KLEINFELDER

GEO-93

GEOTECHNICAL INVESTIGATION
DESERT INN SUPER ARTERIAL
CLARK COUNTY, NEVADA

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1.0 INTRODUCTION

1.1 General

This report presents the results of our geotechnical investigation performed for the Desert Inn Super Arterial Underpass at Las Vegas Boulevard and pavement analyses along the Desert Inn alignment from Valley View Boulevard to Paradise Road.

The purposes of this investigation were to:

- Evaluate the general nature and engineering properties of the subsurface soil at the site of the proposed improvements.
- Identify potential geotechnical hazards to the proposed improvements.
- Identify potentially unsuitable foundation soil conditions.
- Identify foundation systems suitable for use at this site.
- Perform analyses of groundwater conditions and methods of control.
- Provide a discussion of anticipated site conditions affecting construction methods.

Our subsurface investigation included subsurface exploration, representative soil and water sampling, penetration tests, field permeability tests, laboratory testing, engineering analyses and preparation of this report.

1.2 Project Description

The proposed Desert Inn Super Arterial will consist of a six lane street linking Desert Inn Road between Valley View Boulevard and Paradise Road. The Super Arterial will cross over Interstate I-15, the Union Pacific Railroad and Industrial Road and then cross beneath Las Vegas Boulevard returning to grade near Channel 8 Drive. The

bridge segments over I-15, the Union Pacific Railroad and Industrial Road were not a part of our geotechnical investigation for the proposed Super Arterial.

The proposed construction will include earth fill ramps leading to the bridges, earth retaining structures, and an underpass structure at Las Vegas Boulevard. Embankment heights on the order of 5 to 35 feet are anticipated. The road grade at Las Vegas Boulevard will be depressed approximately 25 feet below existing site grade.

We anticipate that cast-in-place concrete underpass walls, retaining walls, columns and post-tensioned bridge decks will be utilized for the structures. Earth retaining structures may be reinforced with metal strips or geotextiles to steepen fill slopes or carry part of the lateral earth pressure.

Foundation loads of approximately 40 to 60 kips per foot of wall are anticipated at the Las Vegas Boulevard underpass site with possible column or pier loads of approximately 400 to 600 kips.

Injection grouting and/or a curtain wall is anticipated surrounding the portion of the roadway depressed below the existing groundwater level.

2.0 FIELD EXPLORATION

The subsurface soil conditions at the project site were explored by drilling forty-three (43) borings to depths ranging from 10 to 61 feet below existing site grade. The borings were located approximately as shown on Plates 1 and 2.

The borings were located in the field by pacing from existing roads and structures. The coordinates and elevations were estimated from site plans provided by Louis Berger and Associates. The boring identification number, date drilled, approximate northing, easting and elevation are presented on the boring logs.

The borings were drilled with truck-mounted drill rigs equipped for soil sampling utilizing hollow stem, continuous flight auger, rotary air and rotary wash drilling methods. Representative soil samples were obtained from the borings using a standard split spoon (SPT) sampler with an inside diameter (ID) of 1-3/8 inch and an outside diameter (OD) of 2 inches. The sampler was driven with a 140 pound hammer free falling through a distance of 30 inches. Relatively "undisturbed" soil samples were obtained using a ring-lined California split spoon sampler (1.925 inch ID) and a 2.625 inch ID ring-lined sampler. The California split spoon sampler was driven with the 140 pound hammer. The 2.625 inch ID sampler was driven with a 350 pound hammer free-falling through a distance of 30 inches. The sampler driving resistance, expressed as "blows per inches of penetration", is presented on the boring logs at the respective sampling depths. The soil samples were classified and the consistency and moisture conditions were recorded by our field geologist during drilling. Representative soil samples from the borings were packaged and transported to our laboratory for

additional testing and evaluation, as appropriate. The log of subsurface conditions as encountered in each boring is presented on Plates A-1 through A-43 in Appendix A.

Five groundwater observation wells were constructed at the Las Vegas Boulevard Underpass site. Two of the wells were constructed in Boring B-5. The remaining wells were constructed in Borings B-28, B-31 and B-33. The observation well number, locations, depth to top of screened section, length of screened section, pipe diameter and date installed are presented in Table No. 2-1.

Table No. 2-1

Groundwater Observation Wells

Well No.	Location	Depth to Top of Screen (ft)	Screen Length (ft)	Diameter (inches)	Date Installed
MW-1	B-5	16	10	2	5-1-92
MW-2	B-5	33	15	2	5-1-92
MW-3	B-28	39	20	4	6-24-92
MW-4	B-31	46	10	2	6-18-92
MW-5	B-33	9.4	10	2	6-18-92

3.0 LABORATORY TESTING

Representative soil samples from the borings were tested in the laboratory to verify the field classification and evaluate pertinent engineering properties of the subsurface soils encountered.

The laboratory testing program was directed primarily toward soil index properties, grain size distribution, compressibility, shear strength and corrosivity. The laboratory testing program included:

- One-hundred and fifty-one natural moisture content tests.
- Ten dry density tests;
- Fifty-one sieve analyses;
- Fifty Atterberg Limits tests;
- Four hydrometer test;
- Twelve direct shear tests;
- One consolidation test;
- One expansion test;
- Three R-value tests;
- Two solubility tests;
- One resistivity test; and
- Five soil corrosivity analyses.

The moisture content and dry density test results are presented on the boring logs at the respective sampling depth. Other test results are presented on Plates B-1 through B-32 and Tables B-1 and B-2 in Appendix B.

The groundwater observation wells were developed and allowed to stabilize prior to sampling and field permeability testing. Water quality samples were obtained from

each well, packaged and shipped to National Environmental Testing, Inc. for analyses. Each well was protected with a locking cap. The laboratory test results are presented in Appendix C. Additional groundwater level measurement, water quality sampling, field permeability testing and/or pump tests could be performed at a later date, if requested.

4.0 GENERAL SITE CONDITIONS

4.1 Surface Conditions

The site of the proposed Desert Inn Road Super Arterial is heavily developed along the alignment. Natural surface gradients are on the order of one percent sloping downward toward the east and northeast. Surface gradients of approximately three percent occur near a mapped compaction fault west of I-15. Alterations to the natural ground surface by development presently controls the path of surface runoff. However, the general direction of surface runoff is from west to east. No active natural surface drainage channels cross the alignment. The proposed alignment follows the general alignments of Desert Inn Road, Stardust Drive and Desert Inn Road east of Las Vegas Boulevard. The surface elevation ranges from approximately 2150 feet MSL at Valley View Boulevard to 2040 feet MSL at Paradise Road.

4.2 Subsurface Conditions

Some fill was encountered in nearly all of the borings drilled for this investigation. The fill typically consisted of asphalt pavement underlain by base course gravel and sand to a depth of one to two feet. Some of the soils encountered to depths of four to six feet in the streets may consist of local native soils used as fill in utility trenches.

Native soils encountered during exploration at this site generally consisted of medium dense to very dense clayey sand, silty sand, sand, gravelly sand, silty gravel, clayey gravel and sandy gravel and medium stiff to very hard sandy clay and silty clay. Partially cemented and fully cemented soils (caliche and cemented sand and gravel) were encountered in 36 of the explorations for this investigation. The depth to cemented soils was quite variable across the site. The depth to the first layer of cemented soil and the cumulative thickness of cemented soil in each boring is tabulated in Table No. 4-1:

Table No. 4-1

Exploration Number	Depth to 1st Cemented Layer (ft)	Cumulative Thickness of Cemented Soil (ft)	Total Boring Depth (ft)
B-1	7	2-1/2	11.5
B-2	6-1/2	1	11
B-3	12	12-1/2	26.5
B-4	14	11	25.1
B-5	12-1/2	13-1/2	51.5
B-7	12	11	26
B-8	--	0	11.5
B-9	7	16	26
B-10	1-1/2	3	10.5
B-11	27	11-1/2	50.5
B-12	15-1/2	25-1/2	50.5
B-13	25	9	51
B-14	4	24	51
B-15	17	22	51
B-16	12	31	50.5
B-17	11-1/2	10	26
B-18	10-1/2	16	40.2
B-19	9	16	51
B-20	8	21	51
B-21	13	19	35.2
B-22	12-1/2	14	30.1
B-23	6	30	51
B-24	8	1-1/2	11.5
B-25	--	0	10
B-26	13	2-1/2	21.5
B-27	19-1/2	4-1/2	25.1
B-28	12-1/2	20-1/2	60.5
B-29	9	27-1/2	59
B-31	19	32	60
B-33	19	1-1/2	20.5
B-34	20	2	25.5
B-35	--	0	21.5
B-36	--	0	16.5
B-37	--	0	11.5
B-38	--	0	15
B-39	--	0	20
B-40	9	6	25.5
B-41	7-1/2	5-1/2	25.1
B-42	7-1/2	7-1/2	15.1
B-43	4	4	10.1
B-44	4	1	11.5
B-45	6-1/2	2	11.5
B-46	11	1/2	11.1

Groundwater was encountered in 31 of the 43 borings drilled for this investigation. The depth to groundwater as observed during drilling and as measured after drilling are presented in Table No. 4-2. The water levels measured in observation wells MW-1 through MW-5 and date of measurement are presented in Table No. 4-3.

Table No. 4-2

Boring Number	Depth to Water During Drilling (ft)	Depth to Water	Date
B-1	Not encountered	---	---
B-2	Not encountered	---	---
B-3	20	---	---
B-4	20	---	---
B-5	20.5	14.0	5-1-92
B-7	Not encountered	---	---
B-8	Not encountered	---	---
B-9	15.5	---	---
B-10	10.5	---	---
B-11	19	17.1	7-2-92
B-12	22	16.1	7-2-92
B-13	21.5	16.5	7-1-92
B-14	22	16.4	7-2-92
B-15	19	15.9	7-1-92
B-16	--	17	6-27-92
B-17	21	15.8	6-10-92
B-18	--	15.8	7-1-92
B-19	18.5	15.8	7-1-92
B-20	19	15.8	7-1-92
B-21	--	15.0	6-6-92
B-22	--	14.9	6-6-92
B-23	--	15.4	6-12-92
B-24	--	---	---
B-25	--	---	---
B-26	15.5	10.0	---
B-27	--	10.50	6-12-92
B-28	15.8	15.58	7-6-92
B-29	19	15.2	7-1-92
B-31	19.5	18.82	7-6-92
B-33	19.5	17.22	7-6-92
B-34	23	---	---
B-35	20.5	---	---
B-36	Not encountered	---	---
B-37	Not encountered	---	---

Table No. 4-2
(Continued)

Boring Number	Depth to Water During Drilling (ft)	Depth to Water	Date
B-38	Not encountered	---	---
B-39	Not encountered	---	---
B-40	8.25	---	---
B-41	10	8	6-6-92
B-42	10	7.6	6-6-92
B-43	Not encountered	---	---
B-44	Not encountered	---	---
B-45	Not encountered	---	---
B-46	Not encountered	---	---

Table No. 4-3

Observation Well Water Level Data

Well Number	Date Installed	Water Level (ft)	Date
MW-1	5-1-92	20.5	5-1-92
		14	5-1-92
		14.95	5-5-92
		15.15	5-28-92
		15.16	6-4-92
		15.37	7-10-92
		15.34	7-18-92
		15.32	7-19-92
		15.34	7-21-92
MW-2	5-1-92	20.5	5-1-92
		14	5-1-92
		15.22	5-5-92
		15.42	5-28-92
		15.37	6-4-92
		15.62	7-10-92
		15.58	7-18-92
		15.57	7-19-92
		15.58	7-21-92
MW-3	6-24-92	15.8	6-24-92
		15.58	7-6-92
		15.52	7-10-92
		15.41	7-21-92

Table No. 4-3 (Continued)

Well Number	Date Installed	Water Level (ft)	Date
MW-4	6-18-92	19.5	6-18-92
		18.5	6-23-92
		18.34	6-26-92
		18.82	7-6-92
		18.28	7-10-92
		18.27	7-18-92
		18.30	7-19-92
		18.28	7-21-92
MW-5	6-18-92	19.5	6-18-92
		17.0	6-23-92
		17.2	6-26-92
		17.22	7-6-92
		17.74	7-10-92
		17.72	7-17-92
		17.47	7-18-92
		17.54	7-19-92
		17.66	7-21-92

Field permeability slug tests were performed in four of the five observation wells. The test results are presented in Appendix C on Plates C-1 through C-4. Water injection pump tests were performed in two of the five observation wells. The test procedure and test results are discussed in Section 6.2.2 of this report. Water samples from the five observation wells were tested for pH, total dissolved solids (TFR), turbidity, nitrate as N, total phosphorus as P and total petroleum hydrocarbons (TPH) as gasoline. The water quality test results are presented in Appendix C. The depth to groundwater was variable across the site with an overall gradient down toward the east. The gradient roughly paralleled the ground surface in the area of the Las Vegas Boulevard Underpass, however, the groundwater level was shallower west of I-15 and the groundwater surface was nearly flat in the area immediately east of Las Vegas Boulevard.

Groundwater should be considered a permanent feature at this site. The depth to groundwater should be expected to fluctuate seasonally and with changes in precipitation, irrigation, pumping and local recharge.

5.0 GENERAL SITE GEOLOGY

The site is located within the central portion of the Las Vegas Valley. The Las Vegas Valley is filled with Quaternary and Tertiary aged normally consolidated sediments derived from the surrounding mountains. The valley floor sediments consist of alluvial and playa deposits surrounded by progressively more steeply sloping alluvial aprons derived from erosion of the mountains surrounding the valley. The major source of the alluvium is the Spring Mountain Range located on the west side of the valley. Generally, the gradation of the sediments becomes progressively more fine grained with increasing distance from the source area and with decreasing elevation. The alluvial and playa sediments can be several thousand feet thick in this area. At this site the sediments appear to consist primarily of sand, clay and gravel deposits with extensive calcareous cementation.

5.1 Non-Tectonic Features

Nevada Bureau of Mines and Geology, Bulletin 95 by John W. Bell (1981) titled "Subsidence in Las Vegas Valley"[1)] mapped numerous compaction fault scarps and fissure zones in the Las Vegas Valley. These features are generally associated with geologically recent subsidence activity. There are two compaction faults mapped on Plate 1 of Bulletin 95 within approximately one mile of the proposed improvements to Desert Inn Road discussed in this report. One of these compaction fault scarps crosses Desert Inn Road west of I-15 near Aldebaran Avenue. The nearest mapped fissure zone is located approximately 3-1/2 miles north of the site.

None of the compaction faults mapped near the project site are associated with large topographic relief. Topographic relief across the compaction fault near Aldebaran Avenue was on the order of four to six feet. Surficial evidence of areal settlement or

differential settlement across the compaction fault was not observed during our field work for this investigation. However, subsidence of a few inches to a few feet has been documented over the past 50 years in this area of the valley.

Compaction faults are not bedrock faults, although, the displacement may have been at least partially induced by earthquakes. The age of one of these escarpments, the Eglington scarp approximately eight to nine miles north of the site, has been dated at about 14,000 years old. The more recent differential settlement observed across the valley has been associated with fissuring and local land subsidence due to groundwater withdrawal from the principal aquifers. Because of continued groundwater withdrawal, some broad areal subsidence continues to occur in the valley. The occurrence of springs and shallow groundwater in the vicinity of mapped compaction faults is common in the Las Vegas Valley.

5.2 Tectonic Faulting and Seismicity

Numerous shocks of Richter magnitude 3.0 or greater have been recorded in the Las Vegas area. Most were a probable result of underground blasting (some as high as Richter magnitude 5.8) at the Nevada Test Site which remains the major source of seismic activity in the Las Vegas area. Tectonic shocks having epicenters within southern Nevada have been minimal.

The Las Vegas Valley is located in Seismic Zone 2-B as categorized in the Uniform Building Code. Zone 2-B represents a low to moderately active seismic area. The site is located in an area defined by the AASHTO Acceleration Coefficient Map of the United States[5)] as having an acceleration coefficient between 0.10 and 0.20. No geologically recent (within the last 10,000 years) bedrock or tectonic faults are known

to transect the alluvium at this site. The nearest fault with evidence of possible geologically recent displacement is located at the base of Frenchman Mountain. This fault is approximately 8 miles east of the site.

No indications of significant differential subsidence or ground displacement which might adversely affect the project site were observed during our field exploration. However, continued areal subsidence is anticipated and should be considered in design of structures at this site.

6.0 ENGINEERING ANALYSES AND RECOMMENDATIONS

6.1 General

A wide variety of soil types, consistencies and subsurface moisture conditions were encountered along the Desert Inn Super Arterial alignment. Cemented deposits were encountered in 36 of the 43 explorations. The depth to cemented material ranged from 1-1/2 to 27 feet below existing site grade.

The native non-cemented soils encountered during exploration are suitable for moderate weight foundation loads such as earth embankments, underpass walls and retaining walls. Non-cemented soils at a few locations and elevations may be unsuitable for heavy column loads for settlement sensitive structures. However, the non-cemented soil encountered at or within 10 feet below anticipated foundation elevation at Las Vegas Boulevard would be suitable for the anticipated column loads when utilizing an allowable bearing pressure of 8000 psf. Higher bearing pressures may be appropriate on cemented soils as well as on non-cemented soils at many locations.

Based on discussions with the structural engineers, it is our understanding that foundation loads on the order of 40 to 60 kips per foot are anticipated and that lateral loads, other than earth pressures, will be on the order of 15 percent of the above referenced gravity load.

The following sections of this report present our opinions and analyses regarding the proposed site improvements. Regardless of the foundation systems used, the designer must recognize that some areal subsidence and consequently some differential movement will occur in the future across the site. The structures planned for this site must be designed to accommodate the differential movement. Based on limited historical data from the past approximately 50 years, areal differential subsidence

should be considered to be on the order of 1/4 inch per 100 lineal feet over a 10 to 15 year period. The rate of subsidence will be affected by local groundwater pumping and possibly other activities and use or construction in the area.

6.2 Site Preparation and Grading

6.2.1 Excavations

Deep excavations are anticipated in the vicinity of the Las Vegas Boulevard Underpass. A maximum excavation depth of approximately 35 to 40 feet may be necessary for a permanent dewatering and storm runoff sump. Excavations for the road bed will range in depth from 0 to approximately 28 feet. Excavation should not be particularly difficult in uncemented granular deposits from the surface to a depth of approximately 15 feet.

Excavation of cemented layers will probably require a backhoe mounted hydraulic hammer, crane and headache ball or explosives. Relatively thin cemented layers one to two feet thick could be excavated with a ripper tooth and heavy track vehicle in some cases. The use of explosives should be avoided if possible. Shock wave propagation could be unpredictable due to the variable thickness of caliche beds and discontinuities observed in the borings. Expansive grout placed in closely spaced boreholes could also be used to fracture cemented layers very close to vibration sensitive structures such as active water lines, sewer lines of the church east of the strip. However, we do not anticipate that use of a hydraulic hammer would present a serious risk to the church structure, provided caliche excavation does not approach closer than 15 feet from the structure.

Intact core samples of cemented soil were not obtained from the borings during our exploration. However, based on penetration test results, drilling characteristics, visual

examination of the cuttings and laboratory test results on samples of cemented deposits with similar penetration resistance and drilling characteristics, we anticipate that hard to very hard caliche and cemented sand and gravel strata at this site will exhibit an unconfined compressive strength in the range of 3 to 15 kips per square inch (ksi).

Excavations greater than 15 feet deep will probably require dewatering to stabilize the base of the excavation. Soft or pumping conditions should be expected if fine grained soil (fine sand, silt or clay) is encountered at depths greater than approximately 12 feet, depending upon the weight of the equipment and its vibrational characteristics.

6.2.2 Groundwater Control

Construction and long term dewatering requirements for the highway alignment established below the water table could be substantially reduced by constructing a low permeability curtain wall or other seepage cut off around the excavation perimeter. The seepage cut off should extend at least to the contact with the caliche bed which, based on the boring logs, appears to be continuous beneath the road and elevation. The approximate contact elevation of this strata at each Las Vegas Boulevard Underpass boring location is tabulated in Table No. 6-1.

The curtain wall could provide nearly complete cut-off of seepage. However, it is our understanding that some long-term seepage may be desirable with respect to storm drain pump maintenance. A full curtain wall surrounding the site would be expensive to construct and would not be required for construction purposes.

Field permeability tests were performed in each of the five observation wells. The tests were performed as "slug in" tests in MW-1, MW-2 and MW-4. The test was performed as a "bail" test in MW-3. The aquifer zone tested in MW-1 through MW-4 was essentially confined by overlying caliche beds. Observation well MW-5 was

established above the first caliche layer and is essentially unconfined. The well screen was only partially submerged at this location. A field permeability slug test was attempted in MW-5, however, the depth of the water in the well (2.3 feet) was insufficient to provide reliable data.

The slug test consisted of rapidly introducing (slug-in) or extracting (bailing) a relatively small slug of water from each well to produce a relatively small change in the water level in each well. The water level in each well was then recorded at short time intervals (1/4 minute) as the water level recovered to the level recorded prior to slug injection or extraction. The test data was evaluated by methods described by Bouwer (1978) and others to approximate the permeability of the aquifer. The slug test is a relatively crude but economical method of measuring field permeability. Permeability may also be indirectly estimated from sieve analyses test results using the D_{10} grain size. Where D_{10} represents the grain size at 10 percent finer on the grain size curve.

Table No. 6-1

Boring Number	Apparent Continuous Caliche Bed Contact Elevation	Depth (ft)
B-16	2042.5	30.5
B-18	2040	28
B-31	2048.5	24
B-14	2047.5	24
B-11	2044	27
B-12	2045.5	25.5
B-13	2045	25
B-15	2045	26
B-5	2043.5	26
B-29	2044.5	24-1/2
B-19	2042.5	25.5
B-20	2043.5	25.5
B-21	2044	23
B-28	2046	21
B-22	2044	22
B-23	2048.5	16.5

The confining caliche beds may be somewhat leaky, however, the water quality test results indicate significantly different concentrations of dissolved solids, nitrogen and phosphorous, between the five observation wells and three primary aquifers sampled 1) surface to first caliche layer, 2) aquifer confined by upper and lower caliche bed, 3) aquifer below second apparently contiguous caliche bed. Based on our discussions with Nevada Groundwater Regulatory Agencies and our evaluation of groundwater quality test results presented in Appendix C, we do not anticipate that special treatment of groundwater will be necessary prior to discharge to surface waters.

The field permeability test results are presented on Plates C-1 through C-4 in Appendix C and in Table No. 6-2.

Water injection pump tests were performed in observation wells MW-1 and MW-5. The tests were performed on July 21 and 19, 1992, respectively. The test consisted of pumping water into each well at a rate sufficient to maintain the water level at the top of the well. At MW-1, the injection head was maintained 18.3 feet (+/- 0.2 feet) above the static water level of 15.34 feet below existing grade. This injection head was maintained for a period of 2-1/2 hours. During the 2-1/2 hour test period the water level in MW-2 was observed to rise a total of 0.05 feet.

At MW-5, the injection head was maintained 17.2 feet above the static water level of 17.72 feet below existing grade. The injection head was maintained for a period of 3-1/2 hours.

The well recovery time and depth to water level data were recorded for each test. The test results indicate a field permeability of 1.2×10^{-3} cm/sec at MW-1 and 2.9×10^{-3} cm/sec at MW-5. The water level response in MW-2 to injection in MW-1 indicates that there is some communication between the two aquifers separated by a seven foot

thick caliche bed and the five to seven foot bentonite seal between the wells. The rate of water level rise in MW-2 at the start of the injection pump test was approximately 0.12 ft/hour. However, the rate had decreased to approximately 0.02 ft/hour after 2-1/2 hours. Treated as a falling head permeability test, the combined seven foot caliche layer, bentonite seal and any fractures in the caliche layer would indicate a vertical permeability across the strata on the order of 5×10^{-5} cm/sec in the immediate vicinity of Boring B-5.

During the two pump tests, no response was detected in the other observation wells at this site. The implied vertical permeability observed at MW-2 during the pump test in MW-1 should be evaluated with caution and could vary by at least one to two orders of magnitude.

The aquifer permeabilities evaluated by the two pump tests are presented in Table No. 6-3.

Table No. 6-2

Observation Well	Permeability (cm/sec)
MW-1 (B-5 @ 21')	1.7×10^{-3}
MW-2 (B-5 @ 40.5')	2.9×10^{-4}
MW-3 (B-28 @ 49')	2.9×10^{-4}
MW-4 (B-31 @ 51')	2.9×10^{-5}

Table No. 6-3

Pump Test Well	Permeability (cm/sec)
MW-1 (B-5 @ 21')	1.2×10^{-3}
MW-5 (B-33 @ 14.4')	2.9×10^{-3}

The subsurface soil profile, sieve analyses and field permeability tests indicate that an injection grout curtain wall to control seepage during and after construction may be suitable from engineering, construction, and economic perspectives. Overlying caliche and cemented sand and gravel beds may be difficult to excavate in a narrow trench. Excavating and hauling relatively large quantities of soil and rock could be quite disruptive to traffic, business, and tourist activity in this area.

Based on sieve analyses from the underpass vicinity, the non-cemented soils 15 to 30 feet below grade contained an average of 16.7 percent finer than a No. 200 sieve with median values of 13.2 and 13.8 percent and a range from 41.6 percent to 3.7 percent. Gravel and medium to coarse sands generally accept grout readily. Dense, fine sands and loose silts can usually be grouted but may cause difficulty. Dense silts should be expected to cause difficulty. Generally silty clays can not be effectively grouted. Well graded soil containing 20 percent or more silt should be expected to cause grouting difficulties. In general, poorly graded soils with a high percentage of material in a narrow grain size band will be more permeable than well graded soil with a wide range of particle sizes. Dense to very dense soils will typically exhibit a permeability on the order of magnitude slower than loose to medium dense soils. In addition, vertical permeability in a natural soil deposit should be expected to be one to three orders of magnitude slower than horizontal permeability. It should be noted that the soil gradation was extremely variable across narrow bands in the soil profile (see sieve analyses for Boring B-29 at 19 and 20 feet).

The field permeability test results would be representative of the horizontal permeability for the in-place density conditions and natural ordering of deposition.

The extent of a seepage curtain will be affected by economics as well as construction and long-term drainage requirements. Completely cutting off all seepage laterally, as well as from below, would probably be cost prohibitive and impractical. A partial grout curtain intercepting the thickest or most permeable areas might be adequate for construction. Design and construction of an injection grout seepage cut-off wall should involve a specialist in grouting. Some seepage and possible sumping of excavations should be expected during construction even with a well designed and constructed cut-off wall.

As an alternative to a full slurry trench or injection grout seepage cut-off around the excavation, other methods to control seepage in localized areas may be more economical. Based upon the slug tests and limited injection pump tests it appears the seepage into the excavation could be up to approximately 250 gallons per minute and could be expected to decrease with time. Water quality test results and monitor well response during one pump test indicate that irrigation water may be the primary source of shallow groundwater and that cemented layers provide at least a partial cut-off to vertical seepage.

Methods to reduce seepage in localized areas could include a partial grout curtain, injection grouting of limited extent or over-excavation in localized areas and placement of a lean concrete plug or an impermeable liner patch. The extent of necessary seepage control may not become apparent until construction proceeds.

Actual conditions will not be fully known until construction proceeds. Alternative construction methods to control seepage such as limited sections of curtain wall or overexcavation of granular pockets and filling with lean concrete or covering with an impermeable membrane to lengthen the seepage path may be more economical than a

full cut-off wall. The construction methods should be flexible as possible to take advantage of opportunities to limit the extent and expense of seepage control while providing a method to assure seepage control. The following recommendations for construction of an injection grout curtain are provided and should be applied in the unlikely event that large scale construction seepage control becomes necessary during construction.

Injection grout seepage cutoff walls are typically constructed as a series of rows of closely spaced injection wells. Injection well spacing is controlled by permeability, the grouting pressure, grout setting time for chemical grouts, and grout migration that can be achieved as well as the width or thickness of the curtain desired. Injection wells on two to six foot centers in two to four rows are commonly used. The grout injection pattern is also affected by the relative cost of drilling and injection and the cost of grout since the cost of drilling per foot is relatively linear compared with the required grout volume which increases quadratically with respect to well spacing for equivalent seepage reduction.

To prevent hydraulic fracturing, the grout injection pressure in non-cohesive soils should be limited to the approximate overburden pressure (1 psi per foot of depth). Where the grouted zone is overlain by cohesive soils or caliche layers, the injection pressure may be increased to 2-1/2 psi per foot of overburden beneath confining cohesive soils or 5 psi per foot of overburden beneath confining caliche layers with minimal risk of hydraulic fracturing. The referenced injection pressures do not consider pressure losses in the pumping and piping of the injection system. The restrictions on injection pressure are intended to reduce upheaval and hydraulic fracturing. In undeveloped areas, more than 20 feet from heave sensitive structures or

utilities, higher injection pressures could be safely used. Higher injection pressures and some hydraulic fracturing may be desirable to achieve improved grout migration and seepage cutoff.

Several grout materials could be considered at this site. These could include neat cement, bentonite, bentonite-cement mixtures, sodium silicate, chrome-ligin or resin grout. However, some chrome-ligin and resin grouts contain toxic chemicals and may not be acceptable at this site. Cement grouts are typically limited to gravel and coarse sand deposits. Bentonite grouts are suitable for most medium grained sands. Silicate grouts are suitable for most fine sand and coarser materials. Groutability with chrome-ligins and resins extends into the range of coarse silts.

The comparative ability of grouts to penetrate a formation is mainly a function of their relative viscosity. A maximum grout viscosity of ten centipoise (cp) is recommended. Some difficulty achieving good penetration should be expected in soil containing more than 15 percent fines with a 10 cp grout at this site.

A slurry wall could be constructed to control seepage. However, there would be several disadvantages at this site. Site congestion seriously impedes traffic, access to adjoining properties, and other local activities. Disposal of excavation spoils and used slurries in urban areas could be a problem. Cemented layers will be difficult to cut and may require a chisel tooth percussive hammer, work progress could be slow.

Slurry walls are typically constructed as a series of interlocking panels or a line of tightly spaced drilled shafts. Panel width is determined by the excavating equipment used.

6.2.3 Earth Embankment

Relatively high embankment fills are anticipated for the approach ramps west of the I-15 bridge and east of the Industrial Road viaduct. Prior to placing fill, the existing grade should be cleared and grubbed to remove existing vegetation, organics, loose fill, debris, pavements, structures and disturbed soils. Existing buried utilities should be relocated or evaluated with regard for the effects of increased pressure due to the proposed fill.

After the site has been cleared, any pockets or areas of loose, soft or medium stiff soils should be overexcavated to expose medium dense or stiff undisturbed foundation soils. The area to receive fill should be scarified to a depth of six inches, moisture conditioned to achieve the optimum moisture content for compaction and compacted to at least 90 percent of the materials maximum dry density as established by ASTM Test Method D-1557.

Fill used in highway embankments should consist of structural fill as defined in Section 6.2.4 of this report. Structural fill should be placed in loose lifts eight inches or less in thickness and fully compacted to at least 90 percent of the maximum dry density as established by ASTM Test Method D-1557. The compaction requirements in embankment fills greater than ten feet in height should be increased to 95 percent of maximum dry density to minimize long-term settlement of the fill.

Embankment side slopes should be no steeper than 2:1 (horizontal:vertical). Where steeper side slopes are desired, metal or geotextile earth reinforcing materials could be considered. Alternatively, conventional cantilever retaining walls or crib structures could be used.

For purposes of metal strip, wire grid, geotextile or crib earth retaining system design, embankment fill consisting of silty sand, clayey sand or clayey gravel such as the native soils encountered at the underpass site may be assumed to have a nominal angle of internal friction of 25 degrees with a nominal cohesion of 500 psf. Select granular non-cohesive fill if used, may be assigned an angle of internal friction of 32 degrees with no cohesion for preliminary design purposes. Proposed off-site structural fill should be evaluated at the source to verify the appropriate design strength parameters prior to importation to the site.

6.2.4 Structural Fill

Structural fill for bridge approach ramps west of interstate I-15 and east of the Industrial Road viaduct should consist of low plasticity (PI less than 15), low solubility (solubility less than 5 percent) non-salt laden soils. Structural fill should be free of vegetation and debris and should contain no rocks or clumps larger than six inches in nominal diameter. However, clumps of caliche or cemented sand and gravel up to 18 inches in diameter could be used in embankment fills more than three feet below finish subgrade provided they are not nested and voids between oversize cemented clumps are filled with soil and properly compacted. Structural fill should be placed in eight inch loose lifts brought to optimum moisture content for compaction and compacted to at least 90 percent of maximum dry density as determined by ASTM Test Method D-1557. Higher compaction standards may be appropriate in deep fill sections to reduce long-term settlement.

We anticipate that on-site soil excavated for the Las Vegas Boulevard underpass may be used as structural fill. Some screening of oversized material and/or crushing may be

required to achieve the requirements for structural fill. Imported fill material should be approved at the source by Kleinfelder personnel prior to importing.

6.3 Retaining Walls

6.3.1 Lateral Earth Pressures

Conventional cantilevered retaining walls for approaches to the Las Vegas Boulevard Underpass, Industrial Road Viaduct, and Interstate I-15 Bridge with level backfill, no surcharge and no seepage or groundwater should be designed to resist lateral earth pressures in the active case. Retaining walls at Las Vegas Boulevard established more than 12 feet below existing grade should consider the effects of groundwater and positive measures should be taken to drain backfill soils. Alternatively, retaining walls must be designed to resist hydrostatic pressures.

Non-yielding foundation walls for the Las Vegas Boulevard Underpass should be designed to resist lateral earth pressures in the at-rest case. For seismic design analyses, a seismic lateral coefficient K_h of $K_h = A/2$ would be appropriate for yielding retaining walls. A seismic lateral coefficient of at least 1.5A is recommended for non-yielding abutments or retaining walls. Earth retaining structures should be designed to slide rather than rotate or tilt due to seismic loads, to the extent possible. The referenced seismic coefficient values (K_h) would be appropriate for analyses by the Mononobe-Okabe Method (AASHTO, 1983).

The appropriate active case and at-rest case lateral earth pressure will depend upon the backfill material used. An active case equivalent fluid density of 30 pounds per cubic foot (pcf) would be appropriate for backfill consisting of Clark County Type II aggregate base course or equivalent granular material. An active case equivalent fluid

density of 40 pcf would be appropriate where on-site silty sand, clayey sand, or clayey gravel is used as backfill.

The equivalent fluid density for the at-rest case should be increased to 42 pcf for Clark County Type II aggregate base course or equivalent granular soil. An at-rest equivalent fluid density of 74 pcf would be appropriate for on-site silty sand, clayey sand, or clayey gravel used as backfill.

Where the backfill will support surcharge loads, the horizontal load due to the surcharge may be taken as 0.30 times the surcharge load.

The above referenced lateral earth pressure design values assume that backfill is properly placed and compacted to at least 90 percent of the maximum dry density for the material used as established by ASTM Test Method D-1557. Temporary bracing and care should be used to avoid damage to wells during backfill placement and compaction. All backfill should be mechanically compacted with equipment suitable for the material used. Flooding or jetting of backfill should not be permitted. The lateral earth pressures assume proper surface and subsurface drainage will be maintained to prevent hydrostatic pressure build-up and that adequate backfill drainage including weepholes or drain pipes to a gravity discharge will be provided.

6.3.2 Resistance to Lateral Loads

Horizontal loads acting on foundations cast in open excavations against undisturbed native soil or properly placed and compacted fill will be resisted by friction acting along the base of the footing and by passive earth pressures against the loaded side of the footing. If design makes use of passive earth pressure against backfill, it is

important that a representative of Kleinfelder, inc. be present to monitor and test backfill placement and compaction.

The friction acting along the base of footings founded on suitable, undisturbed foundation soils or properly placed and compacted granular structural fill may be computed by using an allowable coefficient of friction of 0.40 with the normal dead load. Footings established on cemented deposits may be designed using an allowable coefficient of friction of 0.45 with the normal dead load. The allowable passive lateral earth pressure may be computed using an equivalent fluid with a density of 400 pcf for backfill consisting of Clark County Type II aggregate base. The passive case equivalent fluid density should be reduced to 350 pcf for clayey sand or equivalent native soil backfill. Passive pressure capacity in the upper foot should be ignored unless confined by concrete slab-on-grade or pavement. The backfill material designed to resist passive pressure should extend a distance of at least two times the wall height behind the wall.

6.4 Foundations

Conventional spread foundations would be appropriate for the proposed Las Vegas Boulevard Underpass, embankment retaining walls, and underpass approach retaining walls along the Desert Inn Road Alignment. The allowable bearing pressure will be somewhat variable along the alignment.

Shallow foundations for embankment retaining structures established two feet or more below final compacted subgrade on undisturbed native soil or properly placed and compacted structural fill may be designed for a maximum allowable net bearing

pressure of 3,000 psf. Shallow foundations established two to eight feet below final compacted subgrade may be designed for a maximum allowable net bearing pressure of 2,000 + 500*D (psf) where "D" is the depth below the lowest adjacent final compacted subgrade to the bottom of footings in feet.

Based on preliminary alignment profiles by Louis Berger and Associates, we anticipate the foundations for the Las Vegas Boulevard Underpass will bear on or within one to two feet of thick, fully cemented caliche or cemented sand and gravel layers. A maximum allowable net bearing pressure of 10,000 psf would be appropriate for design of foundations for the underpass which bear on the cemented soil. Foundations for the underpass which bear on non-cemented soil more than 18 feet below existing grade may be designed for a maximum allowable net bearing pressure of 8,000 psf.

Underpass approach retaining wall foundations established two feet or more below the lowest adjacent final compacted subgrade may be designed for a maximum net allowable bearing pressure of 3,500+800*D(ft.) psf up to a maximum pressure of 8,000 psf.

The ultimate bearing capacity for the above referenced foundation conditions may be taken as four times the allowable pressure stated for seismic, dynamic and wind load conditions.

For purposes of static foundation design analyses, a modulus of subgrade reaction of 200 pci would be appropriate for foundations which bear on properly placed and compacted structural fill as described in this report and native undisturbed non-

cemented soil. Foundations which bear on fully cemented soil may be evaluated using a modulus of vertical subgrade reaction of 500 pci.

Based upon Guide Specifications for Seismic Design of Highway Bridges (AASHTO, 1983), a Type II soil profile would be appropriate in conjunction with a site coefficient of S=1.2. The site is located in an area between acceleration coefficient contour lines of 0.10 and 0.20. An acceleration coefficient of A=0.15 would be appropriate for use at this site. A shear modulus of approximately 10,000 psi +/- 2,000 psi would be appropriate for use in seismic analysis. This value was determined at a depth of approximately five feet below adjacent grade for a shear strain of 0.001 percent, and would be applicable for both native soil and similar structural fill materials.

Based upon results of sieve analyses, Atterberg Limit test results, the depth to groundwater and the extent of cemented soil deposits encountered during drilling, the subsurface soils at this site are not considered to be susceptible to liquefaction due to either man-induced or earthquake induced shaking.

Prior to placing forms or pouring concrete, the footing excavation should be observed by a representative of Kleinfelder, Inc. to establish whether suitable bearing soils have been exposed and the bottom of excavations are free of loose and disturbed soils.

6.4.1 Settlement

Settlement of properly designed and constructed footings bearing on fully cemented deposits two or more feet below the lowest adjacent final compacted subgrade or top of paving should be about 1/2-inch or less.

Settlement of properly designed and constructed footings bearing on very stiff and/or dense native soil two feet or more feet below the lowest adjacent final compacted subgrade or top of paving should be about one inch or less.

6.5 Pavement Analyses and Design

It is our understanding that design average daily traffic (ADT) for the Desert Inn Arterial will be 70,000 vehicles per day (two-way on six lanes). For purposes of our design analyses, we have assumed that six percent of the traffic will be truck vehicles. We have also assumed that 70 percent of the traffic will use a single traffic lane each way.

Three R-value tests were performed on representative soil samples from below the anticipated road grade. The test results are presented on Plates B-29 through B-31 in Appendix B. A design R-value of 70 was used in pavement design west and east of the Las Vegas Boulevard underpass. However, due to groundwater and subsurface soil conditions at the underpass, we recommend that pavement sections established ten feet and more below existing grade at the underpass should be designed for an R-value of R=35 in conjunction with an underdrain layer. The structural pavement sections were designed in accordance with the 1986 AASHTO Guide to design of pavement structures. A design life of 20 years was assumed with a terminal serviceability index of 2.0. A reliability coefficient of 0.95 (95%) and a standard deviation value of 0.35 were used in pavement design. Asphaltic concrete was assigned a structural coefficient of 0.35. Clark County Type II aggregate base course was assigned a structural coefficient of 0.10.

Concrete pavement sections were designed for Portland cement-concrete (Clark County Class A, Modified, Air Entrained) having a 28-day compressive strength of 4,000 psi.

