plastics. The final list of groundwater contaminants of concern that were to be targeted by remediation efforts included the VOCs: PCE, TCE, 1,1-DCE, 1,1-DCA, and methylene chloride. Additional site investigation work was performed to characterize transport mechanisms, sources, and site physical properties. The investigation also included pilot testing and evaluation of cleanup options (Hydro Geo Chem, Inc., 2002).

In 2005 and 2006, the COA addressed the contamination of groundwater by installing a groundwater pump-and-treat system and an SVE system. The groundwater pump-and-treat system was installed off of the LALF property and south of Paseo del Norte Boulevard NE. The infrastructure and operation of the pump-and-treat system will not be impacted by public access to the LALF and will not be further addressed in this document. The SVE system, however, was installed on the LALF property. The SVE system consists of a number of vapor extraction and injection wells. All of the SVE wells are screened at depths below the bottom of the landfill. An induced vacuum acts to remove VOCs from the vadose zone (unsaturated soils between the ground surface and the groundwater table) to prevent ongoing contamination of the groundwater from the landfill. A vacuum is induced on the extraction wells by a blower connected to the wells by conveyance piping. Collected vapors are discharged directly to the atmosphere. In order to reduce the potential for the extraction wells to pull LFG from the bottom of the landfill or introduce added oxygen into the landfill from an induced vertical pressure gradient, air is injected into strategically placed wells. The objective of the air injection system was to try to sustain a horizontal flow pattern in the vadose zone. The SVE system was constructed with the following elements:

- 20 extraction wells at ten separate locations with shallow and deep wells installed at each location.
- Six air injection wells installed at three separate locations.
- Common extraction piping connecting the ten extraction well locations and common injection piping connecting the three injection well locations.
- 19 condensate sumps.
- 13 flush-mounted well vaults containing wellhead plumbing and controls including gate valves, sample ports, and pressure gauges (two of the SVE wellheads have since been converted to aboveground completions).
- 13 monitoring probes with separate shallow and deep screen sections at each location.

- A skid-mounted blower system consisting of a 15-HP extraction blower, a 10-HP injection blower, a condensate knockout vessel, and a 1-HP condensate transfer pump.
- A condensate storage tank.
- System controls.
- A pre-engineered metal building (enclosing the pump skid, tank, and controls) surrounded by a locked chain-link fence.

Most of the conveyance piping is installed below grade, but the remainder of the SVE system infrastructure penetrates the landfill cover (i.e., well vaults and condensate sumps) or is constructed above grade. The well vaults are flush mounted, but efforts are maintained to prevent traffic impacts. Each sump consists of a riser pipe and a valve box surrounded by bollards. The skid building is centrally located on the LALF and is serviced by buried high-voltage power lines from the transformer located on the east side of the LALF. A site plan showing the layout of the SVE system at the LALF is provided as Figure 3.

2.3 Peripheral LALF Infrastructure

Between 1984 and 2006, improvements were made to the LALF that provided infrastructure supporting the event. These improvements included bringing electrical power to the property, installing street lights, and maintaining a small storage and operations building on-site.

Safety concerns regarding the infrastructure and its maintenance was a source of increasing concern. In 2007, the COA obtained independent reviews of the LALF conditions and operation with the intent of identifying potential safety concerns and ways to adequately address them. These reviews were performed by the State of New Mexico Occupational Health and Safety Bureau and by a private contractor.

One of the major health and safety risks identified in 2007 was the existence of an electrical distribution system used by the AIBF that was not constructed to electrical code. Inspection of the system showed that for many years, AIBF volunteers had retrofitted and repaired the distribution system without adequate regard to standard electrical safety practices and without obtaining COA permits or inspections. Many of the splices and wiring schemes were found to present a significant hazard to those that might perform maintenance on the distribution system as well as to the casual user. In May 2007, the AEHD directed the decommissioning of the former electrical distribution system at the LALF. The decommissioning activities were completed by the COA's electrical contractor, who was directed to disconnect the switchgears, step-down transformers, electrical pedestals, and other ancillary electrical infrastructure used for the AIBF RV parking. As a result of this work, power to AIBF buildings and the street lights was permanently disconnected.

To address the need for providing temporary power to RVs during the AIBF event, the COA worked with the AIBF to safely restore power to a portion of the LALF. A licensed electrical engineer designed a system to provide buried power from the transformer to a series of permanent step-down transformers, disconnects, and circuit breaker boxes. From the circuit breaker boxes, temporary power lines would roll out to permanent junction boxes/outlets. The electrical distribution system was installed on the east side of the LALF near the east entrance gate (Gate 8). The distribution system provides 50-amp, 250-volt service to 40 RV spaces, and 30-amp, 120-volt service to 200 RV spaces. The permanent infrastructure is enclosed by chain-link fencing, and the circuit breaker/motor control cabinets have locking doors.

The AIBF's skid-mounted check-in shed was moved to a more suitable location on the north end of the LALF, and the remaining structures, which were found to be unsafe, were demolished. Most of the street lights are still standing on the LALF, but are not functional.

The COA's Parks and Recreation Division maintains buried water lines that run down the center of the LALF from north to south. Water spigots daylight at the surface for connection of roll outs or direct connection by RVs. Water is supplied from the Washington Business Park near Gate 8.

A site plan showing utilities and peripheral infrastructure is provided as Figure 4.

The COA maintains 19 groundwater monitoring wells that were installed at or near the LALF property. Seven of the groundwater monitoring wells are within the fenced portion of the LALF. The groundwater monitoring wells located on the LALF were constructed with riser casing that is typically a few feet above the ground surface. Bollards are used in many locations to protect the wells from being damaged by vehicles. The COA routinely accesses these groundwater monitoring wells as part of operation and maintenance (O&M) activities at the LALF.

3.0 LALF O&M

Although the LALF is an officially closed landfill, the AEHD is responsible for maintaining several mechanical systems at the LALF and ensuring that LFG continues to be contained within the LALF property. The O&M activities account for workers being on or adjacent to the LALF approximately 60% to 70% of working week days during the year. O&M responsibilities range from routine tasks to providing emergency response to malfunctioning equipment. Interruption of some O&M activities to accommodate public access to the LALF may not be possible. It needs to be understood that AEHD O&M activities take priority over approved public access and ongoing O&M activities may occur concurrent with approved public uses. A summary of necessary O&M activities that are performed at the LALF is provided in this section.

3.1 Landfill O&M

The LFG extraction system at the former LALF has been operating nearly continuously (with the exception of brief O&M events) since 1998. General routine O&M activities include:

- Semiweekly LFG extraction system flow/methane level balancing performed to optimize gas collection efficiency and minimize oxygen intrusion into the landfill.
- Semiweekly monitoring of perimeter and off-site LFG probes to ensure that LFG is not migrating off of the LALF property.
- Weekly inspection/monitoring of the enclosed ground flare and maintenance to associated mechanical equipment.
- Weekly and as-needed evacuation of passive condensate sumps.
- Housekeeping.
- As-needed repairs and improvements.

Average methane concentrations recorded after well field balancing events are approximately 38% to 40%. While well field balancing activities are performed to optimize LFG recovery rates, and these efforts have yielded fairly consistent methane levels observed at the flare, the average LFG recovery rate is gradually declining. This apparent reduction in LFG production is consistent with the expected life cycle of the landfill. LFG production models predict that the highest LFG production rates typically occur within several years of the closure date of the landfill. This peak is followed by a rapid decrease in LFG production, followed by a moderate decrease over several decades or longer depending on the physical properties of the landfill.

Perimeter and off-site LFG probe data show that the LFG extraction system has been effective in mitigating off-site migration of LFG. Detection of LFG outside of the LALF property has been limited to a few intermittent low-level meter readings over the past several years.

Non-routine maintenance activities typically include responding to emergency conditions (i.e., unscheduled shutdown of the LFG flare system) and performing large-scale repairs that require heavy equipment operation or costly components. Most of the non-routine maintenance activities are related to differential settlement issues and their effects on buried infrastructure. The design of the LFG extraction system had to account for public access to the site, most notably during the annual AIBF. During the AIBF, over a thousand RVs use the LALF surface for camping and recreation. All LFG infrastructures must be secured from public access, which is why most of the LFG extraction infrastructure is below grade. The dynamic nature of the landfill puts strain on plumbing at headers, laterals, wellheads, and condensate collection devices. Every year, the COA invests thousands of dollars to repair subsidence-resultant damage.

The common effects of differential settlement on LALF infrastructure are separation of plumbing connections and “sagging” piping. Breaches in the LFG extraction system result in the introduction of oxygen into the piping and an overall reduction of methane concentrations at the point of collection. A sag in the lateral piping results in the retention of condensate until the water occludes the pipe and prohibits the system from extracting LFG from the wells connected to that line. Since the impacted wells are frequently in areas of the LALF that are more prone to subsidence and elevated LFG generation, settlement impacts can have a direct impact on the quality and quantity of LFG. Additionally, there is the potential for the accumulation of LFG at wellhead vaults or venting to the atmosphere as surface emissions. Repairs to buried infrastructure require excavation of piping, vaults, and/or wellheads, which are often located in waste below the soil cover.

The other major effect of landfill settlement at the LALF is the retention of storm water. Since the landfill was closed, significant settlement has been observed across the entire LALF with select zones being more prone to subsidence (up to several feet a year for some areas). This has resulted in most storm water being retained on the landfill surface. Without an engineered cap, the landfill adsorbs much of the storm water resulting in wetting of the waste, which increases LFG generation rates. The effect that this problem has on public access is saturation of the earthen cover and restrictions placed on vehicular traffic. During years where greater than average precipitation has occurred, there have been instances where RVs have become mired in mud and had to be extricated using tow trucks. Each year prior to the AIBF, the COA invests heavily in importing fill material and grading the surface to induce drainage away from camping zones. This maintenance activity takes weeks to complete and often includes multi-department participation including Department of Municipal Development, Parks and Recreation, and Solid Waste.

3.2 Microturbine O&M

When operational, the microturbine pilot project requires weekly routine O&M. The unit has many consumable parts and lubricants that require scheduled replacement. The microturbine requires LFG supply with minimum methane levels between 35% and 40%. This is the nominal LFG production range of the LALF, and starting and maintaining the microturbine pilot project can require frequent maintenance visits.

3.3 SVE O&M

The SVE system requires weekly O&M visits to service mechanical equipment and monitor system operation parameters. Individual wells are screened monthly for flow, vacuum, and vapors from the landfill. Monitoring probes are screened quarterly, and samples are collected from the system quarterly for laboratory analyses.

3.4 Groundwater Monitoring

Groundwater monitoring wells on the LALF are accessed monthly to obtain groundwater level measurements. Samples are collected quarterly from each well for laboratory analyses.

