CITY OF LAS VEGAS
INTER-OFFICE MEMORANDUM

DEPARTMENT OF COMMUNITY PLANNING AND DEVELOPMENT	DATE AUGUST 19, 1993

TO:

DEVELOPMENT COORDINATION	-	JOHN McNELLIS
ELECTRICAL SERVICES	-	GEORGE FERRIS
FLOOD CONTROL	-	TOM CHIATOVICH
LAND DEVELOPMENT	-	CHUCK TURK
RIGHT-OF-WAY	-	ED BYRGE
SANITARY SEWERS	-	MARK OWENS
SURVEY	-	RITA LUMOS
TRAFFIC ENGINEERING	-	GLENN GRAYSON

SUBJECT:
REVERSIONARY MAP

SUBDIVISION NAME:
SANDHILL VILLAS - UNITS 5 & 6

ZONE: R-E (ROI R-PD15)

PLEASE RETURN TO JOHN McNELLIS BY: AUGUST 26, 1993

CITY PLANNING COMMISSION MEETING: SEPTEMBER 9, 1993

ATTACHMENT: MAP, APPLICATION, DEED

DEPARTMENT OF COMMUNITY PLANNING AND DEVELOPMENT

REVERSION TO ACREAGE

FINAL SUBDIVISION MAP SUBMITTAL

THE MAP WILL BE PRESENTED TO THE PLANNING COMMISSION AFTER THE CITY ENGINEER HAS DETERMINED THAT IT IS ACCURATE AND CONFORMS TO ALL TENTATIVE MAP CONDITIONS.

SUBDIVISION NAME: SANDHILL VILLAS-UNITS 5 & 6 (REVERSIONARY)

LOCATION OF SUBDIVISION: Southeast Corner of Owens Ave. and Sandhill

ACRES TO BE DEVELOPED IN THIS UNIT: 1.261 NUMBER OF LOTS: 1 UNITS: _____

PRESENT ZONING: R-E (R01 R-PD15).

SUBMISSIONS REQUIRED WITH THIS APPLICATION:

ZONING: PRESENT R-E(R01 R-PD15) PROPOSED —

RECLASSIFICATION NUMBER: Z-53-83

1. TEN (10) COPIES OF THE FINAL MAP. *(One rolled plus nine folded to 8" x 12")*
2. A COPY OF THE MAP REDUCED TO A SCALE OF 1" = 200'.
3. A COPY OF THE DEED.

(Please Print)

RECORD OWNER(S) NAME(S): Catherine R. Black

ADDRESS: PO Box 90964 Henderson Nv. 89009 PHONE: 566-1042

SUBDIVIDER NAME: Catherine R. Black

ADDRESS: PO Box 90964 Henderson Nv. 89009 PHONE: 566-1042

SIGNED (ENGINEER OR SUBDIVIDER): Allen K Nielsen

FIRM NAME AND ADDRESS (OF ENGINEER): A K NIELSEN CONSULTING ENGINEERS

3390 Wynn Road Ste. D Las Vegas, Nv. 89102 PHONE: 876-9905

******FOR DEPARTMENT USE ONLY******

Filing Fee: 402.00 Receipt Number: 192233

Received By: JMP DATE: 8/11/93

Date of Tentative Map Approval by Planning Commission: —

Subdivision Location: S E CORNER OF SANDHILL RD. & OWENS AVE

District Map No. N-30-Z

RM-8-93 Revised Dec 89

101

Affix R. P. T. T. $ 71.50

RECORDED

9005.02000259

GRANT, BARGAIN, SALE DEED

THIS INDENTURE WITNESSETH: That FIRST INTERSTATE BANK OF NEVADA, N.A.

FOR A VALUABLE CONSIDERATION, the receipt of which is hereby acknowledged, do hereby Grant, Bargain, Sell and Convey to CATHERINE R BLACK, A SINGLE WOMAN

all that real property situated in the _____ **County of** Clark **State of Nevada, bounded and described as follows:**

PER LEGAL DESCRIPTION ATTACHED HERETO, IDENTIFIED AS EXHIBIT "A"

060-01D-001 thru 014
01E-001 thru 014
01H-001 thru 014
01J-001 thru 016

SUBJECT TO: (1) Taxes for the fiscal year 1990-1991.

(2) Supplemental taxes if any.

(3) Restrictions, conditions, reservations, rights, rights of way and easements of record.

Re-Recording to Correct middle initial of Grantee

Together with all and singular the tenements, hereditaments and appurtenances thereunto belonging or in anywise appertaining.

Witness _____ **hand** on **this** 30th **day of** April, 19 90

FIRST INTERSTATE BANK OF NEVADA, N.A.

BY: _____ VICE PRESIDENT

David Walquist

STATE OF NEVADA
COUNTY OF Clark } **SS.**

On 4/30/90 personally appeared before me, a Notary Public, David Walquist

personally known (or proven) to me to be the person(s) whose name(s) subscribed to the above instrument who acknowledged that he executed the instrument.

Signature _____ Notary Public

(Notarial Seal)

SANDY WILSON
Notary Public - State of Nevada
Appointment Recorded in Clark County
MY APPOINTMENT EXPIRES JUNE 28, 1992

ESCROW NO. 99377 MC
ORDER NO.
WHEN RECORDED MAIL TO: CATHERINE R. BLACK
c/o TOM BLACK 4414 E. BALTIMORE, LAS VEGAS, NV 89104

900502 00259

~~911122 00658~~

LEGAL DESCRIPTION

Situate in the County of Clark, State of Nevada, described as follows:

All of Sandhill Villas Unit I as shown by map thereof on file in Book 30 of Plats, page 33, in the Office of the County Recorder, Clark County, Nevada, and amended by Certificate of Amendment recorded April 6, 1984 in Book 1901 of Official Records, Clark County, Nevada as Document No. 1860143, and recorded August 17, 1984 in Book 1975 as Document No. 1934710 and March 7, 1985 in Book 2106 as Document No. 2065376.