Cement treated base with a minimum 7-day compressive strength of 450 psi was considered in the design. The thickness of Clark County Type II aggregate base course and cement treated base was designed to provide a base for concrete with a minimum modulus of subgrade reaction of 300 pci.

Based on our analyses of the projected traffic, subgrade soil conditions and the above referenced design considerations, structural pavement sections for the Desert Inn Super Arterial and presented in Tables No. 6-4, 6-5, and 6-6.

Table 6-4

Flexible Pavement Structural Section
Desert Inn Super Arterial West and East of
Las Vegas Boulevard

Design Parameters	
20-Year 18 kip ESAL	10.7×10^6
Design R-Value (R)	70
Effective Resilient Modulus (Mr)	15,000 psi
Design Serviceability Loss (psi)	2.0
Design Structural Number (SN)	4.0

Asphalt Friction Course	**Asphaltic Concrete**	**Clark County Type II Aggregate Base**
3/4 inch	7 inches	16 inches

Table 6-5

Flexible Pavement Structural Section
Desert Inn Super Arterial at Las Vegas Boulevard
Ten Feet or More Below Existing Site Grade

Design Parameters

20-Year 18 kip ESAL	10.7×10^6
Design R-Value (R)	35
Effective Resilient Modulus (Mr)	8,200 psi
Design Serviceability Loss (psi)	2.0
Design Structural Number (SN)	4.8

Asphalt Friction Course	Asphaltic Concrete	Clark County Type II Aggregate Base	Clark County 2 Inch Minus Drain Backfill
3/4 inch	9 inches	17 inches	12 inches

Table 6-6

Rigid Pavement Structural Section
Desert Inn Super Arterial at Las Vegas Boulevard
Ten Feet or More Below Existing Site Grade

Design Parameters

20-Year 18 kip ESAL	10.7×10^6
Design R-Value (R)	35
Effective Subgrade Modulus (K)	300 pci
Mean Modulus of Rupture (Sc)	650 psi
Load Transfer Coefficient (J)	3.2
Design Serviceability Loss (PSI)	2.0

Portland Cement Concrete	Cement Treated Base	Clark County Type II Aggregate Base	Clark County 2 Inch Minus Drain Backfill
10-1/2 inch	6 inches	6 inches	12 inches

Aggregate base course should be compacted to at least 95 percent of the maximum dry density as established by ASTM Test Method D-1557. Asphaltic concrete should be compacted to at least 92 percent of theoretical maximum specific gravity. Field and laboratory tests should be performed to establish whether applicable requirements have been met.

The gravel drain layer beneath pavements at the Las Vegas Boulevard Underpass should be separated from the underlying subgrade and overlying aggregate base course by a geotextile fabric designed to prevent migration of fines into the drain layer. The gravel drain layer should include a drain collection gallery connected to a sump and pump.

6.6 Moisture Protection

Long-term performance of foundations, retaining walls, and pavements will require that subgrade soils and backfill be protected against excessive water infiltration and/or saturation. Positive drainage away from foundations and retaining walls should be established and maintained. Weepholes and/or gravel collector and perforated drain pipe systems should be placed behind retaining walls to assume positive drainage. A collector drain system, including sump and pump, is recommended along the Desert Inn Road bed where it is established 12 feet or more below existing site grade. The road bed drain system should be continuous with the gravel drain layer underlying the structural pavement section. Drain systems should be constructed with a sealed sump and pump system designed to carry collected water to a gravity discharge well away from foundations.

6.7 Soil Corrosion

Based on the laboratory test results and our experience with previous studies nearby, the soils along the Desert Inn Road Alignment contain sulfate salts in sufficient concentrations to be considered corrosive to metal and concrete. All concrete in contact with soil should be formulated with Type V or equivalent sulfate resistant cement-concrete and should be place at a maximum four inch slump.

6.8 Construction Considerations

As previously discussed, hard cemented soils were encountered at many locations during our field exploration. We anticipate that excavations for the Las Vegas Boulevard Underpass will encounter numerous cemented layers at variable elevations. Thin layers may be broken-up by a ripper tooth and heavy tractor. However, thick layers will probably require a drop hammer or backhoe mounted hydraulic hammer. Drilling during our field exploration with continuous flight hollow-stem auger was slow and difficult, however, drilling by rotary-mud methods was relatively easy. Dewatering should be anticipated in excavations greater than 15 feet deep. The amount of dewatering required will depend on the extent and effectiveness of injection grout or slurry trench seepage cut-off walls.

A shrinkage factor of 5 to 10 percent should be anticipated for surficial medium dense to dense soils. Some bulking may occur with very dense soils and cemented materials.

7.0 CLOSURE

7.1 Limitations

The recommendations contained in this report are based on our field explorations, laboratory tests and our understanding of the proposed construction. The subsurface data used in the preparation of this report were obtained from the 43 borings advanced for this investigation. It is possible and likely that variations in the soil and groundwater conditions could exist between the points explored. The nature and extent of variation may not be evident until construction occurs. If any conditions are encountered at this site which are different from those described in this report, our firm should also be immediately notified so we may re-evaluate recommendations.

This report was prepared in accordance with the generally accepted standard of practice at the time the report was written. No warranty, express or implied is made.

It is the client's responsibility to see that all parties to the project including the Designer, Contractor, Subcontractors, etc. are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on-site and off-site) or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else

will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

7.2 Additional Services

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during the construction to verify compliance with these recommendations. These tests and observations should include, but not necessarily be limited to the following:

- Observations and testing during site preparation and earthwork.
- Observation and testing of structural fill placement.
- Observation of footing excavations.
- Observation and testing of concrete.
- Observation and testing of asphalt.
- Consultation as may be required during construction.

We also recommend that project plans and specifications be reviewed by us to verify compatibility with our conclusions and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or wish to discuss additional services, please do not hesitate to contact us.

REFERENCES

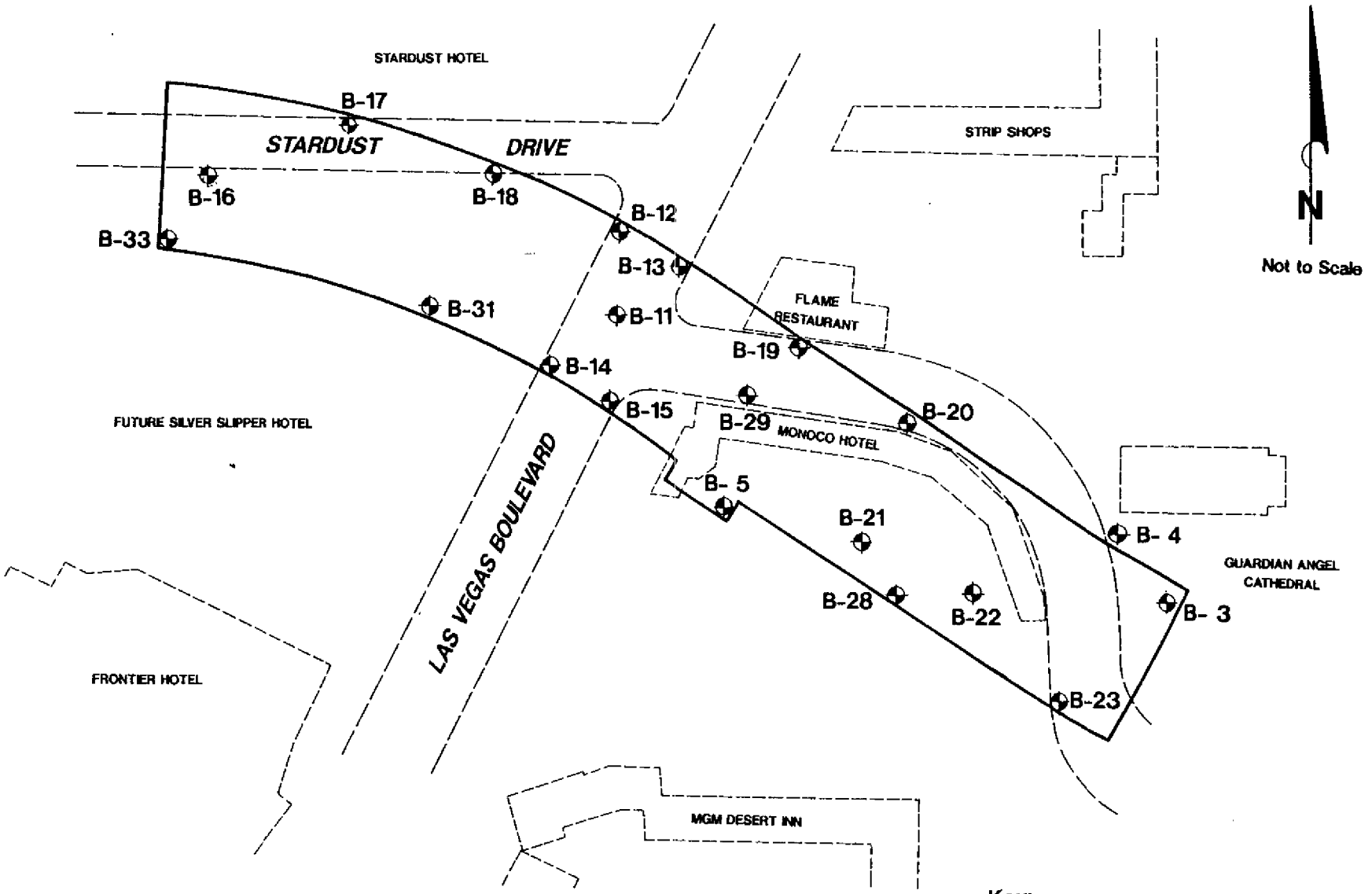
1. Bulletin 95, "Subsidence in Las Vegas Valley", Nevada Bureau of Mines and Geology by John W. Bell, 1981.

2. Las Vegas Northwest Quadrangle Geologic Map, Jonathan C. Matti, Fred W. Bachhuber, Douglas M. Morton and John W. Bell, 1987. Nevada Bureau of Mines and Geology, Mackay School of Mines.

3. Geotechnical Investigation, High Speed Surface Transportation System, Clark County, Nevada, Kleinfelder Project 31-173302, February 1, 1990.

4. Groundwater Chemistry Changes Resulting From Stressed Aquifer Systems in Las Vegas Valley, Clark County, Nevada, by Kay Brothers and Terry Katzer, 1988.

5. AASHTO - Guide Specifications for Design of Highway Bridges, 1983.



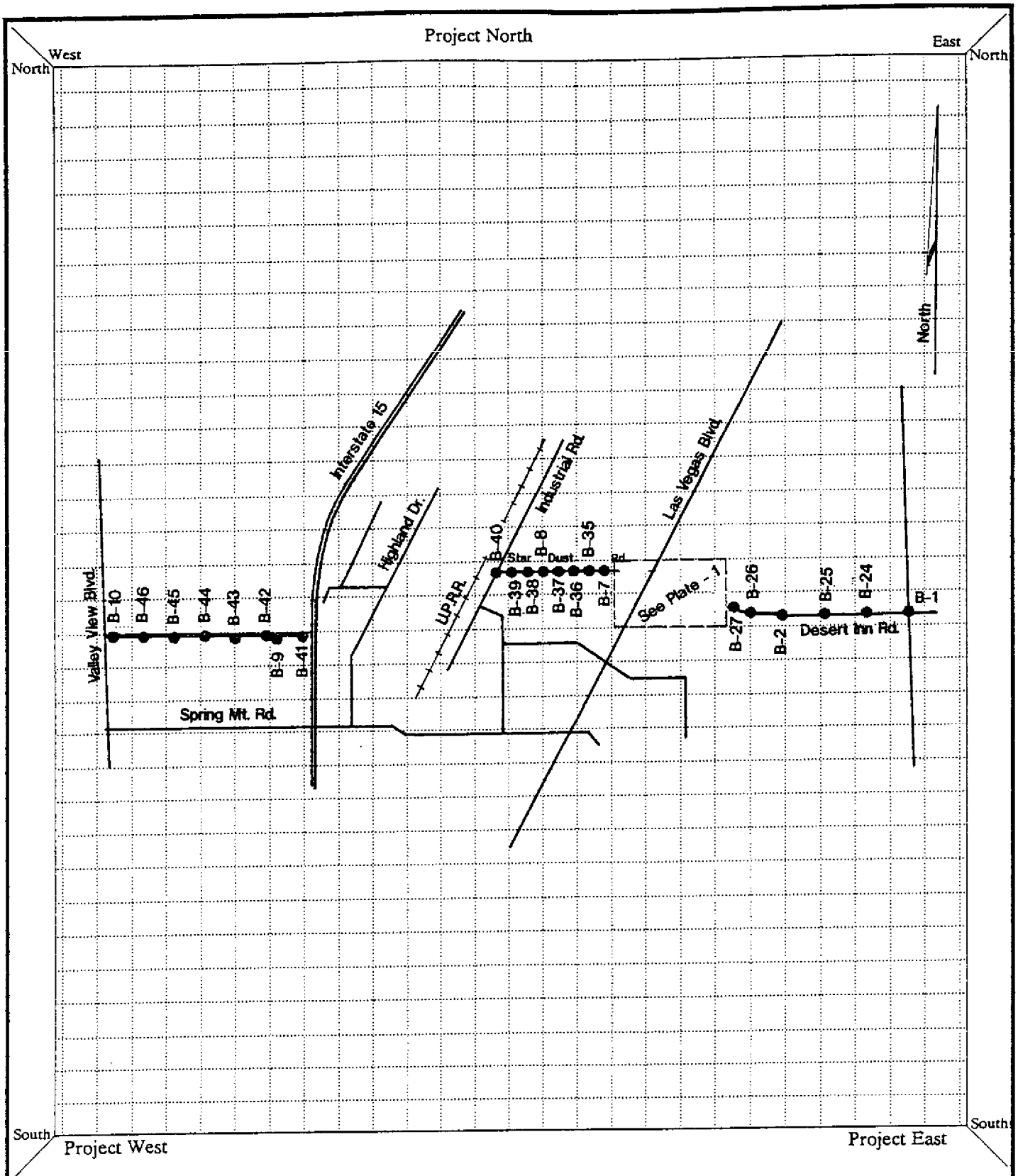
KLEINFELDER

Desert Inn Road Super Arterial

PROJECT NUMBER 31 193605

LOCATION OF BORINGS

PLATE 1



PROJECT: DESERT INN Rd. Super Arterial

LOCATION:

Scale : Approximately 1" = 2000 '

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SOILS AND MATERIALS TESTING

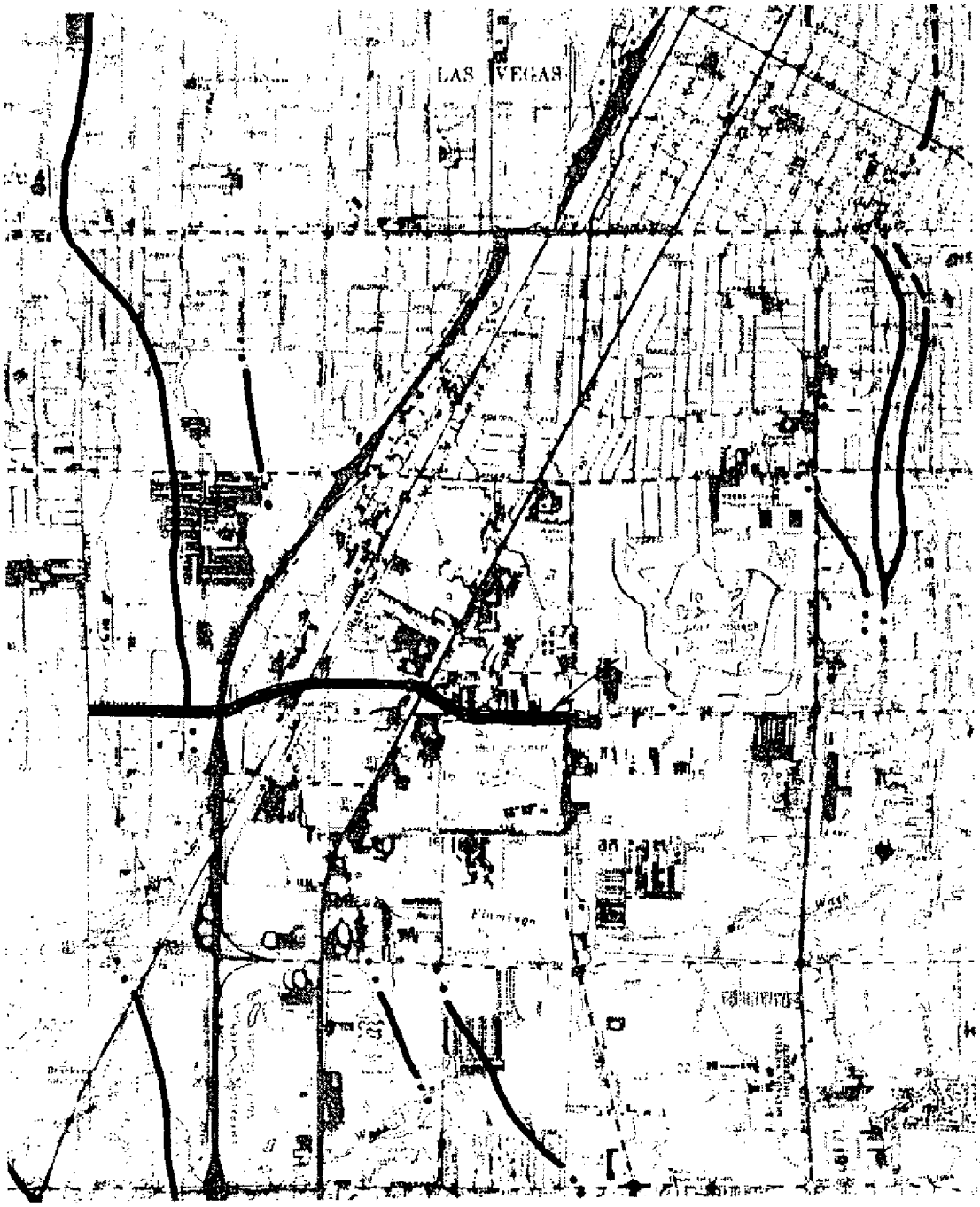
PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

LOCATION OF BORINGS

PLATE

2



From: Nevada Bureau of Mines & Geology Bulletin - 95, Plate - 1 (1981)

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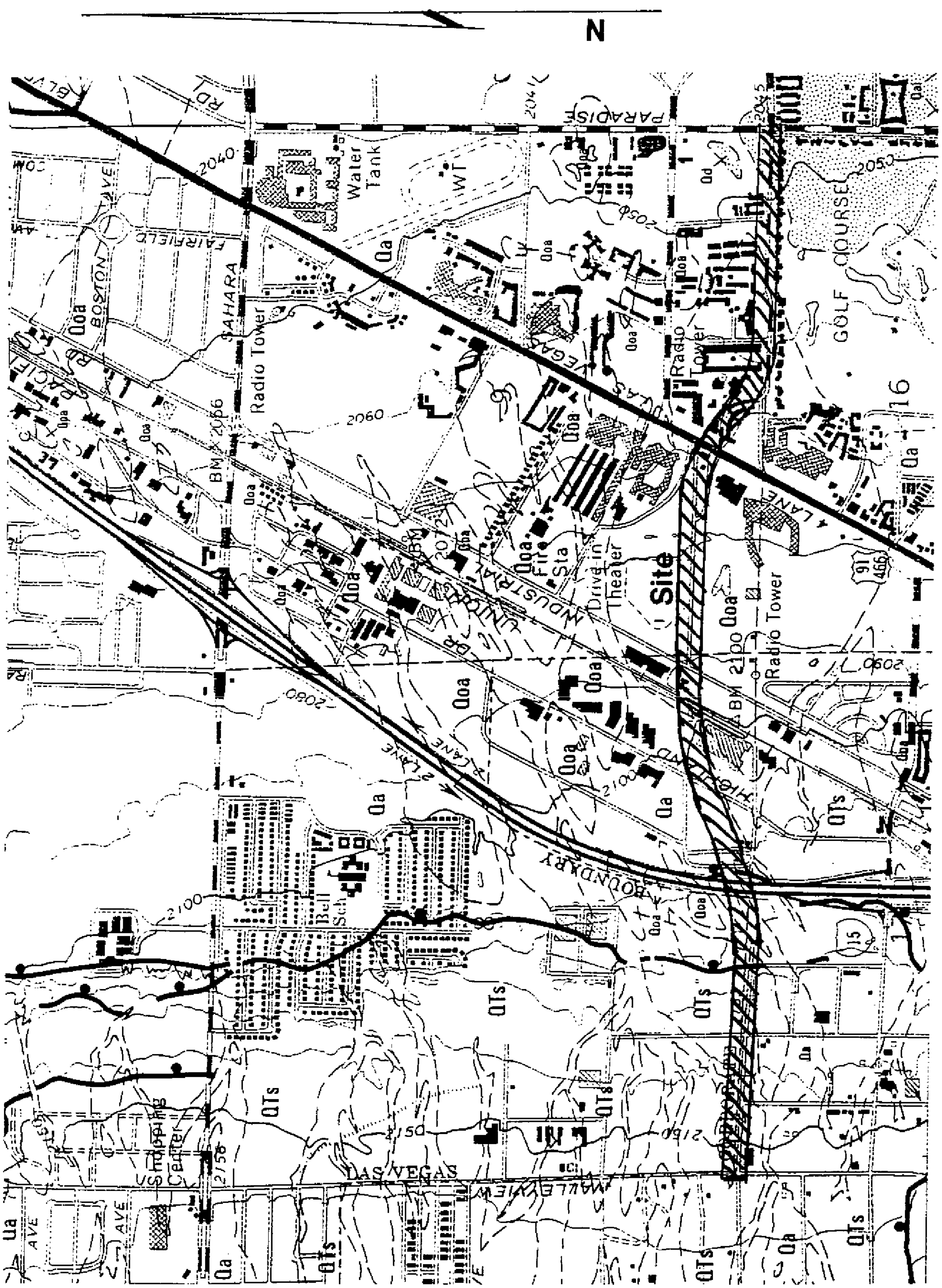
PROJECT NO. 31-183605

GEOLOGIC SITE MAP

PLATE 3

From: Las Vegas NW Quadrangle Geologic Map,
Nevada Bureau of Mines and Geology,
By: Matti, Bachhuber, Morton and Bell, (1987)



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GEOLOGIC SITE MAP

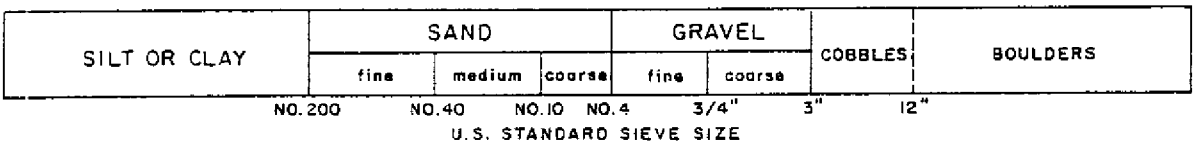
PLATE 4

PROJECT NO. **31 - 183605**

MAJOR DIVISIONS			Group Symbols	TYPICAL NAMES
COARSE GRAINED SOILS More than 50% of material is larger than the No. 200 sieve	GRAVELS More than 50% of coarse part is larger than the No. 4 sieve	CLEAN GRAVELS Little or no fines	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES Appreciable amount of fines	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse part is smaller than the No. 4 sieve	CLEAN SANDS Little or no fines	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH FINES Appreciable amount of fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS More than 50% of material is smaller than the No. 200 sieve	SILTS AND CLAYS Liquid limit LESS than 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with low plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit GREATER than 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS



DESCRIPTIVE TERMS USED WITH SOILS

CONSISTENCY			MOISTURE CONTENT	
	SILTS AND CLAYS	SANDS AND GRAVELS		
STRONGEST ↑	very stiff	very dense	WETTEST ↑	wet
	stiff	dense		very moist
	firm	medium dense		moist
				slightly moist
WEAKEST ↓	soft	loose	DRIEST ↓	dry

	CALICHE	CEMENTED SAND AND GRAVEL	IDENTIFICATION TEST USING KNIFE AND STANDARD GEOLOGIST'S HAMMER
STRONGEST ↑	very hard	very hard	Difficult to scratch or break
	hard	hard	Scratches leave only dust, requires many hammer blows to break
	moderately hard	moderately hard	Can be readily cut with knife and crumbles with several hammer blows
WEAKEST ↓	partially cemented	partially cemented	Gouges easily with knife and crumbles readily with a few blows of a hammer

EXPLANATION OF MATERIAL CLASSIFICATIONS

PLATE NO. 5

APPENDIX A

DATED DRILLED: 5/1/92
LOCATION: See Plate 3

BORING NO. B- 1

ELEVATION: Approx. 2044 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502690.0000
Easting - 627760.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2044.00 / 0							**ASPHALT** - 3 inches thick	slightly moist	
							FILL - gravelly sand, light brown		dense
							CLAYEY SAND (SC) - light brown		medium dense
2039.00 / 5	7			12/6 80/12			**CLAYEY GRAVEL (GC)** - light brown	moist	very dense
							CALICHE - light brown to white	slightly moist	very hard
							CLAYEY SAND (SC) - light brown	moist to very moist	dense
							CALICHE - light brown to white		hard
2034.00 / 10	9			10/6 22/12			**CLAYEY SAND (SC)** - light brown		medium dense

Bottom at 11.5 feet.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-1

DATED DRILLED: 5/7/92
LOCATION: See Plate 3

BORING NO. B- 2

ELEVATION: Approx. 2060.5 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502660.0000
Easting - 625950.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2060.50 / 0							**ASPHALT** - 3 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							SILTY SAND (SM) - light brown		
							CLAYEY SAND (SC) - light brown		dense
2055.50 / 5	6			6/6 40/9					
							CALICHE - light brown to white		hard
							CLAYEY GRAVEL (GC) - light brown	moist	dense
2050.50 / 10	10			16/6 32/4			Bottom at 11 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-2

DATED DRILLED: 5/5/92
LOCATION: See Plate 3

BORING NO. B- 3

ELEVATION: Approx. 2065 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502890.0000
Easting - 625040.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2065.00 / 0							**ASPHALT** - 2 inches thick	slightly moist	
							FILL - gravelly sand, some silt, brown		medium dense
							CLAYEY SAND (SC) - trace gypsum, dark brown		
							- some gravel	moist	dense
2060.00 / 5	9		G,A	15/6 46/12			**SILTY GRAVEL (GM)** - brown		
							CLAYEY SAND (SC) - dark brown - partially cemented		
2055.00 / 10	1			5/6 17/12 sluff					
							CALICHE - some inbedded gravel, light brown to white	slightly moist	very hard
2050.00 / 15				30/0					
2045.00 / 20							- light brown - more gravel	▽ wet	
2040.00 / 25	16		G,A,Hy	18/6 53/11			**CLAYEY GRAVEL (GC)** - some sand, light brown to white		very dense
							Bottom at 26.5 feet.		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 20 feet during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-3

DATED DRILLED: 5/5/92
LOCATION: See Plate 3

BORING NO. B- 4

ELEVATION: Approx. 2065 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502930.0000
Easting - 625020.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2065.00 / 0							**ASPHALT** - 2 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
	9						**SILTY SAND (SM)** - light brown		
							- some gravel - trace gypsum		
2060.00 / 5	16			9/6 29/12				moist	
							POORLY GRADED SILTY SAND (SP-SM) - some gravel, light brown		dense
								slightly moist	
2055.00 / 10	3		G,A	10/6 31/12					
							CEMENTED SAND & GRAVEL - light brown		very dense very hard
2050.00 / 15				30/0					
2045.00 / 20				25/0				wet	
2040.00 / 25				25/0			Bottom at 25 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 20 feet during drilling.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-4

DATED DRILLED: 5/1/92
LOCATION: See Plate 3

BORING NO. B- 5

ELEVATION: Approx. 2069.5 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502850.0000
Easting - 624460.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2069.50 / 0							**ASPHALT** - 4 inches thick **FILL** - gravelly sand, light brown	slightly moist	
							CLAYEY GRAVEL (GC) - light brown		medium dense dense
2064.50 / 5	5		G,A,Sol	10/6 45/12			**SILTY SAND (SM)** - light brown **CLAYEY GRAVEL (GC)** - light brown		
							SILTY GRAVEL (GM) - light brown		very dense
2059.50 / 10	4		Ch	48/6 50/3					
							CALICHE - light brown to white		very hard
2054.50 / 15	0			50/3				moist to very moist	
							CLAYEY GRAVEL (GC) - light brown		dense
							CALICHE - light brown to white		hard
2049.50 / 20	8		G,A	15/6 40/12			**SILTY GRAVEL (GM)** - light brown - partially cemented - partially cemented - partially cemented	wet	dense
2044.50 / 25	12			50/5.5					
							CALICHE - light brown to white		very hard
2039.50 / 30									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 20.5 feet during drilling. Groundwater measured at 14 feet after drilling. Groundwater measured at 15.16 ft.(MW-1) and 15.37 ft.(MW-2) on 6-4-92, and 15.37'(MW-1) and 15.62'(MW-2) on 7-10-92.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-5a

DATED DRILLED: 5/1/92
LOCATION: See Plate 3

BORING NO. B- 5

ELEVATION: Approx. 2069.5 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502850.0000
Easting - 624460.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2039.50 / 30	28			50/5.5			CALICHE - cont.	wet	very hard
							CLAYEY GRAVEL (GC) - light brown - partially cemented		very dense
2034.50 / 35	16		S	13/6 65/12			SILTY SAND (SM) - light brown		
2029.50 / 40	19	113	G,A	10/6 60/12					
							CLAYEY SAND (SC) - light brown		hard
							SANDY CLAY (CL) - light brown		stiff
2024.50 / 45	32			3/6 16/12					
2019.50 / 50	44		G,A	11/6 80/12					

Bottom at 51.5 feet.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 20.5 feet during drilling. Groundwater measured at 14 feet after drilling. Groundwater measured at 15.16 ft.(MW-1) and 15.37 ft.(MW-2) on 6-4-92, and 15.37'(MW-1) and 15.62'(MW-2) on 7-10-92.

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-5b

DATED DRILLED: 5/7/92
LOCATION: See Plate 3

BORING NO. B- 7

ELEVATION: Approx. 2079 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503350.0000
Easting - 623390.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2079.00 / 0							**ASPHALT** - 2 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							POORLY GRADED SILTY GRAVEL (GP-GM) - light brown		
2074.00 / 5	2		G,A	9/6 17/12					
2069.00 / 10	9			7/6 10/12					
							CEMENTED SAND & GRAVEL - light brown		very dense very hard
2064.00 / 15				20/0					
2059.00 / 20				30/0					
							CLAYEY GRAVEL (GC) - light brown	moist	medium dense
2054.00 / 25	10			7/6 24/4					
							Bottom at 26 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-6

DATED DRILLED: 5/7/92
LOCATION: See Plate 3

BORING NO. B- 8

ELEVATION: Approx. 2085 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503345.0000
Easting - 622510.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2085.00 / 0							**FILL** - gravelly sand, light brown	slightly moist	
							SILTY SAND (SM) - light brown		medium dense
2080.00 / 5	2		G,A	6/6 10/12					
							SILTY GRAVEL (GM) - light brown	moist	
2075.00 / 10	8			6/6 20/12					

Bottom at 11.5 feet.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-7

DATED DRILLED: 5/8/92
LOCATION: See Plate 3

BORING NO. B- 9

ELEVATION: Approx. 2119.5 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502400.0000
Easting - 618600.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2119.50 / 0							**ASPHALT** - 3 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							CLAYEY SAND (SC) - light brown		
2114.50 / 5	20		G,A	4/6 20/12					
							CALICHE - light brown to white		hard
									very hard
2109.50 / 10				20/0					
2104.50 / 15				20/2			**CEMENTED SAND & GRAVEL** - light brown	wet	
2099.50 / 20				20/0					
							SANDY CLAY (CL) - light brown		stiff to very stiff
2094.50 / 25	12	107	C	23/12					
							Bottom at 26 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 15.5 feet during drilling.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-8

DATED DRILLED: 5/8/92
LOCATION: See Plate 3

BORING NO. B-10

ELEVATION: Approx. 2150.5 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502465.0000
Easting - 616230.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2150.50 / 0							**ASPHALT** - 3 inches thick	slightly moist	
							FILL - gravelly sand, light brown		hard
							CALICHE - light brown to white		
2145.50 / 5				9/6 23/12			**SANDY CLAY (CL)** - light brown	moist	stiff to very stiff
2140.50 / 10	19			12/4 20/0			Bottom at 10.5 feet.	▽ wet	

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 10.5 feet during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____ BY: ____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-9

DATED DRILLED: 6/24/92
LOCATION: See Plate 3

BORING NO. B-11

ELEVATION: Approx. 2071 ft.
** HAMMER WEIGHT: 140 lb.

Northing - 502900.0000
Easting - 624530.0000

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2071.00 / 0							**ASPHALT** - 4 inches thick	slightly moist to moist	
							FILL - gravelly sand, light brown - trace gravel, trace to little silt, brown		
2066.00 / 5	2			17/6 25/12			**SILTY SAND (SM)** - trace gravel, light brown		medium dense
							- little gypsum below 6 feet		dense
							- some gravel, brown		
2061.00 / 10				6/2 10/0			- areas of partial cementation 10 to 15 feet		very dense to moderately hard
2056.00 / 15	6		G,A					moist to very moist ▼	dense
								wet ▽	
2051.00 / 20	1			6/6 10/4					very dense
							SANDY CLAY (CL) - light brown		stiff
							SILTY GRAVEL (GM) - brown		dense
							SANDY CLAY (CL) - light brown		very stiff
2046.00 / 25	25		G,A	10/5 13/0			**SILTY GRAVEL (GM)** - some clay, light brown		
							CALICHE - with gravel, light brown		hard
									very hard
2041.00 / 30									hard

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19 feet during drilling. Groundwater measured at 17.1 feet on 7-2-92. Groundwater measured at 17 feet on 7-10-92.

APPROV:

BY:

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-10a

DATED DRILLED: 6/24/92
LOCATION: See Plate 3

BORING NO. B-11

ELEVATION: Approx. 2071 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502900.0000
Easting - 624530.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2041.00 / 30				10/0			**CALICHE** - light brown to white, cont. - with thinly interbedded zones of partially cemented silty clay 31 to 35 feet	wet	very hard
2036.00 / 35				10/0					hard
2031.00 / 40	18		G,A	19/6 42/12			**SILTY SAND (SM)** - trace clay, areas of partial cementation, green-brown		dense
2026.00 / 45				13/3 10/0			**GRAVELLY CLAY (CL)** - little sand, areas of partial cementation, light brown - color change to brown below 48 feet		hard to very hard
2021.00 / 50				10/0			Bottom at 50.5 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19 feet during drilling. Groundwater measured at 17.1 feet on 7-2-92. Groundwater measured at 17 feet on 7-10-92.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-10b

DATED DRILLED: 6/25/92
LOCATION: See Plate 3

BORING NO. B-12

ELEVATION: Approx. 2071 ft.
** HAMMER WEIGHT: 140 lb.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

Northing -503000.0000
Easting - 624520.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2071.00 / 0							**ASPHALT** - 4 inches	slightly moist	
							FILL - GRAVELLY SAND, brown		
							CLAYEY SAND (SC) - with gypsum, little gravel, brown		medium dense to dense
2066.00 / 5	7			9/6" 31/12"					
							POORLY GRADED, SILTY SAND (SP-SM) - some gravel, brown - trace to little partial cementation to 10.5 feet		
2061.00 / 10	12		G,A	52/12"					very dense
							CLAYEY SAND (SC) - light brown	moist to very moist	
2056.00 / 15	17		G,A	16/6" 50/5"			**CEMENTED SAND and GRAVEL** - brown	▼	hard very hard
2051.00 / 20				10/0"				▽	
							SILTY CLAY (CL) - light brown and white - trace gravel	wet	very stiff
							CEMENTED SAND and GRAVEL - brown		hard very stiff
2046.00 / 25	29			15/3"			**SILTY CLAY (CL)** - trace gravel, brown		very hard
							CALICHE - with gravel, brown		
2041.00 / 30									

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 22.0 feet during drilling. Groundwater measured at 16.1 feet on 7-2-92. Groundwater measured at 16 feet on 7-10-92.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-11a

BORING NO. B-12

DATED DRILLED: 6/25/92
LOCATION: See Plate 3

ELEVATION: Approx. 2071 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503000.0000
Easting - 624520.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2041.00 30				20/0"			**CALICHE (con't)** - break in caliche	wet	very hard
2036.00 35				15/0"					
2031.00 40				20/0"					
2026.00 45	27		S	40/6" 56/9"			**SANDY CLAY (CL)** - brown		very stiff to hard
2021.00 50	18			29/4"			Bottom at 50.5 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____ BY: ____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 22.0 feet during drilling. Groundwater measured at 16.1 feet on 7-2-92. Groundwater measured at 16 feet on 7-10-92.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-11b

DATED DRILLED: 6/25/92
LOCATION: See Plate 3

BORING NO. B-13

ELEVATION: Approx. 2070 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502970.0000
Easting - 624585.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2070.00 / 0							**ASPHALT** - 5 inches	slightly moist	
							FILL - GRAVELLY SAND, trace silt, brown - little clay		
							CLAYEY SAND (SC) - some gravel, brown		medium dense
2065.00 / 5	7			7/6" 16/12"			- with gypsum		dense
2060.00 / 10	11		G,A	41/6" 41/12"			**SILTY SAND (SM)** - some gravel, some clay, brown	moist	
2055.00 / 15	7			8/6" 40/9"				very moist ▼	very dense
							CEMENTED SAND & GRAVEL - light brown		
2050.00 / 20				20/1"				▽ wet	
							SANDY CLAY (CL) - trace gravel, brown		
2045.00 / 25				10/0"			**CALICHE** - little gravel, brown		
2040.00 / 30									very hard

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 21.5 feet during drilling. Groundwater measured at 16.5 feet on 7-1-92. Groundwater measured at 16.3 feet on 7-10-92.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-12a

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

DATED DRILLED: 6/25/92
LOCATION: See Plate 3

BORING NO. B-13

ELEVATION: Approx. 2070 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502970.0000
Easting - 624585.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2040.00 / 30				20/0"			**CALICHE** - (con't)	wet	very hard
2035.00 / 35	32		S,Ch	18/6" 41/12"			**CLAYEY SAND (SC)** - trace partial cementation, light brown		dense
							SANDY CLAY (CL) - brown and light brown - partially cemented - partially cemented		hard
2030.00 / 40	21		S	12/6" 51/12"			**SILTY SAND (SM)** - reddish-brown		very dense
							CEMENTED SAND & GRAVEL - light brown - with gravel		very hard
2025.00 / 45	9			10/0"					
2020.00 / 50	3			12/6" 24/2"			**GRAVELLY CLAY (CL)** - little sand, brown		hard

Bottom at 51.0 feet

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 21.5 feet during drilling. Groundwater measured at 16.5 feet on 7-1-92. Groundwater measured at 16.3 feet on 7-10-92.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-12b

DATED DRILLED: 6/25/92
LOCATION: See Plate 3

BORING NO. B-14

ELEVATION: Approx. 2071.5 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502830.0000
Easting - 624490.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2071.50 / 0							**ASPHALT** - 4 inches **FILL** - GRAVELLY SAND, brown	slightly moist	
							SANDY CLAY (CL) - trace gravel, brown		stiff
							CALICHE - with gravel, brown		hard
2066.50 / 5				13/6" 36/12"			**SANDY CLAY (CL)** - little gravel, brown and light brown - partially cemented 8.0 to 9.0 feet		dense
2061.50 / 10	8			6/6" 12/3"			**CALICHE** - with gravel, brown **GRAVELLY CLAY (CL)** - brown	moist	hard very stiff
							POORLY GRADED, SILTY GRAVEL (GP-GM) - light brown	very moist	very dense
2056.50 / 15			G,A	30/6" 54/12"			**CEMENTED SAND and GRAVEL** - brown		very dense and very hard
2051.50 / 20				20/0"			**SANDY CLAY (CL)** - trace gravel, brown	wet	hard
							CALICHE - with little gravel, light brown		very hard
2046.50 / 25				10/0"					
2041.50 / 30									

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 22.0 feet during drilling. Groundwater measured at 16.4 feet on 7-2-92. Groundwater measured at 16.3 feet on 7-10-92.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-13a

DATED DRILLED: 6/25/92
LOCATION: See Plate 3

BORING NO. B-14

ELEVATION: Approx. 2071.5 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502830.0000
Easting - 624490.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2041.50 / 30				10/0"			CALICHE - (con't)	wet	very hard
2036.50 / 35				20/0"					
							SANDY CLAY (CL) - trace gravel, brown		medium stiff to stiff
2031.50 / 40	25		S	4/6" 9/12"					
							CALICHE - brown		very hard
2026.50 / 45				10/0"					
							GRAVELLY CLAY (CL) - brown		hard
2021.50 / 50	17			7/6" 50/6"					
							Bottom at 51.0 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____

BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 22.0 feet during drilling. Groundwater measured at 16.4 feet on 7-2-92. Groundwater measured at 16.3 feet on 7-10-92.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-13b

DATED DRILLED: 6/25/92
LOCATION: See Plate 3

BORING NO. B-15

ELEVATION: Approx. 2071 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502800.0000
Easting - 624540.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2071.00 / 0							**ASPHALT** - 5 inches **FILL** - GRAVELLY SAND, brown	slightly moist	
2066.00 / 5	15			7/6" 12/12"			**SILTY SAND (SM)** - little gravel, light brown - with gypsum		medium dense
2061.00 / 10	18			12/6" 48/12"			**GRAVELLY CLAY (CL)** - little to some sand, brown		very stiff to hard
2056.00 / 15	12			4/6" 43/12"				moist to very moist	
							CEMENTED SAND and GRAVEL - scattered sandy silt lenses, light brown and white		very hard
2051.00 / 20	21		G,A,Ch	4/6" 26/12"			**SILTY SAND (SM)** - trace clay, brown - trace gravel - trace gravel	wet	dense
2046.00 / 25	11		S	37/4"					very dense
							CALICHE - brown - occasional gravel		very hard
2041.00 / 30									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19.0 feet during drilling. Groundwater measured at 16.5 feet on 7-1-92. Groundwater measured at 16.4 feet on 7-10-92.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-14a

DATED DRILLED: 6/25/92
LOCATION: See Plate 3

BORING NO. B-15

ELEVATION: Approx. 2071 ft.
** HAMMER WEIGHT: 140 lb.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	Northing -502800.0000 Easting - 624540.0000 SOIL DESCRIPTION	MOISTURE	CONSIST.
2041.00 / 30				10/0"			**CALICHE** - (con't)	wet	very hard
							- break in caliche		very stiff very hard
2036.00 / 35				20/0"			- break in caliche		
							SANDY CLAY (CL) - brown		very stiff
2031.00 / 40				10/0"			**CALICHE** - occasional gravel, light brown		very hard
							- white		
2026.00 / 45				10/0"					
							POORLY GRADED, SILTY GRAVEL (GP-GM) - little clay, light brown		very dense
2021.00 / 50	10		G,A	14/6" 20/1"			Bottom at 50.5 feet		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19.0 feet during drilling. Groundwater measured at 16.5 feet on 7-1-92. Groundwater measured at 16.4 feet on 7-10-92.

