RESULTS OF CORRECTIVE ACTION
AND
FEASIBILITY ASSESSMENT
FORMER CHEVRON SERVICE STATION
9-5630
SAN LORENZO, CALIFORNIA

Prepared for:
Chevron U.S.A., Inc.
2410 Camino Ramon
San Ramon, CA 94583-0804

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Prepared by:

Environmental Geosciences Engineering
a division of Water Resource Associates, Inc.
200 Brown Road, Ste. 210
Fremont, CA 94539

TECHNICAL REVIEW

This report was produced using site specific information supplied to Environmental Geosciences Engineering (EGE), the California Division of Water Resources Associates, Inc., by Chevron U.S.A., Inc., and chemical, geologic and hydrogeologic data obtained from other sources as referenced. As such, EGE is not responsible for the completeness and/or accuracy of those data, any lack of documentation or observations by previous investigators and any discrepancies between our findings and site conditions caused by activities subsequent to observations made by previous investigators. It also should be recognized that EGE's review of this work was conducted in accordance with our understanding of current regulatory requirements. Notwithstanding the above, the review by EGE of the information provided supports our findings as presented in this document.

Valentin Constantinescu
Senior Hydrogeologist

Christopher M. French, C.E.G., R.E.A.
Certified Engineering Geologist #1614 (Exp. 6/30/92)

James P. Burgard, P.E.
Vice President

REGISTERED GEOLOGIST
CEG 1614
CHRISTOPHER M. FRENCH
Exp 6-30-92
No. 4465
STATE OF CALIFORNIA

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1.0 EXECUTIVE SUMMARY

Environmental Geosciences Engineering has been retained by Chevron USA, Inc. (CUSA) to evaluate subsurface conditions at the former CUSA service station # 9-5630, located in San Lorenzo, California for the purpose of establishing requirements for further corrective action at this site. In doing so, EGE has applied the technical and cost benefit criteria codified in California Code of Regulations (CCR) Title 23, Article 11, Section 2720 et seq. as the basis for validating corrective action requirements.

Corrective Action alternatives must be based upon an assessment of impacts including (i) the physical and chemical characteristics of the hazardous substances or its constituents, including toxicity, persistence, and potential for migration (§2724 (e)(1)), (ii) hydrogeologic characteristics of the site and surrounding area (§2724(e)(2)), (iii) proximity and quality of surface water or groundwater, and the current or beneficial uses of these waters (§2724(e)(3)), (iv) the potential effects of residual contamination on nearby surface water and groundwater (§2724(e)(4)), and (v) an exposure assessment, when required by the regulatory agencies. A feasibility assessment must be performed, and each alternative shall be evaluated for cost effectiveness. The responsible parties shall propose to implement the most cost effective corrective action (§2725 (b) and (f)). "Cost-effective" means "actions that achieve similar or greater water quality benefits at an equal or lesser cost than other corrective actions."

In our judgement, the scope of Corrective Action performed at this site has been adequate to restore and protect the current or potential beneficial uses of waters of the State. CUSA has already performed extensive remediation of this site, including excavation and treatment to nondetectable levels of over 5,000 cubic yards of soil, installation of a compacted clay liner with a thickness in excess of ten feet over an areal extent of approximately 10,000 square feet, and groundwater monitoring for assessment of water quality conditions. The hydrogeologic setting, composed of a semiconfining to confining hydraulic medium with strongly adsorptive properties, an upward component to the groundwater potential, extremely low hydraulic gradient and very low hydraulic conductivity will act to naturally attenuate the residual hydrocarbon concentrations. Based upon the detailed assessment of impacts provided herein, performance of further action is not likely to achieve meaningfully greater water quality benefits. Requirements for such action do not meet the legal criteria for cost benefit and technical practicality.

The results of monitoring from the present well configuration have been remarkably consistent. Quarterly monitoring for a period of one year is recommended to ensure that the residual quantities of hydrocarbon are subject to natural attenuation processes of dispersion, adsorption and biodegradation. After one year, the results of the quarterly monitoring program should be assessed for modification of the sampling frequency or case closure. In assessing the requirements for further reporting, EGE has applied the criteria codified in Section 13267 (b) of the Porter Cologne Water Quality Control Act. The request for installation of additional monitoring wells stands in juxtaposition to the legal requirement that the burden, including cost, bear a reasonable relationship to the benefit obtained, based upon the observations that (i) the entire site is underlain by confining strata of extremely low permeability, (ii) the equilateral distribution, around the excavated source area, of the three site groundwater wells is the ideal configuration for the site conditions of essentially flat groundwater gradient and potentially variable flow direction and (iii) groundwater TPHG concentrations in two of the wells are at or near nondetectable and that of the third is asymptotically approaching the limit of analytical detection.

2.0 BACKGROUND

The site has been the subject of two reports by GeoStrategies, Inc. (1991 a,b). Groundwater monitoring reports have been provided by Sierra Environmental Services (1991, 1992 a,b,c). Ware & Freidenrich APC (W&F), a law firm located in Palo Alto, California, retained McLaren Hart to perform an "independent" professional analysis of the property (McLaren-Hart, 1992). None of the evaluations, judgements, opinions and observations provided in the body of previous work have been based upon application of the above referenced criteria established by law.

The location of the site is shown in Figure 1. Two 10,000 gallon, one 6,000 gallon and one 1,000 gallon fiberglass underground storage tanks (Figure 2), containing regular leaded, regular unleaded, supreme unleaded and used oil petroleum constituents, respectively, were removed from the site in December, 1990, one month following installation of four groundwater monitoring wells at the facility (Figure 2). The UST removal and subsequent remedial action is summarized in a letter (CUSA, 1991) and report (GSI, 1991) directed to the attention of the ACHCSA. Samples were collected from beneath the gasoline USTs and appurtenances and analyzed for total petroleum hydrocarbons as gasoline (TPHG) and benzene, toluene, ethylbenzene and xylene (BTEX). TPHG concentrations ranged from nondetectable to 6,000 milligrams per kilogram (mg/kg), or parts per million (ppm). Sampling of the used oil UST revealed the presence of nondetectable concentrations. The latter UST is not the subject of this evaluation.

Overexcavation of the UST complex occurred in two phases (GSI, 1991). The first phase took place in late December, 1990, during which it is calculated that approximately 504 cubic yards of soil were removed to a depth of 11.5 feet, the level of encountered groundwater (Figure 3). Elevated concentrations were detected following the first phase of excavation, and a second remedial phase was initiated in mid February, 1991, during which an additional 4,700 cubic yards are reported to have been removed. The limits of excavation were determined in the field by use of a portable photoionization detector. Confirmatory samples collected from the excavation contained TPHG concentrations ranging from ND to 54 ppm, with the exception of one sample from the western edge of the excavation, which contained TPHG at a concentration of 270 ppm (Figure 4). This sample was collected in close proximity to the property boundary and Washington

Avenue, and further excavation in this direction would have impacted pedestrian and vehicular traffic, including a mass transit station.

3.0 PHYSICAL SETTING

The subject property (Figure 1) is located at an approximate elevation of 22 to 23 feet above mean sea level (SES, 1992) upon the lower alluvial fan of the San Lorenzo Cone groundwater subarea (Alameda County Flood Control and Water Conservation District, 1988). The bay margin is located approximately 1.5 miles southwest of the site. The nearest surface water body, San Lorenzo Creek, a concrete lined channel, is located 1,800 feet north of the site.

3.1 Hydrogeologic Setting

Four monitoring wells have been installed beneath the site (Figure 2), of which one (C-4) has been abandoned in accordance with an ACFCWCD permit. The site is underlain by predominantly fine grained, confining to semiconfining sediments to the depth explored, including sandy to clayey silt, silty clay and clay. Thin, discontinuous water bearing horizons of loose silty sand and "quick" sandy silt are locally present at depth.

3.1.1 Mode and Occurrence of Groundwater

Lithologic logs of borings are provided in Appendix A. During drilling, groundwater was initially encountered at a depth of 18 to 19 feet below grade, and stabilized at approximately 11.5 feet below grade, indicative of semiconfining to confining conditions and the likelihood of an upward component to groundwater flow. Historic groundwater levels have since fluctuated between approximately 7.5 and 11.5 feet (Table 2), assuming an average surface elevation of 22 feet MSL. Permeable units capable of a significant, sustained yield were not encountered to the depth explored.

The principal water bearing unit is a sandy silt. The saturated thickness of the shallow semiconfined water bearing unit is generally less than 10 feet thick. The sustainable yield from this water bearing unit is not likely to be greater than one to three GPM. While this yield might be useful for lawn irrigation, the yield is certainly not useful from the standpoint of municipal, industrial or agricultural supply.

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3.1.2 Groundwater Flow Direction and Gradient

Previous reports, such as SES (1991) have incorrectly reported widely varying flow directions, based upon utilization of incorrect wellhead reference elevations. SES (1992) has provided a corrected series of gradient maps for September and December, 1991 and April, 1992 (see Figures 5A through 5D). The September, 1991 and April, 1992 data illustrate a groundwater gradient ranging from west- southwest to west-northwest under a gradient of 0.002 feet per foot, which are consistent with the GSI (1991a) data for December, 1990, illustrating a west-northwest flow direction under a gradient of 0.003. The SES data for December of 1991 is slightly inconsistent in that a northwest flow direction under a gradient of 0.009 is reported.

Assuming laminar flow and the validity of the Darcy equation for porous flow,

$$\upsilon = K\iota/\eta_e \text{..............................}(1),$$

with velocity (υ) in feet per day, hydraulic conductivity (K) in like units, gradient (ι) (unitless) and kinematic porosity (η_e) (unitless), an approximate groundwater flow velocity may be calculated from literature estimates of hydraulic conductivity and porosity. Assuming a hydraulic conductivity for clay to fine sand of 1 to 3 feet per day (Lohman, 1979), an average reported gradient of 0.0023 for the consistent data and an estimate for kinematic porosity of 0.2 to 0.32 (de Marsily, 1986), it may be conservatively estimated that the velocity of groundwater beneath the site may range from 0.03 to 0.007 feet per day. In a period of one year, the groundwater beneath the site may be expected to move between 3 and 11 feet.

3.1.3 Benefit of Present Well Configuration

The three groundwater wells form an equilateral triangle about the source area, with Well C-2 located at the downgradient apex. W&F (1992) have referenced the ACHCSA as stating that "the flow of the shallow groundwater can from time to time change direction, and the direction and location of any contamination plume is at any one time nebulous and changing." EGE has no evidence to indicate widely varying flow direction and a nebulous and changing plume location. In fact, the flow direction and gradient are remarkably consistent, as are values for contaminant concentrations in the downgradient well. Whether or not either situation is correct, it is our judgement that the equilateral distribution of the monitoring wells about the former source area is the ideal monitoring configuration, particularly in a transport and fate scenario where the advective transport is limited and the processes of adsorption and radial diffusion or dispersion will exercise an important role.

Given the equilateral distribution of the wells, the very low groundwater flow velocity and the absence of significant contaminant concentrations in the downgradient well, it is our judgement that the burden, including cost, of further plume definition does not bear a reasonable relationship to the benefit which could be derived therefrom.

3.2 Beneficial Uses of Water of the State

Existing direct beneficial uses of groundwater are identified in the revised Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) dated December 17, 1986.

The existing beneficial uses of groundwater may include municipal, domestic, industrial and agricultural water supply for designated groundwater basins. As households in the area are now connected to the EBMUD water conveyance system, the aquifer(s) located beneath the site are not presently used for drinking water supply. To assess the existing beneficial uses of groundwater in the vicinity, a detailed well survey was conducted for wells located within a one-half mile radius of the site. The results of the survey are provided in Appendix B.

According to the computer and map records of the Alameda County Flood Control District - Zone 7, there are approximately 62 registered, active wells located within an 0.5 mile radius of the facility, not including the three site monitoring wells. Of these, there are 31 monitoring wells, 24 irrigation wells, four domestic wells, two test wells and 1 cathodic protection well. None are reportedly used for municipal purposes. Approximately 56 wells are located upgradient to transgradient of the site. As shown in the well density map of Figure 6, six wells, or ten percent of the total, including one test well and five irrigation wells, are located within the area potentially subject to groundwater transport from the site. As noted above, the present evidence supports the conclusion that little, if any transport has occurred off site, and that such transport is likely to be of a magnitude of feet per year.

The nearest ACFCWCD Hydrologic Monitoring Station, Well 3S3W13A3, is reported to be perforated between depths of 48 and 113 feet. Most irrigation wells located within a one-half mile radius of the site are completed to depths of 30-40 feet, 80-90 feet, 120-150 feet or deeper. In assessing the impact to beneficial uses, it is instructive to note that the residual hydrocarbon of the site is trapped in the uppermost saturated portion of a confining to semiconfining horizon, hydraulically subject to an upward pressure potential, and located at a depth of less than 15 feet. The adsorptive properties and limited conductivity of the clay hydraulic medium and the upward component to flow derived from the positive pressure potential provide for an extremely low probability that the beneficial uses of the waters of the State can be meaningfully impacted.

4.0 HYDROCARBON CONCENTRATIONS IN SOIL AND GROUND WATER

A compilation of soil and groundwater analytical results are presented in Tables 1 and 2, respectively. EGE has performed a detailed analysis of hydrocarbons detected in site soil by the geostatistical kriging method provided in the SURFER software utility GRID. The kriging method is a valuable tool for statistical evaluation of the spatial variability of hydrocarbon concentrations.

4.1 Distribution of Hydrocarbons in Soil

Figure 7 presents a concentration isopleth map at a level of 10 feet based upon the statistical evaluation of all soil data collected between five feet and the total depth explored, including borehole data. The UST complex, and the western dispensing island located proximal to the complex, are identified as the two primary source areas, consistent with previous evaluations. Superimposed on the isopleth map is the limit of excavation. The average depth of excavation is approximately 10.5 to 11 feet (Clyde Galantine, GSI, personal communication) with the exception of the former tank complex, which was excavated to a depth of greater than 11.5 feet. The analysis indicates that the extent of the excavation has been largely successful in removing the primary zones of contamination.

Concentration isopleths are also presented in cross section in Figures 8 and 9. Given the 10.5 to 11.5 depth of excavation, the statistical evaluation indicates that a comparatively limited volume of soil remains with elevated TPHG concentrations. More significantly, the vertical limit of hydrocarbons appears to be confined to a depth of less than 15 feet, within the confining clay horizon. Analysis of soil samples collected from Well C-4, located within the centroid of contaminant mass, confirms the vertical extent of detectable concentrations.

4.2 Hydrocarbon Occurrence in Ground Water

A tabulation of the results of ground-water sampling and analysis for hydrocarbons beneath the site is presented in Table 2. Concentrations present in ground water beneath the site have ranged from less than detection (< 0.05 ppm) to 1.1 ppm for TPHG and < 0.0005 to 0.15 ppm for benzene. The most elevated concentrations of hydrocarbons have been detected in Well C-3, located transgradient of the source area. A semilogarithmic plot of concentration versus time (Figure 10) for this well indicates that hydrocarbon concentrations are asymptotically approaching the level of detection. Concentrations present in Well C-2, which gradient maps (Figures 5A-5D) have shown to be consistently located downgradient of the source area, have consistently been at or near the level of detection.

4.3 Estimate of Residual Hydrocarbon in Site Ground Water

The ground-water TPHG concentrations span several orders of magnitude. For such positively skewed statistical distributions, most workers have found that a lognormal distribution fits the data well (Freeze, 1975). Utilizing all available data for the site, the lognormal (natural log) average ground-water TPHG concentration is calculated to be 3.71, from which an arithmetic mean is calculated to be 76 micrograms per liter ($\mu g/\ell$), or parts per billion. Given a site model area of 4.4E+5 square feet, a saturated interval of 15 feet and the conservative assumption of a drainable, interconnected porosity (specific yield) of 0.2, the total volume of water available by drainage (EPA, 1985) of the confining horizon and the silty sand water bearing zone is calculated to be

$$VOL_{H2O} = VOL_{SOL} \times Sy = 6.6 \times 10^5 \, ft^3 \times 0.2 = \underline{1.3E5 \, ft^3 = 3.7E6 \, \ell} \quad (4)$$

The volume of 3,700,000 liters water, with a specific gravity of 1.0 g/cm^3, has a mass of 3,700,000 kg. The mass fraction of petroleum hydrocarbon is calculated to be 76 ppb, or 7.6×10^{-8}, from which it is calculated that 0.3 kilograms of hydrocarbon may be present. Converting to liters and using a density of 0.8 kg/ℓ as shown in (3) above, it is calculated that approximately 0.35 liters of product, or roughly 0.1 gallons, may be dissolved in water beneath the site under hypothesized conditions. If one were to assume a maximum value of 1,100 ppb in water - the highest concentration ever measured - application of the same principals would produce an estimated volume of 5.1 liters of product, or roughly 1.3 gallons.

5.0 PHYSICOCHEMICAL PROPERTIES

An evaluation of the physicochemical properties is critical for an understanding of the potential impact to beneficial uses arising from a source of hydrocarbons. The physicochemical properties which must be taken into consideration include toxicity, persistence, and potential for migration in water, soil and air.

5.1 Toxicity

The primary constituent of concern from the standpoint of toxicity is benzene, a known human carcinogen. The Department of Health Services has established a Drinking Water Standard of 1.0 ppb for benzene. Specifically, the drinking water delivered to the free flowing outlet of an ultimate end user (the receptor) must by State and federal law contain less than 1 ppb of benzene. The benzene level established by the State and federal regulations is based upon highly conservative risk assessment criteria, which deliberately overstates risk by at least 100 times [U.S. Environmental Protection Agency Integrated Risk Information Database (IRIS), 1991]. Based upon the conservative assumptions, it is calculated that an "average" male adult consuming two liters of water per day containing 1 ppb benzene over a period of seventy years will have a one in one million (10^{-6}) increased potential risk of developing cancer.

Review of Table 2 indicates that for the last monitoring event, the highest on site benzene concentration was 2.1 ppb. By extension of the conservative risk criteria presented above, this concentration might cause a 2.1×10^{-6} increased potential cancer risk for an adult male consuming two liters of water per day over a period of seventy years, were such exposure to occur. The average lifetime risk of contracting cancer is 0.2, with an uncertainty of 10 % (Wilson and Crouch, Science, 1987). Accordingly, the increased risk of carcinogenesis from consumption of water containing 2.1 ppb is 0.2000021 as opposed to 0.2000010 for water containing 1 ppb benzene. This is an insignificant difference.

There are obviously hundreds of constituents in petroleum which might cause an acute or chronic toxic effect given certain short or long term levels of exposure. What should be emphasized is that for a risk to be incurred, exposure must occur. Because the shallow water bearing zone is not presently and is not likely ever to be used as a source of drinking water, exposure to the toxicity characteristics of benzene or other petroleum hydrocarbons is not likely to occur.

5.2 Persistence

Thousands of leaking underground gasoline storage tanks have been found throughout California from which a tremendous amount of gasoline has leaked into groundwater over the past half century. The most water soluble constituent in gasoline is benzene, and it typically contaminates groundwater beneath leaking underground storage tanks (Hadley and Armstrong, 1991). An evaluation is presented for the persistence of benzene, the compound as greatest concern.

Benzene is a stable non-polar light aromatic compound. Its physical and chemical characteristics are described in various references, including Verschueren (1983). It is moderately soluble in water and readily adsorbed onto carbon. The major route of removal from the environment is through volatilization and ultimately photodegradation under ultraviolet light in the upper atmosphere. Adsorption onto soil is likely to occur. Hydrolysis is unlikely to occur under ambient conditions. Bioaccumulation of benzene - that which would remain in the fatty tissue of exposed organisms - is moderately low.

Biodegradation is an important decomposition process for benzene in groundwater. Several species have been observed to use benzene as a sole carbon source for substrate, even under anaerobic conditions, in the presence of nitrate (Taylor et al., 1970; Braun and Gibson, 1984; Oshima, 1984). Microbial activity is ubiquitous in the unsaturated zone and upper and lower portions of the saturated zone of subsurface strata (Dunlapp and McNabb, 1973). Microorganisms play a critical role in the breakdown of complex organic materials in soil and groundwater, and are likely to adapt to exposure to a wide variety of organic chemicals, including hydrocarbons (McKee et al., 1972). Under controlled conditions, Lee and Ryan (1979) document a biodegradation half life for benzene of 6 days for an initial concentration of 25 micrograms per liter. Tabak et al. (1981) note an approximate biodegradation half life of 7 days at an initial concentration of 5 milligrams per liter. Rittman et al. (1980) indicate that environments composed of fine-grained soil material afford unusually great opportunities for biodegradation by attached organisms because of the high surface area for attachment.

"In a state-mandated program", write Hadley and Armstrong (1991), "7,167 wells serving water-supply systems throughout California were tested for a broad panel of organic constituents. Of the wells tested, 812 (11.3%) had detectable concentrations of at least one of the constituents tested for. Detectable concentrations of benzene were reported for only 10 wells. While many processes influence the fate of organics in ground water, the most likely explanation for the nonoccurrence of benzene is that it is destroyed near its source by biodegradation."

5.3 Potential for Migration

An understanding of physicochemical properties of hydrocarbons is necessary in order to understand the complex interactions and resulting distribution of hydrocarbons in environmental media. Physicochemical properties which influence the transport and fate of chemicals in media include solubility, vapor pressure, degree of interaction with water (hydrophobicity), and potential for evaporative loss. Within the clayey hydrogeologic medium of the site, the physicochemical properties of solubility and degree of interaction with solids prevail. Hydrocarbons are weakly to moderately soluble in water. In general, they are considered hydrophobic compounds subject to sorption. In addition to providing an unusually good opportunity for biodegradation by attached organisms because of the high surface area available for attachment, the clays of the site are likely to provide for substantial adsorption.

5.4 Exposure Assessment → Not proper assessment.

One of the major complexities in evaluating health risks from soil or groundwater contamination is the identification and quantification of the important exposure routes. Site usage is important in defining the exposed population. Usually, the existing land use (e.g., pasture land, shopping center, industrial site, or residential area) will dictate the level of necessary cleanup. For contaminated soil in residential areas, ingestion of soil by children would represent the primary exposure concern. For commercial sites such as the subject property, workers may represent the most exposed population and the relevant exposure routes would be via dermal contact and inhalation of volatilized contaminants and of windblown dust. Ingestion is assumed to be fairly low for the worker population (Beck, 1989, Paustenbach, 1989). Redevelopment of the property, including paving and installation of landscaped areas, would further limit the potential for exposure.

6.0 CORRECTIVE ACTION ALTERNATIVES

Corrective action alternatives which are generally employed for remediation of gasoline hydrocarbons include those useful for remediation of soil and/or water. Soil remediation methods include excavation, which has already been performed to a considerable extent, vapor extraction and bioremediation. Groundwater corrective action includes pumping of groundwater and treatment. As an alternative to active corrective action, a no action alternative with verification monitoring is considered an appropriate corrective action alternative when it is demonstrated to enure to a greater or equal water quality benefit, taking into consideration technical practicality and cost.

6.1 Remediation Performed to Date

CUSA has already performed extensive remediation of this site, including excavation and treatment to nondetectable levels of over 5,000 cubic yards of soil, installation of a compacted clay liner with a thickness in excess of ten feet and an areal extent of approximately 10,000 square feet and groundwater monitoring for assessment of water quality conditions.

6.2 Soil Remediation

Three common technologies used in soil remediation are excavation, vapor extraction, and bioremediation. Some parties (W&F, 1992 and M/H, 1992) have provided the opinion that a 10 ppm cleanup level should be applied to the site. In doing so, these parties have not provided reference to the statutory requirement that such action achieve an equal or greater water quality benefit at an equal or lesser cost than other corrective action (CCR Title 22, §2720).

