GEOLOGIC AND SOILS ENGINEERING EXPLORATION UPDATE

PROPOSED COMMERCIAL DEVELOPMENT

PORTION OF LOT "H" OF THE PARTITION OF THE RANCHO LAS VIRGENES

ACROSS FROM 28720 CANWOOD STREET

AGOURA HILLS, CALIFORNIA

FOR KOMAR INVESTMENTS, LLC.

THE J. BYER GROUP, INC. PROJECT NUMBER JB 19884-Z

AUGUST 19, 2004

INTRODUCTION

This report has been prepared per our signed agreement received August 12, 2004 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 the proposed commercial development.

INTENT

It is the intent of this report to update the previous geotechnical report and 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 update was determined from our initial site visit and consultation with Zaven Hanessian. The preliminary plans prepared by Alajajian Marcoosi Architects, Inc. were considered prior to beginning work on this project. 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 August 15 and 20, 1996 with the aid of a tractor-mounted backhoe and a truck-mounted bucket auger drill rig. It included excavating 19 test pits and drilling four borings to a maximum depth of 20 feet. 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. As part of this update, the site was revisited. The site conditions remain essentially unchanged.

Office tasks included laboratory testing of selected soil samples, review of the air photos of the area, review of the City of Agoura Hills and County of Los Angeles grading records, preparation of seven 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 G.

RESEARCH

Research at the City of Agoura Hills and the County of Los Angeles Department of Building and Safety was performed prior to the preparation of this report. The records contain several geologic and soils engineering reports prepared for Tracts 33249 and 35354 which are located to the east and west of the subject property, respectively. These reports include:

Preliminary Soils Exploration, Proposed Residential Developments, Ventura Freeway and Kanan Road., Agoura Tract 33249, by Tierra Tech Testing Laboratory, dated July 23, 1976;

Preliminary Geologic Investigation, 31 Acre Parcel, Agoura, Tract 33249, by Envicom Corporation, dated August 27, 1976;

Soils Exploration, Four Proposed Industrial Buildings, West Canwood Street, ½ Mile Easterly of Kanan Road, Agoura, Tract 33249, by Tierra Tech, dated March 16, 1977;

Geologic Investigation, 31 Acre Parcel, Tract No. 33249, Canwood Drive, Agoura, by Gorian and Associates, Inc., dated April 6, 1979;

Final Soils Engineering and Geologic Report for Lot 1, Tract 33249, Industrial Tract, Agoura, by Tierra Tech Testing Laboratory Inc., dated January 19, 1983;

Addendum Geotechnical Report, Tract No. 35354, 29001 Canwood Road, by Foundation Engineering Co., Inc., dated June 15, 1983; and

Report on Testing Compacted Fill and Geologic Conditions, Tract No. 35354, 29001 Canwood Road, by Foundation Engineering Co., Inc.,dated March 28, 1985.

The data contained in these reports was reviewed and considered as part of our work on this project.

The California Division of Mines and Geology Open-File Report 84-1 LA, *Geology of Calabasas-Agoura-Eastern Thousand Oaks Area, Los Angeles and Ventura Counties, California,* by F. Harold Weber, 1994, includes the subject property was used to prepare the enclosed Regional Geologic Map.

The University of California at Los Angeles Air Photo Archives were researched. The following air photos from the Spence Air Photo Collection were reviewed: E-17226 dated March 25, 1959; E-69-A-2 dated July 25, 1967; E-69-A-28, E-69-A-29, E-69-A-30, and E-69-A-32 dated October 6, 1967. The air photos do not show any unusual geomorphic features on the site.

PROPOSED DEVELOPMENT

Information concerning the proposed project was provided by Zaven Hanessian. The Grading Plan prepared by Alajajian Marcoosi Architects, Inc. was a guide for the preparation of this update report. It is proposed to create level building pads to accommodate eight commercial buildings and parking areas. Retaining walls up to 13½ feet high are planned to support grade changes. Grading will consist of cutting up to 20 feet below the existing grade and placing up to 25 feet of compacted fill. It is proposed to create 2:1 fill and cut slopes up to 30 feet high. Formal plans have not been prepared and await the conclusions and recommendations of this report.

SITE DESCRIPTION

The subject property consists of a rectangular shaped vacant hillside parcel located on the north side of Canwood Street approximately ½ mile east of Kanan Road, in the City of Agoura Hills, California. One story commercial structures are located east of the site. The area to the north is developed with two story townhomes. West of the subject property, the grade has been lowered to create level building sites which are occupied by two story commercial buildings and warehouses. The grade change is supported by a retaining wall which is up to 25 feet in height.

Physical relief is about 70 feet with slope gradients ranging from 2:1 to flatter than 10:1. Topography on the subject property consists of an east-west trending ridge, with an east draining canyon. A 2:1 to 10:1 slope ascends from Canwood Street to the ridge. Two knobs on the ridge in the central and western portions of the site are separated by a saddle. The knobs are 50 to 70 feet above Canwood Street. North of the ridge, the slope descends 35 to 55 feet at a gradient ranging from 3:1 to 5:1 to the east trending, broad drainage course. A slope ascends to the north of the drainage course at a 4:1 to flatter than 10:1 gradient, 15 to 50 feet, to the northern property line.

Vegetation on the site consists of a moderately thick assemblage of native grass, with several scattered oak trees. Surface drainage on the southern portion of the site is by sheet flow runoff down the contours of the land to the south to Canwood Street. Offsite drainage from the west does not flow onto the site. The northern portion of the site drains to the east trending canyon, to a small debris basin offsite.

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

A minor amount of fill underlies the extreme northern portion of the site to a maximum observed depth of two feet in Test Pit 7. The fill consists of silty sand to gravelly sand which is dark grayish brown to brown, dry to slightly moist, loose, with rootlets and rock fragments up to six inches.

A minor amount of fill was also observed in Test Pit 2. This fill is related to backfill of the existing offsite retaining wall on the west. The fill consists of silty clay which is dark brown, moist, slightly loose to firm, with rootlets.

Soil

Natural residual soil blankets the slopes on the site. The soil consists of clay which is dark grayish brown to black, dry to slightly moist, soft to very firm, slightly porous to very porous, with rock fragments up to two inches. The soil layer observed is on the order of two to three feet thick.

Colluvium

Natural colluvium underlies the north central portion of the site within the drainage course. The maximum observed thickness of the colluvium is 7½ feet in Boring 3. The colluvium consists of gravelly clay, which is black to dark brown, dry to slightly moist, slightly soft to stiff, with rock fragments up to eight inches.

Bedrock

Bedrock underlying the site and encountered in the test pits and borings consists of basalt and andesitic breccia mapped as part of the Conejo Volcanics, and siltstone, sandstone, and shale mapped as part of the Topanga Formation, by F. Harold Weber in the California Division of Mines and Geology Open-File Report 84-1 LA, *Geology of the Calabasas-Agoura-Eastern Thousand Oaks Area*, 1984. The Conejo Volcanics are also exposed in resistant knobs on the ridge. The basalt is orange brown to reddish brown, hard to very hard, slightly weathered to weathered, and jointed. The andesitic breccia is dark gray to dark brown, hard to very hard, and slightly fractured. The siltstone, sandstone, and shale are brown to light brown, slightly hard to moderately hard, slightly weathered to very weathered, and contain gypsum veins up to ½ inch.

GEOLOGIC STRUCTURE

The bedrock described is common to this area of Agoura Hills and the geologic structure is consistent with regional trends. Bedding planes mapped in the sandstone, siltstone, and shale strike from N60W to EW and dip from 40 to 65 degrees to the northeast. Joint planes mapped in the Conejo Volcanics are randomly oriented and steeply dipping.

The contacts between the igneous (Conejo Volcanics) and sedimentary (Topanga Formation) bedrock were observed in several test pits. Weber, in the California Division of Mines and Geology Open-File Report 84-1 LA, *Geology of the Calabasas-Agoura-Eastern Thousand Oaks Area*, 1984, states that the Conejo Volcanics are interlayered with the marine sediments of the Topanga Formation. In the vicinity of the subject property the contacts between the igneous and the sedimentary bedrock are shown by Weber to be depositional. The southern contact between the Conejo Volcanics and Topanga Formation was observed to be moderately dipping to the north, which parallels bedding. The northern contact between the Conejo Volcanics and Topanga Formation was observed to dip moderately to steeply to the south. The northern contact does not appear sheared and is not interpreted as a fault contact.

Weber maps a northeast striking fault to the west of the site. This fault was not encountered in the test pits or borings, but may have been located by Weber based on the saddle. The volcanic/sedimentary contacts are not offset.

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 (CBC Seismic Zone IV). Moderate to strong earthquakes can occur on numerous local faults. The United States Geological Survey,

California Geological Survey, 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 ground shaking. Cosmetic damage should be expected.

Within the past 33 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.

According to the I.C.B.O. publication *Maps of Known Active Fault Near Source Zones in California and Adjacent Portions of Nevada*, February 1998, the site is within eight kilometers of a known seismic source (Malibu Coast fault). From a Building Code (Chapter 16) standpoint, the Malibu Coast fault is classified as a Type "B" fault.

The following table lists the applicable seismic coefficients for the project:

BUILDING CODE SEISMIC COEFFICIENTS	
Earth Materials	Bedrock
Soil Profile Type	S_B
Seismic Coefficient (C_a)	$0.40N_a$
Seismic Coefficient (C_v)	$0.40N_v$
Near-Source Factor (N_a)	1.00
Near-Source Factor (N_v)	1.08

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, frames, 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 and lurching should not occur at the subject property.

Seismic Hazard Zones

The California State Legislature enacted the Seismic Hazards Mapping Act of 1990, which was prompted by damaging earthquakes in northern and southern California, and was intended to protect public safety from the effects of strong ground shaking, liquefaction, landslides, and other earthquake-related hazards. The Seismic Hazards Mapping Act requires that the State Geologist delineate various "seismic hazards zones." The maps depicting the zones are released by the California Geological Survey (CGS, formally CDMG). Sites outside hazard zones are not necessarily free of seismic or geologic hazards. Not all of southern California has been mapped, and new maps are issued and existing maps refined from time to time.