APPROV: _____ BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-14b

DATED DRILLED: 6/24/92
LOCATION: See Plate 3

BORING NO. B-16

ELEVATION: Approx. 2073 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503040.0000
Easting - 624020.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2073.00 / 0							**ASPHALT** - 3 inches thick **FILL** - gravelly sand, light brown	slightly moist to moist	
2068.00 / 5	15			12/6 22/12			**SILTY SAND (SM)** - trace gravel, brown - with gypsum below 5 feet		medium dense to dense
2063.00 / 10	7			32/6 72/12			**WELL GRADED, SILTY SAND (SW-SM)** - some gravel, brown		very dense
							CALICHE - with gravel, brown		hard
2058.00 / 15	7		G,A	16/12 10/1			**WELL GRADED, SILTY GRAVEL (GW-GM)** - trace clay, brown	moist to very moist	very dense
							CALICHE - with gravel, brown		hard
2053.00 / 20	8			15/3					
2048.00 / 25	17			15/6 91/12			**SILTY SAND (SM)** - trace gravel, light red-brown	very moist to saturated	very dense
2043.00 / 30									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Unable to measure ground water after drilling due to presence of drilling fluids in the hole. Groundwater measured at 17 feet on 6-27-92.

KLEINFELDER
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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-15a

DATED DRILLED: 6/24/92
LOCATION: See Plate 3

BORING NO. B-16

ELEVATION: Approx. 2073 ft.
** HAMMER WEIGHT: 140 lb.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	Northing -503040.0000 Easting - 624020.0000 SOIL DESCRIPTION	MOISTURE	CONSIST.
2043.00 / 30				33/3			SILTY SAND (SM) - cont. CALICHE - with gravel, brown	wet	~~very dense~~ hard
									very hard
2038.00 / 35				15/0					
2033.00 / 40				10/0					hard
									very hard
2028.00 / 45				15/0					
2023.00 / 50				15/0			Bottom at 50.5 feet.		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Unable to measure ground water after drilling due to presence of drilling fluids in the hole. Groundwater measured at 17 feet on 6-27-92.

APPROV: _____ BY: _____

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE A-15b

DATED DRILLED: 6/5/92
LOCATION: See Plate 3

BORING NO. B-17

ELEVATION: Approx. 2073 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -503110.0000
Easting - 624200.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	+ SAMPLES	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2073.00 / 0							**ASPHALT** - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							SILTY SAND (SM) - light brown - some gravel		
2068.00 / 5	2		G,A,Sol	15/6 32/12					dense
							- some gravel		very dense
2063.00 / 10	5			5/6 56/9					
							CEMENTED SAND & GRAVEL - light brown		very hard
2058.00 / 15				20/1 bounce				moist to wet	
2053.00 / 20				30/0 bounce				▽ wet	very stiff to hard
							SANDY CLAY (CL) - light brown - partially cemented		
2048.00 / 25	18	102		50/9					

Bottom at 26 feet.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 21 feet during drilling.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-16

DATED DRILLED: 6/8/92
LOCATION: See Plate 3

BORING NO. B-18

ELEVATION: Approx. 2072 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503060.0000
Easting - 624380.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2072.00 / 0							**ASPHALT** - 3 inches thick	slightly moist to moist	
							FILL - gravelly sand, brown		medium dense
							CLAYEY SAND (SC) - trace gypsum, light brown		
							SILTY SAND (SM) - light brown		
2067.00 / 5	7			16/6 59/12			- trace to some gravel - light red to brown		dense
							SILTY GRAVEL (GM) - light red to brown		
2062.00 / 10	18			44/6 20/0			**CLAYEY GRAVEL (GC)** - light red to brown		hard very dense
							CEMENTED SAND & GRAVEL - light brown		
							SILTY GRAVEL (GM) - some clay, light red to brown	moist to very moist	
							CEMENTED SAND & GRAVEL - light red to brown		
2057.00 / 15	14		G,A	14/6 66/12			**SILTY SAND (SM)** - some gravel, alluvial limestone, well rounded, dark gray to black stone with light brown matrix - partially cemented	▼ wet	
2052.00 / 20							**CEMENTED SAND & GRAVEL** - light brown		very dense and hard
							CLAYEY GRAVEL (GC) - silty, some sand, light brown		
2047.00 / 25	26	93		25/6 50/5			**SANDY CLAY (CL)** - partially cemented, light brown - partially cemented		very stiff to hard
	27		G,A				**CALICHE** - some gravel, light brown to white		very hard
2042.00 / 30									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater measured at 15.8 feet on 6-10-92.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-17a

DATED DRILLED: 6/8/92
LOCATION: See Plate 3

BORING NO. B-18

ELEVATION: Approx. 2072 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503060.0000
Easting - 624380.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2042.00 / 30	8			10/4 20/0			**POORLY GRADED, SILTY SAND (SP-SM)** - brown	wet	~~very dense~~ hard to very hard
							CALICHE - light brown to white - some gravel		
2037.00 / 35									hard
							SILTY GRAVEL (GM) - some clay, light brown		very dense
2032.00 / 40	10	128		50/2			**CALICHE** - light brown to white, Lost circulation during 1- hour shut-down. Unable to recover circulation. Hole terminated.		very hard
							Bottom at 40 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater measured at 15.8 feet on 6-10-92.

APPROV: _____ BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE A-17b

DATED DRILLED: 6/9/92
LOCATION: See Plate 3

BORING NO. B-19

ELEVATION: Approx. 2068 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -503020.0000
Easting - 624480.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	+ SAMPLES	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2068.00 / 0							**ASPHALT** - 3 inches thick	moist	
							FILL - gravelly sand, brown		dense
							SILTY SAND (SM) - brown		
							- light brown		
2063.00 / 5	13			7/6 44/12			- some gravel		
							CALICHE - light brown to white		~~hard~~
2058.00 / 10	12		G,A	13/6 67/12			**SILTY SAND (SM)** - some gypsum, light brown		very dense
								very moist	
2053.00 / 15							**CALICHE** - light brown to white	▼	hard
							CLAYEY GRAVEL (GC) - light brown		very dense
								▽ wet	
2048.00 / 20				6/3 20/0			**CALICHE** - light brown to white		~~very hard~~ hard
							SANDY CLAY (CL) - light brown		
							CLAYEY GRAVEL (GC) - light brown		very dense
2043.00 / 25				25/3 20/0			**CALICHE** - light brown to white - some gravel		very hard
2038.00 / 30									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 18.5 feet during drilling. Groundwater measured at 15.8 feet on 7-1-92.

APPROV:

BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-18a

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATED DRILLED: 6/9/92
LOCATION: See Plate 3

BORING NO. B-19

ELEVATION: Approx. 2068 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -503020.0000
Easting - 624480.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2038.00 30				3/1			CALICHE - cont.	wet	~~very hard~~ very dense
				20/0			SILTY SAND (SM) - light brown		very hard
							CALICHE - light brown to white		
							CLAYEY SAND (SC) - white to light brown - occasional thin sandy clay and cemented caliche layers		very dense
2033.00 35				30/0			CALICHE - light brown to white - some gravel - light brown		very hard
							SILTY SAND (SM) - light brown - partially cemented		very dense
2028.00 40	16	106		50/4			CALICHE - light brown to white		very hard
							SILTY SAND (SM) - light brown		very dense
							CALICHE - light brown to white		very hard
2023.00 45							SANDY CLAY (CL) - white to light brown - white		very stiff to hard
							SILTY SAND (SM) - light brown		dense
2018.00 50	25	98	G,A,S	50/11					

Bottom at 51 feet.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 18.5 feet during drilling. Groundwater measured at 15.8 feet on 7-1-92.

APPROV: BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-18b

DATED DRILLED: 6/9/92
LOCATION: See Plate 3

BORING NO. B-20

ELEVATION: Approx. 2069 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502940.0000
Easting - 624440.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2069.00 / 0							ASPHALT - 3 inches thick	slightly moist	
							FILL - gravelly sand, brown		medium dense
							SILTY SAND (SM) - light brown		
							CLAYEY SAND (SC) - light brown		
							- some gravel		
2064.00 / 5	5			19/6 39/12			SILTY SAND (SM) - trace clay, some fine gravel, light brown		dense
							CALICHE - light brown		hard
							CLAYEY SAND (SC) - some gravel, light brown		dense
2059.00 / 10									hard
				20/0 bounce			CALICHE - brown		very stiff
							SANDY CLAY (CL) - light brown		very hard
							CEMENTED SAND & GRAVEL - light brown	moist to very moist ▼	
2054.00 / 15				20/0 bounce					
							CLAYEY GRAVEL (GC) - light brown	▽ wet	very dense
							- some sand		very stiff
2049.00 / 20	21			15/6 24/12			SANDY CLAY (CL) - brown		
							- light brown to white		
2044.00 / 25	17			25/6 25/0			CALICHE - light brown		very hard
							CEMENTED SAND & GRAVEL - light brown		very dense and hard
2039.00 / 30									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19 feet during drilling. Groundwater measured at 15.8 feet on 7-1-92. Groundwater measured at 15.3 feet on 7-10-92.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-19a

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____ BY: ____

DATED DRILLED: 6/9/92
LOCATION: See Plate 3

BORING NO. B-20

ELEVATION: Approx. 2069 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502940.0000
Easting - 624440.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2039.00 / 30				25/0 bounce			CEMENTED SAND & GRAVEL - cont.	wet	very dense and hard
2034.00 / 35	9			24/6 24/3			CLAYEY SAND (SC) - some gravel, brown		very dense
							CALICHE - light brown to white		very hard
							SANDY CLAY (CL) - light brown		stiff
2029.00 / 40	18			15/12			- red to brown - some gravel		
							CALICHE - light brown to white		hard
							CEMENTED SAND & GRAVEL - light brown		very dense
2024.00 / 45							SANDY CLAY (CL) - some gravel, light brown		very stiff to hard
2019.00 / 50	15			50/10					

Bottom at 51 feet.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19 feet during drilling. Groundwater measured at 15.8 feet on 7-1-92. Groundwater measured at 15.3 feet on 7-10-92.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-19b

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATED DRILLED: 6/3/92
LOCATION: See Plate 3

BORING NO. B-21

ELEVATION: Approx. 2067 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502850.0000
Easting - 624590.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2067.00 / 0							ASPHALT - 3 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							CLAYEY SAND (SC) - light brown		
2062.00 / 5	9		G,A	9/6 38/12			SILTY SAND (SM) - some gravel, trace clay, light brown		dense
							- partially cemented		
2057.00 / 10	10		S	16/6 50/6			SILTY, CLAYEY GRAVEL (GM-GC) - light brown		very dense
							CEMENTED SAND & GRAVEL - light brown	moist to very moist	hard
2052.00 / 15				20/6 30/3			SILTY GRAVEL (GM) - light brown	▼	very dense
							CEMENTED SAND & GRAVEL - light brown		
							CLAYEY GRAVEL (GC) - light brown		
							CEMENTED SAND & GRAVEL - light brown	wet	
2047.00 / 20				20/0			CLAYEY GRAVEL (GC) - light brown		very hard
							CALICHE - light brown to white		
							SILTY GRAVEL (GM) - light brown		~~very dense~~ very hard
							CEMENTED SAND & GRAVEL - light brown		
2042.00 / 25				30/2					
							SILTY GRAVEL (GM) - light brown		~~very dense~~ very hard
2037.00 / 30							CALICHE - some gravel, light brown to		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater measured at 15 feet on 6/6/92.

APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-20a

DATED DRILLED: 6/3/92
LOCATION: See Plate 3

BORING NO. B-21

ELEVATION: Approx. 2067 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502850.0000
Easting - 624590.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2037.00 / 30				50/3			white CALICHE - cont.	wet	very hard
2032.00 / 35				50/2			Bottom at 35 feet.		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater measured at 15 feet on 6/6/92.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-20b

DATED DRILLED: 6/4/92
LOCATION: See Plate 3

BORING NO. B-22

ELEVATION: Approx. 2066 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502780.0000
Easting - 624710.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2066.00 / 0							**ASPHALT** - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							SILTY SAND (SM) - light brown		
2061.00 / 5							**CLAYEY SAND (SC)** - light brown		dense
2056.00 / 10	10		G,A	16/6 30/5.5			**WELL GRADED, SILTY GRAVEL (GW-GM)** - light brown		very dense
							CEMENTED SAND & GRAVEL - light brown	moist to very moist	hard
							SILTY GRAVEL (GM) - light brown		dense hard
2051.00 / 15	14		G,A	8/6 14/12			**CEMENTED SAND & GRAVEL** - light brown	wet	medium dense
							SILTY GRAVEL (GM) - some clay, light brown		very hard
							CALICHE - light brown to white		
2046.00 / 20				30/0			**CLAYEY GRAVEL (GC)** - light brown		very dense
							CALICHE - light brown to white		very hard
2041.00 / 25				50/2			**CLAYEY GRAVEL (GC)** - light brown		very dense
							CALICHE - light brown to white		very hard
2036.00 / 30									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV:

BY:

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater measured at 14.9 feet on 6/6/92.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-21a

DATED DRILLED: 6/4/92
LOCATION: See Plate 3

BORING NO. B-22

ELEVATION: Approx. 2066 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502780.0000
Easting - 624710.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2036.00 / 30				50/1			Bottom at 30 feet.	wet	very hard

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater measured at 14.9 feet on 6/6/92.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-21b

DATED DRILLED: 6/10/92
LOCATION: See Plate 3

BORING NO. B-23

ELEVATION: Approx. 2065 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502640.0000
Easting - 624885.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	+ SAMPLES	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2065.00 / 0							ASPHALT - 3 inches thick	slightly moist	
							FILL - gravelly sand, brown		dense
							CLAYEY SAND (SC) - light brown		
							- light brown		
2060.00 / 5	22			17/6 54/11			CALICHE - light brown		very hard
							- some gravel		
2055.00 / 10	8		G,A,Ch	7/6 17/12			WELL GRADED, SILTY GRAVEL (GW-GM) - some sand, brown		medium dense
							CALICHE - some gravel, light brown		very hard
	8							moist	
2050.00 / 15				20/0 bounce				wet	
							SILTY GRAVEL (GM) - light brown		very dense
							CEMENTED SAND & GRAVEL - light brown		hard
									very hard
2045.00 / 20				25/0 bounce					
							CLAYEY GRAVEL (GC) - light brown		very dense
							CEMENTED SAND & GRAVEL - light brown		very hard
2040.00 / 25				25/0 bounce					
									very dense
2035.00 / 30							SILTY SAND (SM) - light brown		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater measured at 15.4 feet on 6-12-92

APPROV:

BY:

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-22a

DATED DRILLED: 6/10/92
LOCATION: See Plate 3

BORING NO. B-23

ELEVATION: Approx. 2065 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -502640.0000
Easting - 624885.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2035.00 / 30				29/6 25/5			**SILTY SAND (SM)** - cont. - partially cemented	wet	very dense
2030.00 / 35				22/6 bounce			**CEMENTED SAND & GRAVEL** - light brown		very hard
2025.00 / 40							**SANDY CLAY (CL)** - red to brown		very stiff to hard
2020.00 / 45				50/3			**CALICHE** - some gravel, red to brown		hard
									very hard
2015.00 / 50				25/1 bounce			Bottom at 51 feet.		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater measured at 15.4 feet on 6-12-92

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: BY:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-22b

DATED DRILLED: 6/11/92
LOCATION: See Plate 3

BORING NO. B-24

ELEVATION: Approx. 2049.5 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502680.0000
Easting - 627155.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2049.50 / 0							ASPHALT - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							SILTY SAND (SM) - light brown		
		80	R-Val				SILTY GRAVEL (GM) - light brown		dense to very dense
2044.50 / 5				30/6					
							CALICHE - light brown to white		hard
2039.50 / 10				5/6 14/12			CLAYEY SAND (SC) - light brown		medium dense

Bottom at 11.5 feet.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-23

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATED DRILLED: 6/11/92
LOCATION: See Plate 3

BORING NO. B-25

ELEVATION: Approx. 2055 ft.
** HAMMER WEIGHT: 140 lb.

Northing - 502670.0000
Easting - 626555.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2055.00 / 0							**ASPHALT** - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		
							FILL - gravelly sand, light brown		
2050.00 / 5	8		G,A	7/6 23/6 20/3			**SILTY GRAVEL (GM)** - light brown - partially cemented - partially cemented - partially cemented - hole caving, unable to sample.		very dense to moderately hard
2045.00 / 10							Bottom at 10 feet.		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

BY: APPROV:

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-24

DATED DRILLED: 6/11/92
LOCATION: See Plate 3

BORING NO. B-26

ELEVATION: Approx. 2062 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502700.0000
Easting - 625500.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2062.00 / 0							**ASPHALT** - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							SILTY SAND (SM) - light brown		
2057.00 / 5	10		G,A	11/6 23/12					
							SILTY GRAVEL (GM) - light brown		dense
2052.00 / 10	5			9/6 42/12				moist to very moist ▼	
							CALICHE - light brown to white		hard
2047.00 / 15				7/6 22/12			**SANDY CLAY (CL)** - light brown	wet ▼	very stiff
							GRAVELLY CLAY (CL) - brown		
2042.00 / 20				32/6 23/12					

Bottom at 21.5 feet.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 15.5 feet during drilling. Groundwater measured at 10 feet on 6-12-92.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-25

DATED DRILLED: 6/11/92
LOCATION: See Plate 3

BORING NO. B-27

ELEVATION: Approx. 2063 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502780.0000
Easting - 625262.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	+ SAMPLES	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2063.00 / 0							ASPHALT - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							SILTY SAND (SM) - light brown		
2058.00 / 5				6/6 32/12			SILTY GRAVEL (GM) - light brown - partially cemented		dense
							- partially cemented		very dense
2053.00 / 10				6/6 10/6 14/2			- partially cemented	wet	
2048.00 / 15	9		G,A,S	5/6 15/12			SILTY SAND (SM) - light brown		medium dense
2043.00 / 20				10/0 bounce			CALICHE - light brown to white		very hard
2038.00 / 25				20/0 bounce			Bottom at 25 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling. Groundwater measured at 10.5 feet on 6-12-92.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-26

BORING NO. B-28

DATED DRILLED: 6/24/92
LOCATION: See Plate 3

ELEVATION: Approx. 2067 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502780.0000
Easting - 624650.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2067.00 / 0							**ASPHALT** - 2 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							SILTY SAND (SM) - light brown		
							CLAYEY SAND (SC) - light brown		
							SILTY SAND (SM) - light brown		
2062.00 / 5	8			8/6 19/12					
							SILTY GRAVEL (GM) - light brown		dense
2057.00 / 10	5			18/6 45/12			**SILTY SAND (SM)** - light brown	very moist	
							SILTY GRAVEL (GM) - trace clay, light brown		hard
							CALICHE - light brown to white		
2052.00 / 15								wet	
							SILTY SAND (SM) - trace clay, light brown		very dense
2047.00 / 20	22		S	5/6 50/5			**CLAYEY SAND (SC)** - light brown		
							CALICHE - light brown to white		very hard
2042.00 / 25	19								
				50/6			**CLAYEY SAND (SC)** - light brown		very dense very hard
							CALICHE - light brown to white		
2037.00 / 30									

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 15.8 during drilling. Groundwater measured at 15.58 feet on 7-6-92. Groundwater measured at 15.52 feet on 7-10-92.

APPROV: BY:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-27a

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

DATED DRILLED: 6/24/92
LOCATION: See Plate 3

BORING NO. B-28

ELEVATION: Approx. 2067 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502780.0000
Easting - 624650.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2037.00 / 30							**CALICHE** - cont.	wet	very hard
2032.00 / 35									
							SANDY CLAY (CL) - light brown		very stiff
2027.00 / 40	12		S	10/6 31/12					
2022.00 / 45	0		G,A	4/6 14/12			**CLAYEY SAND (SC)** - light brown		medium dense
2017.00 / 50	21		G,A	4/6 22/12			- partially cemented		
2012.00 / 55	25		G,A	10/6 26/12					dense
2007.00 / 60									

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 15.8 during drilling. Groundwater measured at 15.58 feet on 7-6-92. Groundwater measured at 15.52 feet on 7-10-92.

APPROV:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-27b

DATED DRILLED: 6/24/92
LOCATION: See Plate 3

BORING NO. B-28

ELEVATION: Approx. 2067 ft.
** HAMMER WEIGHT: 140 lb.

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	Northing -502780.0000 Easting - 624650.0000 SOIL DESCRIPTION	MOISTURE	CONSIST.
				50/2			Bottom at 60.5 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____ BY: ____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 15.8 during drilling. Groundwater measured at 15.58 feet on 7-6-92. Groundwater measured at 15.52 feet on 7-10-92.

KLEINFELDER
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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-27c

DATED DRILLED: 6/10/92
LOCATION: See Plate 3

BORING NO. B-29

ELEVATION: Approx. 2069 ft.
** HAMMER WEIGHT: 140 LB./ 350 LB.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

Northing -502950.0000
Easting - 624440.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2069.00 / 0							FILL - gravelly sand, aggregate base course, brown	slightly moist	
2064.00 / 5	9			5/6 29/12			SILTY GRAVEL (GM) - light brown - some gypsum - partially cemented		medium dense
2059.00 / 10	19		G,A	9/6 7/4 bounce			CEMENTED SAND & GRAVEL - light brown CLAYEY SAND (SC) - some gravel, red to brown CEMENTED SAND & GRAVEL - light brown		hard dense very hard
2054.00 / 15	10			31/6 bounce			SANDY CLAY (CL) - some gravel, red to brown CEMENTED SAND & GRAVEL - light brown	moist ▼	~~very stiff~~ very hard very dense
2049.00 / 20	16 28		G G,A,Hy Ch	26/6 48/12			WELL GRADED SAND (SW) - light brown - partially cemented CLAYEY SAND (SC) - light red to brown	wet ▽	dense
2044.00 / 25				20/0			CALICHE - light brown to white		very hard
2039.00 / 30							SANDY CLAY (CL) - light red to brown CALICHE - light brown to gray CLAYEY GRAVEL (GC) - light brown CALICHE - light brown to white		v. stiff ~~hard~~ ~~v. dense~~ v. hard v. dense

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19 feet during drilling. Groundwater measured at 15.2 feet on 7-1-92. Groundwater measured at 15.3 feet on 7-10-92.

APPROV: _____ BY: _____

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SOILS AND MATERIALS TESTING

PROJECT NO: 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-28a

DATED DRILLED: 6/10/92
LOCATION: See Plate 3

BORING NO. B-29

ELEVATION: Approx. 2069 ft.
** HAMMER WEIGHT: 140 LB./ 350 LB.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

Northing -502950.0000
Easting - 624440.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2039.00 / 30	22			20/0			SANDY CLAY (CL) - light brown	wet	very hard
							CALICHE - light brown to white		
							CALICHE - cont.		
							SANDY CLAY (CL) - white		very stiff hard
							CALICHE - white		
2034.00 / 35	14		G,A,Hy	23/6 24/6 10/0			CLAYEY SAND (SC) - some gravel, white		very dense
							SILTY SAND (SM) - some clay, light brown to red		
2029.00 / 40	19		G,A,Hy	11/6 55/12			SILTY, CLAYEY GRAVEL (GM-GC) - red to brown		
							CALICHE - some gravel, light brown to white		very hard
2024.00 / 45									
2019.00 / 50	21			40/12			SILTY GRAVEL (GM) - brown		dense to very dense
							CEMENTED SAND & GRAVEL - light brown		very hard
2014.00 / 55	17						CALICHE - some gravel, brown		
							SILTY GRAVEL (GM) - some clay, light red to brown		dense
				32/12					
	18		G,A				Bottom at 58 feet.		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19 feet during drilling. Groundwater measured at 15.2 feet on 7-1-92. Groundwater measured at 15.3 feet on 7-10-92.

APPROV: BY:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-28b

DATED DRILLED: 6/18/92
LOCATION: See Plate 3

BORING NO. B-31

ELEVATION: Approx. 2073 ft.
** HAMMER WEIGHT: 140 lb.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

Northing -502930.0000
Easting - 624250.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2073.00 / 0							**ASPHALT** - 2 inches	slightly moist	
							FILL - SILTY GRAVEL, some sand, trace clay, gray to light brown		
							SILTY SAND (SM) - some gravel, light reddish-brown		medium dense to dense
2068.00 / 5				21/6" 22/12"			**SILTY GRAVEL (GM)** - partially cemented, light brown		
							SILTY SAND (SM) - some gravel, trace gypsum, light brown		very dense
2063.00 / 10				11/6" 55/12"			**SILTY GRAVEL (GM)** - light brown		
2058.00 / 15								moist to very moist ▼	
2053.00 / 20				37/2"			**CEMENTED SAND and GRAVEL** - gray to light brown - thin lense of silty gravel at 20.0 feet - trace clay 20.0 to 22.0 feet	▽ wet	very hard
							SANDY CLAY (CL) - white to gray - partially cemented - partially cemented		very stiff to hard
2048.00 / 25							**CALICHE** - white to light brown		hard
									very hard
2043.00 / 30									

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19.5 feet during drilling. Groundwater measured at 18.5 feet on 6-23-92. Groundwater measured at 18.34 feet on 6-26-92. Groundwater measured at 18.82 feet on 7-6-92 and 18.28 on 7-10-92.

APPROV:

BY:

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-29a

DATED DRILLED: 6/18/92
LOCATION: See Plate 3

BORING NO. B-31

ELEVATION: Approx. 2073 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502930.0000
Easting - 624250.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2043.00 / 30				50/2"			**CALICHE** - cont.	wet	very hard
2038.00 / 35							- gravel lense		
2033.00 / 40	19								
							SILTY GRAVEL (GM) - light brown		v.dense
							CALICHE - light brown		very hard
2028.00 / 45							**SILTY GRAVEL (GM)** - light brown		v.dense
							CALICHE - light brown		v.hard
				4/6" 18/12"			**CLAYEY SILT (ML)** - trace gravel, light brown to tan		stiff
2023.00 / 50							**CALICHE** - light brown		very hard
							SILTY GRAVEL (GM) - light brown		v.dense
							CALICHE - light brown		very hard
2018.00 / 55	21		G,A						
				3/6" 28/12"			**CLAYEY SILT (ML)** - some gypsum, light tan to white		very stiff
2013.00 / 60							**SILTY CLAY (CL)** - with gravel, light		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: BY:

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19.5 feet during drilling. Groundwater measured at 18.5 feet on 6-23-92. Groundwater measured at 18.34 feet on 6-26-92. Groundwater measured at 18.82 feet on 7-6-92 and 18.28 on 7-10-92.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-29b

DATED DRILLED: 6/18/92

LOCATION: See Plate 3

BORING NO. B-31

ELEVATION: Approx. 2073 ft.

** HAMMER WEIGHT: 140 lb.

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	Northing -502930.0000 Easting - 624250.0000 SOIL DESCRIPTION	MOISTURE	CONSIST.
							brown		
							Bottom at 60.0 feet		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19.5 feet during drilling. Groundwater measured at 18.5 feet on 6-23-92. Groundwater measured at 18.34 feet on 6-26-92. Groundwater measured at 18.82 feet on 7-6-92 and 18.28 on 7-10-92.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE

A-29c

DATED DRILLED: 6/18/92
LOCATION: See Plate 3

BORING NO. B-33

ELEVATION: Approx. 2074.5 ft.
** HAMMER WEIGHT: 140.lb.

Northing -502980.0000
Easting - 623980.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2074.50 / 0							**ASPHALT** - 2 inches	slightly moist	dense
							AGGREGATE BASE - 6 inches		
							SILTY SAND (SM) - (possible fill), some gravel, reddish-brown		
							- some gypsum, light brown		
2069.50 / 5				7/6" 27/12"					
							SILTY GRAVEL (GM) - some gravel, light brown		very dense
2064.50 / 10				26/6" 50/5"			- light brown to gray		
2059.50 / 15				50/4"				moist to very moist ▼	
							SILTY SAND (SM) - light brown		
							SILTY GRAVEL (GM) - light brown	▽ wet	very hard
2054.50 / 20				20/2"			**CEMENTED SAND and GRAVEL** - light brown		
							Bottom at 20.5 feet		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____ BY: ____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 19.5 feet during drilling. Groundwater measured at 17.0 feet on 6-23-92. Groundwater measured at 17.20 feet on 6-26-92. Groundwater measured at 17.22 feet on 7-6-92 and 17.74 feet on 7-10-72.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-30

DATED DRILLED: 6/5/92
LOCATION: See Plate 3

BORING NO. B-34

ELEVATION: Approx. 2076 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -503195.0000
Easting - 623705.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2076.00 / 0							ASPHALT - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		dense
							SILTY SAND (SM) - light brown		
							- some gravel		
2071.00 / 5	5		G,A	17/6 36/12			- some gypsum		
2066.00 / 10	3			8/6 19/12			- partially cemented		medium dense
									dense
2061.00 / 15									
							CLAYEY GRAVEL (GC) - light brown	moist to very moist	
2056.00 / 20				20/0 bounce			CALICHE - light brown to white		very hard
							CLAYEY GRAVEL (GC) - light brown		~~very dense~~ ~~hard~~
							CALICHE - light brown to white	▽ wet	very stiff to hard
2051.00 / 25	15			50/2 bounce			SANDY CLAY (CL) - light brown - partially cemented		
							Bottom at 25.5 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 23 feet during drilling.

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-31

DATED DRILLED: 6/12/92
LOCATION: See Plate 3

BORING NO. B-35

ELEVATION: Approx. 2080.5 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

Northing -503349.0000
Easting - 623170.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2080.50 / 0							**FILL** - gravelly sand, light brown	slightly moist	
	2	76	R-Val				**SILTY GRAVEL (GM)** - light brown		medium dense to dense
2075.50 / 5				11/6 30/12			- some gypsum		
2070.50 / 10	4			13/6 27/12					dense to very dense
2065.50 / 15	4			31/6 64/12				moist	
2060.50 / 20	10			8/6 35/9				wet ▽	

Bottom at 21.5 feet.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 20.5 feet during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-32

DATED DRILLED: 6/12/92
LOCATION: See Plate 3

BORING NO. B-36

ELEVATION: Approx. 2082.5 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503347.0000
Easting - 622950.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2082.50 / 0							ASPHALT - 3 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							SILTY SAND (SM) - light brown		
2077.50 / 5	4			27/6 46/12			SILTY GRAVEL (GM) - light brown		dense
2072.50 / 10	3			16/6 59/12			- some gypsum		very dense
									dense
2067.50 / 15	5			13/6 24/12				moist	

Bottom at 16.5 feet.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE A-33

DATED DRILLED: 6/12/92
LOCATION: See Plate 3

BORING NO. B-37

ELEVATION: Approx. 2083.5 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503345.0000
Easting - 622730.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2083.50 / 0							**ASPHALT** - 3 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							SILTY SAND (SM) - light brown		
							SILTY GRAVEL (GM) - light brown		
2078.50 / 5	7		G,A	5/6 22/12			**SILTY SAND (SM)** - light brown - trace gypsum		
2073.50 / 10	7			5/6 38/12			- some gypsum		dense

Bottom at 11.5 feet.

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-34

DATED DRILLED: 6/12/92
LOCATION: See Plate 3

BORING NO. B-38

ELEVATION: Approx. 2087 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503343.0000
Easting - 622280.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/ FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2087.00 / 0							FILL - gravelly sand, light brown	slightly moist	
							SILTY GRAVEL (GM) - light brown		medium dense
2082.00 / 5	4			8/6 22/12			- some gypsum		
									dense
2077.00 / 10	2			26/6 bounce			- partially cemented		
							POORLY GRADED, SILTY SAND (SP-SM) - light brown		very dense
	7		G,A						
2072.00 / 15							Bottom at 15 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-35

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

DATED DRILLED: 6/12/92
LOCATION: See Plate 3

BORING NO. B-39

ELEVATION: Approx. 2089 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503340.0000
Easting - 622040.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2089.00 / 0							**ASPHALT** - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		mediun dense to dense
							SILTY SAND (SM) - light brown		
2084.00 / 5	5			5/6 31/12			- some gypsum		
									dense
2079.00 / 10	6			10/5 10/0			- partially cemented - partially cemented		very dense
	6								
2074.00 / 15			G,A				**POORLY GRADED, SILTY SAND (SP-SM)** - light brown		
2069.00 / 20							Bottom at 20 feet.		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE A-36

DATED DRILLED: 7/1/92
LOCATION: See Plate 3

BORING NO. B-40

ELEVATION: Approx. 2092 ft.
** HAMMER WEIGHT: 140 lb.

Northing -503337.0000
Easting - 621810.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2092.00 / 0							**ASPHALT** - 4 inches thick **FILL** - gravelly sand, light brown	slightly moist	
2087.00 / 5	17			3/6 15/12			**SANDY CLAY (CL)** - light brown		stiff
							SILTY SAND (SM) - light brown	wet	dense
2082.00 / 10				30/0 bounce			**CEMENTED SAND & GRAVEL** - light brown		very hard
2077.00 / 15	27		G,A	3/6 44/12			**CLAYEY SAND (SC)** - light brown		dense
							SANDY CLAY (CL) - light brown - some mottled dark brown to black organics		stiff
2072.00 / 20	21			5/6 14/12					
2067.00 / 25	18			3/4 bounce			**CLAYEY SAND (SC)** - light brown Bottom at 25.5 feet.		very dense

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____ BY: ____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 8.25 feet during drilling.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-37

DATED DRILLED: 6/5/92
LOCATION: See Plate 3

BORING NO. B-41

ELEVATION: Approx. 2103 ft.
** HAMMER WEIGHT: 140 lb./ 350 lb.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

Northing -502430.0000
Easting - 618970.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2103.00 / 0							ASPHALT - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
							CLAYEY SAND (SC) - light brown		
2098.00 / 5	16			5/6 16/12					
							CLAYEY GRAVEL (GC) - light brown	moist	hard
							CEMENTED SAND & GRAVEL - light brown		
2093.00 / 10	19			47/6 26/3			SANDY CLAY (CL) - light brown	wet	very stiff to hard
							CALICHE - light brown to white		hard
							CLAYEY SAND (SC) - light brown		very dense
2088.00 / 15	25		G,A,S	9/6 50/bounce			CALICHE - light brown to white		very hard
							SANDY CLAY (CL) - light brown		very stiff
							- partially cemented		
									stiff
2083.00 / 20	33			12/12					
							- partially cemented		very stiff
							CALICHE - light brown to white		very hard
2078.00 / 25				50/1 bounce			Bottom at 25 feet.		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 10 feet during drilling. Groundwater measured at 8 feet on 6-6-92.

APPROV: _____ BY: _____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-38

DATED DRILLED: 6/4/92
LOCATION: See Plate 3

BORING NO. B-42

ELEVATION: Approx. 2123 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502450.0000
Easting - 618450.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2123.00 / 0							**ASPHALT** - 3 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense to dense
							CLAYEY SAND (SC) - some clay, light brown		
							- brown	moist	
2118.00 / 5	21	101	G,A	4/6 23/12					
							CEMENTED SAND & GRAVEL - light brown		very hard
2113.00 / 10	10			20/0				wet	
2108.00 / 15				20/0			Bottom at 15 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater encountered at 10 feet during drilling. Groundwater measured at 7.6 feet on 6/6/92

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-39

DATED DRILLED: 6/4/92
LOCATION: See Plate 3

BORING NO. B-43

ELEVATION: Approx. 2131 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502420.0000
Easting - 618000.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2131.00 / 0							concrete		
							FILL - gravelly sand, light brown	slightly moist	medium dense
	1						SILTY SAND (SM) - trace clay, light brown		
							CALICHE - light brown to white		hard
2126.00 / 5	15			5/6 17/12			SANDY CLAY (CL) - light brown		stiff
							CALICHE - light brown to white		very hard
2121.00 / 10				20/0			Bottom at 10 feet.		

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-40

DATED DRILLED: 6/4/92
LOCATION: See Plate 3

BORING NO. B-44

ELEVATION: Approx. 2137 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502455.0000
Easting - 617560.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2137.00 / 0							ASPHALT - 4 inches thick	slightly moist	
							FILL - gravelly sand, light brown		medium dense
	15		R-Val				CLAYEY SAND (SC) - light brown		
							CALICHE - light brown to white		hard
2132.00 / 5	11		G,A	13/6 18/12			CLAYEY SAND (SC) - light brown		medium dense
							SILTY SAND (SM) - light brown		
2127.00 / 10	17	110		8/6 16/12			CLAYEY SAND (SC) - light brown		

Bottom at 11.5 feet.

Resist.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-41

DATED DRILLED: 6/4/92
LOCATION: See Plate 3

BORING NO. B-45

ELEVATION: Approx. 2043 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502440.0000
Easting - 617115.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2043.00 / 0							CONCRETE		
							FILL - gravelly sand, light brown	slightly moist	dense
	5		G,A				SILTY SAND (SM) - trace to some clay, light brown		
2038.00 / 5	20	106	E	12/6 48/9					
							CALICHE - light brown to white		hard
							CLAYEY SAND (SC) - light brown		medium dense
2033.00 / 10	24			10/6 24/12			- hydrocarbon odor noted		

Bottom at 11.5 feet.

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: _____ BY: _____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

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SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-42

DATED DRILLED: 6/4/92
LOCATION: See Plate 3

BORING NO. B-46

ELEVATION: Approx. 2147 ft.
** HAMMER WEIGHT: 140 lb.

Northing -502455.0000
Easting - 616670.0000

elevation MSL / DEPTH IN FEET	FIELD MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS *	BLOWS/FOOT **	SAMPLES +	SYMBOL	SOIL DESCRIPTION	MOISTURE	CONSIST.
2147.00 / 0							CONCRETE.		
							FILL - gravelly sand, light brown	slightly moist	medium dense to hard
	4						SILTY SAND (SM) - some gravel, light brown		
2142.00 / 5	14			10/6 23/12					
							CLAYEY SAND (SC) - trace gravel, light brown		
2137.00 / 10	23			12/6 28/6					
							CALICHE - light brown to white		
							Bottom at 11.0 feet.		