4.0 IDENTIFICATION OF RISKS

There are many hazards associated with the former LALF. Most of the hazards are addressed through engineering controls, implementation of specific work practices, limiting exposure to the hazards, and employing well-trained and informed personnel to enter and maintain the site. This section identifies the most commonly encountered hazards and risks associated with the LALF. The following discussion is not inclusive of all possible encountered risks. The hazards identified are common to both site workers and the public. Hazards that are considered to be exclusively occupational with regard to COA employees and contractors are not presented here and are addressed in the LALF site-specific health and safety documents.

4.1 Chemical Hazards

The primary environmental media of concern at the LALF is the presence and migration of LFG. LFG is composed of a mixture of many different gases. By volume, the LFG typically measured at the enclosed ground flare at the LALF contains 30% to 40% methane, approximately 30% to 35% carbon dioxide, and a balance consisting of nitrogen and small amounts of oxygen, sulfides, and NMOCs such as chlorinated compounds and petroleum hydrocarbons. These LFG mixtures vary dramatically across the LALF. Some LFG extraction wells routinely produce approximately 50% methane, while others rarely produce significant amounts.

LFG is most likely to be released through the surface of the landfill near penetrations (well locations, excavation locations, etc.), settlement cracks, or areas of thin soil cover. The concentration of LFG is highest at the point of release (i.e., ground surface) and dissipates as it mixes with ambient air.

4.1.1 Explosive/Combustible Gas

The following conditions must be met for LFG to pose an explosion hazard:

- Gas Production – A landfill must be producing gas, and this gas must contain chemicals that are present at explosive levels.
- Gas Migration – The LFG must be able to migrate from its source in the landfill to a point where there is an ignition source. Underground piping/utilities, LFG extraction wells, condensate sumps, tent stakes, or grounding rods may provide migration pathways for LFG. Infrastructure at the landfill that is designed to convey LFG could also be considered a pathway as LFG is moved from the point of generation to a potential point of exposure.
- Gas Collection in a Confined Space or Discharge Point from a Migration Pathway – The LFG must collect in a confined space or discharge from a migration pathway at a concentration at which it could potentially explode. As examples, a confined space may

be a well vault, a manhole, a subsurface space or void, a rodent burrow, or a trench/excavation. A discharge point from a migration pathway could be a leak or discharge from a conveyance pipeline or well, settlement soil cracks that extend to buried waste, discharge from the SVE effluent stack, or any penetration of the landfill cap into waste. The concentration at which the LFG has the potential to explode is defined in terms of its lower explosive limit (LEL) and upper explosive limit (UEL).

Methane is the constituent of LFG that is likely to pose the greatest explosion hazard. Methane is explosive between its LEL of 5% by volume and its UEL of 15% by volume. Methane concentrations within the landfill are typically within 5% to 50%; however, raw LFG in the landfill is unlikely to explode because the percentage of methane may exceed the UEL, and/or oxygen (an essential component of combustion) is generally lower than 5%. As methane migrates and is diluted, however, the methane and oxygen levels may combine to form a mixture containing levels suitable for explosion. At the surface of the landfill, enough oxygen is present to support an explosion, but methane usually diffuses rapidly into the ambient air to concentrations below the 5% LEL.

Other LFG constituents (e.g., ammonia, H_2S, and NMOCs) are flammable; however, because they are unlikely to be present at concentrations above their LELs, they rarely pose explosion hazards as individual gases. Table 1 summarizes the potential explosive hazard of common LFG constituents.

Table 1: Potential Explosion Hazards from Common LFG Components

Component	Potential to Pose an Explosion Hazard
Methane	Methane is highly explosive when mixed with air at a volume between its LEL of 5% and its UEL of 15%. At concentrations below 5% and above 15%, methane is not explosive.
Carbon Dioxide	Carbon dioxide is not flammable or explosive.
Nitrogen	Nitrogen is not flammable or explosive.
Oxygen	Oxygen is not flammable, but is necessary to support explosions.
Ammonia	Ammonia is flammable. Its LEL is 15% and its UEL is 28%. However, ammonia is unlikely to collect at a concentration high enough to pose an explosion hazard.
NMOCs	Potential explosion hazards vary by chemical. The LEL of benzene is 1.2% and its UEL is 7.8%. However, benzene and other NMOCs alone are unlikely to collect at a concentration high enough to pose an explosion hazard.
Hydrogen Sulfide	Hydrogen sulfide (H_2S) is flammable. Its LEL is 4% and its UEL is 44%; however, in most landfills, H_2S is unlikely to collect at a concentration high enough to pose an explosion hazard. NOTE: H_2S health risks are acute. Its flammability is a secondary hazard when compared to its toxic impact on human health.

Table Source – ATSDR 2001

Note: Individually, these gases are typically odorless; however, when combined with each other and in the presence of moisture, they produce a strong, unpleasant odor.

4.1.2 Human Health Risks

While explosions from ignited LFG can pose a very significant health risk, this subsection addresses the chemical effects of LFG on the body. With the exception of H_2S, most typical LFG components will not have acute toxic impacts on the human body. Chemical health risks are often associated with chronic exposure to hazardous chemicals that may occur as a result of occupational contact. The exception to this is the effects of asphyxiants on the human body. Simple asphyxiants are those that displace oxygen in confined spaces resulting in oxygen deficient environments. Although simple asphyxiants may not be considered toxic, their effects on the human body can be deadly. Normally, LFG does not pose an asphyxiation hazard in ambient air. Only when LFG collects in an enclosed space (well vaults, etc.) at concentrations high enough to displace existing air and create an oxygen-deficient environment is an asphyxiation hazard realized (ATSDR 2001). The U.S. Occupational Safety and Health Administration (OSHA) defines an oxygen-deficient environment as one that has less than 19.5% oxygen by volume (ambient air contains approximately 21% oxygen by volume). Any of the gases that comprise LFG can, either individually or in combination, create an asphyxiation hazard if they are present at levels sufficient to create an oxygen-deficient environment. The key components of LFG (methane and carbon dioxide) are simple asphyxiants. Their vapor densities are greater than air and will displace oxygen in enclosed spaces.

Some NMOCs may have toxic effects on the human body. Often, toxic effects are manifested after chronic exposure to irritants or carcinogens. H_2S, however, is acutely toxic and can have lethal effects at concentrations as low as 100 ppm. H_2S is present in LFG at the LALF and has been measured historically at levels exceeding 1,000 ppm. The most recent H_2S survey was conducted in April 2011 by screening LFG with a hand-held instrument. Readings were collected from wellhead plumbing at LFG extraction wells; concentrations of H_2S exceeding 100 ppm were observed at several locations. Results from the April 2011 survey are included on Figure 5.

The uncontrolled placement of industrial waste in the LALF during infilling could have resulted in the disposal of materials composed of a variety of organic compounds including hazardous waste. Table 2 lists NMOCs previously detected in either groundwater samples or vapor samples, along with their occupational exposure limits. Inclusion of compounds in Table 2 suggests that waste containing these compounds was disposed of directly in the LALF, or that the compounds originated from waste that decomposed and released the compound as a vapor. Although the list of detected compounds is extensive, it is likely that it is not inclusive. Prolonged or even short exposures to LFG presents the risk of exposure to a variety of potentially hazardous compounds. The magnitude and extent of any particular NMOC is dependent on where the source of the compound is buried in the landfill in relation to the point of LFG extraction. The Table 2 list of compounds is not compared to any particular reported laboratory analytical data. The intent of Table 2 is to identify which compounds are present in the LALF and their relative toxicity. It must be assumed that the concentration gradient of the compound increases as it approaches the source. For risk evaluation, a conservative assumption is that it is possible that the source could be encountered during excavation and repairs, and compound concentrations at the source could exceed the occupational exposure limits.

The primary route of exposure for LFG and NMOCs is inhalation. The primary indicator of inhalation exposure to LFG is a strong, unpleasant odor. The odor may cause headaches and/or nausea, symptoms that should cease once an individual leaves the immediate LALF area. H_2S, dimethyl sulfide, and mercaptans are the three most common sulfides responsible for landfill odors. These gases produce a very strong rotten egg smell (even at very low concentrations). Studies indicate that of these three sulfides, H_2S is emitted from landfills at the highest rates and concentrations (ATSDR, 2001). Ammonia is another compound that emits a strong odor; however, ammonia must be present in much larger concentrations than sulfides to be detected by the human olfactory system. Table 3 lists common compounds in LFG that can be detected by smell and their odor thresholds.

Dissolved concentrations of NMOCs and other hazardous inorganic compounds could occur in condensate from the SVE system and the LFG collection system. Exposure to condensate provides the opportunity for dermal contact and ingestion. Also, dermal contact and ingestion could result from the handling of excavated waste or waste that "daylights" through the landfill cover.

Table 2: LALF NMOCs and Occupational Exposure Limits

Compound	Immediately Dangerous to Health and Life (ppm)	Threshold Limit Value - Time Weighted Average (ppm)
Hydrogen Sulfide (H_2S)	**100**	**10**
Acetone	2,500	750
Benzene	500	0.5
2-Butanone (methyl ethyl ketone [MEK])	3,000	200
Chloroform	500	10
Cyclohexane	1,300	100
1,2-Dichlorobenzene	200	25
1,4-Dichlorobenzene	150	10
1,1-Dichloroethane (1,1-DCA)	3,000	100
1,2-Dichloroethane (EDC)	50	10
1,1-Dichloroethene (1,1-DCE)	N.D.	None
1,2-Dichloroethene (1,2-DCE)	None	200

Table 2: LALF NMOCs and Occupational Exposure Limits		
Compound	**Immediately Dangerous to Health and Life (ppm)**	**Threshold Limit Value - Time Weighted Average (ppm)**
cis-1,2-Dichloroethene	None	200
trans-1,2-Dichloroethene	None	200
Dichlorodifluoromethane (Freon™ 12)	15,000	1,000
1,2-Dichloropropane	400	75
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon™ 114)	15,000	1,000
Ethyl chloride (Chloroethane)	3,800	100
Ethylbenzene	800	100
4-Ethyltoluene	None	None
Heptane	750	400
n-Hexane	1,100	50
Methyl chloride	2,000	50
Methylene chloride	2,300	50
Methyl isobutyl ketone (hexone)	500	50
Styrene	700	50
1,1,2,2-Tetrachloroethane	100	1
Tetrachloroethene (PCE)	150	25
Tetrahydrofuran	2,000	50
Toluene	500	20
Trichloroethene (TCE)	1,000	10
Trichlorofluoromethane (Freon™ 11)	2,000	1,000
1,1,1-Trichloroethane (1,1,1-TCA)	700	350
1,1,2-Trichloroethane	100	10
1,1,2-Trichlorotrifluoroethane (Freon™ 113)	2,000	1,000
1,2,4-Trimethylbenzene	N.D.	25
1,3,5-Trimethylbenzene	N.D.	25
2,2,4-Trimethylphentane	None	None
Total Xylenes	900	100
Vinyl Chloride	N.D.	1

Notes: The Immediately Dangerous to Health and Life (IDHL) concentration is developed by the National Institute for Occupational Safety and Health (NIOSH). The IDHL is the level at which immediate evacuation is required to avoid irreversible health effects or loss of life. N.D. indicates that an IDHL has not been determined.