6.2.1 Soil Excavation

As discussed previously, a very large quantity of site soil has already been excavated. Reexcavation would require the removal of approximately 10.5 to 11.5 feet of previously remediated, compacted overburden. Removal of additional soil along the westward extension of the excavation, where the highest residual concentration of 270 ppm has been detected, will require removal at a strip ratio of 10:1, resulting in a volumetric ratio of 10 units of uncontaminated soil for every 1 unit of contaminated soil excavated. Extensive shoring will be required if the excavation is to be extended beneath the saturated zone, due to the presence of dilatant, sandy silts, which will flow laterally under a load or in response to removal, and in order to protect workers during site excavation, sampling and compaction activities and the integrity of the nearby sidewalk and Washington Avenue.

EGE has prepared an estimate of costs for reexcavating the treated soil for the purpose of removing the limited quantity of residual hydrocarbons adsorbed onto site soil. In our judgement, removal of approximately 5000 cubic yards of uncontaminated overburden, previously remediated at great cost, would be required in order to access the small residual quantity of affected soil remaining in place. Minimum project costs are expected to vary between $520,000 and $880,000, not including loss of property use and the previous costs incurred by prior excavation, treatment and recompaction.

At present, soil analytical concentrations collected from the source area indicate nondetectable levels of TPHG at 14.5 feet. Further vertical excavation should in our opinion not be performed. Previously, it was demonstrated that the site is underlain by a semiconfining to confining layer of clay. Further vertical excavation will disturb the hydraulic continuity of the semiconfined to confined system, which with its upward component of pressure potential serves as a natural protective barrier to transport. This will result in a net loss of water quality benefits.

6.2.2 Vapor Extraction

Vapor from a contaminant in a soil exists in equilibrium with the unvaporized liquid. Because hydrocarbons have a high vapor pressure, the presence of hydrocarbon contamination in soil can be manifested by the presence of high vapor concentrations. In practice, the amount of contaminant that vaporizes depends on the soil concentration, the vapor pressure of the contaminant and the amount of air moving through the soil. Implementation of a vapor extraction system is not warranted given the extremely low air permeability of clay and compacted clay, and the absence of a significant presence of hydrocarbon in the site vadose zone as a result of prior excavation activities.

6.2.3 Bioremediation

In-situ (in place) bioremediation techniques employ naturally-occurring or artificially-grown microorganisms to remove the organic contaminants from the soil. Due to the major differences in porosity and contaminant level in the soil at most sites, and the high probability of clogging, it is very difficult to achieve a uniform dispersion of water, air, and fertilizer throughout the contaminated soil. Consequently, the bioremediation proceeds very unevenly. Microorganisms begin growing in some portions of the soil, while in other portions very little growth occurs. As a result, it is very difficult to fully remediate all of the effected soil. Given the very low permeability of the site strata and the large proportion of dead pore space in the clay, this Corrective Action method is likely to be largely ineffective, technically unfeasible and not likely to achieve any measurable water quality benefit.

6.3 Groundwater Remediation

The usual method to attempt to remediate contaminated ground water is to pump the water from a well and treat it to remove the dissolved organic compounds. Groundwater pump and treat options are generally recognized to be technically unfeasible because it is not possible to displace adsorbed hydrocarbon. A sufficient body of evidence has been accumulated to show that once the treatment is discontinued, contaminant concentrations may once again increase to pretreatment levels. Groundwater pumping may, however, be considered effective in containing a groundwater plume where hydraulic control is required, such as in a basin utilized for drinking water supply where a well field is threatened.

The hydrogeologic setting of the site precludes groundwater pump and treat as a feasible option. The yield from clay is extremely low. Assuming two extraction wells operating at three gallons per minute - a comparably large yield for sandy silt to clay - it is calculated that a pumping duration of 55 years would be required to flush the affected water bearing zone with ten aquifer volumes, resulting in the removal of roughly 76 gallons of product. Were groundwater extraction to be implemented, it is likely that most extracted water would be derived from the underlying water bearing formation of sandy silt, which is comparatively uncontaminated. Over a protracted period of pumping, dewatering of the confining clay horizon might actually cause vertical spreading of the presently adsorbed hydrocarbon into the underlying water bearing zone, resulting in a net loss to beneficial uses of water. true

6.4 The No Action Alternative

The No Action Alternative with Verification Monitoring consists of utilizing existing or proposed monitoring methodologies to assess the increase or decrease of on site contaminant concentrations through time resulting from natural attenuation processes. The alternative is generally utilized where it can be demonstrated that the impact to beneficial uses, or receptors, of surface water or groundwater are negligible and the cost benefit criteria indicate that remedial action is not cost effective. The No Action alternative is also utilized in cases where passive remediation is required as a result of on site conditions or off site considerations.

6.5 Estimated Cost of Remedial Action Alternatives

The following costs are estimated for various remedial options. Where the feasibility assessment has indicated the option is not feasible, no costs are provided.

ESTIMATED COSTS

TECHNOLOGY	ENGINEERING	EQUIPMENT	INSTALLATION	ANNUAL O&M
Soil Vapor Extraction		(not feasible)		
In Situ Soil Bioremediation		(not feasible)		
Ground Water Pump and Treat	$20,000	$65,000	$15,000	$50,000
Excavation	$150,000		$370,000-730,000 (minimum)	
No Action with Verification Monitoring	$0	$3,200	$0	$4,000

The above costs do not include:

1) Permits
2) Health and Safety Plans
3) Bench-Scale Tests
4) Analysis (with the exception of verification monitoring alternative)
5) Transportation and Disposal of Hazardous Wastes
6) Project Administration and Oversight

7.0 SELECTION AND IMPLEMENTATION OF CORRECTIVE ACTION

California Code or Regulations (CCR) Title 23, Chapter 16, Article 11 of the Underground Storage Tank (UST) regulations was approved on December 2, 1991. These procedures provide the criterion that the Corrective Action chosen shall provide for the most effective protection of State Waters taking into consideration technical practicality and cost, based upon the results of site characterization activities. "Cost-effective" is defined in the regulations as "actions that achieve similar or greater water quality benefits at an equal or lesser cost than other corrective actions."

7.1 Regulatory Criteria for Selection of Appropriate Corrective Action

The regulations specify that the responsible party shall take interim remedial action to abate the unauthorized release (§2722 (b)), including removal of floating product (§2722 (b) (1)), etc. A preliminary site assessment phase shall be implemented (§2723), including initial site investigation, initial abatement actions and initial site characterization. Using information derived from the site investigation, the responsible party shall propose a Corrective Action Plan (§2723 (b)). Corrective Action alternatives must be based upon an assessment of impacts including 1) the physical and chemical characteristics of the hazardous substances or its constituents, including toxicity, persistence, and potential for migration, 2) hydrogeologic characteristics of the site and surrounding area, 3) proximity and quality of surface water or groundwater, and the current or beneficial uses of these waters, 4) the potential effects of residual contamination on nearby surface water and groundwater, and 5) an exposure assessment, when required by the regulatory agencies (§2724 (e)). A feasibility study shall be implemented to evaluate alternatives for remedying the effects of the release (§2724 (f)), and cleanup levels shall be established (§2724 (g)). Upon approval, the responsible party shall implement Corrective Action (§2726) and perform verification monitoring (§2727 (e)). The responsible parties shall propose to implement the most cost effective corrective action (§2725 (b) and (f)). "Cost-effective" means "actions that achieve similar or greater water quality benefits at an equal or lesser cost than other corrective actions."

7.1.1 Physical and Chemical Characteristics

Advective transport is unlikely to be the primary mechanism of contaminant transport in the affected clay. The low to moderate solubility and elevated hydrophobicity of the hydrocarbon are likely to contribute to significant sorption phenomena. The hydrocarbons of concern have been demonstrated to be subject to biodegradation under both aerobic and anaerobic conditions. The fine grained clays of the site are likely to provide an unusually large surface area for the attachment of microorganisms.

The primary compound of concern from a toxicity perspective is benzene, a known carcinogen. The increased risk of carcinogenesis from exposure to site benzene is 0.2000021, as opposed to 0.2000000 for the unaffected population, given the unlikely exposure scenario of continuous exposure to two liters of site water derived from the shallow saturated interval over a period of seventy years. Exposure is in fact not likely to occur given an absence of exposure pathways. The most cost effective method to further limit the already low potential for exposure is to cause development of the property, including paving and installation of landscaped areas to eliminate infiltration and fugitive dust emissions.

7.1.2 Hydrogeologic Characteristics

The bulk of hydrocarbons remaining beneath the site is adsorbed within a clay semiconfining to confining horizon. The water bearing formation through which flow is likely to occur is a sandy silt, located beneath this confining layer, which has been negligibly impacted by the release. An aquifer material capable of significant, sustained yield has not been encountered in the hydrogeologic medium affected by the release. Groundwater is likely to be under a positive (upward) pressure potential, further restricting potential for impact. The gradient and flow direction have been consistent over the period of monitoring. Application of Darcy's Law indicates a probable flow velocity on the order of one to ten feet per year over a saturated interval of ten feet.

7.1.3 Proximity and Quality of Surface Water or Groundwater and Beneficial Uses

The nearest surface water body is located 1,800 feet transgradient of the site and is a concrete lined channel. It is not likely to be impacted by the site. Groundwater which is present within a sandy silt water bearing unit, located beneath the affected semiconfining horizon, has been marginally impacted by the release. It is our judgement that the water bearing unit is not capable of a significant and sustained yield and, therefore, the water bearing zone is generally impractical for most beneficial uses. It is therefore likely that the beneficial uses of waters of the State have not been impacted in a manner which could by any sensible measure be considered significant. This is further supported by the observation that the shallowest water bearing unit has locally and regionally likely been affected by other releases of a similar nature, infiltration of storm water, pesticides and fertilizers from past agricultural nonpoint sources and intrusion of brackish water from the bay. Future beneficial uses of the groundwater supply will likely be derived from deeper aquifers, such as those present between 40 and 110 feet or deeper.

7.1.4 Potential Effects of Residual Contamination

Geostatistical kriging of hydrocarbon data has been utilized to evaluate the spatial variability of hydrocarbons in soil. The previous corrective action has been largely successful in removing the majority of site hydrocarbons. In assessing the continuing impact of residual contamination, it should be noted that the residual hydrocarbon concentrations are present primarily in the uppermost confining horizon. Existing groundwater contaminant concentrations are either below or at the analytical limit of detection for upgradient and downgradient wells, respectively. A trend analysis for the transgradient well illustrates that hydrocarbon concentrations are asymptotically approaching the level of detection.

7.2 SELECTION OF CORRECTIVE ACTION

On the basis of the foregoing discussion, it is evident that the No Action Alternative with Verification Monitoring will achieve an equivalent water quality benefit at lesser cost than the other feasible alternative of excavation.

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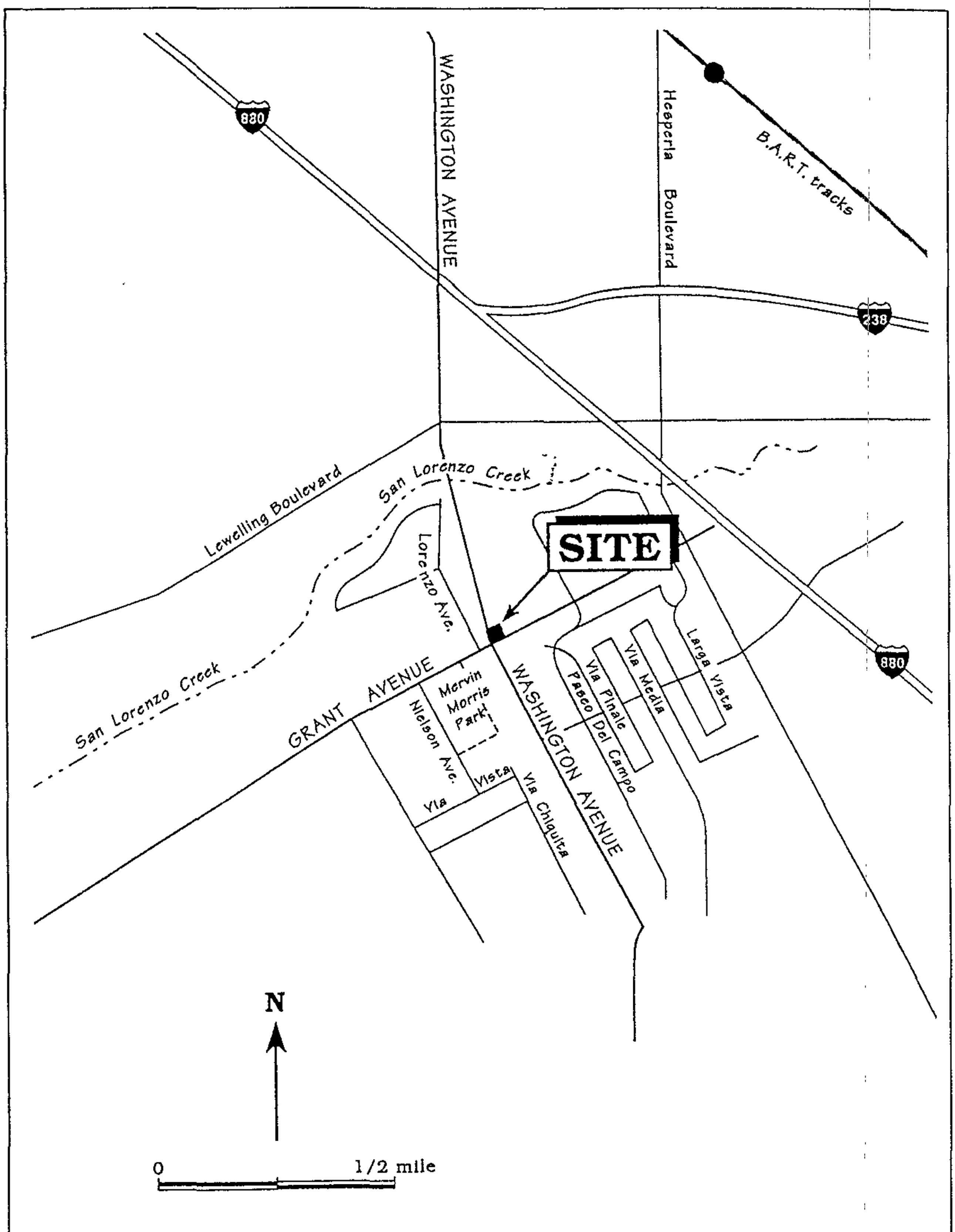
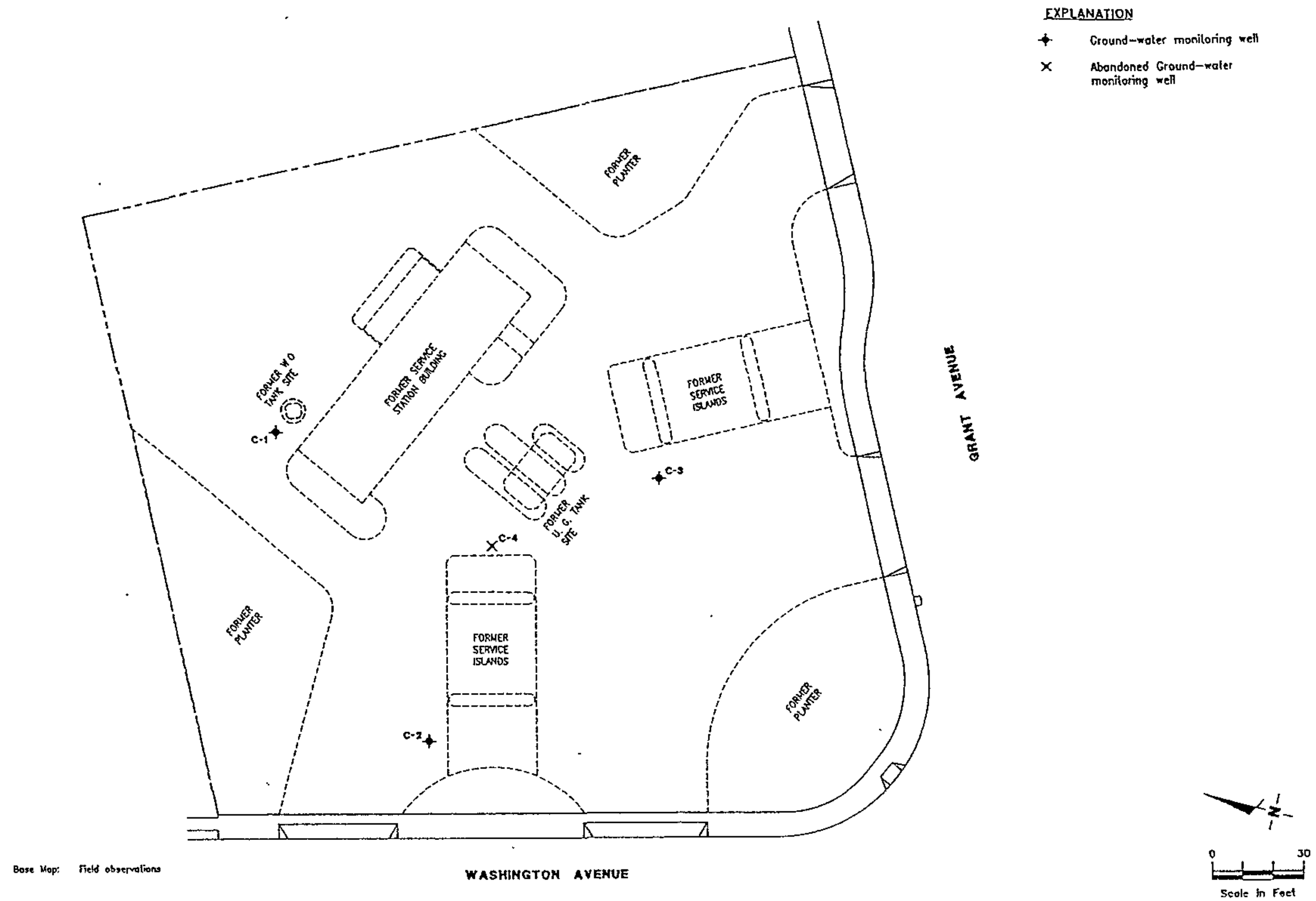
FIGURES



Source: Sierra Environmental (1991)

Base map ref: California State Automobile Association (AAA)

Environmental Geosciences Engineering a division of Water Resources Associates, Inc. Phoenix, Arizona		CHEVRON USA Former Station #9-5630 San Lorenzo, CA SITE LOCATION MAP	Figure 1
Project No. 70601	Drawn by: V. N. C.		
Date: 5/6/92	Checked by: C. M. F.		



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ENVIRONMENTAL GEOSCIENCES ENGINEERING

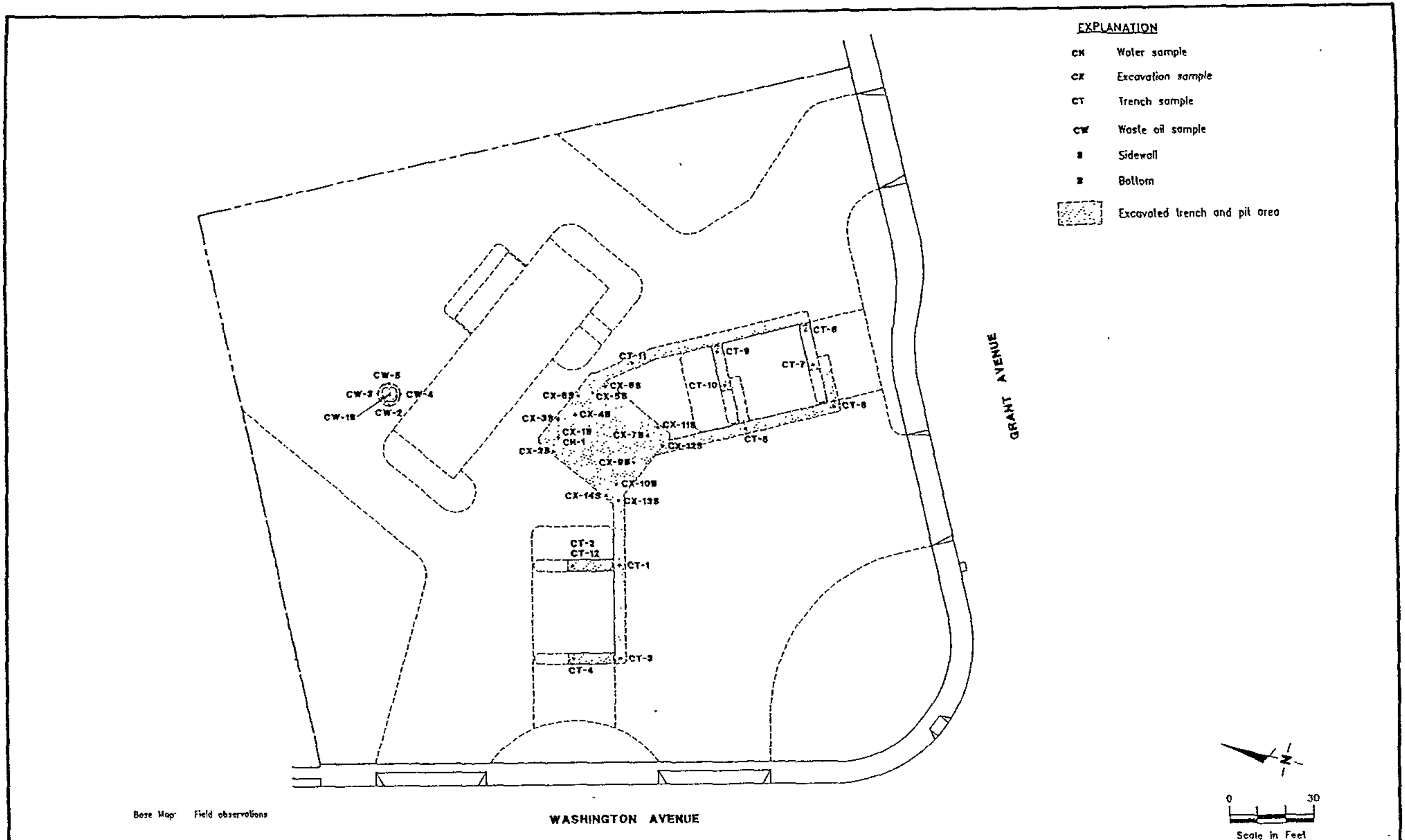
a division of Water Resources Associates, Inc. Phoenix, Arizona

Project No.: 70601	Drawn by: V. N. C.
Date: 5/6/92	Checked by: C. M. P.