The Seismic Hazards Mapping Act requires a site investigation by a certified engineering geologist and/or civil engineer with expertise in geotechnical engineering, for projects sited within a hazard zone. The investigation is to include recommendations for a "minimum level of mitigation" that should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy. The Seismic Hazards Mapping Act does not require mitigation to a level of no ground failure and/or no structural damage.

Seismic Hazard Zone delineations are based on correlation of a combination of factors, including: surface distribution of soil deposits; physical relief; depth to historic high groundwater; shear strength of the soils; and occurrence of past seismic failure. Maps within the series are further designated as Reconnaissance, Preliminary, or Official. Reconnaissance Maps are draft level, while the Official Maps have been thoroughly researched and reviewed.

The CGS has released a map titled *Seismic Hazard Zones, Thousand Oaks 7.5 Minute Quadrangle, Official Map*, 11-17-00. The map delineates areas that have been subject to, or are potentially subject to liquefaction; and areas where previous landsliding has occurred or conditions for potential permanent ground displacements exist as a result of earthquake-caused ground shaking. The subject

property is not included within an area that may be subject to earthquake induced liquefaction or ground deformation.

Ground Motion

Figure 3.3 and 3.4 of the California Geological Survey (CGS) Open File Report 98-17 contains ground motion values assigned for this area of Los Angeles County. The Design Basis Earthquake (10 percent exceedance in 50 years) for the study area is a peak ground acceleration (PGA) of 0.30 (Plate 3.3, Probabilistic PGA). The de-aggregated predominant earthquake magnitude (M_w) is 7.3 (Figure 3.4, Predominant Earthquake). These ground motions could be expected at the site during the design life span of the structure.

CONCLUSIONS AND RECOMMENDATIONS

General Findings

The conclusions and recommendations of this exploration are based upon four borings, 19 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.

The recommended bearing material for the proposed buildings is the future compacted fill which can generally be reached with conventional foundations.

Geotechnical issues affecting the site include the extremely hard bedrock consisting of basalt and andesitic breccia which was encountered on the ridge during exploration. The hard bedrock may require heavy ripping or blasting to achieve the proposed finished grades. In addition, the

expansiveness of the future fill comprised of onsite earth materials will be high to critical. This will require selective grading and/or special design for foundations, retaining walls, slabs, and paving.

SITE PREPARATION

Surficial materials consisting of fill, soil and colluvium blanket the bedrock on the site. Fill, soil and colluvium will be removed during grading and placed as certified compacted fill.

General Grading Specifications

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 areas to receive compacted fill should be prepared by removing all vegetation, debris, existing fill, soil, and colluvium. 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. The excavation shall extend a minimum of five feet beyond the building footprint. The excavated areas shall be observed by the soils engineer or geologist prior to placing compacted fill.

C. The cut portion of the building site shall be undercut three feet and replaced as compacted fill to provide a more uniform foundation condition. The undercut area shall include the entire cut portion of the building site.

D. 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.

E. 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 1557-00, or equivalent.

F. 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.

Fill Slopes

Fill slopes may be constructed at a 2:1 gradient. Compacted fill should be keyed and benched into the bedrock. Keyways should be a minimum of 15 feet wide and three feet into bedrock as measured on the downhill side. A subdrain system which daylights to the atmosphere should be placed at the back of all keyways along the base of fill slopes. The existing east trending drainage course should be provided with a subdrain within the thalweg at the base of the fill. This subdrain should outlet through the base of the future fill slope at the east end of the drainage course.

Cut Slopes

Cut slopes may be created at a 2:1 gradient to any practical height.

Excavation Characteristics

The test pits and borings encountered hard, crystalline 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 bedrock encountered during grading, may require the use of heavy duty ripping or blasting.

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 and/or pad footings may be used to support the proposed buildings and retaining wall provided they are founded in future compacted fill or bedrock. For the portions of the proposed retaining wall adjacent to the top of the existing offsite retaining wall the foundations should be deepened to below a 1:1 plane projected up from the base of the offsite retaining wall (see Section G). 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	24	2,000	0.4	250	3,000
Bedrock	12	4,000	0.5	300	6,000

Increases in the bearing value are allowable at a rate of 20 percent for each additional foot of footing width or depth to a maximum of 3,000 pounds per square foot for the future compacted fill and 6,000 pounds per square foot for the bedrock. 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.

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.

RETAINING WALLS

General Design

Cantilevered retaining walls up to 15 feet high may be designed for an equivalent fluid pressure of 62 pounds per cubic foot, which is the at rest earth pressure of the earth materials to be retained.

Retaining walls should be provided with a subdrain covered with a minimum of 12 inches of ¾ inch crushed gravel. The subdrain should drain to a sump where water can be pumped to the street grade.

Backfill

Retaining wall backfill should be compacted to a minimum of 90 percent of the maximum density as determined by ASTM D 1557-00 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.

Foundation Design

Retaining wall footings may be sized per the "Spread Footings" section 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.

Temporary Excavations

Temporary excavations will be required to construct the proposed retaining walls. The excavations will be up to 15 feet in height and will expose fill and soil over bedrock. The fill and soil should be trimmed to 1:1 for wall excavations. The bedrock is capable of maintaining vertical excavations up to 11 feet per the enclosed calculations. Where vertical excavations in the bedrock exceed 11 feet in height, the upper portion should be trimmed to 1:1 (45 degrees).

The geologist should be present during grading to see temporary slopes. All excavations should be stabilized within 30 days of initial excavation. Water should not be allowed to pond on top of the excavations nor to flow toward them. No vehicular surcharge should be allowed within three feet of the top of the cut.

FLOOR SLABS, DECKING AND PAVING

Floor Slabs and Decking

Due to the high expansion potential, floor slabs and decking should be a minimum of five inches thick, cast over approved compacted fill or bedrock, and reinforced with a minimum of # 4 bars 16 inches on center each way. The subgrade should be saturated (three percent over optimum moisture content) to a depth of 18 inches prior to pouring. Slabs which will be provided with a floor covering should be protected by a polyethylene plastic vapor barrier. The barrier should be covered with a thin layer of sand, about one inch, to prevent punctures and aid in the concrete cure.

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

Paving should be placed over approved compacted fill. 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 sections:

Service	Pavement Thickness (Inches)	Base Course (Inches)
Light Passenger Cars	3	6
Moderate Trucks (Storage, etc.)	4	8

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 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. 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.

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 for keyways, benching, 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. Retaining wall subdrains should 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. 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.

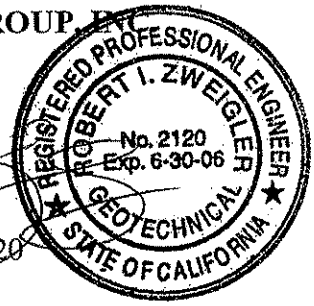
THE EXPLORATION WAS PERFORMED ONLY ON A PORTION OF THE SITE, AND CANNOT BE CONSIDERED AS INDICATIVE OF THE PORTIONS OF THE SITE NOT EXPLORED.

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.



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

JET:JWB:RIZ:flh:cj
S:\FINAL\UPDATE\19884_Komar_Investments_Geologic_Update.wpd

Enc: Appendix I - Laboratory Testing
Shear Test Diagrams, from JB 16979-Z (3 Pages)
Vicinity Map, from JB 16979-Z
Regional Geologic Map, from JB 16979-Z
Log of Test Pits, from JB 16979-Z (7 Pages)
Log of Borings 1-4, from JB 16979-Z (4 Pages)
Calculation Sheet, from JB 16979-Z
Section G
Sections A, B, C, D, E, and F (6 Sheets)

In Pocket: Geologic Map

xc: (1) Addressee
(4) Westland Civil Engineering
(2) Alajajian Marcoosi Architects, Inc

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 onsite material using the procedures outlined in ASTM D 1557, a five-layer standard. Remolded samples were prepared at 90 percent 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
6	2	Dark Grayish Brown Clay	98.0	22.0	135-critical
11	2	Brown to Gray Silty Clay	107.0	20.0	90-high

Expansion Test

To find the expansiveness of the future compacted fill a swell test was performed using the procedures outlined in ASTM D-4829. Based upon the testing, the future compacted fill will be highly to critically expansive.

