Residence "A" Barnsdall Park
Los Angeles
Structural Historic Report

Prepared for

LSA Associates and Chattel Architecture
Riverside, California

Submitted by

Melvyn Green and Associates
Structural Engineers

Table of Contents

Scope and Intent

Introduction

In support of the Historic Structures Report for Residence A at Barnsdall Park, Melvyn Green and Associates, Structural Engineers has developed this structural and condition report on the building.

The building has been used by the Department of Parks and Recreation for many years as an center for art classes. Basic use of the building has been class, work areas and office.

Intent

The intent of this report is to provide information on the building, its structural condition, previous structural alterations and recommendations for any needed repair or retrofit work.

In this report the structure is described and its probable load carrying capacity determined. Further the lateral load system of the building was reviewed and discussed.

To assist in the development of alternate uses for the building, a general review of building code provisions and possible effects are included.

Limitations

This report is based on records and previous plans. Work is limited to visible areas. No additional destructive investigation was conducted.

Methodology

Documents

In order to prepare this report a review of architectural records and drawings was conducted. The following were reviewed:.

- Review of original plans prepared by Frank Lloyd Wright, 1921 were reviewed for general floor layout.
- Elevations and sections from the Schindler archives were provided for review.
- Plans prepared by Melvyn Green and Associates, for repair and hazard mitigation after the 1994 Northridge earthquake. Selected portions of the plans are included herein.

Inspection

A visual inspection of all interior areas of the building, as well as the exterior, was conducted as part of this work.

Gridlines

The floor plans have an overlay of gridlines to assist in defining work locations and, in this report, for describing conditions at specific locations. Within this building description the gridlines are used to describe the location of various wall materials, repair locations, and other building information.

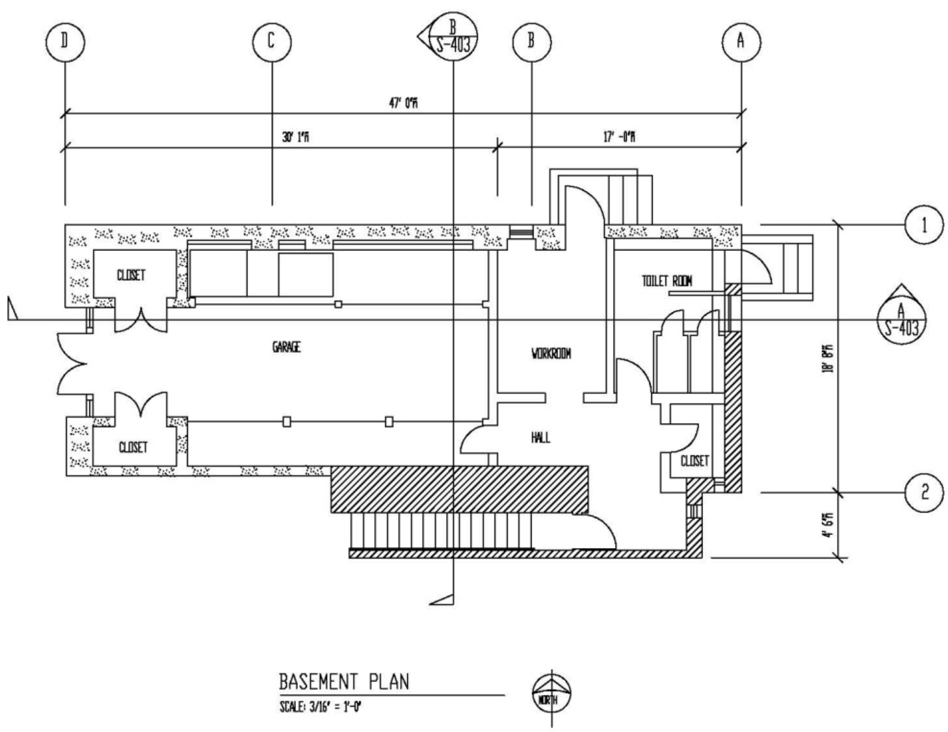


Plate 1. Basement plan.

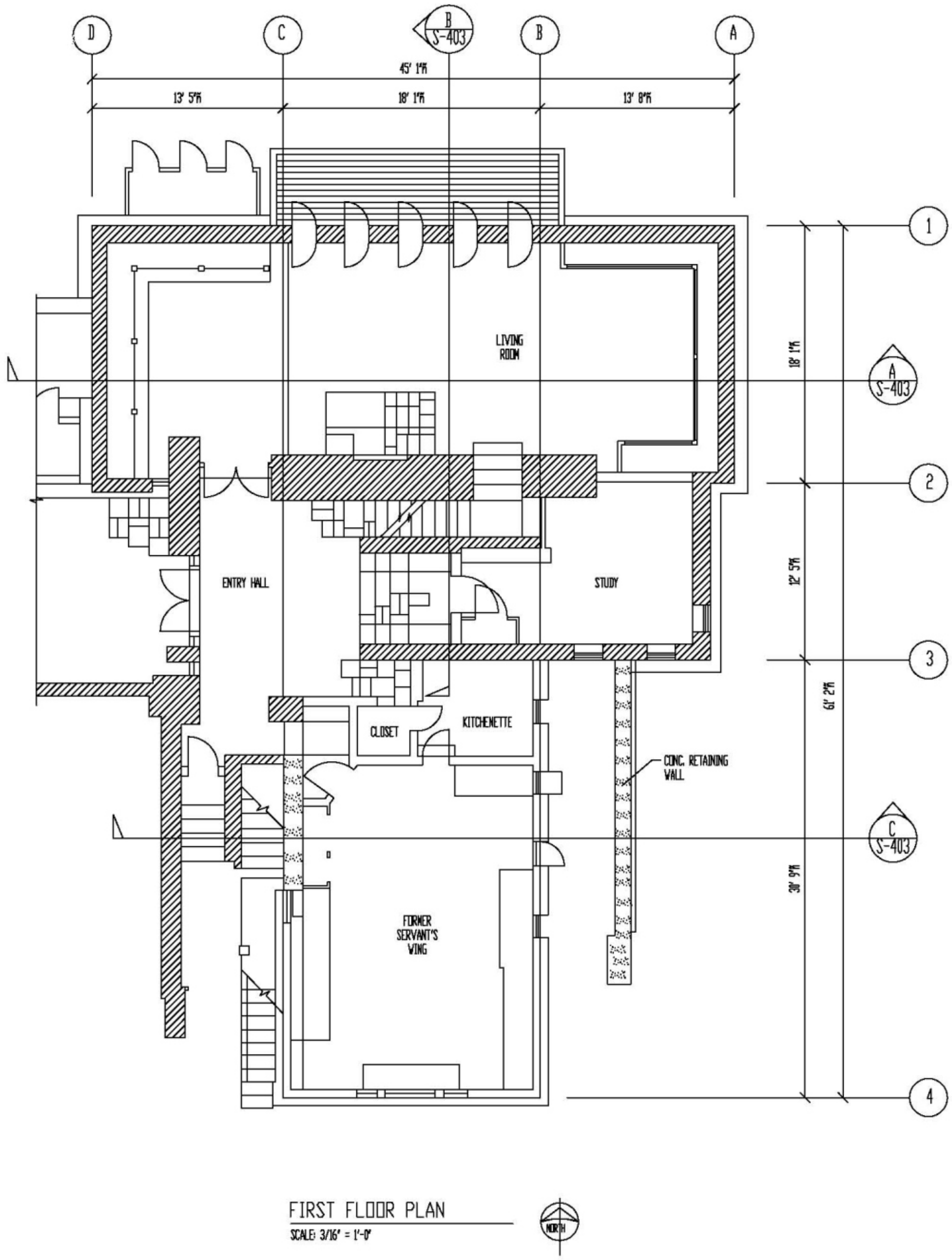


Plate 2. First floor plan

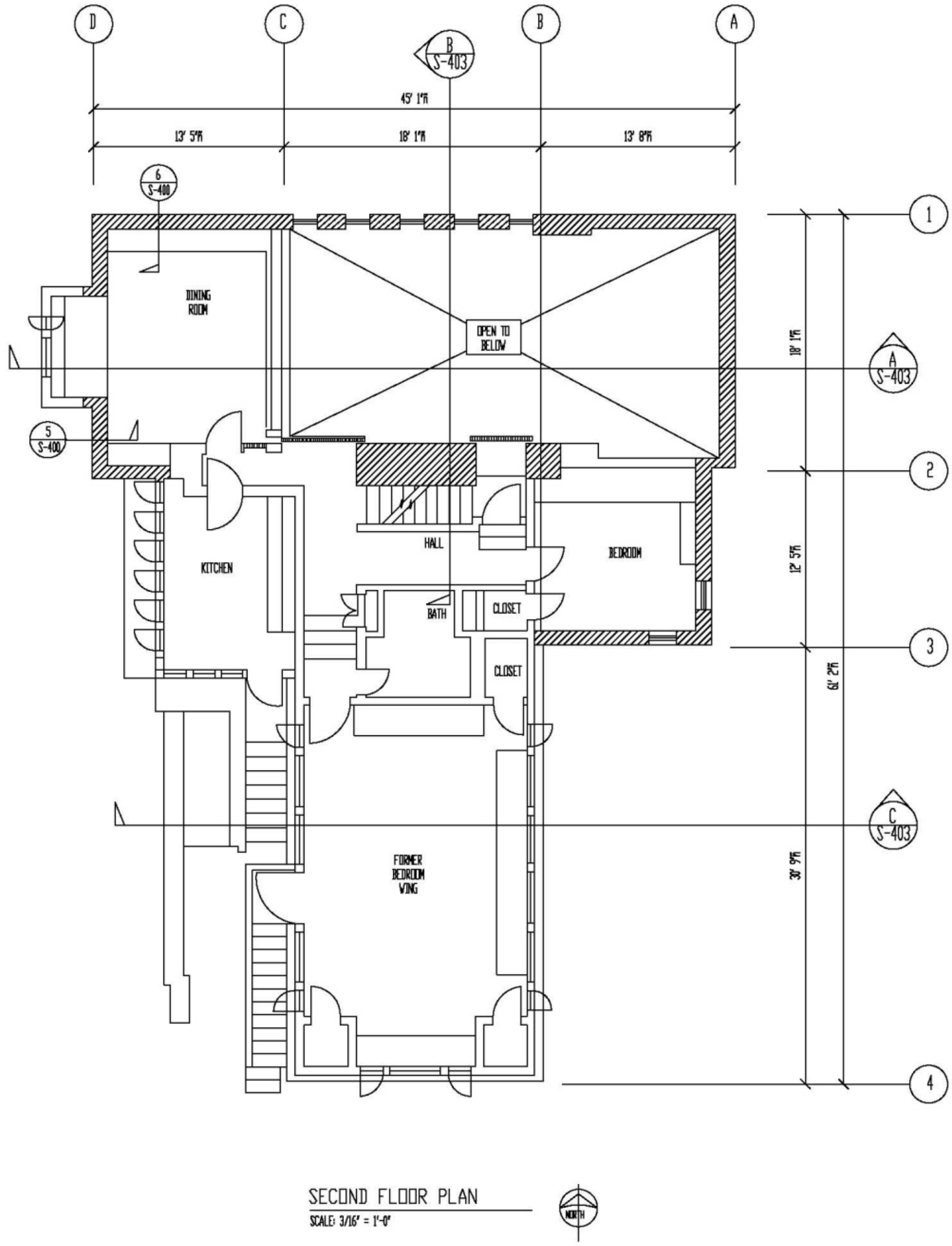


Plate 3. Second floor plan.

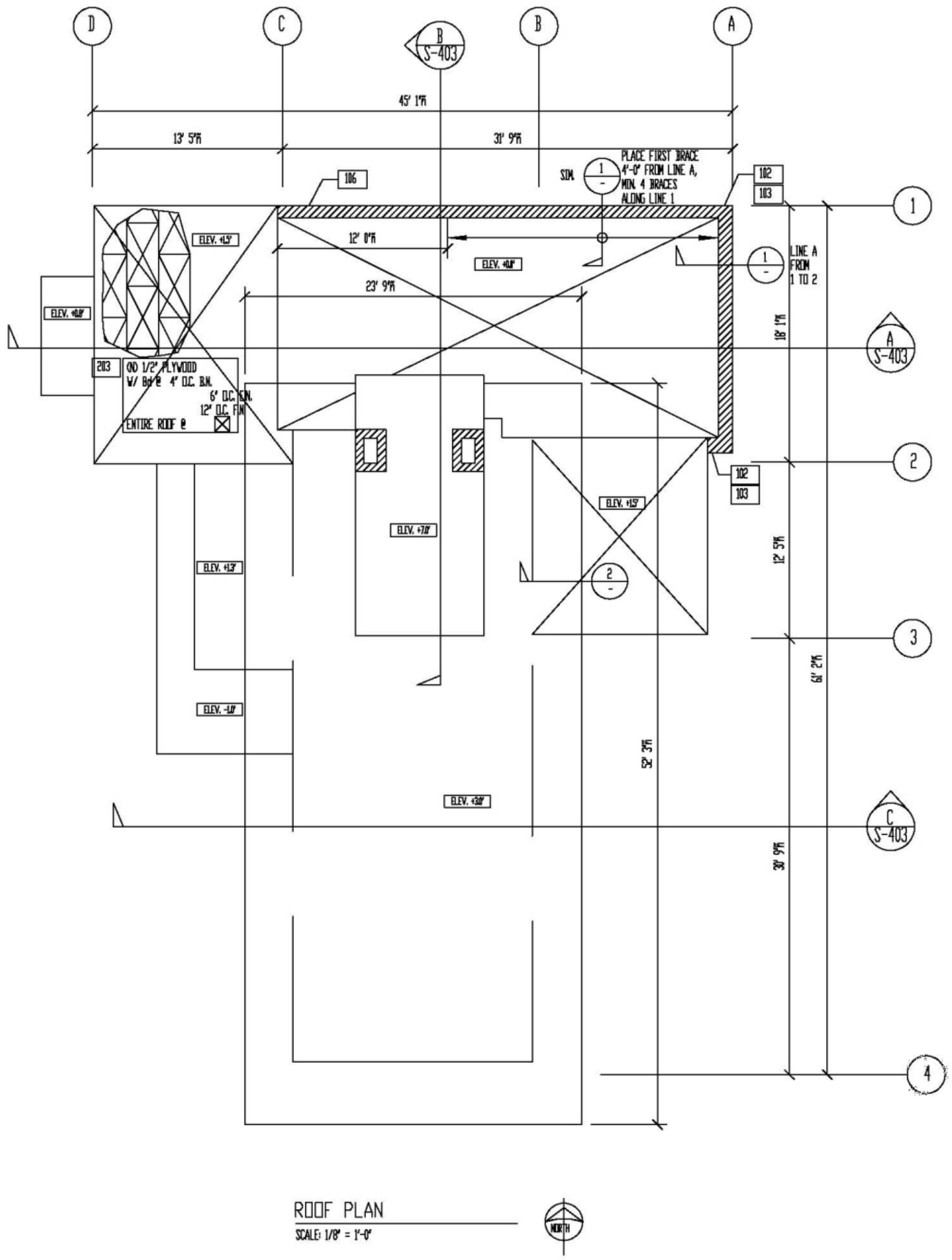


Plate 4. Main roof plan

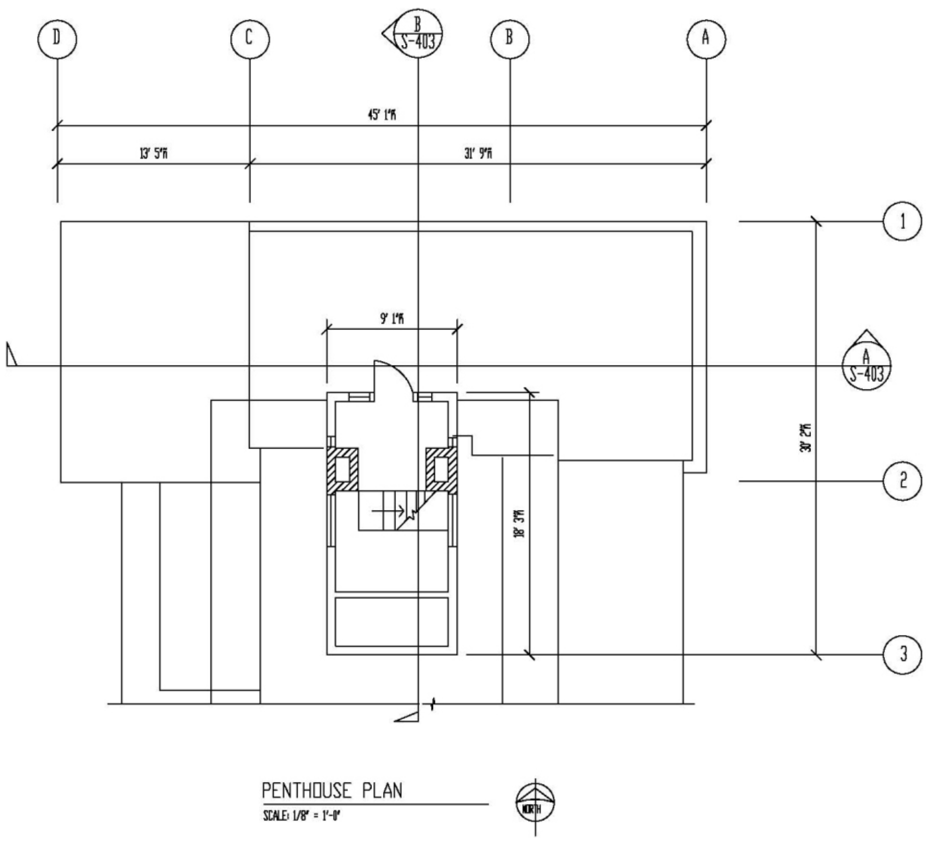


Plate 5. Penthouse plan.

Building Structural Description

General

The building is a two story structure on the north facing slope of Barnsdall Park in Los Angeles. The building is a modified “T” shape. The building is constructed of hollow clay tile (HCT) walls with a wood framed roof and floors.

The roof has a number of different levels Typically there is a step of about 18 inches between the living room and the dining room and the living room and the small bedroom on the second floor.

The roof over the bedroom wing on the south side of the building is about 3 feet above the roof of the living room.

There is a penthouse over the toilet room that provides access to the roof. The penthouse roof is about 7 feet above the living room roof.

Structural Description

Foundation, Retaining Walls, and Basement

Foundations for the exterior walls are continuous concrete footings. The size and depth is unknown. Based on the other structures on the site, they are assumed to be 18 inches wide, 12 inches in thickness and from 12 inches to 18 inches into the soil. Whether or not the footings are reinforced is not known. This is typical for the walls along gridlines 1, 2 and 3, as well as along gridlines A, A.2, C.8 and D.

The walls of the garage, gridlines 1, 2 A and D, are concrete. The walls in the along gridline B and C, and gridline 4, are concrete up to the grade line.

The retaining wall along A.5 from gridline 3 to 3.5 is concrete. The other retaining walls are assumed to be cast concrete with a formed pattern. This would be along grid C.5. It is not known whether or not they are reinforced.

Wall Construction

The exterior walls of the building are of hollow clay tile (HCT) construction. Some of the HCT walls are also on the interior.

Wall heights vary in the building. The living room has a ceiling height of 13 feet 2 inches. Upstairs rooms have a ceiling height of 8 feet 3 inches. First floor rooms have a ceiling of 9 feet 4 inches. The height of the garage is about 8 feet.

On gridline 1 the HCT extends to the roof and is the parapet. Along gridlines A and D, from gridline 1 to 2, the condition is the same.

The wall on gridline 2 is HCT from foundation to second floor line, from gridline B to C. Above the second floor the wall is masonry as it is the chimney. A short portion of the wall along gridline 2, from C.7 to D is also HCT. In this same area, along gridline 2.3, the wall is HCT from grade to second floor line, then wood frame above the second floor line.

HCT walls are along gridline A from gridline 2 to 3. On gridline C.7 from gridline 2 to 3, the wall is HCT one story in height. Along gridline 3 from gridlines A to B.5 on the first floor the wall is HCT. The HCT along gridline 3 is only from gridline A to B on the second floor..

The south section of the building, from gridline 3 to 4 and along gridlines B and C have exterior wood stud walls above grade.

Most of the interior walls are constructed of 2 inch by 4 inch wood studs spaced at 16 inches on center.

Floor Framing

Floor framing consists of 2 inch by 10 inch wood joists spaced at 16 inches on center. A double layer wood floor is placed over the joists. The bottom layer is 1 inch boards placed diagonally. The top layer is the finish flooring.

Roof Framing

The roof has many levels. The roof is framed with 2 inch by 10 inch rafters spaced 16 inches on center. On top of the rafters is a layer of 1 inch straight board sheathing.

A layer of ½ inch plywood was added over the sheathing in some areas of the roof as part of the mitigation work after the 1994 Northridge earthquake. The area with plywood is generally from gridline A to C from gridlines 1 to 2, over the living room. This area is flat plane. In areas C to D from gridlines 1 to 2. the roof is about 18 inches higher. This also has a layer of plywood. The area of gridlines A to B from gridlines 2 to 3 is also 18 inches higher than the roof over the living room and has a layer of plywood.

Northridge Earthquake Damage

The building was damaged in the 1994 Northridge earthquake. The damage consisted of an outward exterior movement of the living room wall at the northeast corner, gridline A and 1. There was come cracking at the joints between different materials.

Previous Seismic Strengthening

In response to damage to all the buildings at Barnsdall Park, the Federal Emergency Management Agency (FEMA), funded repairs of damage and selected mitigation against future earthquakes.

Building Code Requirements

Residence A was constructed as a single family dwelling. (R-3 Occupancy Group) Whether or not any special code approvals and provisions were granted to permit it use for art classes is not known.

Reuse considerations should limit the occupant load in the building.

Business Occupancy -Use as a “welcome center,” ticket and site information facility, with offices would change this to a Group B type occupancy. Informational displays, small group presentations, and waiting areas would be within the same group.

Reuse with a group B occupancy would require a review of exit system capacity and exit path. Doors to stairways may have to be provided with closers to limit smoke spread.

Existing wall finish materials, plaster, should be within flame spread and smoke generation limits. Fire alarm and detection system improvements may be required. Height and area, as well as location on the property, should not be a problem.

Floor loads as an office should be considered acceptable. However no calculations have been made to verify this.

Assembly Use - If the space were to be an art gallery, or other assembly space, additional code issues would result. Art galleries are considered assembly spaces. This requires additional fire protection, panic hardware, and other requirements.

Structural Findings and Recommendations

General

Residence A at Barnsdall Park has several structural issues that will need to be addressed. These are:

- Seismic Safety
- Retaining Walls
- Building Settlement
- Deterioration

Seismic Safety

Seismic safety in unreinforced masonry building can be improved and building use continued under the provisions of the Los Angeles Building Code. The building code provisions require the following specific evaluation and retrofit measures:

- Parapet Bracing
- Wall Anchors for Out of Plane Loads
- Wall Stability
- Diaphragm Stiffness and Strength
- In-plane Shear Improvements

Specific Work Items

Parapets - The parapet is the portion of walls extending above the roof. These tend to rock in earthquakes and topple outward. The parapets were braced in a very elegant manner as part of the FEMA hazard mitigation work. Most parapet bracing is accomplished with diagonal braces back to the roof. In this case a vertical element was placed against the parapet and anchored to the roof to brace the parapet.

Wall Anchors - Wall anchors attach the wall to the roof and/or floor. These anchors keep the wall from falling outward. Wall anchors were installed in most of the HCT walls as part of the FEMA-funded work. Anchors were installed at the roof, second floor line, and first floor line. However, more anchor work remains.

Wall Stability - Walls within a certain height to thickness (h/t) ratio are stable if adequately attached at the floor and roof. Design for wall stability was not included in the FEMA work. It appears, at initial review, that the first floor walls, except for the living room are within allowable limits. Second floor walls may be within acceptable limits. The living room walls exceed the allowable h/t limit. Some retrofit will be required.

Diaphragm Stiffness - The diaphragms are the roof and floors. The floors are a double layer wood construction which is of adequate strength. The roof is straight board sheathing which is inadequate. The varying elevations of the roofs pose some engineering difficulties for analysis. Loads need to be “dragged” to the various walls to resolve forces. This is very difficult in roofs with varying levels and concerns about any visual impact. As part of the FEMA mitigation work, plywood was added to strengthen some of the roof diaphragms. Some drag/collector elements were added the extent is not clear due to difficulties with field installation. Design, additional plywood, and collectors are required.

In-plane Shear - Shear forces in the plane of the wall need to be resisted. Shear strength is determined by physical tests and the adequacy of the wall check by analysis. No work was done on this in the 1994 Northridge repair activities.

Additional work may require posts, or other supports, under any beams supported by the HCT walls.

Hollow Clay Tile (HCT)

Hollow clay tile, used for the walls of Residence A, has a number of design and construction aspects that will effect any seismic improvements.

HCT is a fired clay masonry product. It comes in varying thickness, from 2 inches to 8 inches thick. The tile size vary from 8 inches square to more rectangular size. In most cases the walls are constructed of two or more wythes of HCT masonry.

The advantage of HCT is its relatively light weight, less than half that of a brick wall of equal thickness. The cost for material and installation may be less, but no cost comparison records are available.

The issue with HCT walls is that they are not reinforced and thus are an unreinforced masonry, a known potential seismic hazard. It cannot be practically reinforced as the vertical cells may not align. Sometimes the blocks are turned 90 degrees which blocks the flow of grout and reinforcing.

It is a weak material and not homogeneous in that there may be aggregates of varying size in the block. Connections to the HCT are difficult in that there is little wall thickness to connect to with epoxy adhesives and any drilling into the block to place bolts sometimes results in spalling of the clay surface.

Retaining Walls

There is no information on the retaining wall construction around the site. Walls may be of a cantilevered design, designed using gravity (self-weight), or be braced with tie beams and "deadmen." The wall at the Entry walkway shows distress with a vertical crack. Additional investigation is recommended.