The Threshold Limit Value – Time Weighted Average (TWA) is developed by the American Conference of Governmental Industrial Hygienists (ACGIH) and is a concentration at which all workers may be repeatedly exposed, day after day, over a working lifetime without adverse health effects. The TWA is based on an 8-hour day and a 40-hour work week.

Freon is a Trademark for DuPont's chlorofluorocarbons.

Table 3: Common LFG Components and Their Odor Thresholds		
Component	**Odor Description**	**Odor Threshold (parts per billion [ppb])**
Hydrogen Sulfide	Strong rotten egg smell	0.5 to 1
Ammonia	Pungent acidic or suffocating odor	1,000 to 5,000
Benzene	Paint-thinner-like odor	840
Dichloroethylene	Sweet, ether-like odor	85
Dichloromethane	Sweet, chloroform-like odor	205,000 to 307,000
Ethylbenzene	Aromatic odor like benzene	90 to 600
Toluene	Aromatic odor like benzene	10,000 to 15,000
Trichloroethylene	Sweet, chloroform-like odor	21,400
Tetrachloroethylene	Sweet, ether- or chloroform-like odor	50,000
Vinyl Chloride	Faintly sweet odor	10,000 to 20,000

Table Source – ATSDR, 2001

4.2 Physical Hazards

The potential physical hazards encountered at the LALF during routine O&M activities are varied and abundant. The following list of physical hazards is not inclusive, but it covers the basic common hazards associated with either routine operations on the LALF or hazards potentially encountered by the public when the LALF is accessible for recreational purposes.

- Construction zone or landfill surface conditions (i.e., uneven or slippery ground conditions that could result in slips, trips, and falls).
- Equipment and vehicle traffic, including encounters involving pedestrians and vehicles, and operation of equipment around LALF infrastructure. Many uses of the LALF that result from opening the site to the public will likely include the entrance of vehicles and RVs operated by drivers unfamiliar with the site and distracted by external stimuli. During the annual AIBF, the access roads on the LALF are shared by buses, RVs, bicycles, pedestrian, golf carts, horses, and other modes of transportation.
- Working with equipment, hand tools, and infrastructure that is heavy or unwieldy that could result in straining, crushing, and pinching hazards.
- Exposure to adverse weather conditions, including cold stress in the fall, winter, and spring; lightening; and high winds.
- Operation of heavy equipment, including crushing hazards, roll over hazards, and encounters with buried utilities and other LALF infrastructure.

- Heat stress resulting from working in the hot summer months or strenuously without adequate breaks in milder ambient weather conditions.
- Electrical shock resulting from O&M of mechanical equipment on the LALF, operation of generators, and/or connecting RVs to power sources. Also, shock caused by working with electrical devices in inclement or flooded conditions.
- Working near pressurized hydraulic or pneumatic lines on heavy equipment.
- Interpersonal encounters with individuals who are residing or operating outside of their area of comfort or expertise. This includes encounters with impatient, inebriated, distracted, or discontented campers or the general public.
- Waste excavated or "daylighting" through the landfill cover that has sharp edges or points (i.e. broken glass, cans, metal fragment, etc.) that could result in cuts, punctures, or scrapes.
- Hot surfaces on the enclosed ground flare, SVE air injection piping, and mechanical equipment that could cause discomfort or burns if contacted. The enclosed ground flare combusts LFG at temperatures of approximately 1,400 degrees Fahrenheit. Stack discharge temperatures are a hazard to low flying hot air balloons.

4.3 Biological Hazards

Biologic hazards fall into two general categories: those attributed directly to landfill conditions and those attributed to nature and recreating or working outdoors.

Biological hazards directly attributed to the LALF are fairly minimal and could be restricted to potential exposure to medical waste that has been excavated or has "daylighted" through the soil cover. During excavation in the LALF for repair work to landfill infrastructure, medical waste has been observed in the form of syringes, gauze, and other waste that appears to have originated from hospitals or medical practices. Most viruses or diseases cannot remain viable outside of the human body for any extended length of time; however, avoidance of medical waste for cautionary reasons is recommended. Other diseases, such as tetanus, can live in soil and waste and can be transmitted through open wounds.

Biological hazards attributed to nature and outdoor activities at the LALF are related to the fauna present at the site. The LALF is a 77-acre parcel that has a soil cover over approximately 70% of the area (the rest of the site is covered by asphalt milling or concrete). Weeds grow unabated for much of the year. This open, vegetated area is home to rodents, coyotes, reptiles, and insects. Venomous and biting insects are frequently observed in the valve boxes and vaults, and rodents commonly take up residence in the SVE building. Warm-blooded animals can be carriers of diseases like Hantavirus, rabies, plague, and West Nile Virus (to name only a few). Animals exhibiting odd behavior should be avoided and reported to the COA. Areas containing rodent droppings and urine should be avoided or cleaned using a disinfectant. Lastly, mosquitoes or other disease-carrying vectors could breed in standing storm water (either on site or in the adjacent storm water canals) and may be encountered at the LALF.

5.0 RISK MITIGATION PROCEDURES

The COA's primary concern with regard to the former LALF is the protection of the public and the environment from risks associated with the landfill. The sole purpose of the installation and operation of the LFG extraction system was to protect properties and their occupants from the impacts of LFG that had migrated off site. Similarly, the SVE system and groundwater pump-and-treat system were installed to address adverse impacts to the environment and restore the contaminated groundwater to a useable resource.

The AEHD has been proactive about maintaining a safe work site and protecting its employees and contractors from the many occupational risks that are encountered at the LALF. Abatement of risks starts with establishing protocols and work practices that promote safety. Engineering controls are then used where applicable to further reduce exposure to hazardous conditions.

5.1 General Practices and Procedures

The most effective way for the COA to limit liability and protect the public from the risks identified in the previous section is to minimize man hours dedicated to the facility and restrict entrance to trained and qualified personnel. To this end, the AEHD requires COA employees and subcontractors working at the LALF to have and maintain current OSHA Hazardous Waste Operator and Emergency Response training in accordance with 29 Code of Federal Regulations (CFR) 1910.120. Completion and maintenance of this certification ensures that staff working at the landfill are aware of the hazards, understand the risks, can identify potentially dangerous conditions, can employ critical thinking to perform work tasks while minimizing exposure risks, know what instrumentation and equipment to employ to monitor and abate risks, and are able to respond efficiently in the event of an emergency. As required by OSHA, LALF workers are also trained in first aid and cardiopulmonary resuscitation.

The AEHD and its contractors maintain and operate the LALF under a site-specific health and safety plan (HASP). The HASP identifies the risks and establishes procedures for eliminating or abating them. Another policy that the AEHD enforces to ensure worker safety is the implementation of the buddy system. All work performed at the LALF is accomplished by a minimum of two individuals. This policy enforces safe work practices and ensures that maintenance personnel are immediately supported in the event of an emergency. The LALF HASP includes an emergency response plan, identification of emergency medical facilities, and contact information for key personnel and emergency services.

To minimize injuries to facility personnel, the AEHD established a policy requiring that modified Level D personal protection equipment be worn while working on–site (levels of protection are established by OSHA in 29 CFR 1910.120) . Modified Level D includes steel-toed shoes, safety glasses, and long pants. When working around heavy equipment or as required by the tasks being performed, Level D is extended to include safety vests, hard hats, hearing protection, chemical resistant gloves, leather gloves, and/or fall protection harnesses with lanyards. Qualified personnel are required to be trained and certified to move to Level C personal protection equipment if necessary. Level C includes minimal respiratory protection using air-purifying respirators. Certification includes performing annual fit testing with the respirator available for use and maintaining annual medical surveillance to ensure that the individual maintains the level of physical fitness required to work under the added stress resulting from wearing a respirator. Working in Level C or higher levels of protection is discouraged if an engineering control can be used to improve air quality or waiting for improved working conditions is acceptable. Working in Level C will only be performed by COA contractors or personnel that have all of the necessary certifications. INTERA's respiratory protection plan developed for the LALF, including action levels, is provided in Appendix B. In addition to proper personal protection equipment, personnel are provided with a first aid kit, a fire extinguisher, and a cellular phone to be used in case of emergency.

Hand-held LFG analyzers are used to screen for hazardous atmospheres in vaults, trenches, and other enclosed structures prior to gaining access. These meters (combustible gas indicator and photoionization detector) report levels of methane, oxygen, H_2S, carbon monoxide, and the presence of many VOCs. AEHD's contractors also wear personal H_2S monitors while on the LALF to warn against exposure to toxic gas levels.

AEHD employees and contractors follow procedures established in the HASP for operation of heavy equipment, lock out and tag out of equipment under maintenance, performance of hot work, working in confined spaces, trenching and excavation, establishment of work zones, decontamination, and hazard communication. Personnel are restricted from eating or drinking on the LALF to mitigate against ingestion and avoidable contact with hazardous compounds. To reduce the potential for ignition of explosive vapors, the AEHD has banned its employees and contractors from smoking tobacco at the LALF.

The above general practices and procedures are employed by the AEHD for all site work, including preparation of the LALF for recreational uses.

5.2 Annual AIBF Site Preparation Requirements

Every October, the LALF is used for overnight parking of RVs for several weeks during the AIBF. Typically, the AEHD commits approximately three months' worth of department personnel or contractor time to prepare for, manage, and recover from this event. The AEHD is careful to address each of the hazards identified in Section 4.0 of this document and works to minimize associated risks.

From 2007 to 2010, the COA committed over $870,000 in contractor services and materials specifically for preparation and management of the AIBF. This amount does not include commitment of their department's staff and resources or the contributions made by other COA departments and citizen volunteers.

LALF preparation and oversight activities typically address 1) abatement of LFG exposure risks, 2) minimizing physical hazards, and 3) overseeing third-party activities and ensuring the protection of LALF infrastructure.