Shear-Tests

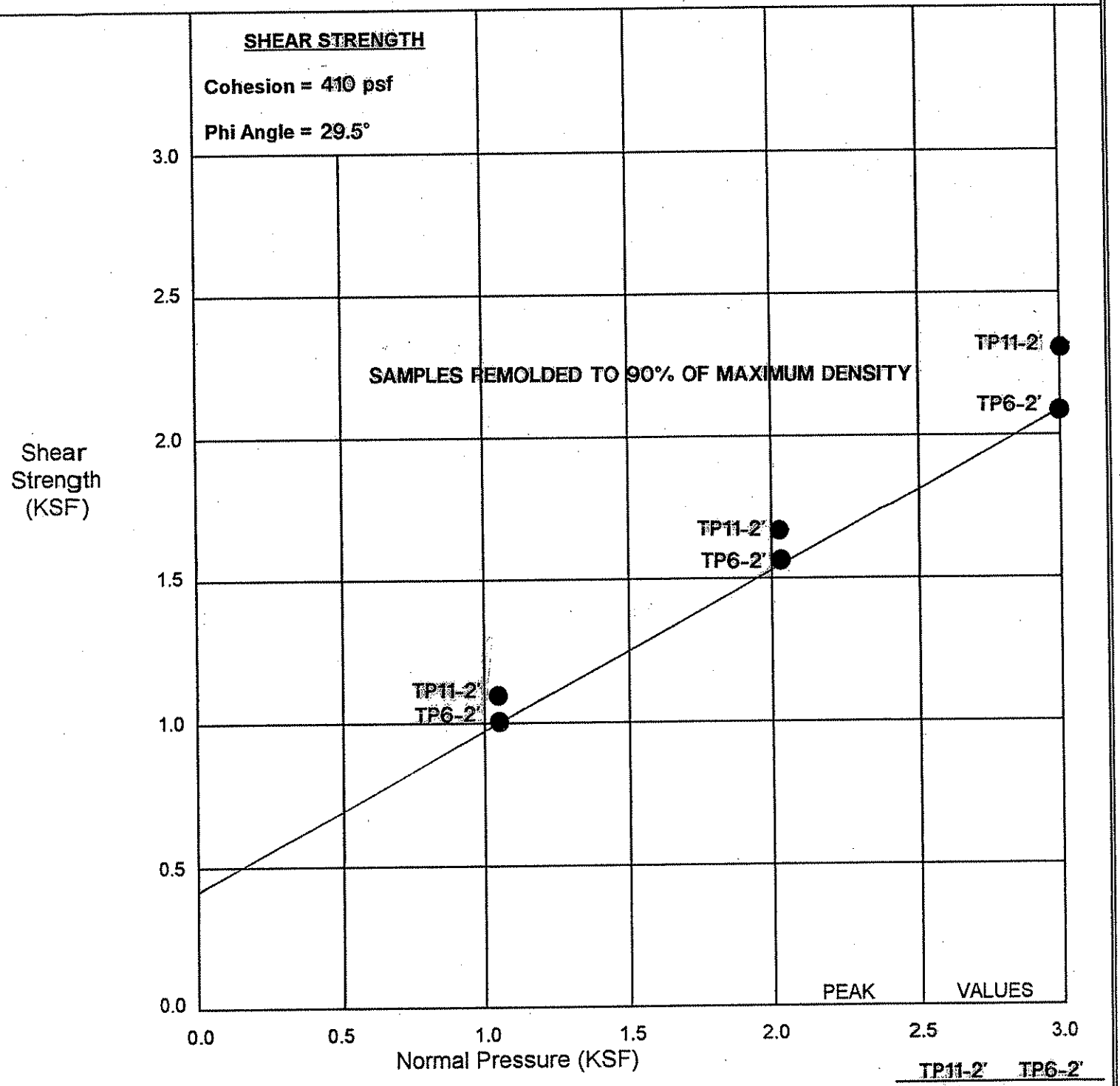
Shear tests were performed on samples of future compacted fill and bedrock using the procedures outlined in ASTM D-3080 and a strain controlled, direct shear machine manufactured by Soil Test, Inc. The rate of deformation was 0.010 inches per minute. The samples were tested in an artificially saturated 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
212 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SHEAR TEST DIAGRAM #1

JB: 16979-Z MSG Enterprises

SAMPLE: Future Compacted Fill



	TP11-2'	TP6-2'
Moisture Content (%) =	26.0	31.6
Dry Density (pcf) =	96.3	88.2

○ Direct Shear (Field Moisture)

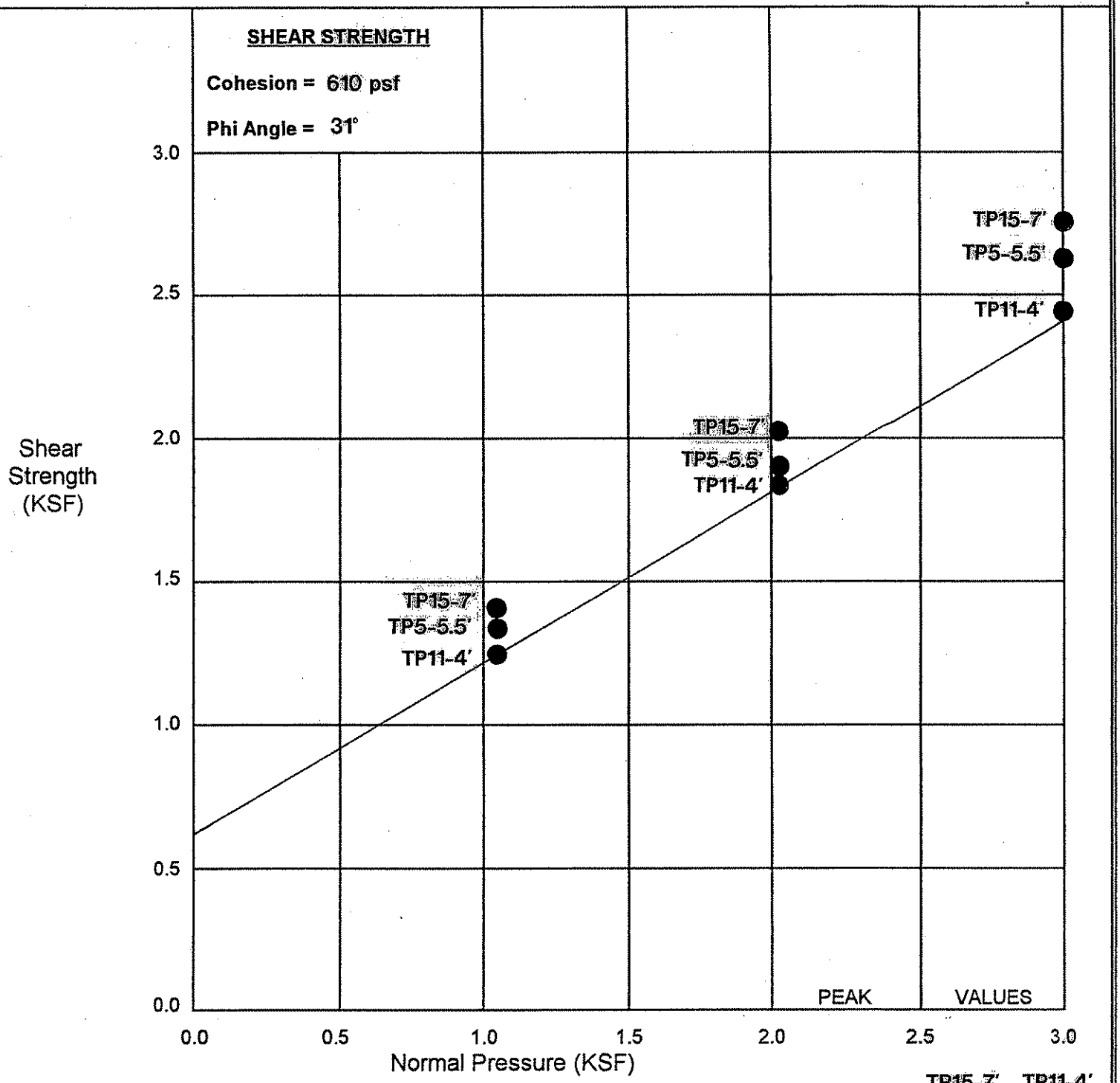
● Direct Shear (Saturated)

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 #2

JB: 16979-Z MSG Enterprises

SAMPLE: Bedrock - Topanga Formation



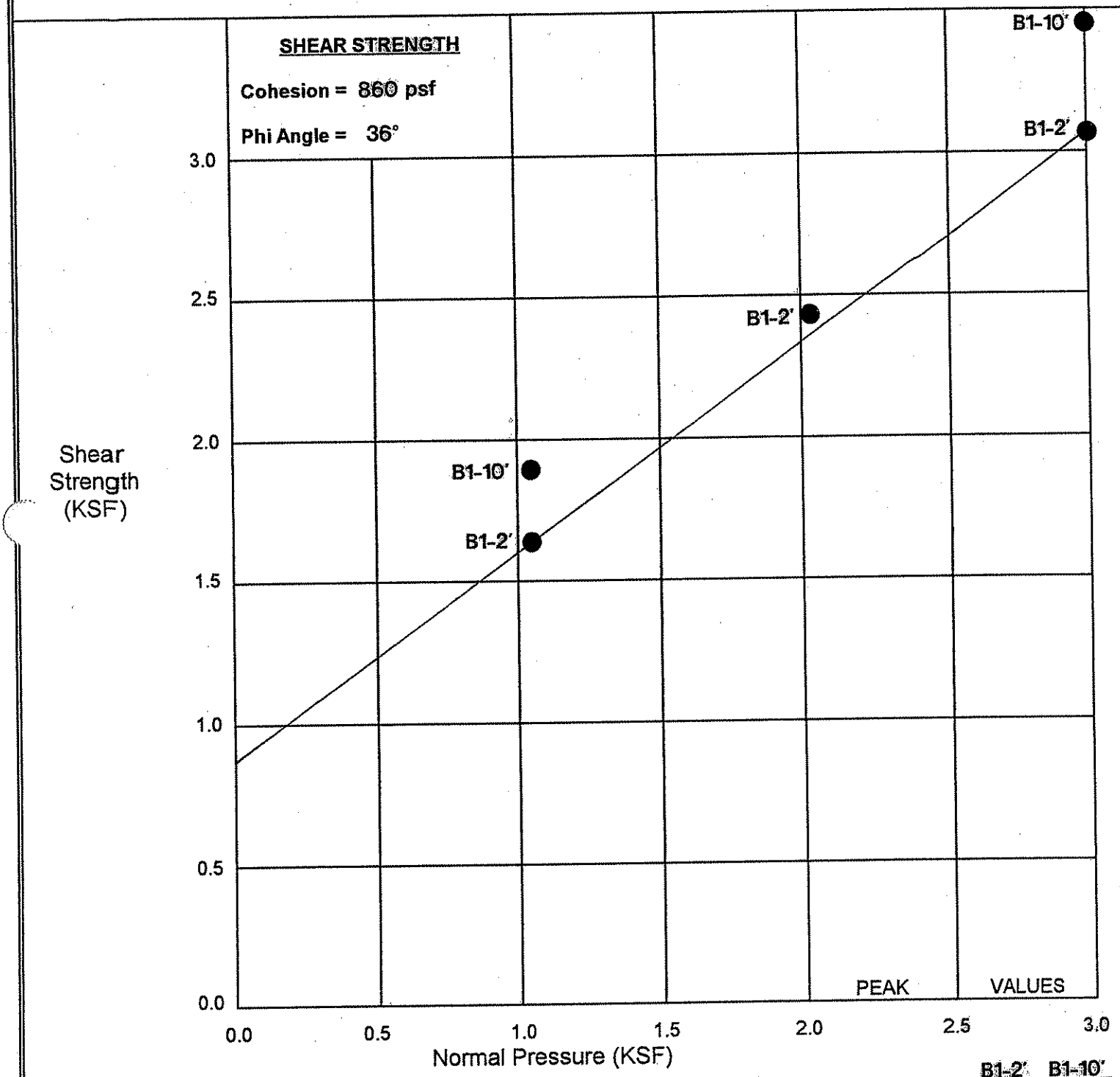
		TP15-7'	TP11-4'
○	Direct Shear (Field Moisture)	Moisture Content (%) = 30.9	32.1
●	Direct Shear (Saturated)	Dry Density (pcf) = 90.1	87.7