All of Sandhill Villas Unit 2 as shown by map thereof on file in Book 30 of Plats, page 34 in the Office of the County Recorder of Clark County, Nevada, and amended by Certificate of Amendment recorded April 6, 1984 in Book 1901 of Official Records, Clark County, Nevada as Document No. 1860143 and recorded August 17, 1984 in Book 1975 as Document No. 1934710, and March 7, 1985 in Book 2106 as Document No. 2065376.

All of Sandhill Villas Unit 5 as shown by map thereof on file in Book 30 of Plats, page 37 in the Office of the County Recorder of Clark County, Nevada, and amended by Certificate of Amendment recorded April 6, 1984 in Book 1901 of Official Records, Clark County, Nevada as Document No. 1860143, and August 17, 1984 in Book 1975 as Document No. 1934710, and March 7, 1985 in Book 2106 as Document No. 2065376.

All of Sandhill Villas Unit 6 as shown by map thereof on file in Book 30 of Plats, page 38 in the Office of the County Recorder of Clark County, Nevada, and amended by Certificate of Amendment recorded April 6, 1984 in Book 1902 of Official Records, Clark County, Nevada as Document No. 1860143, and August 17, 1984 in Book 1975 as Document No. 1934710, and March 7, 1985 in Book 2106 as Document No. 2065376.

RE-RECORDED

CLARK COUNTY, NEVADA
JOAN L. SWIFT, RECORDER
RECORDED AT REQUEST OF:
C BLACK

11-22-91 09:52 LJD 2
OFFICIAL RECORDS
BOOK: 911122 INST: 00658
~~FEE: 6.00 RPTT: EX#003~~

EXHIBIT "A"

CLARK COUNTY, NEVADA
JOAN L. SWIFT, RECORDER
RECORDED AT REQUEST OF:
LAND TITLE OF NV

05-02-90 08:00 NA1 2
OFFICIAL RECORDS
BOOK: 900502 INST: 00259
FEE: 6.00 RPTT: 71.50

CITY OF LAS VEGAS

INTER-OFFICE MEMORANDUM

Date

December 10, 1993

TO:

CHARLES TURK , CHIEF
DEPARTMENT OF PUBLIC WORKS
LAND DEVELDPMENT DIVISION

FROM:

ROBERT S. GENZER
PRINCIPAL PLANNER
CURRENT PLANNING DIVISIDN

SUBJECT:

FINAL MAP APPROVAL BY THE LAS VEGAS
CITY PLANNING COMMISSION

COPIES TO:

The Final Map(s) of Sandhill Villas Units 5 & 6 (Reversionary) was(were) reviewed by the Las Vegas City Planning Commission on September 9, 1993 and was(were) approved as being in conformance with the Tentative Map. The attached original tract map(s) is(are) now being submitted to you for final processing and recordation.

12/13/93
R/W OK
CMC

RSG
Attachment

CITY of LAS VEGAS

September 14, 1993

Ms. Catherine R. Black
P. O. Box 90964
Henderson, Nevada 89009-0964

RE: REVERSIONARY MAP - SANDHILL VILLAS - UNITS 5 AND 6 - RM-8-93

Dear Ms. Black:

The Reversionary Map for Sandhill Villas - Units 5 and 6, located on the southeast corner of Sandhill Road and Owens Avenue, R-E Zone (under Resolution of Intent to R-PD15), was considered by the Planning Commission on September 10, 1993.

The Planning Commission unanimously voted to APPROVE your request, subject to the following:

1. This Reversionary Map must be recorded prior to the recordation of any new maps on this site.

This action by the Planning Commission is final unless a written appeal is filed with the City Clerk within seven days of the date of this letter or there is a review action filed by the City Council within the same time period.

Sincerely,

DEPARTMENT OF COMMUNITY PLANNING
AND DEVELOPMENT
NORMAN R. STANDERFER, DIRECTOR

ROBERT S. GENZER, PRINCIPAL PLANNER
CURRENT PLANNING DIVISION

RSG:erh

cc: A. K. Nielsen Consulting Engineers
3390 Wynn Road, Suite D
Las Vegas, Nevada 89102

CITY OF LAS VEGAS
INTER - OFFICE MEMORANDUM

DATE

August 30, 1993

TO:

Norman R. Standerfer, Director
Department of Community Planning & Development

FROM:

Richard D. Goecke, Director
Department of Public Works

SUBJECT:

RM-8-93
Reversionary Map
Sandhill Villas - Units 5 & 6

COPIES TO:

John McNellis, Engineering Planning
Ed Byrge, Right-of-Way
Chuck Turk, Land Development
Rita Lumos, Survey (FM, PM, & A's only)
Gordon Derr, Traffic Engineering (TIA's only)

1. We have no objection to the request to record a reversionary map that will revert Sandhill Villas - Units 5 & 6 back to acreage. We understand that no right-of-way dedications will be vacated with this reversionary map.

2. Upon development of this site, an additional 29 feet of dedication for a total radius of 54 feet will be required on the corner of Sandhill Road and Owens Avenue.

RDG:KJM:jam

G:\ALAN\WPDATA\WP51DATA\RM-8-93

NOTE 1990 Report, but project is being revived

TM

SOILS REPORT TRANSMITTAL

Date 5-17-95

TO:	FROM:
Josh Harris LAND DEVELOPMENT SERVICES	Doug Johnson CONSTRUCTION SERVICES

PROJECT NAME: SANDHILL VILLAS UNITS 1, 2, 5, & 6

LOCATION:

SOILS REPORT PREPARED BY: _____

DATE OF REPORT: _____

REPORT #: _____

I HAVE REVIEWED THE SOILS REPORT FOR THE ABOVE PROJECT AND HAVE FOUND IT TO BE:

(CHECK ONE)

☒ THIS STUDY IS NOT ACCEPTABLE AND MUST BE RESUBMITTED DUE TO:

need update letter from Geotechnical Engineer to verify the report is applicable to current site conditions

☐ THIS STUDY, AS SUBMITTED, IS ACCEPTABLE.