Settlement

Foundation settlement is suspected along the north wall, specifically at the northeast corner, and possibly at the southeast corner where past grading operations removed some of the hillside. A forensic geotechnical investigation should be done.

Deterioration

In observing the various building elements there is significant deterioration. Most problems are caused by water and possible inappropriate changes made over the years.

Issue to consider are:

Site Watering - Sprinklers and water flow cause most of the problems. Masonry absorbing water, and the flow of water at the base of the building, has resulted in interior staining of concrete and masonry, spalling of paint and stucco, and possibly the damage to the retaining walls.

Coatings - Some of the buildings on the site have had exterior coatings that limited "breathability" of the walls. The building should be checked to determine what layers of paint, and how many, have been applied and whether any of these are causing problems.

Building Occupant Load - The use as an art center has resulted in damage to the interior plaster and wood. Materials and boards have been applied to surfaces without consideration of the underlying damage. With the elimination of such use the walls and floors can be repaired and restored.

Building Code Issues

Building code requirements were discussed earlier in this report. Requirements for any use will be:

Seismic Safety - Meet the Los Angeles URM ordinance fully. Today there is partial compliance.

Occupancy - Any occupancy will require compliance with exit requirements, use

Accessibility - Access to the building and public spaces will be necessary. Restrooms will need to comply.

APPENDIX K

MATERIALS CONSERVATION AND REPAIR REPORT

STUCCO AND MASONRY - CONDITION REPORT

RESIDENCE A
Barnsdall Park

Los Angeles, California

INTRODUCTION

This report is written at the request of Mr. Robert Chattel of Chattel Architecture, Planning & Preservation to address the condition of masonry surfaces at the Residence A at Barnsdall Park in Los Angeles, California. The scope of this report is limited to interior and decorative masonry components. Structural masonry elements such as concrete foundations walls will be the purview of the Structural Engineer for the survey.

The report is based upon a visual survey of the interior and exterior of the building. Where possible, closer examination of the masonry took place to verify conditions observed from a distance. No intrusive or destructive testing took place, and it should be emphasized that the conclusions drawn from this survey are based upon primarily visual examination. Notwithstanding the limitations of this method, the visual inspection process can be a valuable tool in the assessment of a structure regarding evidence of decorative veneer problems, if they exist.

SITE CONDITIONS

EXTERIOR

The Residence A structure is a 2-story structure with basement measuring approximately 40 feet by 60 feet at the base. The structure is a combination of wood-framing and hollow clay tile walls clad on the exterior with cement stucco with wood and cast stone decorative trim elements. *(Illustration #1).*

These areas with decorative cast stone trim are located at window surrounds and spandrel panels and the site retaining walls, and flat area surfaces of the façade between fenestrations are covered with cement stucco.

INTERIOR

The interior masonry decorative components consist of cast-in-place concrete slabs scored to resemble tile, with two fireplaces that appear to be built of brick where exposed. There are also several rooms with cast concrete flooring of a less decorative nature. There are numerous locations where hollow clay tile demising walls exist, but these will be addressed by the structural engineer.

OBSERVATIONS

EXTERIOR

Our visual examination of the building's decorative facade discovered numerous signs of movement and water damage. Most of this damage can be attributed to the infiltration of moisture into the cast stone substrates, causing the interior ferrous metal reinforcing bars to rust and expand in a process known as 'ironjacking.' This expansion has caused the decorative cast stone to crack and spall at numerous locations. Areas of observations are listed as follows:

Entry:
- The existing decorative entry slab is cracked and possibly settling. Inappropriate new concrete has been installed in the center of this entry slab area *(Illustration #2)*. Inappropriate concrete access ramp has been added to this area.
- The north and south retaining walls on either side of the entry walkway have moved over time with noticeable shifting of the foundations. Attached decorative cast stone is cracked and spalled at several locations. *(Illustrations #3+#4).*
- The planters and smaller retaining walls at the outer entry are also damaged and show signs of shifting foundations and internal metal decay *(Illustration #5)*.
- The balcony above the entry is clearly the victim of water infiltration from likely faulty drains in the deck. This has contributed to the further infiltration of moisture into the structure's internal framing, and caused noticeable movement in the wood, cast stone, and cement stucco *(Illustrations #6 + #7)*.

West Elevation:
- At the southwest corner service entry there is noticeable cracking and spalling in approximately 10 lineal feet of decorative cast stone trim.

South Elevation:
- Grout between cast stone trim elements is missing or cracked.

East Elevation:

- Maid's room entry has several areas of decorative cast stone trim that are damaged or missing *(Illustration #8)*. Possible stucco delaminination was also noted.

North Elevation:

- Wood outbuilding and slab adjacent to the original structure represent an inappropriate addition to the site.
- Evidence of the previously removed balcony attachment indicate the likely location of this missing component *(Illustration #9)*.

INTERIOR

Entry:

- The entry floor is decorative colored concrete, cast-in-place and scored to represent tile paving. There are numerous cracks throughout this area, and on the similar concrete steps leading to the basement. Old wax coating and soiling have built up on these surfaces over the years *(Illustration #10)*.

Living Room Windows:

- Though the interior HCT supports are not the focus of this review, it should be noted that an intrusive structural upgrade to these elements between doors would be feasible and welcome, given their current structural enhancement *(Illustration #11)*.

Fireplaces:

- There are two fireplaces, one in the living room, and one in the ground floor bedroom. Both are composed of concrete hearths with brick surrounds. Both have been painted and/or covered with wood sheeting and otherwise obscured from clear view *(Illustration #12)*.

Maid's Room:

- The original scored concrete floor has been repaired in previous years and has, in addition to normal slab-cracks, an intrusive and inappropriate repair that shows as a non-matching cement patch *(Illustration #13)*. Plaster on the lower wall has dissolved and failed at several areas.

Garage Basement:

- The original scored concrete floor in the garage has been coated and stripped in previous years, and displays signs of dirt buildup and discoloration. Plaster on the lower wall has dissolved and failed at several areas.

RECOMMENDATIONS

EXTERIOR

General comments regarding the exterior masonry components: Decorative Cast Stone: Complete paint removal from decorative cast stone units should be achieved using chemical coatings removers and pressurized rinse water. Grout replacement (repointing) and repair of decorative cast stone should be an important part of repair efforts, since keeping moisture out of the building envelope should be a primary concern. Repointing should consist of removal of the cracked or damaged grout and replacement with new mortar formulated to match the original cleaned mortar in color and texture. Damage and spalling due to ironjacking of interior iron reinforcing components should be repaired after all necessary interior steel repairs are completed. There will also be the required molding and production of approximately 30 lineal feet of new matching decorative cast stone at several locations.

All exterior stucco should be stripped of all existing paint using chemical coating removers and pressurized rinse water as for the cast stone above. All elevations currently exhibit minor damage of existing cement stucco at several locations, indicating that the cement stucco veneer has separated from the concrete substrate, or is likely to fail in the near future. The entire stucco portion of the exterior façade should be tapped to sound out areas of delaminated stucco coating. Repairs should consist of removal of all unsound cement stucco from the supporting substrate, and replacement with new stucco prior to painting of all surfaces.

Once repairs and replacement are complete on both stucco and cast stone, all masonry elements should be repainted, but this time using a mineral-based coating system from Silin or Keim. These coatings are silicate-based, highly breathable, and offer an anticipated lifespan of 50-100 years depending on local conditions.

Other exterior areas needing more specific attention:

- Entry: The existing ramp should be removed and the entire entry area reconstructed in a manner more consistent with the original design and construction. Crack repairs of the decorative concrete flooring should be executed after complete cleaning and removal of surface dirt and old coatings.
- Balcony Above Entry: The balcony has likely been subjected to long-term internal moisture penetration, and will require some dis-assembly in order to correct the source of this problem. Once all framing and structural issues are resolved, any previously removed decorative elements can be reinstalled, matching cement stucco applied to the areas of previous removal, and the waterproofing at the deck finished to protect this projecting element.
- North and South Retaining Walls at Entry: Both walls have shifted and may require replacement with newly constructed walls after decorative cast stone

bands are selectively removed. Once new foundations and walls are completed, salvaged cast stone trim can be reinstalled prior to overall painting.

- North Elevation Balcony: The currently installed balcony is inappropriate and should be removed and replaced with a new balcony matching the original, and constructed of contemporary materials and techniques to yield a more durable projecting element.

INTERIOR

General comments regarding the interior masonry components: Where original brick or decorative concrete has been coated or painted, all coatings should be removed to expose the original masonry surface. Cleaned and stripped masonry should be treated with a water repellant sealer to enhance resistance to moisture and further staining. Original concrete flooring should be cleaned thoroughly, repaired using appropriate repair mortars, and treated with a penetrating sealer as above. Gypsum plaster at walls should be repaired using matching material and techniques.

Other interior areas needing more specific attention:

- Living Room Fireplace: In addition to coating removal and general cleaning, this firebox should be exposed and any repair necessary made to restore the original look and appearance.
- North Elevation Balcony Doors and Columns: As mentioned earlier in this report, the hollow clay tile columns between door units can be seismically upgraded *in situ* without complete removal of these components using careful coring and material placement methods.

CONCLUSIONS

Overall the building veneer is in moderate shape for a structure of this type and age. The cement stucco and decorative cast stone portions of the veneer are generally sound, though there is ample evidence of localized damage needing attention. There is evidence of internal structural problems at a few locations as seen during our visual inspection of the building's exterior façade. A careful and thorough planning and investigation process will help in identifying these items and determining how they should be corrected.

Respectfully Submitted,

Charles Kibby
Preservation Arts, Inc.

ILLUSTRATIONS

#1 – Residence A Building – South and West Elevations

#2 – Entry Walkway and Retaining Walls

#3 – South Retaining Wall at Entry

#4 – North Retaining Wall at Entry

#5 – Smaller Retaining Wall at Entry

#6 – Balcony Above Entry Door

#7 – Damaged Decorative Cast Stone at Balcony

#8 – Typical Decorative Cast Stone Damage

#9 – Attachment Location of Original Balcony

#10 – Decorative Concrete Floor at Entry Hall

#11 – Window Columns at North Elevation

#12 – Living Room Fireplace

#13 – Maid's Room Floor

APPENDIX L

SOILS REPORT

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVE. # 201, GLENDALE, CA 91206
818•549•9959 TEL 818•543•3747 FAX

GEOLOGIC AND SOILS ENGINEERING EXPLORATION
PROPOSED BARNSDALL PARK - PHASE I
MASTER PLAN IMPLEMENTATION
PROJECT #1026C, CONTRACT #2723
LOTS 40 AND 49, WEST PORTION OF LICK TRACT
4800 HOLLYWOOD BOULEVARD
LOS ANGELES, CALIFORNIA
FOR THE DEPARTMENT OF RECREATION AND PARKS
THE J. BYER GROUP, INC. PROJECT NUMBER JB 17804-B
FEBRUARY 25, 1999

GEOLOGIC AND SOILS ENGINEERING EXPLORATION
PROPOSED BARNSDALL PARK - PHASE I
MASTER PLAN IMPLEMENTATION
PROJECT #1026C, CONTRACT #2723
LOTS 40 AND 49, WEST PORTION OF LICK TRACT
4800 HOLLYWOOD BOULEVARD
LOS ANGELES, CALIFORNIA
FOR THE DEPARTMENT OF RECREATION AND PARKS
THE J. BYER GROUP, INC. PROJECT NUMBER JB 17804-B
FEBRUARY 25, 1999

INTRODUCTION

This report has been prepared per our signed authorization dated June 25, 1998 and summarizes findings of The J. Byer Group, Inc. geologic and soils engineering exploration performed on the site. The purpose of this study is to evaluate the nature, distribution, engineering properties, relative stability, and geologic structure of the earth materials underlying the site with respect to grading and construction related to Phase I of the Barnsdall Park Master Plan.

INTENT

It is the intent of this report to assist in the design and completion of the proposed project. The recommendations are intended to reduce geotechnical risks affecting the project. The professional opinions and advice presented in this report are based upon commonly accepted standards and are subject to the general conditions described in the NOTICE section of this report.

EXPLORATION

The scope of the field exploration was determined from our initial site visit and consultation with Kathleen Chan, Project Manager with the City of Los Angeles Department of Recreation and Parks and Paul Sieron of Peter Walker and Partners. The Grading Plan prepared by Peter Walker and Partners undated, was considered prior to beginning work on this project. Exploration was conducted using techniques normally applied to this type of project in this setting. This report is limited to the area of the exploration and the proposed project as shown on the enclosed Geologic Map and Cross Sections. Conditions affecting portions of the property outside the area explored, are beyond the scope of this report.

Exploration was conducted on July 30, August 4, August 13, and September 10, 1998 with the aid of a truck mounted bucket auger drill rig, and hand labor. It included drilling two borings to a maximum depth of 40 feet and excavating 18 test pits. Samples of the earth materials were obtained at frequent intervals and were delivered to the soils engineering laboratory for testing and analysis. Downhole observation of the earth materials was performed by the project geologist. Exposures of earth materials were geologically mapped.

Office tasks included laboratory testing of selected soil samples, review of the United States Department of Agriculture 1952 series air photos, review of the City of Los Angeles grading records, preparation of eight geologic Cross Sections, preparation of the Geologic Map, and slope stability calculations. The earth materials exposed in the test pits and borings are described on the enclosed Log of Test Pits and Log of Borings. Appendix I contains a discussion of the laboratory testing procedures and results.

The proposed project, surface geologic conditions, and the location of the test pits and borings are shown on the Geologic Map. Subsurface distribution of the earth materials, projected geologic structure, and the proposed project are shown on Sections A through H.

The J. Byer Group, Inc.
512 E. Wilson Avenue • Suite 201 • Glendale, California 91206 • (818) 549-9959 • Fax (818) 543-3747

RESEARCH - PRIOR WORK

Research at the City of Los Angeles Department of Building and Safety was performed as part of our work on this project. The records contain two compaction reports and two geotechnical reports pertaining to the subject property:

Barnsdall Park Entrance, Final Report on Soils Compaction, by the City of Los Angeles Department of Public Works, Bureau of Engineering, dated April 3, 1968;

Barnsdall Park Art Gallery - Compaction Report, by the City of Los Angeles Department of Public Works, Bureau of Engineering, Geology and Soils Section, dated April 5, 1972;

Barnsdall Park Restoration - Carriage House, by the City of Los Angeles Department of Public Works, Bureau of Engineering, Geotechnical Services, dated August 21, 1990; and

Geotechnical Investigation Restoration of Barnsdall Park Access Shaft and Construction Staging Area, Metro Red Line Segment 2, by Converse Consultants, Inc., dated April 30, 1998.

The compaction reports dated April 3, 1968 and April 5, 1972 were approved by the City of Los Angeles Department of Building and Safety, Grading Division, in letters dated April 4, 1968 and April 19, 1972, respectively. The geotechnical report dated August 21, 1990 was approved by the City of Los Angeles Department of Building and Safety, Grading Division, in the Application for Review of Technical Reports and Import-Export Routes, dated November 25, 1990. The data contained in these reports was reviewed and considered as part of our work on this project.

PROPOSED DEVELOPMENT

Information concerning the proposed project was provided by Kathleen Chan, Project Manager, and Paul Sieron of Peter Walker and Partners. The Grading Plan prepared by Peter Walker and Partners, undated, was a guide for the field exploration and the preparation of this report. It is proposed to change the alignment and elevation of the entrance road, renovate several of the existing buildings, retaining walls and appurtenant structures, and construct new stairs, walkways, retaining walls and light standards. Retaining walls up to 15 feet high are planned to support the proposed roadway in the east portion of the site. Grading will consist of cut and fill operations to achieve the grades shown on the Grading Plan.

Formal plans have not been prepared and await the conclusions and recommendations of this report.

SITE DESCRIPTION

The subject property consists of the Barnsdall Park which is located on Olive Hill, in the Hollywood section of the City of Los Angeles, California. Barnsdall Park is located on the south side of Hollywood Boulevard approximately one mile northwest of the Hollywood (101) Freeway. The site is developed with the Hollyhock House historical landmark, Municipal Art Gallery, and Junior Art Center. The northern portion of the site is occupied by an access shaft and construction staging area for the Metro Red Line Segment 2 construction project. Excavations for the construction staging area are up to 25 feet high and are supported by temporary shoring consisting of soldier piles and tie-back anchors. The access shaft is approximately 100 feet deep. This excavation is also supported by soldier piles. An apartment building is west of the park. A parking structure and hospital building are south of the park. Commercial buildings are east of the park. Hollywood Boulevard is north of the park. A paved access road ascends from Hollywood Boulevard to the upper portion of Olive Hill. The road circles around the Hollyhock House, Junior Art Center, and Municipal Art Gallery.

Past grading on the site has consisted of several generations of cut and fill operations associated with development of the park. Physical relief is about 75 feet with slope gradients ranging from 1½:1 to 4:1. In the west portion of the site, a slope descends from the roadway west to a driveway for an apartment building, approximately 40 feet, at gradients ranging from 1½:1 to 2:1. In the south portion of the site, a slope descends from the elevation of the Hollyhock House, approximately 50 feet to the roadway at gradients ranging from 2:1 to 2½:1. This slope continues to descend below the roadway an additional 20 feet to the top of a six foot high retaining wall. The slope in the east portion of the site descends from the roadway, approximately 20 feet, at a gradient of 1½:1. A 12 foot high retaining wall is located along the east property line, approximately 20 feet from the toe of the descending slope. The slope in the north portion of the site descends from the roadway approximately 40 feet to the top of the temporary shoring wall for the Metro Red Line staging area at gradients ranging from 1½:1 to 4:1.

Vegetation on the site consists of trees, plants and grasses. Surface drainage is by sheetflow runoff down the contours of the land to the north, south, east and west to the surrounding roadway.

MANOMETER SURVEY

A manometer survey was performed within the Hollyhock House main residence to determine the relative floor elevations. The manometer consists of a continuous, water filled tube with a container at one end and a vertical graduated column at the other. Since water will achieve the same elevation within an interconnected conduit, the relative floor elevations can be measured with respect to a datum point. The container is placed at a selected location which becomes the datum point. The graduated column is then placed at locations through the residence and relative elevations with respect to the datum point are recorded. The degree of accuracy depends on the accuracy of the instrument, graduation of the metered columns, and the different floor coverings.

The northwest corner of the residence slopes approximately one inch. The southwest corner of the residence slopes approximately 1½ inches.

GROUNDWATER

Groundwater was not encountered during exploration. Seasonal fluctuations in groundwater levels may occur due to variations in climate, irrigation, and other factors not evident at the time of the exploration. Fluctuations in groundwater levels may also occur across the site. Rising groundwater can saturate earth materials, causing subsidence of the site or instability of slopes.

EARTH MATERIALS

Fill

Fill, associated with previous site grading, underlies the north, south, and east facing slopes to a maximum observed depth of 9½ feet in the vicinity of Test Pit 15. The fill consists of silty sand and sandy silt which is light to dark brown, grayish brown, and greenish brown, dry to moist, loose to firm, with rock, brick, and concrete fragments up to six inches and roots to one inch.

Soil

Natural residual soil underlies the existing fill on the descending slopes on the site. The soil consists of sandy silt, clayey silt and sandy clay which is dark gray brown, dark brown to black, slightly moist to moist, slightly firm to stiff, slightly porous to very porous, with cobbles up to six inches and roots up to ½ inch. The soil layer observed is on the order of two to four feet thick.

Bedrock

Bedrock underlying the site and encountered in the test pits consists of fine grained sediments mapped as part of the Puente Formation by Donald L. Lamar in the California Division of Mines and Geology, Special Report 101, "Geology of the Elysian Park-Repetto Hills Area, Los Angeles

County, California", 1970. The bedrock consists of siltstone and shale, which are light gray to grayish brown, brown to orange brown, soft to hard, slightly weathered to very weathered, slightly fractured to moderately fractured and thinly bedded.

GEOLOGIC STRUCTURE

The geologic structure of Olive Hill is mapped as a syncline by Donald L. Lamar in the California Division of Mines and Geology, Special Report 101, "Geology of the Elysian Park-Repetto Hills Area, Los Angeles County, California", 1970. Bedding planes mapped in the southwest portion of the site generally strike west-northwest and dip shallowly to the north. Bedding planes mapped in the north portion of the site are generally horizontal. Joint planes mapped are randomly oriented and steeply dipping.

The geologic structure of the bedrock is favorably oriented for stability of the site and proposed project.

GENERAL SEISMIC CONSIDERATIONS

Southern California is located in an active seismic region. Moderate to strong earthquakes can occur on numerous local faults. The United States Geological Survey, California Division of Mines and Geology, private consultants, and universities have been studying earthquakes in Southern California for several decades. Early studies were directed toward earthquake prediction and estimation of the effects of strong ground shaking. Studies indicate that earthquake prediction is not practical and not sufficiently accurate to benefit the general public. Governmental agencies are shifting their focus to earthquake resistant structures as opposed to prediction. The purpose of the code seismic design parameters is to prevent collapse during strong groundshaking. Cosmetic damage should be expected.

Within the past 25 years, southern California and vicinity have experienced an increase in seismic activity beginning with the San Fernando Earthquake in 1971. In 1987, a moderate earthquake struck the Whittier area and was located on a previously unknown fault. Ground shaking from this event caused substantial damage to the City of Whittier, and surrounding cities.

The January 17, 1994, Northridge Earthquake was initiated along a previously unrecognized fault below the San Fernando Valley. The energy released by the earthquake propagated to the southeast, northwest, and northeast in the form of shear and compression waves, which caused the strong ground shaking in portions of the San Fernando Valley, Simi Valley, City of Santa Clarita, and City of Santa Monica.

Southern California faults are classified as: active, potentially active, or inactive. Faults from past geologic periods of mountain building, but do not display any evidence of recent offset, are considered "potentially active". Faults that have historically produced earthquakes or show evidence of movement within the past 11,000 years are known as "active faults". There are no known active faults within close vicinity of the subject property.

The principal seismic hazard to the subject property and proposed project is strong ground shaking from earthquakes produced by local faults. Modern, well-constructed buildings are designed to resist ground shaking through the use of shear panels and reinforcement. Additional precautions may be taken to protect personal property and reduce the chance of injury, including strapping water heaters and securing furniture. It is likely that the subject property will be shaken by future earthquakes produced in southern California. However, secondary effects such as surface rupture, lurching, liquefaction, consolidation, ridge shattering, and landsliding should not occur at the subject property.

SLOPE STABILITY

Gross Stability

Slopes on the subject property include a 40 foot high fill slope, which is flatter than 2:1 and a 20 foot high 1½:1 fill slope. The gross stability of the 1½:1 slope was analyzed using Taylor's method. In addition, the stability of the slope along the fill/soil and soil/bedrock contacts was analyzed using Spencer's method with a software program by Taga, copyright 1983.

The analysis shows that the subject property and existing slopes will be grossly stable with a factor of safety in excess of 1.5. The calculations use the shear tests of samples believed to represent the weakest earth materials encountered during exploration. The slope angles used are the most critical for the slopes analyzed.

Surficial Stability

Based upon the enclosed calculations, it is reasonable to assume that the natural residual soil is surficially stable. The method of analysis used is the "parallel seepage model" recommended by the American Society of Civil Engineers and the Building and Safety Advisory Committee (8/16/78). The assumptions of this method are: a uniform planar slope; uniform soil density and shear strength; and uniform seepage parallel to the slope. The validity of the analysis depends, in part, by how closely the assumptions model the field conditions.

For surficial deposits overlying natural slopes, it is the opinion of The J. Byer Group, Inc. that the assumptions of the "parallel seepage model" are not completely satisfied. Thus, though the calculation shows that the surficial materials on the site are stable with a factor of safety in excess of 1.5, the mitigating measures recommended in the "Conclusions and Recommendations" of this report should be implemented during development of the site.

CONCLUSIONS AND RECOMMENDATIONS

General Findings

The conclusions and recommendations of this exploration are based upon two borings, eighteen test pits, field geologic mapping, research of available records, consultation, years of experience observing similar properties in similar settings and review of the development plans. It is the finding of The J. Byer Group, Inc. that construction of the proposed project is feasible from a geologic and soils engineering standpoint provided the advice and recommendations contained in this report are included in the plans and are implemented during construction.

Hollyhock House

The Hollyhock House consists of a one and two story main residence, and a two story carriage house. The residence and carriage house are connected by a colonnade. The exterior of the residence is cracked and portions of the concrete are spalling. The interior walls of the residence are also cracked and show signs of water damage. A manometer survey was performed on the interior floor of the residence. The results are shown on the enclosed Manometer Survey. A reflecting pond is located adjacent to the west end of the residence. The reflecting pond is cracked and the southwest corner appears to have settled. The carriage house is located to the north of the residence adjacent to the access road. The carriage house extends over a 10 foot high descending slope. The north facing wall of the carriage house is cracked, and the northwest corner appears to have settled.

The footing for the residence was exposed in Test Pits 4 and 6. The footing is six to twelve inches deep and is founded in existing fill. The footing for the carriage house was exposed in Test Pit 11. The bottom of the footing was 14 inches below grade and founded in existing fill and soil.

It is recommended that the residence and carriage house footings founded in fill and/or soil be underpinned with footings founded into bedrock. The southwest corner of the reflecting pond may also be underpinned. Underpinning footings should be installed utilizing the A-B-C slot cutting method. The slot cutting method allows the excavation to proceed in phases. Alternate "A" slot underpinning footing excavations of three feet in width may be worked. The distance between "A" slots should be six feet in width. The underpinning footing should be completed before the "B" slots are excavated. The "C" slots may be excavated upon completion of the under pinning footings for the "B" slots.

Design values for the underpinning are in the Foundation Design section of this report.

Schindler's Terrace

Schindler's Terrace consists of a level concrete area in the west portion of the site. The terrace is supported by a series of retaining walls. The retaining walls are cracked and leaning down slope. Portions of the retaining walls are being restrained at the top by steel cables. Test Pit 8 was excavated at the base of the retaining wall to expose the footing. The footing is 16 inches below grade and founded in existing fill. Existing fill is located on the descending slope below the Schindler's Terrace retaining walls.