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

SHEAR TEST DIAGRAM #3

JB: 16979-Z MSG Enterprises

SAMPLE: Bedrock - Conejo Volcanics



Direct Shear (Field Moisture)

Direct Shear (Saturated)

	B1-2'	B1-10'
Moisture Content (%) =	98.7	24.5
Dry Density (pcf) =	100.9	24.1

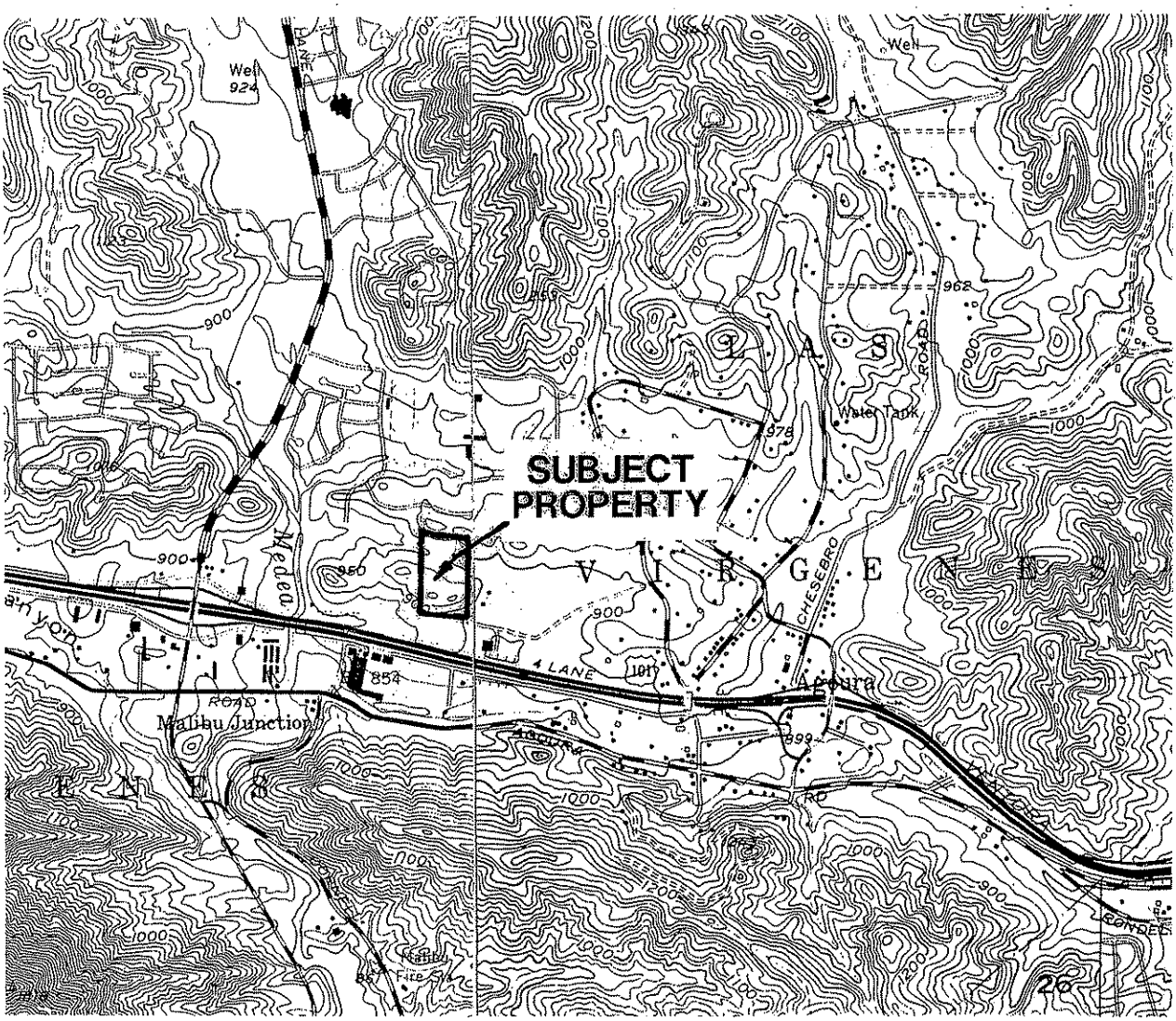
THE J. BYER GROUP, INC.
GEOTECHNICAL CONSULTING FIRM
2 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

VICINITY MAP

JB 16979-Z CLIENT: MSG Enterprises

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

REFERENCE: *U.S.G.S. 7.5 Minute Quadrangles, Calabasas and Thousand Oaks Sheets.*



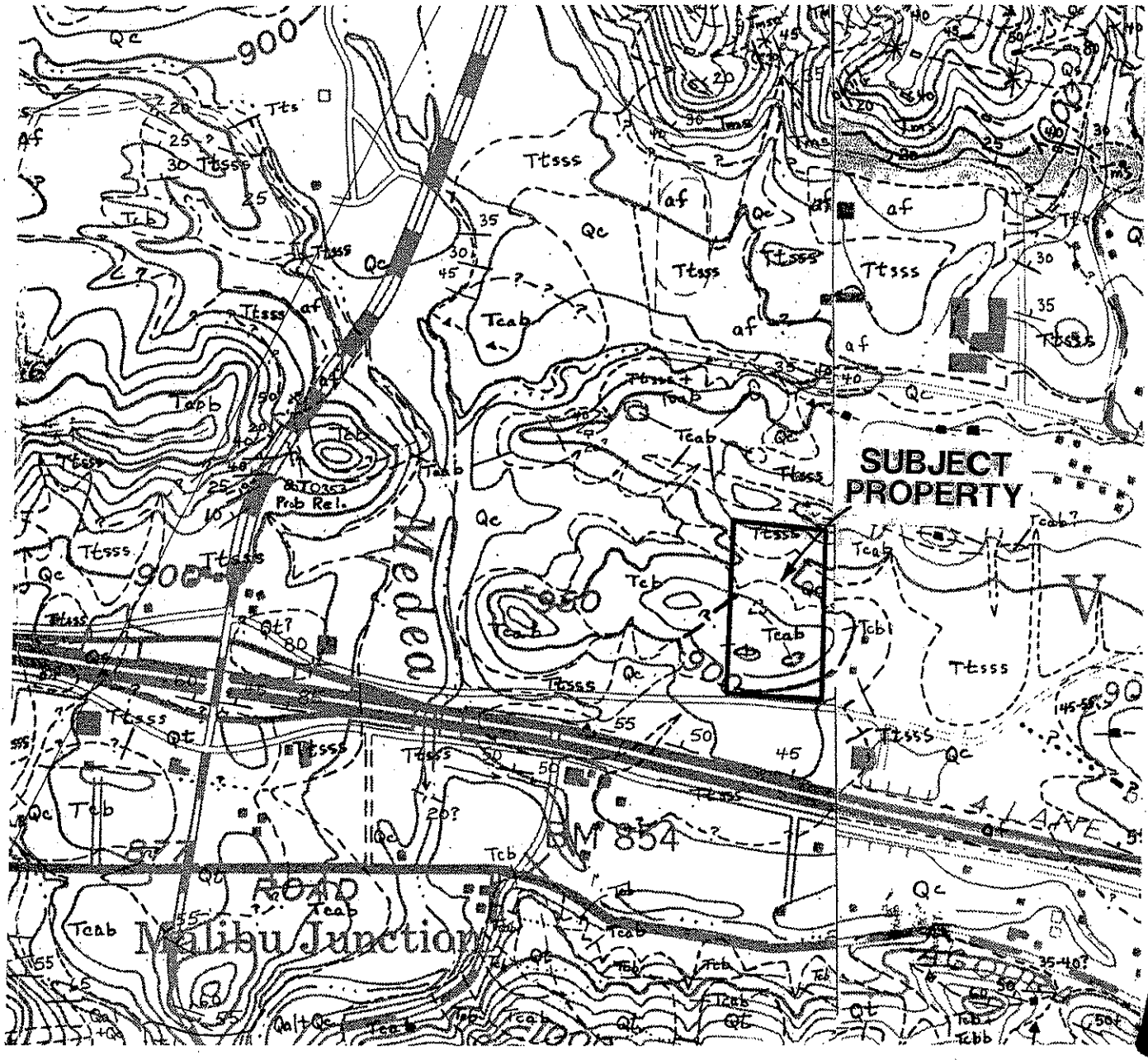
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
2 E. WILSON AVENUE SUITE 201, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

REGIONAL GEOLOGIC MAP

JB 16979-Z CLIENT: MSG Enterprises

CONSULTANT: JET SCALE: 1" = 800'

REFERENCE: *C.D.M.G. OFR 84-1 LA, Geology of the Calabasa-Agoura-Eastern Thousand Oaks Area, Plates II-B and IIC, Weber 1984.*



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: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/20/96

REPORT DATE: 10/18/96

TEST PIT #1

Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0-2½	**SOIL:**	Clay, black, dry to slightly moist, firm, very porous with roots up to 3/4" and rock fragments up to 2"
			2½-4	**COLLUVIUM:**	Clayey Gravel, black to dark brown, slightly moist, dense with rock fragments up to 8" and roots up to 1"
			4-5	**BEDROCK:**	Siltstone and Shale, brown to light brown, moderately hard, weathered and fractured
			5-6½		Basalt, orange brown to reddish brown, hard, moderately fractured and moderately weathered
			6½-7		Very hard

Basalt/Siltstone and *End at 7 Feet; No Water; No Caving; No Fill. Contact between Shale is approximately east-west and dips moderately to steeply to the south.*

TEST PIT #2

Surface Conditions:

			0-2	**FILL:**	Silty Clay, dark brown, moist, slightly loose to firm with rootlets
			2-5	**BEDROCK:**	Basalt, brown to orange brown, hard, slightly weathered and jointed
					Jointing: N85W; 45 NE @ 4' Jointing: N27E; 61SE @ 4' Jointing: N20W; Vertical @ 4½'
			5-5½		Very hard

End at 5½ Feet; No Water; No Caving; Fill to 2 Feet.