BASED ON THE INFORMATION SUBMITTED, THE STREET SECTIONS FOR THIS PROJECT SHOULD:
(CHECK ONE)

☐ CONFORM TO THE CITY'S STANDARD STREET SECTIONS

☐ CONSIST OF _____

COMMENTS: _____

By _____ Date 5/23/95 JO

PLEASE SIGN AND RETURN WHITE COPY TO LAND DEVELOPMENT

1730-049-3/95

White - Land Development • Yellow - Retain in Construction Services • Pink - Retain in Land Development

B-SAFE CONSULTANTS
715 Strawberry Place Henderson, Nevada 89015 (702) 565-1948
Soil & Foundation Investigations/Site Evaluations/Testing Services

GEOTECHNICAL INVESTIGATION

for

PROPOSED SANDHILL VILLAS-UNITS 1,2,5 & 6
Southeast Corner of Owens Ave. and Sandhill Road, and
also Southeast Corner of Spino Ave. and Sandhill Road
Las Vegas, Nevada

FOR: A&A Associates
3560 Polaris Ave., St. #24
Las Vegas, Nevada 89103

Project No. 90-112-1

September 20, 1990

INTRODUCTION

General

This report presents the results of a geotechnical investigation performed at the site of the proposed Sandhill Villas residential development in Las Vegas, Nevada. The purposes of this investigation were to:

- o assess the nature and pertinent engineering properties of the subsurface soils.
- o provide recommendations for site preparation and grading, including subgrade excavations and estimated material volume changes.
- o provide recommendations to aid in the design and construction of foundations and slabs-on-grade.
- o provide recommendations for moisture protection, surface drainage, and soil corrosion.
- o Provide recommendations to aid in the design and construction of on-site asphalt pavements.

The investigation included subsurface exploration, laboratory testing, engineering analyses, and the preparation of this report.

Project Description

It was our understanding that the proposed development was to consist of numerous one-story residential structures similar to those constructed for Units 3 and 4. All structures were to have been of wood-frame construction with a concrete slab-on-grade floor. The remainder of the site was to consist of asphalt parking/roadways and landscaping with walkways.

Anticipated structure load data was not available; therefore, for the purposes of this investigation, we have assumed that wall loads would not exceed 2 kips per lineal foot. Also, we have assumed that structure floor slabs would be located at or very near the existing grades. If the proposed construction is different or if the design loads exceed the assumed loads by more than 50 percent, our office should be notified.

FIELD INVESTIGATION

The subsurface soil conditions were explored by excavating four trenches to a depth of 10 feet. The approximate locations of the field explorations are shown on Drawing No. 1. Continuous logs of the subsurface conditions as encountered in the explorations, were recorded at the time of excavation and these logs are presented on Drawing Nos. 2 through 5. A key to soil symbols and terms used in

conjunction with these logs is presented on Drawing No. 7.

Trenching was accomplished using a Case 580D rubber-tired backhoe. Undisturbed samples were collected with hand sampling equipment. All soil samples obtained were classified by a field engineer and were packaged and transported to our laboratory for possible testing.

LABORATORY TESTING

Representative soil samples were tested in the laboratory (and field) to aid in the assessment of their physical properties and engineering characteristics. The amount and selection of the types of testing for a given study are based upon the geotechnical conditions of the project. The results of the tests are presented on the Log of Trenches (Drawing Nos. 2 through 5), on the Consolidation Test data graph (Drawing No. 6), and in the following table. The soil samples from this project will be stored in our laboratory for roughly 30 days after the date of this report. Unless we receive a specific request to retain the samples for a longer period, the samples will be discarded at the end of this period. A discussion of the various laboratory tests conducted for this project are presented below.

Moisture Content and Dry Density

Data Obtained from these tests, performed on relatively undisturbed samples, were used to aid in the classification and correlation of the soils, and to provide qualitative information regarding soil strength and compressibility.

Consolidation

Data obtained from this test, performed on a relatively undisturbed soil sample, were used to evaluate the settlement and hydrocollapse characteristics of the foundation soils under load. Preparations for this test involved trimming the sample in a one-inch high brass ring and loading it into the test apparatus which contained porous stones to accommodate drainage and/or the introduction of water during testing. Normal axial loads were applied to one end of the sample and the resulting deflections were recorded at various time periods. The load was increased after the sample reached a reasonable state of equilibrium. Maximum applied loads are based upon the anticipated loading conditions and the total percentage of settlement encountered during testing.

Clay Swell

A representative sample of the near surface clay soils was tested in the laboratory to determine its moisture content volume-change characteristics. The sample was remolded to a density that could be obtained during normal field recompaction, at a moisture content below optimum (represents some field drying of the soils). The sample was loaded using a surcharge pressure of 60 pounds per square foot (psf) and the percent of vertical swell was determined following the

introduction of water into the sample. The test results were as follows:

Trench No.	Depth, Feet	Soil Description	Remolded Dry Density (pcf)	Remolded Moisture Content-%	Percent Vertical Swell Under 60 psf Surcharge
3	1.5-2	light brown Silty Clay	102.2	3.0	6.8

Shear Strength

Shear strength tests were performed in the field and laboratory using a pocket penetrometer. The pocket penetrometer tests were not correlated against one of the standard laboratory shear test methods; therefore, these test results represent only a relative indication of the shear strength of the native subgrade soils.

SITE CONDITIONS

Surface

Units 1 and 2. The site was bounded on the north by Spino Ave. and existing Units 3 and 4, on the east by two-story wood-frame apartments, on the south by undeveloped desert, and on the west by Sandhill Road and two-story wood-frame apartments. At the time of our investigation, the site was undeveloped but had been leveled, with some apparent grading having been performed. The surface of the site contained only minor amounts of widely scattered trash and debris. A few fill piles were present on the north boundry adjacent to Spino Ave. Vegetation was sparse to nonexistent over a majority of the site; however, heavy vegetation and several moderately large trees were present along the east property line. The site sloped gently toward the south and site drainage was by sheetflow to the adjacent streets and a shallow drainage ditch along the south property line.

Units 5 and 6. The site was bounded on the north by Owens Ave. and a horse corral, on the east by undeveloped desert to the north and two-story wood-frame apartments to the south, on the south by existing Units 3 and 4, and on the west by Sandhill Road and undeveloped, but leveled, property. At the time of our investigation, the site was undeveloped but had been mostly leveled, with some apparent grading having been performed. The surface of the site contained only minor amounts of widely scattered trash and debris. Vegetation was sparse to nonexistent except in a narrow area along the south portion of the east property line. Vegetation in this area was heavy with several moderately large trees. Except for a lower area at the north end, the site was relatively flat and sloped gently toward the south. Site drainage was by sheetflow to the adjacent streets.