Restoration of Metro Red Line Access Shaft and Staging Area

The northern portion of the site is occupied by an access shaft and construction staging area for the Metro Red Line Segment 2 construction project. Excavations for the construction staging area are up to 25 feet high and supported by temporary shoring consisting of braced soldier piles. The access shaft is approximately 100 feet deep. This excavation is also supported by soldier piles. The geotechnical report, *Geotechnical Investigation Restoration of Barnsdall Park Access Shaft and Construction Staging Area, Metro Red Line Segment 2*, by Converse Consultants, Inc., dated April 30, 1998, recommends that the existing access shaft be backfilled with earth materials compacted to 90 percent of the maximum relative density, or lean mix slurry. Slopes are to be restored by placing and compacting fill at 90 percent of the maximum relative density. Earthwork specifications are contained in the referenced report by Converse Consultants.

Fill Slopes - New Access Road

It is proposed to construct fill slopes to accommodate the proposed road alignment and elevation of the new access road. Fill slopes are planned to support a new access stairway in the east portion of the site and new parking in the north portion of the site. Fill slopes may be constructed at a 2:1 gradient. Compacted fill should be keyed and benched into bedrock. Keyways should be a minimum of 12 feet wide and three feet into bedrock as measured on the downhill side. The base of all fills require subdrains. As an alternative to keyways, the toe of the proposed slopes may be supported by soldier piles.

To limit remedial grading, soldier piles may be placed along the downhill side of the future road in the north portion of the site. This would eliminate mass grading of the existing slopes below the proposed road. The portion of the proposed road which may be supported by soldier piles is shown on the enclosed Geologic Map. The following design parameters may be utilizing for the recommended soldier piles. All future compacted fill should be placed in accordance with the guidelines contained in this report.

Grading Guidelines - Proposed Road

The following guidelines may be used in preparation of the grading plan and job specifications. The J. Byer Group would appreciate the opportunity of reviewing the plans to insure that these recommendations are included. The grading contractor should be provided with a copy of this report.

A. The area underlying the proposed road, upslope from the soldier piles, should be prepared to receive compacted fill by removing all existing paving, vegetation, debris, existing fill, and soil. The exposed excavated area should be observed by the soils engineer or geologist prior to placing compacted fill. The exposed grade should be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted to 90 percent of the maximum density.

B. Fill, consisting of soil approved by the soils engineer, shall be placed in horizontal lifts and compacted in six inch layers with suitable compaction equipment. The excavated onsite materials are considered satisfactory for reuse in the controlled fills. Any imported fill shall be observed by the soils engineer prior to use in fill areas. Rocks larger than six inches in diameter shall not be used in the fill.

C. The fill shall be compacted to at least 90 percent of the maximum laboratory density for the material used. The maximum density shall be determined by ASTM D 1557-91 or equivalent. Compacted fill shall be benched into the bedrock.

D. Field observation and testing shall be performed by the soils engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until 90 percent compaction is obtained. One compaction test is required for each 500 cubic yards or two vertical feet of fill placed.

E. The existing fill and soil are anticipated to shrink 10 to 15 percent upon removal and recompaction.

Excavation Characteristics

The test pits and borings did encounter hard, cemented bedrock. Excavation difficulty is a function of the degree of weathering and amount of fracturing within the bedrock. The bedrock generally becomes harder and more difficult to excavate with increasing depth. Hard cemented layers are also known to occur at random locations and depths and may be encountered during foundation excavation. Should a hard cemented layer be encountered, coring or the use of jackhammers may be necessary.

FOUNDATION DESIGN

General Conditions

The following foundation recommendations are minimum requirements. The structural engineer may require footings that are deeper, wider, or larger in diameter, depending on the final loads.

Spread Footings

Continuous or pad footings may be used to underpin the existing Hollyhock House main residence and carriage house provided they are founded in bedrock. Continuous footings may be used for the proposed retaining walls provided they are founded in bedrock or approved compacted fill and are deepened to provide the code required horizontal setback from descending slopes. Continuous footings should be a minimum of 12 inches in width. Pad footings should be a minimum of 24 inches square. The following chart contains the recommended design parameters.

Bearing Material	Minimum Embedment Depth of Footing (Inches)	Vertical Bearing (psf)	Coefficient of Friction	Passive Earth Pressure (pcf)	Maximum Earth Pressure (psf)
Future Compacted Fill	18	2,000	0.3	300	4,000
Bedrock	12	3,000	0.4	400	6,000

Increases in the bedrock bearing value are allowable at a rate of 600 pounds per square foot for each additional foot of footing width or depth to a maximum of 6,000 pounds per square foot. Increases in the bearing value for compacted fill are allowable at a rate of 400 pounds per square foot for each additional foot of footing width or depth to a maximum of 4,000 pounds per square foot. For bearing calculations, the weight of the concrete in the footing may be neglected.

The bearing values shown above are for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces. When combining passive and friction for lateral resistance, the passive component should be reduced by one third.

All continuous footings should be reinforced with a minimum of four #4 steel bars; two placed near the top and two near the bottom of the footings. Footings should be cleaned of all loose soil, moistened, free of shrinkage cracks and approved by the geologist prior to placing forms, steel or concrete.

Deepened Foundations - Friction Piles

As an alternative to deepened conventional foundations, drilled, cast in place concrete friction piles are recommended to support the proposed retaining walls in the Schindler's Terrace area and the northeast portion of the site. Piles should be a minimum of 24 inches in diameter and a minimum of eight feet into bedrock. Piles may be assumed fixed at three feet into bedrock. The piles may be designed for a skin friction of 500 pounds per square foot for that portion of pile in contact with the bedrock. Piles for retaining walls do not need to be tied in two horizontal directions with grade beams.

Drilled, cast in place concrete friction piles may be utilized to support the proposed light standards and signs. These piles should be a minimum of 18 inches in diameter and a minimum of six feet into bedrock and/or future compacted fill. Piles may be assumed fixed at three feet into bedrock or compacted fill. The piles may be designed for a skin friction of 500 pounds per square foot for that portion of pile in contact with the bedrock and 300 pounds per square foot for that portion in contact with the compacted fill.

Soldier Piles

Soldier piles should be a minimum of 24 inches in diameter and a minimum of eight feet into bedrock. Piles may be assumed fixed at three feet into bedrock. The piles may be designed for a skin friction of 500 pounds per square foot for that portion of pile in contact with the bedrock. Soldier piles should be spaced a maximum of eight feet on center. Based upon the enclosed calculations, the soldier piles may be designed for an equivalent fluid pressure of 30 pounds per cubic foot, per foot of pile spacing.

The skin friction value is for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces. Resistance to lateral loading may be provided by passive earth pressure within the bedrock. Passive earth pressure may be computed as an equivalent fluid having a density of 400 pounds per cubic foot. The maximum allowable earth pressure is 5,000 pounds per square foot. For design of isolated piles, the allowable passive and maximum earth pressures may be increased by 100 percent. Piles spaced more than 2½ pile diameters on center may be considered isolated.

Lateral Design

The friction value is for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces. Resistance to lateral loading may be provided by passive earth pressure within the bedrock and compacted fill. Passive earth pressure may be computed as an equivalent fluid having a density of 400 pounds per square foot for the bedrock and 300 pounds per cubic foot for the compacted fill. The maximum allowable earth pressure is 5,000 pounds per square foot for the bedrock and 4,000 pounds per square foot for the compacted fill. For design of isolated piles, the allowable passive and maximum earth pressures may be increased by 100 percent. Piles spaced more than 2½ pile diameters on center may be considered isolated.

Foundation Settlement

Settlement of the foundation system is expected to occur on initial application of loading. A settlement of ¼ to ½ inch may be anticipated. Differential settlement should not exceed ¼ inch.

Foundation Setback

The Building Code requires that foundations be a sufficient depth to provide horizontal setback from a descending slope steeper than 3:1. The required setback is ⅓ the height of the slope with a minimum of five feet and a maximum of 40 feet measured horizontally from the base of the foundation to the slope face.

RETAINING WALLS

General Design

Retaining walls up to 15 feet high, and with a backslope up to 2:1 in gradient may be designed for an equivalent fluid pressure of 43 pounds per cubic foot per the enclosed calculations. Retaining walls should be provided with a subdrain or weepholes covered with a minimum of 12 inches of ¾ inch crushed gravel.

Backfill

Retaining wall backfill should be compacted to a minimum of 90 percent of the maximum density as determined by ASTM D 1557. Where access between the retaining wall and the temporary excavation prevents the use of compaction equipment, retaining walls should be backfilled with ¾ inch crushed gravel to within two feet of the ground surface. Where the area between the wall and the excavation exceeds 18 inches, the gravel must be vibrated or wheel-rolled, and tested for compaction. The upper two feet of backfill above the gravel should consist of a compacted fill blanket to the surface. Retaining wall backfill should be capped with a paved surface drain.

Foundation Design

Retaining wall footings may be sized per the "Deepened Foundations" and "Spread Footings" sections of this report.

Freeboard

Retaining walls surcharged by a sloping condition should be provided with a minimum of 12 inches of freeboard for slough protection. An open "V" drain should be placed behind the wall so that all upslope flows are directed around the structure to the street.

Decking

Concrete decking should be placed over approved compacted fill or bedrock. Decking should be four inches thick and reinforced with a minimum of #4 bars placed 16 inches on center, each way. Decking which caps a retaining wall should be provided with a flexible joint to allow for the normal one to two percent deflection of the retaining wall. Decking which does not cap a retaining wall should not be tied to the wall. The space between the wall and the deck will require periodic caulking to prevent moisture intrusion into the retaining wall backfill.

Paving

Prior to placing paving, the existing fill and soil should be removed, moistened as required to obtain optimum moisture content, and recompacted to 90 percent of the maximum dry density, as determined by ASTM D 1557-91. Trench backfill below paving, should be compacted to 90 percent of the maximum dry density. Irrigation water should be prevented from migrating under paving. The following table shows the recommended pavement section:

Service	Pavement Thickness (Inches)	Base Course (Inches)
Light Passenger Cars and Moderate Trucks (Storage, etc.)	3	4

Base course should be crusher-run base (CRB) or decomposed granite.

DRAINAGE

Control of site drainage is important for the performance of the proposed project. Pad and roof drainage should be collected and transferred to the street or access road in non-erosive drainage devices. Drainage should not be allowed to pond on the pad or against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters located within retaining wall backfill should be sealed to prevent moisture intrusion into the backfill. Planters located next to raised floor type construction also should be sealed to the depth of the footings. Drainage control devices require periodic cleaning, testing and maintenance to remain effective.

WATERPROOFING

Interior and exterior retaining walls are subject to moisture intrusion, seepage, and leakage and should be waterproofed. Waterproofing paints, compounds, or sheeting can be effective if properly installed. Equally important is the use of a subdrain that daylights to the atmosphere. The subdrain should be covered with ¾ inch crushed gravel to help the collection of water. Yard areas above the wall should be sealed or properly drained to prevent moisture contact with the wall or saturation of wall backfill.

Positive drainage away from the footings, waterproofing the footings, compaction of trench backfill and subdrains can help to reduce moisture intrusion.

PLAN REVIEW

Formal plans ready for submittal to the Building Department should be reviewed by The J. Byer Group. Any change in scope of the project may require additional work.

SITE OBSERVATIONS DURING CONSTRUCTION

The Building Department requires that the geotechnical company provide site observations during construction. The observations include foundation excavations, keyways for fill, benching, pool excavations, temporary slopes and permanent cut slopes. All fill that is placed should be tested for compaction and approved by the soils engineer prior to use for support of engineered structures. The City of Los Angeles requires that all retaining wall subdrains be observed by a representative of the geotechnical company and the City Inspector.

Please advise The J. Byer Group, Inc. at least 24 hours prior to any required site visit. The agency approved plans and permits should be at the jobsite and available to our representative. The project consultant will perform the observation and post a notice at the jobsite of his visit and findings. This notice should be given to the agency inspector.

CONSTRUCTION SITE MAINTENANCE

It is the responsibility of the contractor to maintain a safe construction site. When excavations exist on a site, the area should be fenced and warning signs posted. All pile excavations must be properly covered and secured. Soil generated by foundation and subgrade excavations should be either removed from the site or properly placed as a certified compacted fill. Soil must not be spilled over any descending slope. Workers should not be allowed to enter any unshored trench excavations over five feet deep.

GENERAL CONDITIONS

This report and the exploration are subject to the following NOTICE. Please read the NOTICE carefully, it limits our liability.

NOTICE

In the event of any changes in the design or location of any structure, as outlined in this report, the conclusions and recommendations contained herein may not be considered valid unless the changes are reviewed by us and the conclusions and recommendations are modified or reaffirmed after such review.

The subsurface conditions, excavation characteristics, and geologic structure described herein and shown on the enclosed cross sections have been projected from excavations on the site as indicated and should in no way be construed to reflect any variations that may occur between these excavations or that may result from changes in subsurface conditions.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, irrigation, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can be extremely hazardous. Saturation of earth materials can cause subsidence or slippage of the site.

If conditions encountered during construction appear to differ from those disclosed herein, notify us immediately so we may consider the need for modifications. Compliance with the design concepts, specifications or recommendations during construction requires the review of the engineering geologist and geotechnical engineer during the course of construction.

THE EXPLORATION WAS PERFORMED ONLY ON A PORTION OF THE SITE, AND CANNOT BE CONSIDERED AS INDICATIVE OF THE PORTIONS OF THE SITE NOT EXPLORED.

This report is issued and made for the sole use and benefit of the client, is not transferable and is as of the exploration date. Any liability in connection herewith shall not exceed the fee for the exploration. No warranty, expressed or implied, is made or intended in connection with the above exploration or by the furnishing of this report or by any other oral or written statement.

THIS REPORT WAS PREPARED ON THE BASIS OF THE PRELIMINARY DEVELOPMENT PLAN FURNISHED. FINAL PLANS SHOULD BE REVIEWED BY THIS OFFICE AS ADDITIONAL GEOTECHNICAL WORK MAY BE REQUIRED.

The J. Byer Group appreciates the opportunity to provide our service on this project. Any questions concerning the data or interpretation of this report should be directed to the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.

James E. Tucker
Project Geologist

This report was prepared under the direction and supervision of:

John W. Byer
E.G. 883

Robert I. Zweigler
G.E. 2120

REGISTERED PROFESSIONAL ENGINEER
ROBERT I. ZWEIGLER
No. 2120
Exp. 6-30-02
GEOTECHNICAL
STATE OF CALIFORNIA

JET:JWB:RIZ:flh
G:\FINAL\REPORTS\17804-B2.RPT

Enc: Appendix I - Laboratory Testing
Shear Test Diagrams (4)
Vicinity Map
Regional Geologic Map
Log of Test Pits (7 Pages)
Log of Borings (4 Pages)
Calculation Sheets (10)

In Pocket: Geologic Map
Sections A through H
Manometer Survey

xc: (2) Addressee
(2) Peter Walker and Partners Landscape Architecture Inc.
(1) C. W. Cook
(3) City of Los Angeles Department of Building and Safety, Grading Section

APPENDIX I

LABORATORY TESTING

Undisturbed and bulk samples of the fill, soil, and bedrock were obtained from the test pits and borings and transported to the laboratory for testing and analysis. The samples were obtained by driving a ring lined barrel sampler conforming to ASTM D-3550 with successive drops of the kelly bar and hand sampler weight. Experience has shown that sampling causes some disturbance of the sample, however the test results remain within a reasonable range. The samples were retained in brass rings of 2.50 inches outside diameter and 1.00 inches in height. The samples were stored in close fitting, waterproof containers for transportation to the laboratory.

Moisture-Density

The dry density of the samples was determined using the procedures outlined in ASTM D-2937. The moisture content of the samples was determined using the procedures outlined in ASTM D-2216. The results are shown on the Log of Test Pits and Log of Borings.

Maximum Density

The maximum dry density and optimum moisture content of the future compacted fill was determined by remolding bulk samples of the existing fill using the procedures outlined in ASTM D 1557, a five-layer standard. Remolded samples were prepared at 90% of the maximum density. The remolded samples were tested for shear strength.

Test Pit	Depth (Feet)	Soil Type	Maximum Density (pcf)	Optimum Moisture %	Expansion Index
15	5	Sandy Silt	101.0	24.0	55-Moderate

Expansion Test

To find the expansiveness of the future fill, a swell test was performed using the procedures outlined in ASTM D-4829. Based upon the testing, the future fill is moderately expansive.

Shear-Tests

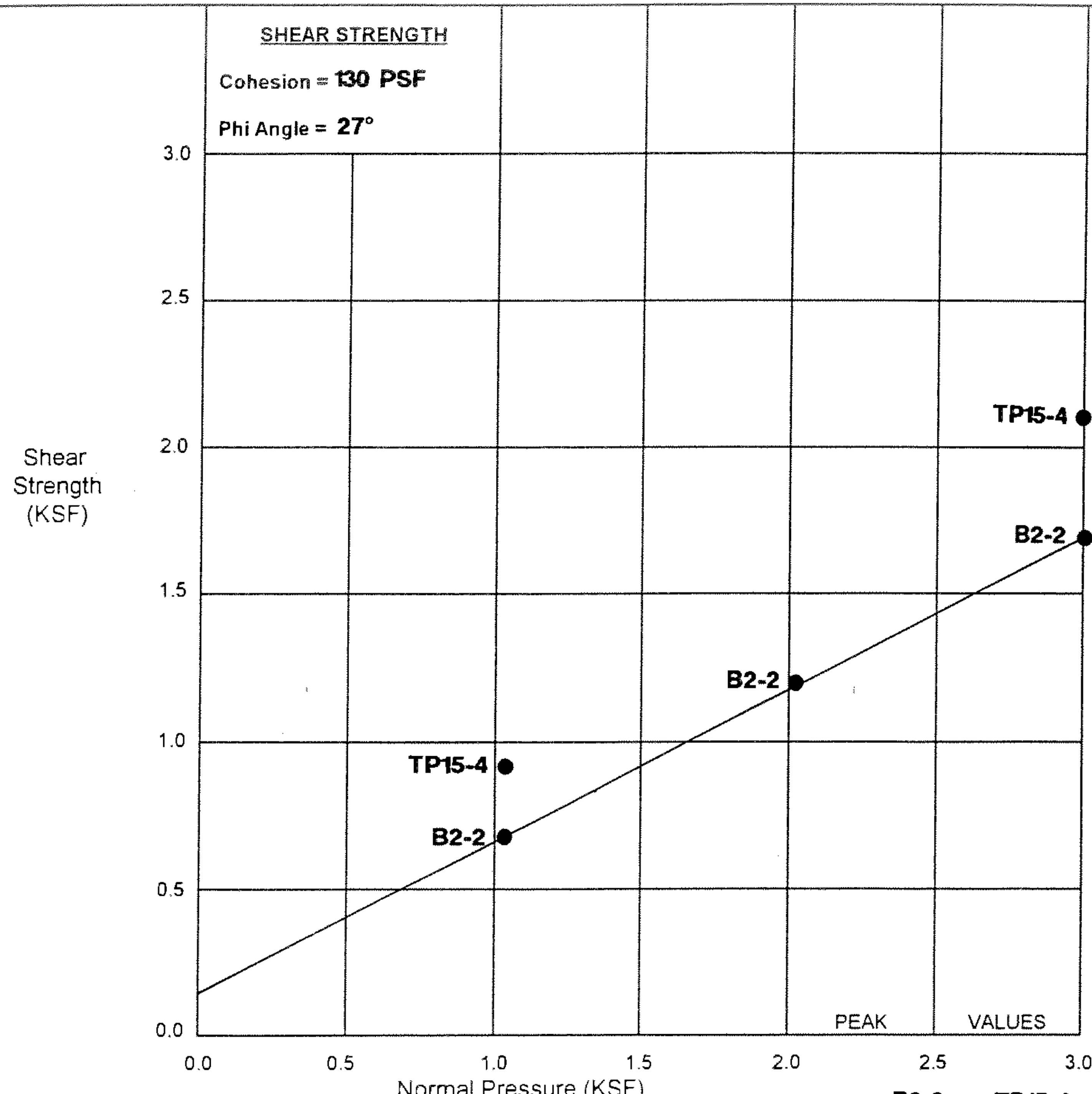
Shear tests were performed on samples of existing fill, future compacted fill, soil, and bedrock using the procedures outlined in ASTM D-3080 and a strain controlled, direct shear machine manufactured by Soil Test, Inc. The rate of deformation for the existing fill, future compacted fill and bedrock samples was 0.025 inches per minute. The rate of deformation for the soil samples was 0.010 inches per minute. The samples of the soil were repeatedly sheared to determine the residual shear strength. The samples were tested in an artificially saturated condition. Following the shear test, the moisture content of the samples was determined to verify saturation. The results are plotted on the "Shear Test Diagrams".

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SHEAR TEST DIAGRAM

JB: 17804-B L.A. Parks - Barnsdall

SAMPLE: Existing Fill



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

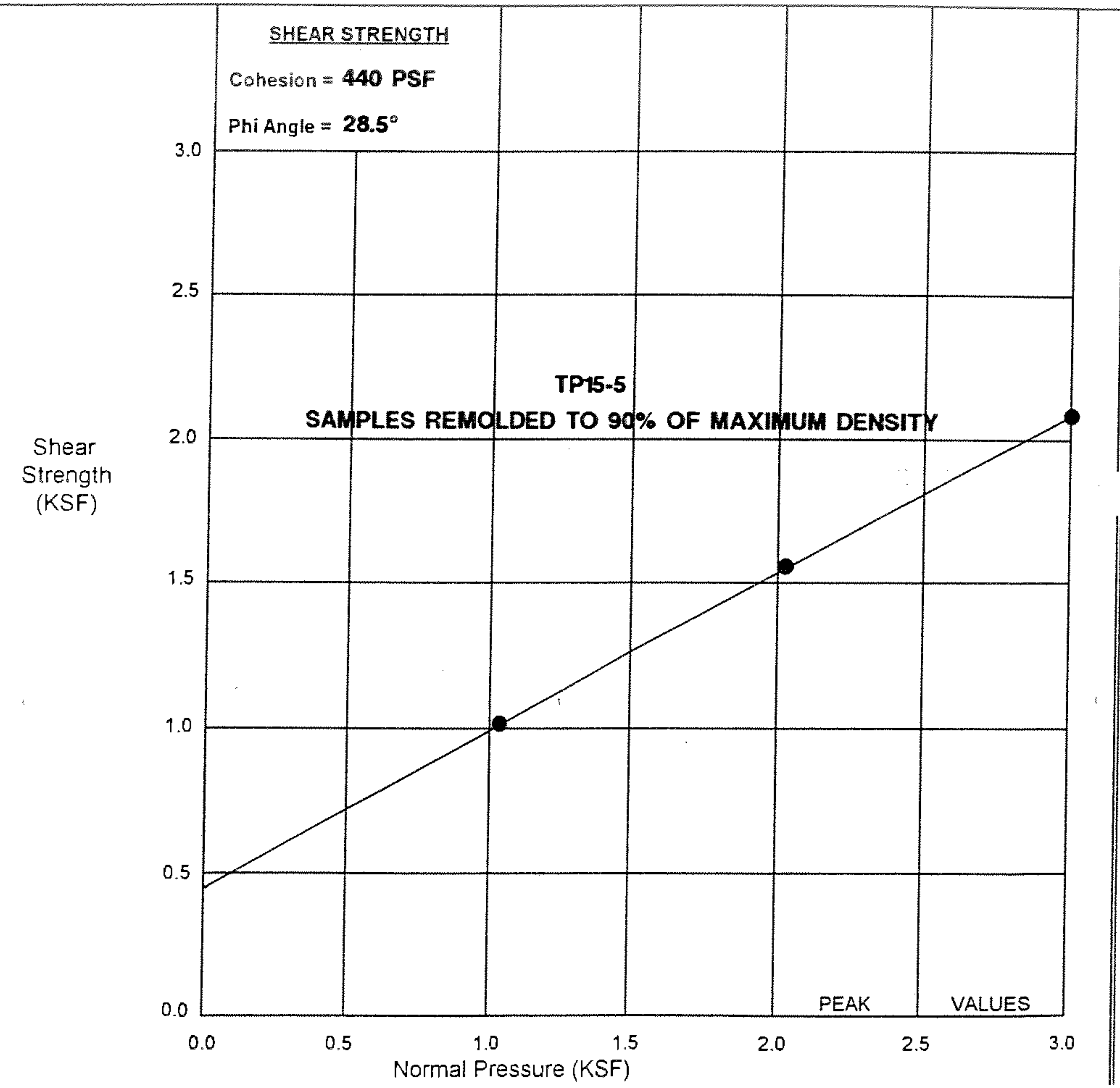
	B2-2	TP15-4
Moisture Content (%) =	41.3	38.3
Dry Density (pcf) =	74.5	81.5

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SHEAR TEST DIAGRAM

JB: 17804-B L.A. Parks - Barnsdall

SAMPLE: Future Fill



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Moisture Content (%) = **30.4**