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

APPROV: ____ BY: ____

* OTHER TESTS: C-CONSOLIDATION, A-ATTERBERG, S-SHEAR, G-GRAIN-SIZE, E-EXPANSION, R-R-VALUE, SOL-SOLUBILITY, U-UNCONFINED COMPRESSION,

\+ SAMPLER TYPE: Drive Sample 2.625" I.D. | Shelby Tube | Bulk | Ca. S.S. Sample 1.925" I. D. | SPT Sample 1.375" I.D.

NOTES: Groundwater not encountered during drilling.

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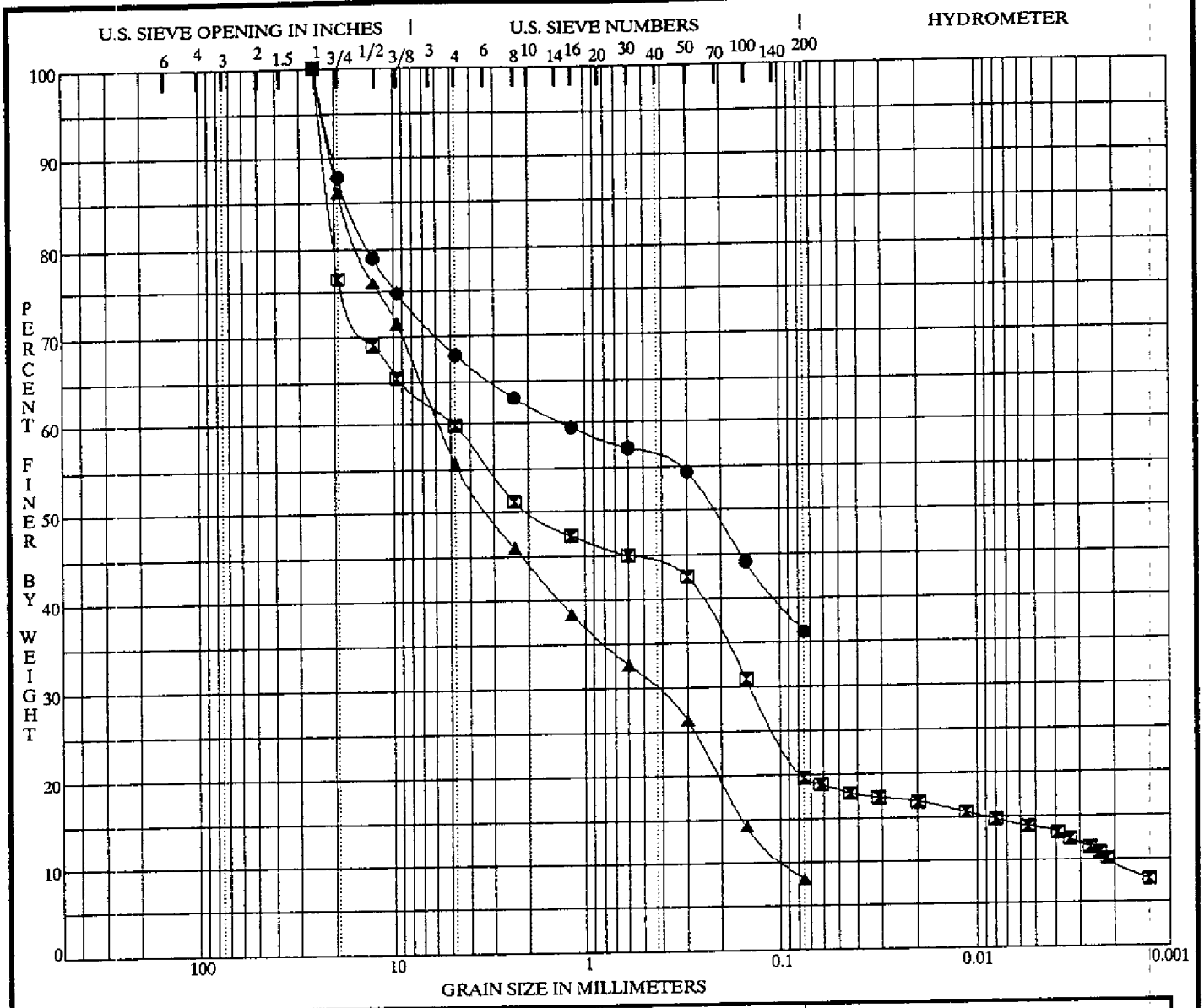
PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

BORING LOG AND TEST SUMMARY

PLATE
A-43

APPENDIX B



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B- 3	5.0	SILTY GRAVEL with SAND (GM)	45	27	18		
⊠	B- 3	25.0	CLAYEY GRAVEL with SAND (GC)	32	21	11		
▲	B- 4	10.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.38	62.2

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B- 3	5.0	25.40	1.33			32.1	31.8	36.1	
⊠	B- 3	25.0	25.40	4.87	0.142	0.0022	40.2	40.2	5.9	13.7
▲	B- 4	10.0	25.40	5.79	0.451	0.0931	44.5	47.4	8.1	

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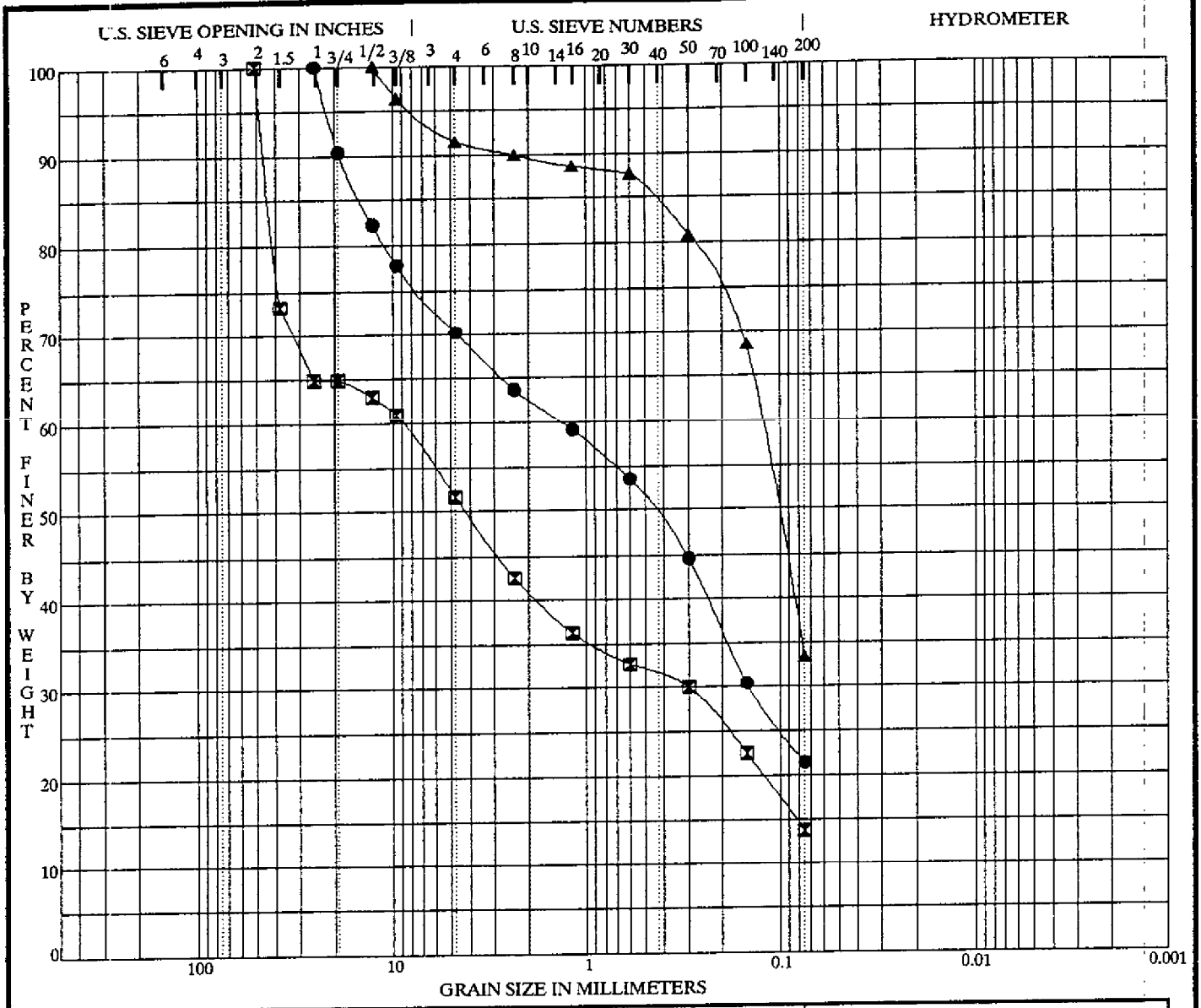
PROJECT: **DESERT INN Rd. Super Arterial**

GRAIN SIZE ANALYSES

PLATE
B-1



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B- 5	5.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		
⊠	B- 5	20.0	SILTY GRAVEL with SAND (GM)	18	16	2		
▲	B- 5	40.0	SILTY SAND (SM)	NP	NP	NP		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B- 5	5.0	25.40	1.34	0.145		29.9	48.6	21.5	
⊠	B- 5	20.0	50.80	8.85	0.300		48.4	37.8	13.8	
▲	B- 5	40.0	12.70	0.13			8.5	58.1	33.4	

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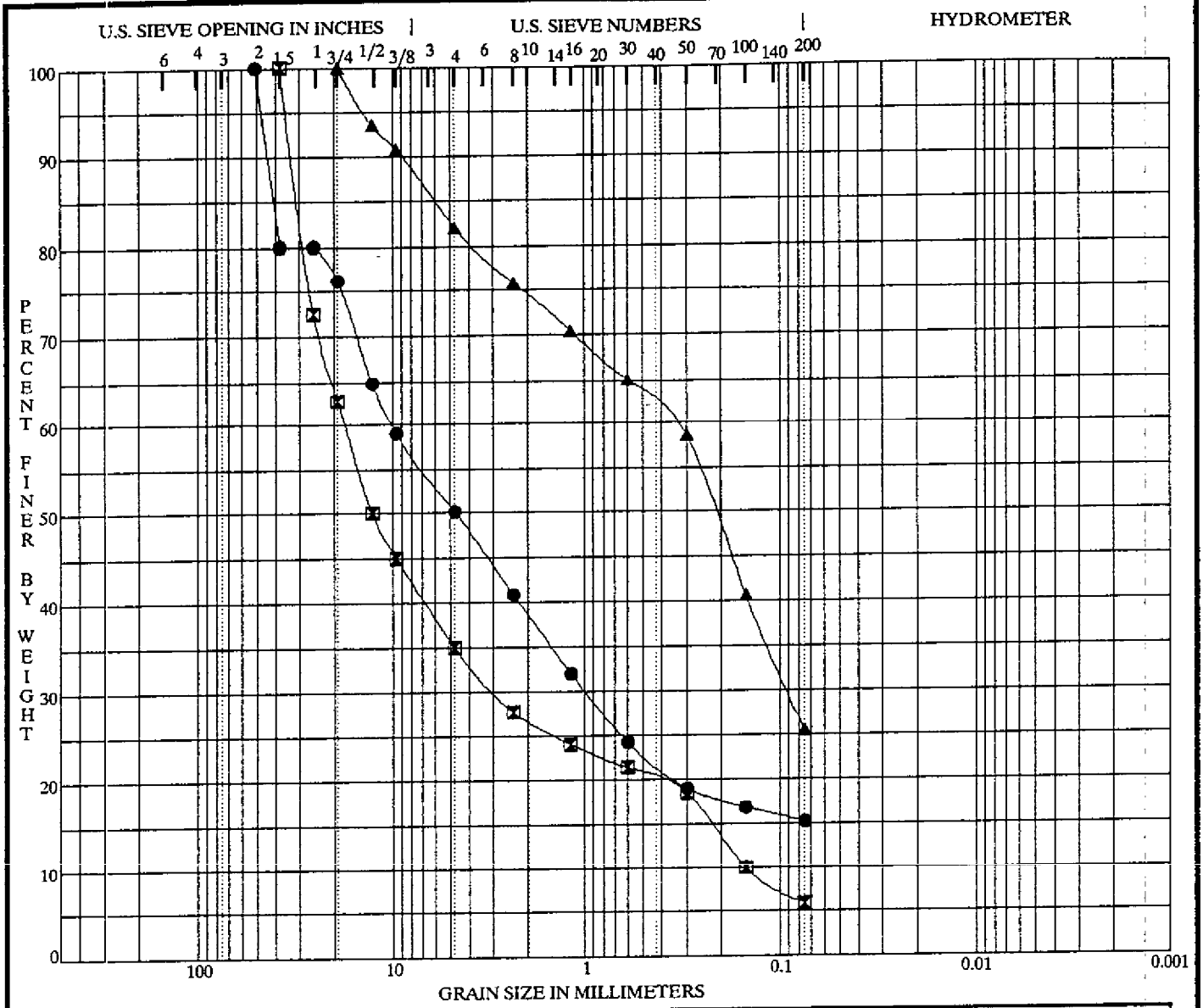
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: **DESERT INN Rd. Super Arterial**

GRAIN SIZE ANALYSES

PLATE
B-2



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B- 5	50.0	SILTY GRAVEL with SAND (GM)	42	27	15		
⊠	B- 7	5.0	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)	NP	NP	NP	3.32	116.5
▲	B- 8	5.0	SILTY SAND with GRAVEL (SM)	17	15	2		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B- 5	50.0	50.80	10.01	0.992		49.9	34.9	15.2	
⊠	B- 7	5.0	38.10	17.47	2.951	0.1500	65.1	29.0	5.9	
▲	B- 8	5.0	19.10	0.35	0.092		18.0	56.5	25.5	

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PROJECT NO. 31-183605

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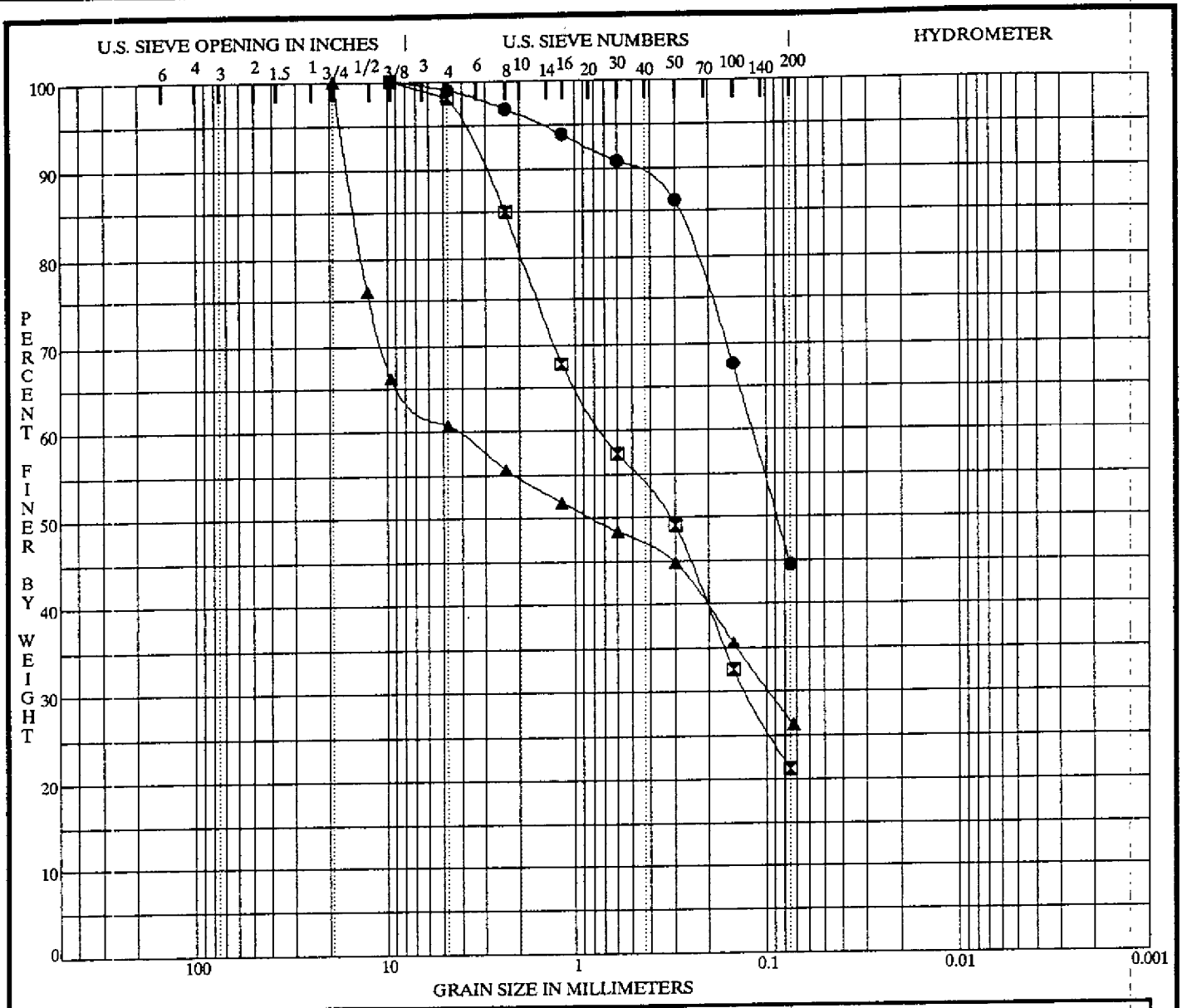
GRAIN SIZE ANALYSES

PLATE
B-3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B- 9	5.0	CLAYEY SAND (SC)	42	18	24		
⊠	B-11	15.0	SILTY SAND (SM)	NP	NP	NP		
▲	B-11	25.0	SILTY SAND (SM)	NP	NP	NP		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B- 9	5.0	9.53	0.12			1.0	54.5	44.5	
⊠	B-11	15.0	9.53	0.71	0.128		1.9	76.9	21.2	
▲	B-11	25.0	19.10	4.31	0.098		39.3	34.1	26.6	

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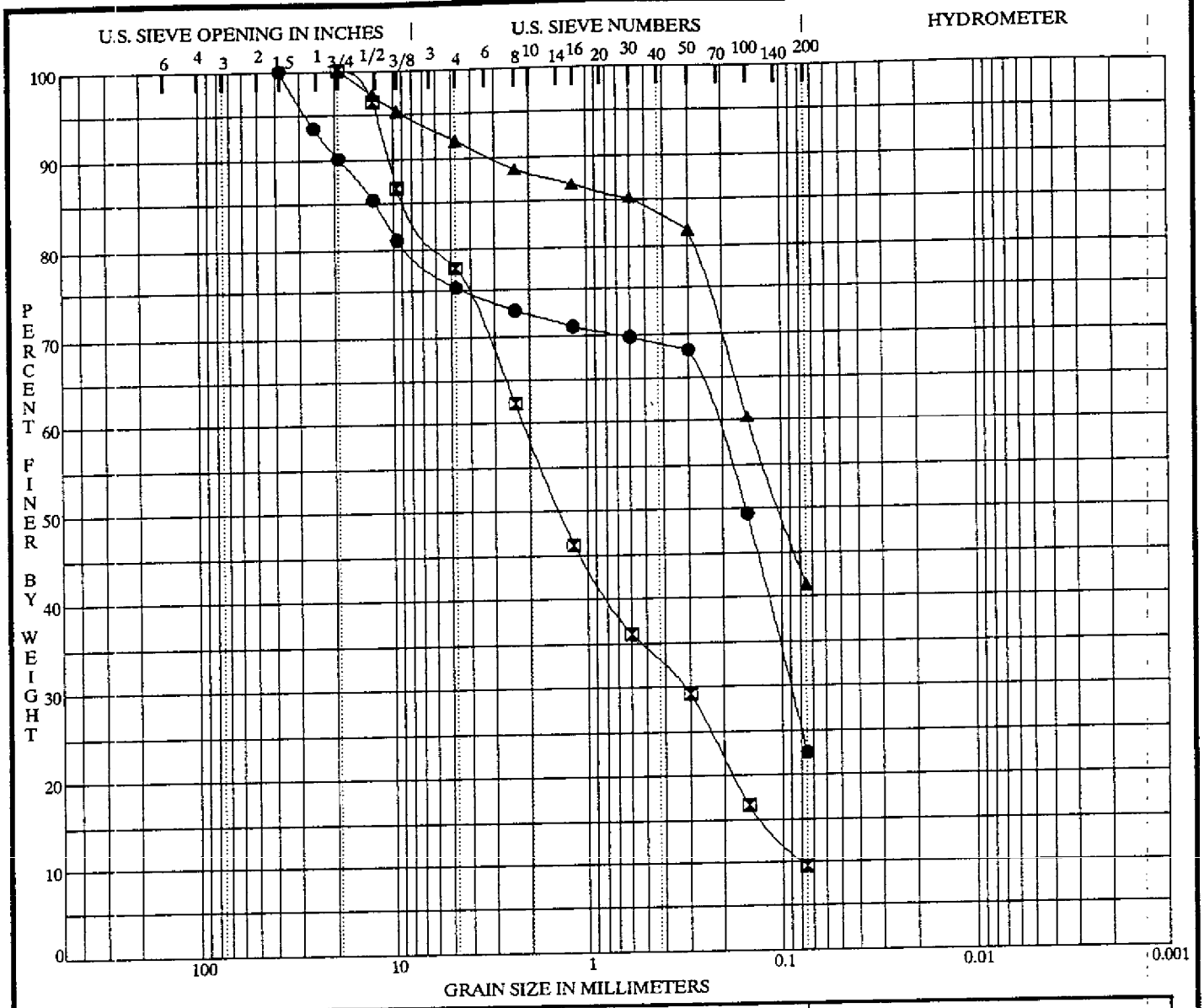
PROJECT: DESERT INN Rd. Super Arterial

GRAIN SIZE ANALYSES

PLATE
B-4



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-11	40.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		
⊠	B-12	11.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.63	27.1
▲	B-12	15.0	SILTY SAND (SM)	43	27	16		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-11	40.0	38.10	0.22	0.091		24.7	52.8	22.5	
⊠	B-12	11.0	19.10	2.14	0.325	0.0788	22.4	68.1	9.5	
▲	B-12	15.0	19.10	0.15			8.1	50.6	41.3	

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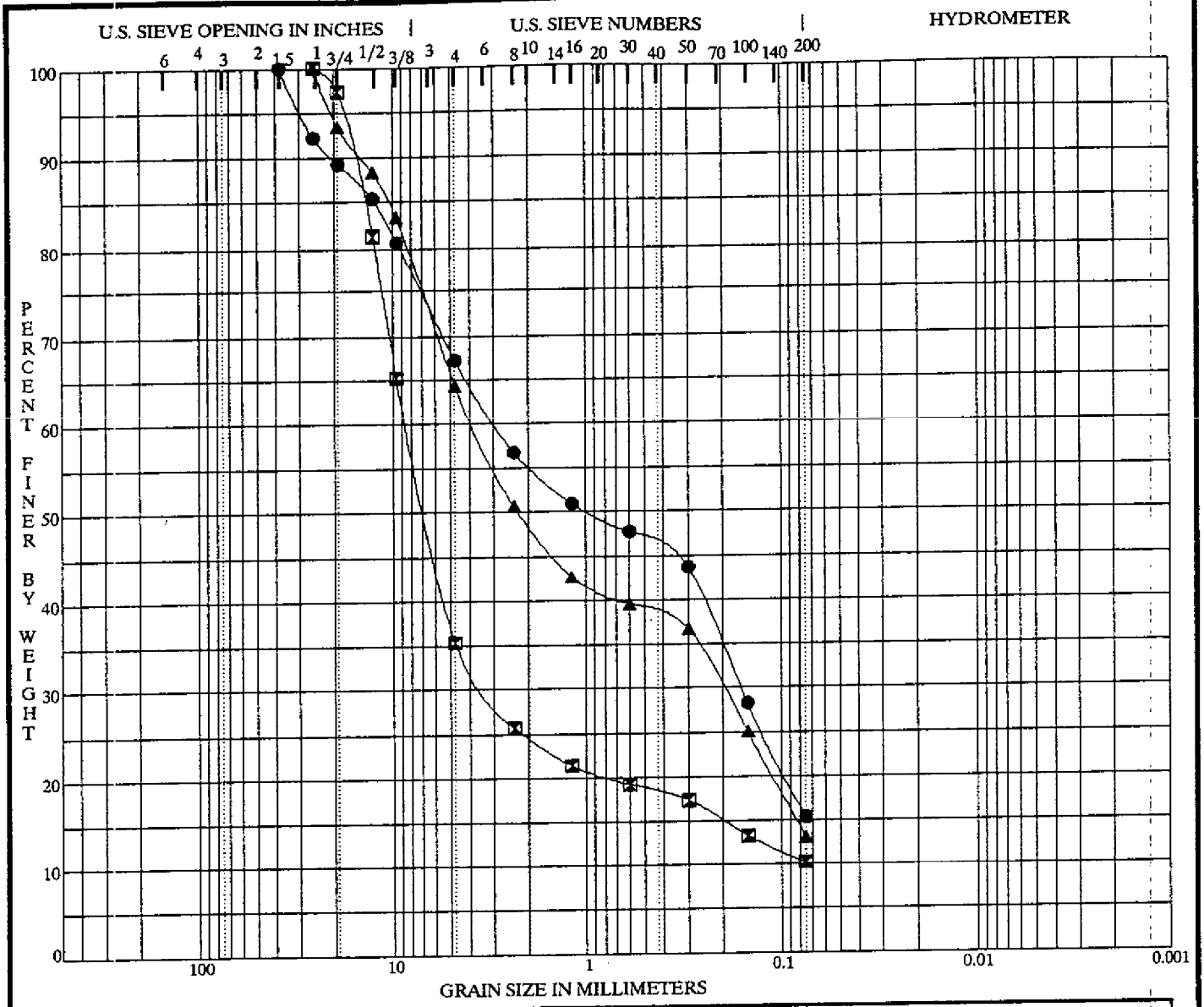
GRAIN SIZE ANALYSES

PLATE
B-5



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-13	10.0	SILTY SAND with GRAVEL (SM)	31	24	7		
⊠	B-14	15.0	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)	NP	NP	NP	17.63	120.6
▲	B-15	20.0	SILTY SAND with GRAVEL (SM)	41	28	13		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-13	10.0	38.10	2.93	0.163		32.8	51.9	15.3	
⊠	B-14	15.0	25.40	8.44	3.228		64.7	25.1	10.2	
▲	B-15	20.0	25.40	3.81	0.201		35.7	51.2	13.1	

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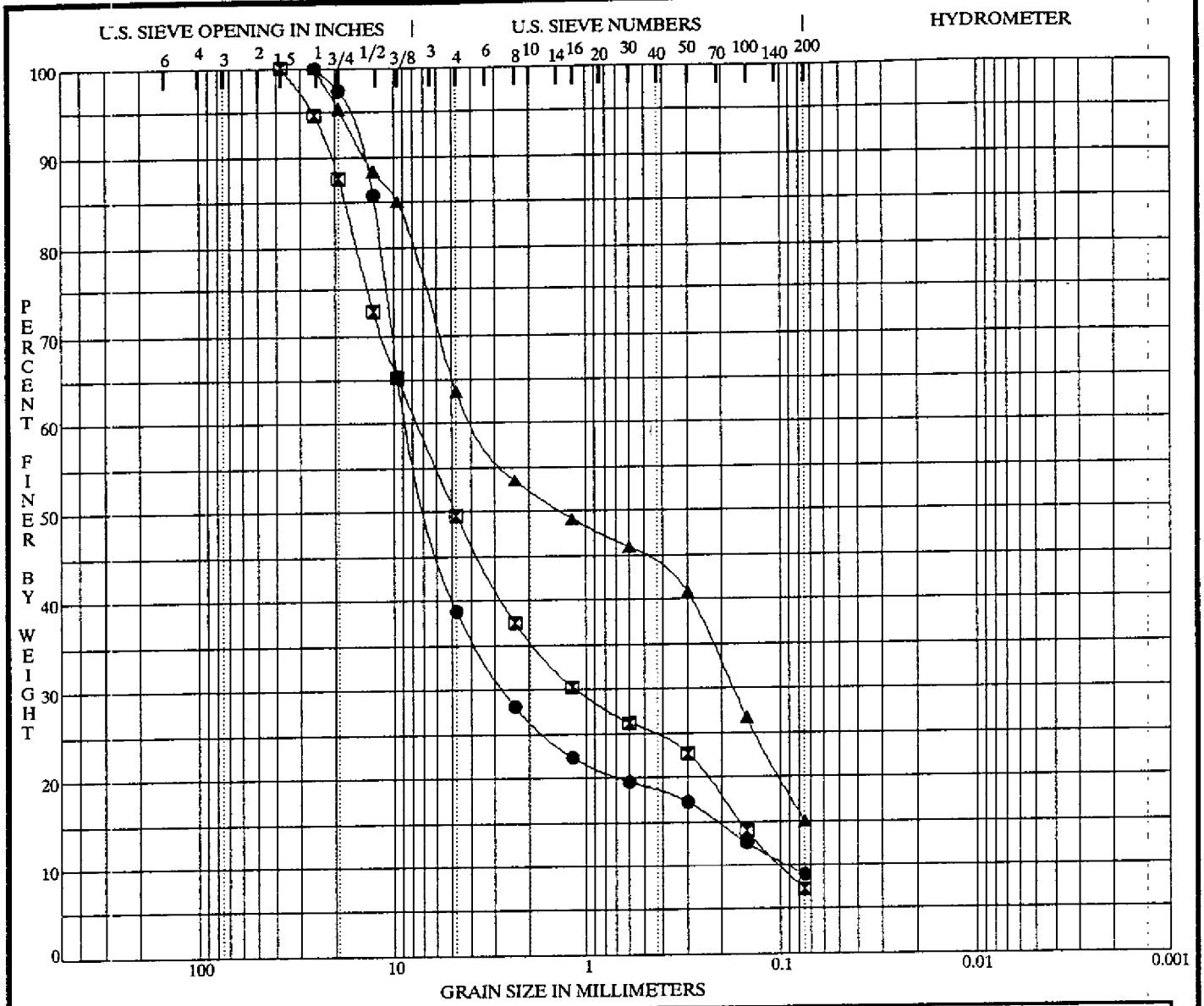
GRAIN SIZE ANALYSES

PLATE **B-6**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-15	50.0	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)	NP	NP	NP	9.36	89.8
⊠	B-16	16.0	WELL GRADED GRAVEL with SILT and SAND (GW-GM)	NP	NP	NP	1.67	75.7
▲	B-17	5.0	SILTY SAND with GRAVEL (SM)	21	19	2		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-15	50.0	25.40	8.27	2.672	0.0922	61.2	29.9	8.9	
⊠	B-16	16.0	38.10	7.56	1.123	0.0998	50.4	42.4	7.2	
▲	B-17	5.0	25.40	3.70	0.176		36.4	48.6	15.0	

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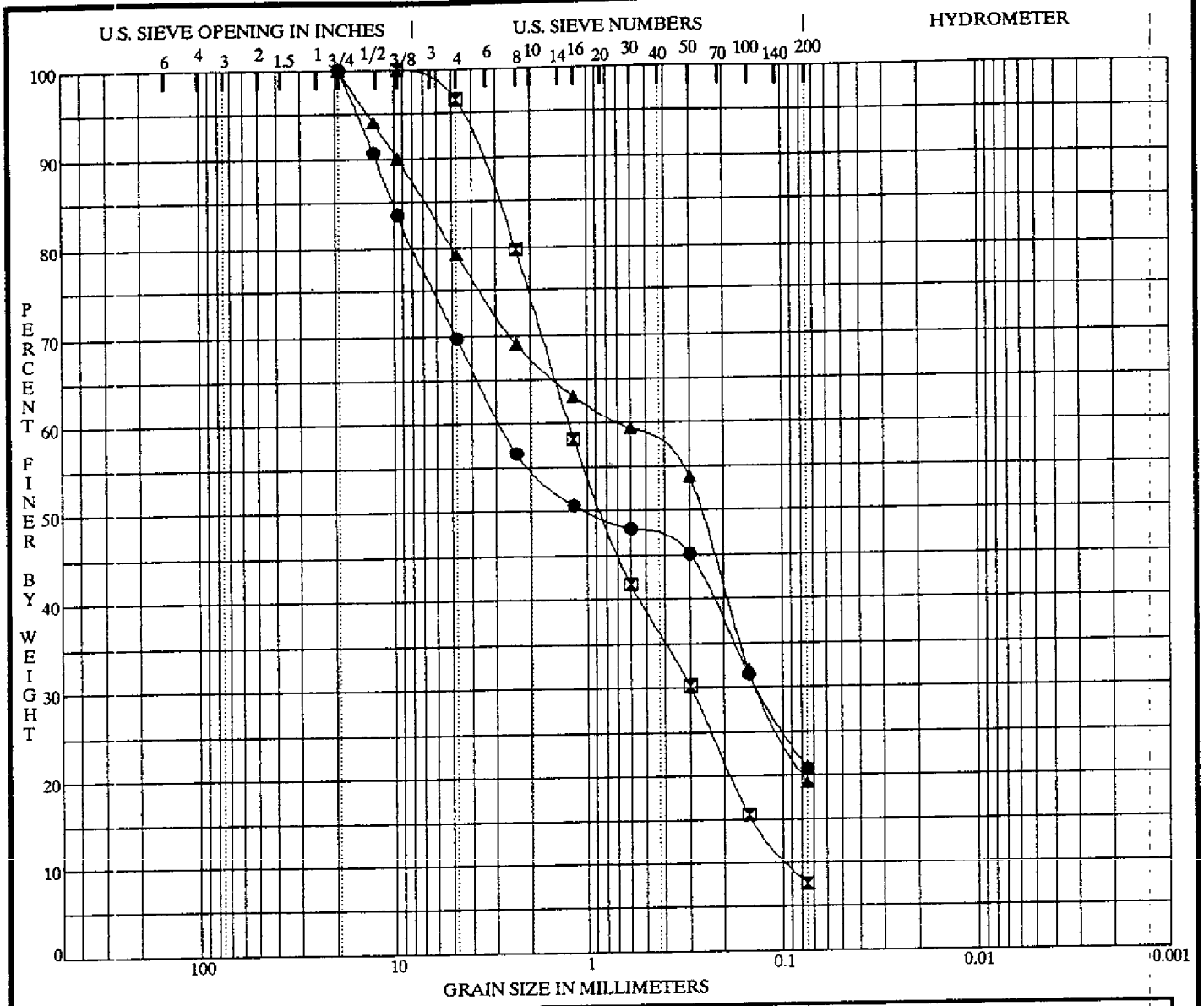
GRAIN SIZE ANALYSES

PLATE **B-7**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-18	15.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		
⊠	B-18	28.0	POORLY GRADED SAND with SILT (SP-SM)	NP	NP	NP	0.76	13.5
▲	B-19	10.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-18	15.0	19.10	2.83	0.136		30.3	48.9	20.8	
⊠	B-18	28.0	9.53	1.25	0.297	0.0926	3.5	88.9	7.6	
▲	B-19	10.0	19.10	0.67	0.135		20.9	59.9	19.2	

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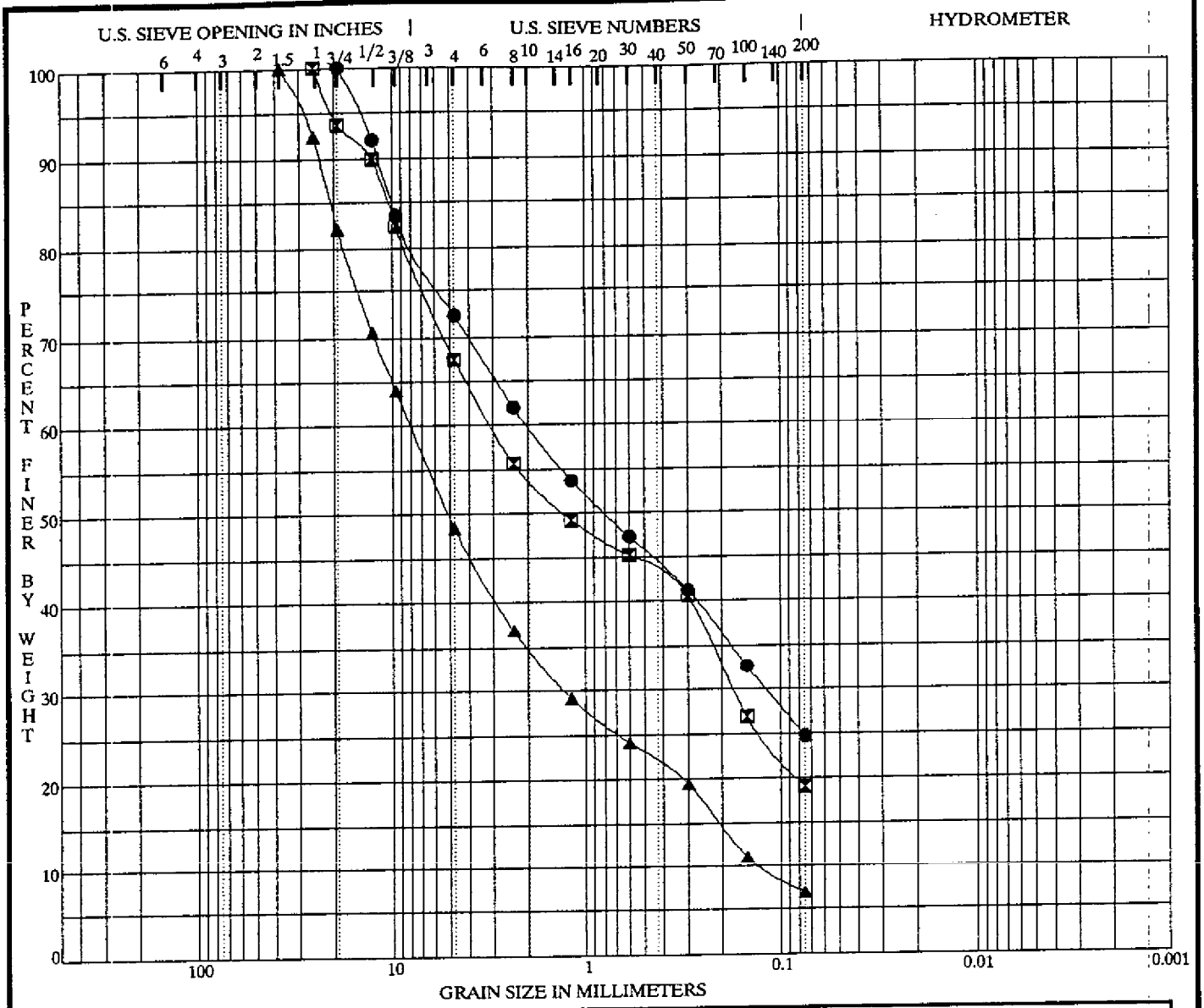
GRAIN SIZE ANALYSES

PLATE
B-8



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-19	49.0	SILTY SAND with GRAVEL (SM)	43	31	12		
⊠	B-21	5.0	SILTY SAND with GRAVEL (SM)	21	18	3		
▲	B-22	10.0	WELL GRADED GRAVEL with SILT and SAND (GW-GM)	NP	NP	NP	1.64	63.7

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-19	49.0	19.10	2.00	0.119		27.7	47.6	24.7	
⊠	B-21	5.0	25.40	3.05	0.176		32.5	48.5	19.0	
▲	B-22	10.0	38.10	7.97	1.278	0.1251	51.6	41.5	6.9	