Subsurface

Based upon the four trenches excavated for this study, the natural soils generally consisted of stiff to extremely stiff clayey silts, silty clays and sandy silts to the depths explored. These near surface natural soils were generally slightly porous to porous. Dry fill (possibly controlled) consisting of gravelly clays, clayey silts and silty clays were encountered at the surface of three of the four trenches. This fill ranged in depth from 1 to 2.5 feet and contained numerous shrinkage cracks as a result of drying following compaction. Groundwater was not encountered within the depths explored. Laboratory testing indicated that the near surface natural soils had low to moderate dry densities, were susceptible to moderate to large hydrocollapse and/or settlement under additional loading and increased moisture conditions, had good shear strength characteristics, and the clays were susceptible to at least a moderate swell potential when recompacted to higher densities.

Variations

Based upon the results of our subsurface explorations and experience, variations in the continuity and depth of the subsoil deposits should be anticipated. Due to the nature and depositional characteristics of the natural soils at the site, care should be exercised in interpolating or extrapolating subsurface soil conditions between or beyond the exploration locations.

GEOLOGIC CONDITIONS

Geologic Setting

The site of the proposed development is located within the central portion of the Las Vegas Valley. The Las Vegas Valley is filled with Quaternary and Tertiary aged unconsolidated sediments derived from the surrounding mountains.

The valley floor consists of alluvial, playa, and aeolian deposits surrounded by the more steeply sloping alluvial aprons derived from erosion of the mountains surrounding the valley. Generally, the grading of the sediments becomes increasingly finer with distance from the source area and with decreasing elevation. The alluvial, playa, and aeolian sediments can be several thousand feet thick.

Seismicity and Tectonic Faulting

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 5.8 Richter magnitude) at the Nevada Test Site which remains the major source of seismic activity in the Las Vegas area. Tectonic shocks having epicenters within the Southern Nevada area have been minimal.

The Las Vegas Valley is located in Seismic Zone 2 as categorized in

the Uniform Building Code. Zone 2 presents a low to moderately active seismic area. No geologically recent (within the last 10,000 years) bedrock or tectonic faults are known to transect the alluvial deposits at the site of the proposed development. The nearest faults with evidence of possibly geologically recent displacement are located at the base of Frenchman's Mountain. These faults are approximately 3 to 4 miles east of the project.

Non-Tectonic Features

The nearest known subsidence fault is located approximately 1.2 miles south of the project site. These faults, which occur within unconsolidated valley fill deposits, are considered the result of differential consolidation of deep alluvial and lacustrine (playa) sediments having dissimilar grain size and consolidation characteristics. These faults are not bedrock faults, although the displacement may have been at least partly induced by an earthquake. The age of one of these escarpments has been dated at about 14,000 years old. Differential stress including the presence of "fissures", has in some cases been localized near these subsidence faults. This appears to be the result of regional and local subsidence due to the withdrawal of groundwater from principal aquifers.

To the best of our knowledge, there are no indications of any significant differential subsidence or ground displacement which might adversely affect the project site.

ENGINEERING ANALYSES AND RECOMMENDATIONS

General

Based upon the results of the field and laboratory investigations, combined with engineering analyses and our experience and judgement, the dry fills, and natural porous and moderately to highly moisture sensitive soils are not considered suitable for the support of the proposed structures. Although the existing fills appeared to have been compacted, these fills have dried (increased swell potential) and have depths and/or materials which are not consistent with current geotechnical standards for this area. Therefore, certain measures must be taken to reduce the potential for unacceptable settlement beneath the structures. One method is to completely remove and recompact the porous soils. However, due to the anticipated cost of this alternative, partial removal and replacement of these soils is a method which has been locally adopted. The owner should be aware of the risk involved with this partial removal alternative, i.e. if saturation of the subgrade soil occurs in the future, settlement resulting in some distress to structures could still occur, although at a reduced level.

The natural soils and fill should be easily excavated for utilities, foundations, and general site grading using standard earthwork equipment. Groundwater is not expected to be encountered during the utility excavations.

The following paragraphs present our specific recommendations for site preparation and grading, foundation design including lateral loads, slabs-on-grade, moisture protection and surface drainage, soil corrosion, and on-site pavement design.

Building Pad Preparation and Grading

General. Prior to earthwork operations, the existing vegetation, including major root systems, should be stripped from the site and disposed of. Also, any uncontrolled fill and debris should be removed from the proposed structure areas prior to placing structural fill.

Within building areas, the on-site soils should be excavated, processed and recompacted to provide a zone of structural fill for the support of footings and slabs-on-grade. The depth of overexcavation, scarification, and recompaction should extend to at least two feet below footings and slabs-on-grade. Also, the zone of overexcavation or scarification and recompaction beneath asphalt pavements and exterior concrete flatwork should be at least one foot. Laterally, the zone of structural fill should extend to at least 5 feet beyond building areas and 2 feet beyond pavement areas, where possible. Where any proposed fill depths exceed these requirements, overexcavation is not required.

The soils exposed in the above recommended excavations should be scarified to a minimum depth of six inches, brought to near optimum moisture content for any granular soils or 3 to 5 percent above optimum for clay soils, and compacted to at least 90% of the maximum dry density (ASTM D1557) for any granular soils or from 85 to 92 percent of the maximum dry density for clay soils. The site may then be brought to final grades with structural fill, placed and compacted in accordance with the following section. Where the clay soils are used as deep structural fill or are present at pavement subgrade, its moisture content should be maintained within building and pavement areas until construction is complete. As an alternative, the subgrade clay soils may be removed and replaced with structural fill to the depth of the overexcavations in structure areas.