TEST PIT #3

Surface Conditions:

			0-1	**SOIL:**	Clay, black, dry, loose to slightly firm and porous
			1-6	**BEDROCK:**	East side of test pit - Andesitic Breccia, dark grey to dark brown, hard and moderately fractured, very hard at 2'
					West side of test pit - Basalt, brown to reddish brown to orange brown, moderately hard, very fractured and weathered

End at 6 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: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/20/96

REPORT DATE: 10/18/96

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
TEST PIT #4					Surface Conditions:
			0-1	**SOIL:**	Clay, black to dark brown, slighty moist, firm, porous
			1-3	**BEDROCK:**	Basalt, brown to dark brown, slightly hard, very weathered and very fractured
			3-5		Hard, slightly fractured
			5-5½		Very hard
					End at 5½ Feet; No Water; No Caving; No Fill.
TEST PIT #5					Surface Conditions:
2	26.0	89.1	0-3	**SOIL:**	Clay, black, dry to slightly moist, soft to slightly firm, and porous
			3-4½	**BEDROCK:**	Sandstone, light brown, slightly hard, weathered to very weathered, fine grained
5½	21.8	88.9	4½-6		Siltstone, brown, moderately hard, slightly fractured, slightly weathered, thinly bedded with gypsum veins along bedding Bedding: N75W; 60 NE
					End at 6 Feet; No Water; No Caving; No Fill.
TEST PIT #6					Surface Conditions:
2	26.7	80.5	0-3	**SOIL:**	Clay, dark grayish brown to black, slightly moist, firm, slightly porous
			3-5	**BEDROCK:**	Siltstone and Shale, gray to light brown, moderly hard, slightly weathered
					End at 5 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: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/20/96

REPORT DATE: 10/18/96

TEST PIT #7

Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0-2	**FILL:**	Silty Sand, tan, dry, loose with rootlets
			2-5	**SOIL:**	Clay, dark grayish brown, slightly moist, firm to very firm with rock fragments up to 2"
			5-7	**BEDROCK:**	Sandstone and Siltstone, brown to light brown, moderately hard, weathered, fine grained, well bedded with gypsum veins along bedding
			7-8		Siltstone and Shale, gray to light brown, moderately hard, thinly bedded Bedding: N75W; 65 NE @ 7'

End at 8 Feet; No Water; No Caving; Fill to 2 Feet.

TEST PIT #8

Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0-2	**FILL:**	Gravelly Sand, brown, dry, loose with rock fragments up to 6" and rootlets
3½	18.2	93.2	2-4½	**SOIL:**	Clay, dark grayish brown, slightly moist, very firm and slightly porous
			4½-6½	**BEDROCK:**	Siltstone and Shale, gray to light brown, hard, moderately fractured, thinly bedded with gypsum veins along bedding Bedding: N71W; 53 NE @ 5½'

End at 6½ Feet; No Water; No Caving; Fill to 2 Feet.

TEST PIT #9

Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0-1½	**FILL:**	Gravelly Sand, brown, dry, loose with rock fragments up to 1"
			1½-4	**SOIL:**	Clay, dark grayish brown to dark brown, slightly moist, firm, porous with rootlets
			4-5½	**BEDROCK:**	Siltstone, Sandstone and Shale, gray to brown to light brown, soft, very weathered gypsum veins along bedding
6	20.9	89.0	5½-8		Moderately hard Bedding: N60W; 54 NE @ 6'

End at 8 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: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/20/96

REPORT DATE: 10/18/96

TEST PIT #10

Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0-1½	**FILL:**	Gravelly Sand, dark brown, dry, loose with some clay and rootlets
2	27.1	85.9	1½-4	**SOIL:**	Clay, dark grayish brown, slightly moist, soft
			4-6		Gravelly Clay, firm with rock fragments up to 3"
			6-9	**BEDROCK:**	Siltstone and Shale, white to light brown to brown, moderately hard to hard, slightly fractured, weathered, thinly bedded Bedding: N74W; 55NE

End at 9 Feet; No Water; No Caving; Fill to 1½ Feet.

TEST PIT #11

Surface Conditions:

			0-1	**SOIL:**	Clay, dark gray, slightly moist, firm
			1-4	**BEDROCK:**	Sandstone, Siltstone and Shale, brown to gray to white, dry, soft, very weathered, very fractured, gypsum veins randomly oriented
4	20.1	87.7	4-8		Gray to brown to orange brown, slightly moist, moderately hard, slightly weathered, slightly fractured, well bedded Bedding: EW 45N @ 4½' Bedding: N80W; 40 NE @ 7'

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

TEST PIT #12

Surface Conditions:

			0-3½	**SOIL:**	Clay, dark grayish brown to black, slightly moist to moist, firm to stiff with rootlets
			3½-5	**BEDROCK:**	Sandstone, Siltstone and Shale, gray to light brown, slightly loose, weathered, very fractured with gypsum veins randomly oriented
			5-7½		Moderately hard to hard, slightly fractured, well bedded with gypsum veins along bedding Bedding: N61W; 53NE @ 6'

End at 7½ 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: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/20/96

REPORT DATE: 10/18/96

TEST PIT #13

Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0-2	**SOIL:**	Clay, black, slightly moist to moist, firm and porous
			2-4½	**BEDROCK:**	Siltstone and Shale, brown to gray to white, moderately hard, weathered
			4½-5½		Sandstone, light brown, slightly moist, moderately hard and fine grained
			5½-9		Siltstone and Shale, gray to orangish brown to light brown, moist, moderately hard, thinly bedded Joint: N60E; 72 SE @ 7' Bedding: N64W; 42 NE @ 7½'

End at 9 Feet; No Water; No Caving; No Fill.

TEST PIT #14

Surface Conditions:

2	25.6	87.0	0-3½	**SOIL:**	Gravelly Clay, dark blackish brown to orange brown, slightly moist, slightly loose to firm with rock fragments up to 10"
			3½-5	**BEDROCK:**	Andesitic Breccia, dark gray to dark brown to dark reddish brown, dry, very hard and moderately fractured
			5-6		Fragments of Andesitic Breccia and Sandstone, orange brown to whitish gray, hydrothermally altered
			6-7½		Sandstone and Siltstone, dark gray to brown, moist, moderately hard very contorted bedding, very weathered, fractured

End at 7½ Feet; No Water; No Caving; No Fill. Contact Between Andesitic Breccia/Sandstone And Siltstone N75W; 57 S.

TEST PIT #15

Surface Conditions:

			0-1	**SOIL:**	Clay, black to dark grayish brown, dry, slightly loose with roots to ¼", porous
			1-6		Moist, firm to very firm
7	22.3	90.1	6-8	**BEDROCK:**	Siltstone, grayish brown to light gray, moist, slightly hard, very weathered

End at 8 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: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/20/96

REPORT DATE: 10/18/96

TEST PIT #16

Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0-2½	**SOIL:**	Clay, dark grayish brown, dry to slightly moist, firm and slightly porous
			2½-3½	**BEDROCK:**	Sandstone, orange brown to grayish white, soft, very weathered
4	21.1	92.5	3½-6		Siltstone and Shale, gray to orange brown, moderately hard, slightly weathered, thinly bedded Bedding: N70W; 54 NE @ 4½'

End at 6 Feet; No Water; No Caving; No Fill.

TEST PIT #17

Surface Conditions:

			0-3	**SOIL:**	Clay, black, dry to slightly moist, soft and very porous
			3-4½	**BEDROCK:**	Andesitic Breccia, orange brown to gray to light gray, moderately hard, very fractured and very weathered
			4½-6		Sandstone, light grayish white to light brown, moderately hard and very weathered
			6-7		Siltstone and Shale, dark gray to dark brown, hard, moderately weathered

End at 7 Feet; No Water; No Caving; No Fill. Contact Between Andesitic Breccia/Sandstone Is Approximately Eastwest And Dips Moderately To The North.

TEST PIT #18

Surface Conditions:

2	17.9	88.6	0-2½	**SOIL:**	Clay, dark grayish brown, dry, firm and slightly porous
			2½-7½	**BEDROCK:**	North side of test pit: Andesitic Breccia, dark reddish brown to gray brown, hard to very hard, fractured and weathered South side of test pit: Siltstone and Shale, gray to gray brown, moderately hard, very weathered, thinly bedded Bedding: N70W; 43 NE

End at 7½ Feet; No Water; No Caving; No Fill. Contact Between Andesitic Breccia/Siltstone And Shale: N85E; 70 NW

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: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/20/96

REPORT DATE: 10/18/96

TEST PIT #19

Surface Conditions:

SAMPLE DEPTH (feet)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	DEPTH INTERVAL (feet)	EARTH MATERIAL	LITHOLOGIC DESCRIPTION
			0-2	**SOIL:**	Clay, black, dry to slightly moist, slightly firm with rootlets
			2-8	**BEDROCK:**	North side of test pit: Siltstone and Shale, gray to grayish brown, moderately hard, very weathered South side of test pit: Andesitic Breccia, dark reddish brown to grayish brown, hard to very hard, fractured, slightly weathered

End at 7 Feet; No Water; No Caving; No Fill. Contact Between Andesitic

TEST PIT #17*Surface Conditions:*

0-3SOIL:Clay, black, dry to slightly moist, soft and very porous

3-4½BEDROCK:Andesitic Breccia, orange brown to gray to light gray, moderately hard, very fractured and very weathered

4½-6Sandstone, light grayish white to light brown, moderately hard and very weathered

6-7Siltstone and Shale, dark gray to dark brown, hard, moderately weathered

End at 7 Feet; No Water; No Caving; No Fill. Contact Between Andesitic Breccia/Sandstone Is Approximately Eastwest And Dips Moderately To The North.