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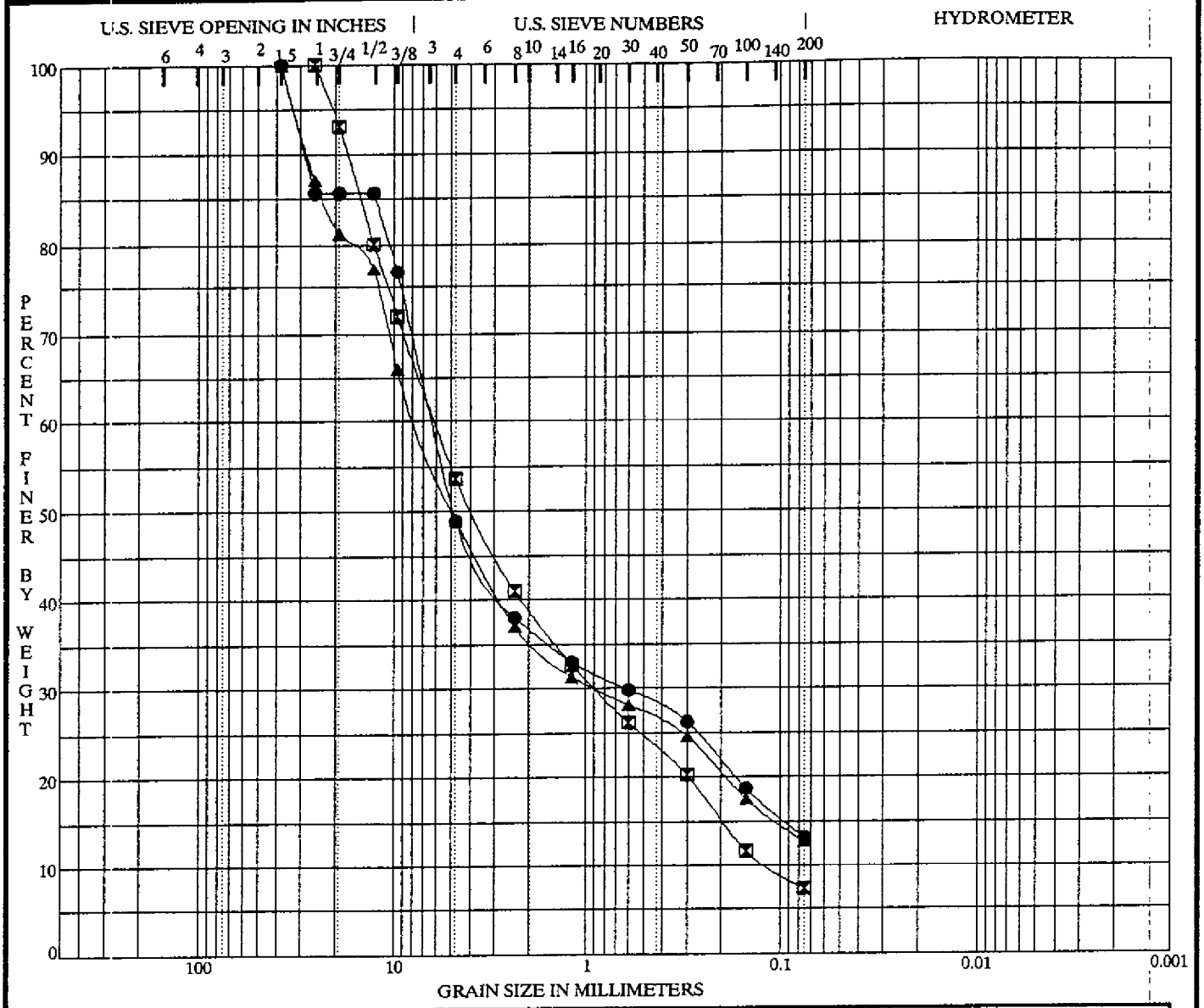
GRAIN SIZE ANALYSES

PLATE
B-9



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
● B-22	15.0	SILTY GRAVEL with SAND (GM)	NP	NP	NP		
⊠ B-23	10.0	WELL GRADED GRAVEL with SILT and SAND (GW-GM)	NP	NP	NP	1.15	52.8
▲ B-25	5.0	SILTY GRAVEL with SAND (GM)	NP	NP	NP		

Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
● B-22	15.0	38.10	6.27	0.626		51.1	35.7	13.2	
⊠ B-23	10.0	25.40	6.06	0.895	0.1148	46.4	46.3	7.3	
▲ B-25	5.0	38.10	7.45	0.897		51.0	36.2	12.8	

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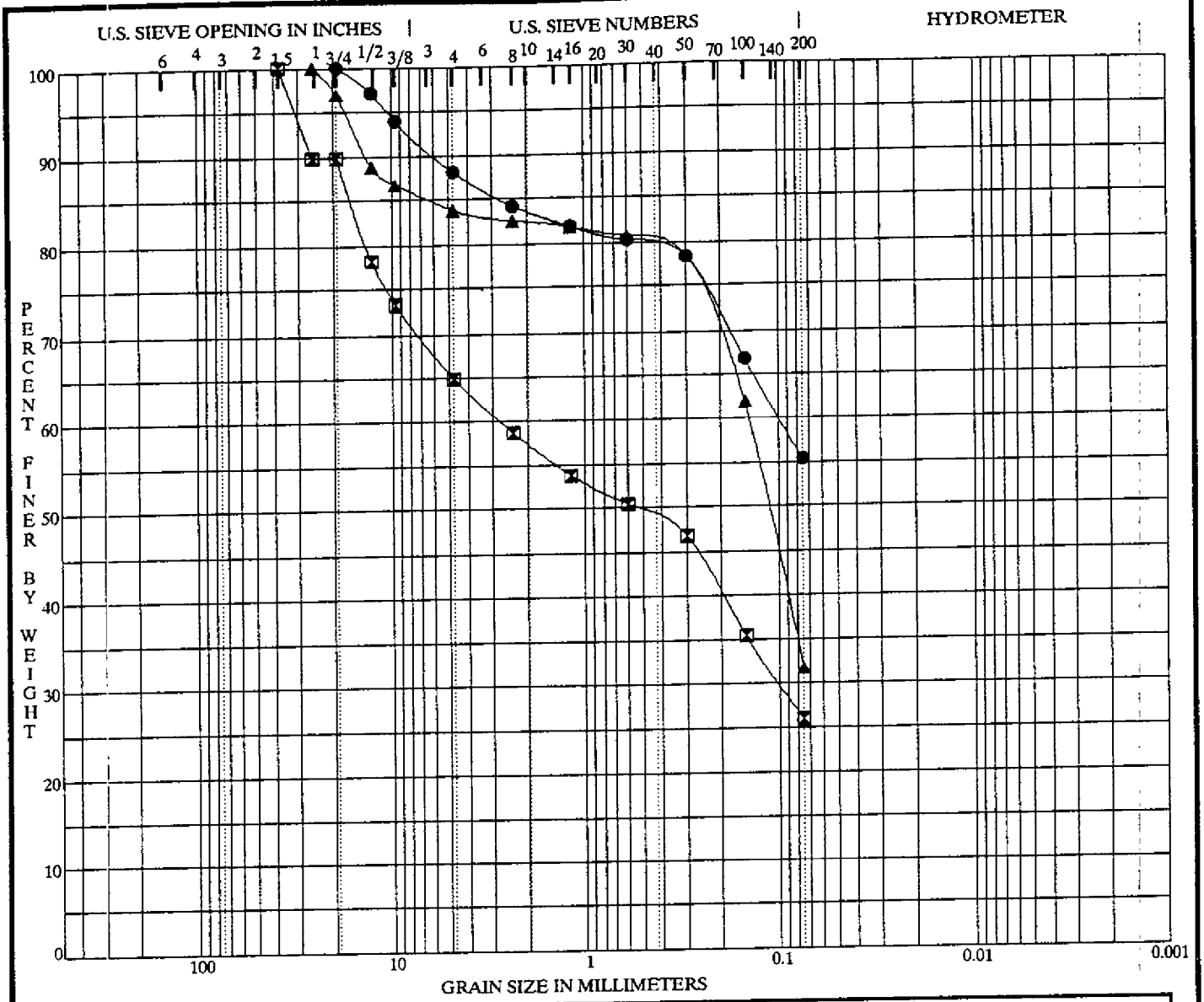
GRAIN SIZE ANALYSES

PLATE
B-10



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-26	5.0	SANDY SILT (ML)	39	26	13		
⊠	B-27	15.0	CLAYEY SAND with GRAVEL (SC)	32	23	9		
▲	B-28	45.0	CLAYEY SAND with GRAVEL (SC)	32	19	13		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-26	5.0	19.10	0.10			11.9	32.7	55.4	
⊠	B-27	15.0	38.10	2.73	0.101		35.1	39.0	25.9	
▲	B-28	45.0	25.40	0.14			16.3	52.0	31.7	

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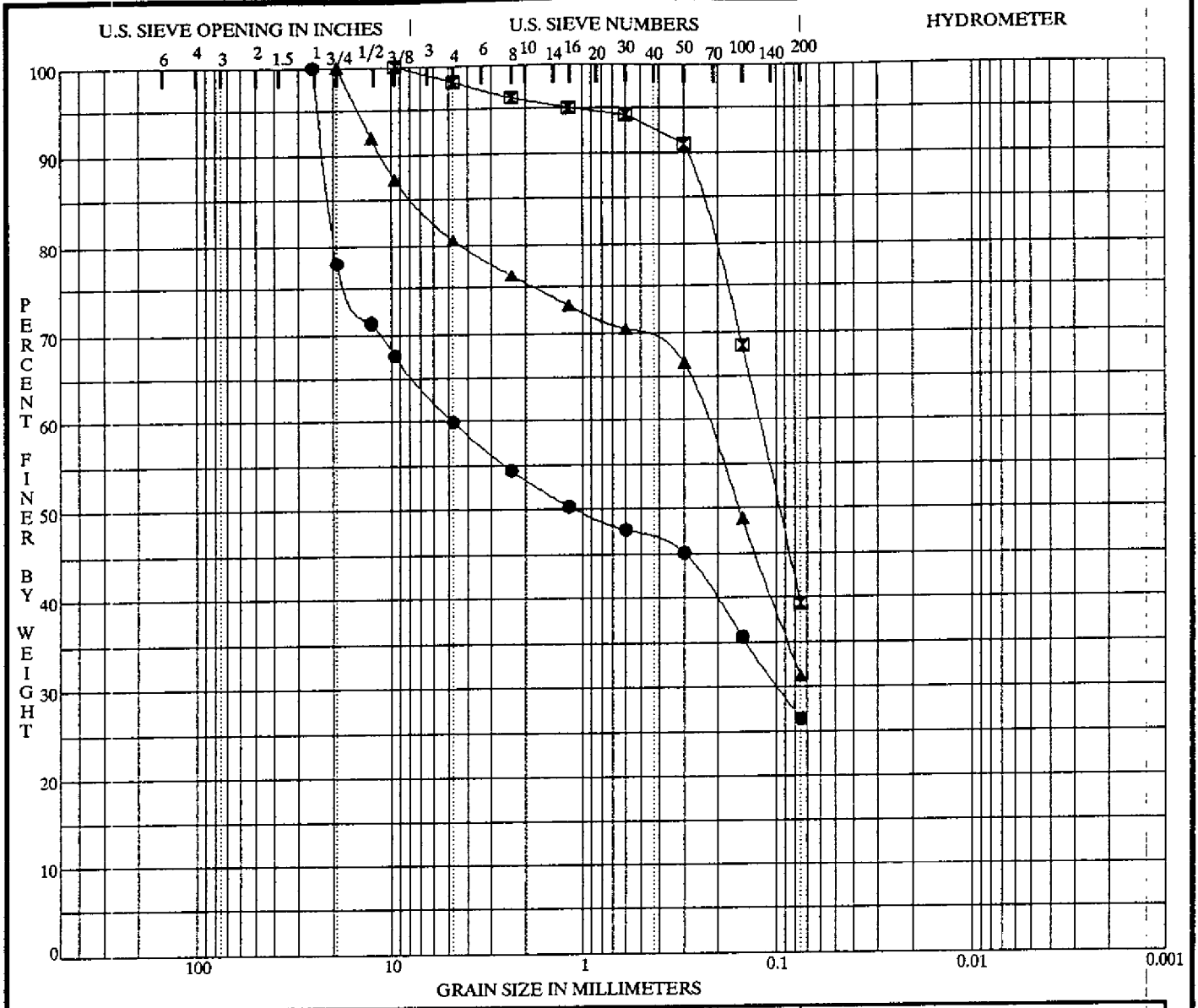
PROJECT: **DESERT INN Rd. Super Arterial**

GRAIN SIZE ANALYSES

PLATE
B-11



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-28	50.0	SILTY GRAVEL with SAND (GM)	46	29	18		
⊠	B-28	55.0	CLAYEY SAND (SC)	47	23	24		
▲	B-29	10.0	CLAYEY SAND with GRAVEL (SC)	37	22	15		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-28	50.0	25.40	4.79	0.098		40.1	33.5	26.4	
⊠	B-28	55.0	9.53	0.12			1.9	58.8	39.3	
▲	B-29	10.0	19.10	0.23			19.5	49.3	31.2	

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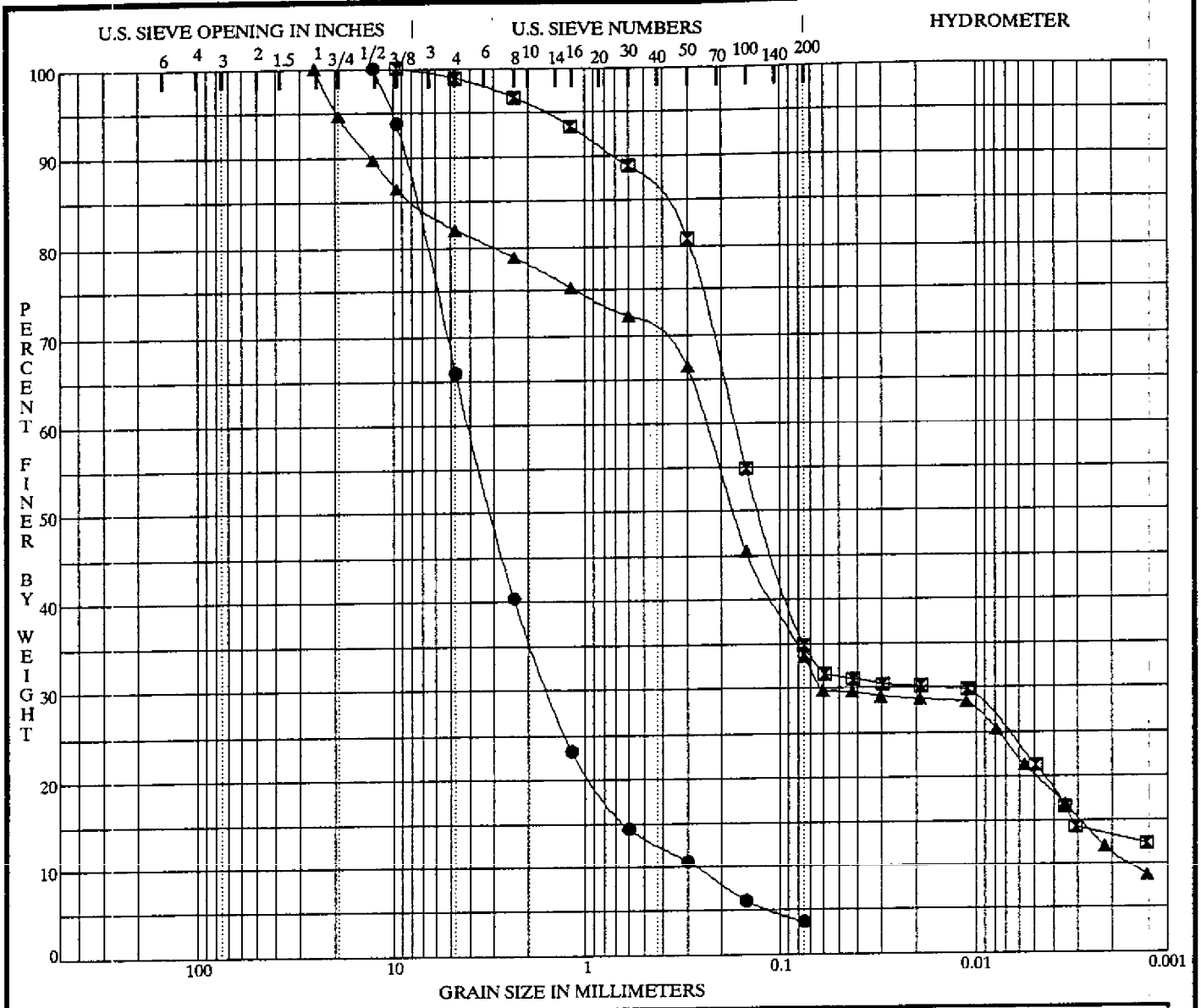
GRAIN SIZE ANALYSES

PLATE
B-12



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-29	19.0	WELL GRADED SAND with GRAVEL (SW)				2.17	14.8
⊠	B-29	20.0	CLAYEY SAND (SC)	62	28	34		
▲	B-29	35.0	CLAYEY SAND with GRAVEL (SC)	27	16	11		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-29	19.0	12.70	4.04	1.548	0.2735	34.1	62.2	3.7	
⊠	B-29	20.0	9.53	0.17	0.015		1.1	64.1	13.5	21.3
▲	B-29	35.0	25.40	0.24	0.062	0.0016	18.0	48.5	13.3	20.2

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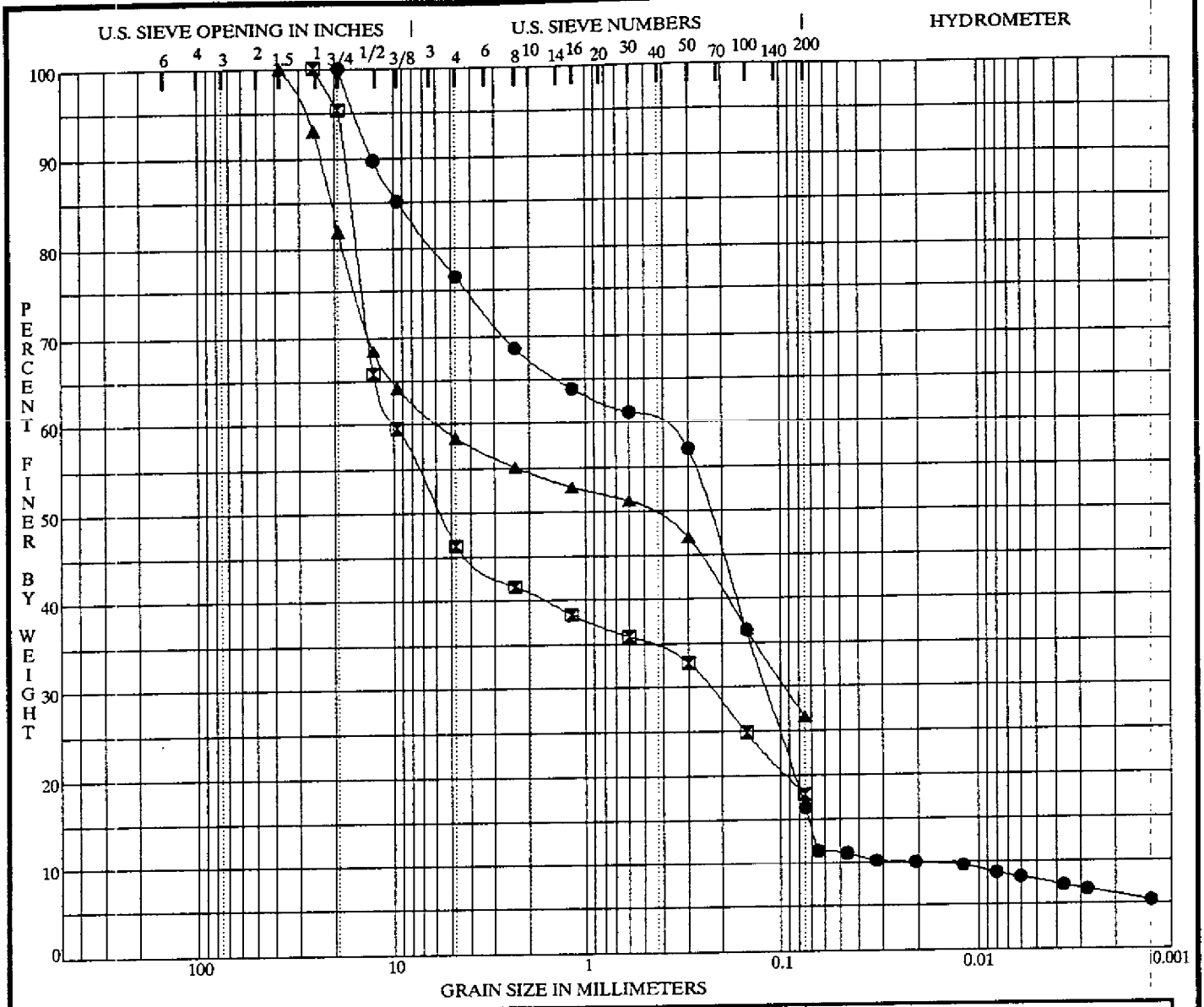
GRAIN SIZE ANALYSES

PLATE
B-13



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-29	40.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		
⊠	B-29	59.0	SILTY GRAVEL with SAND (GM)	NP	NP	NP		
▲	B-31	55.0	CLAYEY GRAVEL with SAND (GC)	88	30	58		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-29	40.0	19.10	0.49	0.120	0.0208	23.5	60.2	8.5	7.8
⊠	B-29	59.0	25.40	9.71	0.235		53.7	28.4	17.9	
▲	B-31	55.0	38.10	5.76	0.095		41.6	31.9	26.5	

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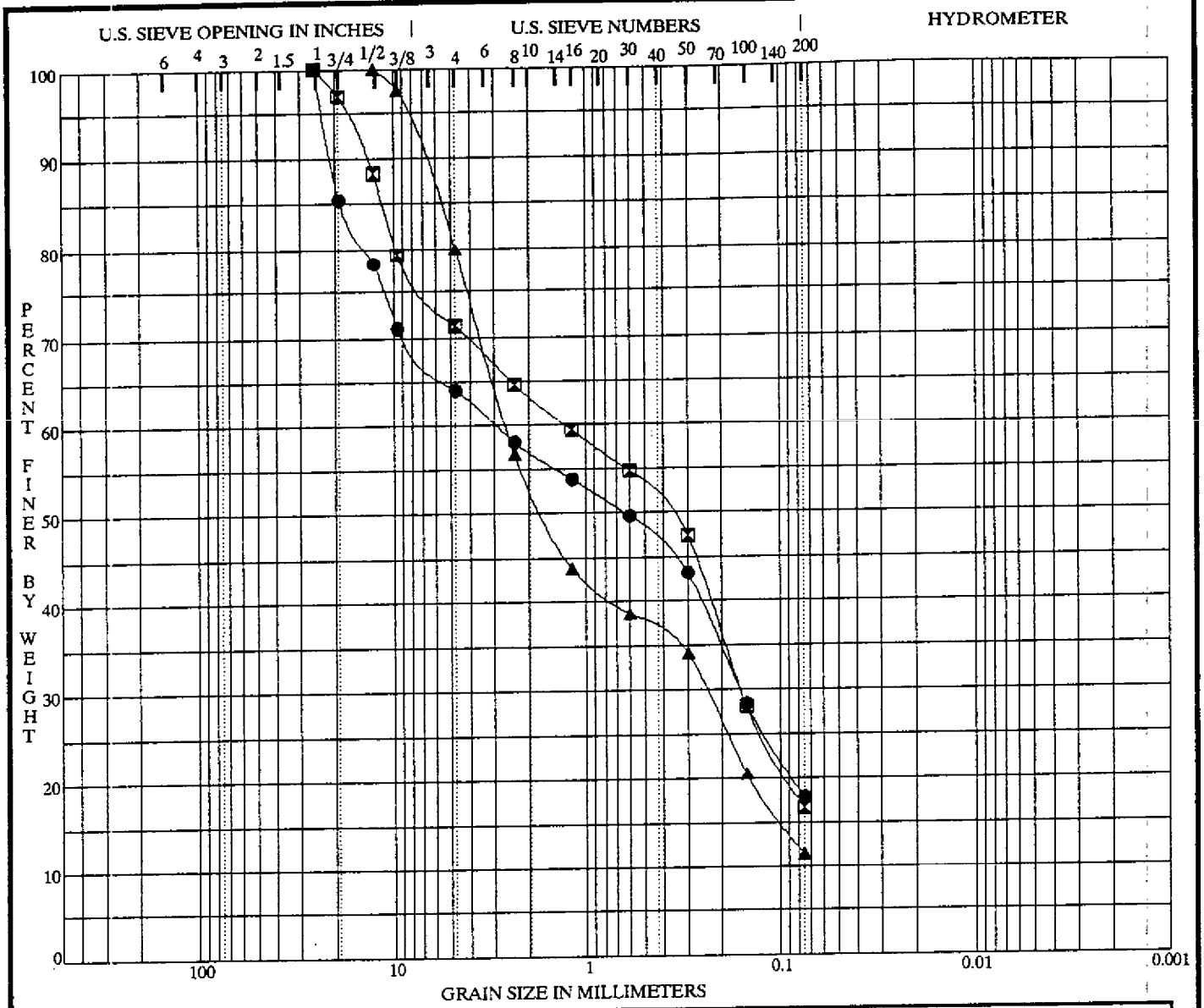
GRAIN SIZE ANALYSES

PLATE
B-14



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-34	5.0	SILTY SAND with GRAVEL (SM)	20	18	2		
⊠	B-37	5.0	SILTY SAND with GRAVEL (SM)	NP	NP	NP		
▲	B-38	13.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.32	37.2

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-34	5.0	25.40	2.96	0.162		36.0	46.2	17.8	
⊠	B-37	5.0	25.40	1.28	0.161		28.8	54.6	16.6	
▲	B-38	13.0	12.70	2.61	0.243		20.1	68.4	11.5	

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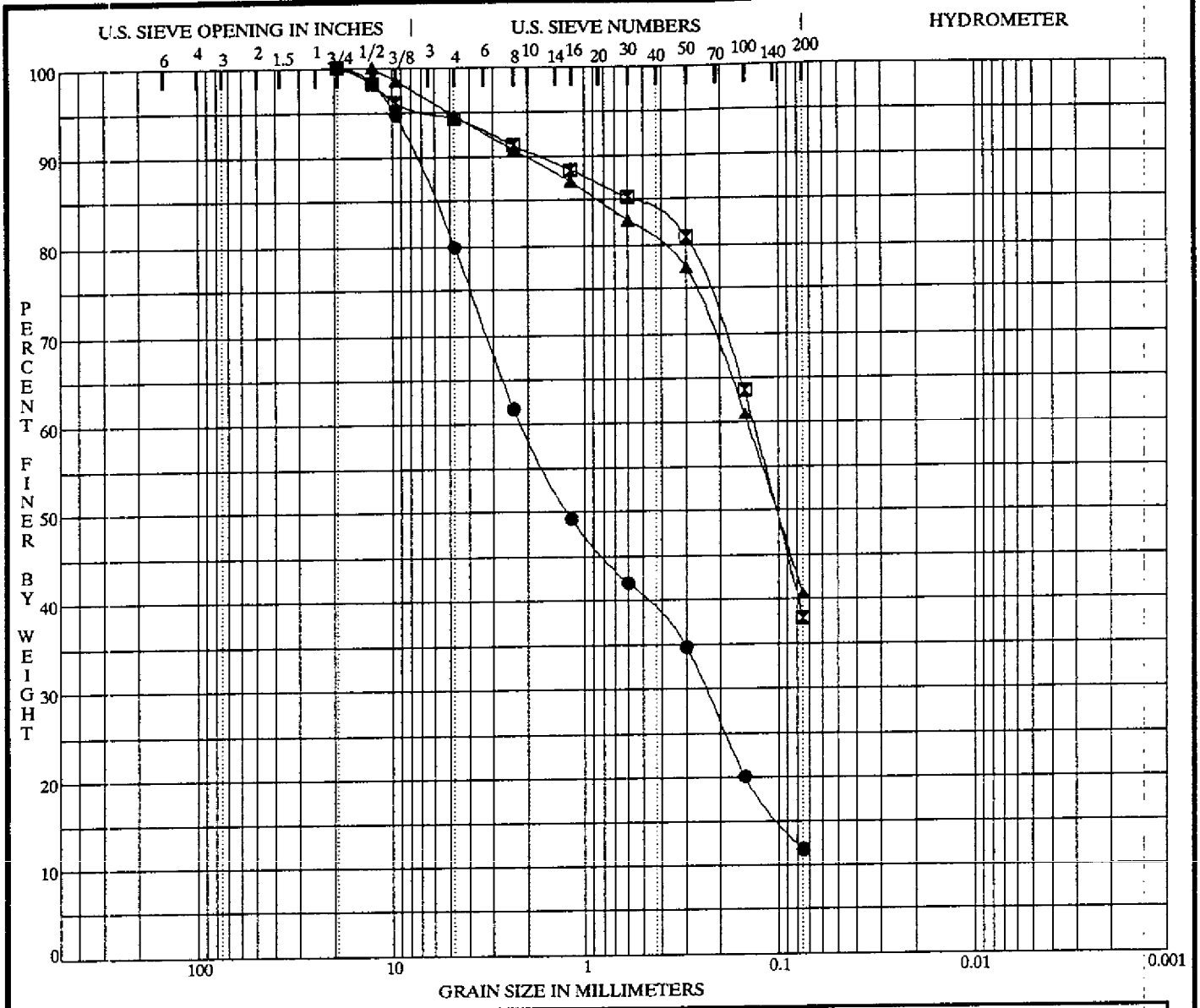
GRAIN SIZE ANALYSES

PLATE
B-15



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-39	18.0	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.38	30.5
⊠	B-40	15.0	CLAYEY SAND (SC)	38	19	19		
▲	B-41	15.0	CLAYEY SAND (SC)	35	18	17		

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-39	18.0	19.10	2.14	0.240		20.1	68.1	11.8	
⊠	B-40	15.0	19.10	0.14			5.7	56.4	37.9	
▲	B-41	15.0	12.70	0.15			5.4	54.0	40.6	

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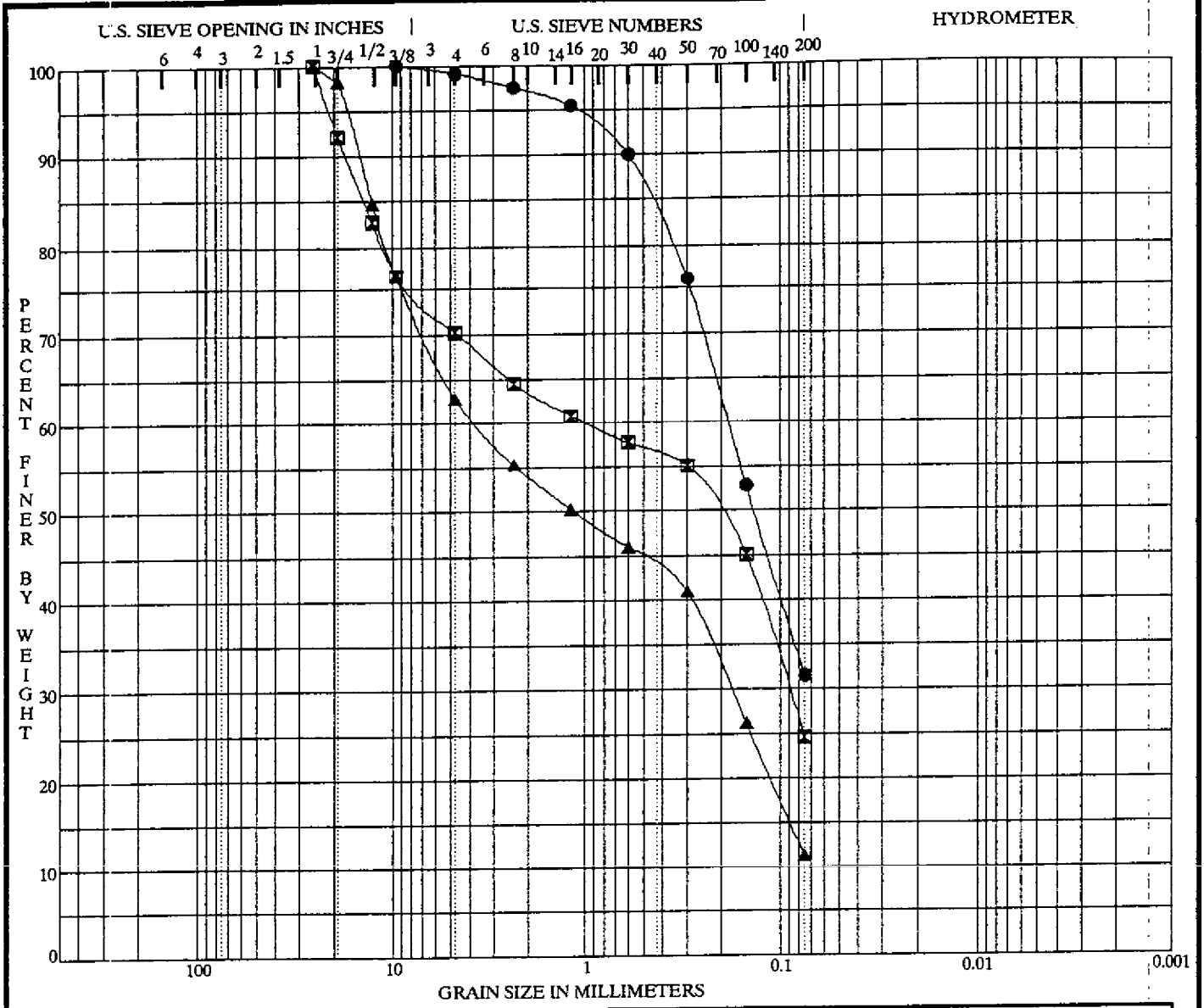
GRAIN SIZE ANALYSES

PLATE
B-16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Exploration No.	Depth(ft)	Classification	LL	PL	PI	Cc	Cu
●	B-42	5.0	CLAYEY SAND (SC)	47	18	30		
⊠	B-44	5.0	CLAYEY SAND with GRAVEL (SC)	32	18	14		
▲	B-45	1.5	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)	NP	NP	NP	0.13	52.3

	Exploration No.	Depth(ft)	D100 (mm)	D60 (mm)	D30 (mm)	D10 (mm)	%Gravel	%Sand	%Silt	%Clay
●	B-42	5.0	9.53	0.19			0.9	67.6	31.5	
⊠	B-44	5.0	25.40	0.99	0.090		29.8	45.6	24.6	
▲	B-45	1.5	25.40	3.66	0.179		37.2	51.5	11.3	

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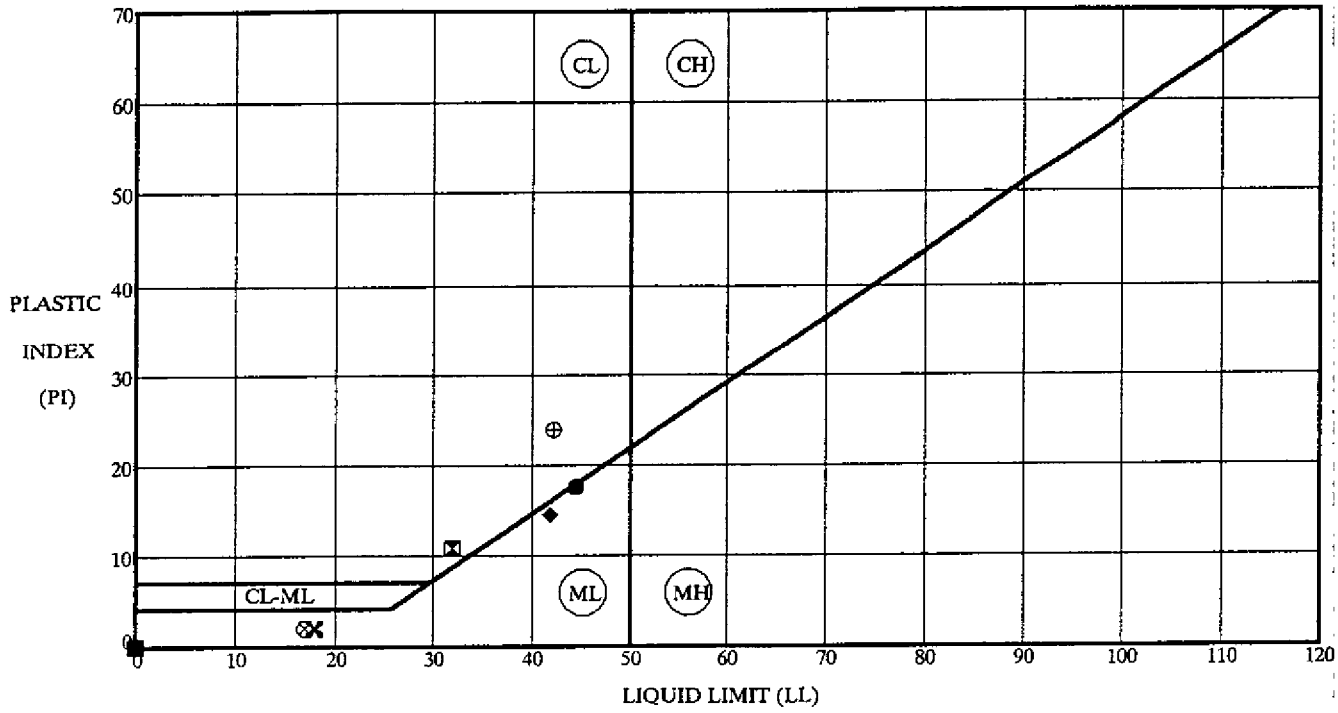
GRAIN SIZE ANALYSES

PLATE
B-17



Exploration No.		Depth(ft)	LL	PL	PI	Fines	Classification
●	B- 3	5.0	45	27	18	36.1	SILTY GRAVEL with SAND (GM)
⊠	B- 3	25.0	32	21	11	19.6	CLAYEY GRAVEL with SAND (GC)
▲	B- 4	10.0	NP	NP	NP	8.1	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)
★	B- 5	5.0	NP	NP	NP	21.5	SILTY SAND with GRAVEL (SM)
✕	B- 5	20.0	18	16	2	13.8	SILTY GRAVEL with SAND (GM)
✪	B- 5	40.0	NP	NP	NP	33.4	SILTY SAND (SM)
◆	B- 5	50.0	42	27	15	15.2	SILTY GRAVEL with SAND (GM)
■	B- 7	5.0	NP	NP	NP	5.9	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)
⊗	B- 8	5.0	17	15	2	25.5	SILTY SAND with GRAVEL (SM)
⊕	B- 9	5.0	42	18	24	44.5	CLAYEY SAND (SC)

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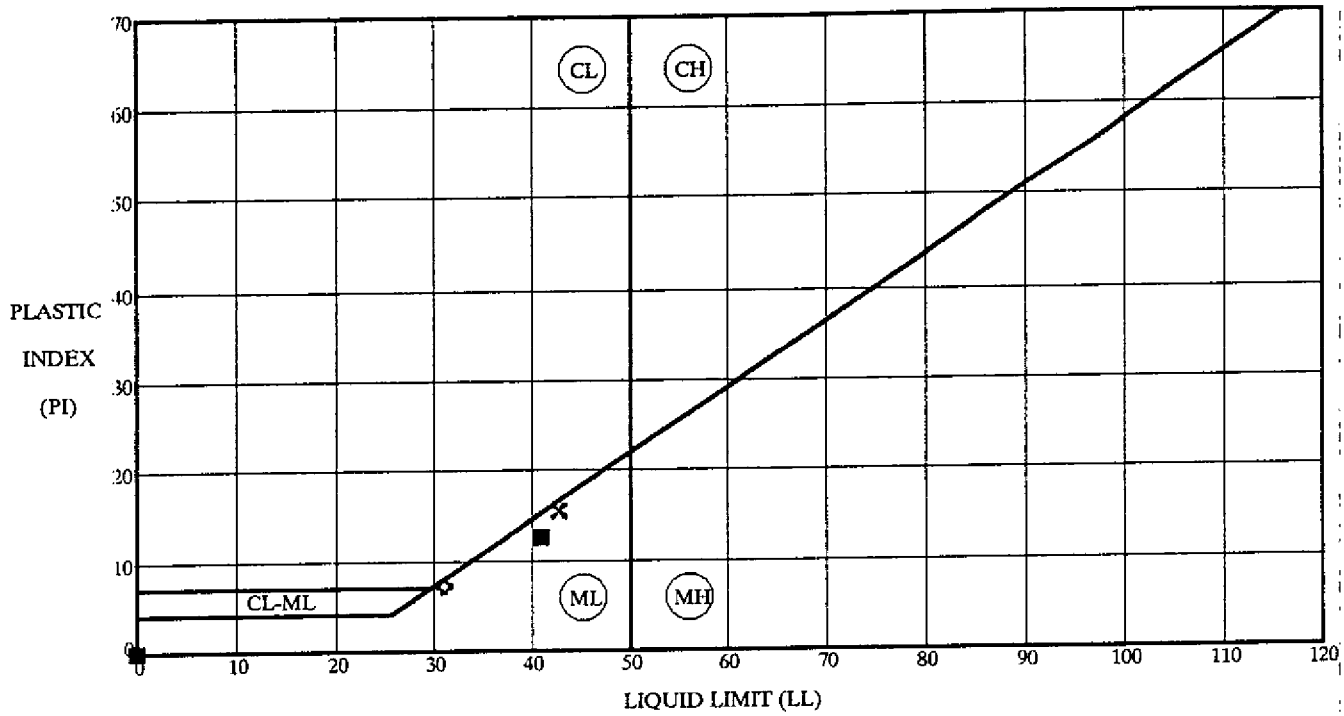
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