5.2.1 Abatement of LFG Risks

The AEHD treats the potential risk related to LFG hazards and public exposure as one of its highest priorities each year. As previously discussed, the explosive/combustible characteristic of methane is the highest LFG hazard. The AEHD looks at each possible route of exposure from the buried waste to the ground surface and takes measures to eliminate them. The most common routes of exposure and corresponding abatement actions are described below:

- <u>Leaks in plumbing at wellheads and material transition:</u> As the waste in the landfill continues to decompose, its mass is reduced and differential settlement occurs. The resulting stresses separate pipe connections, create low points in the laterals that retain condensate, collapse flexible hose, and stress polyvinyl chloride (PVC) wellheads to the point of failure. Several months before the AIBF, the AEHD identifies trouble spots in the LFG extraction system and SVE system infrastructure and makes repairs to the system. These repairs typically result in excavation of wellheads, laterals, and other plumbing components. Often the opportunity to upgrade infrastructure and replace damaged vaults is capitalized on.
- <u>Differential settlement creates cracks in the soil cover that create conduits to buried waste:</u> The cracks are most prevalent along the west side of the LALF where storm water accumulates and subsidence activity is the highest. The cracks can open up several inches and have been observed to drain storm water directly to the buried waste. Monitoring the cracks for LFG with hand-held instruments confirms that the cracks are conduits for LFG. Screening of the larger cracks has resulted in over-limit errors on the detection instruments. The AEHD typically addresses this issue by filling the cracks with a bentonite powder, and then mechanically disturbing the soil cover and re-compacting the disturbed soil to close and seal the cracks. The cracks are routinely screened while the LALF is accessed by the public to ensure that the mitigation measure works throughout the AIBF event.

- <u>Penetrations through the soil cover:</u> The soil cover on the landfill is penetrated at each LFG extraction well, groundwater monitoring well, condensate sump, SVE well, and SVE probe. LFG occasionally accumulates in enclosed vaults and requires venting prior to accessing the structure for routine O&M activities. As a precaution during the AIBF, the AEHD secures LFG extraction well vaults and surface features by bolting down/locking vault covers and erecting temporary fencing around each location. This redundant security feature has worked well to discourage vandalism and inquisitive citizens from accessing the wells. AIBF volunteers and vendors erect event tents, install grounding rods, and drive fence posts. Some of these activities result in penetrations deep enough to contact waste. The AEHD or its contractor supervises the advancements of these items through the landfill cover to ensure that there are no conflicts with buried infrastructure. In areas where these penetrations are near heavy public use, LFG levels are regularly monitored with a surface emission monitor.
- <u>Surface emission monitoring:</u> Much of the LALF surface is used for RV parking, balloon skill completion, and general recreation. Because of the size, age, and potential for cover thinning (wind and water erosion), there are risks associated with LFG exiting the landfill vertically through the soil cover. Each year before RVs are allowed to enter the LALF, the AEHD performs surface emission monitoring across the landfill. The survey involves a walking transit of the LALF with a flame ionization detector (FID) and an H_2S meter to screen for surface emissions. As discussed above, spot checks with the FID are performed daily during the AIBF activities. Spot checks are focused on settlement crack repairs and landfill penetrations, and inside large event tents that are set up for RV club events. Daily spot check data is transmitted to the AEHD project manager and any anomalies are confirmed.
- <u>Temporary cessation of SVE system operation:</u> The SVE system directly vents to the atmosphere vapors that are extracted from beneath the landfill. These vapors include common LFG compounds as well as the targeted NMOCs. Direct discharge of the vapors could result in explosive levels of LFG and an inhalation risk to nearby campers. Turning off the SVE system also eliminates nuisance odors and noise that would disturb recreational users of the LALF. The SVE system is turned off before the general public is allowed onto the LALF, and remains off until after the AIBF.
- <u>Security of enclosed ground flare:</u> The flare and equipment skid are enclosed in a chain-link fence with privacy slats that remains locked when not attended. The general public is restricted from that portion of the LALF and parking/camping is not permitted within 50 ft of the flare fence. In the event of an emergency, the enclosed ground flare is turned off.

During the AIBF, AEHD's representatives perform daily site inspections to ensure that there is no damage to LALF infrastructure and that no actions are being taken that may result in LFG exposure. The AEHD, however, cannot continuously monitor the all of the activities across the LALF to ensure that the public is not exposed to LFG. With acknowledgement of this fact, the AEHD establishes conditions of use and protocols for the AIBF organizers to promulgate and enforce. Protocols that are implemented include the following:

- All fires, barbeques, and open flames are prohibited at ground surface. Barbeques are permitted when maintained at least 2 ft above the ground.
- Digging is not allowed.
- Grading, placing soil, or moving soil is prohibited.
- Tent camping on the LALF surface is prohibited and special tent areas should be designated.
- Fireworks, rockets, and other pyrotechnics are not allowed.
- Uncontrolled discharge of water to the LALF surface is prohibited.
- Electrical connections (including wiring and receptacle plug-ins) are prohibited within 18 inches from the ground surface.

5.2.2 Abatement of Physical Hazards

Much of the LALF preparation for the AIBF involves tasks that enhance facility conditions and remove or isolate features that may pose physical hazards. As previously indicated, the AEHD invests considerably each year to try to keep soil-covered areas well drained and free of impediments. Fill material is spread and graded by AEHD contractors and COA employees, and rocks, weeds, and trash are removed using the combined efforts of COA personnel, AEHD contractors, and AIBF volunteers. To mitigate against damage to LALF infrastructure and maintain worker safety, the AEHD restricts the use of heavy equipment to their personnel and contractors only.

Coordinated efforts are made to remove trash from the LALF surface. Most of the trash that ends up on the LALF is deposited by wind from off site sources. Some waste does make it to the surface of the LALF through natural processes or by excavation work. The site is inspected for waste that may be considered medical waste or has sharp edges or surfaces. Trash bins are provided throughout the AIBF event to control littering.

Mitigating electrical shock hazards has been a focus of AEHD in recent years. Removal of relic infrastructure that was not to electrical code was a significant improvement to site conditions. Other measures that have been implemented include:

- Only New Mexico-licensed contractors can make electrical connections and set up roll outs for RV parking.
- The COA electrical inspector must approve all roll out set ups prior to use.
- All electrical panels, transformers, switch boxes, junction boxes, etc., are enclosed in locked fences. AIBF volunteers and the general public are not provided access to these locked enclosures.
- All electrical connections and outlet plug-ins must be maintained 18 inches off of the ground and out of standing water.
- Ground fault interrupters must be used when required by electrical code.
- All equipment must be adequately grounded.
- Roll out cables are protected from being run over to keep wires from being damaged.
- The COA contract electrician is placed on call in case of emergency.

Prior to and during the AIBF, the volunteers (with assistance from the Parks and Recreation Department) take the initiative to maintain traffic control and site security. This includes setting up traffic signs, laying out parking rows with chalk lines, closing off non-traffic areas with flagging and T-posts, and escorting RVs to their designated parking spots. These measures are essential to traffic control and public safety. Security is provided in the evenings and non-paying campers are not allowed on-site. At check-in, campers are notified of site restrictions and volunteers assist the AEHD in enforcing safety protocols.

5.2.3 Abatement of Biological Hazards

Natural biological hazards are mitigated primarily through habitat control. Each year, the COA mows all accessible areas and removes the weeds. This typically displaces rodents and coyotes during the AIBF. Volunteers take the lead on exterminating ants in the camping zones.

There are no RV sanitation dumps at the LALF, but portable toilets are provided as well as daily septic pump out service. These services discourage illegal dumping of septic waste and the associated spread of diseases.

6.0 PUBLIC ACCESS PLAN

The LALF provides a large vacant area that attracts public interest for recreational uses. The site, however, lacks the infrastructure to support recreational uses, and LALF O&M goals conflict with such uses. The previous sections of this document identify the origins of the LALF and provide an overview on the amount of effort and expense the COA has expended at this site to control associated hazards and mitigate associated environmental impacts. Use of the LALF during the annual AIBF has demonstrated that provided with the adequate resources and cooperation from numerous departments and entities, the risks associated with the LALF have so far been controlled. The success of this event is the product of months of prior planning and preparation.

Providing additional access to the LALF throughout the year for other public uses will require a change in the COA's operation and maintenance objectives for the landfill. Modifying the existing infrastructure may be necessary to protect the COA's investment in the infrastructure as well as to protect the public from the hazards previously identified. The hazards associated with the LALF cannot be fully eliminated without excavation and removal of the waste from the property and remediation of the subsurface to regulatory standards.

As it pertains to access to the LALF for public recreational uses, probably the most important element that will affect overall success is the understanding of the risks and hazards associated with the landfill. It is necessary that the organizers of any event at the LALF realize that risk mitigation issues take priority over the success of the recreational use. Because it is unlikely that prospective event organizers can always be relied upon to be advocates for public safety, it is the first recommendation of this plan that the AEHD maintain site control for all recreational uses. This should include coordination with the AEHD and obtaining supervision of the event from AEHD personnel or a contractor trained to respond to the site hazards.

Planning for an event at the LALF should include notification to the AEHD at least four weeks prior to the event, submittal of an operation and risk management plan two weeks prior to the event, and negotiation of an agreement that may include monetary reimbursement to the AEHD for site preparation and event supervision. The user will be required to sign applicable liability waivers and agree to safety requirements imposed by the AEHD.

6.1 Operation and Risk Management Plan

The submittal of an operation and risk management plan by an event organizer must demonstrate an understanding of the site hazards and should include the following items and identify the responsible parties, where applicable:

1. A description of the activity.
2. A traffic/parking plan including the use of signage, attendants, and ground markings.
3. A site security plan.
4. A list of amenities that will be provided and removed (trash bins, toilets, lighting, etc.).
5. A key contact list.
6. An emergency response plan (evacuation procedures and EMS notification/access procedures).

6.2 COA Responsibilities

Prior to public access to the LALF, it is recommended that the following items be addressed. Use of the entire site may not be requested, in which case, site preparation may be limited to the area intended for use as long as adequate precautions are taken to ensure site control is maintained.

1. Secure all vaults and LALF infrastructure in and adjacent to the intended area of use. This includes bolting down covers and erecting temporary safety fencing around features that convey LFG or where LFG could be encountered.
2. Inspect the LALF for settlement cracks and make repairs where needed.
3. Pick up waste that has surfaced from the LALF. Screen the area for medical waste and properly dispose of such waste.
4. Address grading and drainage issues as necessary.
5. Perform baseline LFG monitoring prior to public access. Continue monitoring for LFG as warranted based on the recreational use and the duration of use.
6. Arrange for weed cutting and removal to mitigate fire and biological hazards.
7. Open and close gates and maintain site control throughout the event.
8. Repair and test water lines (as applicable).
9. Turn off the SVE system as necessary and turn off the flare station in emergency conditions.
10. Perform inspections daily (or at other appropriate intervals).