CHEVRON USA
FORMER STATION #9-5630
SAN LORENZO, CA

SITE FEATURES

Figure 2

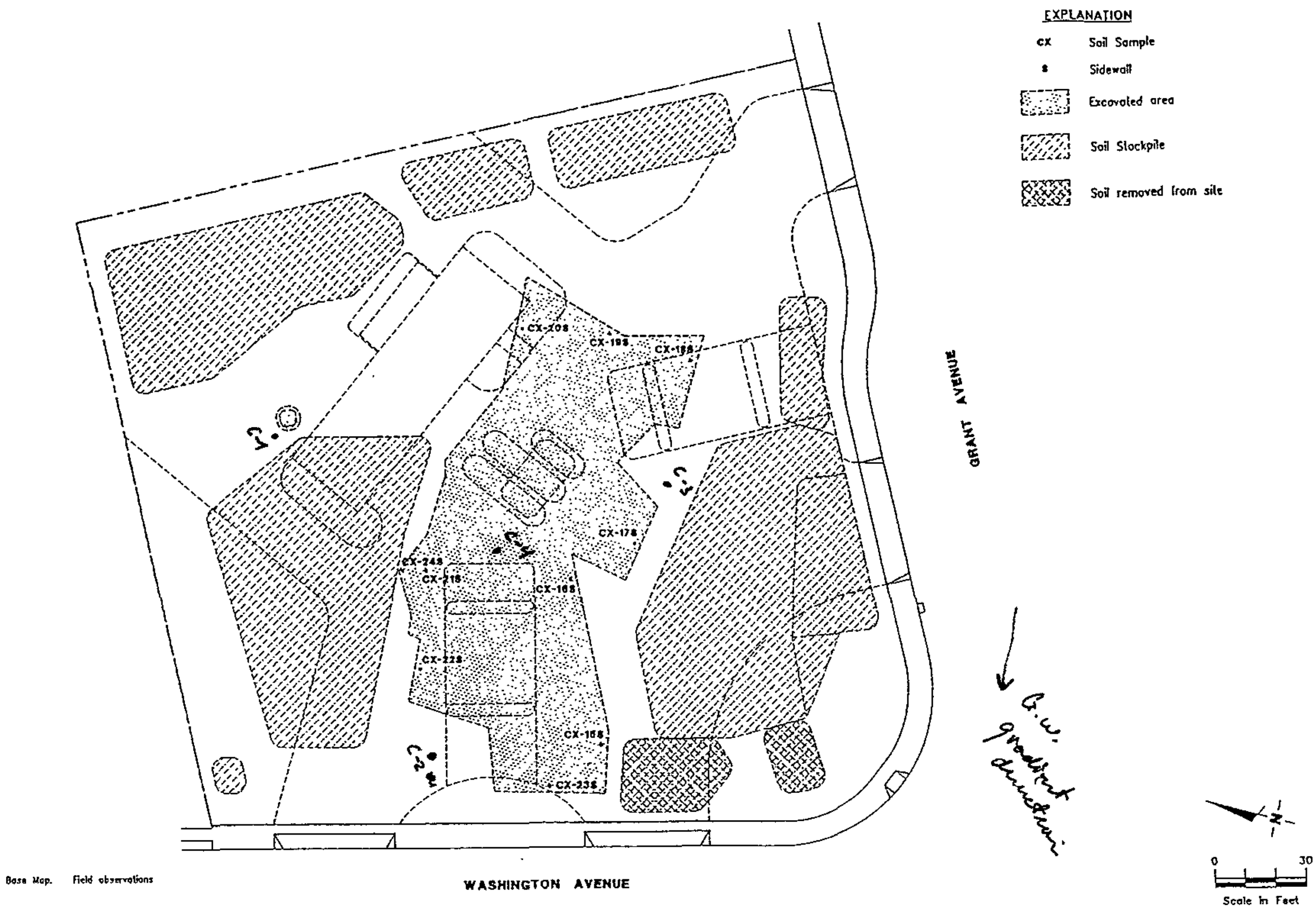


Reference: GSI (1991b)

ENVIRONMENTAL GEOSCIENCES ENGINEERING		
a division of Water Resources Associates, Inc. Phoenix, Arizona		
Project No.: 70601	Drawn by: V. N. C.	
Date: 5/6/92	Checked by: C. M. F.	

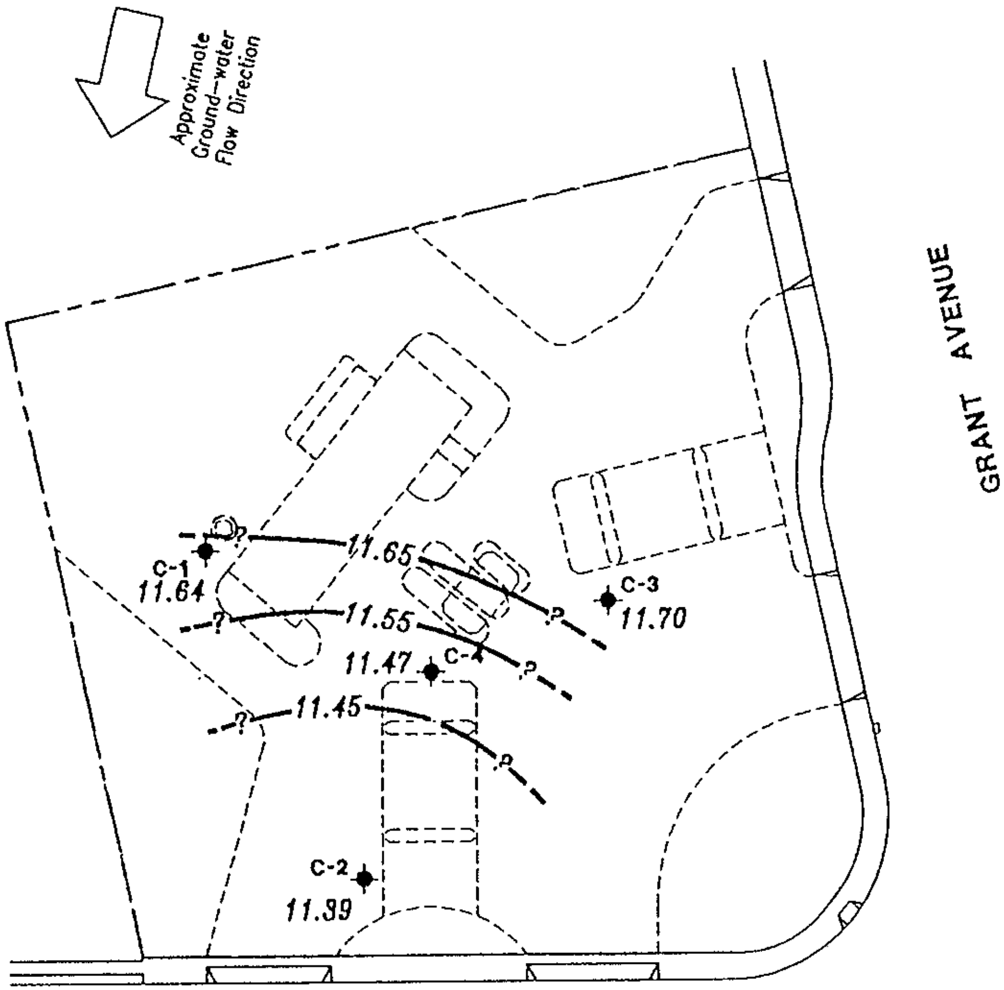
CHEVRON USA
FORMER STATION #9-5630
SAN LORENZO, CA
INITIAL EXCAVATION SAMPLE MAP

Figure 3



Reference: GSI (1991b)

ENVIRONMENTAL GEOSCIENCES ENGINEERING		CHEVRON USA FORMER STATION #9-5630 SAN LORENZO, CA FINAL EXCAVATION SAMPLE MAP	Figure 4
a division of Water Resources Associates, Inc. Phoenix, Arizona			
Project No.: 70601	Drawn by: V. N. C.		
Date: 5/6/92	Checked by: C. M. F.		



EXPLANATION

Ground-water monitoring well

99.99 — Ground-water elevation contour
Approximate Gradient = 0.003

99.99 Ground-water elevation in feet referenced to Mean Sea Level (MSL) measured on December 5, 1990

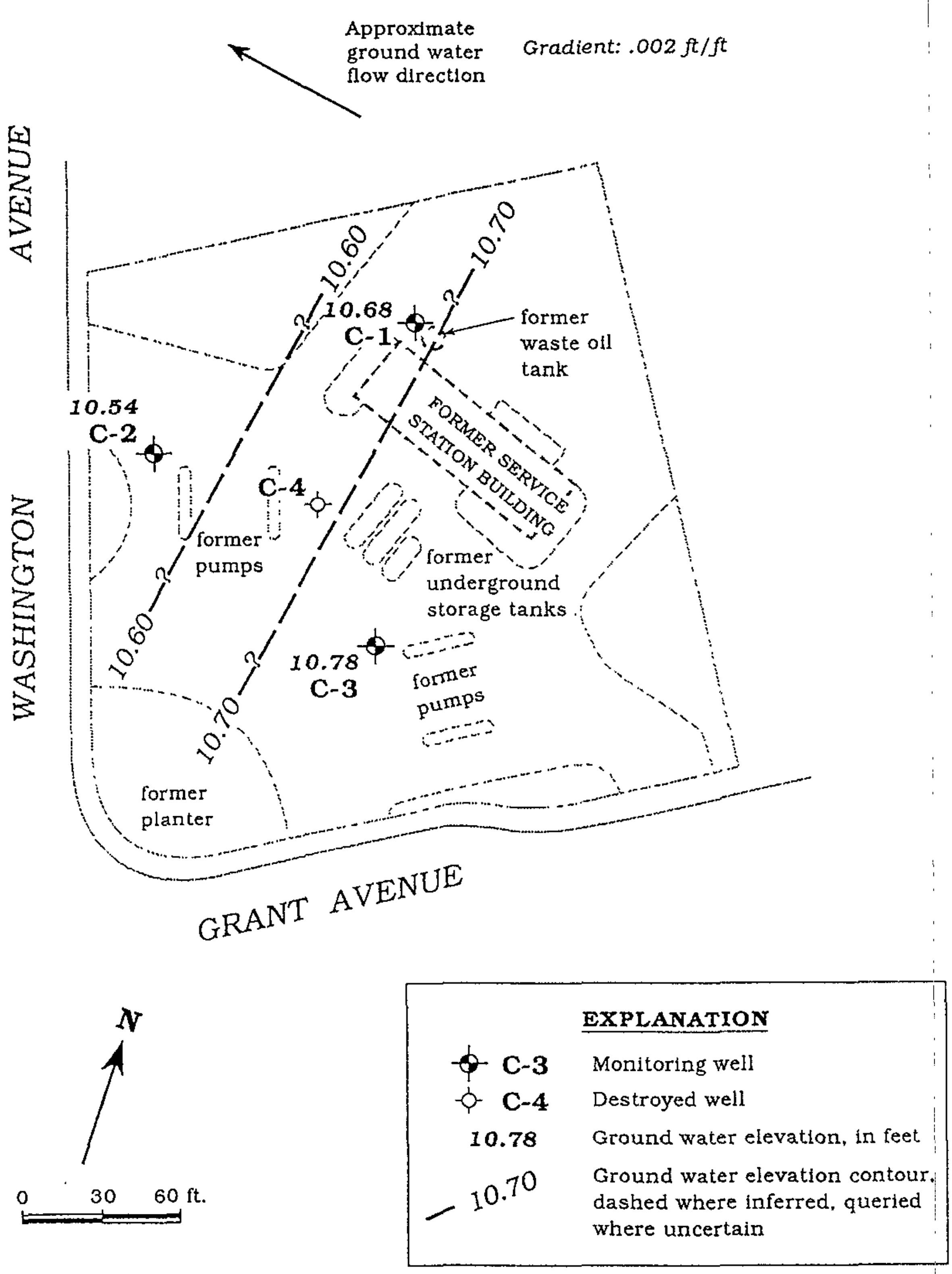
Note: Contours may be influenced by irrigation practices and/or site construction activities.

NOTE: On-site service station facilities were being demolished at the time of this investigation.

Base Map: Field observations

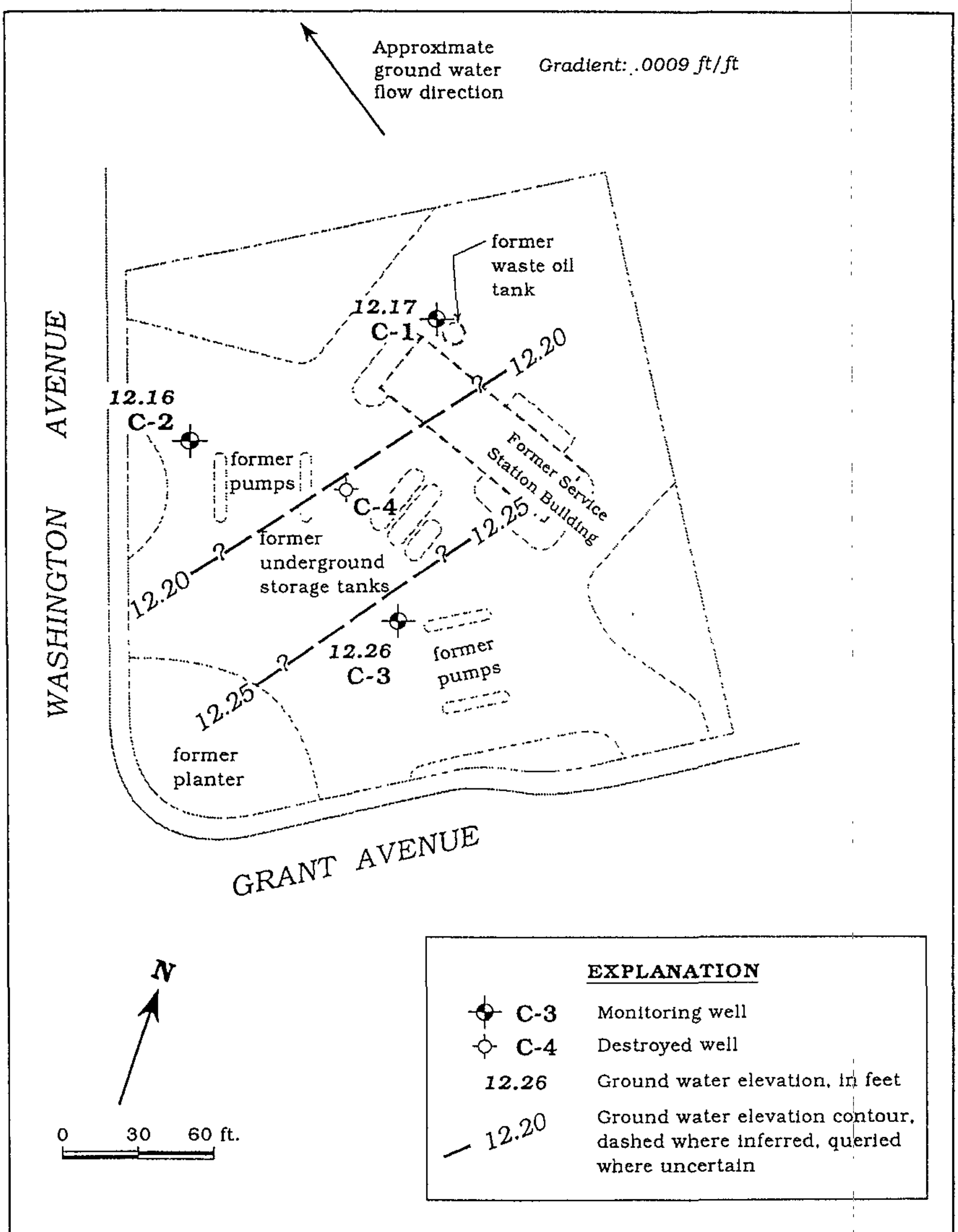
Reference: GSI (1991a)

ENVIRONMENTAL GEOSCIENCES ENGINEERING		CHEVRON USA FORMER STATION #9-5630 SAN LORENZO, CA GROUNDWATER POTENTIOMETRIC MAP DECEMBER 1990	Figure 5A
a division of Water Resources Associates, Inc. Phoenix, Arizona			
Project No.: 70601	Drawn by: V. N. C.		
Date: 5/6/92	Checked by: C. M. F.		



Reference: Sierra Environmental (1991 a)

	Environmental Geosciences Engineering a division of Water Resources Associates, Inc. Phoenix, Arizona		CHEVRON USA Former Station #9-5630 San Lorenzo, CA GROUNDWATER POTENTIOMETRIC MAP SEPTEMBER, 1991	Figure 5B
	Project No. 70601	Drawn by: V. N. C.		
	Date: 5/6/92	Checked by: C. M. F.		



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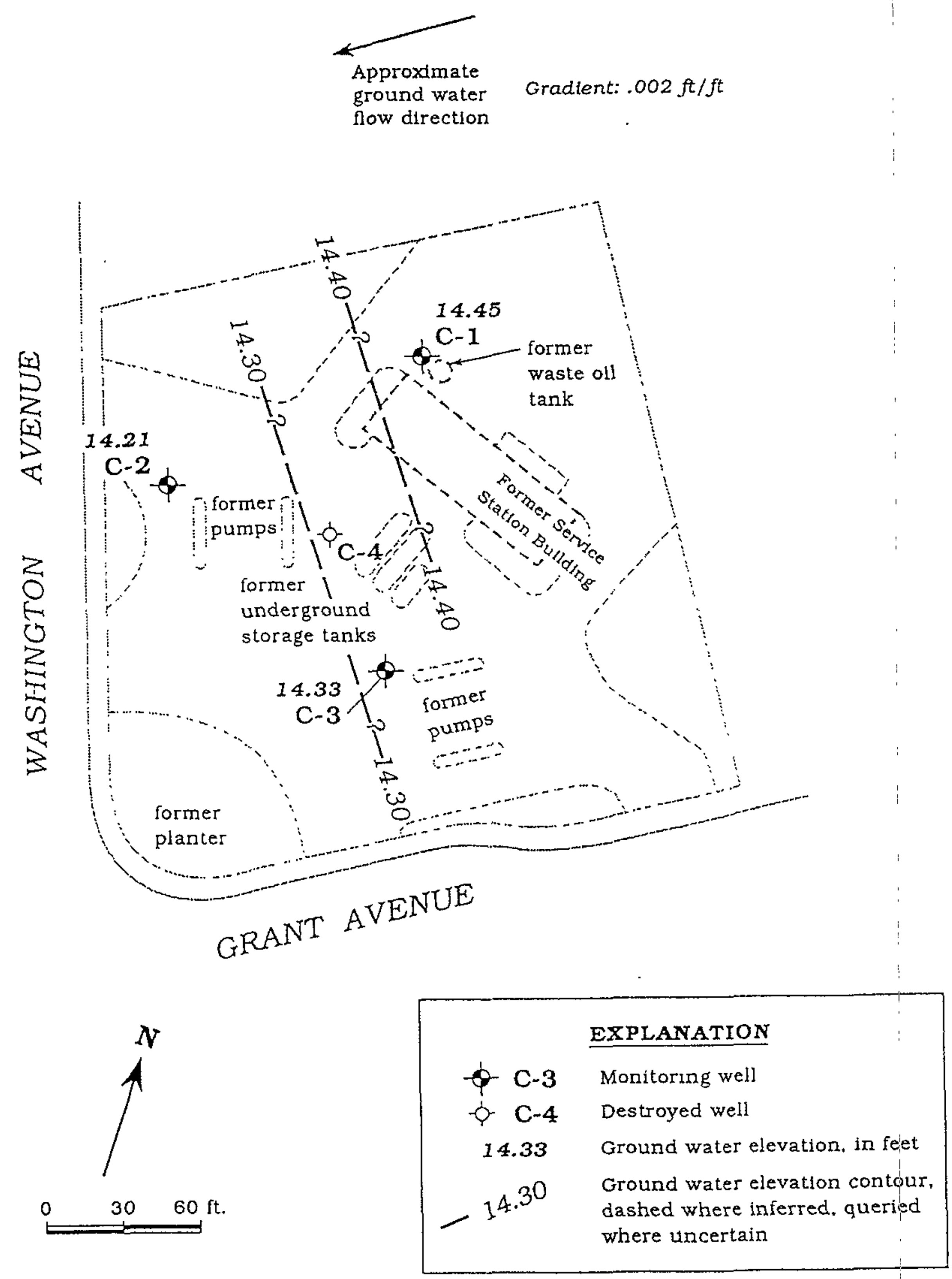
Environmental Geosciences Engineering

a division of Water Resources Associates, Inc. Phoenix, Arizona

Project No. 70601	Drawn by: V. N. C.
Date: 5/6/92	Checked by: C. M. F.

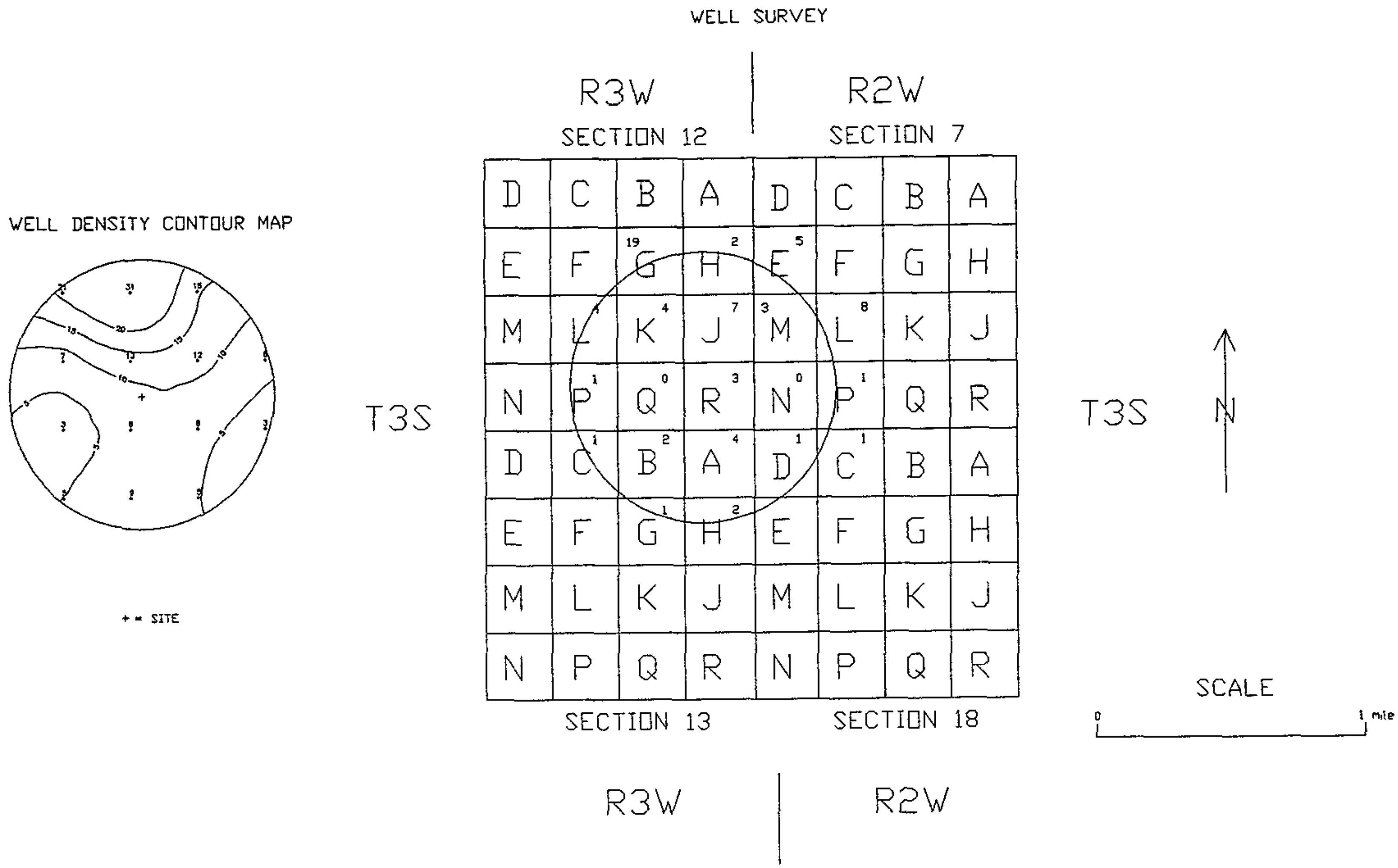
CHEVRON USA
Former Station #9-5630
San Lorenzo, CA
GROUNDWATER POTENTIOMETRIC MAP
DECEMBER, 1991

Figure 5C



Reference: Sierra Environmental (1992)

Environmental Geosciences Engineering a division of Water Resources Associates, Inc. Phoenix, Arizona	CHEVRON USA Former Station #9-5630 San Lorenzo, CA GROUNDWATER POTENTIOMETRIC MAP APRIL, 1992	Figure 5D
Project No. 70601 — Drawn by: V. N. C.		
Date: 5/6/92 — Checked by: C. M. F.		