Dry Density (pcf) = **90.9**

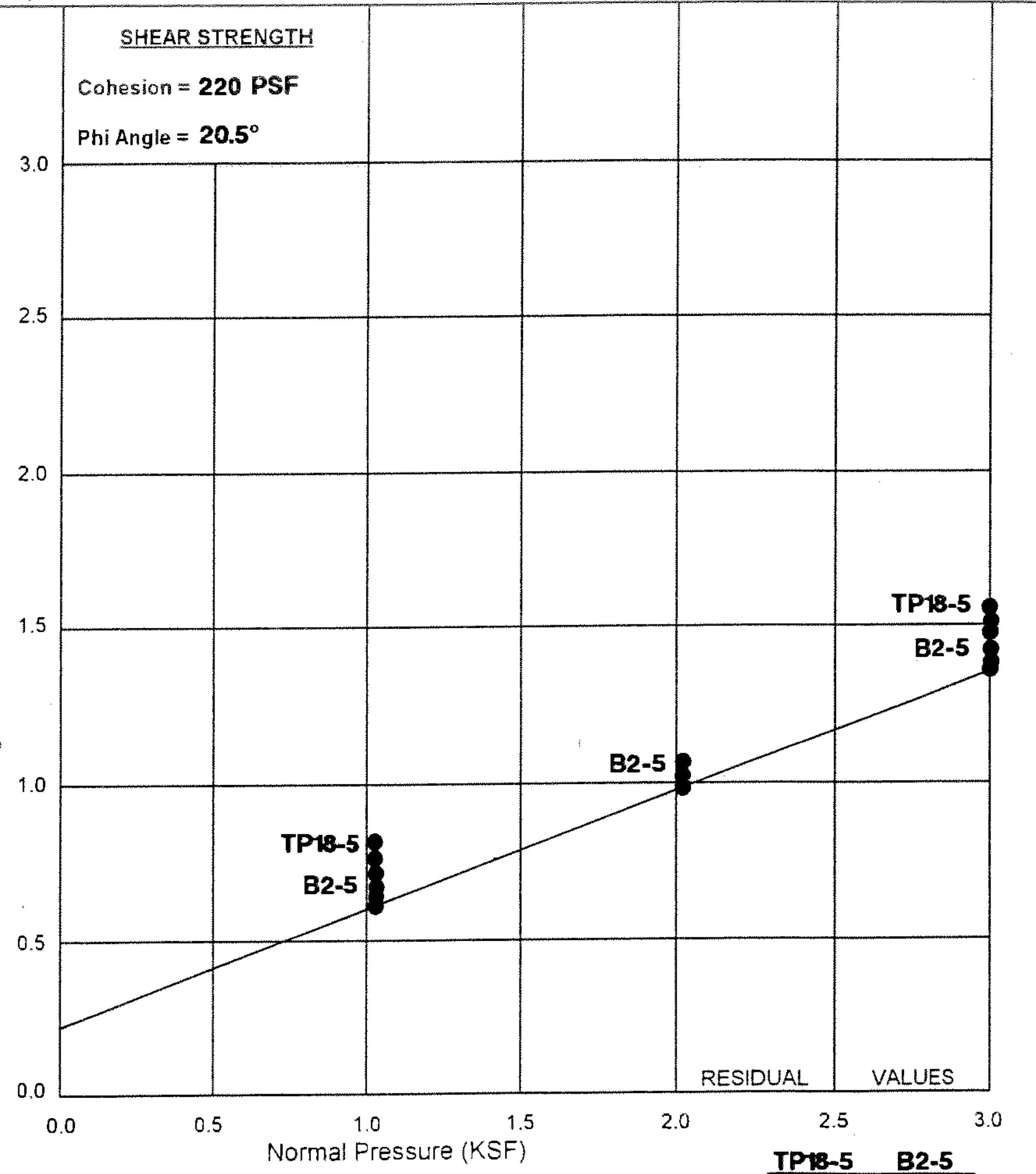
SHEAR TEST DIAGRAM

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

JB: 17804-B L.A. Parks - Barnsdall

SAMPLE: Soil

Samples repeatedly sheared



	TP18-5	B2-5
Moisture Content (%) =	34.2	48.9
Dry Density (pcf) =	85.9	67.6

○ Direct Shear (Field Moisture)

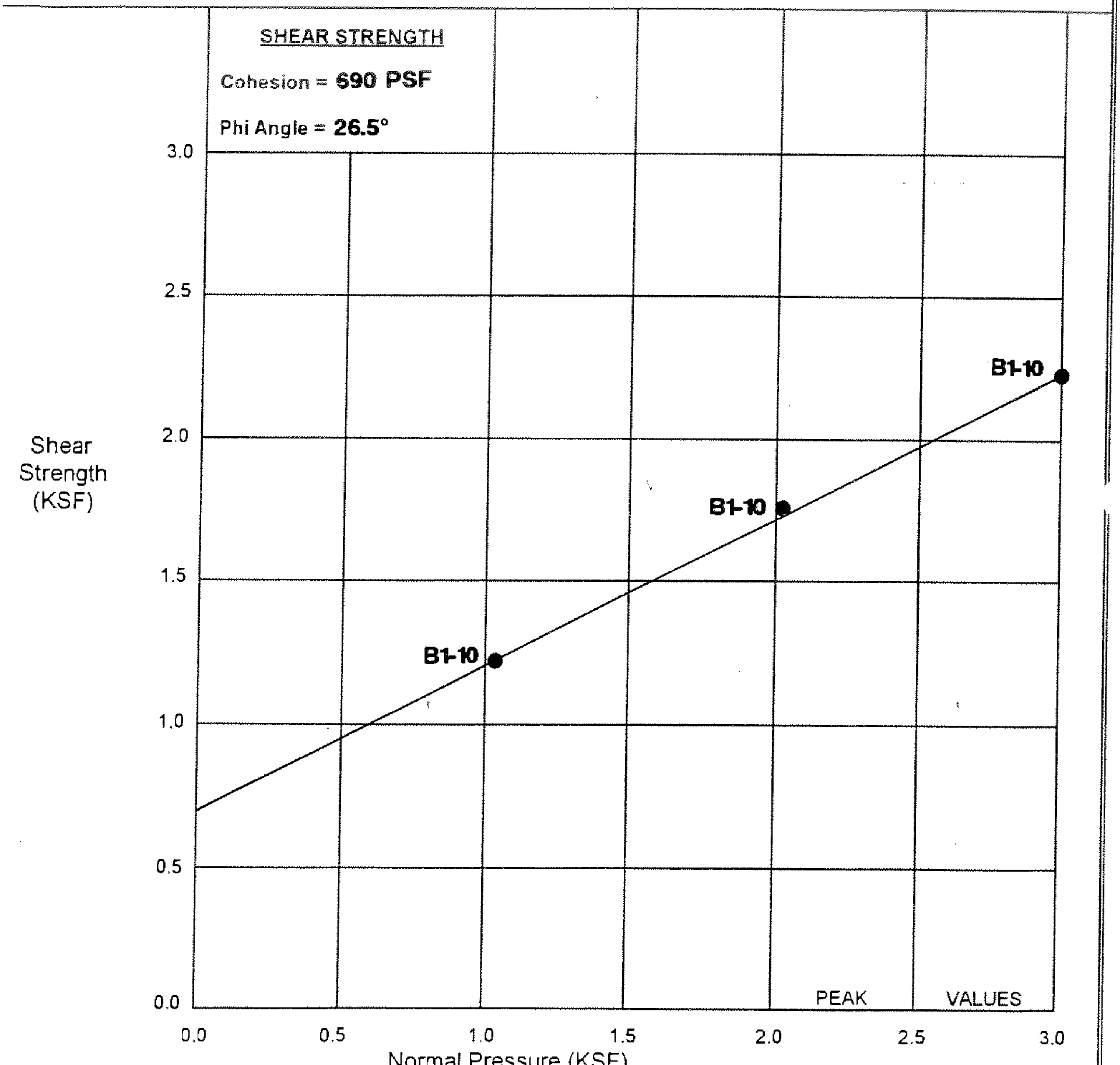
● Direct Shear (Saturated)

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SHEAR TEST DIAGRAM

JB: 17804-B L.A. Parks - Barnsdall

SAMPLE: Bedrock



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Moisture Content (%) = **35.5**

Dry Density (pcf) = **85.0**

THE J. BYER GROUP, INC.

A GEOTECHNICAL CONSULTING FIRM

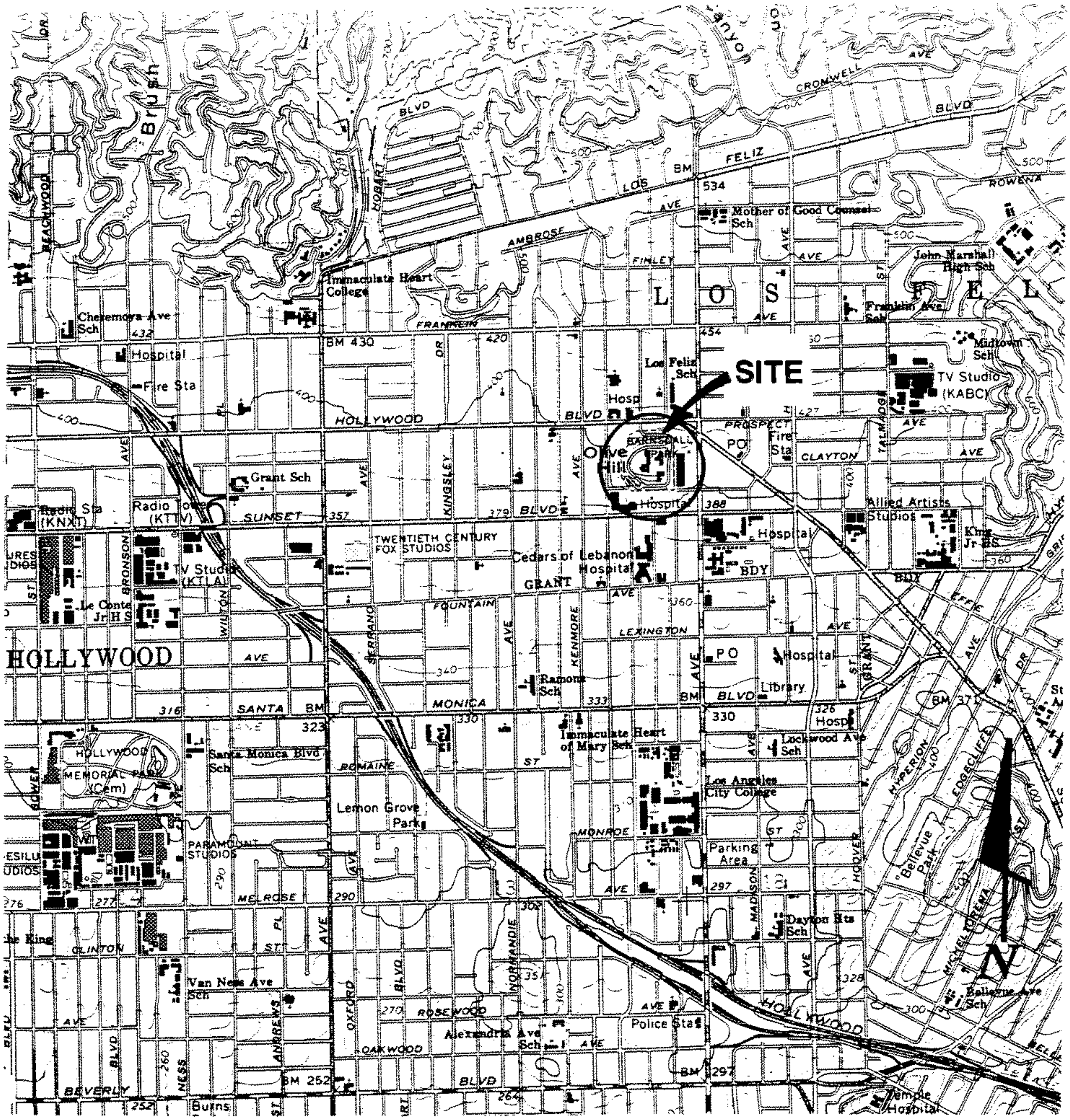
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

VICINITY MAP

JB 17804-B CLIENT: L. A. Parks - Barnsdall

CONSULTANT: JET SCALE: 1" = 2,000'

REFERENCE: *U.S.G.S. Topographic Map, 7.5 Minute Quadrangle Series, Hollywood Sheet, Photorevised 1981.*



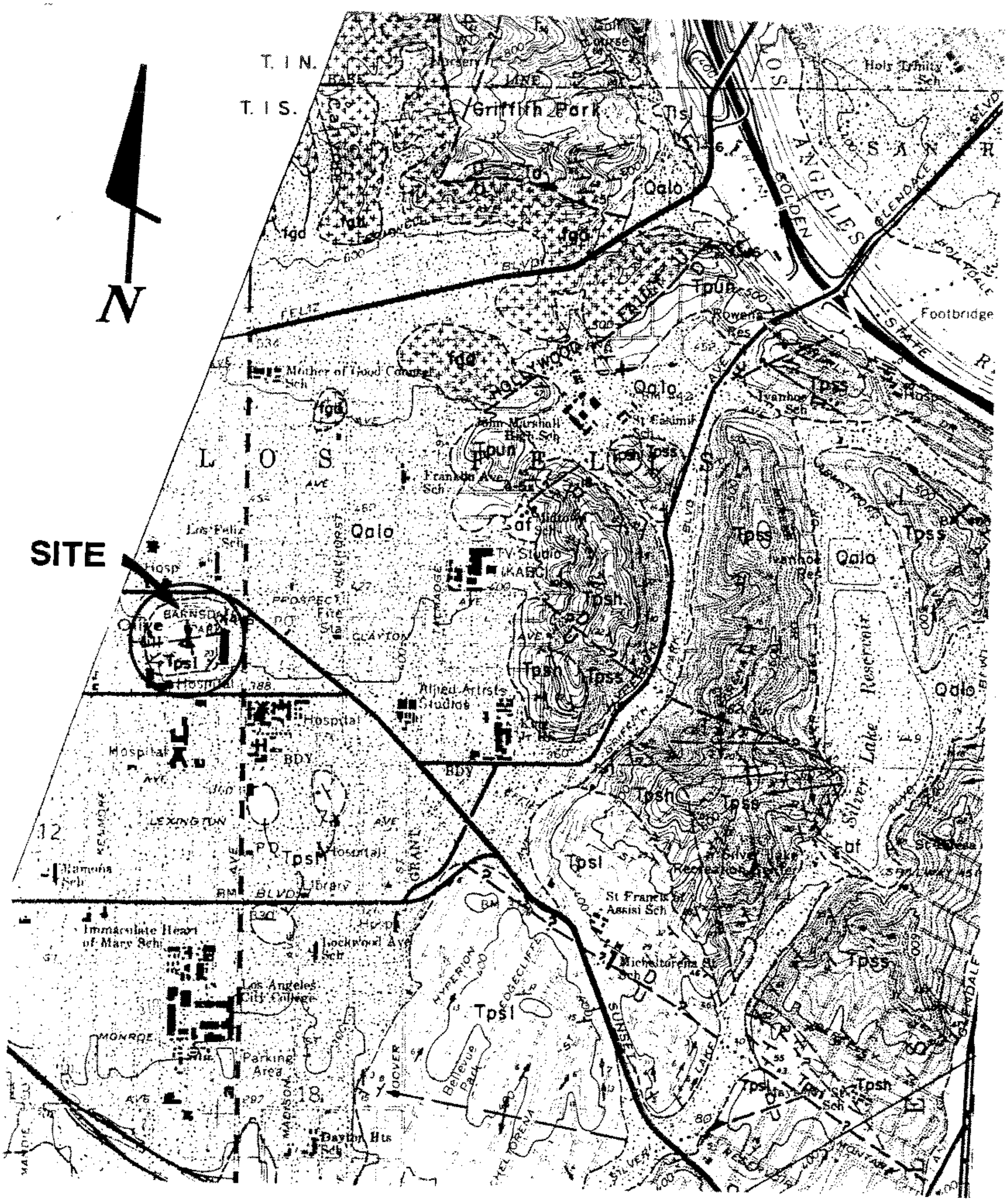
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

REGIONAL GEOLOGIC MAP

JB 17804-B CLIENT: L. A. Parks - Barnsdall

CONSULTANT: JET SCALE: 1" = 2,000'

REFERENCE: *C.D.M.G. Special Report 101, Geologic Map of the Elysian Park-Repetto Hills Area, Lamar, 1970.*



THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

LOG OF TEST PITS

JB: 17804-B CLIENT: BARNSDALL

GEOLOGIST: JET DATE LOGGED: 7/30/98

REPORT DATE: 9/30/98

TEST PIT #1 Surface Conditions: Grass

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 1	FILL:	Sandy Silt, dark gray brown, dry, firm, rootlets, rock fragments to 2 inches
			1 - 3	BEDROCK:	Siltstone, gray to gray-brown and brown, moderately hard, slightly fractured beds are horizontal, Joint: N67W 75SW

End at 3 Feet; No Water; No Caving; Fill to 1 Foot.

TEST PIT #2 Surface Conditions: Grass

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
2	22.6	84.6	0 - 3½	FILL:	Silty Clay, gray-brown, moist, slightly firm, roots up to ⅛ inch, rock fragments up to 3 inches
4	28.9	84.9	3½ - 5	SOIL:	Sandy Silt, dark gray brown, moist, slightly firm, roots up to ½ inch, porous, Fill/Soil contact is horizontal
			5 - 7	BEDROCK:	Siltstone, gray to greensih gray, weathered, fractured to roots up to ¼ inch, chaotic structure, Soil/Bedrock contact dips gently to the southwest

End at 7 Feet; No Water; No Caving; Fill to 3½ Feet.

TEST PIT #3 Surface Conditions: Grass

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
2 4	29.3 28.6	81.4 87.1	0 - 4½	FILL:	Sandy Silt to Gravelly Silt, gray to gray brown, moist, firm, rock fragments up to 5 inches, slightly porous, roots up to 1 inch
			4½ - 9	SOIL:	Clayey Silt, dark gray brown, moist, rock fragments up to 1 inch, roots up to 1 inch, porous, Fill/Soil contact is horizontal to very gently dipping to the southwest
			9 - 10½	BEDROCK:	Siltstone, greenish gray to light gray, moderately fractured, moderately weathered, moderately hard, roots up to ¼ inch, at 10 Feet less weathered, less fractured, Bedding: N27E 10NW

End at 10½ Feet; No Water; No Caving; Fill to 4½ Feet.

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

LOG OF TEST PITS

JB: 17804-B CLIENT: BARNSDALL

GEOLOGIST: JET DATE LOGGED: 7/30/98

REPORT DATE: 9/30/98

TEST PIT #4 Surface Conditions: Grass

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
2	28.1	81.5	0 - 2½	**FILL:**	Sandy Silt, light gray to gray brown, slightly moist, slightly firm, roots up to ¼ inch, rock fragments up to 1 inch
			2½ - 5	**TRENCH BACKFILL:**	Sandy Silt, dark gray-brown, slightly moist, slightly firm, very porous, roots up to ¼ inch, rock fragments up to 2 inches, wood fragments up to 1 inch, trench is trending N20E, dipping gently southwest
			5 - 6	**BEDROCK:**	Siltstone, gray to gray-brown, slightly fractured, bedding approximately horizontal

End at 6 Feet; No Water; No Caving; Fill to 2½ Feet.
Cast Iron Sewer Pipe, 4 Inches in Diameter, 1 Foot below surface, Trending North-South
Bottom of Footing 6 Inches Below Grade.

TEST PIT #5 Surface Conditions: Grass

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
2	28.1	84.3	0 - 2	**FILL:**	Sandy Silt, gray to gray brown, slightly moist, slightly firm, rock fragments up to 2 inches, roots up to ¼ inch
4	27.2	88.0	2 - 5½	**SOIL:**	Sandy Silt, dark gray brown, moist, slightly firm to firm, porous to very porous, roots up to ¼ inch, dipping gently to south
			5½ - 7½	**BEDROCK:**	Siltstone, gray to greenish-gray, slightly loose and soft, fractured, very weathered, roots in fractures at 7 feet less weathered, less fractured Bedding N70E; 12NW

End at 7½ Feet; No Water; No Caving; Fill to 2 Feet.

TEST PIT #6 Surface Conditions: Bare "dirt"

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
2	22.5	81.2	0 - 4	**FILL:**	Sandy Silt, light gray-brown, firm to slightly firm, rock fragments to 1 inch, concrete block, brick and asphalt fragments to 1 inch, roots up to ½ inch
			4 - 6	**BEDROCK:**	Siltstone, light gray-brown, slightly moist, very fractured, very weathered, soft to moderately hard, Bedding: N33E 16 NW, at 5 feet less weathered, less fractured, moderately hard, light gray brown to orange brown

End at 6 Feet; No Water; No Caving; Fill to 4 Feet.
Bottom of Footing 12 Inches Below Grade.

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

LOG OF TEST PITS

JB: 17804-B CLIENT: BARNSDALL

GEOLOGIST: JET DATE LOGGED: 7/30/98

REPORT DATE: 9/30/98

TEST PIT #7 Surface Conditions: Grass

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 1½	**FILL:**	Clayey Silt, black to dark gray-brown, moist, firm, rock fragments up to 1 inch, roots up to ¼ inch, porous
			1½ - 3		Silty Gravel, gray-brown, moist, dense, fragments to 6 inches
			3 - 4	**BEDROCK:**	Siltstone, gray-brown to gray, soft, very weathered, moist

End at 4 Feet; No Water; No Caving; Fill to 1½ Feet.

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

LOG OF TEST PITS

JB: 17804-B CLIENT: BARNSDALL

GEOLOGIST: JET DATE LOGGED: 8/4/98

REPORT DATE: 9/30/98

TEST PIT #8 Surface Conditions: Dirt

0 - 3	**FILL:**	Gravelly Silt, light gray-brown, dry, slightly firm, roots up to 1 inch, rock and brick fragments up to 1 ½ inches
3 - 6	**SOIL:**	Sandy Silt, dark gray-brown, slightly moist, firm, roots up to ¼ inch, rock fragments up to ½ inch, porous to very porous, Fill/Soil contact is horizontal
6 - 7½	**BEDROCK:**	Siltstone, lightly greenish gray to whitish gray, slightly hard, very weathered, moderately fractured, rootlets, Soil/Bedrock contact dips moderately to the west

End at 7½ Feet; No Water; No Caving; Fill to 3 Feet.

TEST PIT #9 Surface Conditions: Grass

0 - 1	**FILL:**	Sandy Silt, brown to dark gray brown, dry, slightly firm, roots to 1 inch, rock fragments to 1 inch
1 - 3	**SOIL:**	Sandy Silt, dark gray-brown, dry, slightly firm to firm, roots to 1 inch, rock fragments to ¼ inch, very porous, Fill/Soil contact dips gently west
3 - 4	**BEDROCK:**	Siltstone, light greenish gray to orange-brown, moderately hard, slightly weathered, slightly fractured, rootlets, Soil/Bedrock contact dips moderately to the west

End at 4 Feet; No Water; No Caving; Fill to 1 Foot.

TEST PIT #10 Surface Conditions: Grass

0 - 3	**FILL:**	Silty Sand, dark brown to brown, dry, slightly dense to dense, roots and rock fragments to 1 inch
3 - 4		Sandy Silt, dark gray brown to gray brown, slightly moist, slightly firm, rock fragments to 1 inch
4 - 6	**SOIL:**	Clayey Silt, dark gray brown, slightly moist to moist, slightly firm, roots to ½ inch, porous, Fill/Soil contact dips shallowly to the west
6 - 7½	**BEDROCK:**	Siltstone, light gray brown, very fractured and weathered, soft, Soil/Bedrock contact dips moderately to the west-southwest
7½ - 8		moderately hard, slightly weathered and fractured, bedding horizontal

End at 8 Feet; No Water; No Caving; Fill to 4 Feet.

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

LOG OF TEST PITS

JB: 17804-B CLIENT: BARNSDALL

GEOLOGIST: JET DATE LOGGED: 8/4/98

REPORT DATE: 9/30/98

TEST PIT #11 Surface Conditions: Grass

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 1	FILL:	Gravelly Silt, gray-brown to gray, moist, slightly firm, rootlets, rock fragments up to 2 inches
			1 - 3	SOIL:	Clayey Silt, dark gray brown, moist, slightly firm, roots up to ¼ inch, rock fragments up to 6 inches, porous to very porous, Fill/Soil Contact dips gently to the north
			3 - 4	BEDROCK:	Siltstone, gray-brown to light gray, moderately weathered and fractured, slightly hard, Bedding moderately dips to the north
			4 - 4½		less weathered and fractured, moderately hard, bedding is horizontal

End at 4½ Feet; No Water; No Caving; Fill to 1 Foot.
Bottom of Footing 14 Inches Below Grade.

TEST PIT #12 Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - ½	FILL:	Silty Sand, light brown, dry, medium dense
			½ - 2		Clayey Silt, dark gray brown, slightly moist, firm, rock fragments to 1 inch, rootlets
			2 - 7		gray to grayish green, gray-brown, moist, slightly firm, rock fragments to 1½ inches, at 5½ feet rock fragments to 6 inches
			7 - 10	SOIL:	Clayey Silt, moist, dark gray brown, slightly firm to firm, porous, rocks to 1 inch, Fill/Soil contact dips very gently to the east
			10 - 11½	BEDROCK:	Siltstone, slightly gray to greenish gray to orange-brown, moderately weathered and hard, bedding is horizontal, Soil/Bedrock contact dips gently to the east

End at 11½ Feet; No Water; No Caving; Fill to 7 Feet.

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

LOG OF TEST PITS

JB: 17804-B CLIENT: BARNSDALL

GEOLOGIST: JET DATE LOGGED: 9/10/98

REPORT DATE: 9/30/98

TEST PIT #13 Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 5	**FILL:**	Clayey Silt, gray brown, moist, slightly firm to firm, roots to ½ inch, rock fragments to 6 inches Unable to continue due to concrete at bottom of excavation, at least 18 inches by 2 feet

End at 5 Feet; No Water; No Caving; Fill to Total Depth.

TEST PIT #14 Surface Conditions: Lawn

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 1	**FILL:**	Sandy Silt, medium brown, moist, firm
			1 - 3	**BEDROCK:**	Siltstone, gray to brown gray, moderately hard, moderately fractured, slightly weathered and rootlets
			3 - 4		less weathered, bedding is horizontal

End at 4 Feet; No Water; No Caving; Fill to 1 Foot.

TEST PIT #15 Surface Conditions: Vines and Trees

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
2 4	14.8 22.2	71.5 75.3	0 - 9½	**FILL:**	Sandy Silt, light brown to light green, rock fragments up to 3 inches, soft to slightly firm, dry to slightly moist
			9½ - 11½	**SOIL:**	Sandy Clay, dark brown, moist, firm, porous
			11½ - 12½	**BEDROCK:**	Siltstone, gray to orange brown, moderately hard, moderately weathered

End at 12½ Feet; No Water; No Caving; Fill to 9½ Feet.