The exploration trenches were excavated at the approximate locations as shown on Drawing No. 1. If required, the actual locations of the trenches should be verified by survey. The trenches were backfilled with the excavated soils to the extent possible with the equipment at hand. However, the backfill was not compacted to the requirements for structural fill. If structures, concrete flatwork, pavements, utilities, or other improvements are to located over any of the trenches, the backfill should be removed and replaced with structural fill in accordance with the following section. Failure to properly compact the backfill could result in excessive settlement of improvements located over trenches.

Structural Fill. Structural fill should consist of non-gypsiferous (solubility less than 2%), low expansive (expansion potential of less than 2% under 144 psf or a plasticity index less than 15), low chemical heave potential (water soluble sodium sulfate percentage less than 0.3%), soils free of vegetation and debris, and containing no rocks larger than 6 inches in diameter. Structural fill should be

placed in thin, loose lifts compatable with the equipment being used, brought to near optimum moisture content for granular soils or 3 to 5 percent above optimum for clay soils, and compacted to at least 90% of the maximum dry density (ASTM D1557) for granular soils or from 85 to 92 percent of the maximum dry density for clay soils.

Most of the on-site natural soils and fill will most likely not meet the requirements presented above. However, these clayey soils may be used as structural fill in building areas where the depth of fill below slabs is greater than 2 feet. Imported structural fill should be approved at the source prior to importion to the site.

Excavations. Based upon our observations made during the field explorations, we expect that the subgrade soils should be easily excavated with standard earthwork equipment. Groundwater is not expected to be encountered in the utility excavations.

Vertical excavations for utility trenches in the natural soils and fill would be expected to slough and cave. Excavations should be laid back to safe slopes or properly shored. Trenching and shoring operations should be conducted in accordance with Section Nos. 1926.650 through .653 of the State of Nevada Occupational Safety and Health Standards for the Construction Industry with ammendments of August 31, 1986. Temporary excavations in the silts and clays should have slope gradients no steeper than 1:1 (horizontal to vertical). Temporary excavations should be flattened to have slope gradients of 1.5:1 where any silty sands or granular fills are encountered. Surcharge loads such as construction equipment and materials should not be placed within 10 feet of the top of the excavation slope. It should be noted that safety of construction personnel is the responsibility of the contractor.

Material Volume Changes. There will be material losses due to clearing and grubbing operations which are difficult to estimate. Also, there will be shrinkage losses when excavating and recompacting the on-site soils. A subsidence, or additional shrinkage factor, will also be encountered where the exposed natural soils are scarified and recompacted to a maximum depth of six inches. The following estimated shrinkage and subsidence factors should be used to compute cut/fill volumes:

Approximate Depth Below Natural Ground Surface (Feet)	Soil Type	Shrinkage, Percent *	Subsidence, Feet **
0 to 5	silty clays, clayey silts and sandy silts	20 to 25	0.15

* A 10 percent shrinkage factor would mean that it would take 1.1 cubic yards of excavated materials to make 1.0 cubic yards of properly compacted fill.

** For one-half foot scarification. Deeper scarification depths would be proportionately more.

Foundation Design

Structures may be supported by conventional spread footings founded on a zone of properly placed and compacted structural fill. All fill should be placed and compacted in accordance with the "Site Preparation and Grading" section of this report.

Footings should be a minimum of 12 inches wide and should be embedded a minimum of 15 inches below the lowest adjacent exterior compacted grade. Foundations supported as recommended may be proportioned for a maximum net allowable bearing pressure of 1500 pounds per square foot (psf). A one-third increase in the allowable bearing pressure may be used for wind and seismic loads. Total and differential settlements of footings founded in accordance with our recommendations are estimated to be on the order of one-quarter to one-half inch or less, provided the subgrade porous soils do not become saturated as a result of water or sewer line leaks and excessive irrigation, eithor from an on-site or an off-site source.

Horizontal loads acting on foundations formed in open excavations will be resisted by friction forces acting on the base of the footing and by passive earth pressures. If design makes use of passive earth pressure, it is important that the Geotechnical Engineer be present during footing backfill placement. The friction acting along the base of footings founded on suitable foundation soils may be computed by using a coefficient of friction of 0.3 with the normal dead load forces. An allowable lateral passive earth pressure may be computed by using an equivalent fluid weighing 200 pounds per cubic foot (pcf) for the sides of footings poured against properly placed and compacted structural fill. The maximum allowable passive pressure should not exceed 2000 psf.

Building Slabs-on-Grade

Concrete slabs-on-grade should be supported by a granular blanket of at least six inches of pit-run gravel or Type 2 aggregate base, compacted to not less than 90% of ASTM D1557, or pea gravel, or clean gravel (Type 57 or 67 concrete aggregate). The granular blanket should be overlain by a visqueen moisture barrier covered with 2 inches of sand. The granular blanket can be considered as part of the required zone of structural fill beneath slabs-on-grade. Prior to placement of the blanket, the building pad should have been prepared as recommended in the "Site Preparation and Grading" section of this report.

All concrete slabs should be designed to minimize cracking as a result of shrinkage and reinforced to resist at least a moderate soil expansion potential (if clay soils are used as deeper structural fills). The reinforcement should be installed at mid-height in the slabs. Special precautions must be taken during the placement and curing of all concrete slabs. Excessive slump (high water-cement ratio) of the concrete and/or improper curing procedures could lead to excessive shrinkage, cracking, or curling in the slabs. We recommend

that all concrete placement and curing operations be performed in accordance with the American Concrete Institute (ACI) Manual.

Moisture Protection and Surface Drainage

We recommend that precautions be taken during and after construction to help reduce the potential for saturation of the moisture sensitive natural foundation soils. The final surface should slope away from the exterior walls of the structures, and we recommend that planters not be placed adjacent to the structure walls. The minimum recommended slope in landscaped areas is three percent. Care should be taken during construction of utility lines and during backfill of utility trenches. We recommend that all backfill of utility lines consist of on-site natural soils compacted to the requirements presented in the "Site Preparation and Grading" section of this report to reduce the potential for future subsurface saturation.

Soil Corrosion

Based upon our experience and knowledge of the soil conditions within the Las Vegas Valley, soils on this site should be considered highly corrosive to metal and concrete. We recommend that Type V or an equivalent sulfate resisting cement be used for footings, slabs-on-grade, and any other concrete in contact with the on-site soils. Special protections, such as the use of PVC or other corrosion resistant pipe should be considered for the long-term performance of underground utilities.