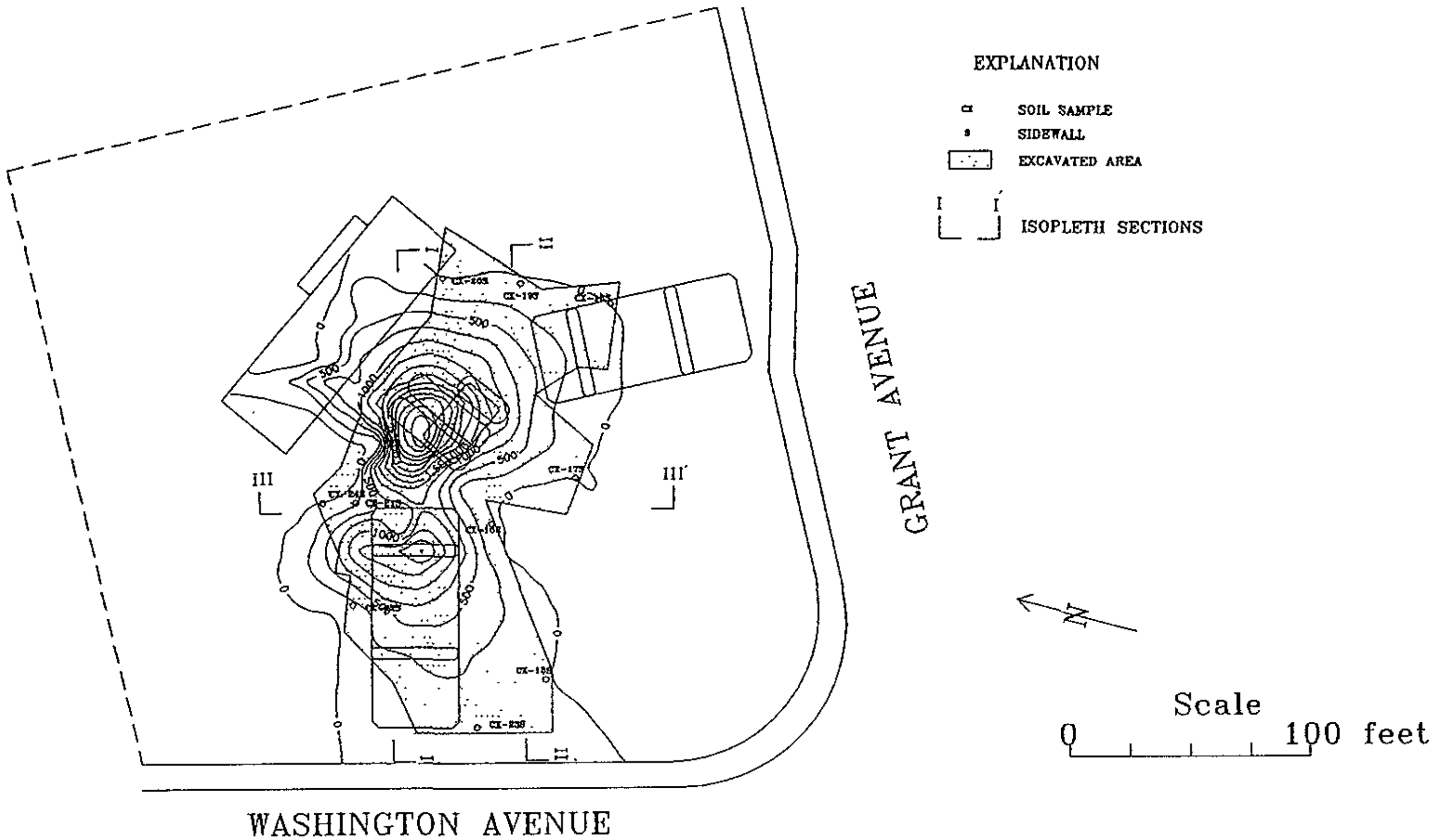
ENVIRONMENTAL GEOSCIENCES ENGINEERING

a division of Water Resources Associates, Inc. Phoenix, Arizona

Project No.: 70601	Drawn by: V. N. C.
Date: 5/6/92	Checked by: C. M. F.

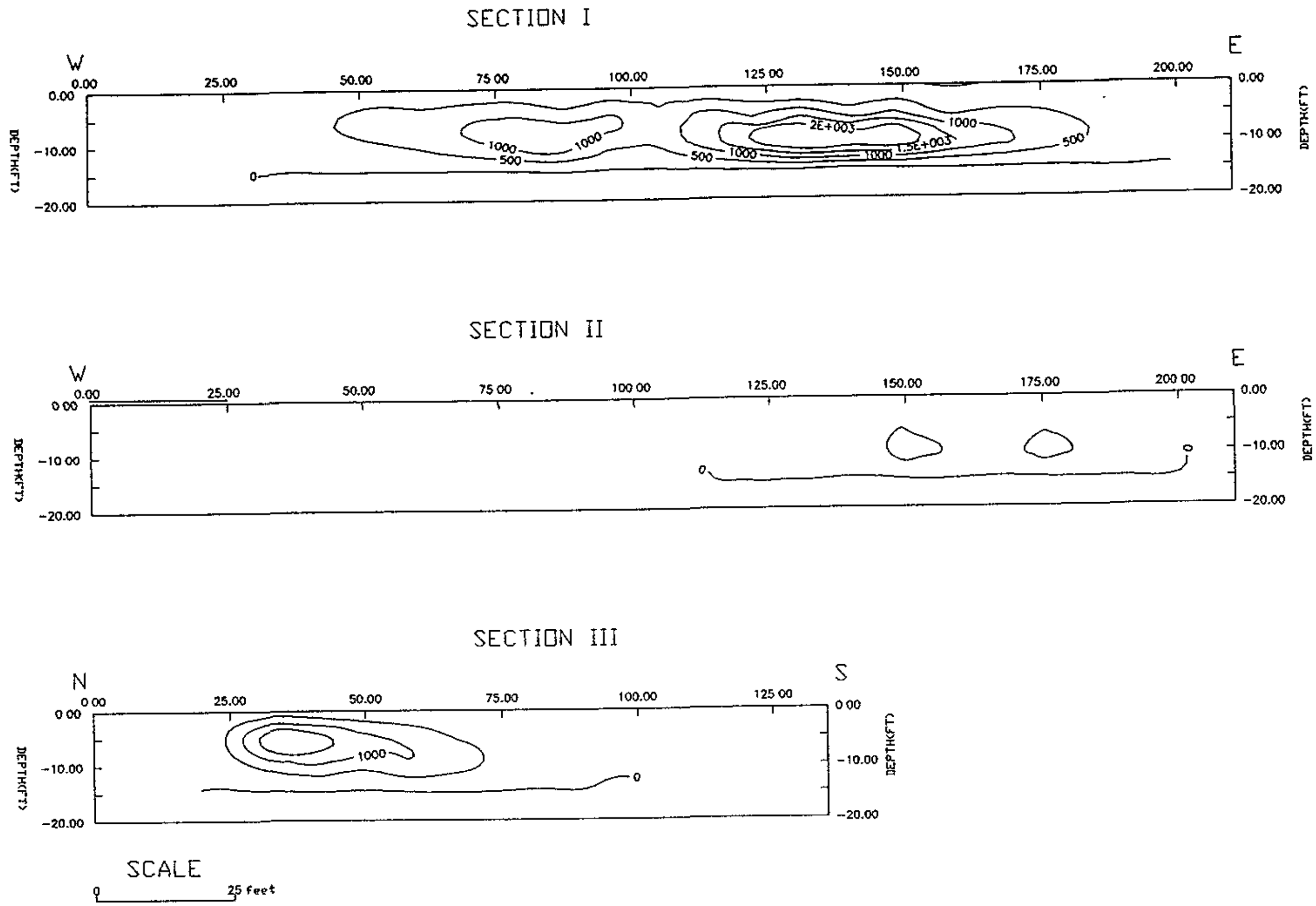
CHEVRON USA
FORMER STATION #9-5630
SAN LORENZO, CA
WELL SURVEY AND
WELL DENSITY CONTOUR MAP

Figure 6



NB: Concentration isopleths expressed in milligrams per kilogram (mg/kg), or parts per million (ppm)

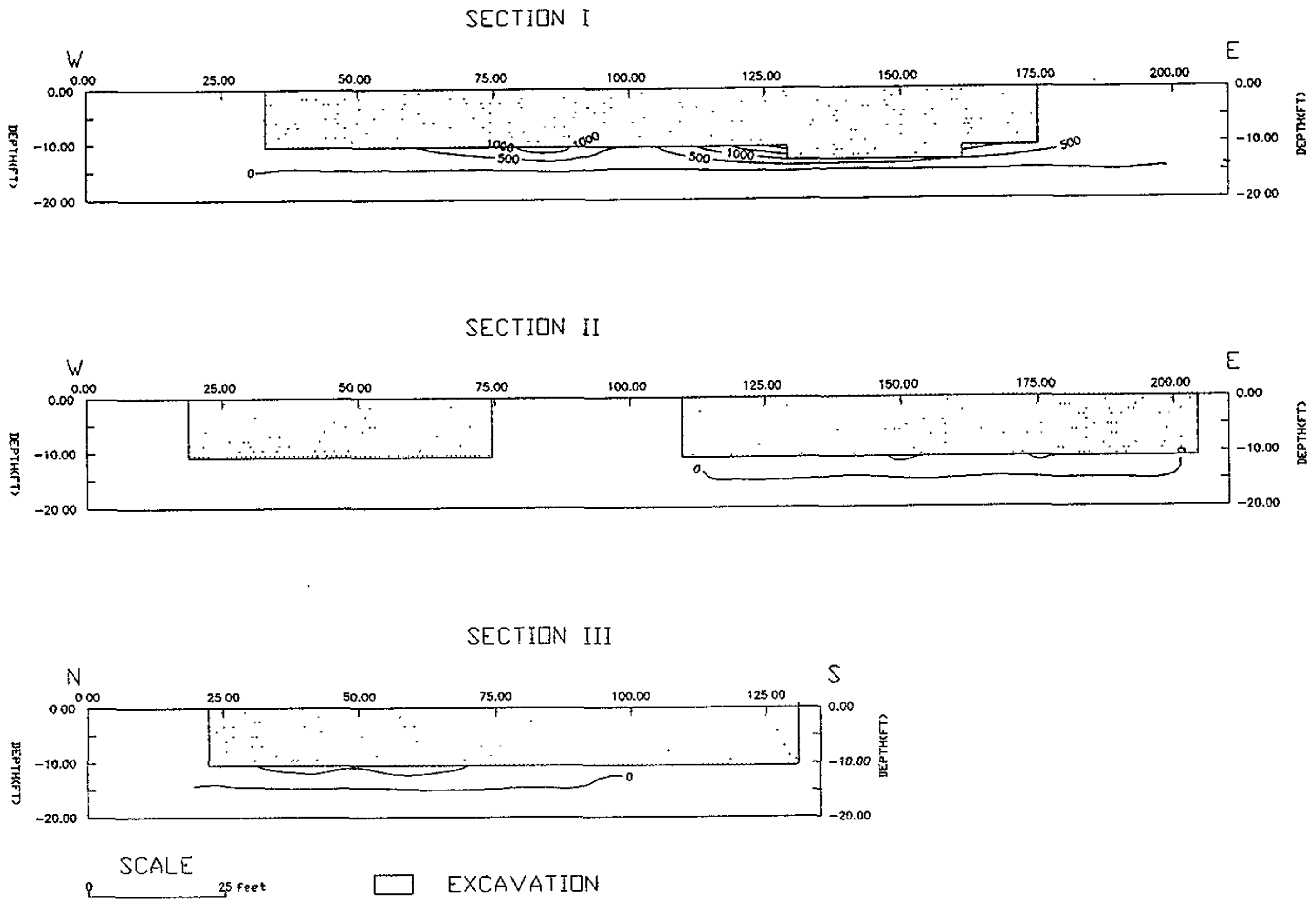
	ENVIRONMENTAL GEOSCIENCES ENGINEERING		CHEVRON USA FORMER STATION #9-5630 SAN LORENZO, CA SOIL TPH-G ISOPLETH MAP 10 FOOT DEPTH	Figure 7
	a division of Water Resources Associates, Inc. Phoenix, Arizona			
	Project No.: 70601	Drawn by: V. N. C.		
	Date: 5/6/92	Checked by: C. M. F.		



NB: Concentration isopleths expressed in milligrams per kilogram (mg/kg), or parts per million (ppm)

ENVIRONMENTAL GEOSCIENCES ENGINEERING		CHEVRON USA FORMER STATION #9-5630 SAN LORENZO, CA SOIL TPH-G ISOPLETH SECTIONS
a division of Water Resources Associates, Inc. Phoenix, Arizona		
Project No.: 70601	Drawn by: V. N. C.	
Date: 5/6/92	Checked by: C. M. F.	

Figure 8



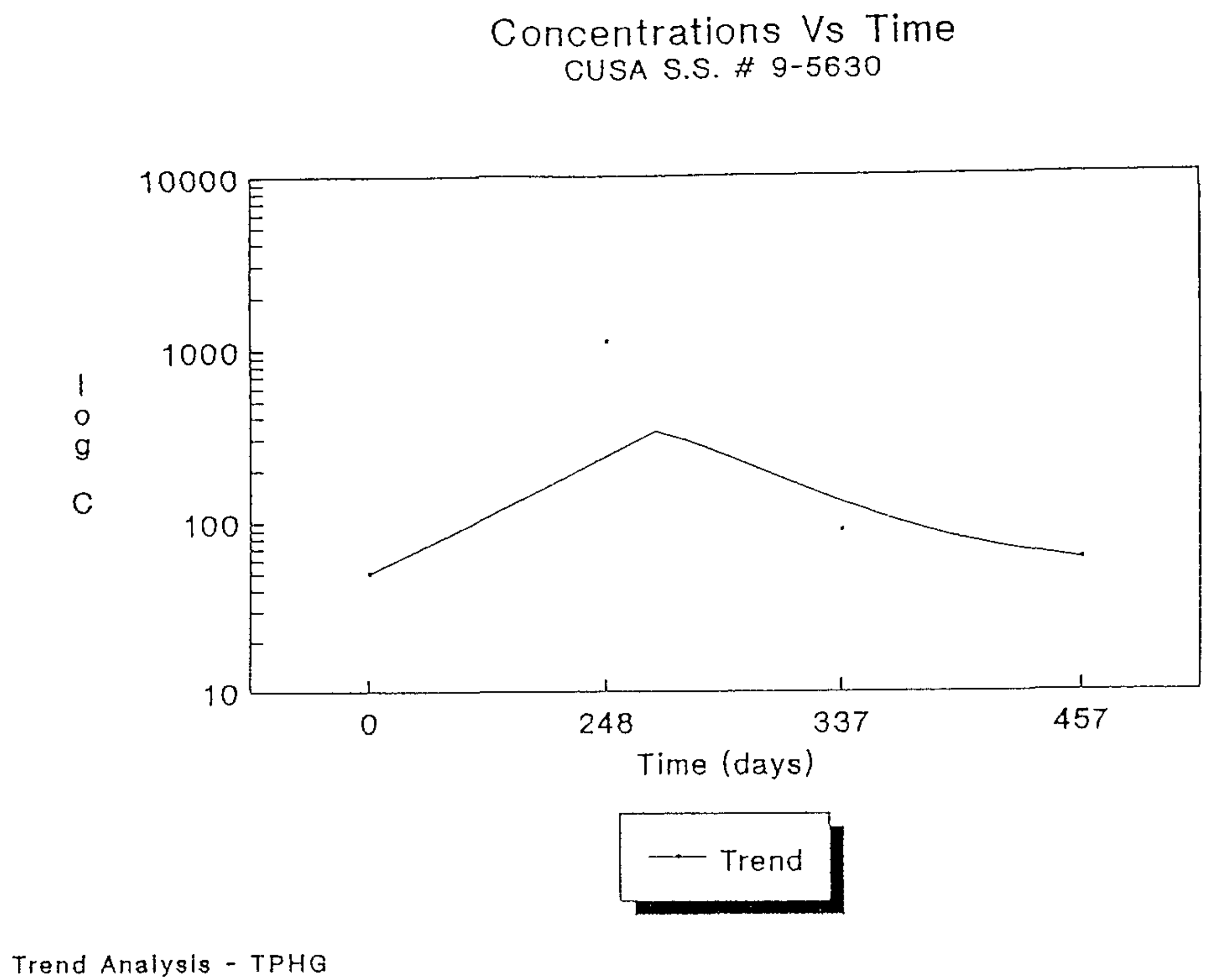
NB: Concentration isopleths expressed in milligrams per kilogram (mg/kg), or parts per million (ppm)

ENVIRONMENTAL GEOSCIENCES ENGINEERING		
a division of Water Resources Associates, Inc. Phoenix, Arizona		
Project No.: 70601	Drawn by: V. N. C.	
Date: 5/6/92	Checked by: C. M. F.	

CHEVRON USA
FORMER STATION #9-5630
SAN LORENZO, CA

SOIL TPH-G ISOPLETH SECTIONS

Figure 9



ENVIRONMENTAL GEOSCIENCES ENGINEERING		
a division of Water Resources Associates, Inc. Phoenix, Arizona		
Project No.: 70601	Drawn by: V. N. C.	
Date: 5/6/92	Checked by: C. M. F.	

CHEVRON USA
FORMER STATION #9-5630
SAN LORENZO, CA
SEMI-LOG TREND ANALYSIS
WELL C-3

Figure **10**

TABLES

Borings

Table 1 - Summary of In-Situ Soil Analytical Data, CUSA Service Station #9-5630, San Lorenzo, CA

SOIL ANALYSES DATA

SAMPLE I.D.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	TOG (PPM)
C-1-5.0	12-Nov-90	20-Nov-90	<1	<0.010	<0.015	<0.015	<0.015	<50
C-1-10.5	12-Nov-90	20-Nov-90	<1	<0.010	<0.015	<0.015	<0.015	<50
C-1-15.5	12-Nov-90	20-Nov-90	<1	<0.010	<0.015	<0.015	<0.015	<50
C-2-4.0	12-Nov-90	20-Nov-90	3	0.046	0.008	<0.005	0.036	N/A
C-2-9.0	12-Nov-90	20-Nov-90	99	0.18	0.22	0.96	1.5	N/A
C-2-14.0	12-Nov-90	20-Nov-90	<1	0.006	<0.005	<0.005	0.010	N/A
C-2-19.5	12-Nov-90	20-Nov-90	<1	<0.005	<0.005	<0.005	<0.005	N/A
C-3-5.5	12-Nov-90	20-Nov-90	2	1.7	0.019	0.036	0.037	N/A
C-3-10.5	12-Nov-90	20-Nov-90	140	0.20	0.041	1.4	0.93	N/A
C-3-15.5	12-Nov-90	20-Nov-90	<1	<0.005	0.008	<0.005	0.013	N/A
C-3-20.5	12-Nov-90	20-Nov-90	<1	<0.005	0.006	<0.005	0.011	N/A

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
TOG = Total Oil and Grease
PPM = Parts Per Million
N/A = Not Analyzed

Notes: 1. All data shown as <x are reported as ND (none detected).
2. BTEX results for samples C-1-5.0, C-1-10.5 and C-1-15.5 were reported in micrograms per kilogram (parts per billion).

Table 1 - Summary of In-Situ Soil Analytical Data, CUSA Service Station #9-5630, San Lorenzo, CA (continued)

SOIL ANALYSES DATA

SAMPLE I.D.	SAMPLE DATE	ANALYZED DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	TOG (PPM)
C-4-10.5	12-Nov-90	21-Nov-90	890	2.8	26	22	110	N/A
C-4-15.5	12-Nov-90	20-Nov-90	<1	<0.005	<0.005	<0.005	0.008	N/A
C-4-20.5	13-Nov-90	20-Nov-90	1	0.007	0.014	0.008	0.043	N/A

Table 1 - Summary of In-Situ Soil Analytical Data, CUSA Service Station #9-5630, San Lorenzo, CA (continued)

SOIL ANALYSES DATA

SAMPLE NO	DEPTH (FT)	SAMPLE DATE	ANALYSIS DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	OIL & GREASE (PPM)
CH-1	9.5	18-Dec-90	02-Jan-91	8	7.8	19	2.7	17	----
CW-1B	11	18-Dec-90	28-Dec-90	<1	<.005	<.005	<.005	<.005	<50
CW-2	7	18-Dec-90	28-Dec-90	<1	<.005	<.005	<.005	0.010	<50
CW-3	7	18-Dec-90	28-Dec-90	<1	<.005	<.005	<.005	0.007	<50
CW-4	7	18-Dec-90	28-Dec-90	<1	<.005	<.005	<.005	0.010	<50
CW-5	7	18-Dec-90	28-Dec-90	<1	<.005	<.005	<.005	<.005	<50
CT-1	3.5	18-Dec-90	28-Dec-90	<1	<.005	<.005	<.005	0.009	----
CT-2	3.5	18-Dec-90	28-Dec-90	3400	<0.5	1.7	12	80	----
CT-3	3.5	18-Dec-90	02-Jan-91	8	0.12	0.10	0.35	0.30	----
CT-4	3.5	18-Dec-90	28-Dec-90	8	0.11	0.069	0.26	0.15	----
CT-5	3.5	18-Dec-90	02-Jan-91	<1	0.010	<.005	<.005	0.017	----
CT-6	3.5	18-Dec-90	28-Dec-90	5	0.031	0.010	<.005	0.15	----

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPM = Parts Per Million
CX = Excavation and Overexcavation Sample
CW = Waste Oil Sample
B = Bottom
CH = Ground-water Sample
CT = Trench Sample
S = Sidewall

Table 1 - Summary of In-Situ Soil Analytical Data, CUSA Service Station #9-5630, San Lorenzo, CA (continued)

SOIL ANALYSES DATA

SAMPLE NO	DEPTH (FT)	SAMPLE DATE	ANALYSIS DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	OIL & GREASE (PPM)
CT-7	3.5	18-Dec-90	28-Dec-90	2	<.005	0.006	0.007	0.030	----
CT-8	3.5	18-Dec-90	28-Dec-90	<1	<.005	<.005	<.005	0.005	----
CT-9	3.5	18-Dec-90	28-Dec-90	3	<.005	0.012	<.005	0.030	----
CT-10	3.5	18-Dec-90	28-Dec-90	13	0.029	0.010	0.29	0.61	----
CT-11	3.5	18-Dec-90	28-Dec-90	4	0.45	<.005	0.11	0.062	----
CT-12	5.5	15-Jan-91	24-Jan-91	6000	0.500	17	56	400	----
CX-1B	11.5	18-Dec-90	28-Dec-90	1500	1.2	50	29	160	----
CX-2S	9.5	18-Dec-90	28-Dec-90	12	0.014	0.100	0.096	0.38	----
CX-3S	8.5	18-Dec-90	28-Dec-90	6	0.009	0.014	0.100	0.075	----
CX-4B	11.5	18-Dec-90	28-Dec-90	1700	0.40	31	25	150	----
CX-5B	11.5	18-Dec-90	28-Dec-90	1600	0.39	32	24	140	----
CX-6S	8.5	18-Dec-90	28-Dec-90	6	0.005	0.013	0.040	0.12	----
CX-7B	11.5	18-Dec-90	28-Dec-90	730	0.89	19	11	62	----
CX-8S	8.0	18-Dec-90	28-Dec-90	4500	0.70	10	39	210	----