ATTERBERG LIMITS TEST RESULTS

PLATE
B-18



Exploration No.		Depth(ft)	LL	PL	PI	Fines	Classification
●	B-11	15.0	NP	NP	NP	21.2	SILTY SAND (SM)
⊠	B-11	25.0	NP	NP	NP		SILTY SAND (SM)
▲	B-11	40.0	NP	NP	NP	22.5	SILTY SAND with GRAVEL (SM)
★	B-12	11.0	NP	NP	NP	9.5	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)
✕	B-12	15.0	43	27	16	41.3	SILTY SAND (SM)
✿	B-13	10.0	31	24	7	15.3	SILTY SAND with GRAVEL (SM)
◆	B-14	15.0	NP	NP	NP	10.2	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)
■	B-15	20.0	41	28	13	13.1	SILTY SAND with GRAVEL (SM)
⊗	B-15	50.0	NP	NP	NP	8.9	POORLY GRADED GRAVEL with SILT and SAND (GP-GM)
⊕	B-16	16.0	NP	NP	NP	7.2	WELL GRADED GRAVEL with SILT and SAND (GW-GM)

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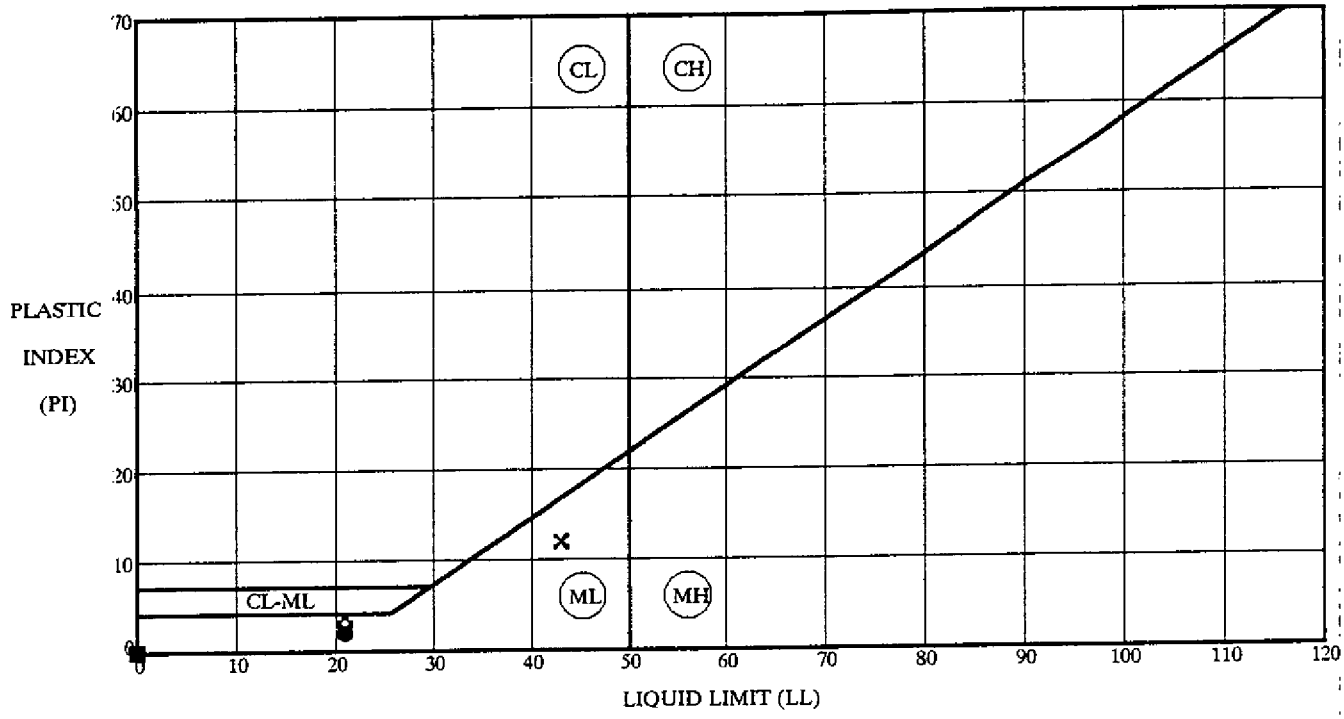
SOILS AND MATERIALS TESTING

PROJECT NO. 31-183605

PROJECT: **DESERT INN Rd. Super Arterial**

ATTERBERG LIMITS TEST RESULTS

PLATE
B-19



Exploration No.		Depth(ft)	LL	PL	PI	Fines	Classification
●	B-17	5.0	21	19	2	15.0	SILTY SAND with GRAVEL (SM)
⊠	B-18	15.0	NP	NP	NP	20.8	SILTY SAND with GRAVEL (SM)
▲	B-18	28.0	NP	NP	NP	7.6	POORLY GRADED SAND with SILT (SP-SM)
★	B-19	10.0	NP	NP	NP	19.2	SILTY SAND with GRAVEL (SM)
✕	B-19	49.0	43	31	12	24.7	SILTY SAND with GRAVEL (SM)
✪	B-21	5.0	21	18	3	19.0	SILTY SAND with GRAVEL (SM)
◆	B-22	10.0	NP	NP	NP	6.9	WELL GRADED GRAVEL with SILT and SAND (GW-GM)
■	B-22	15.0	NP	NP	NP	13.2	SILTY GRAVEL with SAND (GM)
⊗	B-23	10.0	NP	NP	NP	7.3	WELL GRADED GRAVEL with SILT and SAND (GW-GM)
⊕	B-25	5.0	NP	NP	NP	12.8	SILTY GRAVEL with SAND (GM)

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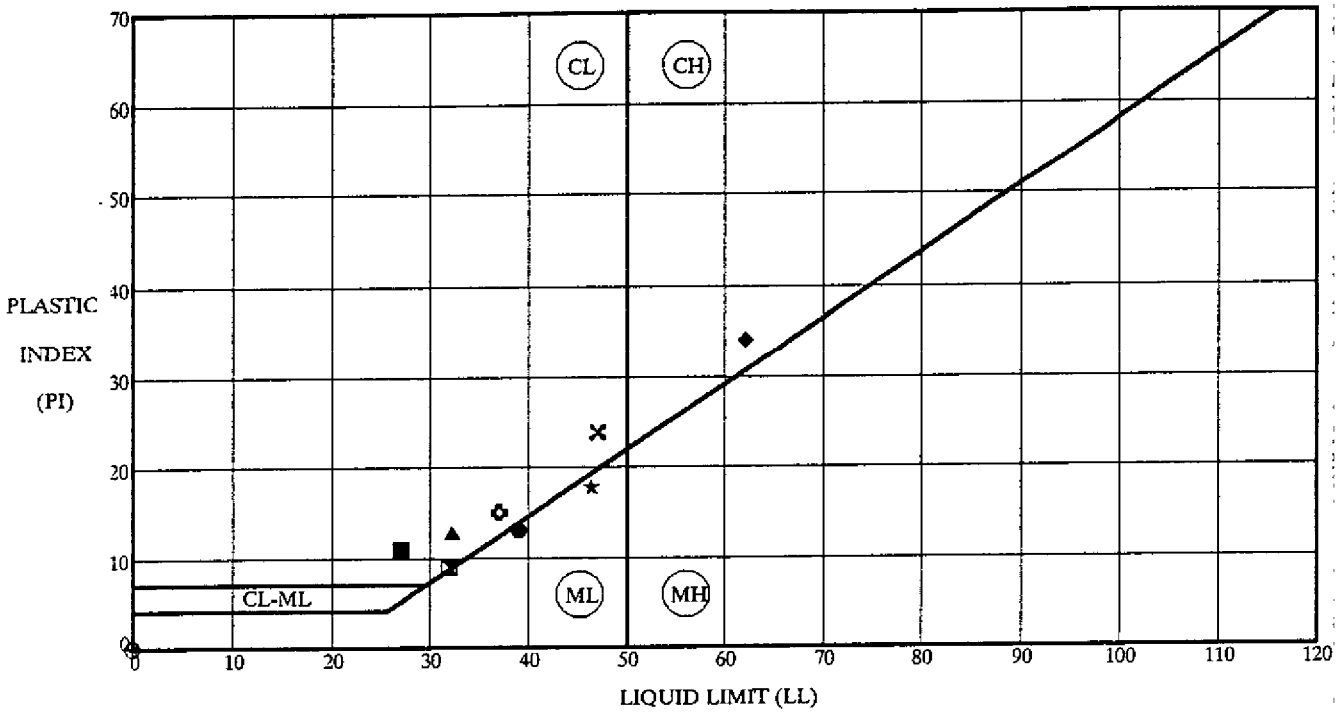
ATTERBERG LIMITS TEST RESULTS

PLATE
B-20



Exploration No.		Depth(ft)	LL	PL	PI	Fines	Classification
●	B-26	5.0	39	26	13	55.4	SANDY SILT (ML)
⊠	B-27	15.0	32	23	9	25.9	CLAYEY SAND with GRAVEL (SC)
▲	B-28	45.0	32	19	13	31.7	CLAYEY SAND with GRAVEL (SC)
★	B-28	50.0	46	29	18	26.4	SILTY GRAVEL with SAND (GM)
✕	B-28	55.0	47	23	24	39.3	CLAYEY SAND (SC)
✿	B-29	10.0	37	22	15	31.2	CLAYEY SAND with GRAVEL (SC)
◆	B-29	20.0	62	28	34	34.8	CLAYEY SAND (SC)
■	B-29	35.0	27	16	11	33.5	CLAYEY SAND with GRAVEL (SC)
⊗	B-29	40.0	NP	NP	NP	16.3	SILTY SAND with GRAVEL (SM)
⊕	B-29	59.0	NP	NP	NP	17.9	SILTY GRAVEL with SAND (GM)

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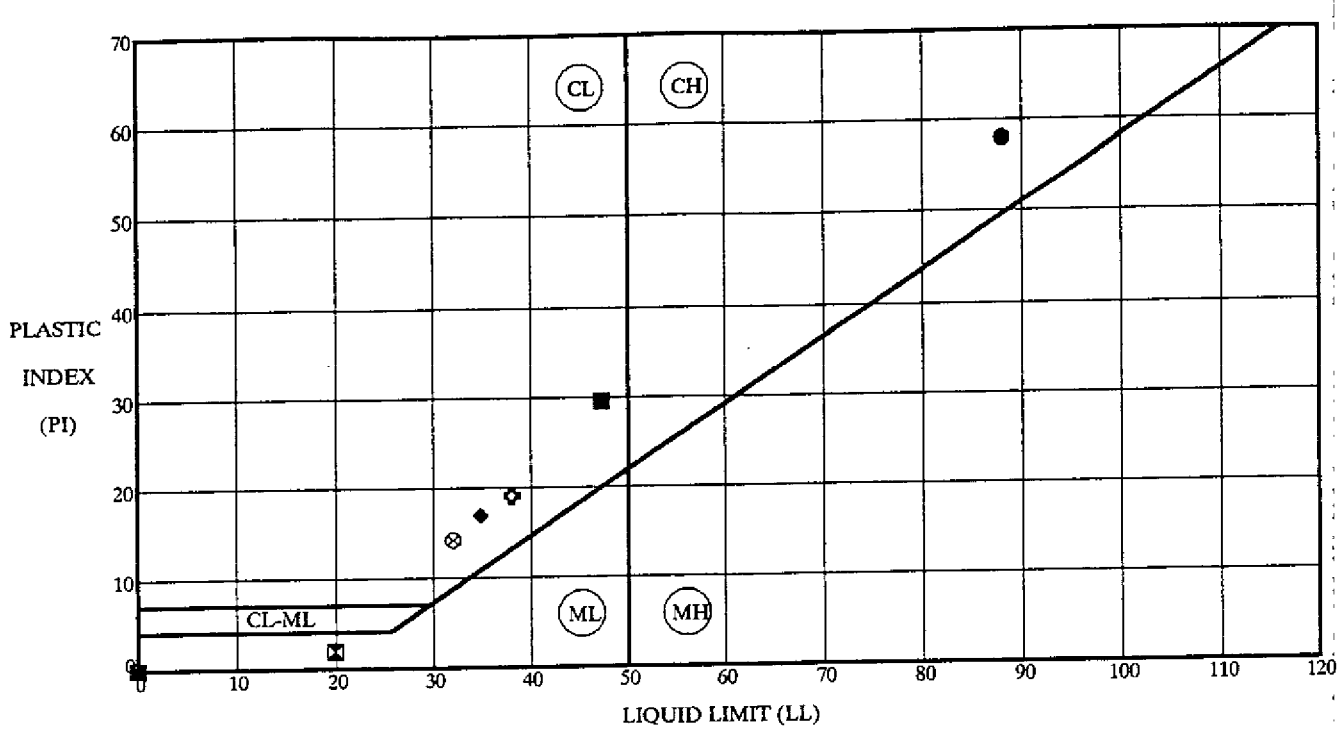
PROJECT: **DESERT INN Rd. Super Arterial**

ATTERBERG LIMITS TEST RESULTS

PLATE
B-21



Exploration No.		Depth(ft)	LL	PL	PI	Fines	Classification
●	B-31	55.0	88	30	58	26.5	CLAYEY GRAVEL with SAND (GC)
⊠	B-34	5.0	20	18	2	17.8	SILTY SAND with GRAVEL (SM)
▲	B-37	5.0	NP	NP	NP	16.6	SILTY SAND with GRAVEL (SM)
★	B-38	13.0	NP	NP	NP	11.5	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)
✕	B-39	18.0	NP	NP	NP	11.8	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)
✿	B-40	15.0	38	19	19	37.9	CLAYEY SAND (SC)
◆	B-41	15.0	35	18	17	40.6	CLAYEY SAND (SC)
■	B-42	5.0	47	18	30	31.5	CLAYEY SAND (SC)
⊗	B-44	5.0	32	18	14	24.6	CLAYEY SAND with GRAVEL (SC)
⊕	B-45	1.5	NP	NP	NP	11.3	POORLY GRADED SAND with SILT and GRAVEL (SP-SM)

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SOILS AND MATERIALS TESTING

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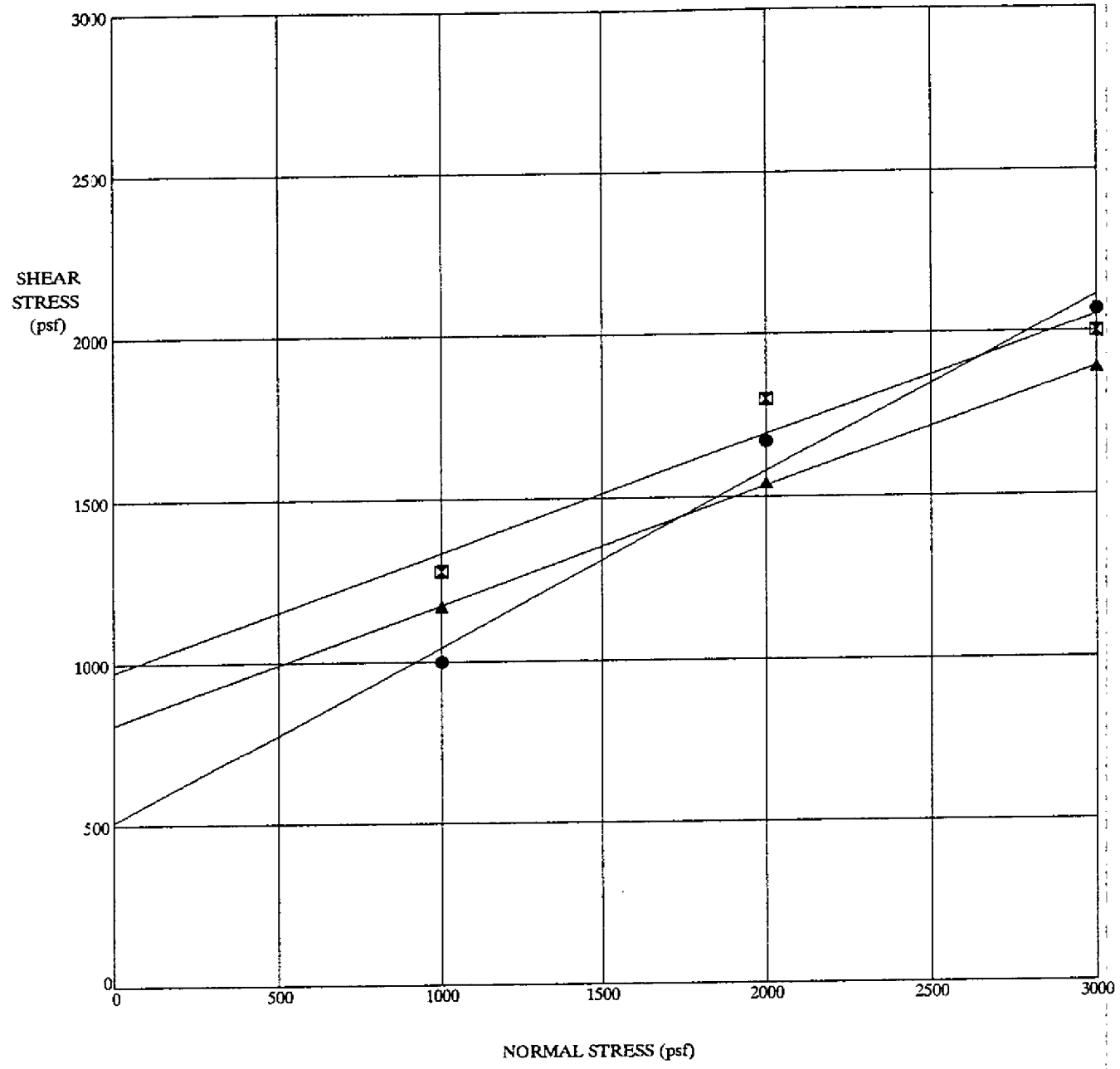
PROJECT: DESERT INN Rd. Super Arterial

ATTERBERG LIMITS TEST RESULTS

PLATE
B-22



Exploration No.	Depth (ft.)	Soil Description	PHI Angle Degrees	Cohesion (psf)
● B- 5	35.0	SILTY, CLAYEY SAND (SC-SM)	28	510
⊠ B-12	45.0	SANDY CLAY (CL)	20	973
▲ B-13	35.0	CLAYEY SAND (SC)	20	813

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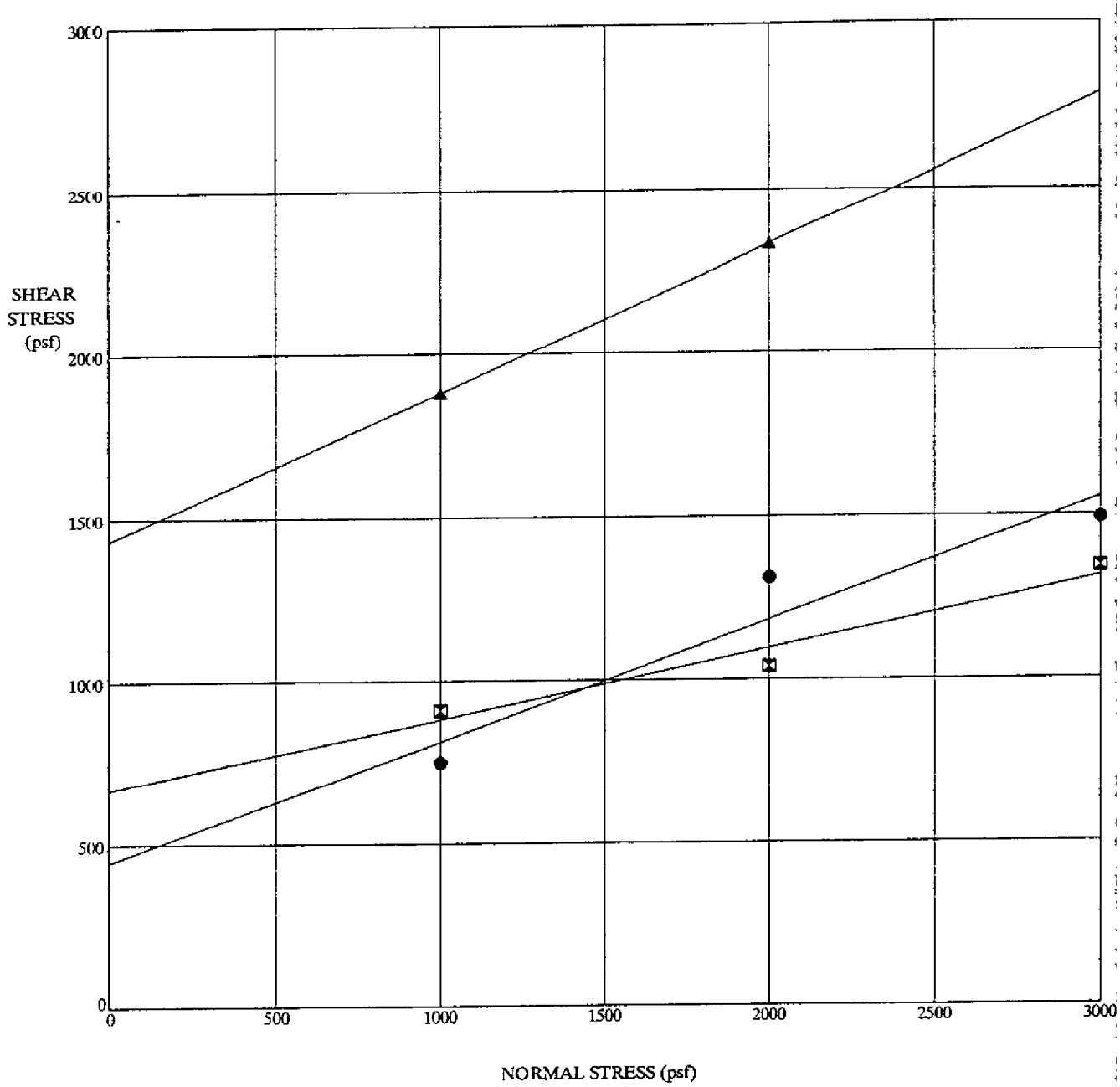
PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

DIRECT SHEAR TEST RESULTS

PLATE
B-23



Exploration No.		Depth (ft.)	Soil Description	PHI Angle Degrees	Cohesion (psf)
●	B-13	40.0	SILTY SAND (SM)	20	443
⊠	B-14	40.0	SANDY CLAY (CL)	12	667
▲	B-15	25.0	SILTY SAND (SM)	30	1263

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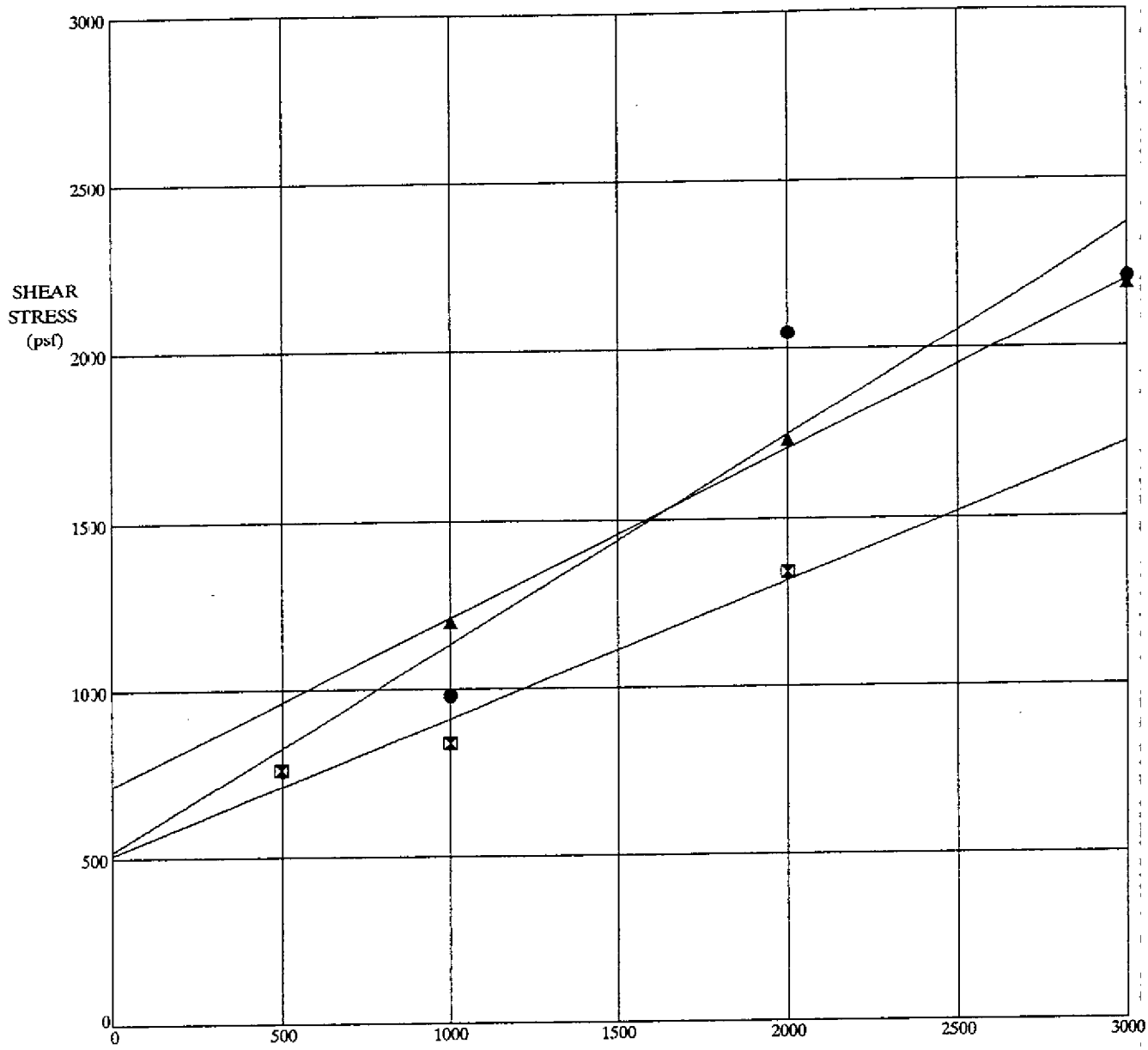
DIRECT SHEAR TEST RESULTS

PLATE
B-24



Exploration No.	Depth (ft.)	Soil Description	PHI Angle Degrees	Cohesion (psf)
● B-19	50.0	SILTY, CLAYEY SAND (SC-SM)	32	517
⊠ B-21	10.0	SILTY, CLAYEY GRAVEL (GC-GM)	22	510
▲ B-27	15.0	SILTY SAND (SM)	26	717

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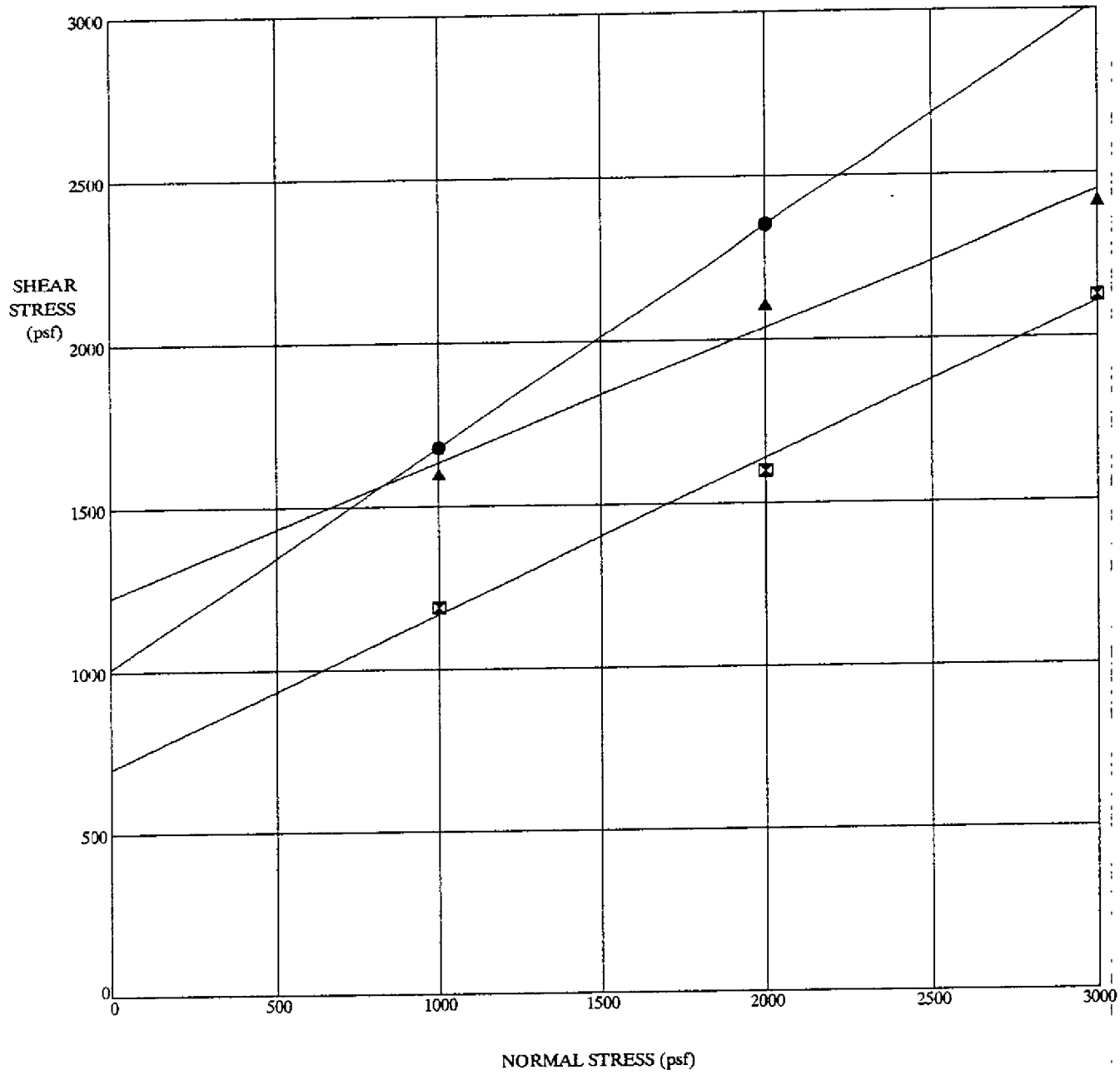
PROJECT: **DESERT INN Rd. Super Arterial**

DIRECT SHEAR TEST RESULTS

PLATE
B-25



Exploration No.		Depth (ft.)	Soil Description	PHI Angle Degrees	Cohesion (psf)
●	B-28	20.0	SILTY SAND (SM)	35	983
⊠	B-28	40.0	SANDY CLAY (CL)	25	700
▲	B-41	20.0	CLAYEY SAND (SC)	22	1230

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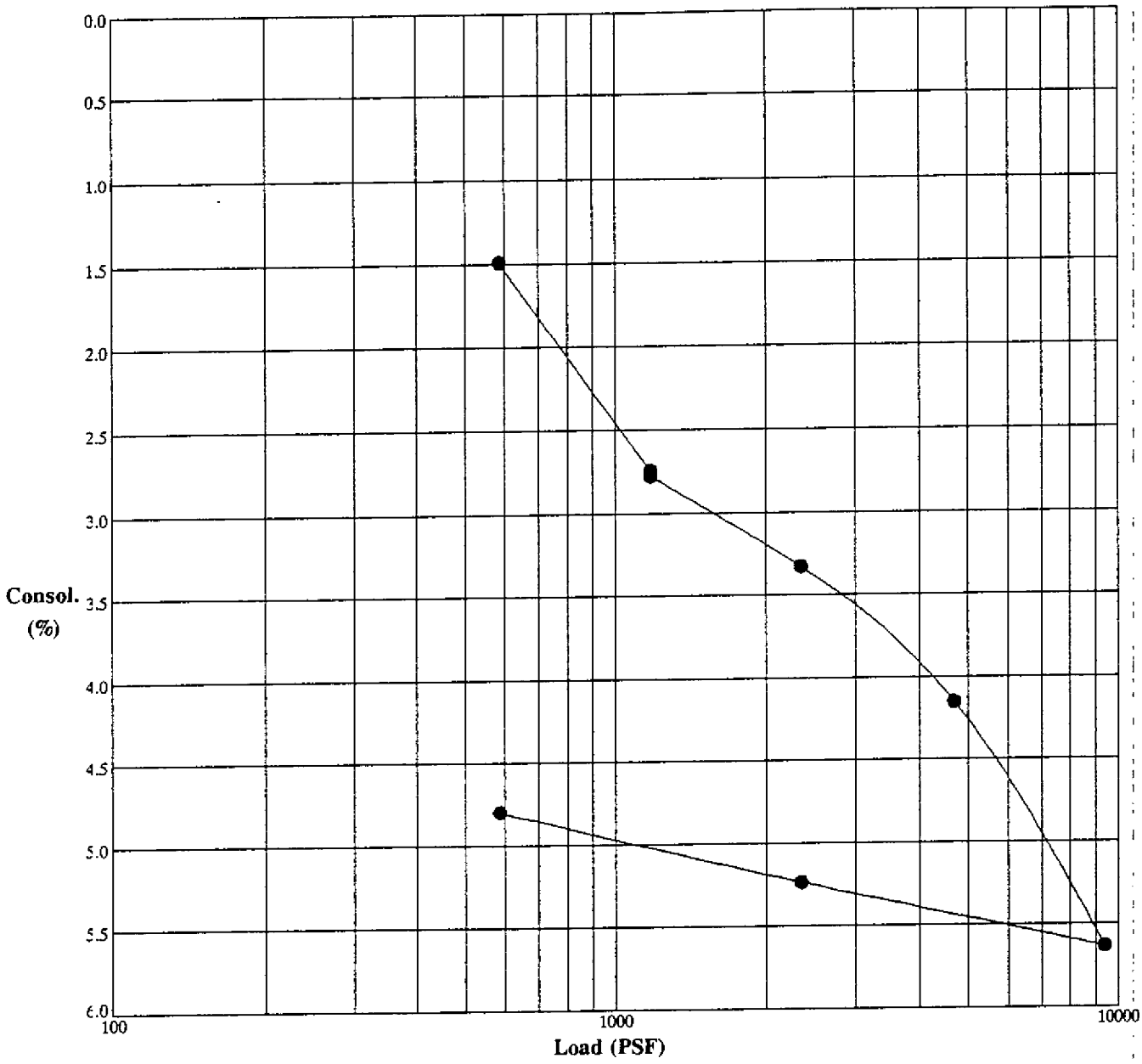
PROJECT: DESERT INN Rd. Super Arterial

DIRECT SHEAR TEST RESULTS

PLATE
B-26



CONSOLIDATION IN PERCENT OF SAMPLE HT.

vs

LOAD IN POUNDS PER SQUARE FOOT

Exploration No.	Depth (ft.)	Soil Description	Dry Density (pcf)	Moisture Content (%)
B- 9	25.0	**SANDY CLAY (CL)**	107	12

WATER ADDED @ 1170 psf

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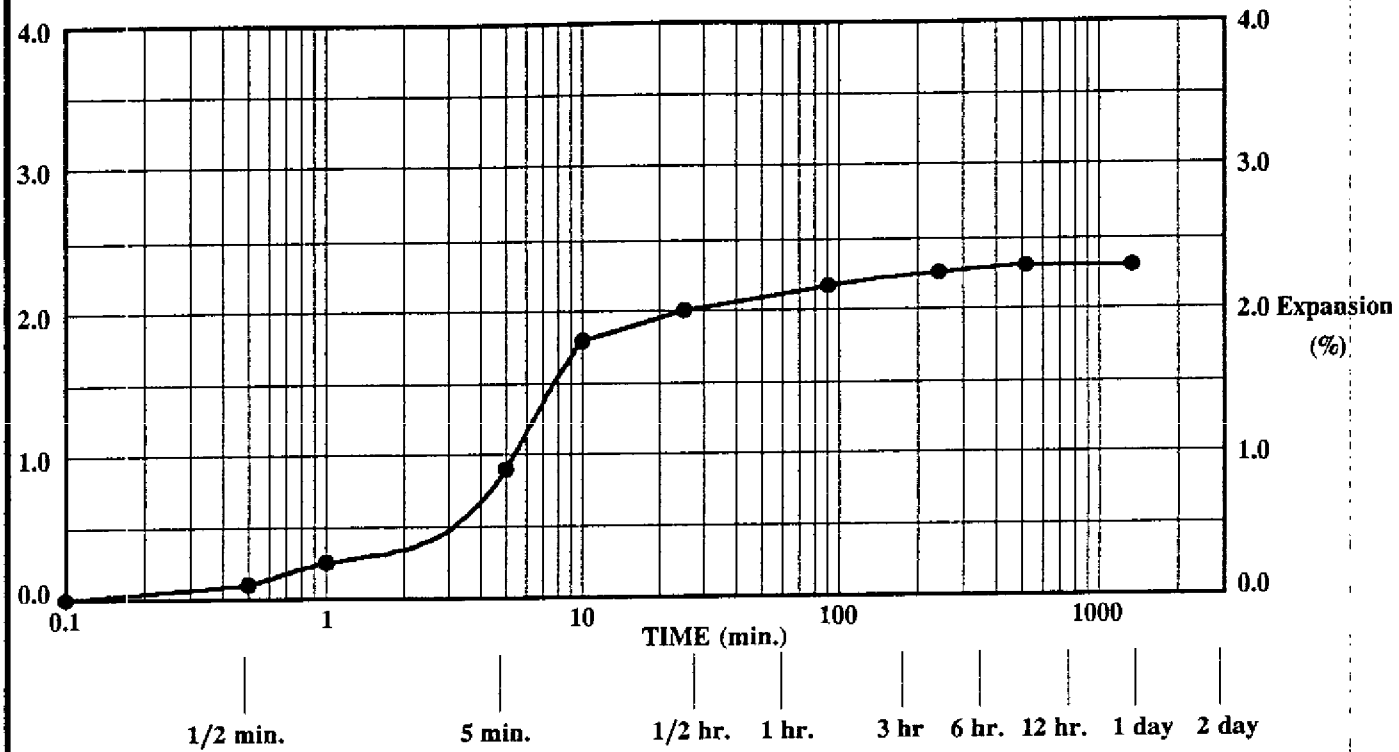
PROJECT: **DESERT INN Rd. Super Arterial**

CONSOLIDATION TEST DATA

PLATE

B-27



EXPANSION (%)
vs
TIME IN MINUTES (min.)

Exploration No.	Depth (ft.)	EXPANSION (%) @ 60 psf Surcharge	TEST CONDITIONS Dry Density (pcf) Initial	Dry Density (pcf) Final	Moisture content (%) Initial	Moisture content (%) Final
B-45	5.0	2.3 %	106	104	9	22

Exploration No.	Depth (ft.)	Soil Description	FIELD CONDITIONS Dry Density (pcf)	Moisture Content (%)
B-45	5.0	CLAYEY SAND (SC)	106	20

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PROJECT NO. 31-183605

PROJECT: DESERT INN Rd. Super Arterial

EXPANSION TEST RESULTS

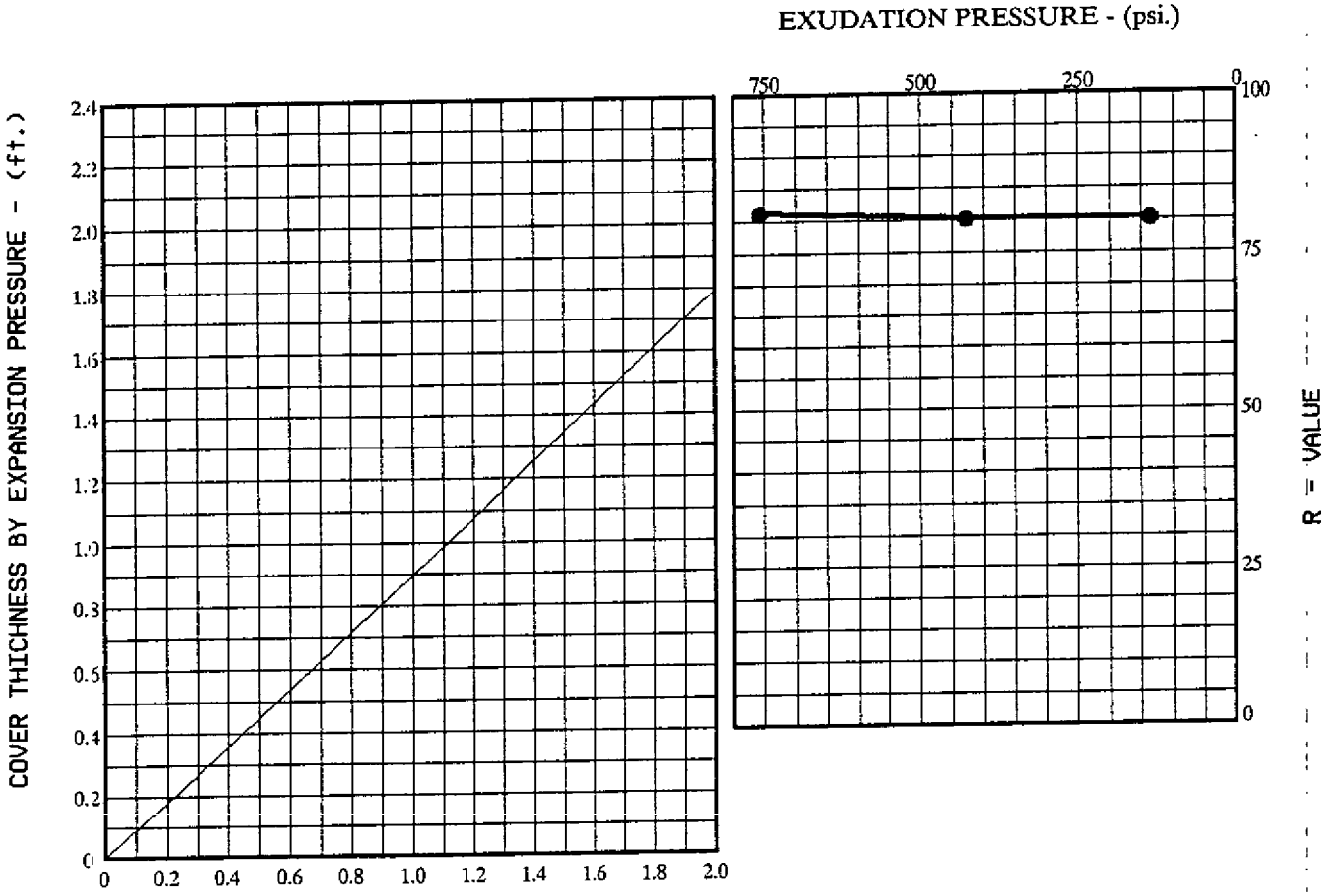
PLATE
B-28

DATE SAMPLED 6-30-92

SAMPLE DESCRIPTION SILTY GRAVEL (GM)

TEST METHOD ASTM D-2844

SAMPLE LOCATION B-24 @ 3.0 ft.