TEST PIT #18Surface Conditions:

0-2½SOIL:

2½-7½BEDROCK:North side of test pit: Andesitic Breccia, dark reddish brown to gray brown, hard to very hard, fractured and weathered South side of test pit: Siltstone and Shale, gray to gray brown, moderately hard, very weathered, thinly bedded Bedding: N70W; 43 NE

End at 7½ Feet; No Water; No Caving; No Fill. Contact Between Andasetic Breccia/Siltstone And Shale: N85E; 70 NW

Breccia/Siltstone And Shale Is N85W; 65 SW

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 BORING 1

JB: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/15/96

REPORT DATE: 10/18/96

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				0	**SOIL:** Gravelly Sand, brown, dry, loose, with some Clay, rock fragments up to one inch
				1	**BEDROCK:** Basalt, dark brown to dark reddish brown, moderately hard to hard, moderately weathered
2	6/6"	23.2	98.7	2	
				3	
				4	
				5	hard - switched to 18" bucket
				6	
				7	
				8	
				9	
10	8/6"	19.5	100.9	10	
				11	very hard, coring
				12	
				12½	*End at 12½ Feet; No Water; No Caving; No Fill. Unable to continue due to hardness.*

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 BORING 2

JB: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/15/96

REPORT DATE: 10/18/96

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				0	**FILL:** Clay, light grayish brown, dry, slightly loose, Concrete fragments to one inch
				1	**COLLUVIUM:** Clay, dark reddish brown, moist, firm, porous
2	P	24.9	99.3	2	
				3	
				4	**BEDROCK:** Siltstone and Sandstone, light brown to gray brown, moist, stiff, very weathered
5	3	9.2	118.7	5	Sandstone, reddish brown to grayish brown, slightly moist, moderately hard, fine to medium grained
				6	
				7	
				7½	Siltstone, Sandstone and Claystone, light brown, gray to grayish brown, reddish brown, moist, moderately hard
				8	
				9	
10	4	26.1	98.6	10	Bedding: N65W; 45NE
				11	
				11½	Bedding: N70W; 48NE
				12	
				13	
				14	
15	5	26.6	102.2	15	*End at 15 Feet; No Water; No Caving; Fill to One Foot.*

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 BORING 3

JB: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/15/96

REPORT DATE: 10/18/96

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				0	**COLLUVIUM:** Gravelly Clay, black, dry, slightly loose, Rock fragments up to 4 inches
				1	
2	3	NR	NR	2	Rock fragments up to 8 inches
				3	Clay, dark brown, moist, stiff
				4	
				4½	dark brown with white stringers
5	1	24.3	100.3	5	
				6	
				7	
				7½	**BEDROCK:** Siltstone and Claystone, gray to gray brown to brown, moist, stiff, very weathered
				8	
				9	
10	3	31.4	91.3	10	less weathered, some Gypsum Bedding: N67W; 50 NE
				11	
				12	
				13	
				14	
15	3	30.4	92.2	15	
				16	
				17	
				18	
				19	
				20	*End at 20 Feet; No Water; No Caving; No Fill.*

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 BORING 4

JB: 16979-Z CLIENT: MSG ENTERPRISES

GEOLOGIST: JET DATE LOGGED: 8/15/96

REPORT DATE: 10/18/96

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				0	**BEDROCK:** Andesitic Breccia, dark brown, brown, and light gray brown, dry, hard to very hard, slightly weathered
				1	
2	8/4"	NR	NR	2	No Recovery of Sample
				3	very hard, coring required
				4	
				5	*End at 5 Feet; No Water; No Caving; No Fill. Stopped due to extremely hard rock.*

G:\FINAL\LOGS\16979-Z.BOR

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

TEMPORARY STABILITY ANALYSIS
JB 16979-Z MSG ENTERPRISES

CALCULATE THE MAXIMUM ALLOWABLE HEIGHT OF TEMPORARY VERTICAL EXCAVATIONS IN TOPANGA FORMATION WITH A 27 DEGREE BACKSLOPE. ASSUME THE TOPANGA FORMATION IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE.

TOPANGA FORMATION PROPERTIES (Saturated)

COHESION	610 psf	STABLE EXCAVATION HT.	11 feet
PHI ANGLE	31 degrees	BACKSLOPE ANGLE	27 degrees
DENSITY	117.9 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 = 406.66 psf
Phid = atan(tan(Phi)/FS) = 21.82 degrees

779 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 20 FEET AT AN INTERVAL OF 1 FEET.

THE HORIZONTAL UPSLOPE DISTANCE TO THE TENSION CRACK WHICH RESULTS IN HIGHEST HORIZONTAL THRUST ON THE TEMPORARY VERTICAL EXCAVATION IS 2 FEET. THE TOTAL EXTERNAL SURCHARGE ON THE FAILURE WEDGE IS 0 POUNDS.

CRITICAL FAILURE ANGLE (degrees)	AREA OF FAILURE WEDGE (sq. ft.)	TENSION CRACK DEPTH (feet)	MAXIMUM HORIZONTAL THRUST (pounds)	EQUIVALENT FLUID PRESSURE (pcf)
53.00	20.36	9.36	-13.82	-0.23

CONCLUSIONS:

THE CALCULATION INDICATES THAT TEMPORARY VERTICAL EXCAVATIONS UP TO 11 FEET HIGH EXPOSING TOPANGA FORMATION WITH A 27 DEGREE BACKSLOPE WILL HAVE A NEGATIVE THRUST AND ARE, THEREFORE, TEMPORARILY STABLE.

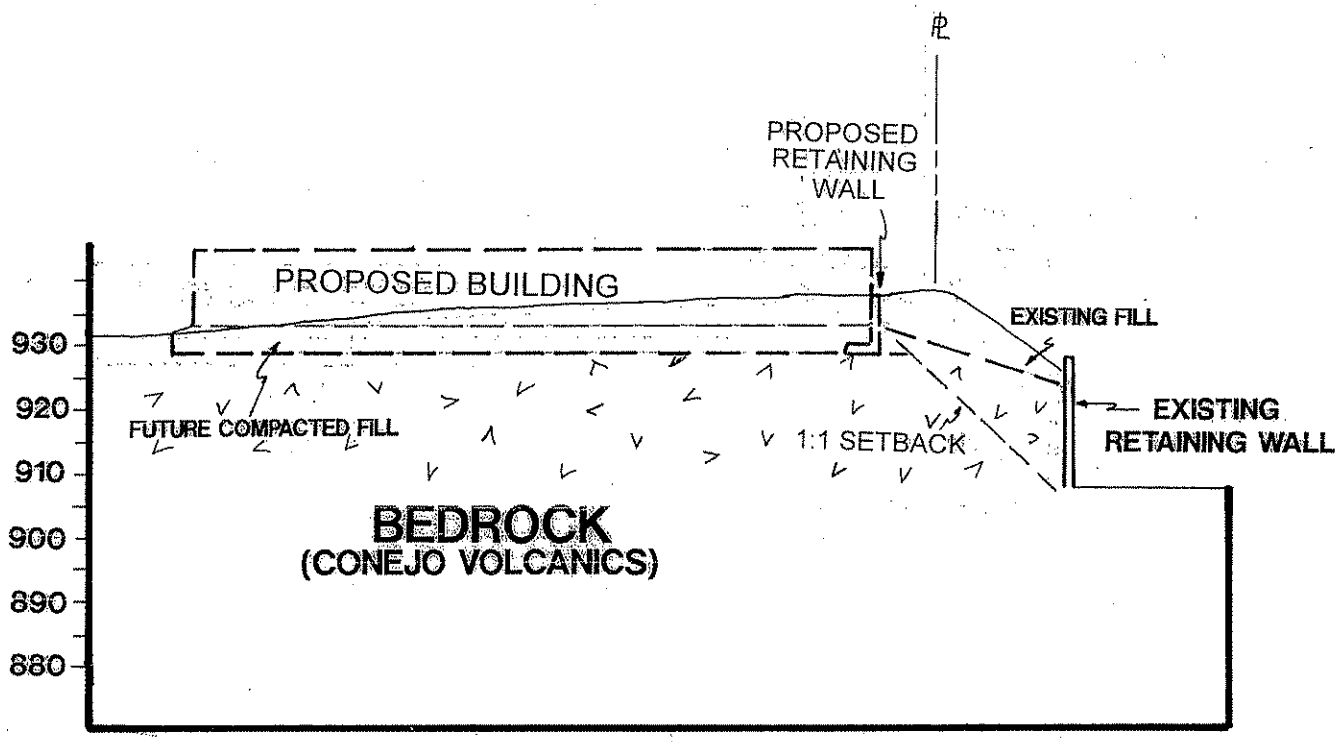
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
61 E. CHEVY CHASE DRIVE SUITE 200, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SECTION G

JB 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ SCALE: 1"=30'