Table 1 - Summary of In-Situ Soil Analytical Data, CUSA Service Station #9-5630, San Lorenzo, CA (continued)

SOIL ANALYSES DATA

SAMPLE NO	DEPTH (FT)	SAMPLE DATE	ANALYSIS DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	OIL & GREASE (PPM)
CX-9B	11.5	18-Dec-90	28-Dec-90	1100	<0.3	9.9	15	80	----
CX-10B	11.5	18-Dec-90	28-Dec-90	54	0.026	0.23	0.38	1.6	----
CX-11S	8.0	18-Dec-90	28-Dec-90	780	0.35	11	11	65	----
CX-12S	8.5	18-Dec-90	28-Dec-90	220	0.17	0.070	7	0.30	----
CX-13S	8.5	18-Dec-90	28-Dec-90	1900	0.45	16	28	160	----
CX-14S	9.0	18-Dec-90	29-Dec-90	680	<0.3	6	9.6	57	----
CX-15S	9.5	15-Feb-91	25-Feb-91	3	<.005	<.005	0.014	0.008	----
CX-16S	9.5	15-Feb-91	25-Feb-91	2	<.005	<.005	0.011	0.013	----
CX-17S	9.5	15-Feb-91	25-Feb-91	<1	0.056	<.005	<.005	0.011	----
CX-18S	9.5	15-Feb-91	25-Feb-91	2	0.008	<.005	0.019	0.006	----
CX-19S	9.5	15-Feb-91	25-Feb-91	46	<.030	0.046	0.18	0.41	----
CX-20S	9.5	15-Feb-91	25-Feb-91	<1	<.005	<.005	<.005	<.005	----
CX-21S	9.5	15-Feb-91	25-Feb-91	170	0.037	0.075	2	4	----
CX-22S	9.5	15-Feb-91	25-Feb-91	54	0.024	0.038	0.25	0.83	----

Table 1 - Summary of In-Situ Soil Analytical Data, CUSA Service Station #9-5630, San Lorenzo, CA (continued)

SOIL ANALYSES DATA

SAMPLE NO	DEPTH (FT)	SAMPLE DATE	ANALYSIS DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	OIL & GREASE (PPM)
CX-23S	9.5	15-Feb-91	25-Feb-91	270	0.011	0.093	3	9	----
CX-24S	8.5	26-Aug-91	30-Aug-91	5	<.005	0.049	0.012	0.015	----

Table 2 - Summary of Groundwater Monitoring Data, CUSA Service Station #9-5630, San Lorenzo, CA

Well ID	Date Measured	DTW (ft)	TOC (ft)	GWE (msl)	Product Thickness (ft)	Screen Interval	Sand Pack Interval	Bentonite/Grout Interval
						<-----feet below grade		--------->
C-1	12/5/90	12.44	24.08[1]	11.64	0	15 - 28	13 - 28	0 - 13
	9/6/91	13.20	23.88[2]	10.68	0			
	12/4/91	11.71		12.17	0			
	4/2/92	**9.43**		**14.45**	**0**			
C-2	12/5/90	11.30	22.69[1]	11.39	0	15 - 28	13 - 28	0 - 13
	9/6/91	11.00	21.54[2]	10.54	0			
	12/4/91	9.38		12.16	0			
	4/2/92	**7.33**		**14.21**	**0**			
C-3	12/5/90	11.75	23.45[1]	11.70	0	17 - 27	15 - 27	0 - 15
	9/6/91	11.62	22.40[2]	10.78	0			
	12/4/91	10.14		12.26	0			
	4/2/92	**8.07**		**14.33**	**0**			
C-4	12/5/90	11.85	23.32[1]	11.47	0	17 - 29	17 - 29	0 - 15
	9/6/91[3]	---	---	---	---			
	12/4/91[3]	---	---	---	---			

EXPLANATION:

DTW = Depth to water
TOC = Top of casing elevation
GWE = Ground water elevation
msl = Measurements referenced relative to mean sea level
--- = Not applicable

NOTE:

SES product thicknesses were measured with an MMC flexi-dip interface probe.
1 Well head elevations taken from the Preliminary Site Assessment/Well Installation Report prepared by GeoStrategies, Inc., dated February 8, 1991.
2 Top of Casing elevations surveyed by Ron Miller, P.E. #15816, on April 2, 1992. Ground water elevations prior to this date, corrected using this survey data.
3 Well was destroyed during tank removal and soil excavation operations.

Table 2 - Summary of Groundwater Monitoring Data, CUSA Service Station #9-5630, San Lorenzo, CA (continued)

Well ID	Date Sampled	Analytic Lab	Analytic Method	TPPH (G)	B	T	E	X	O&G
				<------------	------------	ppb	------------	------------	------------>
C-1	12/5/90	SAL	8015/8020/503E	<50	<0.5	<0.5	<0.5	<0.5	<5,000
	9/6/91	SPA	8015/8020	<50	<0.5	<0.5	<0.5	<0.5	---
	12/4/91	SPA	8015/8020	<50	<0.5	<0.5	<0.5	<0.5	---
	4/2/92	**SPA**	**8015/8020**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5,000**
C-2	12/5/90	SAL	8015/8020	<50	0.7	<0.5	<0.5	0.5	---
	9/6/91	SPA	8015/8020	<50	1.3	0.6	0.7	1.5	---
	12/4/91[2]	---	---	---	---	---	---	---	---
	4/2/92	**SPA**	**8015/8020**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	---
C-3	12/5/90	SAL	8015/8020	<50	1	0.7	<0.5	<0.5	---
	9/6/91	SPA	8015/8020	1,100	150	0.6	51	1.9	---
	12/4/91	SPA	8015/8020	89	<0.5	<0.5	0.7	0.6	---
	4/2/92	**SPA**	**8015/8020**	**60**	**2.1**	**1.3**	**1.1**	**3.2**	---
C-4	12/5/90	SAL	8015/8020	<50	4	2	0.7	3	---
	9/6/91[1]	---	---	---	---	---	---	---	---
AA (Trip Blank)	12/5/90	SAL	8015/8020	<50	<0.5	<0.5	<0.5	<0.5	---
	9/6/91	SPA	8015/8020	<50	<0.5	<0.5	<0.5	<0.5	---
	12/4/91	SPA	8015/8020	<50	<0.5	<0.5	<0.5	<0.5	---
	4/2/92	**SPA**	**8015/8020**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	---
BB (Bailer Blank)	9/6/91	SPA	8015/8020	<50	<0.5	<0.5	<0.5	<0.5	---
	12/4/91	SPA	8015/8020	<50	<0.5	<0.5	<0.5	<0.5	---
	4/2/92	**SPA**	**8015/8020**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	---
DHS MCLs	---	---	---	NE	1	---	680	1,750	NE
DHS RALs	---	---	---	NE	---	100	---	---	NE

Table 2 - Summary of Groundwater Monitoring Data, CUSA Service Station #9-5630, San Lorenzo, CA (continued)

EXPLANATION:

TPPH(G) = Total Purgeable Petroleum Hydrocarbons as Gasoline
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
O&G = Total Oil and Grease
--- = Not analyzed/Not applicable
DHS MCLs = Department of Health Services Maximum Contaminant Levels
DHS RALs = Department of Health Services Recommended Action Levels
NE = Not established
ppb = Parts per billion

ANALYTIC METHODS:

8015 = EPA Method 8015/5030 for TPPH(G)
8020 = EPA Method 8020 for BTEX
503E = Standards Method Method 503E for O&G

ANALYTIC LABORATORY:

SAL = Superior Analytical Laboratory of San Francisco, California
SPA = Superior Precision Analytical, Inc. of Martinez, California

NOTE:

[1] Well was destroyed during tank removal and soil excavation operations.
[2] Well obstructed, therefore could not be sampled.

APPENDIX A

Lithologic Logs of Borings

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

Perm	- Permeability
Consol	- Consolidation
LL	- Liquid Limit (%)
PI	- Plastic Index (%)
G_s	- Specific Gravity
MA	- Particle Size Analysis
2.5 YR 6/2	- Soil Color according to Munsell Soil Color Charts (1975 Edition)
5 GY 5/2	- GSA Rock Color Chart

⍁	- No Soil Sample Recoverd
■	- "Undisturbed" Sample
⊠	- Bulk or Classification Sample
▽	- First Encountered Ground Water Level
▼	- Piezometric Ground Water Level
Penetration	- Sample drive hammer weight - 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs

Field location of boring: (See Plate 2)	Project No.: 727801	Date: 11/12/90	Boring No: C-1
	Client: Chevron Service Station No. 5630		
	Location: 997 Grant Avenue		
	City: San Lorenzo, California		Sheet 1 of 2
	Logged by: KDM	Driller: Bayland	
	Casing installation data:		
Drilling method: Hollow Stem Auger			
Hole diameter: 8-inches	Top of Box Elevation: 24.08	Datum: MSL	

Water Level	17.5'		12.44'
Time	15:45		17:32
Date	11/13/90		12/5/90

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Description
				0	
				1	PAVEMENT SECTION - 1.3 ft.
				2	SILTY CLAY (CL) - *black* (10YR 2/1), very stiff, damp, medium plasticity; 50% clay; 35% silt; 15% fine sand; trace fine gravel in cuttings.
				3	
				4	SILTY SAND (SM) - dark grayish brown (10YR 4/2), *medium dense*, damp; 70% fine sand; 30% silt; trace worm burrows.
6.8	300 400 refusal	S&H	C-1-5.0	5	
				6	
				7	
				8	SILTY CLAY (CL/ML) - black (10YR 2/1), very stiff, damp, low plasticity; 60% clay; 45% silt; 5% fine sand; roots and rootholes; small white caliche concretions.
				9	
1.5	18	S&H	C-1-10.5	10	
				11	
				12	CLAY (CL) - light olive brown (2.5YR 5/4), stiff, moist, medium to high plasticity; 80% clay; 15% silt; 5% fine sand.
				13	
				14	ocasional small (<1 mm) black and red-brown rock fragments.
1.5	10	S&H	C-1-15.5	15	
				16	
				17	easier drilling at 17 feet. Water on sample rods at 17.5 feet.
				18	
				19	

Remarks: * Converted to equivalent Standard Penetration blows/ft.

GSI GeoStrategies Inc.

Log of Boring

BORING NO. C-1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCC: CEG 1351	11/90		

Field location of boring:

(See Plate 2)

Project No.: 727801	Date: 11/12/90
Client: Chevron Service Station No. 5630	
Location: 997 Grant Avenue	
City: San Lorenzo, California	
Logged by: KDM	Driller: Bayland

Boring No: C-1

Sheet 2 of 2

Casing installation data:

Drilling method: Hollow Stem Auger

Hole diameter: 8-Inches

Top of Box Elevation:

Datum:

Water Level				
Time				
Date				

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
								SANDY SILT (ML) - pale yellow (2.5Y 7/4), loose, moist, low plasticity; 70% silt; 20% fine sand; 10% nodules of saturated fine sand and white caliche.
1.5	4	S&H	C-1-20.5	20				
				21				
				22				grades to:
				23				50% silt; 40% fine sand; 10% scattered small caliche nodules; rare harder fragments (1/4 inch diameter).
				24				
1.5	8	S&H	C-1-25.5	25				
				26				
				27				Stiffer at 28 feet.
				28				CLAY (CL) - pale yellow brown (2.5Y 7/4), very stiff, damp, medium plasticity; 70% clay; 25% silt; 5% fine sand.
				29				
1.5	15	S&H	C-1-30.0	30				
				31				CLAYEY SILT (ML/CL) - pale yellow brown (2.5Y 7/4), medium stiff, slightly damp, medium plasticity; 50% silt; 40% clay; 10% fine sand.
				32				
N/A	8	SPT	C-1-33.5	33				
				34				Bottom of sample at 33.5 feet. Bottom of boring at 33.5 feet. 11/12/90
				35				
				36				
				37				
				38				
				39				

Remarks: N/A = Not Available

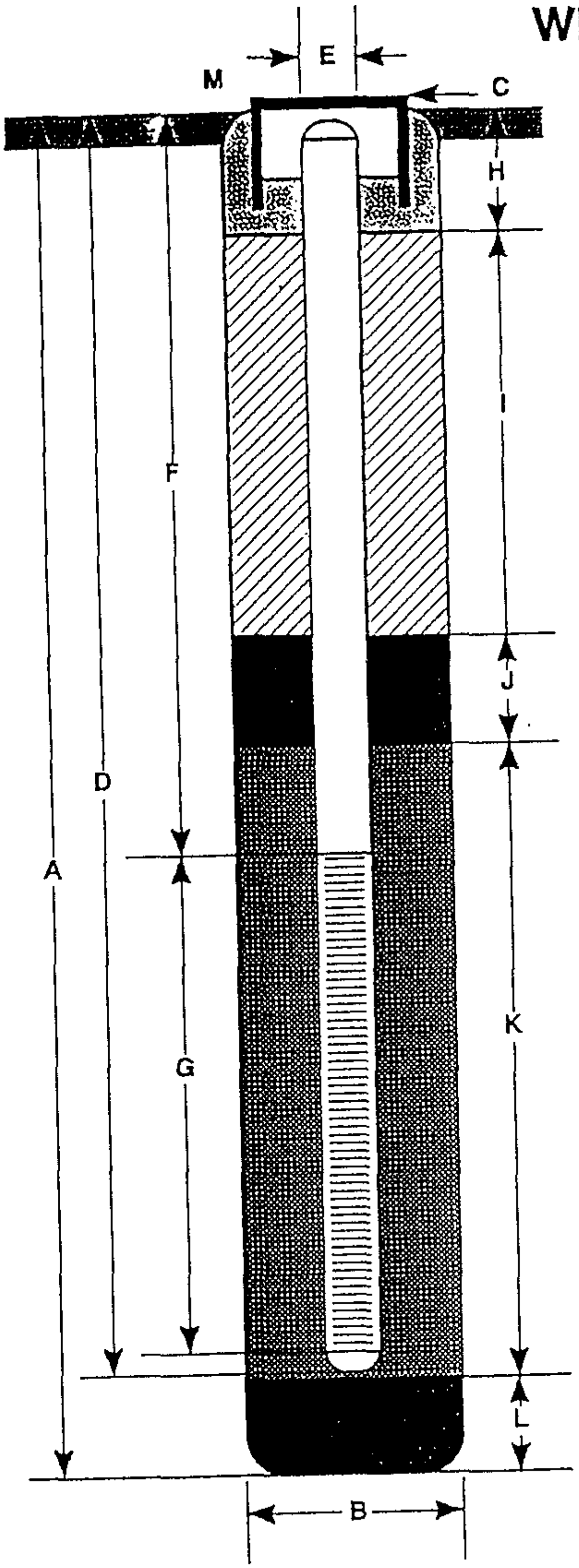
Log of Boring

GSI GeoStrategies Inc.

BORING NO. **C-1**

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCC: CEG 1351	11/90		

WELL CONSTRUCTION DETAIL



A	Total Depth of Boring	33.5	ft.
B	Diameter of Boring	8	in.
	Drilling Method	Hollow Stem Auger	
C	Top of Box Elevation	24.08	ft.
	[X] Referenced to Mean Sea Level		
	[ ] Referenced to Project Datum		
D	Casing Length	28	ft.
	Material	Schedule 40 PVC	
E	Casing Diameter	2	in.
F	Depth to Top Perforations	15	ft.
G	Perforated Length	13	ft.
	Perforated Interval from	15 to 28	ft.
	Perforation Type	Factory Slot	
	Perforation Size	0.020	in.
H	Surface Seal from	0.0 to 1.5	ft.
	Seal Material	Concrete	
I	Backfill from	1.5 to 10.5	ft.
	Backfill Material	Concrete	
J	Seal from	10.5 to 13	ft.
	Seal Material	Bentonite	
K	Gravel Pack from	13 to 28	ft.
	Pack Material	Lonestar #2/12 sand	
L	Bottom Seal	5.5	ft.
	Seal Material	Bentonite	
M	Vault box with locking cap and cover.		

Note: Depths measured from initial ground surface.

GSI GeoStrategies Inc.

Well Construction Detail

WELL NO. C-1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCC: CEG 1351	11/90		

*Field location of boring:	(See Plate 2)
Project No.:	727801
Date:	11/12/90
Boring No:	C-2
Client:	Chevron Service Station No. 5630
Location:	997 Grant Avenue
City:	San Lorenzo, California
Sheet	1 of 2
Logged by:	KDM
Driller:	Bayland
Casing installation data:	
Drilling method:	Hollow Stem Auger
Hole diameter:	8-inches
Top of Box Elevation:	22.69
Datum:	MSL

Water Level	18.7'	11.0'		11.30'
Time	16:00	15:50		17:00
Date	11/12/90	11/13/90		12/5/90

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Description
					PAVEMENT SECTION - 1.3 ft. thick
				1	
				2	SANDY CLAY (CL) - black (2.5YR/), medium stiff, damp, medium plasticity; 50 % clay; 40% fine sand; 10% silt; trace worm burrows.
				3	
	150				
62	150	S&H	C-2-4.0	4	
	150				
				5	
				6	
				7	
				8	CLAYEY SAND (SC) - olive yellow (2.5YR 6/6), medium dense, damp; 50% medium sand; 30% clay; 10% coarse sand; 10% silt.
	250				
1274	250	S&H	C-2-9.0	9	
	250				
				10	
				11	
				12	
				13	CLAY (CL) - gray (2.5 YR/4), stiff, damp, medium plasticity; 70% clay; 25% silt; 5% diseminated caliche (white to gray color), small rootholes; dark staining along vertical soil pores or burrows.
7.9	9	S&H	C-2-14.0	14	
				15	
				16	CLAYEY SILT (ML/CL) - olive yellow (2.5Y 6/6), medium stiff, moist; 60% silt; 10% fine sand; 25% clay; 5% rock fragments; very small rootholes.
				17	
				18	
				19	
N/A	7	S&H	C-2-19.5		
				20	

Remarks: *Converted to equivalent Standard Penetration blow/ft.

GSI GeoStrategies Inc.

Log of Boring

BORING NO. C-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCC: CEG 1351	11/90		

Field location of boring: (See Plate 2)	Project No.: 727801
	Date: 11/12/90
	Boring No: C-2
	Client: Chevron Service Station No. 5630
	Location: 997 Grant Avenue
	City: San Lorenzo, California
	Sheet 2 of 2
	Logged by: KDM
	Driller: Bayland
	Casing installation data:
Drilling method: Hollow Stem Auger	Top of Box Elevation:
Hole diameter: 8-inches	Datum:

Water Level				
Time				
Date				

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				21				SANDY SILT (ML) - olive yellow (2.5Y 6/6), loose, saturated, small rootlets, trace caliche; 40% - 60% silt; 30% - 50% fine sand; 10% - 30% clay. Alternate sandy and silty beds, 1 to 2 inches thick.
				22				
				23				
50.3	7	S&H	C-2-24.0	24				
				25				
				26				
				27				
				28				harder drilling at 27.5 ft.
1.5	9	S&H	C-2-29.0	29				CLAY (CL) - olive yellow (2.5Y 6/6), stiff, moist, trace disemenated caliche; 60% clay; 30% silt; 10% fine sand.
				30				Bottom of Boring at 29.5 ft.
				31				Bottom of Sample at 29.5 ft. 11/12/90
				32				
				33				
				34				
				35				
				36				
				37				
				38				
				39				
				40				

Remarks:

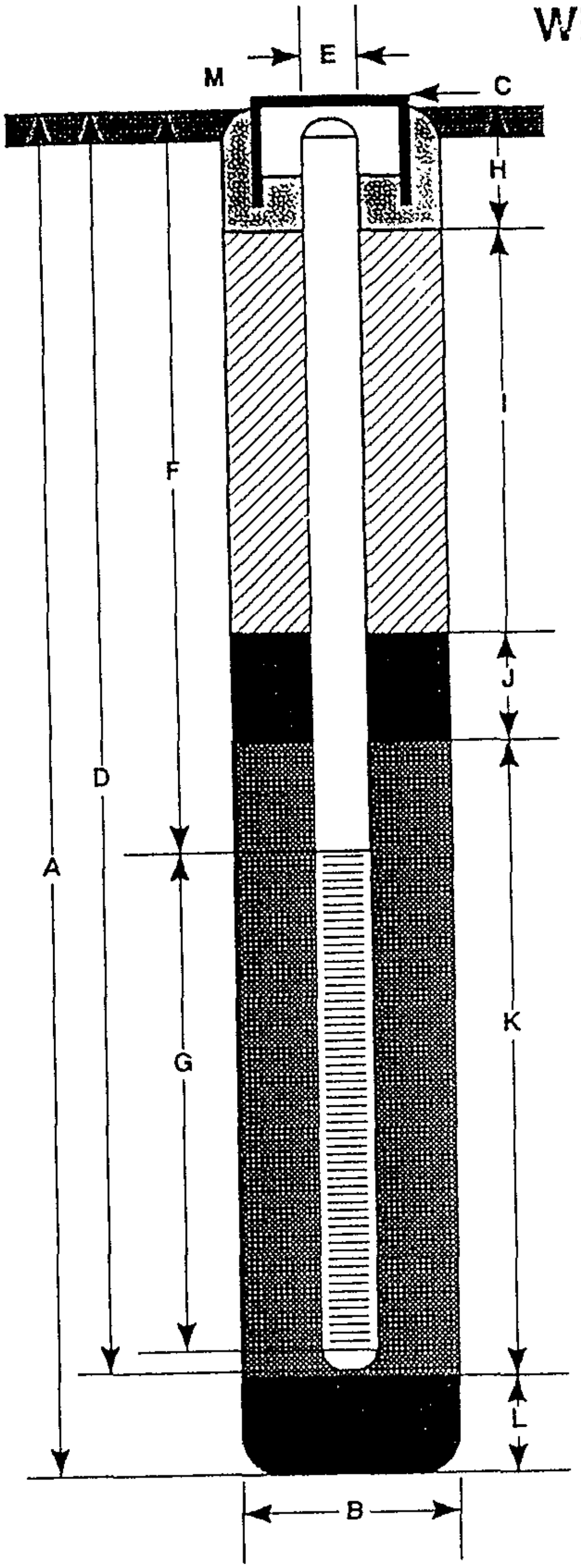
Log of Boring

GSI GeoStrategies Inc.

BORING NO. C-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCC: CEG 1351	11/90		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 29.5 ft.

B Diameter of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 22.69 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 28 ft.
Material Schedule 40 PVC

E Casing Diameter 2 in.

F Depth to Top Perforations 15 ft.

G Perforated Length 13 ft.
Perforated Interval from 15 to 28 ft.
Perforation Type Factory Slot
Perforation Size 0.020 in.

H Surface Seal from 0.0 to 1.5 ft.
Seal Material Concrete

I Backfill from 1.5 to 11 ft.
Backfill Material Concrete

J Seal from 11 to 13 ft.
Seal Material Bentonite

K Gravel Pack from 13 to 28 ft.
Pack Material Lonestar #2/12 sand

L Bottom Seal 1.5 ft.
Seal Material Native Material

M Vault box with locking cap and cover.

Note: Depths measured from initial ground surface.