SPECIMEN	A	B	C
EXUDATION PRESSURE (psi)	137	429	758
EXPANSION PRESSURE (psf)			
RESISTANCE VALUE - R	80	80	81
% MOISTURE AT TEST (by weight)			
DRY DENSITY (pcf)			
R - VALUE @ 300 psi EXUDATION PRESSURE		80	
R - VALUE BY EXPANSION PRESSURE (TI=)			

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PROJECT: **DESERT INN Rd. Super Arterial**

RESISTANCE VALUE

PLATE

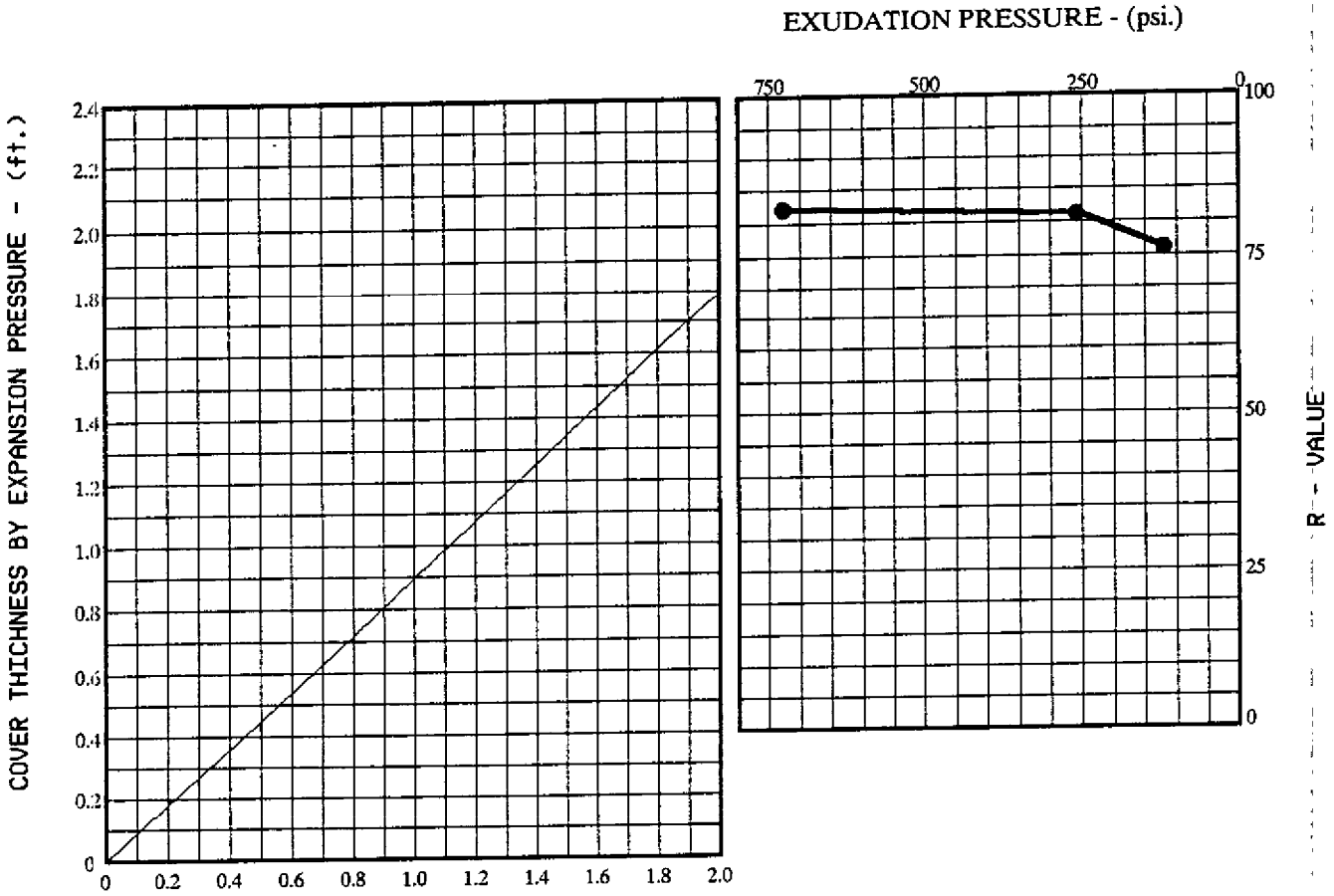
B-29

DATE SAMPLED 6-30-92

SAMPLE DESCRIPTION SILTY GRAVEL (GM)

TEST METHOD ASTM D-2844

SAMPLE LOCATION B-35 @ 3.0 ft.



SPECIMEN	A	B	C
EXUDATION PRESSURE (psi)	121	260	728
EXPANSION PRESSURE (psf)			
RESISTANCE VALUE - R	76	81	82
% MOISTURE AT TEST (by weight)			
DRY DENSITY (pcf)			
R - VALUE @ 300 psi EXUDATION PRESSURE		81	
R - VALUE BY EXPANSION PRESSURE (TI=)			

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PROJECT: **DESERT INN Rd. Super Arterial**

RESISTANCE VALUE

PLATE

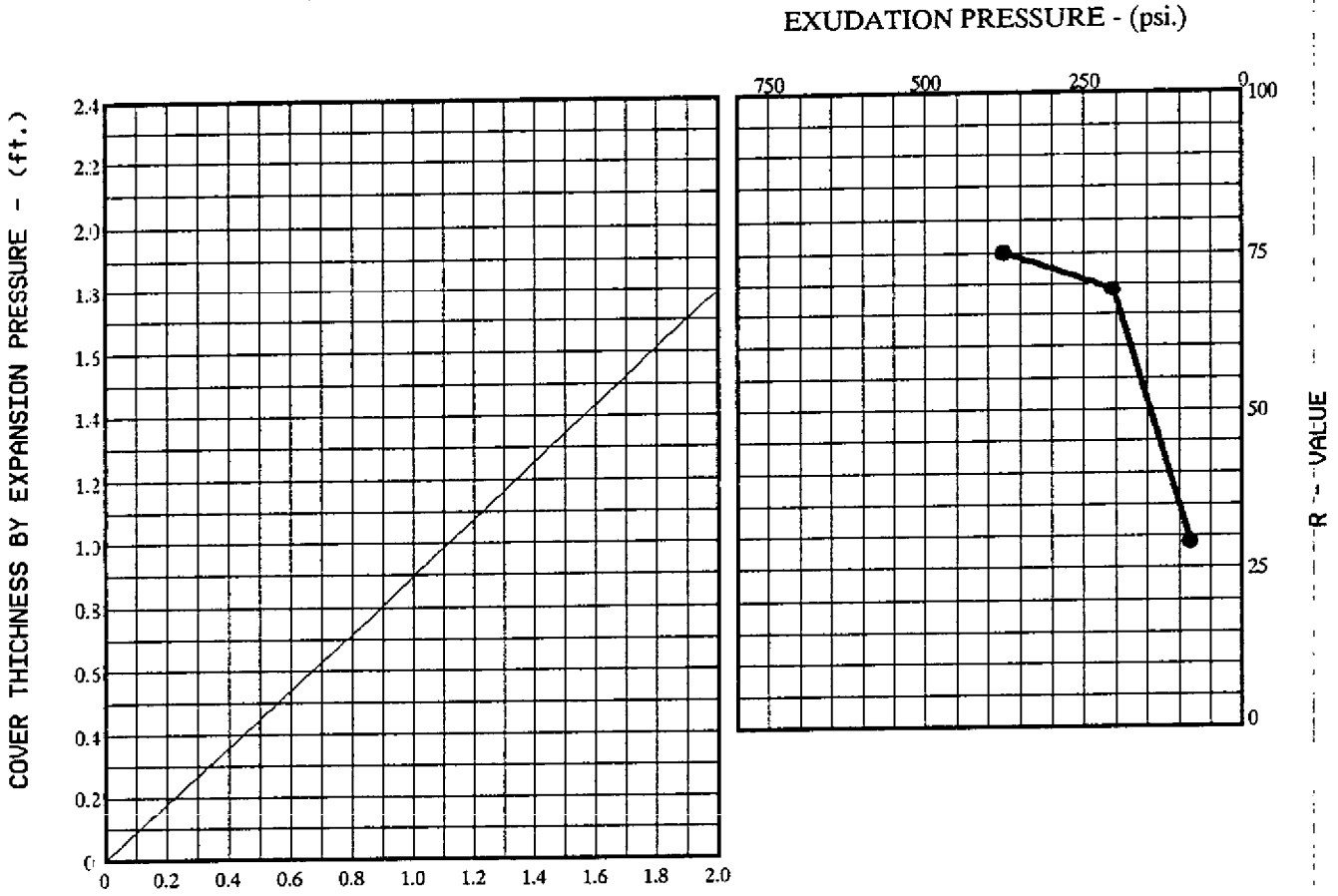
B-30

DATE SAMPLED 6-12-92

SAMPLE DESCRIPTION CLAYEY SAND (SC)

SAMPLE LOCATION B-44 @ 3.0 ft.

TEST METHOD ASTM D-2844



SPECIMEN	A	B	C
EXUDATION PRESSURE (psi)	137	207	377
EXPANSION PRESSURE (psf)			
RESISTANCE VALUE - R	29	69	75
% MOISTURE AT TEST (by weight)			
DRY DENSITY (pcf)			
R - VALUE @ 300 psi EXUDATION PRESSURE		73	
R - VALUE BY EXPANSION PRESSURE (TI=)			

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RESISTANCE VALUE

PLATE

B-31

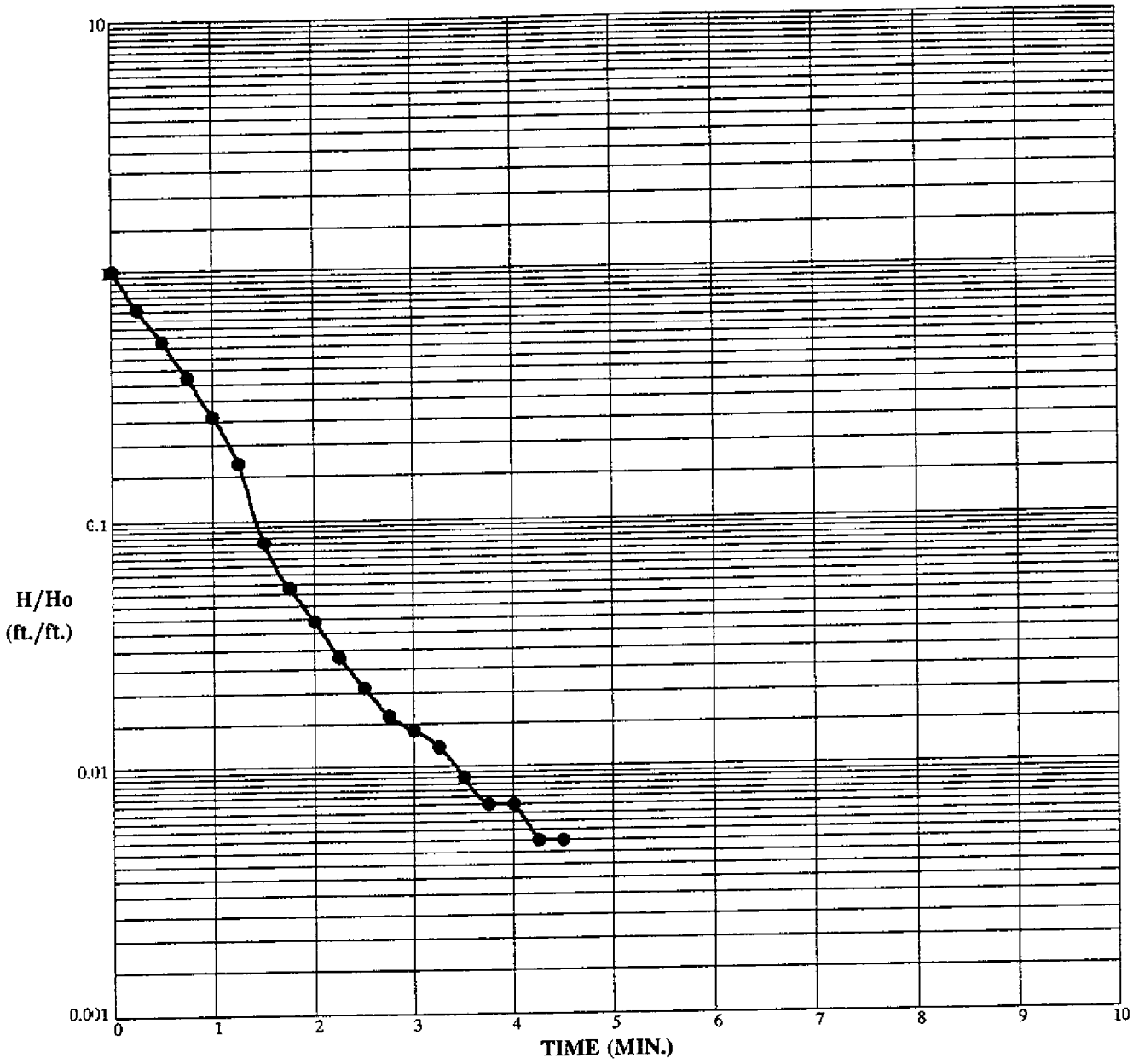
Table B-1: Solubility Test Results

Exploration Number	Depth (feet)	Soil Description	Solubility Percent by Dry Weight
B-5	5	Silty Sand (SM), light brown	5.5
B-17	5	Silty Sandy (SM), light brown	4.2

Table B-2: Resistivity Test Results (Miller Soil Box Method)

Exploration Number	Depth (feet)	Soil Description	Resistivity Field Moisture (ohm-cm)	Saturated (ohm-cm)
B-44	10	Silty Sand (SM) light brown	9100	1430

APPENDIX C



H/Ho (FEET/FEET)
vs
TIME (MINUTES)

Exploration No.	Depth (ft.)	Soil Description	Permeability (cm/sec.)
B- 5	21.0	**SILTY GRAVEL (GM)**	**0.001650**

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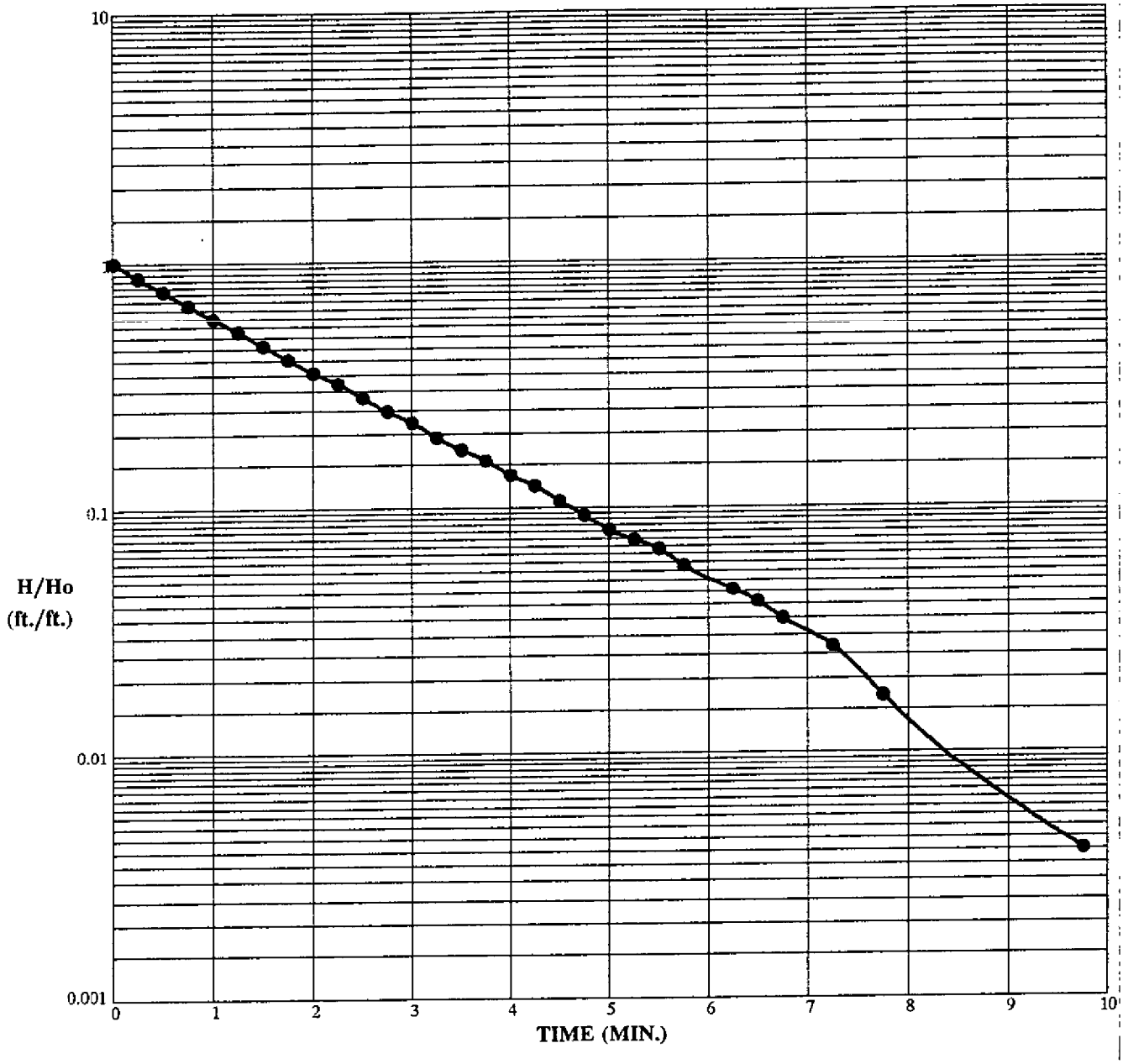
AQUIFER TEST DATA

PLATE
C-1



H/Ho (FEET/FEET)

vs

TIME (MINUTES)

Exploration No.	Depth (ft.)	Soil Description	Permeability (cm/sec.)
B- 5	40.5		**0.000287**

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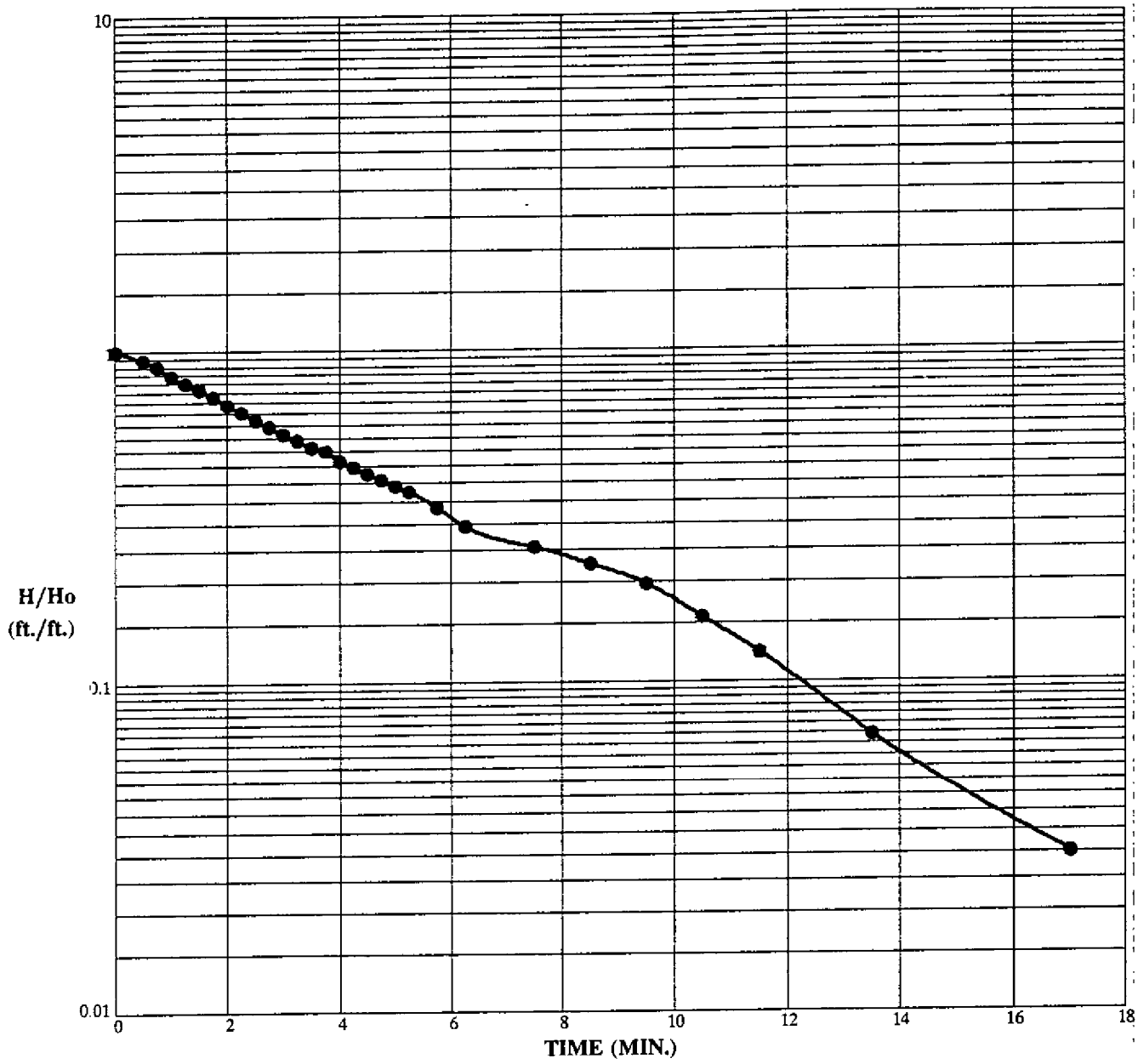
PROJECT: **DESERT INN Rd. Super Arterial**

AQUIFER TEST DATA

PLATE

C-2



H/Ho (FEET/FEET)
vs
TIME (MINUTES)

Exploration No.	Depth (ft.)	Soil Description	Permeability (cm/sec.)
B-28	49.0	**SANDY CLAY (CL)**	**0.000290**

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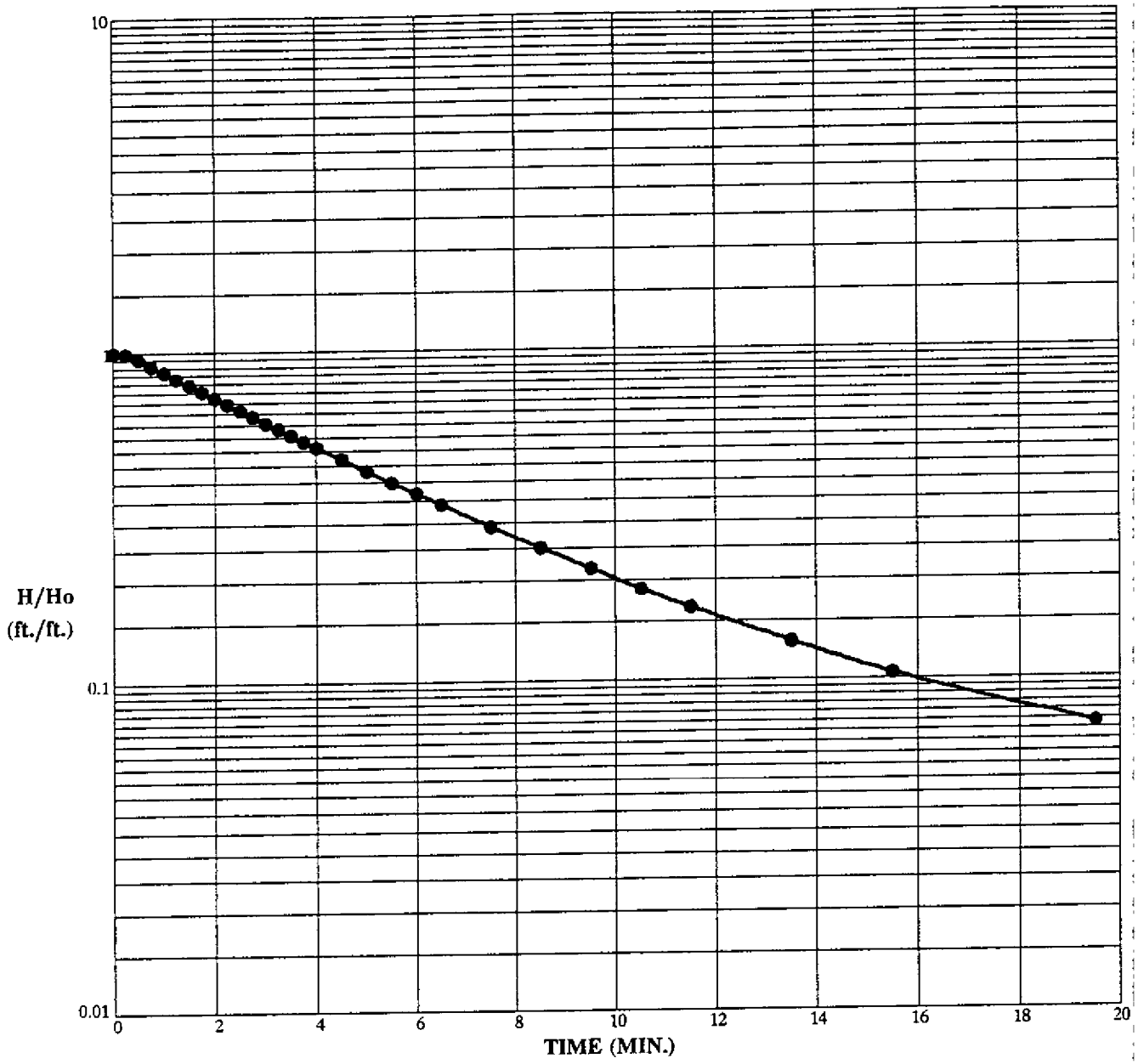
PROJECT NO. 31-183605

PROJECT: **DESERT INN Rd. Super Arterial**

AQUIFER TEST DATA

PLATE
C-3



H/Ho (FEET/FEET)

vs

TIME (MINUTES)

Exploration No.	Depth (ft.)	Soil Description	Permeability (cm/sec.)
B-31	51.0	**SANDY CLAY (CL)**	**0.000029**

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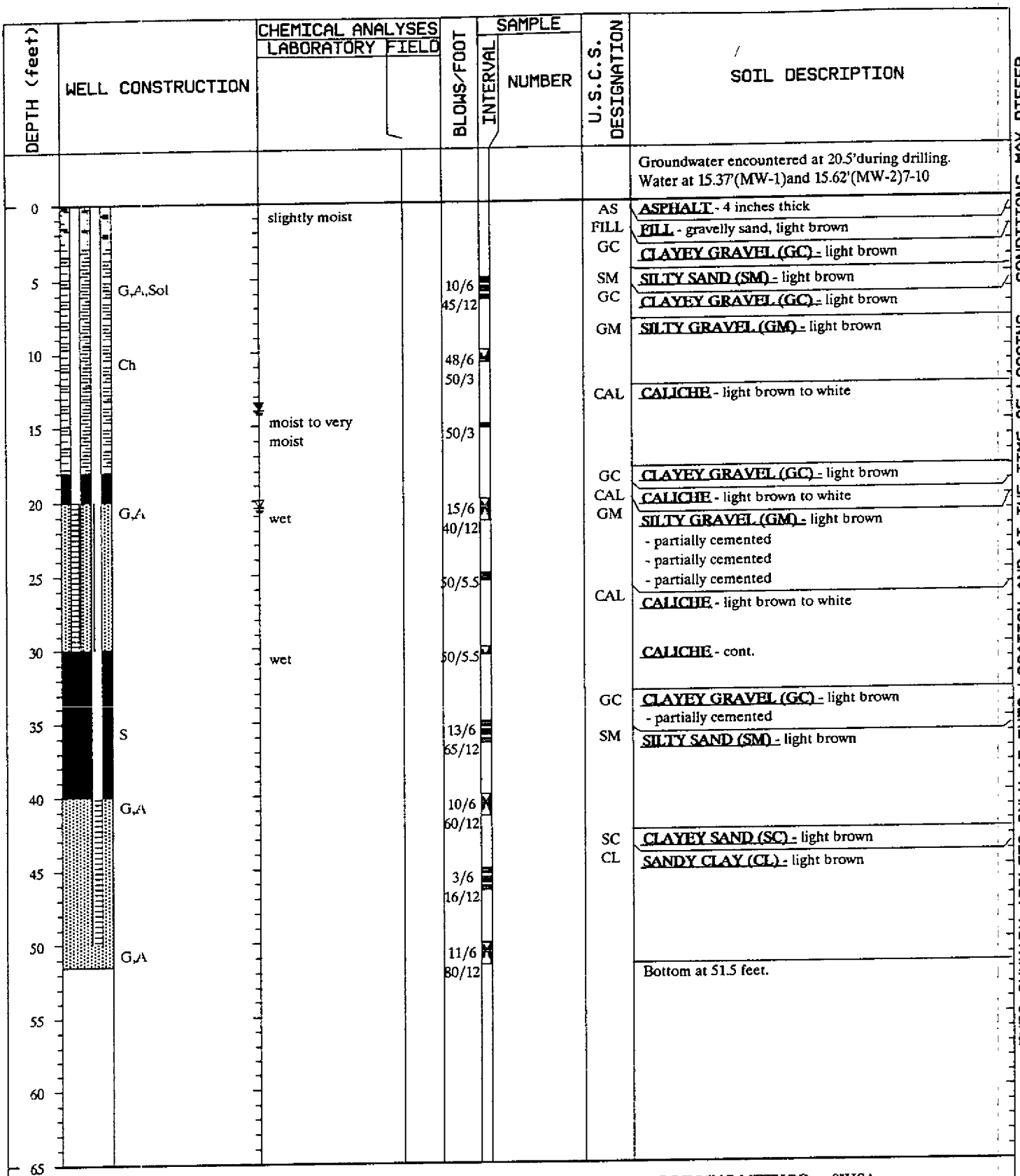
PROJECT: **DESERT INN Rd. Super Arterial**

AQUIFER TEST DATA

PLATE

C-4



DATE DRILLED: 5-1-92
LOGGED BY: W. Vanderpool
REVIEWED BY: WEV

SURFACE ELEVATION (feet): 2069.5
TOTAL DEPTH (feet): 51.5
DIAMETER OF BORING: 8 inch

DRILLING METHOD: 8"HSA
SCREEN SIZE: 0.02 "
CASING SIZE: 2 "

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

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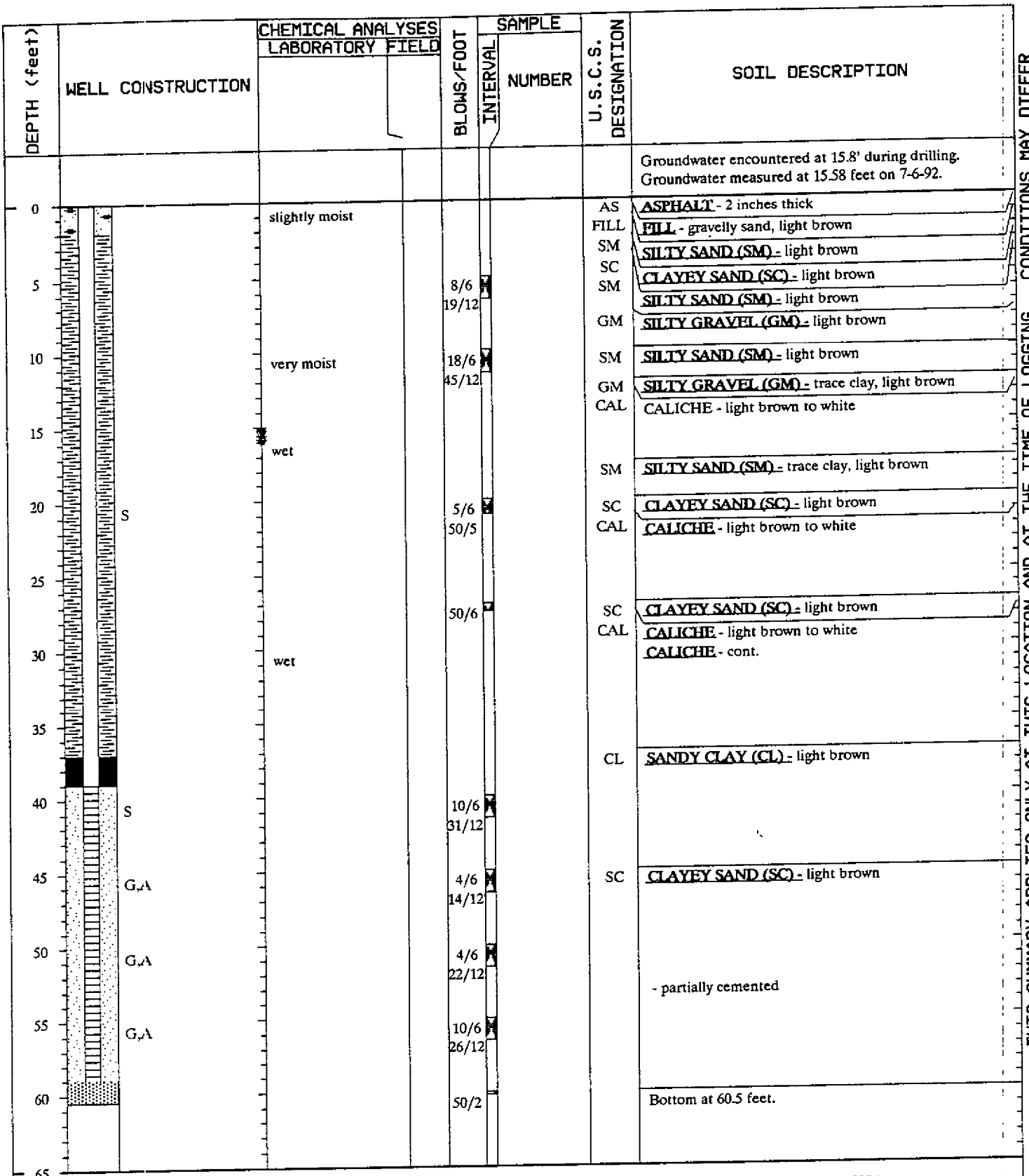
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER 31-183605

PROJECT: **DESERT INN Rd. Super Arterial**

LOG OF MONITORING WELL MW-1&2

PLATE
C-5
PAGE 1 of 1



DATE DRILLED: 6-24-92
LOGGED BY: W. Vanderpool
REVIEWED BY: WEV

SURFACE ELEVATION (feet): 2067.0
TOTAL DEPTH (feet): 60.5
DIAMETER OF BORING: 8 inch

DRILLING METHOD: 8"HSA
SCREEN SIZE: 0.02 "
CASING SIZE: 2 "

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

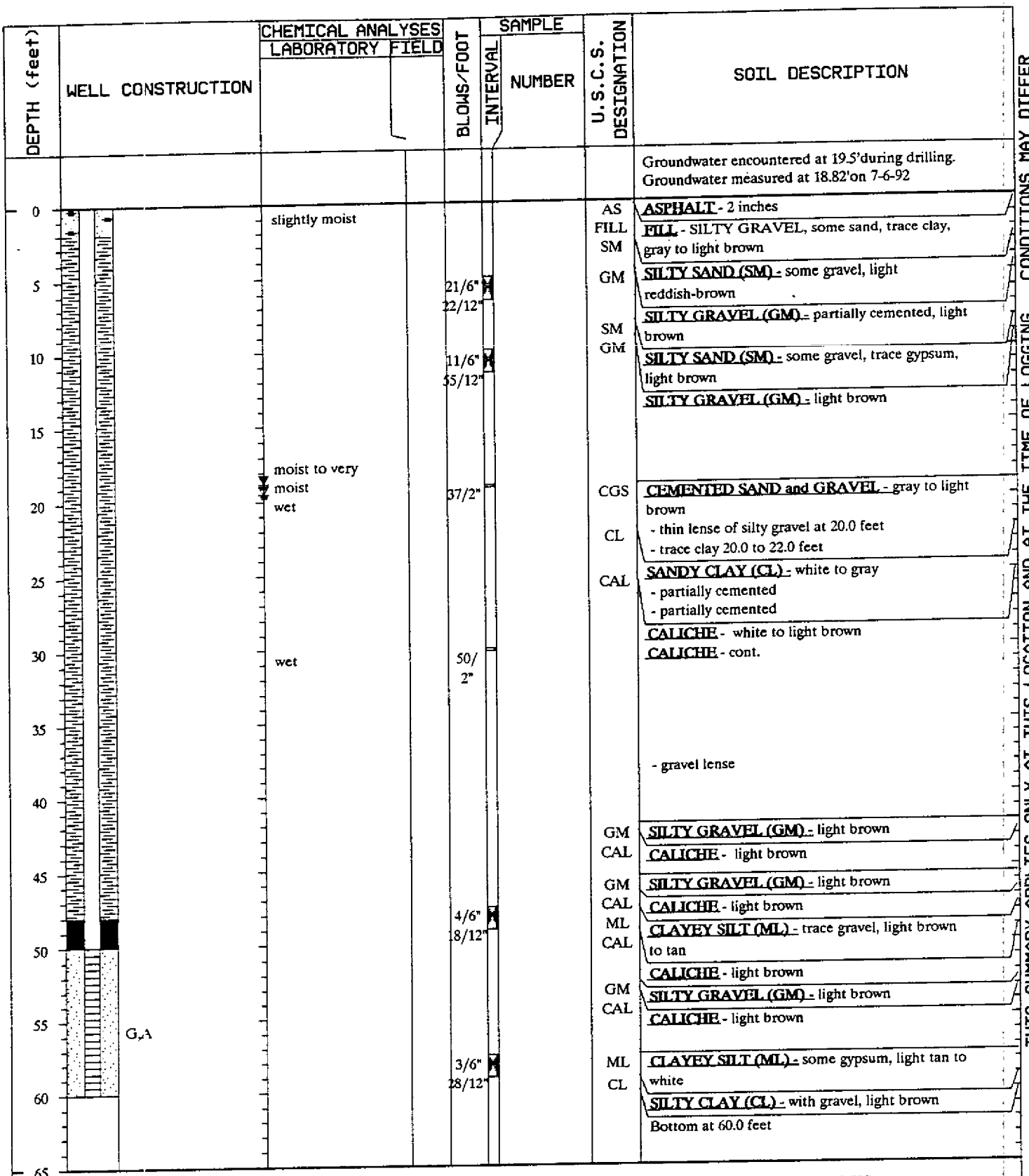
KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER 31-183605

PROJECT: DESERT INN Rd. Super Arterial

LOG OF MONITORING WELL MW-3

PLATE
C-6



THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

DATE DRILLED: 6-18-92
LOGGED BY: W. Vanderpool
REVIEWED BY: WEV

SURFACE ELEVATION (feet): 2073.0
TOTAL DEPTH (feet): 60.0
DIAMETER OF BORING: 8 inch

DRILLING METHOD: 8"HSA
SCREEN SIZE: 0.02 "
CASING SIZE: 2 "

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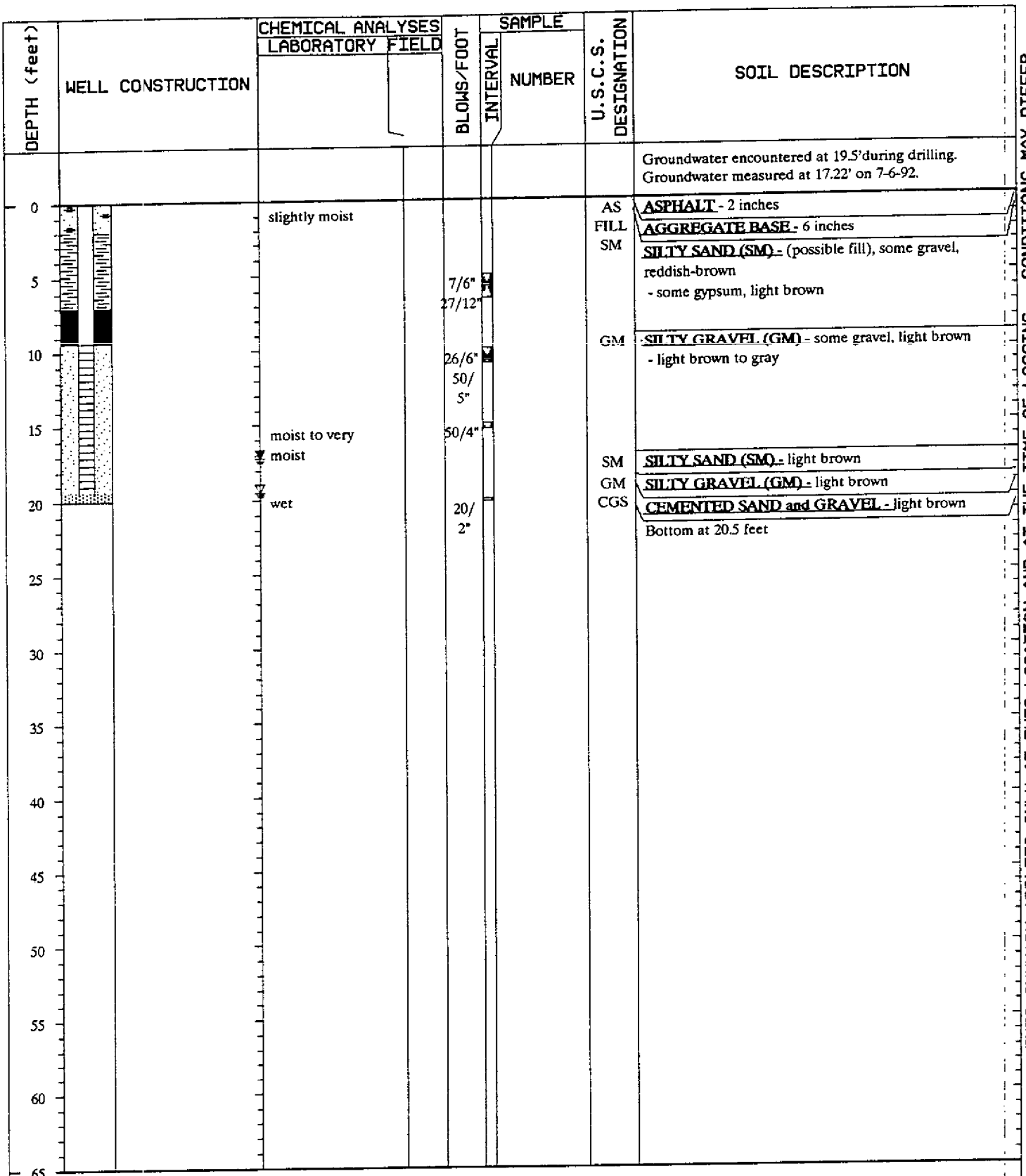
PROJECT NUMBER 31-183605

PROJECT: DESERT INN Rd. Super Arterial

LOG OF MONITORING WELL MW-4

PLATE
C-7
PAGE 1 of 1



DATE DRILLED: 6-18-92
LOGGED BY: W. Vanderpool
REVIEWED BY: WEV

SURFACE ELEVATION (feet): 2074.5
TOTAL DEPTH (feet): 20.5
DIAMETER OF BORING: 8 inch

DRILLING METHOD: 8"HSA
SCREEN SIZE: 0.02 "
CASING SIZE: 2 "

THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH TIME. DATA PRESENTED IS A SIMPLIFICATION.