6.3 Organizer Responsibilities

The following items may be the responsibility of the event organizer. Some items may be provided by the COA based on negotiations with the AEHD and the Parks and Recreation Division.

1. Provision of adequate security personnel.
2. Provision, maintenance, and removal of sanitation facilities and garbage bins.
3. Provision of lighting (including power).
4. Provision of required utilities. Limited power and water hookups are available on site. These require inspection and maintenance by the COA prior to use. Repair services may be included in negotiated access fees. Use of existing electrical and water infrastructure requires provision of proper roll out cables and hoses by the organizer.
5. Provision of traffic control including signage, ground markings, flagging, and attendants. Where possible, pedestrian traffic shall be kept separate from vehicular traffic. Employment of COA traffic police may be required if facility use includes foot access across Alameda Boulevard NE.
6. Provision of security fencing or barriers if use is restricted to a limited portion of the LALF.
7. Coordination with public emergency response agencies to develop an appropriate emergency response plan for the event.
8. Provision of dust control measures (water is not available on-site for dust control).

6.4 Guidelines and Protocols for LALF Public Use

The following provisions must be acted upon and are considered conditions of public access. The AEHD and Albuquerque safety professionals have ultimate decision making control at the LALF. Public access can be denied at any time if conditions are found to be unsafe. Event coordinators shall abide by decisions and directives made by the COA.

1. No fires, torches, fireworks, rockets, or pyrotechnics are allowed within the enclosed LALF property. Hot work (welding, brazing, grinding, etc.) must be approved by the AEHD. A hot work permit may be required.
2. Barbeques may only be used with conditional approval and shall be no less than 2 ft above the ground surface.
3. No digging of any kind into the landfill/ground surface shall be allowed. This includes spinning or repeated passes with tires designed with aggressive off-road tread.

4. Removal of weeds and weed seeds shall be coordinated with the AEHD. The burning of weeds is prohibited.
5. Placement of fill material may only be performed by the AEHD or by its contractors or other COA departments under AEHD supervision.
6. Placement of temporary infrastructure shall be coordinated with the AEHD. The operation of heavy equipment on the LALF property is prohibited without AEHD direct supervision. This includes the use of backhoes, graders, compactors, trenchers, etc.
7. No stakes, grounding rods, T-posts or other ground penetrations shall be allowed without coordination with the AEHD and spotting of buried infrastructure. Penetrations deeper than 4 ft will not be allowed.
8. Tent camping or sleeping on the ground is not permitted on the LALF.
9. The uncontrolled discharge of water to the LALF surface shall be prohibited.
10. Any structure or facility brought onto the site shall be well vented. Air intakes should be at roof level or no more than 4 ft above the ground surface.
11. No structures, facilities, or parking is allowed within 50 ft of the fence surrounding the enclosed ground flare and microturbine on the south end of the LALF.
12. Erection of event tents shall be coordinated with the AEHD prior to delivery.
13. No structures, facilities, or camping are allowed in Clifford Channel or along the west side of the LALF where storm water accumulates.
14. No weapons are allowed on-site.
15. Smoking is discouraged and adequate butt disposal receptacles shall be provided.
16. Traffic of heavy vehicles shall be coordinated with the AEHD to protect buried infrastructure.
17. Cables for electrical roll outs shall be protected from vehicle traffic. Trenching for cable runs is prohibited.
18. Ground fault circuit interruption (GFCI) for RV hook ups shall be provided where required by electrical code.
19. Electrical roll outs shall not be placed in standing water.
20. All electrical connections and roll out preparations shall be inspected and approved by the COA's electrical inspector prior to use.
21. Only qualified persons working under the supervision of a New Mexico-licensed contractor are permitted to work on electrical equipment and roll outs.

22. Electrical equipment must be grounded in accordance with electrical codes. All electrical connections and devices shall be no less than 18 inches from the ground surface.

23. Landfill infrastructure shall be protected from vehicular traffic. Tampering with LFG extraction wells, SVE sumps and wells, and any other LALF infrastructure is not permitted.

24. Use of the LALF may require individuals or groups to sign liability waivers and/or forms of acknowledgement of terms of use.

25. Hot air balloons shall not land at or take off from the LALF without explicit permission from the AEHD.

26. In flight, hot air balloonists shall not pass within 100 ft (vertical or horizontal) of the enclosed ground flare at the south end of the LALF.

27. Safety inspections by AEHD or Albuquerque Fire Department officials must be attended as requested.

28. All materials brought onto the LALF shall be removed after use.

7.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 2001. Landfill Gas Primer – An Overview for Environmental Health Professionals. http://www.atsdr.cdc.gov.

Connell, S.D., Lucas, S.G., and Love, D.W. 2001. Stratigraphy and Tectonic Development of the Albuquerque Basin, Central Rio Grande Rift. Open-File Report 454B. New Mexico Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology. April 27 (Revised June 11, 2001).

Fox Consulting Engineers and Geologists (Fox). 1983. Closure Plan, City of Albuquerque Los Angeles Landfill. 1983.

Hydro Geo Chem Inc. 2002. Site Investigation and Remedial Alternatives Evaluation, Los Angeles Landfill Site, Albuquerque, New Mexico. Submitted to City of Albuquerque. January 31.

International Technology Corporation (IT). 1996. City of Albuquerque Landfill Gas Assessment of the Former Los Angeles Landfill, Final Technical Report. March 22.

———. 1997a. City of Albuquerque Site Investigation and Preliminary Risk Assessment for the Los Angeles Landfill, Vol. 1, Technical Report. IT Project No. 766926. February.

———. 1997b. Los Angeles Landfill Perimeter Landfill Gas Extraction System Final Design Submittal. Presented to Environmental Health Department, City of Albuquerque. Presented by IT Corporation. May 5.

———. 1998a. City of Albuquerque As-Builts for the Landfill Gas Extraction System Located at the Former Los Angeles Landfill. IT Project No. 771778. July.

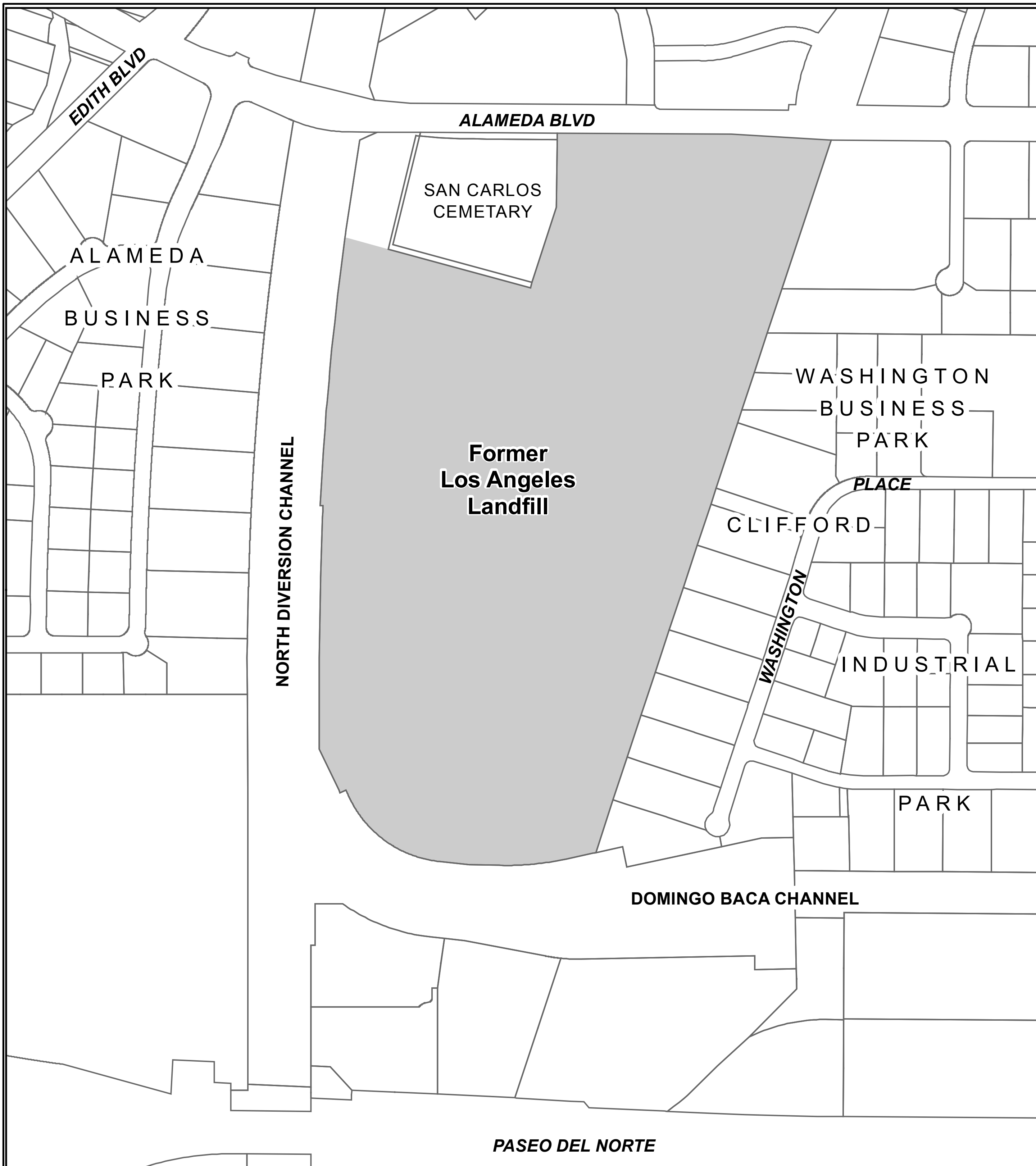
———. 1998b. Operation and Maintenance Manual for the Landfill Gas Extraction System Located at the Former Los Angeles Landfill, Albuquerque, New Mexico. Prepared for City of Albuquerque Environmental Health Department. October.

Nelson, Terry. 1997. Past and Present Solid Waste Landfills in Bernalillo County, New Mexico, 1997. Water Resource Administration Professional Paper. University of New Mexico School of Public Administration. June 25.

North Wind. 2007. Final Report, Los Angeles Landfill Status and Recommendations. Prepared for Environmental Health Department, City of Albuquerque. August 15.

U.S. Environmental Protection Agency (EPA). 1986. Potential Hazardous Waste Site, Inspection Report. Prepared by Richard Rawlings. February 4.