GSI GeoStrategies Inc.	Well Construction Detail			WELL NO C-2
JOB NUMBER 727801	REVIEWED BY RG/CEG MCC: CEG 1351	DATE 11/90	REVISED DATE	REVISED DATE

Field location of boring:	Project No.: 727801	Date: 11/12/90	Boring No: C-3
(See Plate 2)	Client: Chevron Service Station No. 5630		
	Location: 997 Grant Avenue		
	City: San Lorenzo, California		Sheet 1 of 2
	Logged by: KDM	Driller: Bayland	
	Casing installation data:		

Drilling method: Hollow Stem Auger

Hole diameter: 8-inches

Top of Box Elevation: 23.45 | Datum: MSL

Water Level	18.0'	11.5'		11.75'
Time	15:40	16:00		15.55
Date	11/12/90	11/13/90		12/5/90

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				0				PAVEMENT SECTION 1.0 ft.
				1				
				2				SANDY CLAY (CL) - black (10YR 2/1), medium stiff, damp, low to medium plasticity.
				3				
				4				
	150							
	200			5				SANDY SILT (ML) - black (10YR 2/1), medium stiff, damp, low to medium plasticity; 70% silt; 20% sand; 10% clay; discoloration from product.
78	200	S&H	C-3-5.5	6				
				7				
				8				
				9				COLOR CHANGE to very dark grayish brown (2.5YR 3/2), damp, low plasticity; 70% silt; 25% sand; 5% clay.
				10				
750	13	S&H	C-3-10.5	11				
				12				
				13				easy drilling at 12.5 ft.
				14				CLAY (CL) - dark grayish brown (10YR 4/2), stiff, saturated, medium to high plasticity; rootholes; 75% clay; 15% silt; 10% sand;
				15				
29	10	S&H	C-3-15.5	16				
				17				
				18				Water on rods at 18.0 ft.
				19				

Remarks: * Converted to equivalent Standard Penetration blow/ft.

GSI GeoStrategies Inc.

Log of Boring

BORING NO. C-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCC: CEG 1351	11/90		

Field location of boring:	Project No.: 727801	Date: 11/12/90	Boring No: C-3
(See Plate 2)	Client: Chevron Service Station No. 5630		
	Location: 997 Grant Avenue		
	City: San Lorenzo, California		Sheet 2 of 2
	Logged by: KDM	Driller: Bayland	
	Casing installation data:		
Drilling method: Hollow Stem Auger	Top of Box Elevation:	Datum:	
Hole diameter: 8-inches			

Water Level				
Time				
Date				

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
								COLOR CHANGE to dark brown (10YR 3/13) at 19.0 ft., medium stiff; 80% clay; 10% silt; 10% fine sand; open burrows; rootholes.
6	6	S&H	C-3-20.5	20				
				21				
				22				
				23				Harder drilling at 23.5 ft.
				24				COLOR CHANGE to light olive brown (2.5YR 5/4) at 24.0 ft.; damp.
3.5	9	S&H	C-3-25.5	25				
				26				
				27				Bottom of Boring at 27.0 ft. Bottom of Sample at 27.0 ft. 11/12/90
				28				
				29				
				30				
				31				
				32				
				33				
				34				
				35				
				36				
				37				
				38				

Remarks:

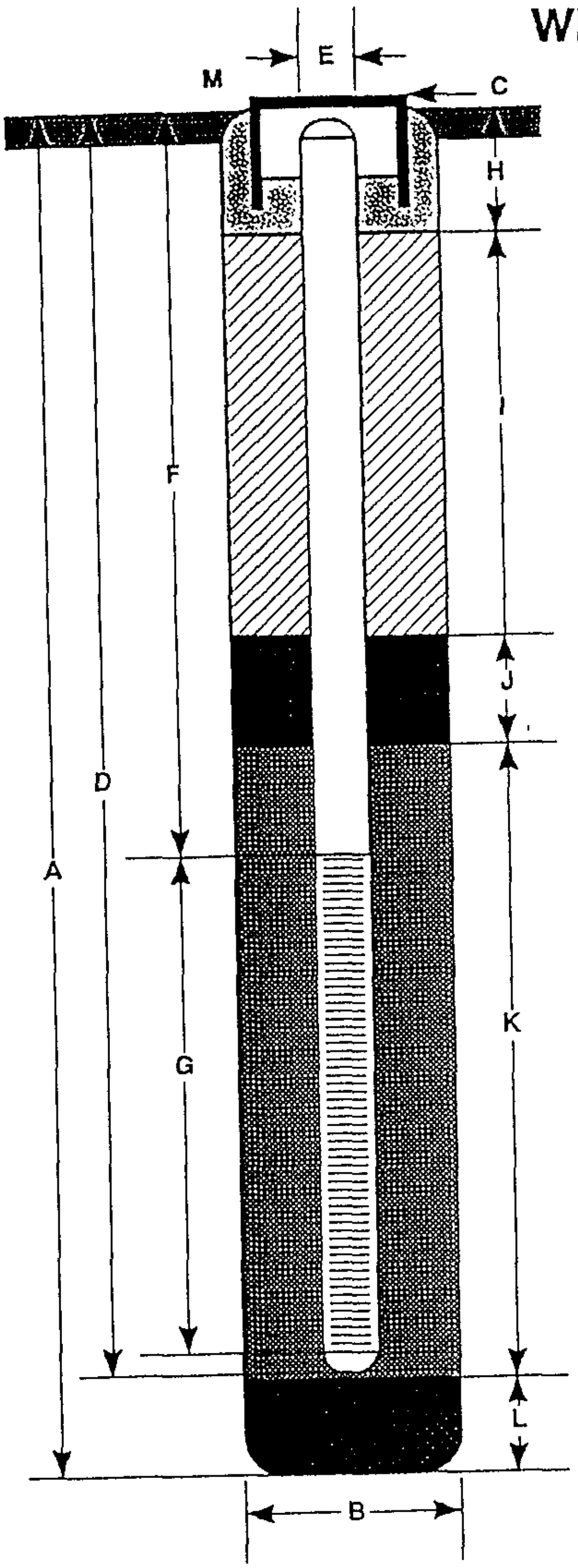
GSI GeoStrategies Inc.

Log of Boring

BORING NO. C-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCL: CEG 1351	11/90		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 27 ft.

B Diameter of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 23.45 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 28 ft.
Material Shedule 40 PVC

E Casing Diameter 2 in.

F Depth to Top Perforations 17 ft.

G Perforated Length 10 ft.
Perforated Interval from 17 to 27 ft.
Perforation Type Factory Slot
Perforation Size 0.020 in.

H Surface Seal from 0.0 to 1.5 ft.
Seal Material Concrete

I Backfill from 1.5 to 13 ft.
Backfill Material Concrete

J Seal from 13 to 15 ft.
Seal Material Bentonite

K Gravel Pack from 15 to 27 ft.
Pack Material Lonestar #2/12 sand

L Bottom Seal 0.0 ft.
Seal Material Native Material

M Vault Box with locking cap and cover.

Note: Depths measured from initial ground surface.

GSI GeoStrategies Inc.	Well Construction Detail		WELL NO. C-3
JOB NUMBER 727801	REVIEWED BY RG/CEG MCC: CEG 1351	DATE 11/90	REVISED DATE	REVISED DATE

Field location of boring: (See Plate 2)	Project No.: 727801 · Date: 11/13/90 · Boring No: C-4
	Client: Chevron Service Station No. 5630
	Location: 997 Grant Avenue
	City: San Lorenzo, California · Sheet 1 of 2
	Logged by: KDM · Driller: Bayland
	Casing installation data:
Drilling method: Hollow Stem Auger	
Hole diameter: 8-inches	Top of Box Elevation: 23.32 · Datum: MSL

Water Level	19.0'	14.0'	12.0'	11.85'
Time	14:30	15:00	16:05	16:36
Date	11/13/90	11/13/90	11/13/90	12/5/90

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Description
				0	PAVEMENT SECTION 1.0 ft.
				1	FILL - GRAVELLY SAND, dense, slightly damp
				2	
				3	
				4	SANDY CLAY (CL) - black (10YR 2/1), medium stiff, damp, low to medium plasticity; 60% clay; 20% silt; 20% sand.
	200				
	200			5	
0	200	S&H	C-4-5.5		
				6	
				7	
				8	
				9	
				10	COLOR CHANGE to olive brown (2.5Y 4/4) at 9.0 ft., stiff, damp; 50% clay; 25% silt; 25% sand; trace shell fragments.
1994	14	S&H	C-4-10.5		
				11	
				12	
				13	
				14	
				15	CLAY (CL) - grayish brown (2.5Y 4/2), medium stiff, damp, medium to high plasticity; 70% clay; 25% silt; 5% sand; gray oxidation staining along small rootholes and soil pores.
0	8	S&H	C-4-15.5		
				16	
				17	
				18	
				19	

Remarks: * Converted to equivalent Standard Penetration blows/ft.

GSI GeoStrategies Inc.

Log of Boring

BORING NO. C-4

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCC : CEG 1351	11/90		

Field location of boring:	
(See Plate 2)	
Drilling method:	Hollow Stem Auger
Hole diameter:	8-inches

Project No.: 727801	Date: 11/13/90	Boring No: C-4
Client: Chevron Service Station No. 5630		
Location: 997 Grant Avenue		
City: San Lorenzo, California		Sheet 2 of 2
Logged by: KDM	Driller: Bayland	
Casing installation data:		
Top of Box Elevation:	Datum:	

Water Level				
Time				
Date				

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
								CLAYEY SILT (ML) - light olive brown (2.5YR 5/4),
				20				medium stiff, damp, medium plasticity; 60% silt; 35%
15.5	6	S&H	C-4-20.5					clay; 5% fine sand.
				21				
				22				
				23				
				24				
				25				
7.9	7	S&H	C-4-25.5					
				26				
				27				
				28				
				29				
				30				
N/A	6	S&H	C-4-30.5					
				31				Bottom of Boring at 30.5 ft.
								Bottom of Sample at 30.5 ft.
				32				11/13/90
				33				
				34				
				35				
				36				
				37				
				38				
				39				

Remarks:

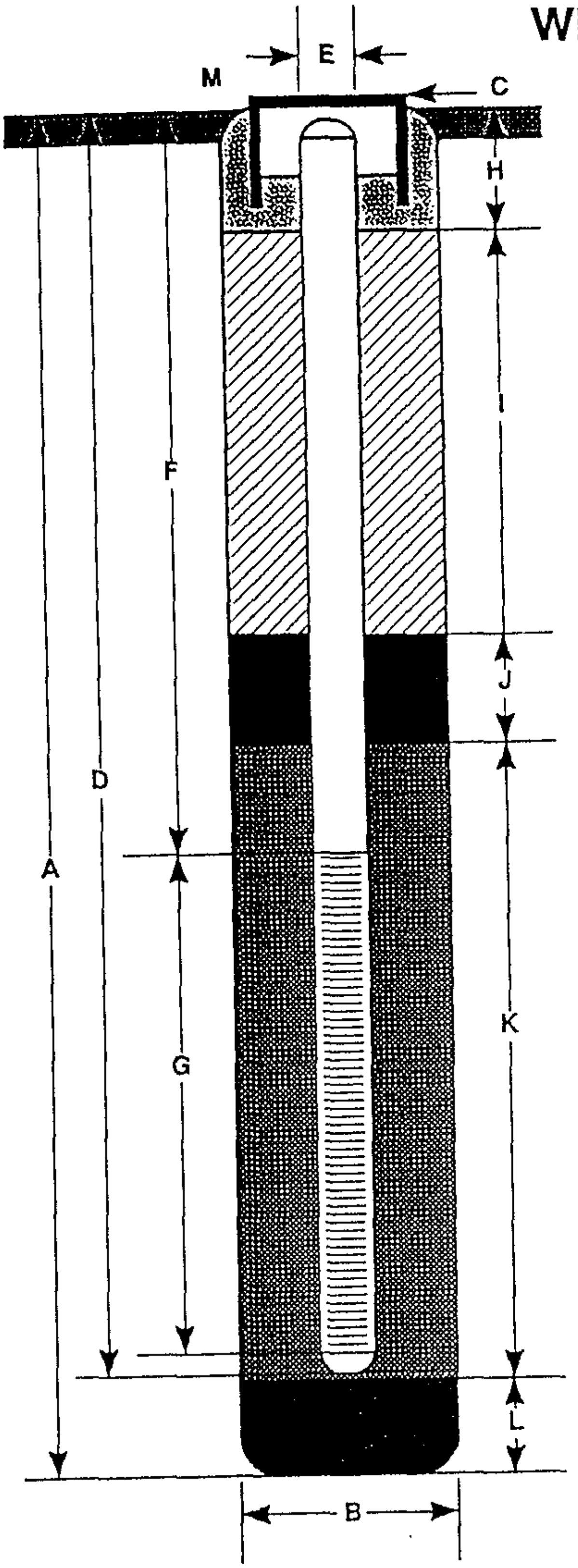
GSI GeoStrategies Inc.

Log of Boring

BORING NO C-4

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCC : CEG 1351	11/90		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 30.5 ft.

B Diameter of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 23.32 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 29 ft.
Material Schedule 40 PVC

E Casing Diameter 2 in.

F Depth to Top Perforations 17 ft.

G Perforated Length 22 ft.
Perforated Interval from 17 to 29 ft.
Perforation Type Factory Slot
Perforation Size 0.020 in.

H Surface Seal from 0.0 to 1.5 ft.
Seal Material Concrete

I Backfill from 1.5 to 13 ft.
Backfill Material Concrete

J Seal from 13 to 15 ft.
Seal Material Bentonite

K Gravel Pack from 17 to 29 ft.
Pack Material Lonestar #2/12 sand

L Bottom Seal 1.5 ft.
Seal Material Native Material

M Vault box with locking cap and cover.

Note: Depths measured from initial ground surface.

GSI GeoStrategies Inc.

Well Construction Detail

WELL NO. C-4

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
727801	MCC: CEG 1351	11/90		

APPENDIX B

WELL SURVEY

User ID: ANDREAS   Request 522

Project ID: P00G26

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:NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
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 WWW   W   W  WWWW   WWWW   WWWWW   WWW    WWW
W   W  WW  W  W   W  W   W  W      W   W  W   W
W   W  W W W  W   W  W   W  W      W   W  W
WWWWW  W  WW  W   W  WWWW   WWWW   WWWWW   WWW
W   W  W   W  W   W  W W    W      W   W      W
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3S/2W	7A 9	LORENZO MASONIC BLDG ASSO	764 GALWAY DRIVE	SL	0	6/ 1/1986
3S/2W	7C 1	STENZEL	SYCAMORE	SLZ	0	8/ 3/1984
3S/2W	7D 1	TWIN NURSERY	HESPERIAN	SL	0	8/ 3/1984
3S/2W	7D 2	TWIN NURSERY	HESPERIAN BLVD	SL	0	8/ 3/1984
3S/2W	7E	?	15840 HESPERIAN BLVD.	SLO	0	/ /
3S/2W	7E 1	EXXON OIL USA	HESPERIAN & LEWELLING	SL	0	8/ 3/1984
3S/2W	7E 2	Unocal Corporation	15599 Hesperian Blvd	SLE	0	7/ 9/1991
3S/2W	7E 3	Unocal Corporation	15599 Hesperian Blvd	SLE	0	7/ 9/1991
3S/2W	7E 4	Unocal Corporation	15599 Hesperian Blvd	SLE	0	7/ 9/1991
3S/2W	7F 1	CHARLES GONSALVES	15539 ASHER	SLZ	0	8/ 3/1984
3S/2W	7F 2	FRANK MACIEL	15594 SHARON ST	SL	0	8/ 3/1984
3S/2W	7F 3	UNOCAL STATION	376 LEWELLING BLVD	SLZ	0	6/ 3/1988
3S/2W	7F 4	Unocal Corp.	376 Lewelling Blvd.	SLZ	0	2/27/1991
3S/2W	7F 5	Unocal Corp.	376 Lewelling Blvd.	SLZ	0	2/27/1991
3S/2W	7F 6	Unocal Corp.	376 Lewelling Blvd.	SLZ	0	2/27/1991
3S/2W	7G 1	F. GOYETTE MACHINE WORK	624 LEWELLING	SLZ	0	8/ 3/1984
3S/2W	7G 3	SAN LORENZO UNION H.S. DISTRICT	SAN LORENZO H.S.	SLZ	0	8/ 3/1984
3S/2W	7G 4	DU PONT BIOSYSTEMS	44 LEWELLING BLVD.	SLZ	4627772	6/15/1989
3S/2W	7G 5	DU PONT BIOSYSTEMS	44 LEWELLING BLVD.	SLZ	4627772	6/15/1989
3S/2W	7G 6	DU PONT BIOSYSTEMS	44 LEWELLING BLVD.	SLZ	[illegible]	6/15/1989
3S/2W	7G 7	DU PONT BIOSYSTEMS	44 LEWELLING BLVD.	SLZ	[illegible]	6/15/1989
3S/2W	7G 8	Conoco Inc.	44 Lewelling Blvd	SLZ	0	5/29/1990
3S/2W	7G 9	Conoco Inc.	44 Lewelling Blvd	SLZ	0	5/29/1990
3S/2W	7H 1	KAWAHARA NURSERY	16550 ASHLAND AVE	SLZ	0	8/ 3/1984
3S/2W	7H 2	JUNCTION NURSERY	16467 ASHLAND AVE	SLZ	0	8/ 3/1984
3S/2W	7H 3	KAWAHARA NURSERY	16550 ASHLAND AVE	SLZ	0	3/ 8/1988
3S/2W	7J 1	BAYSIDE NURSERY	16755 MEEKLAND AV	SLZ	0	7/30/1984
3S/2W	7J 3	SUTI	15721 MEEKLAND AVE	SLZ	0	8/ 3/1984
3S/2W	7J 4	BUEHLER	177 LEWELLING BLVD	SLZ	0	8/ 3/1984
3S/2W	7J 5	H. HYLTON	155 LEWELLING BLVD	SLZ	0	8/ 3/1984
3S/2W	7J 6	SIDERA	?	SLZ	0	8/ 3/1984
3S/2W	7J 7	WILLIAM SANTOS	15968 VIA CORDOBA	SLZ	0	8/ 3/1984
3S/2W	7J 8	KURT TESCHKE	15939 VIA CORDOBA	SL	0	8/ 3/1984
3S/2W	7K 1	A. RATTI	?	SLZ	0	1/29/1985
3S/2W	7K 2	A. RATTI (OLD)	?	SLZ	0	3/14/1958
3S/2W	7K 3	A. RATTI	?	SLZ	0	8/ 3/1984
3S/2W	7L 1	MOBIL OIL CORP	15864 HESPERIAN BLVD	SLZ	0	10/ 6/1986
3S/2W	7L 2	MOBIL OIL CORP	15864 HESPERIAN BLVD	SLZ	0	10/ 6/1986
3S/2W	7L 3	MOBIL OIL CORP	15864 HESPERIAN BLVD	SLZ	0	10/ 6/1986
3S/2W	7L 4	MOBIL OIL CORP	15864 HESPERIAN BLVD	SLZ	0	10/ 6/1986

5/ 5/92

ALAMEDA COUNTY--GROUNDWATER WELLS--LOCATIONS

WELL NUMBER	WELL OWNER	WELL ADDRESS	CITY	PHONE NUMBER	DATE OF LAST UPDATE
3S/2W 7L 5	MOBIL OIL CORP.	15884 HESPERIAN BLVD.	SLZ	0	6/15/1989
3S/2W 7L 6	Chevron USA	15900 Hesperian	HAY	0	7/25/1990
3S/2W 7L 7	Chevron USA	15900 Hesperian	HAY	0	7/25/1990
3S/2W 7L 8	Chevron USA	15900 Hesperian	HAY	0	7/25/1990
3S/2W 7M 1	LEVY	646 VIA DELRIO	SLZ	0	8/ 3/1984
3S/2W 7M 2	KINO NURSERY	LEWELLING	SLZ	0	8/ 3/1984
3S/2W 7M 3	PAUL FRINK	754 GRANT AVE	SLZ	0	8/ 3/1984
3S/2W 7P 1	SAN LORENZO HOME ASSOC.	427 PASEO GRANDE	SLO	0	1/22/1990
3S/2W 7Q80	RATTI	?	SLZ	0	8/ 3/1984
3S/2W 18B 1	KENNETH LARSON	16138 VIA SEGUNDO	SLZ	0	8/ 8/1984
3S/2W 18B 2		575 QUIGLEY	SLZ	0	12/12/1984
3S/2W 18B 3	EDWARD VIEIRA	17162 VIA PRIMERO	SLZ	0	8/ 8/1984
3S/2W 18B 4	ROBERT REEDER	396 HACIENDA AVE	SLZ	0	8/ 8/1984
3S/2W 18B 5	ARCO PETROLEUM PRODUCTS	17601 HESPERIAN BLVD	SLZ	0	6/ 1/1988
3S/2W 18B 6	ANDRES GLASSOW	17578 VIA PRIMERO	SLO	0	1/22/1990
3S/2W 18C 1	HORACE ROBERTSON	17127 VIA FLORES	SL	0	8/ 8/1984
3S/2W 18D 1	CHRIST LUTHERN CHURCH	700 HATHAWAY	H	0	8/ 8/1984
3S/2W 18E 1	P. DUNCAN	16089 VIA ALAMITOS	H	0	8/ 8/1984
3S/2W 18F 1	GREEN	620 QUIGLEY ST	SLZ	0	8/ 8/1984
3S/2W 18F 2		775 HACIENDA AV	SL	0	8/ 8/1984
3S/2W 18F 3	P.F. NEAL	840 HACIENDA AVE	H	0	8/ 8/1984
3S/2W 18F 4	WALLACE LEROY	17061 VIA PERDIDO	SLO	0	1/22/1990
3S/2W 18G	ARCO STATION	HESPERIAN & HACIENDA	HAY	0	3/14/1988
3S/2W 18G 1	LEWIS BARTON	18451 ROBSCOTT	H	0	8/ 8/1984
3S/2W 18G 2	ARCO PETROLEUM CO	17601 HESPERIAN BLVD	SLZ	0	8/ 4/1988
3S/2W 18G 3	ARCO PETROLEUM CO	17601 HESPERIAN BLVD	SLZ	0	8/ 4/1988
3S/2W 18G 4	ARCO PETROLEUM PRODUCTS	17601 HESPERIAN BLVD	SLZ	0	6/10/1988
3S/2W 18G 7	Arco Petroleum Products	17601 Hesperian Blvd	SLZ	0	9/11/1990
3S/2W 18G 8	Arco Petroleum Products	17601 Hesperian Blvd	SLZ	0	9/11/1990
3S/2W 18G 9	Arco Petroleum Products	17601 Hesperian Blvd	SLZ	0	9/11/1990
3S/2W 18G10	Arco Petroleum Products	17601 Hesperian Blvd	OAK	0	9/11/1990
3S/2W 18G11	Arco Petroleum Products	17601 Hesperian Blvd	SLZ	0	9/11/1990
3S/2W 18J 1	FRED LOURIE	1238 BARTLETT AV	SLZ	0	8/ 8/1984
3S/2W 18J 2	MINAMI	21626 HESPERIAN BLVD	SLZ	0	8/ 8/1984
3S/2W 18J 2	KAUFMAN & BROAD SO. BAY	600 SHIRLEY	HAY	0	6/15/1989
3S/2W 18J 3	BEAR	21680 HESPERIAN BLVD	H	0	8/ 8/1984
3S/2W 18J 4	KAWABATA NURSERY	657 BARTLETT AV	H	0	8/ 8/1984
3S/2W 18J 5	GENOVESIO	704 BARTLETT AV	H	0	8/ 8/1984
3S/2W 18J 6	BRUSSEAU	713 BARTLETT AV	H	0	8/ 8/1984
3S/2W 18J 7	HATAKEDA	18600 HESPERIAN BLVD	H	0	8/ 8/1984
3S/2W 18J 8	FRANK DEL RIO	1266 BARTLETT	H	0	8/ 8/1984
3S/2W 18K 1	HARD	HESPERIAN BLVD	H	0	8/ 8/1984
3S/2W 18K 2	HARD	KENNEDY PARK	HAY	0	3/14/1988
3S/2W 18K 3	HARD	HESPERIAN BLVD	H	0	8/ 8/1984
3S/2W 18L 1	J. JACKSON	17125 VIA MEDIA	SL	0	8/ 8/1984
3S/2W 18M 1	JOHN MC CONAGHY	HESPERIAN & BOCKMAN	?	0	12/19/1984
3S/2W 18M 2	MANUEL INOCONCIO	1304 VIA ________	SL	0	12/19/1984
3S/2W 18M 3	MICHAEL RYAN	17232 VIA ESTRELLA	SL	0	8/ 8/1984