On-Site Pavement Design

Since actual traffic data was not available, we have assumed Traffic Indexes based upon the proposed use of the pavement areas. We anticipate that on-site pavements will be subjected primarily to passenger car traffic with low volumes of heavy truck traffic. If increased traffic levels are anticipated, we should be notified so that necessary changes in the required pavement structural sections can be made.

Our recommendations are based upon our visual classification of the subsurface soils, the assumed Traffic Indexes, an assumed minimum R-value of 25 based upon soil classification, and the site preparation and grading recommendations in this report. The following minimum pavement sections are recommended:

Pavement Area	Assumed Traffic Index	Asphalt Concrete Thickness (Inches)	Type 2 Aggregate Base (Inches)
Onsite Streets*	5.5	2.5	9.0
Auto Parking Areas	4.0	2.0	6.0

* With garbage truck traffic.

Pavement sections should be supported upon a properly prepared subgrade which consists of at least 12 inches of scarified and recompacted natural soils and/or structural fill, as recommended in

the "Site Preparation and Grading" section of this report.

All asphalt and Type 2 aggregate base should meet the criteria set forth in the Uniform Standard Specifications for Clark County, Nevada. Type 2 aggregate base should be compacted to at least 95 percent of ASTM D1557 while the asphalt concrete should be compacted to a minimum of 93 percent of the maximum theoretical density. Field and laboratory testing should be performed to determine whether the applicable requirements have been met.

CLOSURE

Our assumptions, conclusions, recommendations, and opinions presented herein are (1) based upon our evaluation and interpretation of the findings of the field and laboratory programs, (2) based upon an interpolation of the soil conditions between and extrapolation beyond the explored locations, (3) based upon our geotechnical experience in the area, (4) subject to confirmation of the subsurface conditions encountered during construction, (5) based upon the assumption that sufficient observation and testing will be provided to implement our recommendations during construction, and (6) prepared in accordance with generally accepted professional geotechnical engineering principles and practice. We make no other warranty, eithor express or implied.

This report has been prepared to provide information allowing the Architect or Engineer to design the project. If there are changes in the design or location of the project from the time of this report, the changes should be communicated to us and our recommendations would be reviewed and possibly modified. If the Geotechnical Engineer is not accorded the privilege of making this recommended review, he can assume no responsibility for misinterpretation or misapplication of his recommendations or their validity in the event changes have been made in the original design concept without his review. Also, if conditions are encountered during construction that appear to be different than indicated in this report, our office should be notified.

It has been our pleasure to serve you on this project. If you have any questions, please contact the undersigned.

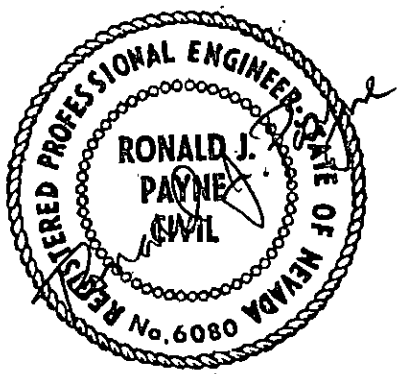
Respectfully submitted,
B-SAFE CONSULTANTS

Ronald J. Payne

Ronald J. Payne, P.E.

Encl: Drawings 1 through 7

Dist: 6/Addressee



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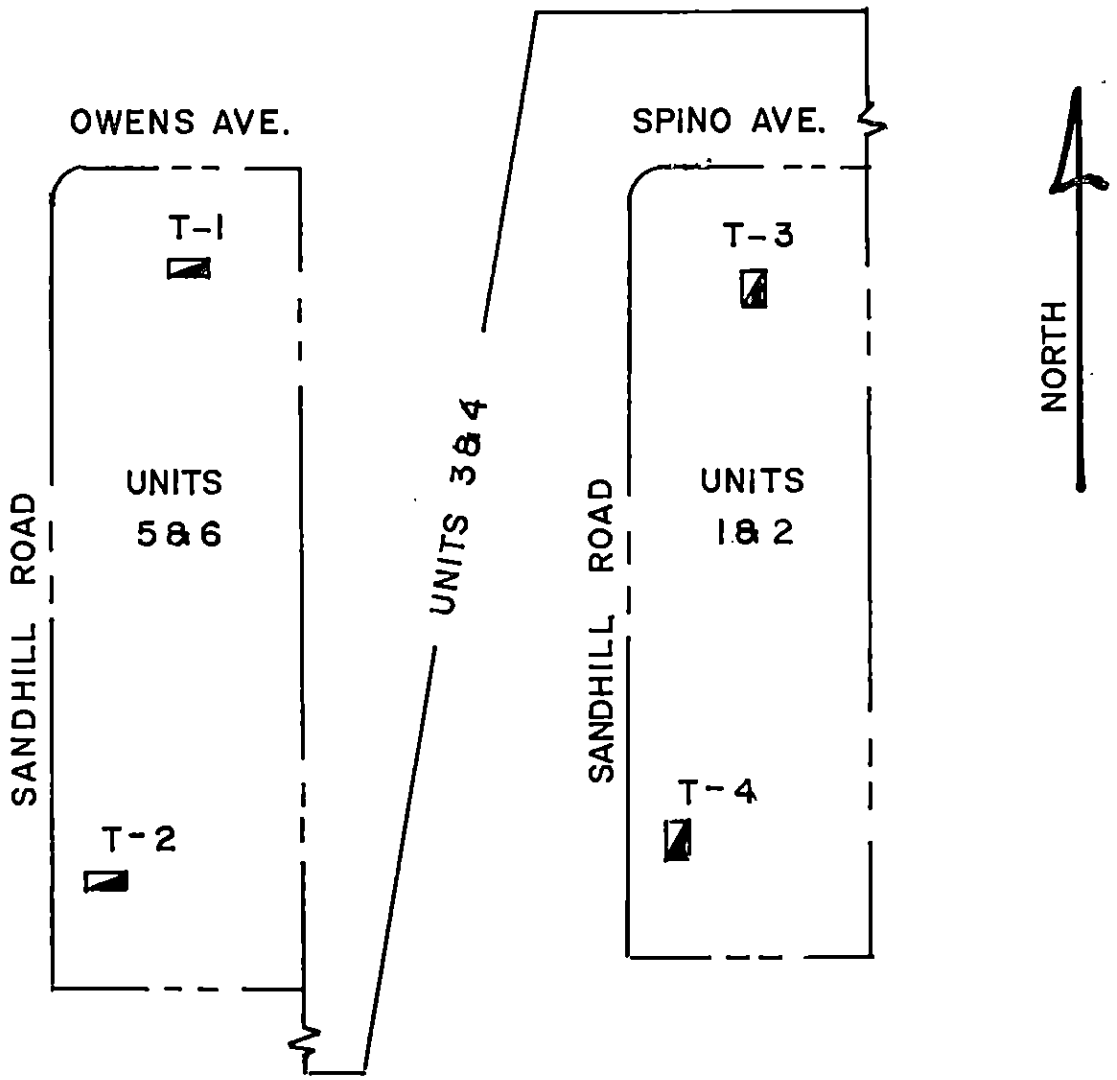