TEST PIT #16 Surface Conditions: Grass Lawn

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
2	21.6	82.3	0 - 2	**SOIL:**	Sandy Clay, dark brown to black, slightly moist, firm, roots to ⅛ inch
			2 - 3		Sandy Silt, brownish gray, slightly moist to moist, firm
			3 - 4	**BEDROCK:**	Siltstone, gray, soft, very weathered, massive, rootlets
			4 - 5½		gray to orange brown, moderately hard, slightly fractured, well bedded, bedding is horizontal

End at 5½ Feet; No Water; No Caving; No Fill.

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

LOG OF TEST PITS

JB: 17804-B CLIENT: BARNSDALL

GEOLOGIST: JET DATE LOGGED: 9/10/98

REPORT DATE: 9/30/98

TEST PIT #17 Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 3½	**SOIL:**	Sandy Clay, dark brown to black, moist, firm, roots up to 3 inches and slightly porous
			3½ - 4½	**BEDROCK:**	Siltstone, whitish brown, very weathered, soft, massive
			4½ - 5½		whitish gray, moderately hard to hard, well bedded, near horizontal bedding

End at 5½ Feet; No Water; No Caving; No Fill.

TEST PIT #18 Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0 - 1½	**FILL:**	Gravelly Silt, gray brown, dry, slightly loose, roots to 1 inch, rocks to 2 inches
2	15.5	76.4	1½ - 4		gray to brownish gray, rocks to 1 inch, slightly firm to firm
5	21.3	85.9	4 - 8	**SOIL:**	Sandy Silt, black to dark brown, moist, stiff to very stiff, rootlets, slightly porous
			8 - 10	**BEDROCK:**	Siltstone, light gray, moderately hard, slightly weathered, well bedded, with thin beds of orange brown Sandstone and thin layers of white diatomaceous Siltstone, bedding horizontal

End at 10 Feet; No Water; No Caving; Fill to 4 Feet.

NOTE: The stratification depths shown on the Log of Test Pits are approximate and are based upon visual classification of samples and cuttings. The actual depths may vary. Variations between test pits may also occur.

Project No: JB 17804-B

Log of Boring 1

Client: BARNSDALL PARK

Location: 4800 Hollywood Boulevard

By: JET

The J. Byer Group, Inc.
512 East Wilson Ave., Suite 201
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description (SUBSURFACE PROFILE)	Symbol	USCS	Type (SAMPLE)	Blow Count Per Foot (SAMPLE)	Moisture Content (%) (Lab Data)	Dry Density (pcf) (Lab Data)	PHI Angle (degrees)	Cohesion (psf)	Remarks
476	0	Ground Surface									
		BEDROCK Siltstone, Gray to gray-brown, soft, moderately fractured, moist									
475	1										
474	2	orange-brown, fractured to very fractured		—	R	2	27.0	85.0			
473	3	gray to dark gray, moderately fractured, moderately hard, bedding is horizontal, orange-brown oxidation along bedding									
472	4										
471	5	Joint: N-S 62W		—	R	4	31.4	90.6			
470	6	orange-brown to dark gray, soft, moist, structure is contorted									
469	7	Joint N65E, 63NW									
468	8										
467	9										
466	10	Shale layer 12 inches thick, dark gray brown to orange brown, hard, very fractured		—	R	4	30.2	85.0			
465	11	Siltstone, dark gray to gray, soft, no structure									
464	12										
463	13										
462	14	moderately hard, well bedded									
461	15	bedding is near horizontal		—	R	3	32.0	89.6			
460	16										
459	17	Joint N5E vertical									
458	18										
457	19										
456	20										

Surface: Asphalt Parking Area

Drill Method: Bucket Auger

Drill Date: 8/13/98

Size: 24 Inch

Elevation: 476

Project No: JB 17804-B

Log of Boring 1

Client: BARNSDALL PARK

Location: 4800 Hollywood Boulevard

By: JET

The J. Byer Group, Inc.
512 East Wilson Ave., Suite 201
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count Per Foot	Moisture Content (%)	Dry Density (pcf)	PHI Angle (degrees)	Cohesion (psf)	Remarks
		Joint E-W near vertical, roots along joint surface, Bedding is horizontal		—	R	4	34.4	85.5			
455	21										
454	22										
		fine Sandstone, light brown									
453	23	Siltstone, gray to orange-brown									
452	24										
451	25										
450	26										
449	27	Bedding N40E; 10SE									
448	28										
447	29										
446	30			—	R	8	34.7	83.7			
445	31										
444	32	Siltstone and Shale, dark gray to red-brown, slightly fractured, moderately hard, moist									
443	33	Bedding near horizontal									
442	34										
441	35	light gray to whitish gray, moderately hard									
440	36	dark gray, moderately hard to very hard									
439	37										
438	38										
437	39			—	R	16	26.7	95.9			
436	40	End at 40 Feet; No Water; No Caving									

Surface: Asphalt Parking Area

Drill Method: Bucket Auger

Drill Date: 8/13/98

Size: 24 Inch

Elevation: 476

Project No: JB 17804-B

Client: BARNSDALL PARK

Location: 4800 Hollywood Boulevard

Log of Boring 2

By: JET

The J. Byer Group, Inc.
512 East Wilson Ave., Suite 201
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description (SUBSURFACE PROFILE)	Symbol	USCS (SAMPLE)	Type (SAMPLE)	Blow Count Per Foot (SAMPLE)	Moisture Content (%) (Lab Data)	Dry Density (pcf) (Lab Data)	PHI Angle (degrees)	Cohesion (psf)	Remarks
442	0	Ground Surface									
441	1	**FILL** Sandy Silt, dark gray brown, slightly moist, slightly firm, rock fragments up to 1 inch, roots to 1/2 inch									
440	2			ML	R	1	20.5	94.5			
439	3	**SOIL** Silt, dark gray brown, moist, slightly firm to medium firm, roots to ¼ inch, porous to very porous, rock fragments to ½ inch									Fill/Soil Contact dips moderately to the south
438	4										
437	5			ML	R	3	21.5	67.6			
436	6	**BEDROCK** Siltstone, gray-white to gray, moderately hard, very fractured and weathered, roots to ¼ inch									Soil/Bedrock Contact dips moderately to the south
435	7										
434	8										
433	9	Siltstone, gray to gray-brown, moderately hard slightly fractured and weathered									
432	10			—	R	8	32.2	90.9			
431	11										
430	12										
429	13										
428	14										
427	15	rootlets along fractures		—	R	5	25.0	94.7			
426	16										
425	17										
424	18										
423	19										
422	20										

Surface: Dirt at Edge of Asphalt Parking Area

Drill Method: Bucket Auger

Drill Date: 8/13/98

Size: 24 Inch

Elevation: 442

Project No: JB 17804-B

Client: BARNSDALL PARK

Location: 4800 Hollywood Boulevard

Log of Boring 2

By: JET

The J. Byer Group, Inc.
512 East Wilson Ave., Suite 201
Glendale, CA 91206
(818) 549-9959

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count Per Foot	Moisture Content (%)	Dry Density (pcf)	PHI Angle (degrees)	Cohesion (psf)	Remarks
		roots up to ¼ inch		—	R	2	33.3	86.1			
421	21										
420	22	moderately hard to hard									
419	23	dark gray to orange brown gypsum veins up to 1/8 inch thick, roots up to 1/8 inch									
418	24										
417	25	dark gray to reddish brown, moderately hard to hard, well bedded, horizontal									
416	26	1/8 inch gypsum vein along bedding									
415	27	Bedding: N75E; 12 NW									
414	28	dark gray to yellowish gray, hard									
413	29	Shale, light gray-brown to whitish gray to reddish brown, very hard, very cemented									
412	30										
411	31			—	R	25	31.6	87.3			
410	32	Siltstone, dark gray to dark yellowish brown, hard									
409	33	Bedding N80E; 15 NW									
408	34										
407	35	Joint N35W Vertical, gypsum veins up to ½ inch, moderately dipping to the south, but mostly erratic									
406	36										
405	37										
404	38										
403	39	End at 40 Feet; No Water; No Caving, Fill to 3 Feet		—	R	30	32.5	90.1			
402	40										

Surface: Dirt at Edge of Asphalt Parking Area

Drill Method: Bucket Auger

Drill Date: 8/13/98

Size: 24 Inch

Elevation: 442

THE J. BYER GROUP, Inc.
A Geotechnical Consulting Firm

RETAINING WALL ANALYSIS
JB 17804-B   L.A. PARKS - BARNSDALL

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED RETAINING WALLS SUPPORTING FUTURE FILL UP TO 15 FEET HIGH, WITH A 27 DEGREE BACKSLOPE. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE.

FUTURE FILL PROPERTIES (Saturated)

COHESION	440 psf	RETAINING WALL HEIGHT	15 feet
PHI ANGLE	28.5 degrees	BACKSLOPE ANGLE	27 degrees
DENSITY	118.5 pcf	UNIFORM SURCHARGE	0 pounds/foot
REF. SHEAR DIAGRAM 2		FACTOR OF SAFETY	1.5

For Factor of Safety (FS) = 1.5 : Cd = C/FS = 293.33 psf
Phid = atan(tan(Phi)/FS) = 19.89 degrees

FOR THIS CALCULATION THE ANGLE OF FRICTION BETWEEN THE WALL AND THE BACKFILL IS 0 DEGREES.

1189 TRIALS WERE ANALYZED USING ASSUMED FAILURE ANGLES VARYING FROM 30 TO 70 DEGREES AT AN INTERVAL OF 1 DEGREES, AND UPSLOPE DISTANCES TO THE TENSION CRACK FROM 2 TO 30 FEET AT AN INTERVAL OF 1 FEET.

THE HORIZONTAL UPSLOPE DISTANCE TO THE TENSION CRACK WHICH RESULTS IN THE HIGHEST HORIZONTAL THRUST ON THE RETAINING WALL IS 12 FEET. THE TOTAL EXTERNAL SURCHARGE ON THE FAILURE WEDGE IS 0 POUNDS.

DESIGN THE RETAINING WALL AS FOLLOWS:

CRITICAL FAILURE ANGLE (degrees)	AREA OF FAILURE WEDGE (sq. ft.)	TENSION CRACK DEPTH (feet)	MAXIMUM HORIZONTAL THRUST (pounds)	EQUIVALENT FLUID PRESSURE (pcf)
49.00	133.86	7.31	3055.38	27.16

CONCLUSIONS:

THE CALCULATION INDICATES THAT THE PROPOSED RETAINING WALL UP TO 15 FEET HIGH SUPPORTING FUTURE FILL WITH A 27 DEGREE BACKSLOPE MAY BE DESIGNED FOR A MINIMUM EFP OF 43 PCF.

```
**************************************************
* ********************************************** *
* *                                            * *
* *     ----------------------------------     * *
* *     TSLOPE - slope stability analysis      * *
* *          Revision 2.52 - 01/06/86          * *
* *     ----------------------------------     * *
* *                                            * *
* *     TAGA Engineering Software Services     * *
* *          Berkeley, California USA          * *
* *                                            * *
* *   IBM PC & 8086/8088 MS-DOS Version by     * *
* *                                            * *
* * Design Professionals Management Systems    * *
* *          Kirkland, Washington USA          * *
* *                                            * *
* *       copyright (c) 1983,84,85 TAGA        * *
* *       copyright (c) 1983,84,85 DPMS        * *
* *                                            * *
* ********************************************** *
**************************************************
```

JB 17084-B L. A. PARKS BARNSDALL

STABILITY ANALYSIS ALONG SOIL/BEDROCK, UTILIZING SOIL SHEAR STRENGTH VALUES, SECTION G.

INPUT DATA

CONTROL DATA,

NUMBER OF TRIAL SLIP SURFACES	1
NUMBER OF SPECIFIED SLOPE POINTS	5
NUMBER OF POINT LOADS	0
NUMBER OF PRESSURE LOADS	0

INITIAL ESTIMATE OF F	=	3.000
INITIAL ESTIMATE OF THETA	=	15.000
ALLOWABLE FORCE IMBALANCE	=	10.000
ALLOWABLE MOMENT IMBALANCE	=	100.000
SEISMIC COEFFICIENT	=	.000
ATMOSPHERIC PRESSURE	=	2116.000
UNIT WEIGHT OF WATER	=	62.400

SLOPE POINTS COORDINATES

X	Y
10.00	11.00
27.00	11.00
66.00	11.00
90.00	26.00
98.00	30.00

NUMBER OF SLICES = 4

SLICE DATA

X	Y	GAMMA	U	CEE	PHI	DPHI
10.00	16.00					
		112.70	.00	220.00	20.50	.00
27.00	20.00					
		112.70	.00	220.00	20.50	.00
66.00	28.00					
		112.70	.00	220.00	20.50	.00
90.00	34.00					
		112.70	.00	220.00	20.50	.00
98.00	30.00					

RESULTS

ITERATION	F	THETA DEGREES	EXCESS FORCE	EXCESS MOMENT
1	3.000	15.0	-54.0	11873.2
2	2.942	9.2	-4.4	-402.9
3	2.943	9.5	.0	.0

SECTION NUMBER	X COORDINATE	INTERSLICE FORCES FORCE	THETA	POA	EFFECTIVE STRESSES ON SLIP SURFACE NORMAL	SHEAR
0	10.00	.0	0.0	.00	.0	.0
SPECIFIED TENSION CRACK						
1	27.00	107.5	9.5	.06	747.9	169.7
2	66.00	1498.3	9.5	.04	1407.2	253.5
3	90.00	3668.1	9.5	.22	1332.8	244.1
4	98.00	.0	9.5	.00	602.0	150.9

COMPUTED FACTOR OF SAFETY = 2.943

STABILITY ANALYSIS ALONG FILL/SOIL, UTILIZING SOIL SHEAR STRENGTH VALUES, SECTION G.

INPUT DATA

CONTROL DATA,

NUMBER OF TRIAL SLIP SURFACES	1
NUMBER OF SPECIFIED SLOPE POINTS	4
NUMBER OF POINT LOADS	0
NUMBER OF PRESSURE LOADS	0

INITIAL ESTIMATE OF F	=	3.000
INITIAL ESTIMATE OF THETA	=	15.000
ALLOWABLE FORCE IMBALANCE	=	10.000
ALLOWABLE MOMENT IMBALANCE	=	100.000
SEISMIC COEFFICIENT	=	.000
ATMOSPHERIC PRESSURE	=	2116.000
UNIT WEIGHT OF WATER	=	62.400

SLOPE POINTS COORDINATES

X	Y
27.00	11.00
66.00	11.00
90.00	26.00
98.00	30.00

NUMBER OF SLICES = 3

SLICE DATA

X	Y	GAMMA	U	CEE	PHI	DPHI
27.00	16.00					
		112.70	.00	220.00	20.50	.00
66.00	25.00					
		112.70	.00	220.00	20.50	.00
90.00	30.00					
		112.70	.00	220.00	20.50	.00
98.00	30.00					

RESULTS

ITERATION	F	THETA DEGREES	EXCESS FORCE	EXCESS MOMENT
1	3.000	15.0	-695.4	7595.7
2	2.974	25.0	-528.1	7872.3
3	2.942	15.0	-434.8	5686.1
4	2.842	5.0	9.2	-4745.8
5	2.848	11.6	.1	25.4
6	2.848	11.6	.0	.0

SECTION NUMBER	X COORDINATE	INTERSLICE FORCES FORCE	THETA	POA	EFFECTIVE STRESSES ON SLIP SURFACE NORMAL	SHEAR
0	27.00	.0	0.0	.00	.0	.0
SPECIFIED TENSION CRACK						
1	66.00	953.6	11.6	.03	1017.1	210.8
2	90.00	896.5	11.6	.14	972.1	204.9
3	98.00	.0	11.6	.00	247.9	109.8

COMPUTED FACTOR OF SAFETY = 2.848

STABILITY ANALYSIS ALONG FILL/SOIL, USING EXISTING FILL SHEAR STRENGTH VALUES, SECTION G.

INPUT DATA

CONTROL DATA,

NUMBER OF TRIAL SLIP SURFACES	1
NUMBER OF SPECIFIED SLOPE POINTS	4
NUMBER OF POINT LOADS	0
NUMBER OF PRESSURE LOADS	0

INITIAL ESTIMATE OF F	=	3.000
INITIAL ESTIMATE OF THETA	=	15.000
ALLOWABLE FORCE IMBALANCE	=	10.000
ALLOWABLE MOMENT IMBALANCE	=	100.000
SEISMIC COEFFICIENT	=	.000
ATMOSPHERIC PRESSURE	=	2116.000
UNIT WEIGHT OF WATER	=	62.400

SLOPE POINTS COORDINATES

X	Y
27.00	11.00
66.00	11.00
90.00	26.00
98.00	30.00

NUMBER OF SLICES = 3

SLICE DATA

X	Y	GAMMA	U	CEE	PHI	DPHI
27.00	16.00					
		112.70	.00	130.00	27.00	.00
66.00	25.00					
		112.70	.00	130.00	27.00	.00
90.00	30.00					
		112.70	.00	130.00	27.00	.00
98.00	30.00					

RESULTS

ITERATION	F	THETA DEGREES	EXCESS FORCE	EXCESS MOMENT
1	3.000	15.0	101.9	1246.9
2	3.020	11.6	.0	-12.2
3	3.020	11.6	.0	.0

SECTION NUMBER	X COORDINATE	INTERSLICE FORCES FORCE	THETA	POA	EFFECTIVE STRESSES ON SLIP SURFACE NORMAL	SHEAR
0	27.00	.0	0.0	.00	.0	.0
SPECIFIED TENSION CRACK						
1	66.00	797.8	11.6	.03	1017.0	214.7
2	90.00	686.1	11.6	.14	972.1	207.1
3	98.00	.0	11.6	.00	242.7	84.0

COMPUTED FACTOR OF SAFETY = 3.020

STABILITY ANALYSIS ALONG FILL/SOIL, UTILIZING SOIL SHEAR STRENGTH VALUES, SECTION G.

INPUT DATA

CONTROL DATA,

NUMBER OF TRIAL SLIP SURFACES	1
NUMBER OF SPECIFIED SLOPE POINTS	3
NUMBER OF POINT LOADS	0
NUMBER OF PRESSURE LOADS	0

INITIAL ESTIMATE OF F	=	3.000
INITIAL ESTIMATE OF THETA	=	15.000
ALLOWABLE FORCE IMBALANCE	=	10.000
ALLOWABLE MOMENT IMBALANCE	=	100.000
SEISMIC COEFFICIENT	=	.000
ATMOSPHERIC PRESSURE	=	2116.000
UNIT WEIGHT OF WATER	=	62.400

SLOPE POINTS COORDINATES

X	Y
66.00	11.00
90.00	26.00
98.00	30.00

NUMBER OF SLICES = 2

SLICE DATA

X	Y	GAMMA	U	CEE	PHI	DPHI
66.00	25.00					
		112.70	.00	220.00	20.50	.00
90.00	30.00					
		112.70	.00	220.00	20.50	.00
98.00	30.00					

Y COORDINATE OF FLUID IN TENSION CRACK = 16.00000
UNIT WEIGHT OF FLUID IN TENSION CRACK = 62.40000

RESULTS

ITERATION	F	THETA DEGREES	EXCESS FORCE	EXCESS MOMENT
1	3.000	15.0	-1825.7	873.2
2	2.000	10.4	884.6	-24191.8
3	2.087	20.4	590.0	-7924.5
4	2.192	30.4	266.9	477.8
5	2.291	38.5	.6	76.2
6	2.291	38.4	.0	.0

SECTION NUMBER	X COORDINATE	INTERSLICE FORCES FORCE	THETA	POA	EFFECTIVE STRESSES ON SLIP SURFACE NORMAL	SHEAR
0	66.00	2527.2	0.0	.21	.0	.0
SPECIFIED TENSION CRACK						
1	90.00	1557.9	38.4	.53	943.6	250.1
2	98.00	.0	38.4	.00	346.4	152.7

COMPUTED FACTOR OF SAFETY = 2.291

THE J. BYER GROUP, Inc.
A Geotechnical Consulting Firm

GROSS STABILITY ANALYSIS - TAYLOR'S METHOD
JB 17804-B BARNSDALL

CALCULATE THE MAXIMUM SLOPE HEIGHT TO WHICH 33 DEGREE SLOPES CONSISTING OF EXISTING FILL HAVE A FACTOR OF SAFETY GREATER THAN 1.5 UTILIZING TAYLOR'S METHOD *(FUNDAMENTALS OF SOIL MECHANICS)*.

EXISTING FILL PROPERTIES (Saturated)		**REFERENCE: SHEAR DIAGRAM 1**
Cohesion (C)	**Density (W)**	**Phi Angle**
130 psf	**112.7 pcf**	**27 degrees**

SLOPE ANGLE ANALYZED = 33 DEGREES.

For Factor of Safety (FS) = 1.5 : Cd = C / Fs = 86.66 psf
Phid = atan(tan(Phi)/Fs)= 18.76 degrees

Interpolate Stability Number (sn) from Taylor's charts:

		Slope Angles							
degrees		20	30	40	50	60	70	80	90
P	5	.090	.110	.130	.145	.160	.185	.210	.260
h	10	.045	.075	.100	.120	.140	.160	.188	.220
i	15	.020	.045	.070	.095	.115	.140	.168	.200
d	20	000	.025	.050	.075	.098	.120	.150	.180
	25	000	.010	.033	.055	.080	.105	.130	.170

FROM CHART sn = .037

$$\text{SAFE SLOPE HEIGHT} = \frac{Cd}{Wt \times (sn)} = \frac{86}{112.7 \times .037} = 20.53 \text{ feet.}$$

CONCLUSIONS:

THE CALCULATIONS INDICATE THAT 33 DEGREE SLOPES IN EXISTING FILL ARE GROSSLY STABLE WITH A FACTOR OF SAFETY GREATER THAN 1.5 UP TO 20 FEET HIGH. THEREFORE, THE EXISTING SLOPES UP TO 20 FEET HIGH CONSISTING OF EXISTING FILL ARE GROSSLY STABLE.

THE J. BYER GROUP, Inc.
A Geotechnical Consulting Firm

SOLDIER PILE ANALYSIS
JB 17804-B L.A. PARKS - BARNSDALL

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED SOLDIER PILES SUPPORTING FUTURE FILL UP TO 15 FEET HIGH, WITH A 27 DEGREE BACKSLOPE. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE.

FUTURE FILL PROPERTIES (Saturated)

COHESION	440 psf	RETAINED HEIGHT	15 feet
PHI ANGLE	28.5 degrees	BACKSLOPE ANGLE	27 degrees
DENSITY	118.5 pcf	UNIFORM SURCHARGE	0 pounds/foot
REF. SHEAR DIAGRAM		FACTOR OF SAFETY	1.5

For Factor of Safety (FS) = 1.5 : Cd = C/FS = 293.33 psf
Phid = atan(tan(Phi)/FS) = 19.89 degrees

FOR THIS CALCULATION THE ANGLE OF FRICTION BETWEEN SOLDIER PILES AND THE RETAINED EARTH MATERIAL IS 0 DEGREES.

1599 TRIALS WERE ANALYZED USING ASSUMED FAILURE ANGLES VARYING FROM 30 TO 70 DEGREES AT AN INTERVAL OF 1 DEGREES, AND UPSLOPE DISTANCES TO THE TENSION CRACK FROM 2 TO 40 FEET AT AN INTERVAL OF 1 FEET.

THE HORIZONTAL UPSLOPE DISTANCE TO THE TENSION CRACK WHICH RESULTS IN THE HIGHEST HORIZONTAL THRUST ON THE SOLDIER PILES IS 12 FEET. THE TOTAL EXTERNAL SURCHARGE ON THE FAILURE WEDGE IS 0 POUNDS.

DESIGN THE SOLDIER PILES AS FOLLOWS:

CRITICAL FAILURE ANGLE (degrees)	AREA OF FAILURE WEDGE (sq. ft.)	TENSION CRACK DEPTH (feet)	MAXIMUM HORIZONTAL THRUST (pounds)*	EQUIVALENT FLUID PRESSURE (pcf)*
49.00	133.86	7.31	3055.38	27.16

*** VALUES PER LINEAR FOOT OF RETAINED EARTH**

CONCLUSIONS:

THE CALCULATION INDICATES THAT PROPOSED SOLDIER PILES SUPPORTING UP TO 15 FEET OF FUTURE FILL MAY BE DESIGNED TO RETAIN A MINIMUM EFP OF 30 pcf (PER LINEAR FOOT OF RETAINED EARTH). THE EFP AND THRUST MUST BE MULTIPLIED BY THE PILE SPACING.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DR. #200, GLENDALE, CA 91206
818•549•9959 TEL 818•543•3747 FAX

February 9, 2000
JB 17804-B

City of Los Angeles
Department of Recreation and Parks
200 North Main Street, Room 709
City Hall East
Los Angeles, California 90012

Attention: Kathleen Chan, Project Manager

Subject

Addendum Geologic and Soils Engineering Exploration
Proposed Restoration, Grading
Barnsdall Park - Phase I Master Plan Implementation
Project #1026C; Contract #2723
4800 Hollywood Boulevard
Los Angeles, California

References: Report by The J. Byer Group, Inc.:

Geologic and Soils Engineering Exploration, Proposed Barnsdall Park - Phase I, Master Plan Implementation, dated February 25, 1999.

Hydrology Calculation for Barnsdall Park, by C. W. Cook Company Inc., dated January 20, 2000.

City of Los Angeles Department of Building and Safety Conditional Approval Letter, dated March 18, 1999.

Gentlepersons:

This Addendum Geologic and Soils Engineering report has been prepared to address issues raised during plan check by the City of Los Angeles Department of Building and Safety, Grading Section, of the grading plans by Peter Walker and Partners. In addition, this addendum contains recommendations for the proposed park restoration and grading. Sections X, Y, and Z have been prepared to illustrate the proposed grading and site conditions.