BY: _____ APPROV: _____

KLEINFELDER
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
SOILS AND MATERIALS TESTING

PROJECT NUMBER 31-183605

PROJECT: **DESERT INN Rd. Super Arterial**

LOG OF MONITORING WELL MW-5

PLATE
C-8

NET Pacific, Inc.

Client Name: Kleinfelder
Client Ref.: 31-183605-011

NET Job No.: 92.0692

Date Reported: 06/11/1992
Sample Matrix: water

Date Taken :	05/28/1992	05/28/1992
Sample ID :	B5S WATER	B5D WATER
Lab No. :	45431	45432

ANALYTES/METHOD	RESULTS		R.L.	UNITS
pH	7.3	7.4		pH units
Tot. Dissolved Solids (TFR)	5,180	1,150	10	mg/L
Turbidity	17.0	3.50	0.05	NTU
Nitrate, as N	18	1.2	0.03	mg/L
Total Phosphorus, as P	0.60	0.05	0.02	mg/L
METHOD 8015 MOD. water for Gas				
DATE ANALYZED	06-01-92	06-01-92		
Reporting Limit Multiplier	1	1		
as Gasoline	ND	ND	10	ug/L
Surrogate Spike	--	--		
Bromofluorobenzene	110	101		% Rec.

ND - Not Detected at the Reporting Limit

Client Name: Kleinfelder
Client Ref.: D.I./Super

NET Job No.: 92.0902

Date Taken: 07/06/1992
Date Reported: 07/09/1992

Sample ID : B-28

Lab No. : 46681

Sample Matrix: water

ANALYTES/METHOD	RESULTS	R.L.	UNITS
pH	7.2		pH units
Tot. Dissolved Solids (TFR)	2,940	10	mg/L
Nitrate, as N	10.1	0.03	mg/L
Total Phosphorus, as P	18	0.02	mg/L
METHOD 8015 MOD. soil for Gas			
DATE EXTRACTED	07-09-92		
DATE ANALYZED	07-09-92		
Reporting Limit Multiplier	1		
as Gasoline	ND	1	mg/Kg
Surrogate Spike	--		
Bromofluorobenzene	97		% Rec.

ND - Not Detected at the Reporting Limit

Client Name: Kleinfelder
Client Ref.: 31-183605-021

Date Reported: 07/07/1992

NET Job No.: 92.0875

Sample Matrix: Aqueous

Date Taken :		07/01/1992	07/01/1992
Sample ID :		MW-33	MW-31
Lab No. :		46536	46537

ANALYTES/METHOD		RESULTS		R.L.	UNITS
pH	150.1	7.8	7.1		pH units
Tot. Dissolved Solids (	160.1	9,510	2,910	10	mg/L
Turbidity	180.1	28	12	0.05	NTU
Nitrate, as N		0.18	5.24	0.03	mg/L
Total Phosphorus, as P		0.06	ND	0.05	mg/L
METHOD 8015 MOD. water					
DATE ANALYZED		07-07-92	07-07-92		
Reporting Limit Multip		1	1		
as Gasoline	8015	ND	ND	10	ug/L
Surrogate Spike		--	--		
Bromofluorobenzene	8015	115	113		% Rec.

ND - Not Detected at the Reporting Limit

Atlas Chemical Testing Laboratories

2120 Western Avenue, Suite C-6 • Las Vegas, Nevada 89102
(702) 383-1199 • Fax (702) 383-4983

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AMERICAN SOCIETY FOR
TESTING MATERIALS

CHEMICAL
PHYSICAL
FORENSIC

LABORATORY NO: 5061a **DATE:** 6/1/92

SAMPLE: Soil (1 sample)

MARKED: 183605-012

DATE RECEIVED: 5/29/92

SUBMITTED BY: Kleinfelder, Inc.
6850 South Paradise Road
Las Vegas, NV 89119

REPORT OF DETERMINATION

SOIL CORROSIVITY ANALYSIS

The soil sample(s) that you submitted to our laboratory were analyzed for the standard corrosivity parameters. A 20.00 gram portion of each sample was agitated to equilibrium with 100.0 mL of ASTM Type I water. The resulting solution(s) were then analyzed by American Society for Testing Materials (ASTM) and Standard Methods for the Examination of Water and Wastewater, 15th Edition (Std. Meth.) procedures. The results that appear on the report page are for those SOLUTION(S). To convert a solution ppm (or mg/L) to a SOIL ppm (or mg/kg) for this extraction ratio multiply by five(5). To convert a soil ppm to a weight percent divide by ten thousand(10,000). The standard methods used for the determinations are as follows:

pH Value: glass electrode/silver-silver chloride reference/Std. Meth. 423. Oxidation-Reduction Potential: platinum electrode/silver-silver chloride reference/results reported referred to the standard hydrogen electrode/ASTM D 1498. Sulfate: Turbidimetric/Std. Meth. 426C. Sulfide: solutions - Methylene Blue/Std. Meth. 427C soils - sodium azide-potassium iodide detection prior to solution quantitation. Total Salts: Electrical Conductivity, factor empirically determined/Std. Meth. 205. Chloride: Argentometric/Std. Meth. 407A.

Respectfully submitted,
ATLAS CHEMICAL TESTING LABORATORIES

Robert L. Summers
Analytical Chemist

JUN 8 1992

ACT LAB NO: 5061a
PROJECT NO: 183605-012
DATE: 6/1/92

Kleinfelder, Inc.
6850 South Paradise Road
Las Vegas, NV 89119

BORING NUMBER	DEPTH (FEET)	pH VALUE	RED-OX (MV)	SULFATE CONCENTRATION (ppm)	SULFIDE CONCENTRATION (ppm)	TOTAL SALTS CONCENTRATION (ppm)	CHLORIDE CONCENTRATION (ppm)
B-5	10	8.88	+542	1075	nil	1828	95

Respectfully submitted,
ATLAS CHEMICAL TESTING LABORATORIES

Robert L. Summers
Analytical Chemist

Atlas Chemical Testing Laboratories

2120 Western Avenue, Suite C-6 • Las Vegas, Nevada 89102
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TESTING MATERIALS

CHEMICAL
PHYSICAL
FORENSIC

LABORATORY NO: 5135a **DATE:** 7/8/92

SAMPLE: Soil (4 samples)

MARKED: 183605-032

DATE RECEIVED: 7/8/92

SUBMITTED BY: Kleinfelder, Inc.
6850 South Paradise Road
Las Vegas, NV 89119

REPORT OF DETERMINATION

SOIL CORROSIVITY ANALYSIS

The soil sample(s) that you submitted to our laboratory were analyzed for the standard corrosivity parameters. A 20.00 gram portion of each sample was agitated to equilibrium with 100.0 mL of ASTM Type I water. The resulting solution(s) were then analyzed by American Society for Testing Materials (ASTM) and Standard Methods for the Examination of Water and Wastewater, 15th Edition (Std. Meth.) procedures. The results that appear on the report page are for those SOLUTION(S). To convert a solution ppm (or mg/L) to a SOIL ppm (or mg/kg) for this extraction ratio multiply by five(5). To convert a soil ppm to a weight percent divide by ten thousand(10,000). The standard methods used for the determinations are as follows:

pH Value: glass electrode/silver-silver chloride reference/Std. Meth. 423. Oxidation-Reduction Potential: platinum electrode/silver-silver chloride reference/results reported referred to the standard hydrogen electrode/ASTM D 1498. Sulfate: Turbidimetric/Std. Meth. 426C. Sulfide: solutions - Methylene Blue/Std. Meth. 427C soils - sodium azide-potassium iodide detection prior to solution quantitation. Total Salts: Electrical Conductivity, factor empirically determined/Std. Meth. 205. Chloride: Argentometric/Std. Meth. 407A.

Respectfully submitted,
ATLAS CHEMICAL TESTING LABORATORIES

Robert L. Summers
Analytical Chemist

ACT LAB NO:	5135a	Kleinfelder, Inc.
PROJECT NO:	183605-032	6850 South Paradise Road
DATE:	7/8/92	Las Vegas, NV 89119

BORING NUMBER	DEPTH (FEET)	pH VALUE	RED-OX (MV)	SULFATE CONCENTRATION (ppm)	SULFIDE CONCENTRATION (ppm)	TOTAL SALTS CONCENTRATION (ppm)	CHLORIDE CONCENTRATION (ppm)
B-13	35	8.73	+581	115	nil	317	25
B-15	20	8.82	+594	130	nil	257	35
B-23	10	8.56	+590	325	nil	692	15
B-29	20	8.77	+575	88	nil	233	40

Respectfully submitted,

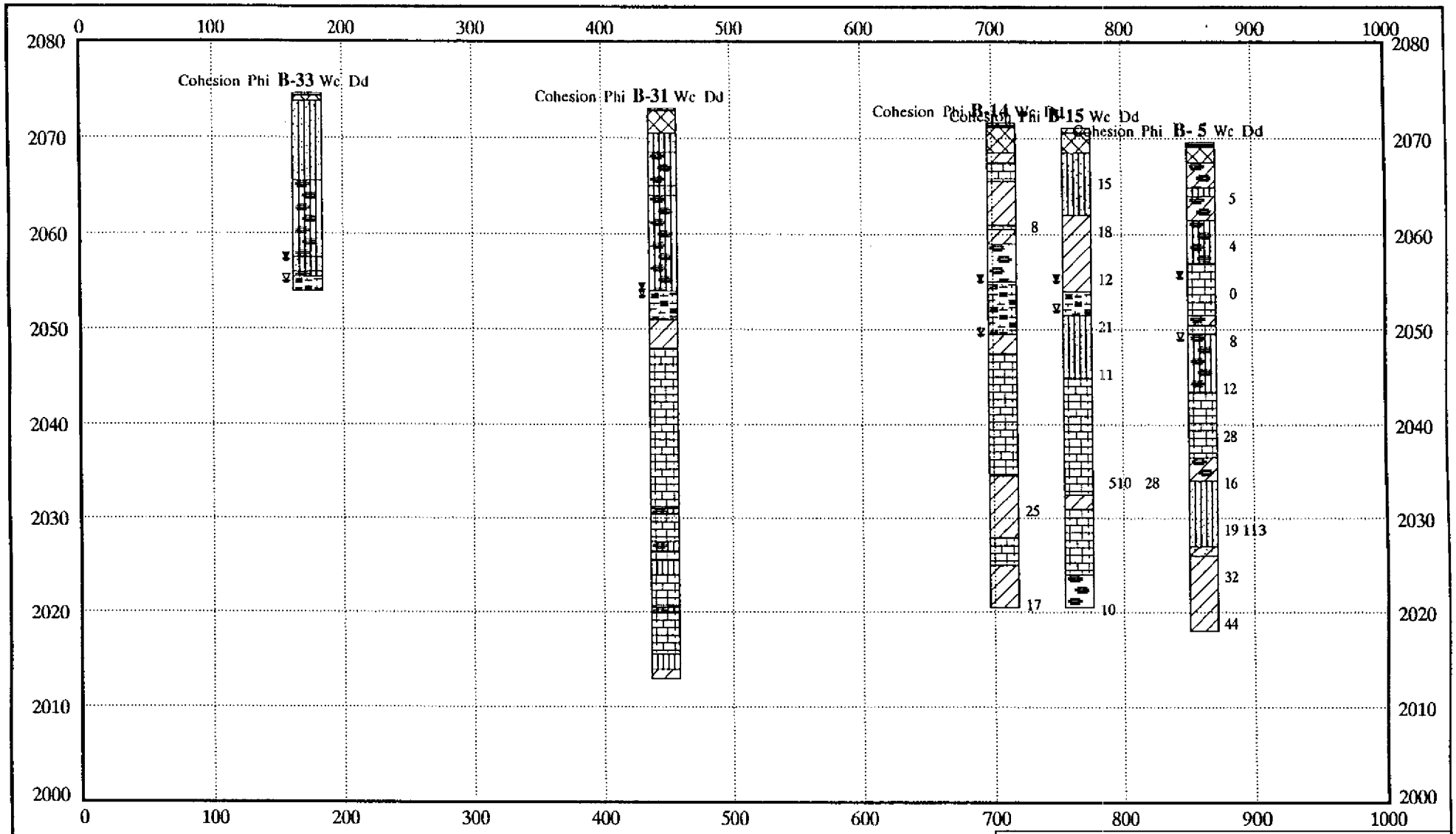
ATLAS CHEMICAL TESTING LABORATORIES

Robert L. Summers

Robert L. Summers

Analytical Chemist

APPENDIX D



Exp. No.	North	East	Elev.	Depth
B- 5	502850.0	624460.0	2069.5	51.5
B-14	502830.0	624490.0	2071.5	51.0
B-15	502800.0	624540.0	2071.0	51.0
B-31	502930.0	624250.0	2073.0	60.0
B-33	502980.0	623980.0	2074.5	20.5

DISTANCES:

Beginning	0.0
Ending	1000.0

VIEWING ANGLES (degrees):

Horizontal	0.0
Vertical	0.0

Position	North	East
Left	502980.00	623980.00
Right	502850.00	624460.00

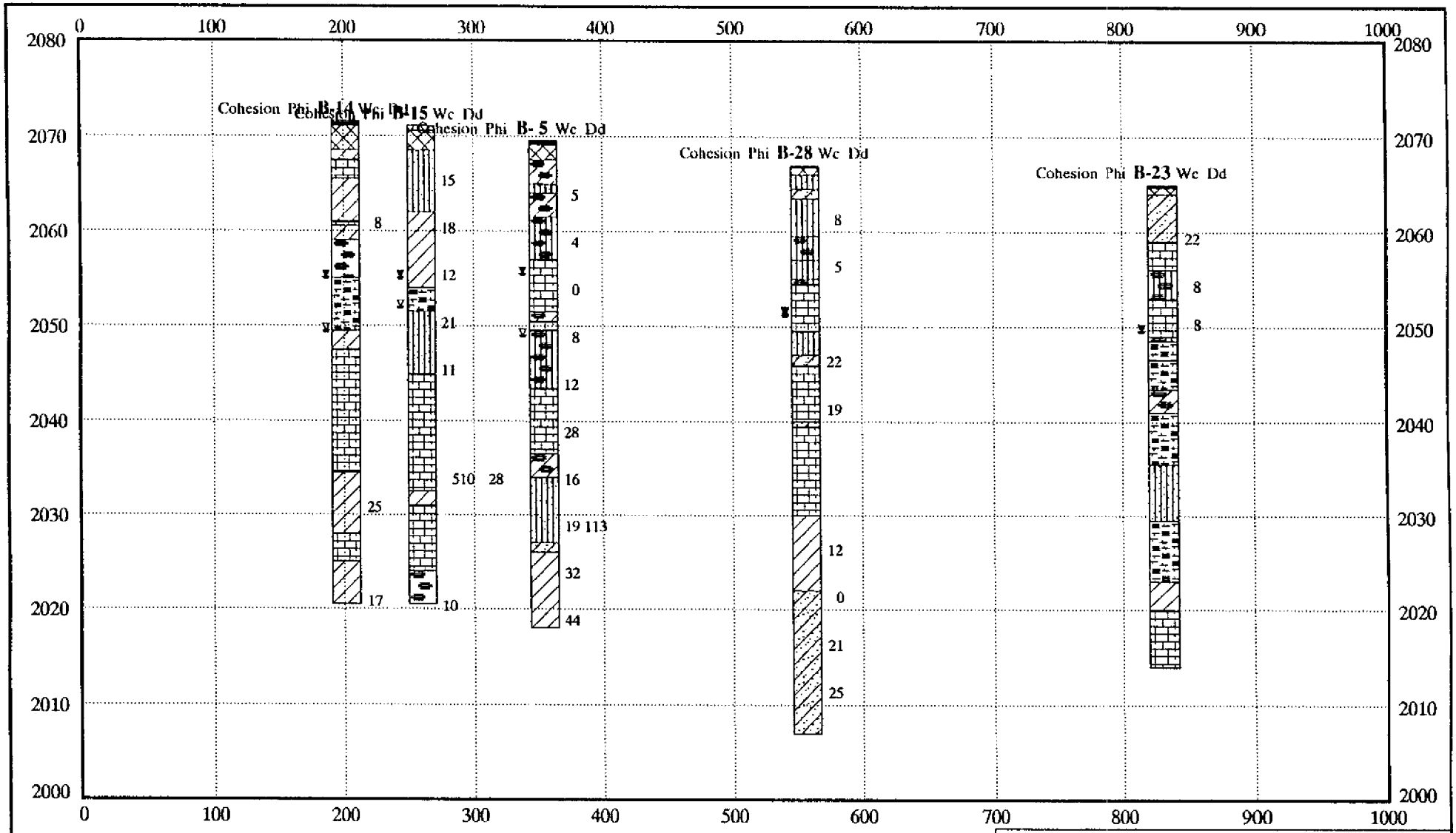
KLEINFELDER

Geotechnical and Environmental Engineers
Soils and Material Testing

SUBSURFACE FENCE DIAGRAM

South Side W to E (W-half)
DESERT INN Rd. Super Arterial

PROJECT No.	DATE	PLATE
31-183605	JUL 92	D-1



Exp. No.	North	East	Elev.	Depth
B- 5	502850.0	624460.0	2069.5	51.5
B-14	502830.0	624490.0	2071.5	51.0
B-15	502800.0	624540.0	2071.0	51.0
B-23	502640.0	624885.0	2065.0	51.0
B-28	502780.0	624650.0	2067.0	60.5

DISTANCES:

Beginning	0.0
Ending	1000.0

VIEWING ANGLES (degrees):

Horizontal	0.0
Vertical	0.0

Position	North	East
Left	502830.00	624490.00
Right	502640.00	624885.00

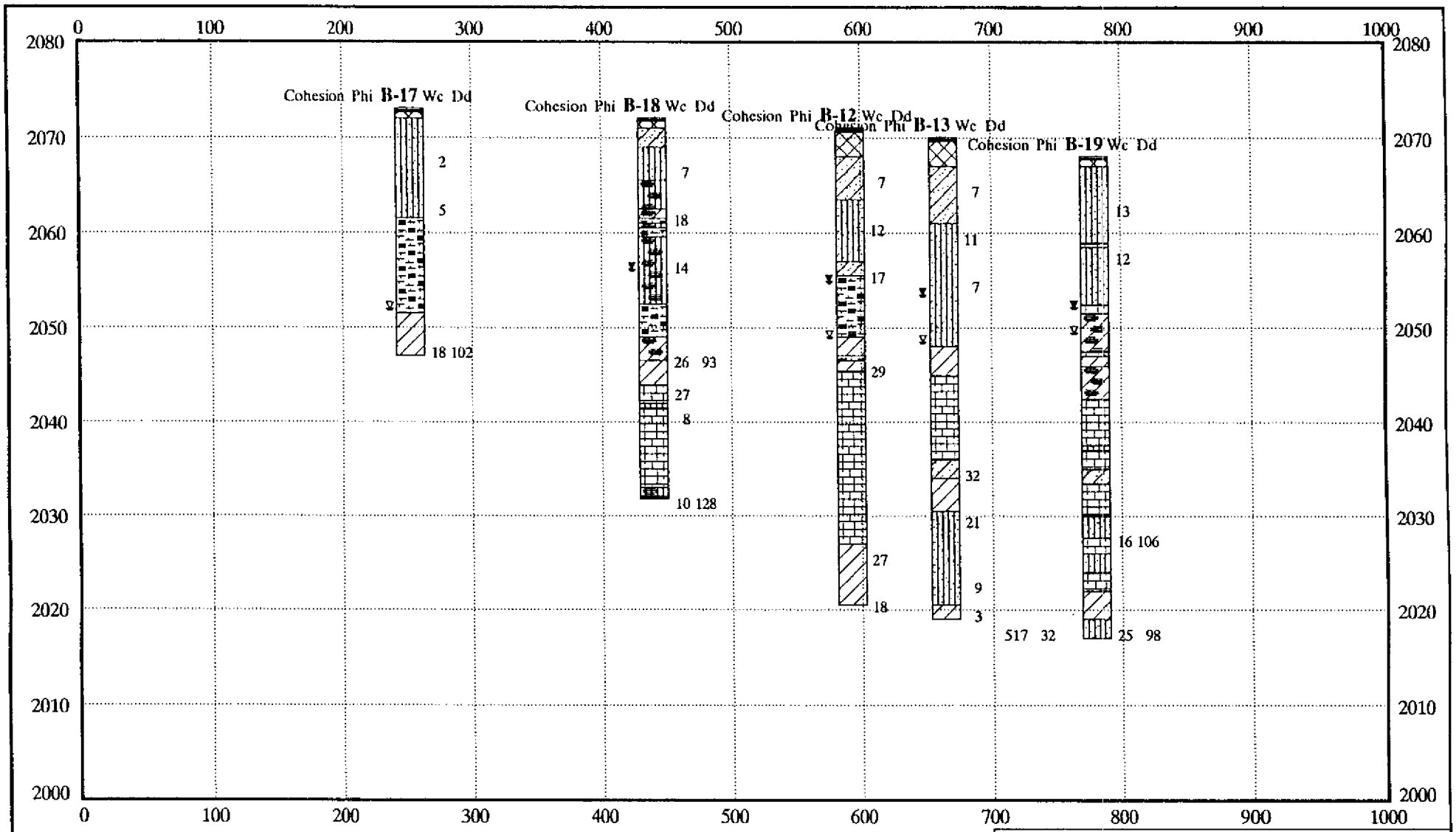
KLEINFELDER

Geotechnical and Environmental Engineers
Soils and Material Testing

SUBSURFACE FENCE DIAGRAM

South Side W to E (E half)
DESERT INN Rd. Super Arterial

PROJECT No.	DATE	PLATE
31-183605	JUL 92	D-2



Exp. No.	North	East	Elev.	Depth
B-12	503000.0	624520.0	2071.0	50.5
B-13	502970.0	624585.0	2070.0	51.0
B-17	503110.0	624200.0	2073.0	26.0
B-18	503060.0	624380.0	2072.0	40.2
B-19	503020.0	624480.0	2068.0	51.0

DISTANCES:

Beginning	0.0
Ending	1000.0

VIEWING ANGLES (degrees):

Horizontal	0.0
Vertical	0.0

Position	North	East
Left	503110.00	624200.00
Right	503020.00	624480.00

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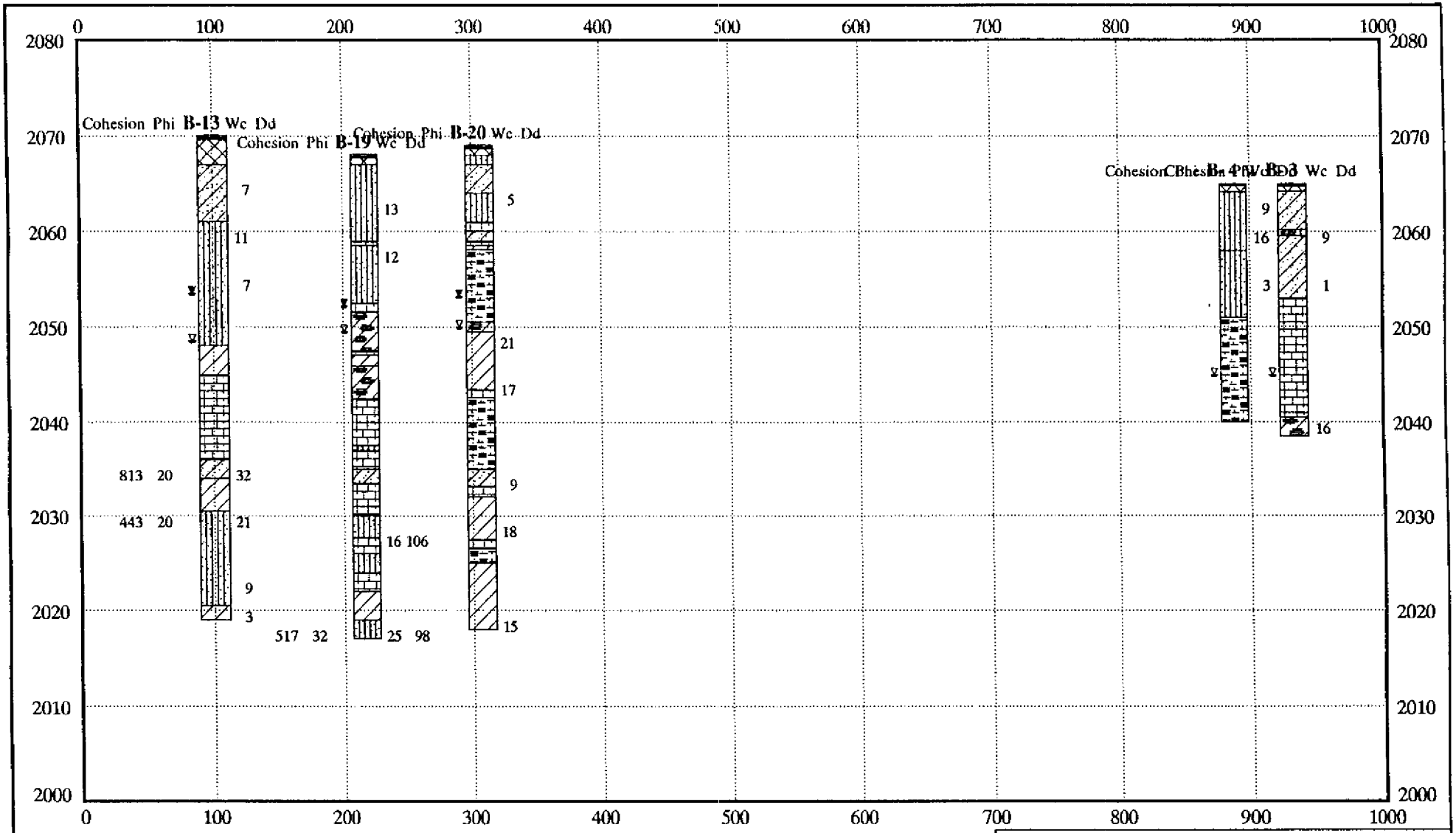
Geotechnical and Environmental Engineers
Soils and Material Testing

SUBSURFACE FENCE DIAGRAM

North Side W to E (W half)
DESERT INN Rd. Super Arterial

PROJECT No.	DATE	PLATE
31-183605	JUL 92	D-3



Exp. No.	North	East	Elev.	Depth
B- 3	502890.0	625040.0	2065.0	26.5
B- 4	502930.0	625020.0	2065.0	25.1
B-13	502970.0	624585.0	2070.0	51.0
B-19	503020.0	624480.0	2068.0	51.0
B-20	502940.0	624440.0	2069.0	51.0

DISTANCES:
Beginning 0.0
Ending 1000.0
VIEWING ANGLES (degrees):
Horizontal 0.0
Vertical 0.0

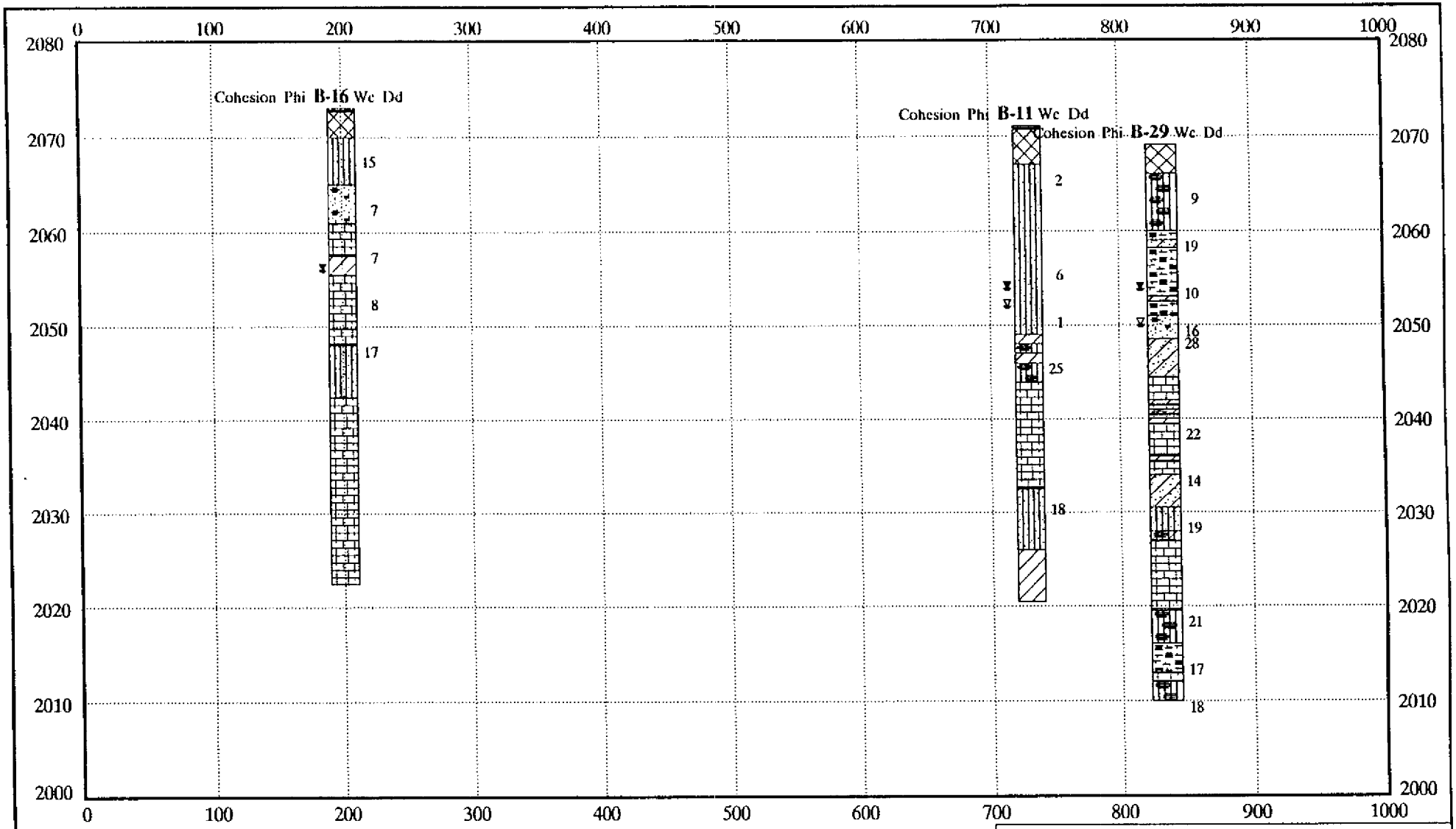
Position	North	East
Left	502970.00	624585.00
Right	502890.00	625040.00

KLEINFELDER
Geotechnical and Environmental Engineers
Soils and Material Testing

SUBSURFACE FENCE DIAGRAM

North Side W to E (E half)
DESERT INN Rd. Super Arterial

PROJECT No.	DATE	PLATE
31-183605	JUL 92	D-4



Exp. No.	North	East	Elev.	Depth
B-11	502900.0	624530.0	2071.0	50.5
B-16	503040.0	624020.0	2073.0	50.5
B-29	502950.0	624440.0	2069.0	59.0

DISTANCES:
Beginning 0.0
Ending 1000.0
VIEWING ANGLES (degrees):
Horizontal 0.0
Vertical 0.0

Position	North	East
Left	503040.00	624020.00
Right	502950.00	624440.00

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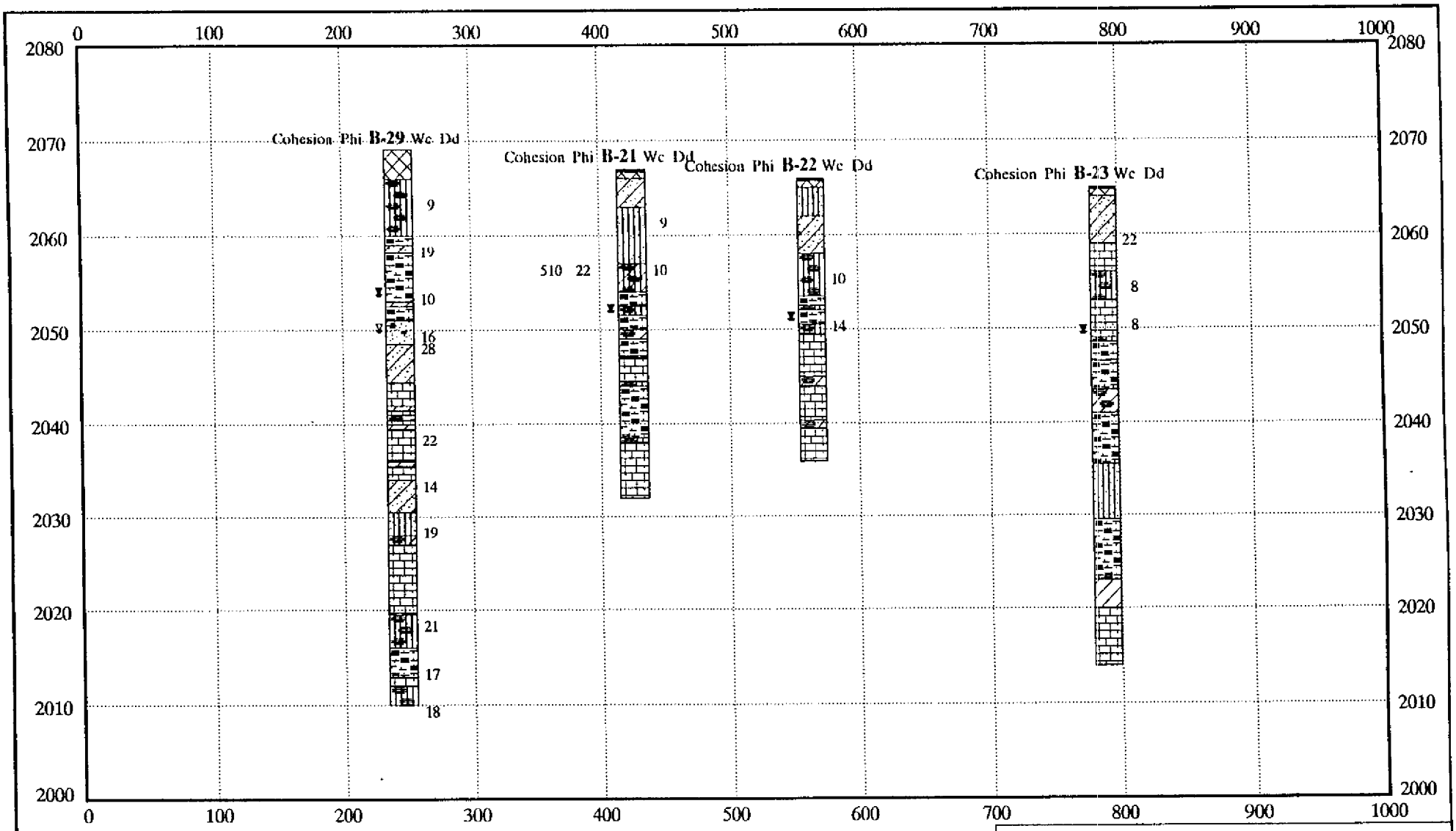
Geotechnical and Environmental Engineers
Soils and Material Testing

SUBSURFACE FENCE DIAGRAM

Center Line W to E (W-half)
DESERT INN Rd. Super Arterial

PROJECT No.	DATE	PLATE
31-183605	JUL 92	D-5



Exp. No.	North	East	Elev.	Depth
B-21	502850.0	624590.0	2067.0	35.2
B-22	502780.0	624710.0	2066.0	30.1
B-23	502640.0	624885.0	2065.0	51.0
B-29	502950.0	624440.0	2069.0	59.0

DISTANCES:

Beginning	0.0
Ending	1000.0

VIEWING ANGLES (degrees):

Horizontal	0.0
Vertical	0.0

Position	North	East
Left	502950.00	624440.00
Right	502640.00	624885.00

KLEINFELDER

Geotechnical and Environmental Engineers
Soils and Material Testing

SUBSURFACE FENCE DIAGRAM

Center Line W to E (E-half)
DESERT INN Rd. Super Arterial

PROJECT No.	DATE	PLATE
31-183605	JUL 92	D-6