5/ 5/92

ALAMEDA COUNTY--GROUNDWATER WELLS--LOCATIONS

WELL NUMBER	WELL OWNER	WELL ADDRESS	CITY	PHONE NUMBER	DATE OF LAST UPDATE
3S/2W 18N 1	SL STOCK FARMS	14ØØ FEET SOUTH BOCKMAN	H	Ø	8/ 8/1984
3S/2W 18N 2	HARRY LANGFELDER	17336 VIA ALAMITOS	H	Ø	8/ 8/1984
3S/2W 18P 1	HAYWARD RECREATIONAL DEPT	14Ø1 GOLF COURSE RD	H	Ø	1Ø/3Ø/1986
3S/2W 18Q 1	CITY OF HAYWARD	1Ø15 E ST	H	Ø	8/ 8/1984
3S/2W 18Q 2	EAST BAY DISCHARGE AUTHO.	HESPERIAN BLVD	H	Ø	8/ 8/1984
3S/2W 18R	FLIGHTCRAFT INC.	1999Ø SKYWEST DRIVE	HAY	Ø	11/ 3/1989
3S/2W 18R	Unocal Corporation	2Ø5Ø1 Hesperian Blvd.	HAY	Ø	7/ 3/199Ø
3S/2W 18R 1	HOBSON	779 SUNSET BLVD	H	Ø	8/ 8/1984
3S/2W 18R 2	O'CONNER	813 SUNSET BLVD	H	Ø	8/ 8/1984
3S/2W 18R 2	STAN FELSON	813 W. SUNSET BLVD	HA	Ø	12/14/1988
3S/2W 18R 3	CITY OF HAYWARD	AIRPORT	H	Ø	8/ 8/1984
3S/2W 18R 4	BEECHKARFT WEST AUTOGAS	1999Ø SKYCREST DR	H	Ø	7/23/1985
3S/2W 18R 5	BEECHKARFT WEST AUTOGAS	1999Ø SKYWEST DR	H	Ø	7/23/1985
3S/2W 18R 6	BEECHKARFT WEST AUTOGAS	1999Ø SKYWEST DR	H	Ø	7/23/1985
3S/2W 18R 7	ARCO PETROLEUM	2Ø2ØØ HESPERIAN BLVD	H	Ø	1Ø/ 6/1986
3S/2W 18R 8	ARCO PETROLEUM	2Ø2ØØ HESPERIAN BLVD	H	Ø	1Ø/ 6/1986
3S/2W 18R 9	ARCO PETROLEUM	2Ø2ØØ HESPERIAN BLVD	H	Ø	1Ø/ 6/1986
3S/2W 18R1Ø	TEXACO STA. £62488ØØØ148	2Ø499 HESPERIAN BLVD	HA	Ø	12/14/1988
3S/2W 18R11	TEXACO STA. £62488ØØØ148	2Ø499 HESPERIAN BLVD	HA	Ø	12/14/1988
3S/2W 18R12	TEXACO STA. £62488ØØØ148	2Ø499 HESPERIAN BLVD	HA	Ø	12/14/1988
3S/2W 18R13	FLIGHTCRAFT INC.	1999Ø SKYWEST DRIVE	HAY	Ø	11/ 3/1989
3S/2W 18R14	TEXACO REFINING	2Ø499 HESPERIAN	HAY	Ø	1/12/199Ø
3S/2W 18R15	TEXACO REFINING	2Ø499 HESPERIAN	HAY	Ø	1/12/199Ø
3S/2W 18R16	TEXACO REFINING	2Ø499 HESPERIAN	HAY	Ø	1/12/199Ø
3S/2W 18R17	Texaco Refining & Market.	2Ø499 Hesperian Blvd	HAY	Ø	5/3Ø/199Ø
3S/2W 18R18	Unocal Corporation	2Ø5Ø1 Hesperian Blvd.	HAY	Ø	6/ 8/199Ø
3S/2W 18R19	Unocal Corporation	2Ø5Ø1 Hesperian Blvd.	HAY	Ø	6/ 8/199Ø
3S/2W 18R2Ø	Unocal Corporation	2Ø5Ø1 Hesperian Blvd.	HAY	Ø	6/ 8/199Ø
3S/2W 18R21	Unocal Corporation	2Ø5Ø1 Hesperian Blvd.	HAY	Ø	6/ 8/199Ø
3S/2W 18R22	Unocal Corporation	2Ø5Ø1 Hesperian Blvd.	HAY	Ø	6/ 8/199Ø
3S/2W 18R23	Unocal Corporation	2Ø5Ø1 Hesperian Blvd.	HAY	Ø	6/ 8/199Ø
3S/2W 18R24	Unocal Corporation	2Ø5Ø1 Hesperian Blvd.	HAY	Ø	6/ 8/199Ø
3S/2W 18R25	Texaco Refining & Mrktg	2Ø499 Hesperian Blvd	HAY	Ø	7/31/199Ø
3S/2W 18R26	Texaco Refining & Mrktg	2Ø499 Hesperian Blvd	HAY	Ø	7/31/199Ø
3S/3W 12A 1	D. MARENGO	14933 WASHINGTON	SL	Ø	8/15/1984
3S/3W 12A 2	TWIN NURSERY CORP	14938 WASHINGTON	SL	Ø	8/16/1984
3S/3W 12A 3	TWIN NURSERY CORP.	14958 WASHINGTON AV	SL	Ø	9/2Ø/1984
3S/3W 12B 1	FARA BROTHERS	391 W. 15Ø AV	SLZ	Ø	9/2Ø/1984
3S/3W 12B 2	H. GANSBERGER	15Ø & WASHINGTON	SLZ	Ø	9/2Ø/1984
3S/3W 12B 3	L. RAMIREZ	1496Ø CROSBY ST	SLZ	Ø	9/2Ø/1984
3S/3W 12B 4	J. BOSTICK	15Ø36 ALEXANDRIA ST	SL	Ø	8/17/1984
3S/3W 12B 5	ROY SWATMAN	15Ø34 ALEXANDRIA ST	SL	Ø	9/2Ø/1984
3S/3W 12B 6	LYLE BATES	15Ø28 GRENADA ST	SL	Ø	9/2Ø/1984
3S/3W 12B 7	GREENHOUSE MARKET PLAZA	GREENHOUSE MARKET PLAZA	SL	Ø	8/ 1/1985
3S/3W 12B 8	GREENHOUSE MARKET PLAZA	GREENHOUSE MARKET PLAZA	SL	Ø	8/ 1/1985
3S/3W 12B 9	GREENHOUSE MARKET PLAZA	GREENHOUSE MARKET PLAZA	SL	Ø	8/ 1/1985
3S/3W 12B1Ø	FARIA BROTHERS HARDWARE	519 MANOR BLVD	SL	Ø	1Ø/ 6/1986
3S/3W 12C 1	CITY OF SAN LORENZO	ZELMA & MERSEY	SLZ	Ø	9/2Ø/1984

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ALAMEDA COUNTY--GROUNDWATER WELLS--LOCATIONS

WELL NUMBER	WELL OWNER	WELL ADDRESS	CITY	PHONE NUMBER	DATE OF LAST UPDATE
3S/3W 12C 2	KNAPP	W. 150 AV & ZELMA	SLZ	0	9/20/1984
3S/3W 12C 3	ORLINO ANDRADA	15088 ANDOVER ST	SL	0	8/17/1984
3S/3W 12D 1	O. OWLSON	1146 BODMIN AV	SLZ	0	8/16/1984
3S/3W 12D 2	KIRKLEY	15008 DEWEY ST	SL	0	8/16/1984
3S/3W 12E 1	JOE ALAMEDA	15099 EDGEMOOR	SLZ	0	8/16/1984
3S/3W 12E 2		15118 INVERNESS ST	SLZ	0	12/12/1984
3S/3W 12E 3	L. VANDERBURG	15202 GAUT ST	SL	0	8/17/1984
3S/3W 12E 4	SAMUEL FASSLER	15205 GALT ST	SL	0	8/17/1984
3S/3W 12F 1	REAIRWIN	15211 NORTON ST	SLZ	0	8/16/1984
3S/3W 12F 2	L. BOTHELL	15049 FLEMING ST	SLZ	0	9/20/1984
3S/3W 12F 3	HERMAN ALBRIGHT	15185 NORTON ST	SL	0	8/17/1984
3S/3W 12F 4	RICHARD ARMSTRONG	15177 NORTON ST	SL	0	8/17/1984
3S/3W 12F 5	JAN TISBY	15193 ENDICOTT ST	SL	0	8/17/1984
3S/3W 12F 6	LAPIN	15105 BEATTY ST	SL	0	8/17/1984
3S/3W 12F 7	CHRIST PRESBYTERIAN	690 FARGO AV	SL	0	8/16/1984
3S/3W 12F 8	SAL. CAMPILENGO	15190 NORTON ST	SL	0	8/17/1984
3S/3W 12G 1		685 FARGO AV	SLZ	0	12/12/1984
3S/3W 12G 2	MOBIL OIL CORP	WASHINGTON & FARGO AVE	SL	0	5/21/1986
3S/3W 12G 3	SHELL OIL	15275 WASHINGTON AVE	SL	0	2/ 3/1988
3S/3W 12G 4	SHELL OIL	15275 WASH. AVE.	SLO	0	6/15/1989
3S/3W 12G 5	SHELL OIL	15275 WASHINGTON AVE	SLE	0	2/ 8/1990
3S/3W 12G 6	SHELL	15275 WASH. AVE.	SLO	0	6/15/1989
3S/3W 12G 7	SHELL OIL	15275 WASH. AVE.	SLO	0	6/15/1989
3S/3W 12G 8	SHELL OIL	15275 WASH. AVE.	SLO	0	6/15/1989
3S/3W 12G 9	SHELL OIL	15275 WASH. AVE.	SLO	0	6/15/1989
3S/3W 12G10	SHELL OIL	15275 WASH. AVE.	SLO	0	6/15/1989
3S/3W 12G11	SHELL OIL	15275 WASHINGTON AVE	SLE	0	1/19/1990
3S/3W 12G12	SHELL OIL	15275 WASHINGTON AVE	SLE	0	1/19/1990
3S/3W 12G13	SHELL OIL	15275 WASHINGTON AVE	SLE	0	1/19/1990
3S/3W 12G14	SHELL OIL	15275 WASHINGTON AVE	SLE	0	1/19/1990
3S/3W 12G15	SHELL OIL	15275 WASHINGTON AVE	SLE	0	1/19/1990
3S/3W 12G16	DESERT PETROLEUM	15201 WASH. AVE.	SLO	0	6/15/1989
3S/3W 12G17	DESERT PETROLEUM	15201 WASH. AVE.	SLO	0	6/15/1989
3S/3W 12G18	DESERT PETROLEUM	15201 WASH. AVE.	SLO	0	6/15/1989
3S/3W 12G19	Shell Oil Company	15275 East Washington St.	SLE	0	7/ 3/1990
3S/3W 12H 1	SAN LORENZO NURSERY	15100 WASHINGTON AV	SLZ	0	8/16/1984
3S/3W 12H 2	SAN LORENZO NURSERY	15100 WASHINGTON AV	SLZ	0	9/20/1984
3S/3W 12J 1	A. CHRISTENSEN	WASHINGTON & GRANT	SL	0	8/16/1984
3S/3W 12J 2	MODERN VEGETABLE NURSERY	15550 WASHINGTON	SLZ	0	8/16/1984
3S/3W 12J 3	E. MANUEL GUALCO	15325 WASHINGTON	SL	0	8/16/1984
3S/3W 12J 4	FRANK PERRY	15600 LORENZO AVE	SLZ	0	9/20/1984
3S/3W 12J 5	TEXACO	15595 WASHINGTON AVE	SLZ	0	10/ 6/1986
3S/3W 12J 6	TEXACO	15595 WASHINGTON AVE	SLZ	0	10/ 6/1986
3S/3W 12J 7	TEXACO	15595 WASHINGTON AVE	SLZ	0	10/ 6/1986
3S/3W 12K 1	E. PIANETTA	915 LEWELLING ST	SLZ	0	8/16/1984
3S/3W 12K 2	W. JONES	983 LEWELLING BLVD	SLZ	0	8/16/1984
3S/3W 12K 4	RAGLE	15547 SEDGEMAN ST	SLZ	0	9/20/1984
3S/3W 12L 1	E. PIANETTA	15388 ANDOVER ST	SL	0	9/20/1984

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ALAMEDA COUNTY--GROUNDWATER WELLS--LOCATIONS

WELL NUMBER	WELL OWNER	WELL ADDRESS	CITY	PHONE NUMBER	DATE OF LAST UPDATE
3S/3W 12L 2	BURKE	15367 NORTON ST	SLZ	0	9/21/1984
3S/3W 12L 3	ROBERT PERINO	15596 TILDEN ST	SL	0	8/17/1984
3S/3W 12L 4	AUBREY ELLIOTT	1018 KRAMER ST	SL	0	8/17/1984
3S/3W 12M 1	STRATMAN	15311 FARNSWORTH ST	SLZ	0	8/16/1984
3S/3W 12M 2	E. ROSENQUIST	15301 FARNSWORTH ST	SLZ	0	8/16/1984
3S/3W 12M 3	DONALD WOOLERY	15340 CHURCHILL ST	SL	0	8/17/1984
3S/3W 12M 4	HERMAN HOWELL	15307 FARNSWORTH ST	SLZ	0	9/21/1984
3S/3W 12M 5	RONALD STANLEY	15368 CHURCHILL	SL	0	9/21/1984
3S/3W 12N 1	APARODI	1508 LEWELLING BLVD	SLZ	0	8/16/1984
3S/3W 12N 2	BEVILACQUA HOMES	2020 DAVIS ST	SL	0	9/21/1984
3S/3W 12N 3	WILLIAM MCTIGUE	1520 SAYRE ST	SL	0	8/16/1984
3S/3W 12N 4	GEORGE BOLLA	1335 SAYRE ST	SL	0	8/17/1984
3S/3W 12N 5	ALVIN BROWN	15501 JUTLAND ST	SL	0	8/17/1984
3S/3W 12P 1	MASSOLA	TWIN PALMS	SL	0	8/16/1984
3S/3W 12R 1	ARROYO HIGH SCHOOL	GRANT STREET	SLZ	0	9/21/1984
3S/3W 12R 2	CORSO	15651 WASHINGTON	SL	0	8/16/1984
3S/3W 12R 3	FRANCIS PARETTI	2133 BENEDICT DR	SL	0	9/21/1984
3S/3W 12R 4	TOM CLEMENTS	GRANT & WASHINGTON	HAY	0	9/25/1989
3S/3W 13A 1	HEIDE	90 GRANT AV	SL	0	8/16/1984
3S/3W 13A 4	MARK PETERSON	16124 VIA LUPINE	SLZ	0	8/16/1984
3S/3W 13A 5	San Lnzo Community Church	945 Paseo Grande	SLZ	0	2/27/1991
3S/3W 13A 6	San Lnzo Community Church	945 Paseo Grande	SLZ	0	2/27/1991
3S/3W 13B 1	MODERN VEGETABLE NURSERY	15550 WASHINGTON AV	SLZ	0	8/16/1984
3S/3W 13B 2	GIANELLI	143 GRANT ST	SLZ	0	8/16/1984
3S/3W 13C 1	THOMAS BRATTON	15868 CORTEULISSE	SLZ	0	8/16/1984
3S/3W 13D 1	LAWRENCE MOYERS	1508 VIA HERMANA	SLZ	0	9/21/1984
3S/3W 13E 1		?	SL	0	12/12/1984
3S/3W 13F 1	EARL ZIERAU	1836 BOCKMAN RD	SL	0	8/17/1984
3S/3W 13F 2	DAVID & DELIA NORRIS	16030 VIA NUEVA	SLZ	0	9/21/1984
3S/3W 13G 1	F. LICHTY	16148 CHANNEL ST	SLZ	0	8/16/1984
3S/3W 13H 1	ROBERT HARRIS	1432 VIA LUCAS	SLZ	0	9/21/1984
3S/3W 13H 2	SHIRLEY S. JONES	17038 VIA DEL REY	SLZ	0	6/ 9/1988
3S/3W 13J 1	WULMAC	17166 VIA DEL RAY	SLZ	0	9/21/1984
3S/3W 13J 2	BAPTIST CHURCH	BOCKMAN RD & CHANNEL ST	SLZ	0	9/21/1984
3S/3W 13J 3	DUDEK	1580 BOCKMAN RD	SLZ	0	8/16/1984
3S/3W 13J 4	ROBERT ZOLLER	17050 CHANNEL ST	SLZ	0	9/21/1984
3S/3W 13J 5	TOM SHARP	1316 VIA MADERA	SLO	2762310	9/ 1/1989
3S/3W 13K 1	BECKES	1664 BANDONI AV	SLZ	0	8/16/1984
3S/3W 13K 2	JENNINGS	1831 VIA NATAL	SL	0	8/16/1984
3S/3W 13K 3	ROBERT HERRESCHOU	1782 VIA REDONDO	SLZ	0	9/21/1984
3S/3W 13K 4	MAX SAMSEL	1819 VIA CARRETA	SLZ	0	9/21/1984
3S/3W 13K 5	ALFRED RICH	1843 VIA CARRETA	SLZ	0	8/16/1984
3S/3W 13K 6	James Drurey	17032 Ganley Street	SLZ	0	7/ 3/1990
3S/3W 13L 1	ALFRED PERIO	1917 VIA NATAL	SLZ	0	9/21/1984
3S/3W 13M 1	BAY CITY LIVESTOCK CO.	GRANT NR SFRR TRACK	SL	0	9/21/1984
3S/3W 13M 2	THE BANK OF CALIF.	16303 WORTHELEY DRIVE	LOR	0	2/23/1988
3S/3W 13M 3	PACIFIC INTL. STEEL	16525 WORTHELEY DRIVE	LOR	0	2/24/1988
3S/3W 13N 1	Crown Metal Manufacturing	16323 Worthley Drive	SLZ	0	7/13/1990

ALAMEDA COUNTY--GROUNDWATER WELLS--LOCATIONS

WELL NUMBER	WELL OWNER	WELL ADDRESS	CITY	PHONE NUMBER	DATE OF LAST UPDATE
3S/3W 13N 2	Crown Metal Manufacturing	16525 Worthley Drive	SLZ	0	7/13/1990
3S/3W 13Q 1	L. NIXON	17275 VIA ANNETTE	SL	0	8/16/1984
3S/3W 13Q 2	LAUREL COSBY	17344 VIA CARMEN	SL	0	9/21/1984
3S/3W 13Q 3	HUGO TASSINARI	17312 VIA CARMEN	SL	0	9/21/1984
3S/3W 13Q 4	JAMES GILBERT	17329 VIA CARMEN	SL	0	9/21/1984
3S/3W 13R 1	HARWIN	1450 VIA CORALLA	SL	0	8/16/1984
3S/3W 13R 2	XERXES COLE	17260 VIA EL CERRITO	SL	0	9/24/1984
3S/3W 13R 3	BOB FIKE & DAVE LAUGHLIN	17408 VIA SUSANA	SL	0	9/21/1984
3S/3W 13R 4	R.G. ZOLLER	17326 VIA SUSANA	SLO	0	9/ 1/1989

ALAMEDA COUNTY -- BAY PLAIN GROUNDWATER STUDY -- WELL INVENTORY REPORT

WELL NUMBER	DATE (MO/YR)	SURFACE ELEV. (FT)	TOTAL WELL DEPTH (FT)	DEPTH TO WATER (FT)	DTW (MSL)	WELL USE	LOG	WQ	WL	YIELD (GPM)	DIA. (IN)
3S/2W 7A 1	/45	37	120	0	0	IRR	?	0	0	0	5
3S/2W 7A 2	/38	35	40	0	0	IRR	?	0	0	0	0
3S/2W 7A 3	?	37	42	0	0	IRR	?	0	0	0	5
3S/2W 7A 4	?	38	125	0	0	IRR	?	0	0	0	6
3S/2W 7A 5	/09	38	50	0	0	DOM	?	0	0	0	6
3S/2W 7A 6	9/49	39	49	0	0	IRR	D	0	0	0	8
3S/2W 7A 7	?	39	60	0	0	DOM	?	0	0	0	6
3S/2W 7A 8	/18	39	68	0	0	DOM	?	0	0	0	6
3S/2W 7A 9	02/88	0	0	0	0	DES	D	0	0	0	0
3S/2W 7C 1	/35	37	270	0	0	IRR	?	0	0	0	10
3S/2W 7D 1	?	31	0	0	0	IRR	?	0	0	0	0
3S/2W 7D 2	?	30	0	0	0	ABN	?	0	0	0	8
3S/2W 7E	02/89	0	0	10	0	DES	G	0	0	0	60
3S/2W 7E 1	8/77	0	50	0	0	CAT	D	0	0	0	0
3S/2W 7E 2	4/91	37	25	16	21	MON	G	0	0	0	2
3S/2W 7E 3	4/91	39	25	18	21	MON	G	0	0	0	2
3S/2W 7E 4	4/91	39	25	18	21	MON	G	0	0	0	2
3S/2W 7F 1	?	38	23	0	0	IRR	?	0	0	0	0
3S/2W 7F 2	/55	44	27	0	0	IRR	?	0	0	0	4
3S/2W 7F 3	02/85	0	30	18	0	MON	G	0	0	0	3
3S/2W 7F 4	8/90	0	30	22	0	TES	X	0	0	0	3
3S/2W 7F 5	8/90	0	25	21	0	TES	X	0	0	0	3
3S/2W 7F 6	8/90	0	26	20	0	TES	X	0	0	0	3
3S/2W 7G	12/88	0	37	21	0	BOR	G	0	0	0	0
3S/2W 7G 1	7/37	0	75	0	0	DOM	D	1	0	0	8
3S/2W 7G 3	9/51	42	616	20	22	IRR	D	1	0	250	14
3S/2W 7G 4	12/85	0	30	23	0	MON	G	0	0	0	2
3S/2W 7G 5	12/88	0	30	21	0	MON	G	0	0	0	2
3S/2W 7G 6	12/88	0	30	22	0	MON	G	0	0	0	2
3S/2W 7G 7	12/88	0	27	21	0	MON	G	0	0	0	2
3S/2W 7G 8	9/89	0	27	20	0	MON	X	1	0	0	2
3S/2W 7G 9	9/89	0	24	22	0	MON	X	1	0	0	2
3S/2W 7H 1	/49	40	72	0	0	IRR	?	0	0	0	6
3S/2W 7H 2	/29	38	75	0	0	IRR	?	0	0	0	10
3S/2W 7H 3	06/85	0	65	19	0	IRR	D	0	0	0	8
3S/2W 7J 1	/38	45	130	0	0	IRR+	?	4	+	50	8
3S/2W 7J 3	/20	50	110	0	0	IRR	?	0	0	0	8
3S/2W 7J 4	/46	48	65	0	0	IRR	?	0	0	0	8
3S/2W 7J 5	/47	48	80	0	0	IRR	?	0	0	0	8
3S/2W 7J 6	8/34	46	223	0	0	IRR	D	0	0	0	0
3S/2W 7J 7	5/77	0	30	16	0	DOM	D	0	0	0	6
3S/2W 7J 8	11/77	0	37	18	0	IRR	D	0	0	0	6
3S/2W 7K 1	1/46	0	410	0	0	ABN	D	0	0	0	0
3S/2W 7K 2	1/49	0	410	0	0	ABN				0	0
3S/2W 7K 3	3/49	0	441	0	0	ABN	D	0	0	0	0
3S/2W 7L 1	07/86	0	25	14	0	MON	G	0	0	0	2
3S/2W 7L 2	07/86	0	25	15	0	MON	G	0	0	0	2
3S/2W 7L 3	07/86	0	23	14	0	MON	G	0	0	D	2