FIGURES



N

500 250 0 500 Feet

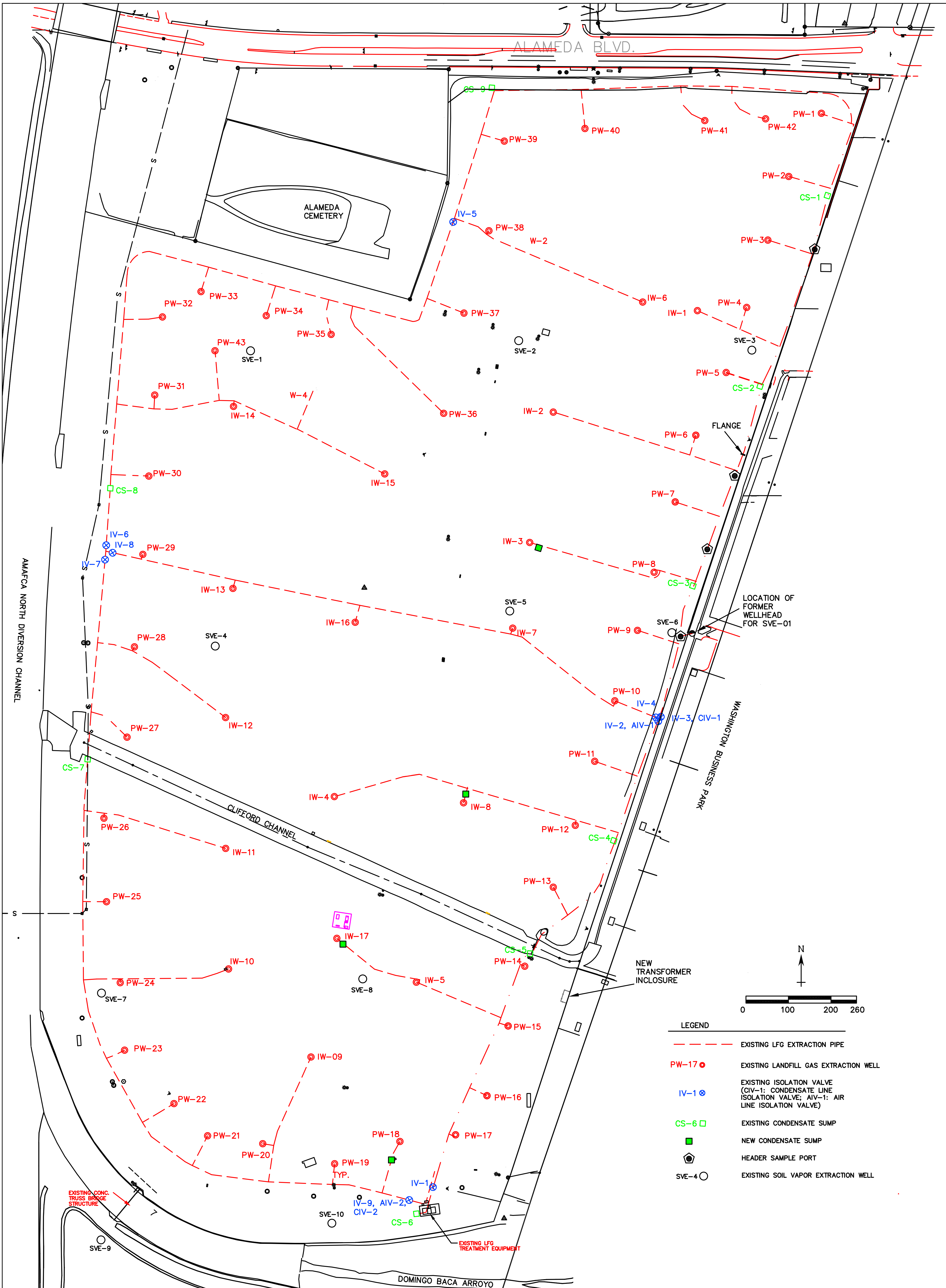
INTERA

SITE MAP

DATE: 06/07/2011

FILE: StreetMap.mxd

FIGURE 1



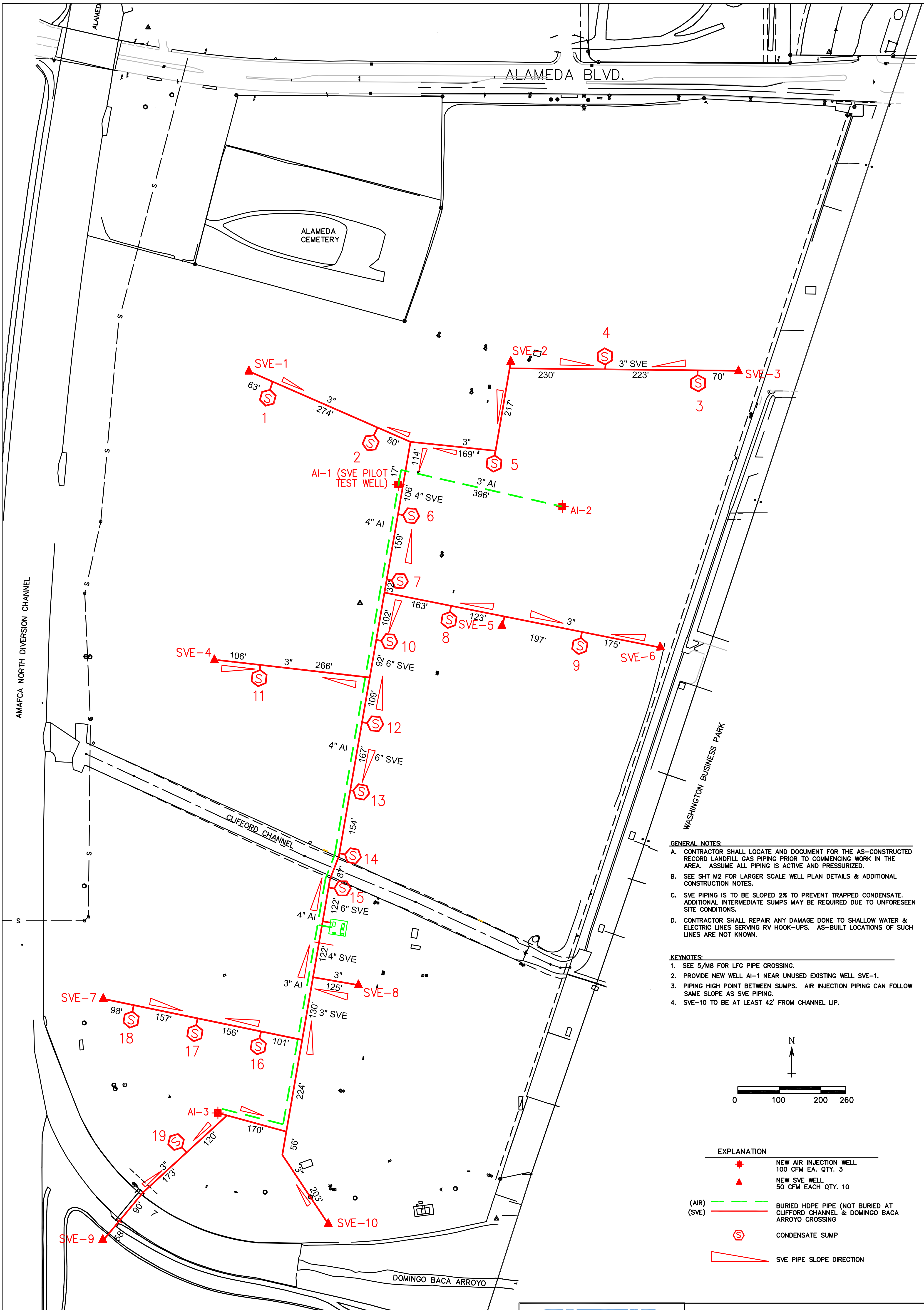
INTERA

LANDFILL GAS SYSTEM
LOS ANGELES LANDFILL

DATE: 05/20/2011

FILE: Figure2.DWG

FIGURE 2



GENERAL NOTES:

A. CONTRACTOR SHALL LOCATE AND DOCUMENT FOR THE AS-CONSTRUCTED RECORD LANDFILL GAS PIPING PRIOR TO COMMENCING WORK IN THE AREA. ASSUME ALL PIPING IS ACTIVE AND PRESSURIZED.

B. SEE SHT M2 FOR LARGER SCALE WELL PLAN DETAILS & ADDITIONAL CONSTRUCTION NOTES.

C. SVE PIPING IS TO BE SLOPED 2% TO PREVENT TRAPPED CONDENSATE. ADDITIONAL INTERMEDIATE SUMPS MAY BE REQUIRED DUE TO UNFORESEEN SITE CONDITIONS.

D. CONTRACTOR SHALL REPAIR ANY DAMAGE DONE TO SHALLOW WATER & ELECTRIC LINES SERVING RV HOOK-UPS. AS-BUILT LOCATIONS OF SUCH LINES ARE NOT KNOWN.

KEYNOTES:

1. SEE 5/M8 FOR LFG PIPE CROSSING.
2. PROVIDE NEW WELL AI-1 NEAR UNUSED EXISTING WELL SVE-1.
3. PIPING HIGH POINT BETWEEN SUMPS. AIR INJECTION PIPING CAN FOLLOW SAME SLOPE AS SVE PIPING.
4. SVE-10 TO BE AT LEAST 42' FROM CHANNEL LIP.