One issue raised during plan check is that a 12 inch high berm is required at the top of descending slopes which are to be graded (Section 91.7013.3 of the Los Angeles Building Code). The second issue is that an eight foot wide paved terrace drain be provided for every 25 vertical feet on graded slopes (Section 91.7013.1 of the Los Angeles Building Code). These two items affect proposed grading on the north slope (Section X) and east slope (Section Z). Proposed grading on the north slope will not exceed 25 vertical feet (Section X). However, grading on the east slope will be approximately 34 feet (Section Z). It has been proposed by Peter Walker and Partners to eliminate the berm requirement and the mid-slope bench for the 34 foot high slope to preserve the natural look of the park. This will require approval of a Request for Modification of the Building Ordinances from the City of Los Angeles Department of Building and Safety, Grading Section. The C. W. Cook Company has provided Hydrology Calculations demonstrating that the proposed road section will be sufficient to accommodate drainage without the 12 inch top of slope berm. A copy of the Hydrology Calculations is included with this report. It is the opinion of The J. Byer Group that due to the fact that no habitable structures are in the vicinity of the proposed grading and that the slopes will be maintained by the City of Los Angeles Department of Recreation and Parks, that these two requirements can be eliminated from the proposed grading. The 34 foot high section of the slope is 60 feet wide, 10 feet of which will be a staircase, limiting the drainage of the slope.

In addition, it is proposed to steepen the minor fill slopes proposed above the soldier piles to a gradient as steep as 1½:1 in order to match existing grades and eliminate the need for a small retaining wall on the piles. The fill slopes will be up to eight feet high. The enclosed slope stability analysis indicates that compacted fill slopes at a 1½:1 gradient up to eight feet high will be grossly and surficially stable with a factor of safety in excess of 1.5.

The J. Byer Group, Inc.
1461 E. Chevy Chase Drive • Suite #200 • Glendale, California 91206 • (818) 549-9959 • Fax (818) 543-3747
"Trust the Name You Know"

The grading adjacent to the Municipal Art Gallery Building will require removal and recompaction of the existing fill and soil. Also, the grade will be raised up to six feet. This will require the construction of a retaining wall adjacent to the Municipal Art Gallery. The proposed retaining wall should be founded into bedrock at a depth that will not surcharge the Municipal Art Gallery basement wall (Section Y). The retaining wall will be up to 14 feet high and will support future compacted fill. The retaining wall should be designed for an equivalent fluid pressure of 43 pounds per cubic foot per the enclosed calculations. Foundations may be designed per the spread footings section of the referenced report dated February 25, 1999.

Should you have any questions please call on the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.

James Tucker

James E. Tucker
Project Geologist

REGISTERED PROFESSIONAL ENGINEER
ROBERT I. ZWEIGLER
No. 2120
Exp. 6-30-02
GEOTECHNICAL
STATE OF CALIFORNIA

Robert I. Zweigler
E. G. 1210/G. E. 2120

John W. Byer
E. G. 883

RIZ:JWB:JET:flh
F:\FINAL\ADDENDUM\17804-b.add.wpd

Enc: Shear Test Diagram
Calculation Sheets (2)
Hydrology Calculation (6 Pages)
Plot Plan
Sections X, Y, and Z

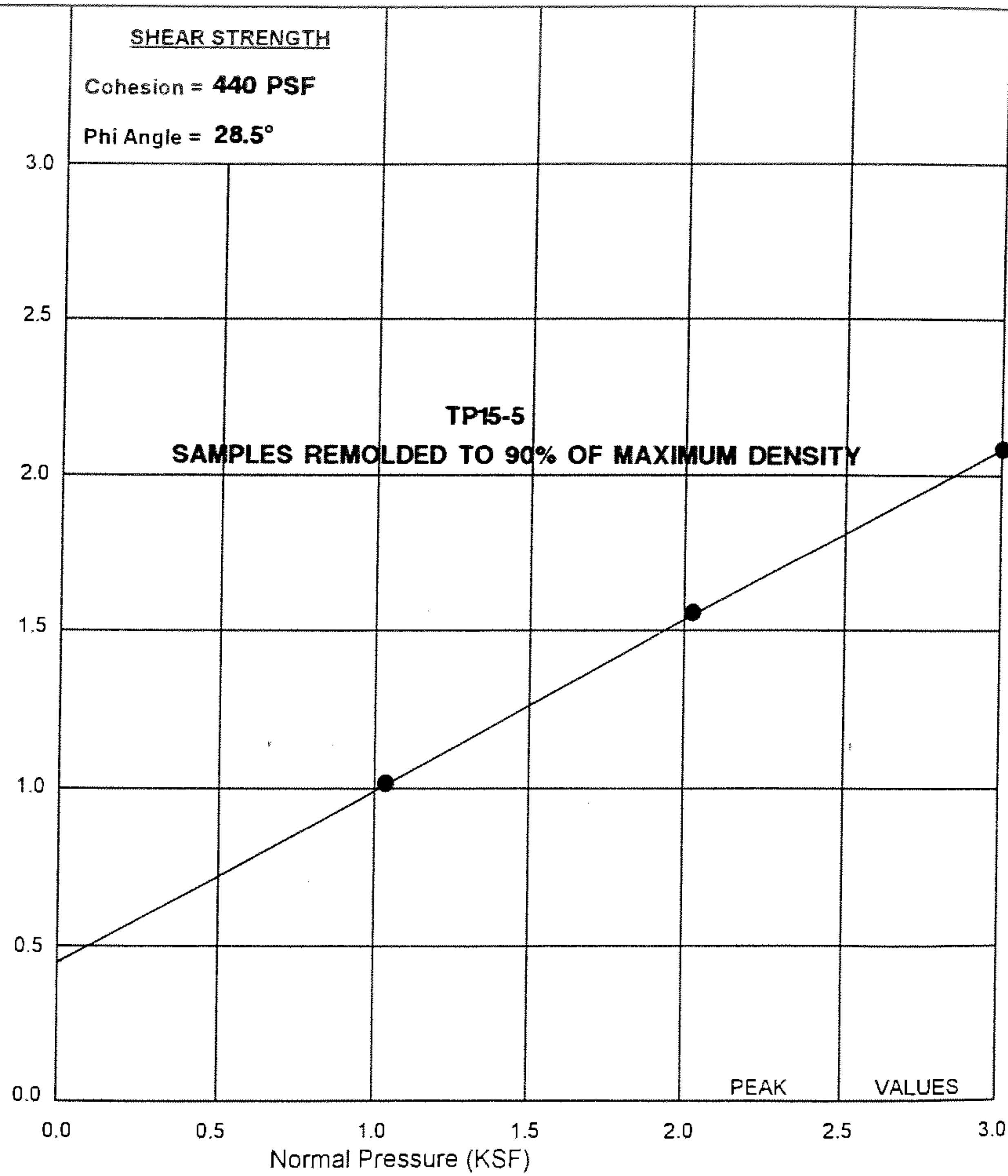
xc: (1) Addressee
(1) C. W. Cook, Attention: Alden Chase and Jesse Negrete
(5) Peter Walker & Partners, Architect

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SHEAR TEST DIAGRAM

JB: 17804-B L.A. Parks - Barnsdall

SAMPLE: Future Fill



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Moisture Content (%) = **30.4**

Dry Density (pcf) = **90.9**

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DR., SUITE 200, GLENDALE, CA 91206
(818) 549-9959 (818) 543-3747

STABILITY - TAYLOR'S METHOD

JB: 17804-B CONSULT: JET
CLIENT: BARNSDALL PARK

CALCULATION SHEET #

CALCULATE THE MAXIMUM HEIGHT TO WHICH UNIFORM SLOPES ARE GROSSLY STABLE USING TAYLOR'S METHOD FOR THE STABILITY OF EARTHEN EMBANKMENTS (*FUNDAMENTALS OF SOIL MECHANICS*).

CALCULATION PARAMETERS

EARTH MATERIAL:	FUTURE FILL	SAFETY FACTOR:	1.5
SHEAR DIAGRAM:	0	SLOPE ANGLE:	34 degrees
COHESION:	440 psf	Cd Base (C/fs):	293.3 psf
PHI ANGLE:	28.5 degrees	PhiD = atan(tan(phi)fs) =	19.9 degrees
DENSITY (w):	118.5 pcf		

INTERPOLATE STABILITY NUMBER (sn) FROM TAYLOR'S CHARTS:

TAYLOR'S CHART

		SLOPE ANGLES						
	Degrees	20	30	40	50	60	70	80
PhiD	5	0.090	0.110	0.130	0.145	0.160	0.185	0.210
	10	0.045	0.075	0.100	0.120	0.140	0.160	0.188
	15	0.020	0.045	0.070	0.095	0.115	0.140	0.168
	20	0.000	0.025	0.050	0.075	0.098	0.120	0.150
	25	0.000	0.010	0.033	0.055	0.080	0.105	0.130

FROM CHART sn = **0.035**

SAFE SLOPE HEIGHT = $\dfrac{Cd}{w \times (sn)}$ **69.9 feet**

CONCLUSIONS:

THE CALCULATION INDICATES THAT THE PROPOSED 8 FOOT HIGH 1½:1 SLOPE IN THE FUTURE COMPACTED FILL IS STABLE WITH A FACTOR OF SAFETY IN EXCESS OF 1.5.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE, SUITE 200 GLENDALE, CA 91206
(818) 549-9959 (818) 543-3747

SURFICIAL STABILITY

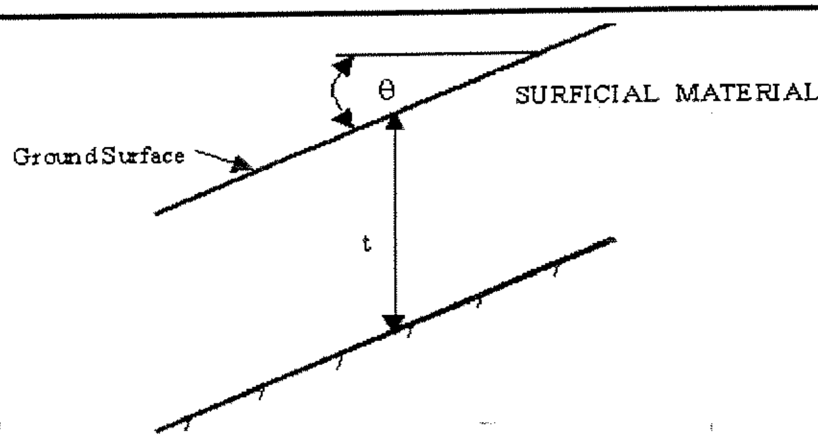
JB: 17804-B CONSULT: JET
CLIENT: BARNSDALL PARK

CALCULATION SHEET #

CALCULATE THE SURFICIAL STABILITY OF THE EARTH MATERIAL USING THE INFINITE SLOPE ANALYSIS WITH PARALLEL SEEPAGE. THIS METHOD WAS RECOMMENDED BY THE ASCE AND THE BUILDING AND SAFETY ADVISORY COMMITTEE (8/16/78). MODIFIED FROM SKEMPTON & DeLORY, 1957.

CALCULATION PARAMETERS

EARTH MATERIAL:	FUTURE FILL		
COHESION:	440 psf	SHEAR DIAGRAM:	0
PHI ANGLE:	28.5 degrees	SLOPE ANGLE:	34 degrees
DENSITY:	118.5 pcf	SATURATION DEPTH (t):	3.0 feet



$$FS = \frac{C + (\gamma_{soil} - \gamma_{water}) \bullet t \bullet \cos^2\theta \tan\Phi}{\gamma_{soil} \bullet t \bullet \cos\Phi \sin\Phi}$$

SAFETY FACTOR = 3.05

CONCLUSIONS:

THE CALCULATION INDICATES THAT THE PROPOSED 1½:1 SLOPES IN FUTURE COMPACTED FILL ARE SURFICIALY STABLE.

HYDROLOGY CALCULATION

FOR

BARNSDALL PARK

date : 1/20/2000
by : J. WOO
Job # : FX2-91-1854

1. Design Criteria
   A. Design Storm ; 50 year frequency
   B. Soil Classification ; Loam (2) considered
   C. Development Classification ;
      Park ; Td = 15
   D. On hour maximum Rainfall ;
      I50 = between 1.33 & 1.55
   E. Per Base Peak Rate Method

2. Hydrology.

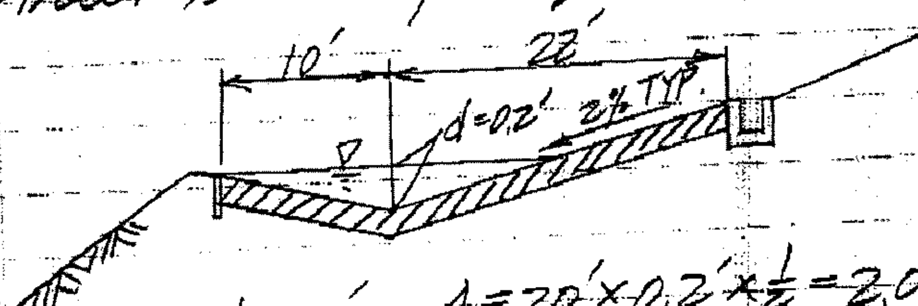
$F_{RO} = 0.60$ for $I_{50} = 1.33$
$F_{RO} = 0.81$ for $I_{50} = 1.55$
Say $F_{RO} = 0.70$

$Q = BPRR \times F_{RO} \times A$
where $BPRR = 3.40$ for $tc = 5$ min

For Area A : Area $= 290' \times 33' = 9{,}570$ S.F. $\simeq 0.22$ Ac
For Area B ; Area $= 21{,}000$ S.F. $\simeq 0.48$ Ac

$\therefore Q_A = 3.40 \times 0.70 \times 0.22 = 0.5$ CFS
$Q_B = 3.40 \times 0.70 \times 0.48 = 1.1$ CFS

3. Street Flow Capacity



if $d = 0.2'$ $A = 20' \times 0.2' \times \frac{1}{2} = 2.0$ S.F.
$R = A/p = 2.0/20' = 0.1'$
$S = 3.54\%$ per plan
$n = 0.015$ for A.C.

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

$$= \frac{1.486}{0.015}(2.0)(0.1)^{2/3}(0.0354)^{1/2}$$

$$= 8.0 \text{ CFS} > 1.1 \text{ CFS} \quad \text{O.K.}$$

4. Grating capacity

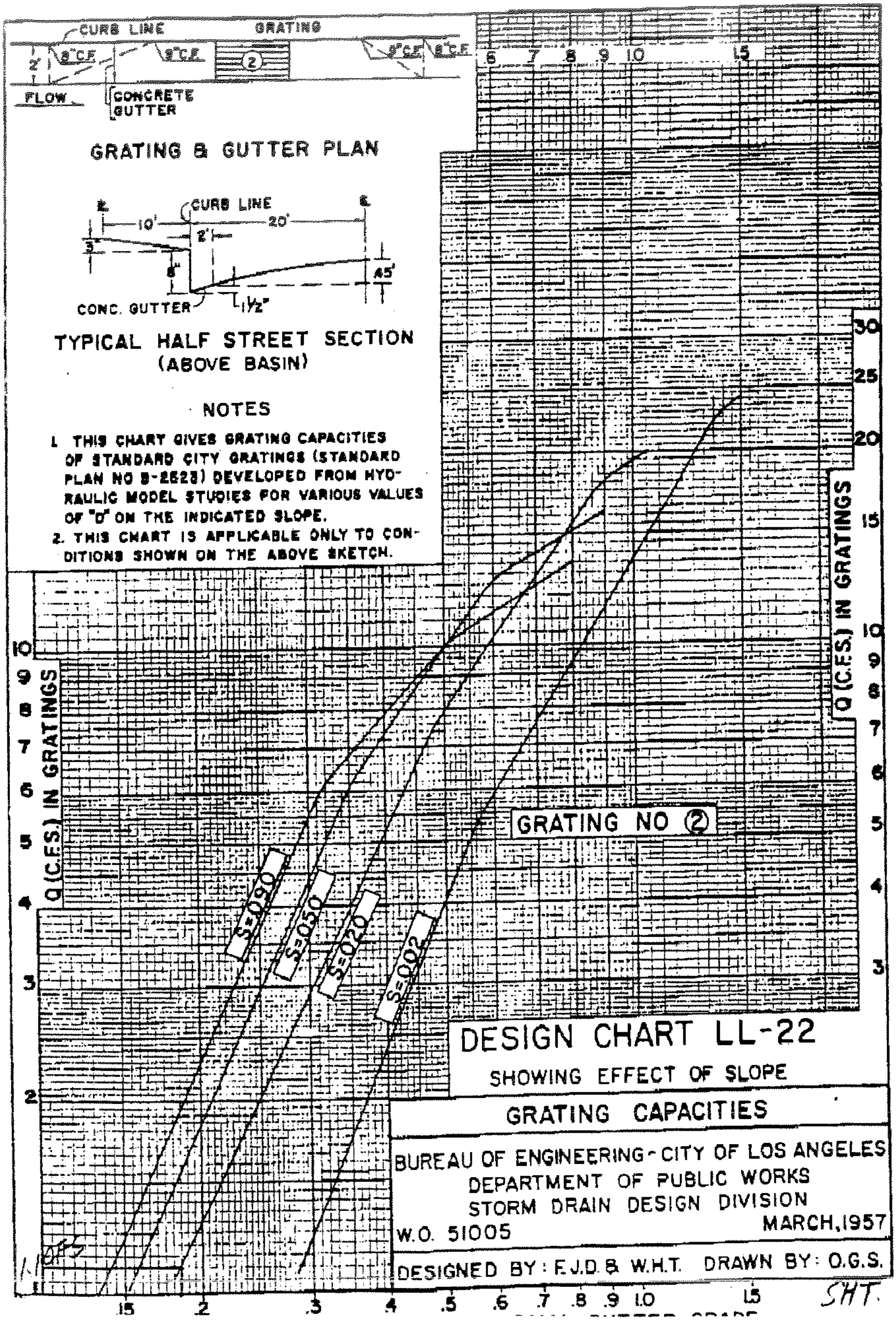
See SHT 4.

d = 0.185' for inlet Q = 1.1 CFS

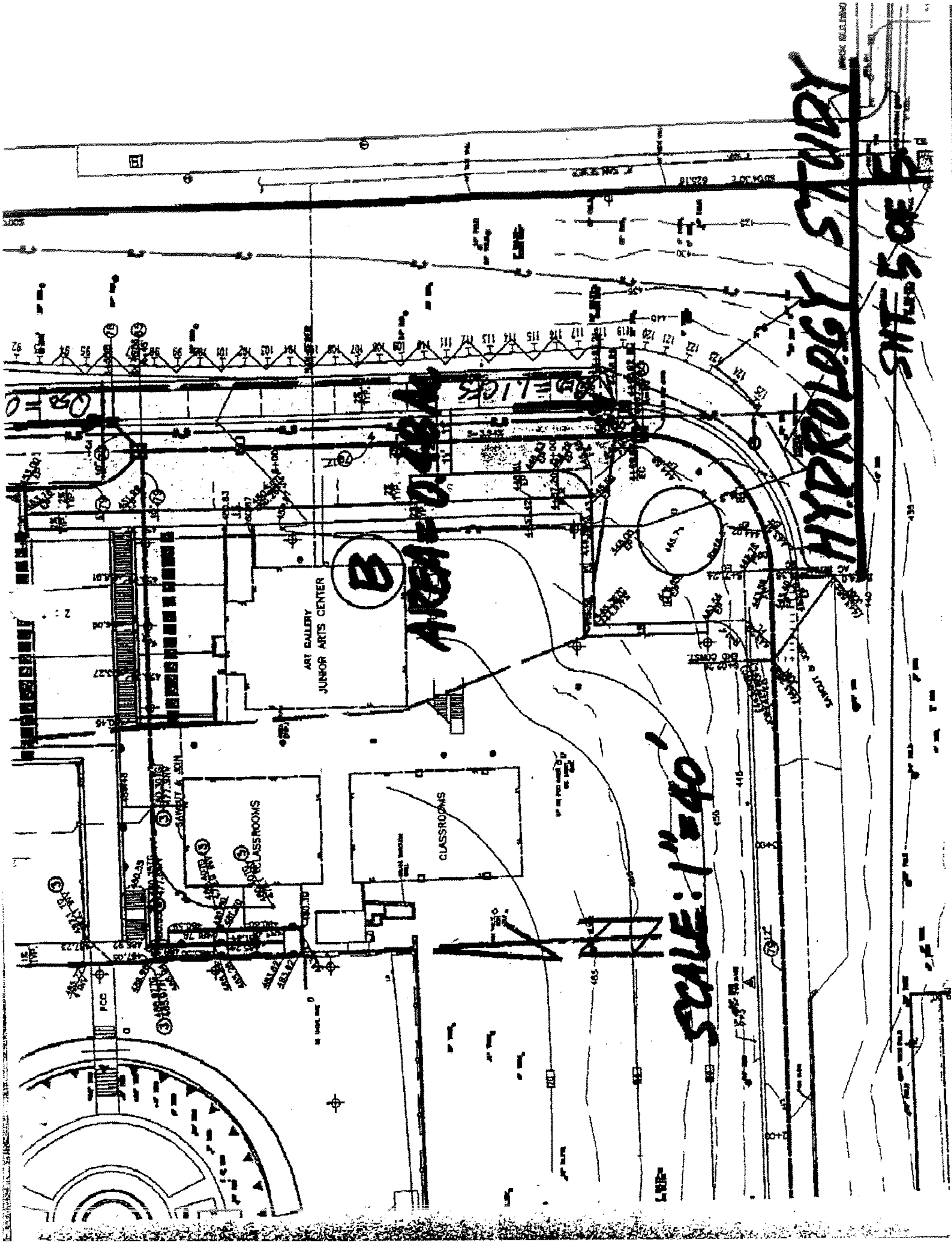
which is less than 0.2'

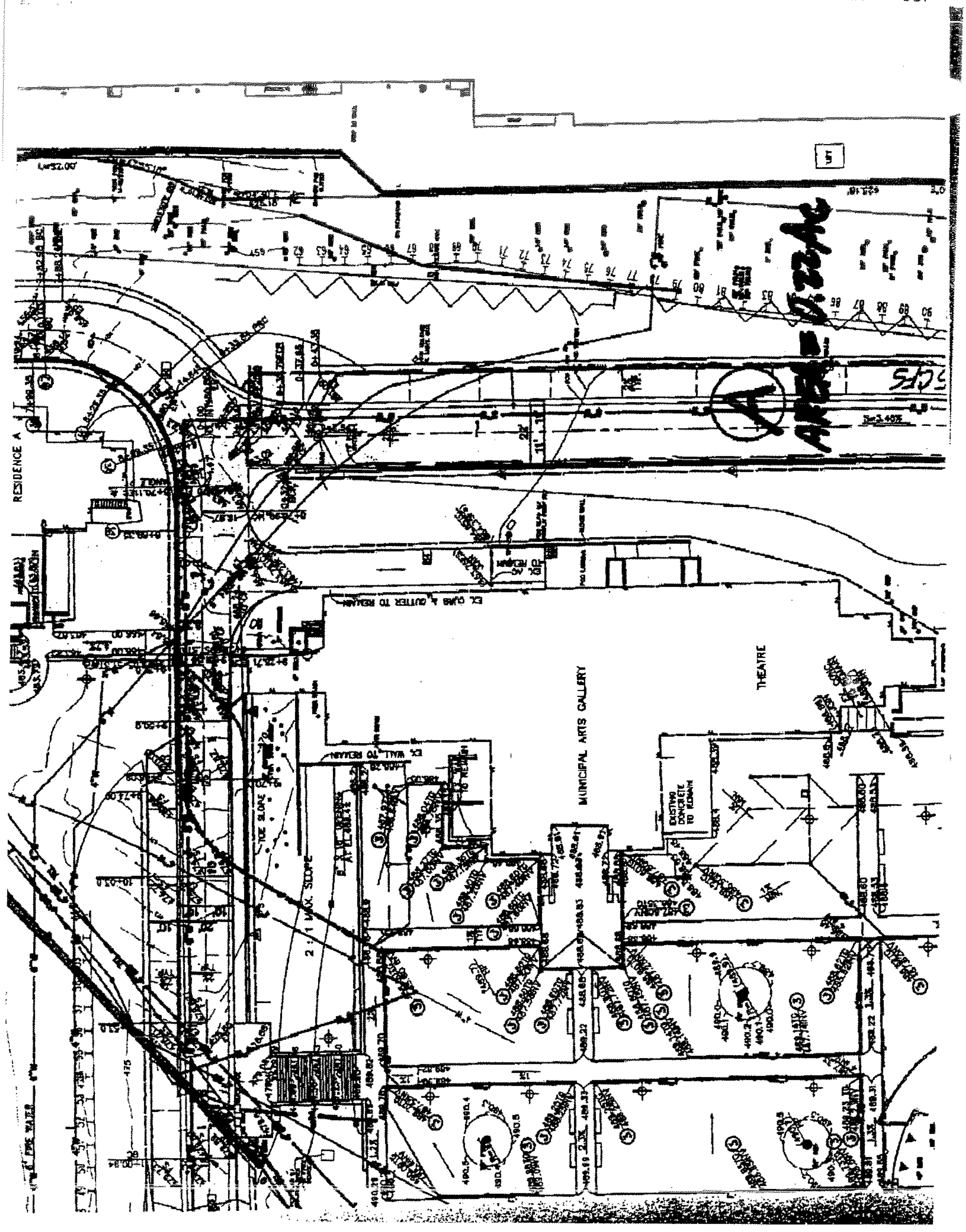
Say O.K.