LEGEND:

APPROX. TRENCH LOCATION

SANDHILL VILLAS

B-SAFE CONSULTANTS

Scale 1"=100'	Project No. 90-112-1
Prepared by RJP	Date 9-19-90
Checked by	Drawing No. 1
Approved by	

LOG OF TRENCH NO. 1

DATE: 9/9/90

LOCATION: See Drawing No. 1

ELEVATION: Not measured.

DEPTH IN FEET	SAMPLES	SYMBOL	SOIL DESCRIPTION	COLOR	MOISTURE	CONSISTENCY	REMARKS
0		ML-CL	CLAYEY SILT to SILTY CLAY, slightly porous	light brown	dry to sl. moist	ext. stiff	DD=90 pcf, M=3.8% PP=4.5+ksf
5		ML	SANDY SILT, slightly porous to porous -- with pockets of sandy gravel			stiff to very stiff	DD=84pcf, M=4.6%
10			Bottom of Trench at 10'. No groundwater encountered.				
15							

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

SANDHILL VILLAS

DRAWING NO. 2

B-SAFE CONSULTANTS

PROJ. NO. 90-112-1

LOG OF TRENCH NO. 2

DATE: 9/9/90

LOCATION: Drawing No. 1

ELEVATION: Not measured.

DEPTH IN FEET	SAMPLES	SYMBOL	SOIL DESCRIPTION	COLOR	MOISTURE	CONSISTENCY	REMARKS
0		FILL	GRAVELLY CLAY, some sand, numerous shrinkage cracks	light brown	dry	ext. stiff	PP=4.5+ ksf to 10' DD=92pcf, M=2.4%
		CL-ML	SILTY CLAY to CLAYEY SILT, slightly porous to porous		sl. moist to moist		DD=83pcf, M=11.3%
10			Bottom of Trench at 10'. No groundwater encountered.				
15							

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

SANDHILL VILLAS

DRAWING NO. 3

B-SAFE CONSULTANTS

PROJ. NO. 90-112-1

LOG OF TRENCH NO. 3

DATE: 9/9/90

LOCATION: See Drawing No. 1

ELEVATION: Not measured.

DEPTH IN FEET	SAMPLES	SYMBOL	SOIL DESCRIPTION	COLOR	MOISTURE	CONSISTENCY	REMARKS
0		FILL	CLAYEY SILT to SILTY CLAY, numerous shrinkage cracks	light brown	dry	ext. stiff	PP= 4.5+ ksf to 10'
							DD=94pcf, M=2.6%
		CL-ML	SILTY CLAY to CLAYEY SILT, slightly porous to porous		dry to sl. moist		
5							DD=76pcf, M=6.7%
10			Bottom of Trench at 10'. No groundwater encountered.				
15							

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

SANDHILL VILLAS

DRAWING NO. 4

B-SAFE CONSULTANTS

PROJ. NO. 90-112-1

LOG OF TRENCH NO. 4

DATE: 9/9/90

LOCATION: See Drawing No. 1

ELEVATION: Not measured.

DEPTH IN FEET	SAMPLES	SYMBOL	SOIL DESCRIPTION	COLOR	MOISTURE	CONSISTENCY	REMARKS
0		FILL	CLAYEY SILT, some shrinkage cracks	light brown	dry	ext. stiff	PP=4.5+ ksf to 10'
		CL-ML	SILTY CLAY to CLAYEY SILT, slightly porous to porous		dry to sl. moist		
							DD=82pcf, M=5.4%
5							DD=78pcf, M=6.8%
10			Bottom of Trench at 10'. No groundwater encountered.				
15							