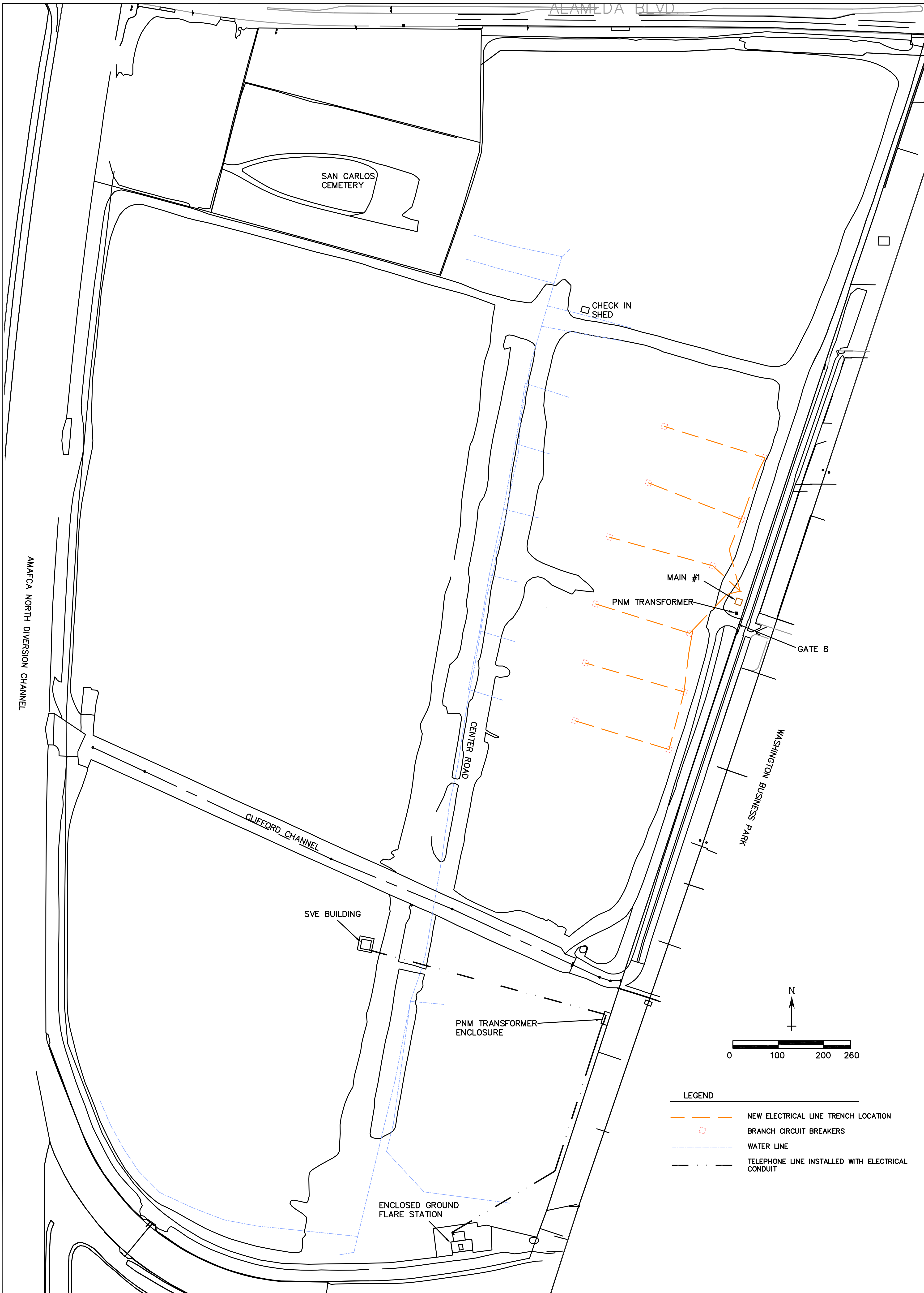
INTERA

SVE SYSTEM
LOS ANGELES LANDFILL

DATE: 05/20/2011

FILE: Figure3.DWG

FIGURE 3



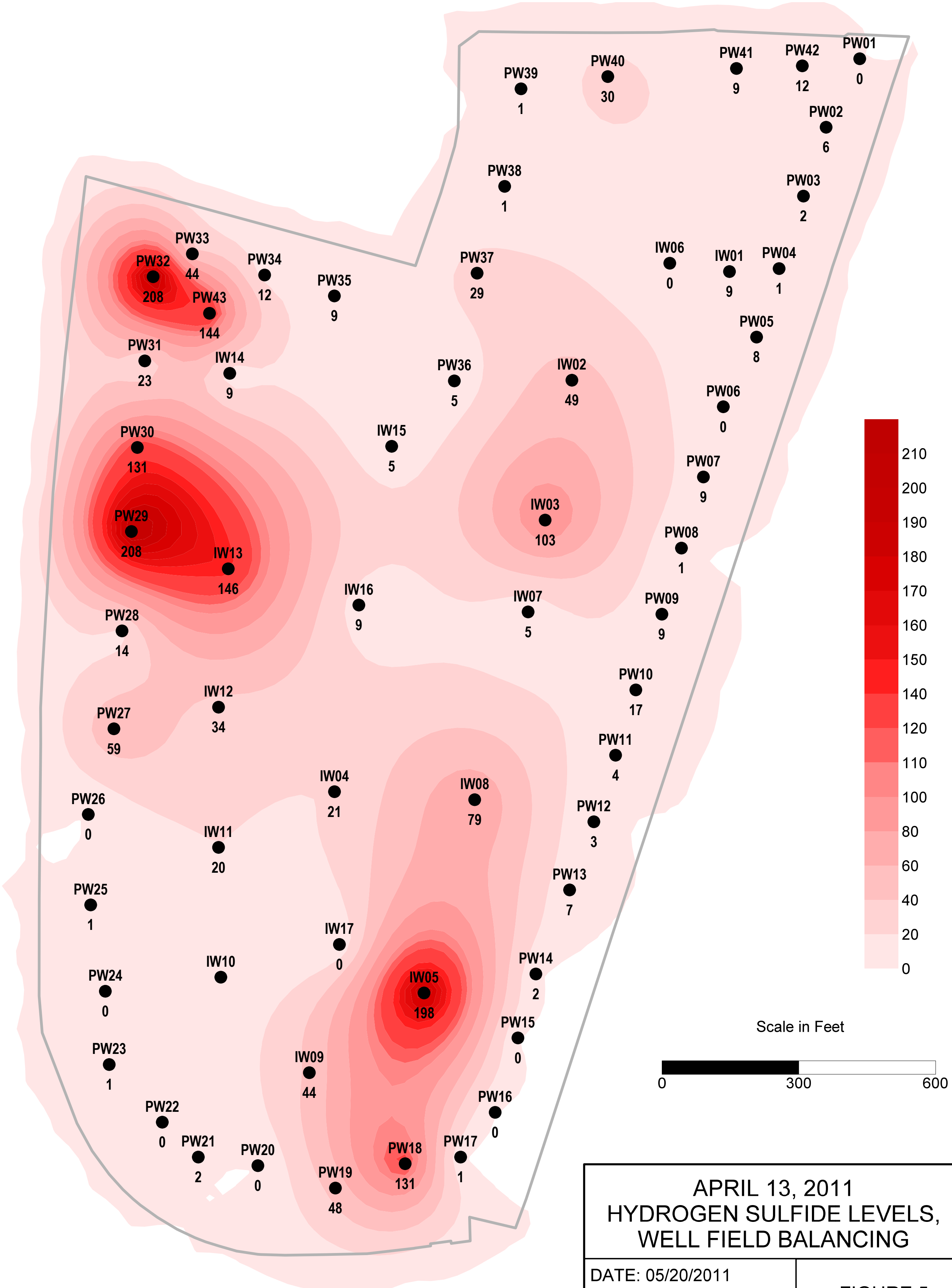
INTERA

Utility Site Plan
Los Angeles Landfill

DATE: 05/20/2011

FILE: Figure4.DWG

FIGURE 4



APRIL 13, 2011
HYDROGEN SULFIDE LEVELS,
WELL FIELD BALANCING

DATE: 05/20/2011	FIGURE 5
FILE: Figure5.srf	

APPENDIX A

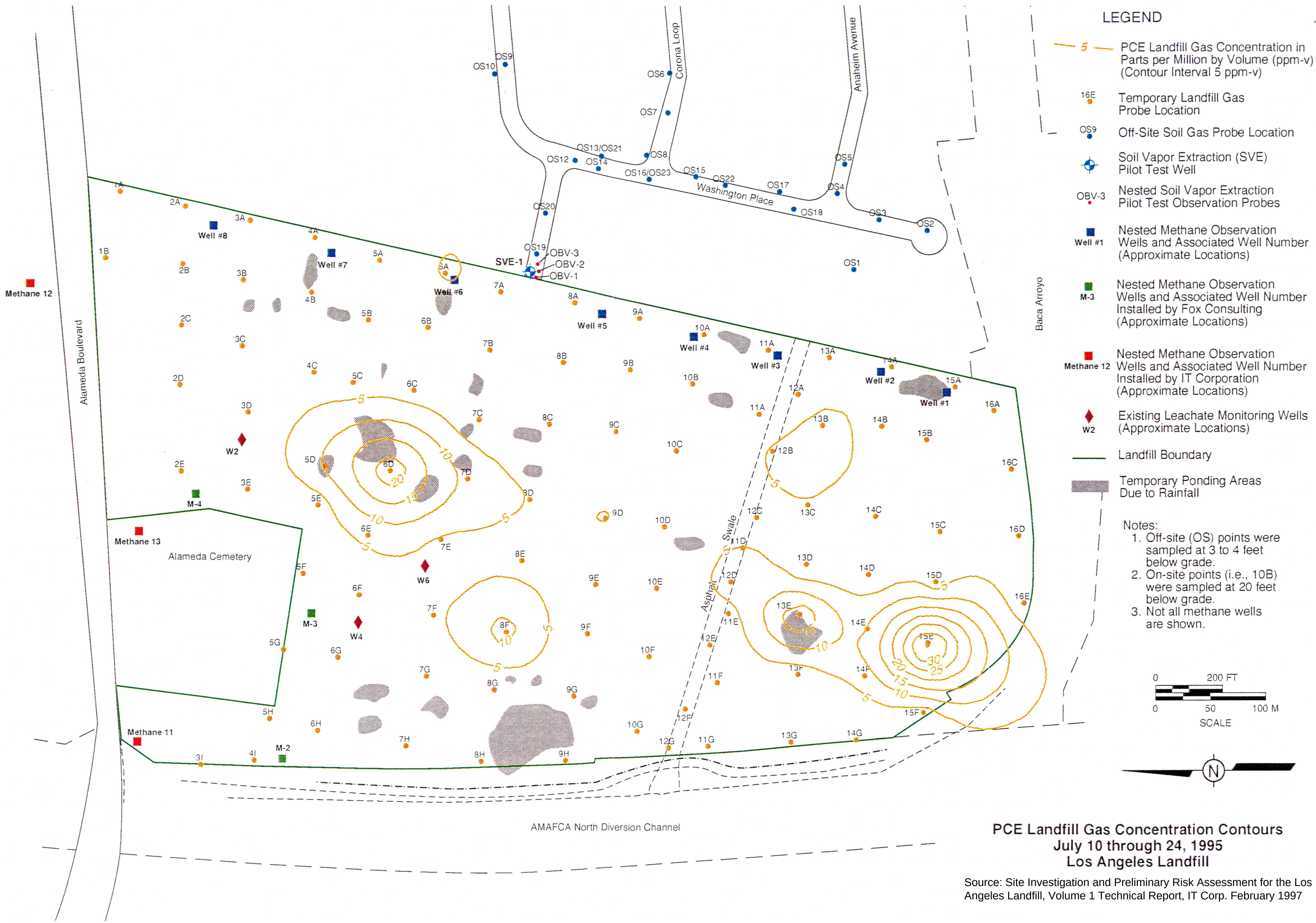
1997 LFG Study Result – IT, Corp.