OFFICE STANDARD NO 109



SHT. 4


HYDROLOGY STUDY
SHT 5 OF
AREA B = 0.48 Ac
B
SCALE: 1" = 40'
ART GALLERY
JUNIOR ARTS CENTER
CLASSROOMS
CLASSROOMS


RESIDENCE A
MUNICIPAL ARTS GALLERY
THEATRE
EXISTING CONCRETE TO REMAIN
TOE SLOPE
2 : 1 MAX. SLOPE
EX. CURB & GUTTER TO REMAIN
EX. WALL TO REMAIN

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DR. #200, GLENDALE, CA 91206
818•549•9959 TEL 818•543•3747 FAX

February 18, 2000
JB 17804-B

City of Los Angeles
Department of Recreation and Parks
200 North Main Street, Room 709
City Hall East
Los Angeles, California 90012

Attention: Kathleen Chan, Project Manager

Subject

Additional Recommendations
Proposed Compacted Fill Slopes
Barnsdall Park - Phase I Master Plan Implementation
Project #1026C; Contract #2723
4800 Hollywood Boulevard
Los Angeles, California

References: Reports by The J. Byer Group, Inc.:

Geologic and Soils Engineering Exploration, Proposed Barnsdall Park - Phase I, Master Plan Implementation, dated February 25, 1999; and

Addendum Geologic and Soils Engineering Exploration, Proposed Restoration, Grading, dated February 9, 2000.

City of Los Angeles Department of Building and Safety, Conditional Approval Letter, dated March 18, 1999.

Gentlepersons:

This report has been prepared at the request of Peter Walker Partners to provide additional recommendations for the proposed project. It is proposed to construct compacted fill slopes up to 20 feet high at a 1½:1 gradient. In addition, it is planned to over-excavate the proposed 16 foot high 2:1 cut slope, which will expose bedrock in the southeast portion of the park, and construct a compacted fill slope for landscaping purposes.

The enclosed calculation sheet indicates the proposed 20 foot high 1½:1 slopes in compacted fill will have a factor of safety in excess of 1.5.

The proposed compacted fill slope in the southeast portion of the slope may be constructed at a 2:1 gradient. Compacted fill should be keyed and benched into bedrock. Keyways should be a minimum of 12 feet wide and three feet into bedrock as measured on the downhill side. The base of all fills require subdrains.

Should you have any questions please call on the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.

James E. Tucker
Project Geologist

Jon A. Irvine
E. G. 1691/R.C.E. 55005

REGISTERED PROFESSIONAL ENGINEER
JON A. IRVINE
RCE 55005
Exp. 6/2000
CIVIL
STATE OF CALIFORNIA

JAI:JET:flh
F:\FINAL\LETTERS\17804-b2.ltr.wpd

Enc: Shear Test Diagram
Calculation Sheet

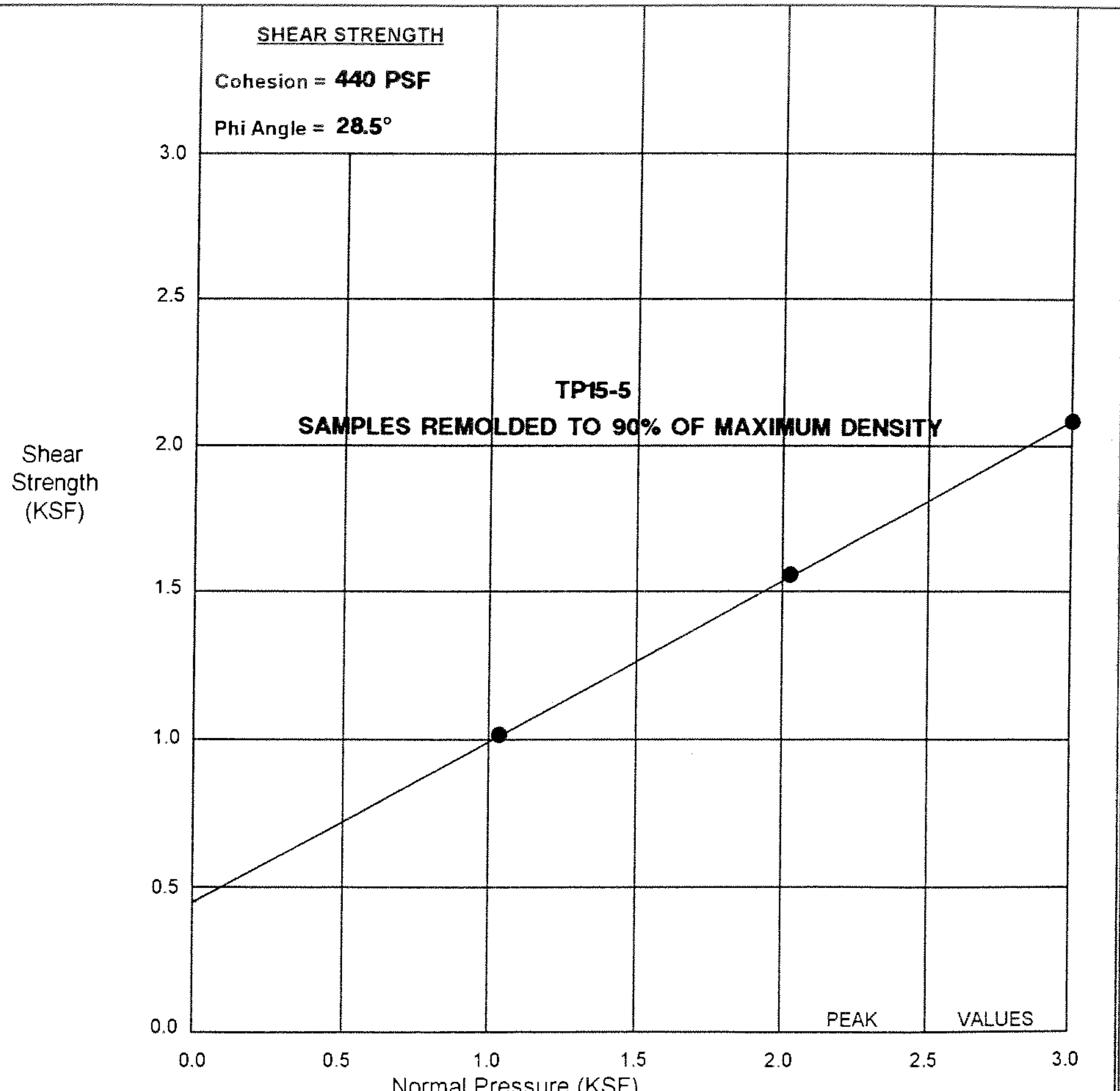
xc: (1) Addressee
(1) C. W. Cook, Attention: Alden Chase and Jesse Negrete
(5) Peter Walker & Partners, Architect

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SHEAR TEST DIAGRAM

JB: 17804-B L.A. Parks - Barnsdall

SAMPLE: Future Fill



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Moisture Content (%) = **30.4**

Dry Density (pcf) = **90.9**

STABILITY - TAYLOR'S METHOD

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206
(818) 549-9959 FAX: (818) 543-3747

JB: 17804-B CONSULT: JET
CLIENT: L.A. PARKS-BARNSDALL

CALCULATION SHEET #

CALCULATE THE MAXIMUM HEIGHT TO WHICH UNIFORM SLOPES ARE GROSSLY STABLE USING TAYLOR'S METHOD FOR THE STABILITY OF EARTHEN EMBANKMENTS (*FUNDAMENTALS OF SOIL MECHANICS*).

CALCULATION PARAMETERS

EARTH MATERIAL:	FUTURE FILL	SAFETY FACTOR:	1.5
SHEAR DIAGRAM:		SLOPE ANGLE:	34 degrees
COHESION:	440 psf	Cd Base (C/fs):	293.3 psf
PHI ANGLE:	28.5 degrees	PhiD = atan(tan(phi)fs) =	19.9 degrees
DENSITY (w):	118.5 pcf		

INTERPOLATE STABILITY NUMBER (sn) FROM TAYLOR'S CHARTS:

TAYLOR'S CHART

		SLOPE ANGLES						
	Degrees	20	30	40	50	60	70	80
PhiD	5	0.090	0.110	0.130	0.145	0.160	0.185	0.210
PhiD	10	0.045	0.075	0.100	0.120	0.140	0.160	0.188
PhiD	15	0.020	0.045	0.070	0.095	0.115	0.140	0.168
PhiD	20	0.000	0.025	0.050	0.075	0.098	0.120	0.150
PhiD	25	0.000	0.010	0.033	0.055	0.080	0.105	0.130

FROM CHART sn = **0.035**

SAFE SLOPE HEIGHT = $\dfrac{Cd}{w \times (sn)}$ **69.9 feet**

CONCLUSIONS:

THE CALCULATION INDICATES THAT THE PROPOSED 1½:1 SLOPES IN FUTURE COMPACTED FILL UP TO 20 FEET WILL BE GROSSLY STABLE WITH A FACTOR OF SAFETY IN EXCESS OF 1.5.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DR #200 GLENDALE CA 91206
818•549•9959 TEL 818•543•3747 FAX

March 10, 2000
JB 17804-B

City of Los Angeles
Department of Recreation and Parks
200 North Main Street, Room 709
City Hall East
Los Angeles, California 90012

Attention: Kathleen Chan, Project Manager

Subject

Transmittal Letter
Proposed Underground Utility Vault
Barnsdall Park - Phase I Master Plan Implementation
Project #1026C; Contract #2723
4800 Hollywood Boulevard
Los Angeles, California

Gentlepersons:

The enclosed report has been revised to eliminate the paved surface drain for the proposed vault retaining wall.

The revised copies have been sent to the following:

(1) Addressee
(1) Melvyn Green & Associates, Inc., Attention: Anja Kluge
(5) Peter Walker & Partners, Attention: Liz Einwiller

Respectfully submitted,
THE J. BYER GROUP, INC.

James Tucker

James E. Tucker
Project Geologist

JAI:mrk
Y:\FINAL\LETTERS\17804-b3.ltr.wpd

Enc: Revised Additional Recommendations, dated March 10, 2000.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DR. #200 GLENDALE CA 91206
818•549•9959 TEL 818•543•3747 FAX

March 1, 2000
JB 17804-B
Revised March 10, 2000

City of Los Angeles
Department of Recreation and Parks
200 North Main Street, Room 709
City Hall East
Los Angeles, California 90012

Attention: Kathleen Chan, Project Manager

Subject

Additional Recommendations
Proposed Underground Utility Vault
Barnsdall Park - Phase I Master Plan Implementation
Project #1026C; Contract #2723
4800 Hollywood Boulevard
Los Angeles, California

References: Reports by The J. Byer Group, Inc.:

Geologic and Soils Engineering Exploration, Proposed Barnsdall Park - Phase I, Master Plan Implementation, dated February 25, 1999; and

Addendum Geologic and Soils Engineering Exploration, Proposed Restoration, Grading, dated February 9, 2000.

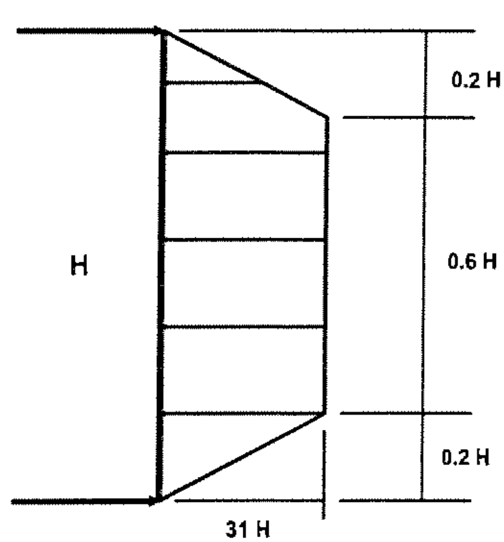
City of Los Angeles Department of Building and Safety Conditional Approval Letter, dated March 18, 1999.

Gentlepersons:

This addendum geologic and soils engineering report has been prepared at the request of Melvyn Green & Associates, Inc., to provide recommendations for the proposed underground utility vault. It is proposed to locate the vault approximately 12½ feet to the north of the Hollyhock House. The vault will be approximately eight feet by 15 feet and 11 feet deep.

Restrained retaining walls for the proposed vault, where deflection at the top of the wall is limited, should be designed to resist a trapezoidal distribution of pressure. The maximum earth pressure is 29H pounds per square foot, where H is the height of the retaining wall in feet. The design earth pressure assumes a subdrain and that excess hydrostatic pressures are not developed. The distribution of earth pressure on restrained walls is shown on the diagram.

TRAPEZOIDAL DISTRIBUTION OF PRESSURE



Retaining wall backfill should be compacted to a minimum of 90 percent of the maximum density as determined by ASTM D 1557-91 or equivalent. Where access between the retaining wall and the temporary excavation prevents the use of compaction equipment, retaining walls should be backfilled with ¾ inch crushed gravel to within two feet of the ground surface. Where the area between the wall and the excavation exceeds 18 inches, the gravel must be vibrated or wheel-rolled, and tested for compaction. The upper two feet of backfill above the gravel should consist of a compacted fill blanket to the surface.

Temporary excavations will be required to construct the proposed vault. The excavations will be up to 11 feet in height and will expose existing fill over bedrock. The fill should be trimmed to 1:1 for wall excavations. The bedrock is capable of maintaining vertical excavations up to ten feet per the enclosed calculations. Where vertical excavations in the bedrock exceed ten feet in height, the upper portion should be trimmed to 1:1 (45 degrees).

Should you have any questions please call on the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.

James E. Tucker
Project Geologist

Jon A. Irvine
E.G. 1691/R.C.E. 55005

REGISTERED PROFESSIONAL ENGINEER
JON A. IRVINE
RCE 55005
Exp. 6/2000
CIVIL
STATE OF CALIFORNIA

JAI:JET:mb
Y:\FINAL\MEMOS\17804-b2.mem.wpd

Enc: Calculation Sheet

xc: (1) Addressee
(1) Melvyn Green & Associates, Inc., Attention: Anja Kluge
(5) Peter Walker & Partners, Attention: Liz Einwiller

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

JOYCE L. FOSTER
PRESIDENT

LEE KANON ALPERT
VICE-PRESIDENT

JEANETTE APPLEGATE
MABEL CHANG
ALEJANDRO PADILLA

CITY OF LOS ANGELES

CALIFORNIA

RICHARD J. RIORDAN
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

ANDREW A. ADELMAN
GENERAL MANAGER

RICHARD E. HOLGUIN
EXECUTIVE OFFICER

March 18, 1999

Log # 27203
C.D. --

SOILS/GEOLOGY FILE - 2

Kathleen Chan
Department of Parks and Recreation
200 N. Main Street
Los Angeles, CA

TRACT: Replat of Prospect Park (MR 43-60)
LOT: arb-14
LOCATION: 4800 Hollywood Bl

CURRENT REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Geology/Soils Report	JB 17804-B	02-25-99	J. Byer Group
Overszd Doc	" "	" "	" "

The report has been reviewed by the Grading Section of the Department of Building and Safety. According to the report, it is planned to repair distressed portions of the Frank Lloyd Wright Hollyhock House and associated carriage house and other appurtenances. A new access road is also planned.

The site consists of a knoll covered by residual soil over Puente Formation bedrock. Uncertified fill exists around the perimeter of the building area and the margin of the roadway. As part of the exploration, the foundations for the buildings were exposed in the area of distress, and found to be bearing in fill and residual soil.

It is recommended that the buildings and the reflecting pond be repaired by underpinning these improvements, where the rest in fill and soil, with a foundation extending into bedrock. Deepened conventional footings and/or friction piles will be required.

The new access road is to be constructed by removing and recompacting the existing uncertified fill and soil, and benching the new fill into bedrock. Restoration of the steep slopes around the construction yard is also planned. Soldier piles may be required along the downslope margins of the new fill, to limit the amount of removal and provide support for the new fill upslope.

AN EQUAL EMPLOYMENT OPPORTUNITY – AFFIRMATIVE ACTION EMPLOYER
Recyclable and made from recycled waste

The report is acceptable, provided the following conditions are complied with during site development:

1. The buildings shall be underpinned into bedrock, where the foundations does not presently bear in bedrock, as recommended.

2. A grading permit shall be obtained.

3. All new graded slopes shall be no steeper than 2:1.

4. Footings supported on approved compacted fill or expansive soil shall be reinforced with a minimum of four (4) ½-inch diameter (#4) deformed reinforcing bars. Two (2) bars shall be placed near the bottom and two (2) bars placed near the top.

5. Concrete floor slabs placed on expansive soil shall be placed on a 4-inch fill of coarse aggregate or on a moisture barrier membrane. The slabs shall be at least 3½ inches thick and shall be reinforced with ½-inch diameter (#4) reinforcing bars spaced maximum of 16 inches on center each way.

6. Existing uncertified fill shall not be used for support of footings, concrete slabs or new fill.

7. Slab-on-uncertified fill shall be designed as a structural slab.

8. Existing uncertified fill shall not be used for lateral support of deep foundation.

9. All recommendations of the reports which are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

10. The geologist and soils engineer shall review and approve the detailed plans prior to issuance of any permits. This approval shall be by signature on the plans which clearly indicates that the geologist and soils engineer have reviewed the plans prepared by the design engineer and that the plans include the recommendations contained in their reports.

11. The applicant is advised that the approval of this report does not waive the requirements for excavations contained in the State Construction Safety Orders enforced by the State Division of Industrial Safety.

12. Grading shall be scheduled for completion prior to the start of the rainy season, or detailed temporary erosion control plans shall be filed in a manner satisfactory to the Department and the Department of Public Works, for any grading work in excess of 200 cu yd.

13. A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans. Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit.

14. The applicant is advised that recommendations contained herein for excavated banks may also be subject to the regulations of the Department of Public Works of the City of Los Angeles. Construction of trenches or excavations which are 5 feet or deeper and into which a person is required to descend requires a permit from the State Division of Industrial Safety prior to obtaining a grading permit.

15. The geologist shall inspect all excavations to determine that conditions anticipated in the report have been encountered and to provide recommendations for the correction of hazards found during grading or foundation excavations.

16. All man-made fill shall be compacted to a minimum 90 percent of the maximum dry density of the fill material per the latest version of ASTM D 1557. Where cohesion-less soil having less than 15 percent of finer than 0.005 millimeters is used for fill, it shall be compacted to a minimum of 95 percent of the maximum dry density.

17. All roof and pad drainage shall be conducted to the street in an acceptable manner.

18. All retaining walls shall be provided with a standard surface backdrain system and all drainage shall be conducted to the street in an acceptable manner and in a non-erosive device.

19. The rear yard retaining walls shall be provided with a minimum freeboard of 12 inches.

20. Prior to issuance of the building permit, the design of the subdrainage system required to prevent possible hydrostatic pressure behind retaining walls shall be approved by the soils engineer and accepted by the Department. Installation of the subdrainage system shall be inspected and approved by the soils engineer and by the City grading inspector.

21. Footings adjacent to a descending slope steeper than 3:1 in gradient shall be located a distance of one-third the vertical height of the slope but need not exceed 40 feet measured horizontally from the face of the descending slope.

22. The geologist and soils engineer shall inspect the excavations for the footings to determine that they are founded in the recommended strata before calling the Department for footing inspection.

23. All friction pile or caisson drilling and installation shall be performed under the periodic inspection and approval of the geologist and soils engineer.

24. Pile caisson and/or isolated foundation ties are required by Code Section 91.1807.2. Exceptions and modification to this requirement are provided in Rule of General Application 662.

25. The Soil Engineer shall review and approve the shoring and/or underpinning plans prior to issuance of the permit.

26. Installation of shoring, underpinning, and/or slot cutting excavations shall be performed under the periodic inspection and approval of the soils engineer.

27. A registered grading deputy inspector approved by and responsible to the project geotechnical engineer shall be required to provide continuous inspection for the proposed slot cutting, underpinning, shoring, tie-back, and/or buttress.

28. All footings shall extend below a 1:1 plane projected upward from the base of the approved compacted fill.

29. Compacted fill shall extend beyond the footings a minimum distance equal to the depth of the fill below the footings, or 5 feet, whichever is greater.

30. A structure shall be considered surcharging an excavation if the structure is located within a horizontal distance from the top of the excavation equal to the depth of the excavation as specified in Code Section 91.3301.2.3.1.

31. If import soils are used, no footings shall be poured until the Soils Engineer has submitted a compaction report containing in-place shear test data and settlement data to the Department, and approval obtained.

32. If the grading permit involves the import or export of more than 1000 cubic yards of earth materials, and is in the grading hillside area, approval is required by the Board of Building and Safety. Application for approval of the import-export route should be filed with the Grading Section. Processing time of this application is approximately 8 weeks to hearing plus 10-day appeal period.

33. Subdrains must be installed in all natural drainage courses within which compacted fill is to be placed.

34. Both the geologist and the soils engineer shall inspect and approve all fill and subdrain placement areas prior to placing fill.

35. Prior to the placing of compacted fill, a representative of the consulting Soils Engineer shall inspect and approve the bottom excavations. He shall post a notice on the job site for the City Grading Inspector and the Contractor stating that the soil inspected meets the conditions of the report, but that no fill shall be placed until the City Grading Inspector has also inspected and approved the bottom excavations. A written certification to this effect shall be filed with the Department upon completion of the work. The fill shall be placed under the inspection and approval of the Foundation Engineer. A compaction report shall be submitted to the Department upon completion of the compaction.

36. Prior to the pouring of concrete, a representative of the consulting Soil Engineer shall

inspect and approve the footing excavations. He shall post a notice on the job site for the City Building Inspector and the Contractor stating that the work so inspected meets the conditions of the report, but that no concrete shall be poured until the City Building Inspector has also inspected and approved the footing excavations. A written certification to this effect shall be filed with the Department upon completion of the work.

37. Prior to excavation, an initial inspection shall be called at which time the sequence of shoring, protection fences and dust and traffic control will be scheduled.

DAVID HSU
Chief of Grading Section

JEFFREY C. KOFOED
Engineering Geologist II

BANWARI BISHNOI
Geotechnical Engineer I

JKBB/:jk/
27203
(213) 977-6329

cc: J. Byer Group
LA District Office

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

MABEL CHANG
PRESIDENT

JOYCE L. FOSTER
VICE-PRESIDENT

CORINA R. ALARCON
RODNEY L. DIAMOND
CHESTER A. WIDOM

CITY OF LOS ANGELES

CALIFORNIA

RICHARD J. RIORDAN
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

ANDREW A. ADELMAN
GENERAL MANAGER

WALT KRUKOW
EXECUTIVE OFFICER

March 21, 2000

Log # 30089
SOILS/GEOLOGY FILE - 2

Kathleen Chan
Department of Parks and Recreation
200 N. Main Street
Los Angeles, CA

TRACT: Replat of Prospect Park (MR 43-60)
LOT: arb-19
LOCATION: 4800 Hollywood Bl

CURRENT REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Geology/Soil Report	JB 17804-B	02-18-00	J. Byer Group
Geology/Soil Report	JB 17804-B	02-09-00	" "
Ovrszd Doc	" "	" "	" "

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Department letter	27203	03-18-99	Bldg & Safety
Geology/Soils Report	JB 17804-B	02-25-99	J. Byer Group
Request For Modification	7836	03-21-00	Bldg. & Safety

The referenced reports concerning additional recommendations for grading adjacent to Hollyhock House in Barnsdall Park and a proposed retaining wall of up to 14 ft high has been reviewed by the Grading Section of the Department of Building and Safety.

Elimination of the a terrace drain and a top-of-slope berm are recommended by the soil engineer based on high factors of safety for slope stability, no habitable structures near the slopes, ample drainage capacity at the top of slope, limited slope length, and acceptance of future maintenance by the City of Los Angeles Department of Recreation and Parks. Variances to the Code were approved in the referenced request for Modification.

The reports are acceptable, provided the following conditions are complied with during site development:

1. The top-of-slope-berm may be eliminated where there is an adjacent roadway, as recommended.
2. The 8-foot-wide terrace drain may be eliminated for graded slopes up to 34 feet high, as recommended.
3. All other conditions of the above referenced Department letter remain in effect.
4. All conditions of the referenced Request for Modification shall apply.

AN EQUAL EMPLOYMENT OPPORTUNITY – AFFIRMATIVE ACTION EMPLOYER

Recyclable and made from recycled waste.

5. Fill slopes up to 20 feet in height may be as steep as 1.5:1, as recommended.

DAVID HSU
Chief of Grading Section

Dana Prevost

DANA PREVOST
Engineering Geologist II

Theodore Gilmore

THEODORE GILMORE
Geotechnical Engineer I

DP/TG:dp/tg
30089
(213) 977-6329
cc: J. Byer Group
Liz Einwiller of PWP
LA District Office

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DR. #200, GLENDALE, CA 91206
818•549•9959 TEL 818•543•3747 FAX

May 9, 2000
JB 17804-B

City of Los Angeles
Department of Recreation and Parks
200 North Main Street, Room 709
City Hall East
Los Angeles, California 90012

Attention: Kathleen Chan, Project Manager

Subject

Additional Recommendations
Proposed Compacted Fill Slope North of the Great Lawn
Barnsdall Park - Phase I Master Plan Implementation
Project #1026C; Contract #2723
4800 Hollywood Boulevard
Los Angeles, California

References: Reports by The J. Byer Group, Inc.:

Geologic and Soils Engineering Exploration, Proposed Barnsdall Park - Phase I, Master Plan Implementation, dated February 25, 1999;

Addendum Geologic and Soils Engineering Exploration, Proposed Restoration, Grading, dated February 9, 2000; and

Additional Recommendations Proposed Compacted Fill Slopes, Barnsdall Park - Phase I Master Plan Implementation, dated February 18, 2000.

City of Los Angeles Department of Building and Safety, Conditional Approval Letter, dated March 18, 1999.

Gentlepersons:

This letter has been prepared at the request of Peter Walker Partners to provide additional recommendations for the proposed project. It is proposed to construct a 25 foot high, 1½:1 compacted fill slope north of the great lawn area.

The enclosed calculation sheet indicates the proposed 25 foot high 1½:1 slopes in compacted fill will have a factor of safety in excess of 1.5.