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ALAMEDA COUNTY -- BAY PLAIN GROUNDWATER STUDY -- WELL INVENTORY REPORT

WELL NUMBER	DATE (MO/YR)	SURFACE ELEV. (FT)	TOTAL WELL DEPTH (FT)	DEPTH TO WATER (FT)	DTW (MSL)	WELL USE	LOG	WQ	WL	YIELD (GPM)	DIA. (IN)
3S/2W 7L 4	Ø7/86	Ø	25	14	Ø	MON	G	Ø	Ø	Ø	2
3S/2W 7L 5	1Ø/88	Ø	29	Ø	Ø	MON	G	Ø	Ø	Ø	2
3S/2W 7L 6	11/89	Ø	25	Ø	Ø	MON	X	Ø	Ø	Ø	2
3S/2W 7L 7	11/89	Ø	23	Ø	Ø	MON	X	Ø	Ø	Ø	2
3S/2W 7L 8	11/89	Ø	26	Ø	Ø	MON	X	Ø	Ø	Ø	2
3S/2W 7M 1	?	28	22	Ø	Ø	IRR	?	Ø	Ø	Ø	4
3S/2W 7M 2	/2Ø	33	15Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	12
3S/2W 7M 3	6/77	Ø	31	1Ø	Ø	IRR	D	Ø	Ø	Ø	Ø
3S/2W 7P 1	Ø5/89	Ø	32	Ø	Ø	MON	G	Ø	Ø	Ø	2
3S/2W 7Q8Ø	8/45	Ø	138	Ø	Ø	?	D	Ø	Ø	Ø	Ø
3S/2W 18B 1	9/5Ø	33	34	1Ø	23	IRR	D	Ø	Ø	3	6
3S/2W 18B 2	?	Ø	44	Ø	Ø	DES	?	Ø	Ø	Ø	7
3S/2W 18B 3	2/78	Ø	4Ø	16	Ø	IRR	?	Ø	Ø	3	6
3S/2W 18B 4	11/77	Ø	31	15	Ø	IRR	D	Ø	Ø	6Ø	6
3S/2W 18B 5	Ø1/88	Ø	29	1Ø	Ø	MON	D	Ø	Ø	Ø	2
3S/2W 18B 6	Ø6/89	Ø	3Ø	12	Ø	DOM	?	Ø	Ø	Ø	4
3S/2W 18C 1	3/77	Ø	25	14	Ø	IRR	D	Ø	Ø	Ø	4
3S/2W 18D 1	2/53	Ø	98	16	Ø	DOM	D	Ø	Ø	2Ø	6
3S/2W 18E 1	?	Ø	Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	Ø
3S/2W 18F 1	/46	33	52	Ø	Ø	DOM	?	Ø	Ø	Ø	6
3S/2W 18F 2	?	Ø	31	13	Ø	ABN	?	Ø	Ø	Ø	6
3S/2W 18F 3	7/77	Ø	29	Ø	Ø	IRR	D	Ø	Ø	Ø	4
3S/2W 18F 4	Ø5/89	Ø	25	9	Ø	IRR	D	Ø	Ø	Ø	4
3S/2W 18G	1Ø/85	Ø	16	Ø	Ø	BOR	G	Ø	Ø	Ø	Ø
3S/2W 18G	1Ø/85	Ø	14	Ø	Ø	BOR	G	Ø	Ø	Ø	Ø
3S/2W 18G	1Ø/85	Ø	12	Ø	Ø	BOR	G	Ø	Ø	Ø	Ø
3S/2W 18G	1Ø/85	Ø	14	Ø	Ø	BOR	G	Ø	Ø	Ø	Ø
3S/2W 18G 1	5/77	Ø	26	1Ø	Ø	IRR	D	Ø	Ø	Ø	4
3S/2W 18G 2	Ø7/88	Ø	24	Ø	Ø	DES	G	Ø	Ø	Ø	3
3S/2W 18G 3	Ø7/88	Ø	29	1Ø	Ø	DES	D	Ø	Ø	Ø	2
3S/2W 18G 4	Ø1/88	Ø	14	11	Ø	MON	D	Ø	Ø	Ø	4
3S/2W 18G 7	Ø3/9Ø	34	22	12	Ø	MON	X	Ø	Ø	Ø	3
3S/2W 18G 8	Ø3/9Ø	33	22	15	Ø	MON	X	Ø	Ø	Ø	3
3S/2W 18G 9	Ø4/9Ø	32	22	9	Ø	MON	X	Ø	Ø	Ø	3
3S/2W 18G1Ø	Ø4/9Ø	32	26	11	Ø	MON	X	Ø	Ø	Ø	3
3S/2W 18G11	Ø4/9Ø	33	21	11	Ø	MON	X	Ø	Ø	Ø	3
3S/2W 18J 1	/53	45	2Ø2	55	-1Ø	DOM	D	1	Ø	2Ø	8
3S/2W 18J 2	/41	43	91	Ø	Ø	IRR	D	Ø	Ø	Ø	6
3S/2W 18J 2	Ø1/89	Ø	85	35	Ø	DES	D	Ø	Ø	Ø	Ø
3S/2W 18J 3	?	44	1ØØ	Ø	Ø	DOM	D	Ø	Ø	Ø	8
3S/2W 18J 4	/16	45	9Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	8
3S/2W 18J 5	/39	45	55	Ø	Ø	DOM	?	Ø	Ø	Ø	6
3S/2W 18J 6	/46	45	95	Ø	Ø	IRR	?	Ø	Ø	Ø	6
3S/2W 18J 7	/29	4Ø	65	Ø	Ø	IRR	?	Ø	+	1ØØ	8
3S/2W 18J 8	5/51	Ø	75	18	Ø	DOM	D	Ø	Ø	12	6
3S/2W 18K 1	/5Ø	37	1Ø8	Ø	Ø	DOM	?	Ø	Ø	Ø	1Ø
3S/2W 18K 2		Ø	Ø	Ø	Ø	DES				Ø	Ø
3S/2W 18K 3	3/78	Ø	155	16	Ø	IRR	D	Ø	Ø	165	8

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ALAMEDA COUNTY -- BAY FLAIN GROUNDWATER STUDY -- WELL INVENTORY REPORT

WELL NUMBER	DATE (MO/YR)	SURFACE ELEV. (FT)	TOTAL WELL DEPTH (FT)	DEPTH TO WATER (FT)	DTW (MSL)	WELL USE	LOG	WQ	WL	YIELD (GPM)	DIA. (IN)
3S/2W 18L 1	?	30	0	0	1	IRR	?	0	0	0	0
3S/2W 18M 1	?	0	0	0	0	?	?	0	0	0	0
3S/2W 18M 2	6/77	0	27	0	0	IRR	D	0	0	0	4
3S/2W 18M 3	4/77	0	20	5	0	IRR	D	0	0	0	6
3S/2W 18N 1	/47	0	100	0	0	STO	?	0	0	0	8
3S/2W 18N 2	06/77	0	25	11	0	IRR	D	0	0	0	4
3S/2W 18P 1	07/86	0	22	11	0	TES	G	0	0	0	2
3S/2W 18Q 1	?	0	105	0	0	IRR	?	0	0	0	10
3S/2W 18Q 2	7/82	0	44	3	0	MON	D	0	0	0	4
3S/2W 18R	11/88	0	11	0	0	BOR	G	0	0	0	0
3S/2W 18R	11/88	0	10	0	0	BOR	G	0	0	0	0
3S/2W 18R	11/88	0	10	0	0	BOR	G	0	0	0	0
3S/2W 18R	11/88	0	10	0	0	BOR	G	0	0	0	0
3S/2W 18R	08/89	0	26	12	0	BOR	G	0	0	0	8
3S/2W 18R	05/89	0	26	12	0	BOR	G	0	0	0	8
3S/2W 18R	11/89	0	16	0	0	BOR*	X	1	0	0	2
3S/2W 18R 1	/20	45	72	0	0	IRR	?	0	0	0	8
3S/2W 18R 2	/34	40	80	0	0	DOM	?	0	0	0	8
3S/2W 18R 2	07/85	0	22	0	0	DES	D	0	0	0	0
3S/2W 18R 3	?	0	0	0	0	ABN	?	0	0	0	8
3S/2W 18R 4	6/85	0	26	5	0	MON	G	0	0	0	2
3S/2W 18R 5	6/85	0	26	5	0	MON	G	0	0	0	2
3S/2W 18R 6	6/85	0	15	5	0	MON	G	0	0	0	2
3S/2W 18R 7	08/85	0	30	12	0	TES	D	0	0	0	2
3S/2W 18R 8	08/86	0	30	12	0	TES	D	0	0	0	2
3S/2W 18R 9	08/86	0	30	12	0	TES	D	0	0	0	2
3S/2W 18R10	06/88	98	20	12	0	MON	G	0	0	0	2
3S/2W 18R10	09/88	0	20	15	0	MON	D	0	0	0	4
3S/2W 18R11	06/88	0	20	12	0	MON	G	0	0	0	2
3S/2W 18R11	09/88	0	20	18	0	MON	D	0	0	0	4
3S/2W 18R12	06/88	97	20	13	0	MON	G	0	0	0	2
3S/2W 18R13	08/89	0	26	12	0	MON	G	0	0	0	8
3S/2W 18R14	06/89	0	21	12	0	MON	D	0	0	0	4
3S/2W 18R15	06/89	0	20	12	0	MON	D	0	0	0	4
3S/2W 18R16	06/89	0	20	12	0	MON	D	0	0	0	4
3S/2W 18R17	11/89	0	19	14	0	MON	X	0	0	0	4
3S/2W 18R18	02/90	0	24	15	0	MON	X	3	1	0	2
3S/2W 18R19	02/90	0	22	14	0	MON	X	2	1	0	2
3S/2W 18R20	02/90	0	23	19	0	MON	X	2	1	0	2
3S/2W 18R21	02/90	0	23	15	0	MON	X	2	1	0	2
3S/2W 18R22	02/90	0	23	15	0	MON	X	2	1	0	2
3S/2W 18R23	02/90	0	24	15	0	MON	X	2	1	0	2
3S/2W 18R24	02/90	0	24	15	0	MON	X	2	1	0	2
3S/2W 18R25	03/90	0	20	14	0	MON	X	0	0	0	2
3S/2W 18R26	03/90	0	20	14	0	MON	X	0	0	0	2
3S/3W 12A 1	/20	22	60	0	0	?	?	0	0	0	8
3S/3W 12A 2	/36	0	335	0	0	IRR	?	0	0	0	12
3S/3W 12A 3	11/61	0	603	0	0	DES	D	0	0	0	12

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ALAMEDA COUNTY -- BAY PLAIN GROUNDWATER STUDY -- WELL INVENTORY REPORT

WELL NUMBER	DATE (MO/YR)	SURFACE ELEV. (FT)	TOTAL WELL DEPTH (FT)	DEPTH TO WATER (FT)	DTW (MSL)	WELL USE	LOG	WQ	WL	YIELD (GPM)	DIA. (IN)
3S/3W 12B 1	/30	20	120	0	0	DOM	?	0	0	0	10
3S/3W 12B 2	9/34	35	545	0	0	IRR	D	0	0	0	12
3S/3W 12B 3	/49	0	32	0	0	IRR	?	0	0	0	4
3S/3W 12B 4	7/77	0	29	8	0	IRR	D	0	0	0	4
3S/3W 12B 5	5/77	0	26	7	0	IRR	D	0	0	15	4
3S/3W 12B 6	5/77	0	28	8	0	IRR	D	0	0	0	4
3S/3W 12B 7	6/85	0	22	13	0	MON	G	0	0	0	0
3S/3W 12B 8	6/85	0	27	7	0	MON	G	0	0	0	0
3S/3W 12B 9	6/85	0	22	14	0	MON	G	0	0	0	0
3S/3W 12B10	08/86	0	23	11	0	MON	G	0	0	0	2
3S/3W 12C 1	?	0	106	0	0	IRR	?	0	0	0	10
3S/3W 12C 2	/47	0	75	0	0	IRR	?	0	0	0	6
3S/3W 12C 3	7/77	0	34	8	0	IRR	D	0	0	0	4
3S/3W 12D 1	?	0	30	0	0	IRR	?	0	0	0	6
3S/3W 12D 2	?	0	60	0	0	DOM	?	0	0	0	4
3S/3W 12E 1	?	10	32	0	0	IRR	?	0	0	0	4
3S/3W 12E 2	?	0	3	0	0	?	?	0	0	0	0
3S/3W 12E 3	6/77	0	40	8	0	IRR	D	0	0	0	6
3S/3W 12E 4	5/77	0	30	7	0	IRR	D	0	0	0	6
3S/3W 12F 1	/32	0	18	0	0	IRR	?	0	0	0	6
3S/3W 12F 2	/58	0	28	0	0	IRR	?	0	0	0	6
3S/3W 12F 3	4/77	0	46	38	0	IRR	D	0	0	0	5
3S/3W 12F 4	8/77	0	40	31	0	IRR	D	0	0	0	4
3S/3W 12F 5	6/77	0	20	11	0	IRR	D	0	0	0	4
3S/3W 12F 6	8/77	0	35	8	0	IRR	D	0	0	0	4
3S/3W 12F 7	7/77	0	28	0	0	IRR	D	0	0	0	4
3S/3W 12F 8	5/77	0	35	5	0	IRR	D	0	0	0	6
3S/3W 12G 1	?	0	42	0	0	DOM	?	0	0	0	0
3S/3W 12G 2	03/86	0	20	10	0	MON	G	0	0	0	2
3S/3W 12G 3	12/86	22	20	7	0	MON	G			0	4
3S/3W 12G 4	11/88	0	24	8	0	MON	G	0	0	0	3
3S/3W 12G 5	11/88	0	24	8	0	MON	G	0	0	0	3
3S/3W 12G 6	11/88	0	24	8	0	MON	G	0	0	0	3
3S/3W 12G 7	11/88	0	20	8	0	MON	G	0	0	0	3
3S/3W 12G 8	11/88	0	20	8	0	MON	G	0	0	0	3
3S/3W 12G 9	11/88	0	25	8	0	MON	G	0	0	0	3
3S/3W 12G10	11/88	0	24	8	0	MON	G	0	0	0	3
3S/3W 12G11	04/89	0	24	9	0	MON	G	0	0	0	3
3S/3W 12G12	05/89	0	24	9	0	MON	G	0	0	0	3
3S/3W 12G13	05/89	0	24	9	0	MON	G	0	0	0	3
3S/3W 12G14	05/89	0	24	9	0	MON	G	0	0	0	3
3S/3W 12G15	05/89	0	24	8	0	MON	G	0	0	0	3
3S/3W 12G16	09/88	0	28	80	0	MON	D	Y	0	0	2
3S/3W 12G17	09/88	0	28	8	0	MON	D	Y	0	0	2
3S/3W 12G18	09/88	0	29	9	0	MON	D	Y	0	0	2
3S/3W 12G19	10/87	0	22	11	0	/ES	X	0	0	0	6
3S/3W 12H 1	6. 57	23	525	32	-9	IRR	D	0	0	0	12
3S/3W 12H 2	10/47	23	720	0	0	ABN	D	0	0	0	12

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ALAMEDA COUNTY -- BAY PLAIN GROUNDWATER STUDY -- WELL INVENTORY REPORT

WELL NUMBER	DATE (MO/YR)	SURFACE ELEV. (FT)	TOTAL WELL DEPTH (FT)	DEPTH TO WATER (FT)	DTW (MSL)	WELL USE	LOG	WQ	WL	YIELD (GPM)	DIA. (IN)
3S/3W 12J 1	3/4Ø	27	27Ø	Ø	Ø	ABN	D	Ø	+	Ø	12
3S/3W 12J 2	/32	24	36Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	12
3S/3W 12J 3	/2Ø	Ø	13Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	1Ø
3S/3W 12J 4	8/78	Ø	8Ø	9	Ø	IRR	D	Ø	Ø	2Ø	8
3S/3W 12J 5	Ø8/86	Ø	15	11	Ø	MON	G	Ø	Ø	Ø	2
3S/3W 12J 6	Ø3/86	Ø	15	9	Ø	MON	G	Ø	Ø	Ø	2
3S/3W 12J 7	Ø8/86	Ø	16	12	Ø	MON	G	Ø	Ø	Ø	2
3S/3W 12K 1	/25	17	12Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	12
3S/3W 12K 2	?	17	42	Ø	Ø	IRR	?	Ø	Ø	Ø	6
3S/3W 12K 4	/77	Ø	3Ø	13	Ø	IRR	D	Ø	Ø	Ø	6
3S/3W 12L 1	/57	Ø	22	Ø	Ø	IRR	?	Ø	Ø	Ø	6
3S/3W 12L 2	/53	Ø	3Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	6
3S/3W 12L 3	3/77	Ø	3Ø	12	Ø	IRR	D	Ø	+	6	4
3S/3W 12L 4	4/77	Ø	3Ø	14	Ø	IRR	D	Ø	+	Ø	6
3S/3W 12M 1	/56	Ø	36	Ø	Ø	IRR	?	Ø	Ø	Ø	6
3S/3W 12M 2	?	9	3Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	6
3S/3W 12M 3	3/77	Ø	23	5	Ø	IRR	D	Ø	+	Ø	4
3S/3W 12M 4	3/77	Ø	24	7	Ø	IRR	D	Ø	Ø	Ø	6
3S/3W 12M 5	5/77	Ø	3Ø	7	Ø	IRR	D	Ø	Ø	Ø	6
3S/3W 12N 1	?	Ø	Ø	Ø	Ø	DOM	?	Ø	Ø	Ø	Ø
3S/3W 12N 2	?	Ø	Ø	Ø	Ø	ABN	?	Ø	Ø	Ø	12
3S/3W 12N 3	3/77	Ø	21	1Ø	Ø	IRR	D	Ø	Ø	Ø	4
3S/3W 12N 4	6/77	Ø	3Ø	14	Ø	IRR	D	Ø	Ø	Ø	1Ø
3S/3W 12N 5	5/77	Ø	31	9	Ø	IRR	D	Ø	Ø	Ø	3
3S/3W 12P 1	?	17	Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	Ø
3S/3W 12R 1	/55	19	6ØØ	Ø	Ø	IES	D	Ø	Ø	Ø	Ø
3S/3W 12R 3	9/77	Ø	1ØØ	12	Ø	IRR	D	Ø	Ø	Ø	8
3S/3W 12R 4	12/89	Ø	38	Ø	Ø	IRR	?	Ø	Ø	Ø	8
3S/3W 12R 4	12/89	Ø	38	Ø	Ø	DES	?	Ø	Ø	Ø	8
3S/3W 13A 1	/ØØ	Ø	36	Ø	Ø	DOM	?	Ø	Ø	Ø	6
3S/3W 13A 4	7/77	Ø	3Ø	13	Ø	IRR	?	Ø	Ø	4Ø	4
3S/3W 13A 5	7/9Ø	Ø	9Ø	13	Ø	IRR	X	Ø	Ø	Ø	5
3S/3W 13A 6	7/9Ø	Ø	7Ø	Ø	Ø	DES	X	Ø	Ø	Ø	6
3S/3W 13B 1	6/48	Ø	55Ø	Ø	Ø	IRR	D	Ø	Ø	Ø	12
3S/3W 13B 2	/35	17	113	6	Ø	DES	D	+	+	Ø	1Ø
3S/3W 13C 1	5/77	Ø	21	9	Ø	IRR	D	Ø	Ø	Ø	4
3S/3W 13D 1	4/77	Ø	3Ø	11	Ø	IRR	D	Ø	Ø	Ø	4
3S/3W 13E 1	?	1Ø	Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	12
3S/3W 13F 1	7/77	Ø	28	1Ø	Ø	IRR	D	Ø	Ø	Ø	4
3S/3W 13F 2	7/77	Ø	2Ø	1Ø	Ø	IRR	D	Ø	Ø	Ø	4
3S/3W 13G 1	8/56	Ø	3Ø	6	Ø	IRR	D	Ø	Ø	Ø	6
3S/3W 13H 1	8/77	Ø	4Ø	9	Ø	IRR	D	Ø	Ø	Ø	6
3S/3W 13H 2	Ø5/88	Ø	33	7	Ø	DOM	D	Ø	Ø	Ø	6
3S/3W 13J 1	?	Ø	3Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	4
3S/3W 13J 2	?	Ø	3Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	4
3S/3W 13J 3	/53	Ø	42	Ø	Ø	IRR	?	Ø	Ø	Ø	6
3S/3W 13J 4	6/77	Ø	28	8	Ø	IRR	D	Ø	Ø	Ø	4
3S/3W 13J 5	Ø2/89	Ø	29	Ø	Ø	IRR	?	Ø	Ø	Ø	Ø

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ALAMEDA COUNTY -- BAY PLAIN GROUNDWATER STUDY -- WELL INVENTORY REPORT

WELL NUMBER	DATE (MO/YR)	SURFACE ELEV. (FT)	TOTAL WELL DEPTH (FT)	DEPTH TO WATER (FT)	DTW (MSL)	WELL USE	LOG	WQ	WL	YIELD (GPM)	DIA. (IN)
3S/3W 13K 1	/52	12	35	Ø	Ø	IRR	?	Ø	Ø	Ø	12
3S/3W 13K 2	/58	Ø	2Ø	Ø	Ø	IRR	?	Ø	Ø	Ø	4
3S/3W 13K 3	6/77	Ø	23	7	Ø	IRR	D	Ø	Ø	Ø	6
3S/3W 13K 4	9/77	Ø	2Ø	11	Ø	IRR	D	Ø	Ø	Ø	4
3S/3W 13K 5	3/77	Ø	25	6	Ø	IRR	?	Ø	Ø	Ø	4
3S/3W 13K 6	9/89	Ø	22	Ø	Ø	DES	X	Ø	Ø	Ø	Ø
3S/3W 13L 1	7/77	Ø	25	12	Ø	IRR	D	Ø	Ø	Ø	4
3S/3W 13M 1	?	Ø	35Ø	Ø	Ø	STO	?	Ø	Ø	Ø	Ø
3S/3W 13M 2	7/87	Ø	24	12	Ø	MON	D	Ø	Ø	Ø	2
3S/3W 13M 3	3/87	Ø	15	6	Ø	DES	D	Ø	Ø	Ø	8
3S/3W 13N 1	11/89	Ø	16	6	Ø	MON	X	Ø	Ø	Ø	2
3S/3W 13N 2	4/89	Ø	18	6	Ø	REC	X	Ø	Ø	Ø	6
3S/3W 13Q 1	/55	9	28	Ø	Ø	IRR	?	Ø	Ø	Ø	14
3S/3W 13Q 2	6/77	Ø	35	6	Ø	IRR	D	Ø	Ø	1Ø	4
3S/3W 13Q 3	7/77	Ø	23	8	Ø	?	D	Ø	Ø	Ø	6
3S/3W 13Q 4	3/77	Ø	26	7	Ø	IRR	D	Ø	Ø	Ø	4
3S/3W 13R 1	?	14	25	Ø	Ø	DOM	?	Ø	Ø	Ø	4
3S/3W 13R 2	6/77	Ø	26	8	Ø	IRR	D	1	Ø	8	6
3S/3W 13R 3	3/77	Ø	22	4	Ø	IRR	D	Ø	Ø	Ø	6
3S/3W 13R 4	Ø3/89	Ø	3Ø	Ø	Ø	DOM	?	Ø	Ø	Ø	7