AUGUST 13, 2004
AUGUST 19, 2004



SECTION G-G

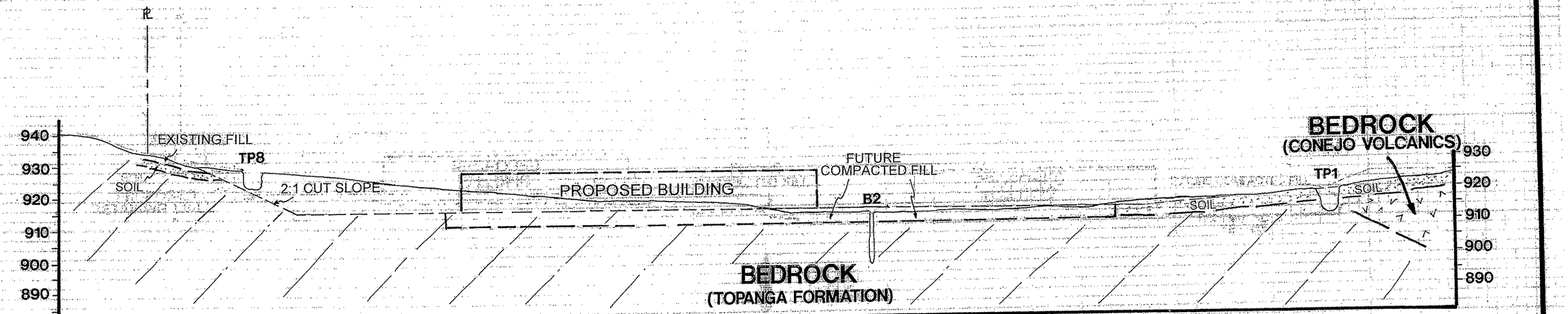
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE SUITE 200, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SECTION A

JB 19884 - Z KOMAR INVESTMENTS

CONSULTANT: RIZ SCALE: 1" = 30'

AUGUST 13, 2004
AUGUST 19, 2004



SECTION A-A

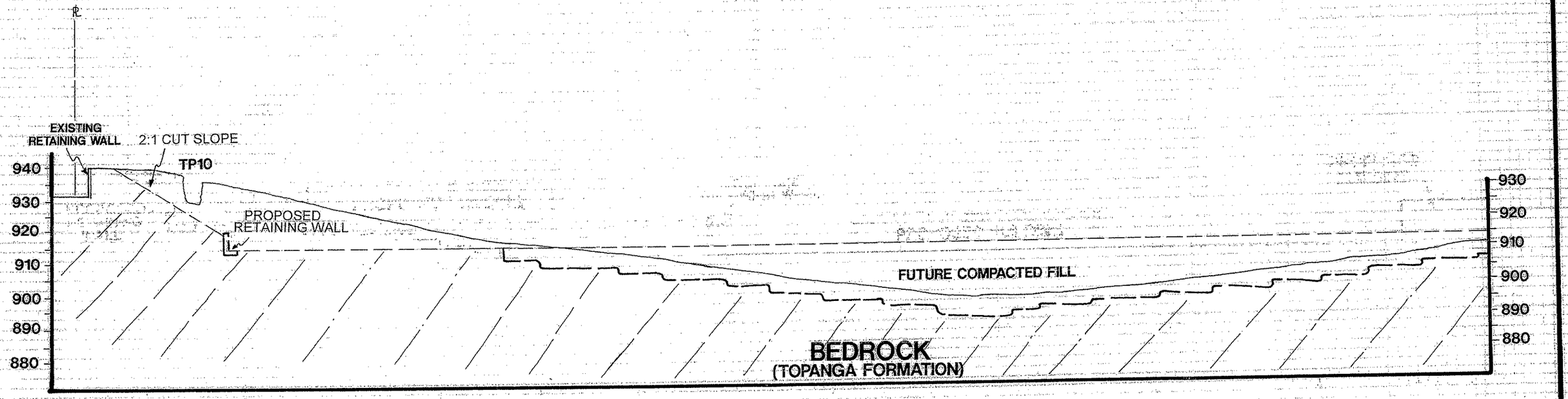
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE SUITE 200, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SECTION B

JB 19884-Z - KOMAR INVESTMENTS

CONSULTANT: RIZ SCALE: 1" = 30'

AUGUST 13, 2004
AUGUST 19, 2004



SECTION B-B

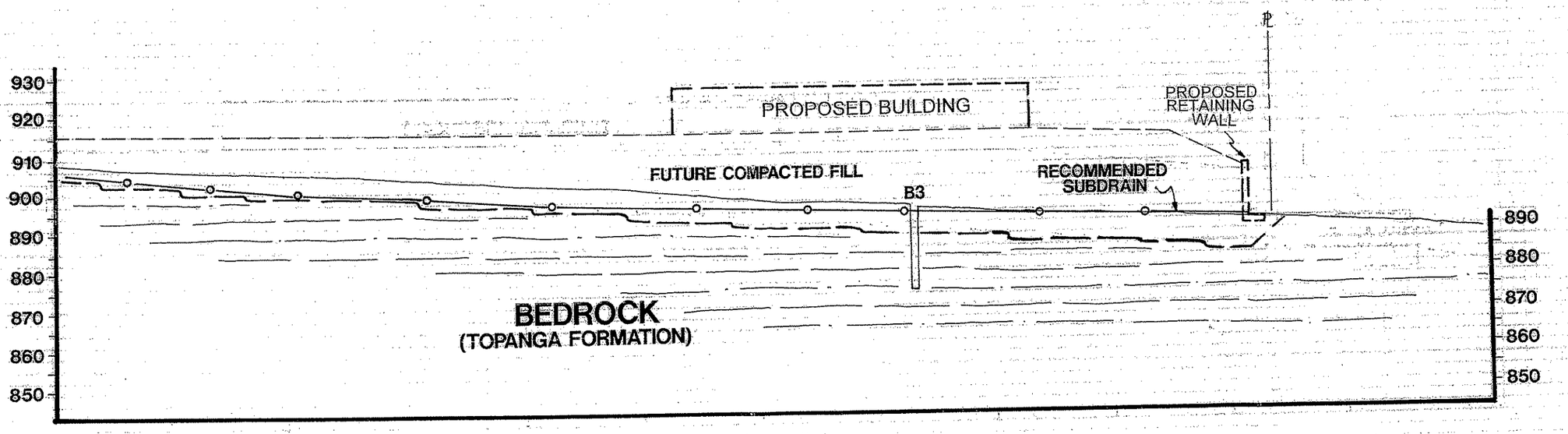
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE SUITE 200, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SECTION C

JB 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ SCALE: 1" = 30'

AUGUST 13, 2004
AUGUST 19, 2004



SECTION C-C

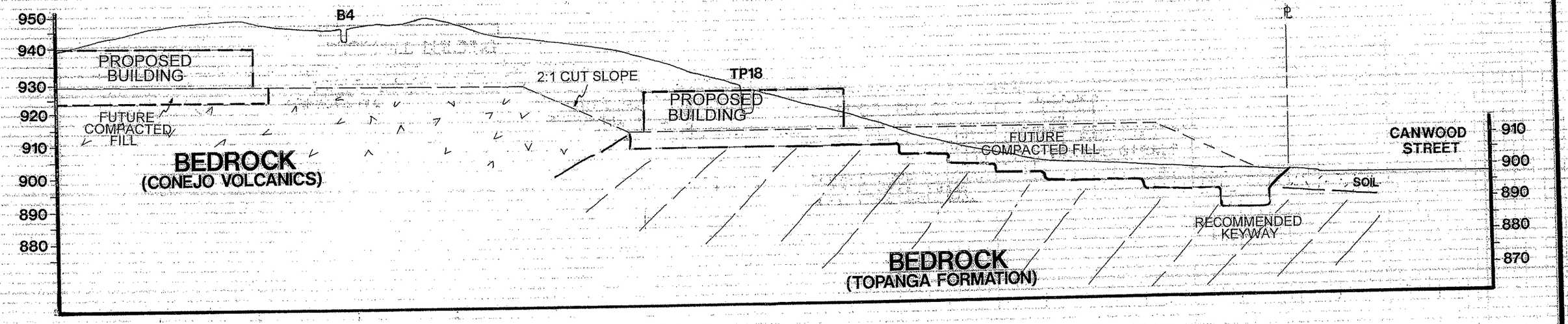
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE SUITE 200, GLENDALE, CA 91206
818•549•9959 Tel. 818•543•3747 Fax

SECTION D

JB 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ SCALE: 1" = 30'

AUGUST 13, 2004
AUGUST 19, 2004



SECTION D-D

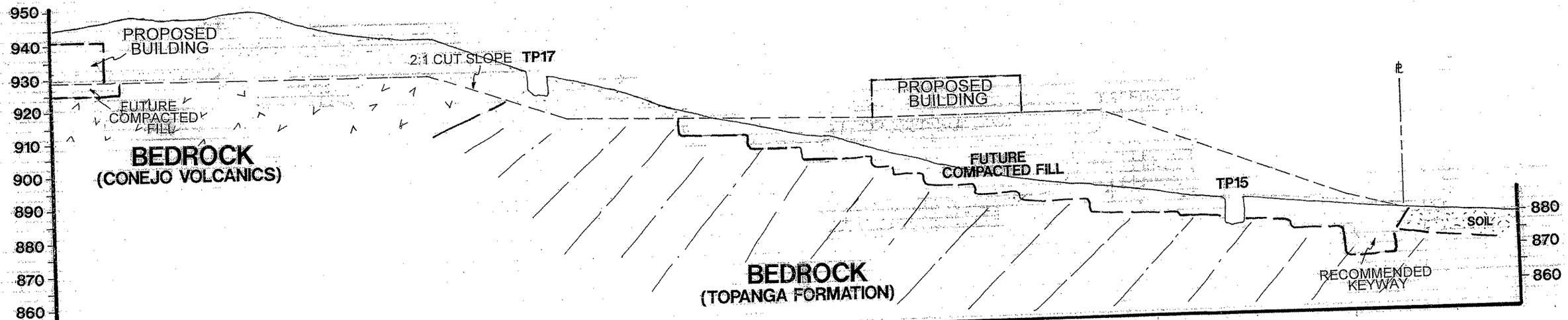
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE SUITE 200, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SECTION E

JB 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ SCALE: 1" = 30'