Keyways should be a minimum of 12 feet wide and three feet into bedrock as measured on the downhill side. The base of all fills require subdrains. For proposed fill slopes steeper than 2:1, the fills shall be either overbuilt and trimmed back to expose the compacted inner core, or the outer ten horizontal feet shall be compacted to a minimum of 92 percent of the maximum density as determined by ASTM D 1557-91 or equivalent.

Should you have any questions please call on the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.

James E. Tucker
Project Geologist

Jon A. Irvine
E. G. 1691/R.C.E. 55005

REGISTERED PROFESSIONAL ENGINEER
JON A. IRVINE
RCE 55005
Exp. 6/2000
CIVIL
STATE OF CALIFORNIA

JAI:JET:flh
F:\FINAL\LETTERS\17804-b4.ltr.wpd

Enc: Shear Test Diagram
Calculation Sheet

xc: (1) Addressee
(1) Land Design Consultants, Attention: Alden Chase and Jesse Negrete
(5) Peter Walker & Partners, Architect

GEOLOGIC AND SOILS ENGINEERING EXPLORATION
PROPOSED BARNSDALL PARK - PHASE I
MASTER PLAN IMPLEMENTATION
PROJECT #1026C, CONTRACT #2723
LOTS 40 AND 49, WEST PORTION OF LICK TRACT
4800 HOLLYWOOD BOULEVARD
LOS ANGELES, CALIFORNIA
FOR THE DEPARTMENT OF RECREATION AND PARKS
THE J. BYER GROUP, INC. PROJECT NUMBER JB 17804-B
FEBRUARY 25, 1999

INTRODUCTION

This report has been prepared per our signed authorization dated June 25, 1998 and summarizes findings of The J. Byer Group, Inc. geologic and soils engineering exploration performed on the site. The purpose of this study is to evaluate the nature, distribution, engineering properties, relative stability, and geologic structure of the earth materials underlying the site with respect to grading and construction related to Phase I of the Barnsdall Park Master Plan.

INTENT

It is the intent of this report to assist in the design and completion of the proposed project. The recommendations are intended to reduce geotechnical risks affecting the project. The professional opinions and advice presented in this report are based upon commonly accepted standards and are subject to the general conditions described in the NOTICE section of this report.

EXPLORATION

The scope of the field exploration was determined from our initial site visit and consultation with Kathleen Chan, Project Manager with the City of Los Angeles Department of Recreation and Parks and Paul Sieron of Peter Walker and Partners. The Grading Plan prepared by Peter Walker and Partners undated, was considered prior to beginning work on this project. Exploration was conducted using techniques normally applied to this type of project in this setting. This report is limited to the area of the exploration and the proposed project as shown on the enclosed Geologic Map and Cross Sections. Conditions affecting portions of the property outside the area explored, are beyond the scope of this report.

Exploration was conducted on July 30, August 4, August 13, and September 10, 1998 with the aid of a truck mounted bucket auger drill rig, and hand labor. It included drilling two borings to a maximum depth of 40 feet and excavating 18 test pits. Samples of the earth materials were obtained at frequent intervals and were delivered to the soils engineering laboratory for testing and analysis. Downhole observation of the earth materials was performed by the project geologist. Exposures of earth materials were geologically mapped.

Office tasks included laboratory testing of selected soil samples, review of the United States Department of Agriculture 1952 series air photos, review of the City of Los Angeles grading records, preparation of eight geologic Cross Sections, preparation of the Geologic Map, and slope stability calculations. The earth materials exposed in the test pits and borings are described on the enclosed Log of Test Pits and Log of Borings. Appendix I contains a discussion of the laboratory testing procedures and results.

The proposed project, surface geologic conditions, and the location of the test pits and borings are shown on the Geologic Map. Subsurface distribution of the earth materials, projected geologic structure, and the proposed project are shown on Sections A through H.

RESEARCH - PRIOR WORK

Research at the City of Los Angeles Department of Building and Safety was performed as part of our work on this project. The records contain two compaction reports and two geotechnical reports pertaining to the subject property:

> *Barnsdall Park Entrance, Final Report on Soils Compaction*, by the City of Los Angeles Department of Public Works, Bureau of Engineering, dated April 3, 1968;
>
> *Barnsdall Park Art Gallery - Compaction Report*, by the City of Los Angeles Department of Public Works, Bureau of Engineering, Geology and Soils Section, dated April 5, 1972;
>
> *Barnsdall Park Restoration - Carriage House*, by the City of Los Angeles Department of Public Works, Bureau of Engineering, Geotechnical Services, dated August 21, 1990; and
>
> *Geotechnical Investigation Restoration of Barnsdall Park Access Shaft and Construction Staging Area, Metro Red Line Segment 2*, by Converse Consultants, Inc., dated April 30, 1998.

The compaction reports dated April 3, 1968 and April 5, 1972 were approved by the City of Los Angeles Department of Building and Safety, Grading Division, in letters dated April 4, 1968 and April 19, 1972, respectively. The geotechnical report dated August 21, 1990 was approved by the City of Los Angeles Department of Building and Safety, Grading Division, in the Application for Review of Technical Reports and Import-Export Routes, dated November 25, 1990. The data contained in these reports was reviewed and considered as part of our work on this project.

PROPOSED DEVELOPMENT

Information concerning the proposed project was provided by Kathleen Chan, Project Manager, and Paul Sieron of Peter Walker and Partners. The Grading Plan prepared by Peter Walker and Partners, undated, was a guide for the field exploration and the preparation of this report. It is proposed to change the alignment and elevation of the entrance road, renovate several of the existing buildings, retaining walls and appurtenant structures, and construct new stairs, walkways, retaining walls and light standards. Retaining walls up to 15 feet high are planned to support the proposed roadway in the east portion of the site. Grading will consist of cut and fill operations to achieve the grades shown on the Grading Plan.

Formal plans have not been prepared and await the conclusions and recommendations of this report.

SITE DESCRIPTION

The subject property consists of the Barnsdall Park which is located on Olive Hill, in the Hollywood section of the City of Los Angeles, California. Barnsdall Park is located on the south side of Hollywood Boulevard approximately one mile northwest of the Hollywood (101) Freeway. The site is developed with the Hollyhock House historical landmark, Municipal Art Gallery, and Junior Art Center. The northern portion of the site is occupied by an access shaft and construction staging area for the Metro Red Line Segment 2 construction project. Excavations for the construction staging area are up to 25 feet high and are supported by temporary shoring consisting of soldier piles and tie-back anchors. The access shaft is approximately 100 feet deep. This excavation is also supported by soldier piles. An apartment building is west of the park. A parking structure and hospital building are south of the park. Commercial buildings are east of the park. Hollywood Boulevard is north of the park. A paved access road ascends from Hollywood Boulevard to the upper portion of Olive Hill. The road circles around the Hollyhock House, Junior Art Center, and Municipal Art Gallery.

Past grading on the site has consisted of several generations of cut and fill operations associated with development of the park. Physical relief is about 75 feet with slope gradients ranging from 1½:1 to 4:1. In the west portion of the site, a slope descends from the roadway west to a driveway for an apartment building, approximately 40 feet, at gradients ranging from 1½:1 to 2:1. In the south portion of the site, a slope descends from the elevation of the Hollyhock House, approximately 50 feet to the roadway at gradients ranging from 2:1 to 2½:1. This slope continues to descend below the roadway an additional 20 feet to the top of a six foot high retaining wall. The slope in the east portion of the site descends from the roadway, approximately 20 feet, at a gradient of 1½:1. A 12 foot high retaining wall is located along the east property line, approximately 20 feet from the toe of the descending slope. The slope in the north portion of the site descends from the roadway approximately 40 feet to the top of the temporary shoring wall for the Metro Red Line staging area at gradients ranging from 1½:1 to 4:1.

Vegetation on the site consists of trees, plants and grasses. Surface drainage is by sheetflow runoff down the contours of the land to the north, south, east and west to the surrounding roadway.

MANOMETER SURVEY

A manometer survey was performed within the Hollyhock House main residence to determine the relative floor elevations. The manometer consists of a continuous, water filled tube with a container at one end and a vertical graduated column at the other. Since water will achieve the same elevation within an interconnected conduit, the relative floor elevations can be measured with respect to a datum point. The container is placed at a selected location which becomes the datum point. The graduated column is then placed at locations through the residence and relative elevations with respect to the datum point are recorded. The degree of accuracy depends on the accuracy of the instrument, graduation of the metered columns, and the different floor coverings.

The northwest corner of the residence slopes approximately one inch. The southwest corner of the residence slopes approximately 1½ inches.

GROUNDWATER

Groundwater was not encountered during exploration. Seasonal fluctuations in groundwater levels may occur due to variations in climate, irrigation, and other factors not evident at the time of the exploration. Fluctuations in groundwater levels may also occur across the site. Rising groundwater can saturate earth materials, causing subsidence of the site or instability of slopes.

EARTH MATERIALS

Fill

Fill, associated with previous site grading, underlies the north, south, and east facing slopes to a maximum observed depth of 9½ feet in the vicinity of Test Pit 15. The fill consists of silty sand and sandy silt which is light to dark brown, grayish brown, and greenish brown, dry to moist, loose to firm, with rock, brick, and concrete fragments up to six inches and roots to one inch.

Soil

Natural residual soil underlies the existing fill on the descending slopes on the site. The soil consists of sandy silt, clayey silt and sandy clay which is dark gray brown, dark brown to black, slightly moist to moist, slightly firm to stiff, slightly porous to very porous, with cobbles up to six inches and roots up to ½ inch. The soil layer observed is on the order of two to four feet thick.

Bedrock

Bedrock underlying the site and encountered in the test pits consists of fine grained sediments mapped as part of the Puente Formation by Donald L. Lamar in the California Division of Mines and Geology, Special Report 101, "Geology of the Elysian Park-Repetto Hills Area, Los Angeles

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVE. # 201, GLENDALE, CA 91206
818•549•9959 TEL 818•543•3747 FAX

GEOLOGIC AND SOILS ENGINEERING EXPLORATION

PROPOSED BARNSDALL PARK - PHASE I

MASTER PLAN IMPLEMENTATION

PROJECT #1026C, CONTRACT #2723

LOTS 40 AND 49, WEST PORTION OF LICK TRACT

4800 HOLLYWOOD BOULEVARD

LOS ANGELES, CALIFORNIA

FOR THE DEPARTMENT OF RECREATION AND PARKS

THE J. BYER GROUP, INC. PROJECT NUMBER JB 17804-B

FEBRUARY 25, 1999

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206
(818) 549-9959 FAX: (818) 543-3747

STABILITY - TAYLOR'S METHOD

JB: 17804-B CONSULT: JET
CLIENT: BARNSDALL PARK

CALCULATION SHEET #

CALCULATE THE MAXIMUM HEIGHT TO WHICH UNIFORM SLOPES ARE GROSSLY STABLE USING TAYLOR'S METHOD FOR THE STABILITY OF EARTHEN EMBANKMENTS (*FUNDAMENTALS OF SOIL MECHANICS*).

CALCULATION PARAMETERS

EARTH MATERIAL:	FUTURE FILL	SAFETY FACTOR:	1.5
SHEAR DIAGRAM:		SLOPE ANGLE:	34 degrees
COHESION:	440 psf	Cd Base (C/fs):	293.3 psf
PHI ANGLE:	28.5 degrees	PhiD = atan(tan(phi)fs) =	19.9 degrees
DENSITY (w):	118.5 pcf		

INTERPOLATE STABILITY NUMBER (sn) FROM TAYLOR'S CHARTS:

TAYLOR'S CHART

		SLOPE ANGLES						
	Degrees	20	30	40	50	60	70	80
PhiD	5	0.090	0.110	0.130	0.145	0.160	0.185	0.210
	10	0.045	0.075	0.100	0.120	0.140	0.160	0.188
	15	0.020	0.045	0.070	0.095	0.115	0.140	0.168
	20	0.000	0.025	0.050	0.075	0.098	0.120	0.150
	25	0.000	0.010	0.033	0.055	0.080	0.105	0.130

FROM CHART sn = **0.035**

SAFE SLOPE HEIGHT = $\dfrac{Cd}{w \times (sn)}$ **69.9 feet**

CONCLUSIONS:

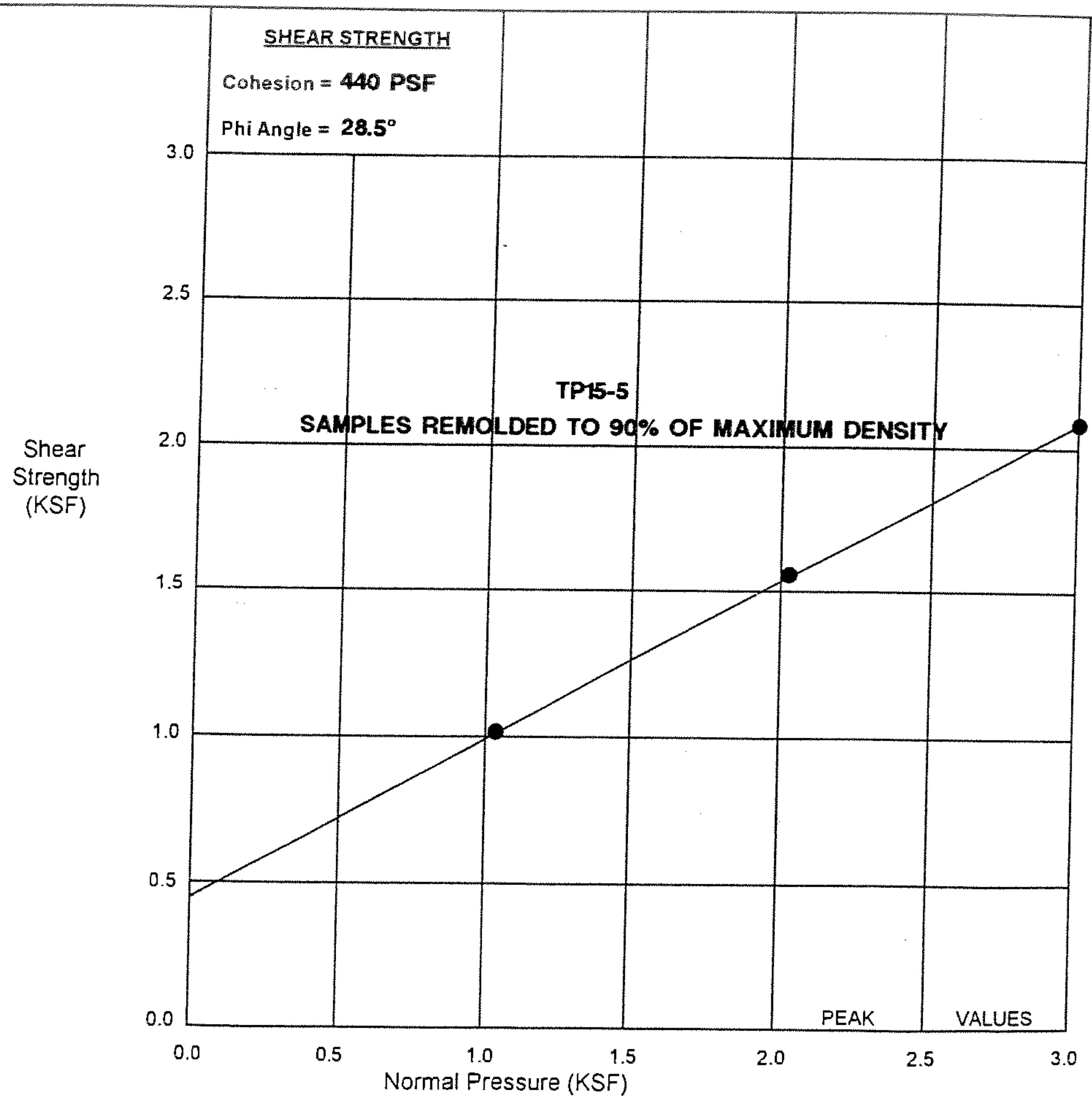
THE CALCULATION INDICATES THAT THE PROPOSED 1.5:1 SLOPES IN FUTURE COMPACTED FILL UP TO 25 FEET WILL BE GROSSLY STABLE WITH A FACTOR OF SAFETY IN EXCESS OF 1.5.

THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
512 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SHEAR TEST DIAGRAM

JB: 17804-B L.A. Parks - Barnsdall

SAMPLE: Future Fill



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Moisture Content (%) = **30.4**

Dry Density (pcf) = **90.9**

APPENDIX M

ORIGINAL BUILDING SPECIFICATIONS FOR RESIDENCE A

GENERAL CONDITIONS

SPECIFICATIONS

RESIDENCE "A"

A. BARNSDALL

HOLLYWOOD, CALIFORNIA

Finally Revised Dec 7 1920 FLlW

GENERAL

SCHEDULE OF DATES:

The Contractor shall prepare, in consultation with the Architect, a schedule fixing dates for the beginning of manufacture and installation of the various parts of the work, and the latest date at which the various detail drawings and decisions will be required for the proper conduct of the work.

DETAIL DRAWINGS:

Detail and working drawings, which shall be true developments of the scale drawings, will be furnished by the Architect from time to time, as necessary and as per schedule agreed upon, and the work shall be executed in conformity therewith and with such instructions, directions and explanations, as may from time to time be given by the Architect.

DRAWINGS AT THE WORK:

The Contractor shall keep in good order upon the work one copy of the Specifications and one copy of each drawing, and the Architect and his representatives shall have free access to such copies.

FIGURES TO GOVERN:

Figured dimensions shall be followed in preference to measurements by scale.

USE AND RETURN OF DRAWINGS AND MODELS:

The Drawings and Specifications furnished by the Architect shall be used for this work only. As instruments of service they are the property of the Architect and shall be returned to him.

SHOP DRAWINGS AND MODELS:

The Contractor shall furnish to the Architect at proper times, all shop and setting drawings or diagrams which the Architect may deem necessary in order to make clear the work intended or to show its relation to adjacent work of other trades. The contractor shall make any changes in such drawings or diagrams which the Architect may require, and shall submit two copies of the revised prints to the Architect for his identification, one copy to be returned to the Contractor, the other to be filed by the Architect.

SKILLED WORKMEN:

All work shall be executed in a skilfull and workmanlike manner, and no one shall be employed who is unskilled in the work which he is given to do. Should the Architect deem any one employed on the work incompetent, or unfit for his duties, and so certify, the Contractor shall dismiss him, and he shall not again, without the Architect's permission, be employed on the work.

MATERIALS:

All materials shall be new, unless otherwise specified.

INSPECTION:

The Contractor shall at all times maintain proper facilities and provide safe access for inspection to all parts of the work. No work shall be enclosed or covered until approved.

CONDEMNATION AND CORRECTION OF DEFECTIVE WORK:

The Contractor upon receiving from the Architect written notice and within such reasonable time as may be named therein, shall remove from the premises all materials, whether worked or unworked, and take down and remove all portions of the work condemned by the Architect as unsound or improper or as in any way failing to conform to the contract; and the Contractor shall bear the expense of making good all work destroyed or damaged by such removal, and shall promptly replace and re-execute his own work in accordance with the contract and without expense to the Owner.

STATEMENT OF COSTS:

The Contractor when required, shall furnish to the Architect, upon a blank form provided or approved by him, a correct statement, showing the estimated cost of each part of the work as subdivided in the specifications, the total equaling the contract price. This statement shall be for the use of the Architect at his discretion, in preparing estimates for payments on account.

REQUISITIONS FOR PAYMENTS:

At least one week before each payment falls due the Contractor shall submit to the Architect a requisition therefor and shall, if required, submit therewith an intemized statement of the quantities and cost, based upon unit prices agreed upon, and of the proportionate share of profit on work performed to the termination of the period to be covered by the payment. Such statement shall be made in form provided or approved by the Architect; but it shall not be binding as against his judgment.

PAYMENT OF FINAL CERTIFICATE A WAIVER:

The acceptance by the Contractor of the payment of the final certificate shall constitute a waiver of all claims against the Owner under or arising out of this Contract.

CERTIFICATES NOT FINAL EVIDENCE:

No certificates given, except the Final Certificate, nor payment made under the Contract, nor partial or entire occupancy of the premises by the Owner shall be construed as an acceptance of defective work, or of improper materials, or as condoning any omission. No payment nor certificate, final or otherwise, shall be construed as relieving the Contractor from his obligations to make good any defects or consequences thereof, discovered in his work after completion and acceptance of the same, other than those due to accident, abuse, or wear and tear, nor as a waiver of any specific obligation the Contractor may have assumed as to the durability of his work. (Subject to arbitration).

2.

CONTRACTOR'S CLAIM FOR REMUNERATION:

Should the Contractor deem any work which he is called upon to perform, whether by instructions, by detail drawings or otherwise, to be extra to the Contract, he shall notify the Architect before proceeding to execute it. Should the Architect decide that no extra is payable, and order the Contractor to proceed, then the Contractor shall do so, and the question whether there is an extra and, if so, its amount, shall be subject to arbitration.

WAIVER OF LIENS:

Neither the Contractor nor any sub-contractor, material man, nor any other person, shall file or maintain a lien, commonly called a mechanic's lien, for materials delivered for use in, or work done in the performance of this contract, and the right to maintain such lien by any or all of the above named parties is hereby expressly waived, except in the event of the failure or refusal of the Owner to pay the amount called for by any certificate of the Architect, within three days of the date of its tender to the Owner for payment. Then, and in such case only, shall any of the above named parties have the right to file and maintain a mechanic's lien.

INSURANCE:

Unless specifically otherwise provided in the Agreement forming a part of this Contract, the Owner and the Contractor shall each protect his own interest against loss or damage by fire, cyclones, earthquakes, floods or other actions of the elements, pending full performance by the Contractor of the work hereunder and full payment therefor by the Ower. For the purpose of maintaining such insurance, the Owner's interest at any time shall be held to amount to the sum of all payments which he shall have made to the Contractor on account of this contract. For the same purpose, the Contractor's interest shall be held to consist of any and all value under and pertaining to this contract not above defined as "Owner's Interest".

CASES SUBJECT TO ARBITRATION:

The final decision of all questions arising under this contract shall be made and given by the Architect, and both the Owner and the Contractor hereby agree to be bound thereby, and such decision shall be a condition precedent to any right or legal action by either Owner or Contractor.

ARCHITECT'S STATUS:

The parties to the contract recognize the Architect as the interpreter of the drawings and specifications which are part of the contract documents, and in that capacity he is to define their true intent and meaning. He is not the agent of the Owner, except in structural emergencies and except when in special instances he is authorized by the Owner so to act.

LABOR AND MATERIALS AND APPLIANCES:

The Contractor, unless otherwise expressly provided, shall furnish and install all material and shall furnish all labor, water, apparatus, light and power necessary for the complete, prompt and satisfactory execution of this work.

3.

DELIVERY:

The Contractor shall furnish all materials and labor promptly, and at such times as shall be best for the proper conduct of the entire work.

STORAGE LIMITS:

The Contractor shall confine the storage of materials and operations of his workmen to the limits indicated by the Architect, and shall not unnecessarily encumber the premises with his materials.

SUB-CONTRACTS:

The Contractor shall not assign this Contract nor sublet any portion of the work without the approval of the Architect, but such approval shall not relieve the Contractor of responsibilityfor his sub-contractors. The Contractor in subletting any/part of the work to be done under this Contract shall make with the sub-contractor a contract by which the sub-contractor shall expressly agree to be bound by the General Conditions of the Contract so far as they are applicable.

NO WORK WITHOUT INSTRUCTIONS:

The Contractor shall not do any work without proper drawings or instructions, and shall, at his own expense, replace any work wrongly executed, whether from lack of such drawings or instructions or otherwise.

MEASUREMENTS:

The Contractor shall measure work already in place, to insure the proper execution of his work, and should any discrepancy between the executed work and the drawings relating to his work be discovered he shall report at once to the Architect.

PERMITS, NOTICES, LAWS AND RULES:

The Contractor shall, at the Owner's expense, obtain for the Owner all necessary permits or licenses required for the execution of this contract, excepting obtaining permanent easements, give all necessary notices, pay, at the expense of the Owner, all fees required by law, and comply with all laws, ordinances, rules and regulations, relating to the work, and to the preservation of the public health and safety, and if the specifications and drawings are at variance therewith, he shall notify the Architect in writing, stating the effect of such compliance upon the contract price.

VOUCHERS AND SAMPLES:

The Contractor shall, when required, produce evidence showing the kind and quality of ma terials used, and furnish duplicate labeled samples of materials and workmanship with sufficient information, for the Architect's approval, and the materials and workmanship furnished shall be equal to the approved samples.

RUBBISH:

The Contractor shall not allow waste material or rubbish caused by his own employees to accumulate in or about the premises, but shall promptly remove the same, and at the completion of the work he shall thoroughly remove all his rubbish

4.

from and about the building, and all tools, scaffolding and supplus materials, and shall leave his work thoroughly cleaned and ready for use. In case of dispute the Owner will remove the rubbish and charge the cost of the work to the Contractors, pro rata.

PROTECTION OF WORK:

The Contractor shall cover and protect his work and materials from damage by the elements, or from any other cause.

REPAIR OF DAMAGES:

The Contractor shall, at his own expense, make good to the Architect's satisfactions, any damage to his work from the action of the elements.

CUTTING, FITTING AND DIGGING:

The Contractor shall do all cutting, fitting or patching of his work that may be required to make the several parts come together properly, in accordance with the specifications, details and general drawings. But the Contractor shall not endanger the stability of the structure or any part thereof by cutting, digging or otherwise, and shall not in any way cut or alter the work of any other contractor except with the consent and under the direction of the Architect, who shall assess the cost of same. The Contractor shall reimburse other contractors for any damage he may do to their work by cutting, digging or otherwise in all cases not authorized by the Architect, and the cost of such damages shall be assessed by the Architect and deducted from any amounts due or to become due the Contractor under this contract.

ACCIDENT INSURANCE:

The Contractor shall maintain such insurance as will adequately protect himself and the owner from claims for damages for personal injuries, arising directly or indirectly from operations under this contract, and he shall be liable to the Owner for failure to maintain such insurance.

Bond

5.