Methane Landfill Gas Concentration Contours
July 10 through 24, 1995
Los Angeles Landfill

Source: Site Investigation and Preliminary Risk Assessment for the Los Angeles Landfill, Volume 1 Technical Report, IT Corp. February 1997

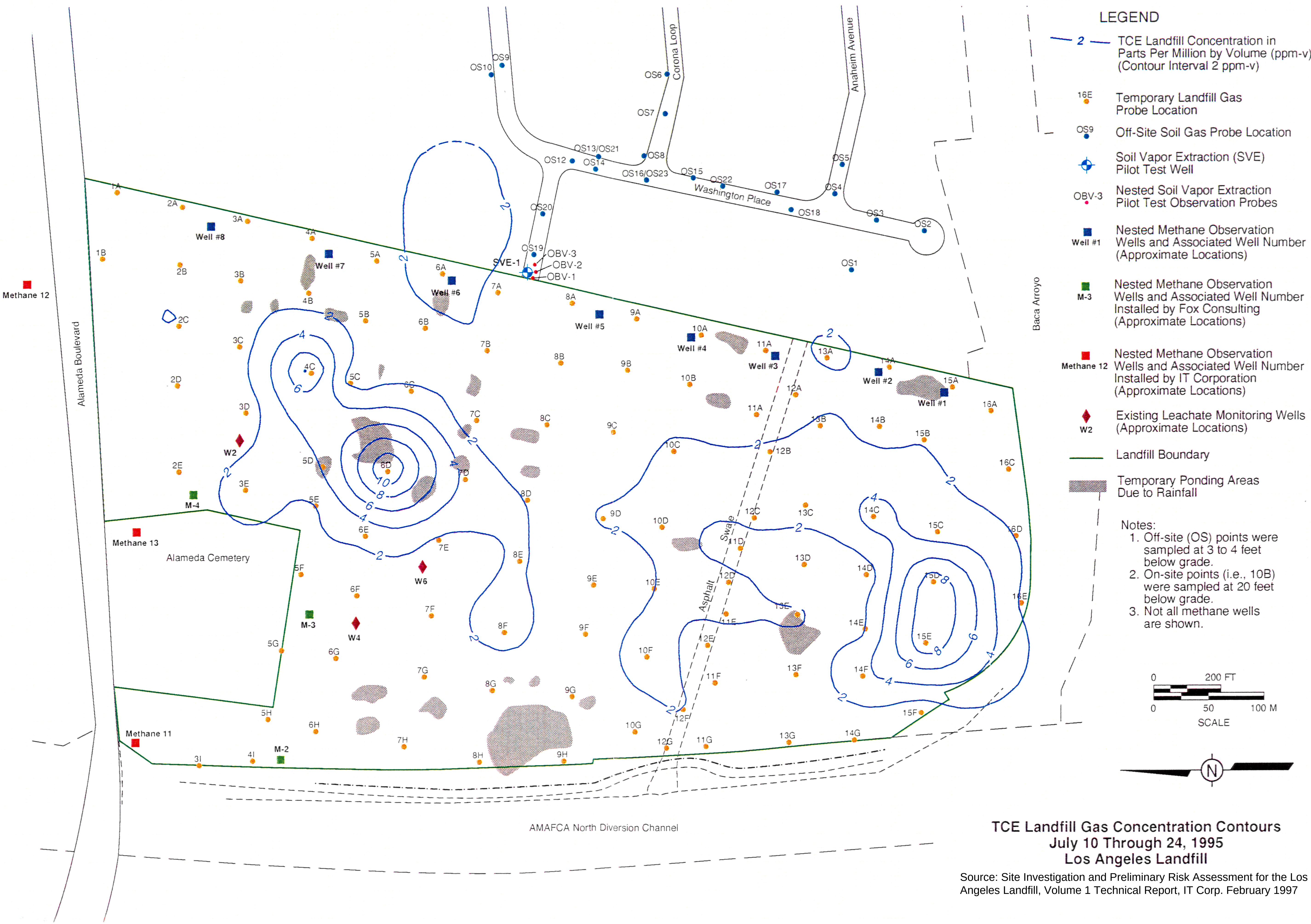
Hydrogen Sulfide Landfill Gas Concentration Contours July 10 through 24, 1995 Los Angeles Landfill

Source: Site Investigation and Preliminary Risk Assessment for the Los Angeles Landfill, Volume 1 Technical Report, IT Corp. February 1997



PCE Landfill Gas Concentration Contours
July 10 through 24, 1995
Los Angeles Landfill

Source: Site Investigation and Preliminary Risk Assessment for the Los Angeles Landfill, Volume 1 Technical Report, IT Corp. February 1997



TCE Landfill Gas Concentration Contours
July 10 Through 24, 1995
Los Angeles Landfill

Source: Site Investigation and Preliminary Risk Assessment for the Los Angeles Landfill, Volume 1 Technical Report, IT Corp. February 1997

APPENDIX B

INTERA's LALF Respirator Protection Plan

LALF Respirator Protection Plan

Procedure for selecting and issuing respirators:
Air purifying (Level C) respirators will be selected based on organic vapor concentrations in the ambient air as observed during LALF site activities. If organic vapors as measured with a photoionization detector (PID) in the breathing zone reach greater than 50 parts per million (ppm), and the Site Safety Officer determines (using the combustible gas indicator [CGI]) that these levels of organic vapors are not caused by the presence of hydrogen sulfide (H_2S), the work will be conducted using Level C respirators. Combination organic vapor/particulate cartridges will be used with full-face respirators. **It should be noted that H_2S will be monitored with a CGI, and if H_2S is measured in excess of 10 ppm, then the area should be evacuated immediately. Only supplied air (Level B) respirators can be used in situations where H_2S is present.**

PID and CGI:
The PID and the CGI will be used to monitor the breathing zones of personnel in the exclusion zone, as well as the ground surface during excavation operations. The PID will be equipped with a 10.6 electron volt (eV) lamp which will provide a response to a set of compounds with ionization potential ranging up to 10.6 eV. The10.6 eV lamp responds to carbon aliphatic compounds greater than C_4 (methane), including all olefins and all aromatics, and responds to inorganic compounds such as H_2S, ammonia, bromine, and iodine (e.g., any compound with an ionization potential of less than 10.6 eV). Specifically, the PID will be used to detect for the presence of non-methane organic compounds (NMOCs) in the breathing zone. A PID equipped with a 10.6 eV lamp should provide the sensitivity necessary to identify the typical landfill gas (LFG) constituents (other than methane). Even though the PID can identify H_2S, it cannot distinguish it from other compounds of similar ionization potential.

The CGI will be calibrated to monitor for the lower explosive limit (LEL) and the upper explosive limit (UEL) for methane and for the presence of H_2S (in ppm). The CGI will monitor for the presence of methane relative to its LEL of 5% and UEL of 15%. The CGI will also monitor H_2S in ppm, carbon monoxide in ppm, and oxygen as a percentage (ranging from 0% to 25%).

The CGI and PID measurements will be recorded in the field logbook or logged by the meter. Alarm set points will be set for audible response.

LFG Action Levels for the Former LALF

According to the Occupational Safety and Health Administration (OSHA), the permissible exposure limit (PEL) for methane is 90,000 ppm (the PEL is the OSHA permissible exposure for a single person during an 8-hour day). The OSHA PEL is 5,000 ppm for carbon dioxide, 10 ppm for H_2S, and 1 ppm for benzene. The LEL for methane is 5% (UEL 15%), the LEL for H_2S is 4% (UEL 44%), and the LEL for benzene is 1.2% (UEL 7.8%).

The primary constituent in LFG is methane. Though other gases are present, methane is the most likely constituent to be present in **ambient** air to cause potential adverse exposure or an explosion. The other constituents of LFG often disperse upon entering the atmosphere as they are emitted from the subsurface. The most immediately dangerous LFG constituent to human health is H_2S. Because of the potential presence and toxicity of H_2S, both methane and H_2S are used to develop the LFG Action Levels. The CGI will be used to detect H_2S and to monitor for the presence of methane. The PID will be used to monitor for the presence of the other NMOCs (and as a potential indicator of H_2S).

1. PID – breathing zone readings:
   - 0 to 50 ppm – remain in MODIFIED LEVEL D.
   - Greater than 50 ppm – discontinue work and prepare to go to MODIFIED LEVEL C.
   - Check the CGI to make sure an elevated PID reading is not caused by the presence of H_2S.
   - If H_2S is detected by the CGI (greater than 10 ppm), leave the area immediately.
   - If not H_2S, and PID readings are consistently above 50 ppm in the breathing zone, discontinue work, leave the exclusion zone, and wait for notification to either proceed or evacuate the site. (The Project Manager shall notify the City of Albuquerque [COA] of PID readings of more than 10 ppm.)

2. CGI – breathing zone readings:
   - 0 to 5 % LEL – remain in MODIFIED LEVEL D.
   - Equal to or greater than 5 % LEL for methane – discontinue work immediately and leave the exclusion zone.
   - Monitor ambient air in the contaminant reduction zone, and if equal to or above 5% of the LEL, immediately move to the support zone.
   - If equal to or greater than 5% of the LEL is still detected in the support zone, immediately leave the site and inform COA personnel and local emergency authorities (Fire Department) of the situation.
   - 0 to 9 ppm readings of H_2S – remain in MODIFED LEVEL D.
   - **10 ppm or greater readings of H_2S – LEAVE THE EXCLUSION ZONE IMMEDIATELY.** H_2S will rapidly fatigue olfactory senses, which cannot be relied

upon to warn of the continuous presence of H_2S. When inhaled in large concentrations as an acute exposure, H_2S can produce fatal intoxication.

3. Detection through senses:

- H_2S can be sensed more readily than other LFG constituents (a strong rotten egg smell). If this odor is detected, all Site personnel should be notified, immediately move upwind, and leave the exclusion zone. If the CGI indicates that the concentration is above 10 ppm when rotten eggs are smelled, the situation is potentially dangerous. All personnel should immediately leave the Site and the Project Manager and the Health and Safety Officer should be notified immediately. The INTERA Project Manager and/or the HSO will in turn inform the COA Project Manager of the H_2S levels. The COA Project Manager and other representatives of the COA Environmental Health Department will then determine the immediate threat to the general public and how best to remedy the situation. As noted above in No. 2, olfactory senses will fatigue; therefore, if a sulfur smell is detected, immediate confirmation of H_2S levels with the CGI is mandatory.
- Other LFG constituents may be detected by odor. If LFG constituents other than methane and H_2S are detected, the ambient air in the exclusion zone should be monitored with the CGI and PID. If greater than 1% of the LEL using the CGI or greater than 50 ppm using the PID is detected, the work should cease and personnel should go to the support zone. If CGI and PID readings are similar in the support zone, then all Site personnel should immediately leave the site, and COA personnel and local emergency authorities (Fire Department) should be notified of the situation immediately.