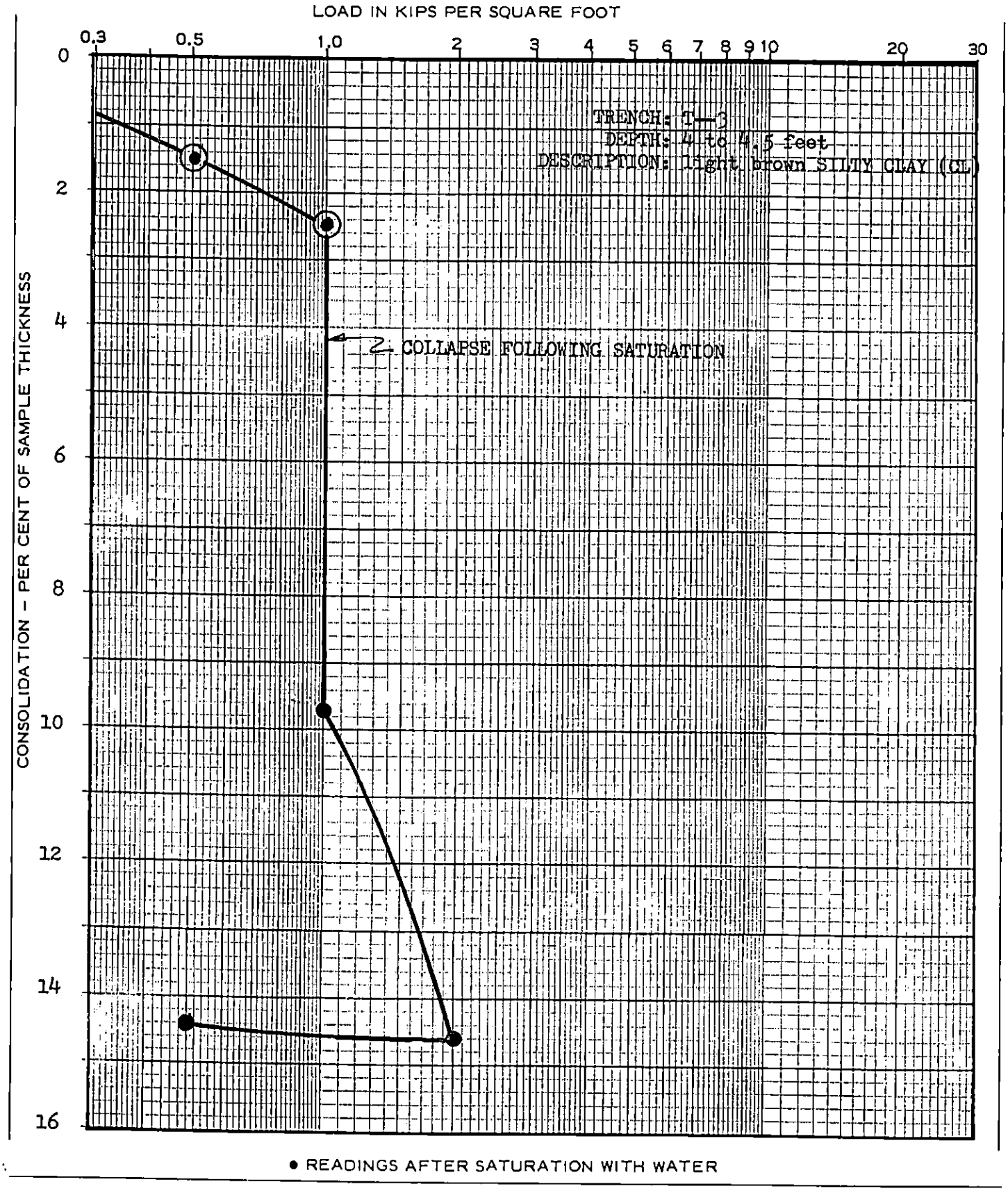
THIS SUMMARY APPLIES ONLY AT THIS LOCATION AND AT THE TIME OF LOGGING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

SANDHILL VILLAS

DRAWING NO. 5

B-SAFE CONSULTANTS

PROJ. NO. 90-112-1



CONSOLIDATION TESTS

SANDHILL VILLAS

Project No.
90-112-1

B-SAFE CONSULTANTS

Drawing No.
6

KEY TO SOILS SYMBOLS AND TERMS

TERMS USED IN THIS REPORT FOR DESCRIBING SOILS ACCORDING TO THEIR TEXTURE OR GRAIN SIZE DISTRIBUTIONS ARE GENERALLY IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM.

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly-graded gravels, 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 half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly-graded sands, 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 half of material is smaller than 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 slight 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

TERMS DESCRIBING CONDITION, CONSISTENCY AND HARDNESS

COARSE GRAINED SOILS (major portion retained on No. 200 sieve): Includes (1) clean gravels, (2) silty or clayey gravels and (3) silty, clayey or gravelly sands. Consistency is rated according to relative density, as determined by field penetration resistance.

Descriptive Term	Relative Density
Very loose	0 to 15%
Loose	15 to 40%
Medium dense	40 to 70%
Dense	70 to 85%
Very dense	85 to 100%

FINE GRAINED SOILS (major portion passing No. 200 sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength as indicated by penetrometer readings or by direct shear tests.

Descriptive Term	Shear Strength (ksf)
Very soft	less than 0.25
Soft	0.25 to 0.50
Firm	0.50 to 1.00
Stiff	1.00 to 2.00
Very stiff	2.00 to 4.00
Extremely stiff	4.00 and higher

ROCK: Includes (rock-like)..... caliche and bedrock materials. Hardness is related to field identification procedures described below.

Descriptive Term	Field Identification Test
Soft	Can be dug by hand and crushed by fingers
Moderately hard	Friable, can be gouged deeply with knife and will crumble readily under light hammer blows
Hard	Knife scratch leaves dust trace, will withstand a few hammer blows before breaking
Very hard	Scratched with knife with difficulty, difficult to break with hammer blows

SOIL MOISTURE

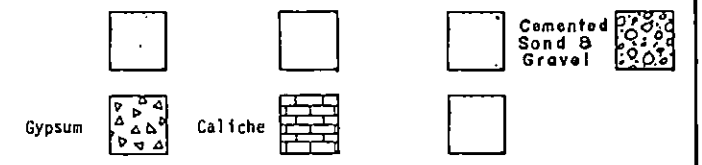
From low to high the soil moisture is indicated by:

Dry
Slightly moist
Moist
Very moist
Wet

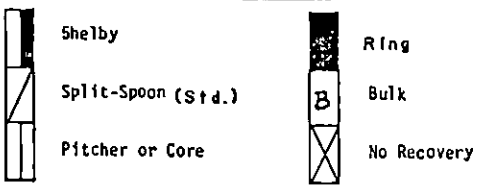
SIZE PROPORTIONS

Designation	Percent by Weight
Trace	0 to 10
Some	10 to 20
With	20 to 35
And	35 to 50

SOIL TYPE KEY



SAMPLER TYPES



LEGEND OF LABORATORY TESTS

G-Grain-size	S-Swell	OS-Direct Shear
A-Liquid & Plastic Limits	Ch-Chemical	T-Triaxial
PP-Pocket Penetrometer	H-Chemical Heave	Sol-Solubility
U-Unconfined	C-Consolidation	P-Compaction
M-Moisture	DD-Dry Density	

B-SAFE CONSULTANTS

Drawing No. 7