AUGUST 13, 2004
AUGUST 19, 2004



SECTION E-E

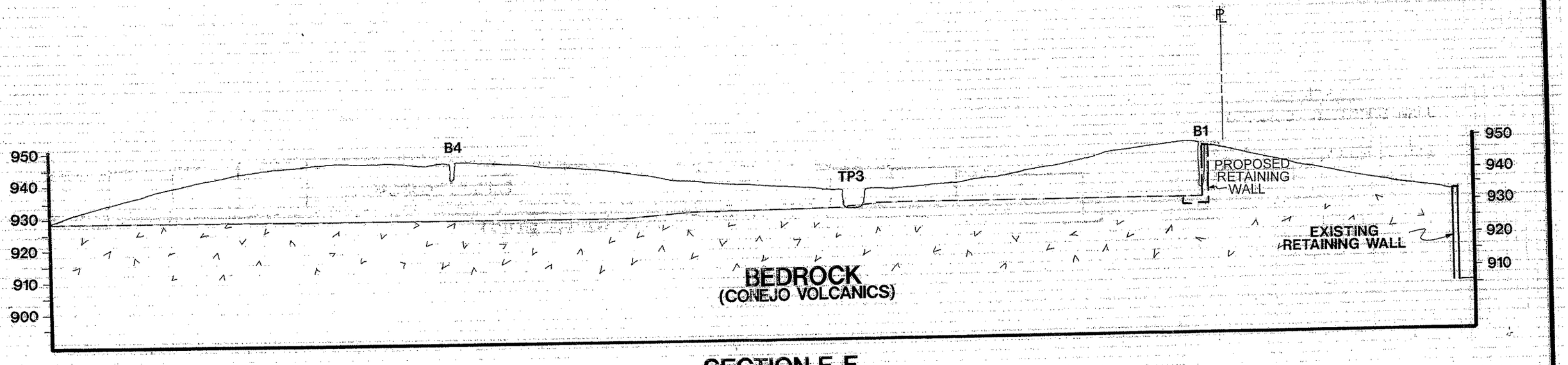
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE SUITE 200, GLENDALE, CA 91206
818•549•9959 Tel 818•543•3747 Fax

SECTION F

JB 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ SCALE: 1" = 30'

AUGUST 13, 2004
AUGUST 19, 2004



SECTION F-F

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
"Trust the Name You Know"

July 12, 2006
JB 19884-Z

Komar Investments, LLC
5581 Daniels Street, Unit A
Chino, California 91710

Attention: Zaven Hanessian

Subject

Addendum Geologic and Soils Engineering Exploration Update
Proposed Commercial Development
Parcel Map 65503
28000 Canwood Street
Agoura Hills, California

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

Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, dated August 12, 2004;

Additional Comments, Proposed Commercial Development, dated October 21, 2004; and

Rippability Study, Proposed Commercial Development, dated August 1, 2005.

City of Agoura Hills - Geotechnical Review Sheet:

By GeoDynamics, Inc., dated March 30, 2006.

Dear Mr. Hanessian:

As requested, The J. Byer Group has prepared this Addendum Geologic and Soils Engineering Exploration Update to provide the information requested in the March 30, 2006, review letter. To assist in preparing this update, the previous geologic data was transferred to the current grading plan

from Westland Civil, Inc. Also, the geologic cross Sections A through F have been updated. The information requested is stated below, followed by our response.

PLANNING/FEASIBILITY COMMENTS

1. *The latest geotechnical update report is over one year old. The consultant should provide a geotechnical update letter/report. Any changes in the geotechnical conditions and/or the proposed development at the site should be discussed. Additional recommendations should be provided as necessary. (**Note:** the grading plan submitted to the City appears to significantly differ from the grading plan used as a base map to the geotechnical map).*

Response: This report is intended as the update. The geotechnical conditions on the site remain the same. The grading and development plan for the site has been revised since preparation of the referenced August 19, 2004, report. The Preliminary Site Grading Plan by Westland Civil, Inc., dated December 14, 2005, was used as the base for this Update Report. The Geologic Map and cross sections have been revised to reflect the current grading plan. The recommendations contained in the referenced reports and not superceded by this Update Report remain valid and applicable.

2. *The consultant recommends in the rippability report (BGI 2005) that "Cut slopes may be created as steep as 1½:1." Manufactured slopes steeper than 2:1 gradient exceed the City's requirements for slope gradient. Any slope steeper than 2:1 gradient should be evaluated for gross (static and seismic) and surficial stability using site specific data. Stringent slope maintenance recommendations should also be provided.*

Response: The current plan proposed no slopes steeper than 2:1 in gradient.

3. *The consultant recommends on page 15 of the August 19, 2004 report that "Cantilevered retaining walls up to 15 feet high may be designed for an equivalent fluid pressure of 62 pounds per cubic foot, which is the at-rest earth pressure of the earth materials to be retained." The consultant should clarify the following comments regarding the above quoted statement.*

- *Is the recommended value of 62 pcf the active earth pressure (cantilevered retaining wall) or the at-rest earth pressure?*

- *The consultant should specify the type of backfill materials to be used for backfilling behind retaining walls. On-site materials are highly expansive. If used for backfilling behind retaining walls, the type of backfill materials should be considered in determining the earth pressure on retaining walls (e.g.: Navy Manual NAVAC or Soil Mechanics in Engineering Practice by Karl Terzaghi and Ralph Peck).*

- *Grading plans and cross-sections show that some of the retaining walls have a sloping backfill behind. The consultant should clarify if the recommended earth pressure is for level backfill or for sloping backfill.*

Response: Retaining walls with a sloping backfill condition will occur in the southeast and northeast portions of the site, as shown on Sections C and D. The 62 pcf design recommendation is the at-rest earth pressure of the soil. This value is recommended due to the highly expansive nature of the on-site soil, which may be used for backfill. The 62 pcf design assumes a backslope of level to no steeper than 2:1 in gradient.

4. *The grading plan depicts a closely located stack of retaining walls and retaining walls close to buildings. The consultant should evaluate the potential for lateral surcharge on retaining walls due to closely located foundations/structures. The 1:1 criterion is not acceptable unless substantiated with analyses and references (. (e.g.: 1-Spangler & Handy (1982), Soil Engineering, fourth Edition, Harper & Row, New York. 2- Navy Design Manual NAVFAC DM-7.2, Figure 18).*

Response: The stacked wall conditions are limited to the front of the property to accommodate a handicapped ramp. It is recommended that foundations for buildings and retaining walls be founded below a 2:1 plane projected up from the bottom of the lowest retaining wall (see Section D).

5. *The fill slope proposed at the northeast corner of property appears to toe out against an existing offsite fill. The consultant should address any specific recommendations appropriate for grading in this area.*

Response: The fill slope that toes on the offsite property to the northeast should be keyed into bedrock to conform to the grading recommendations in this and the referenced reports. All fill and soil shall be removed to bedrock, prior to placing fill. Subdrains are recommended for the back of keyways and in any canyons.

6. *The consultant recommends a three-foot cap of compacted fill on the cut part of the building pad. The cut part of the building pad is likely to be underlain by highly to critically expansive bedrock and areas where non-expansive bedrock (Conejo Volcanics) lies immediately adjacent to highly expansive bedrock (certain horizons in the Topanga Formation). The consultant should discuss whether a three foot cap of compacted fill is adequate to mitigate hazards associated with these conditions.*

Response: The cut portions of the pads for Buildings 1, 2, 5, and 6 should be over-excavated to a minimum depth of five feet below the bottom of the footings. The portion of cut pads not occupied by future buildings may be undercut three feet below finished grade.

7. *The City of Agoura Hills has special setback requirements. The grading plans and sections indicate that the proposed setback may not meet the city's requirements. The consultant should discuss and provide geotechnical recommendations for foundations to slope setback, and substantiate with sections and analyses as necessary, any deviation from the City requirements for setback.*

Response: The City of Agoura Hills requires that buildings be set back from the toe of slopes a distance equal to one-half the vertical height of the slope above the top foundation with a minimum clearance of five feet and a maximum clearance of forty feet. Also, footings adjacent to descending slope surfaces shall be set back a distance of one-half the vertical height of the slope with a minimum of five feet and a maximum of forty feet. The current grading plan complies with these requirements.

8. *On the signature page of the August 1, 2005 report is signed by Robert I. Zweigler and stamped by the stamp of Jon A. Irvine. The consultant should reconcile this discrepancy.*

Response: The signature on the above mentioned report is a copy of Jon A. Irvine's. He signed the report for Robert I. Zweigler. Jon A. Irvine is both a Certified Engineering Geologist (E. G. 1691) and a Registered Civil Engineer (R. C. E. 55005).

REPORT REVIEW COMMENTS

1. *Considering the highly to critically high expansive nature of on-site materials, the consultant should discuss and substantiate the adequacy of the recommended values for footings depth and width.*

Response: The future buildings will be founded in compacted fill. The footings in compacted fill will be a minimum of 24 inches below grade. The compacted fill should be placed at a moisture content at least three percent above the optimum moisture content. It is recommended that the moisture content of the fill be checked prior to pouring concrete into the footing excavations. If the moisture content is not at least three percent over the optimum moisture content, the footing excavations should be soaked. The moisture content of the fill may then be rechecked to verify that it is at least three percent over the optimum moisture content to depth of 18 inches below the bottom of the footings.

2. *Considering the highly to critically high expansive nature of on-site materials, the consultant should discuss and substantiate the adequacy of the recommended thickness of sand underneath slabs-on-grade.*

Response: It is recommended that the polyethylene plastic vapor barrier be placed between two, two to three-inch thick layers of sand.

3. *Considering the highly to critically high expansive nature of on-site materials, the consultant should discuss the need for deepened edges at the end of slabs-on-grade to reduce the potential for moisture fluctuation underneath the slabs.*

Response: The slabs-on-grade for the building interiors should be surrounded by continuous footings, a minimum of 24 inches below grade. The edge of exterior concrete decking and walkways should be thickened to a minimum of six inches below grade.

4. *The consultant provides geotechnical recommendations for the degree of compaction of fill materials at the site. Considering the expansive nature of some of the on-site materials, the consultant should discuss the need to moisture condition fill materials above the optimum moisture content.*

Response: It is recommended that the future compacted fill be placed at a moisture content at least three percent above the optimum moisture.

5. *The consultant should evaluate the potential for differential settlement of buildings that would be underlain by differential fill thickness. Mitigation measures should be recommended as necessary.*

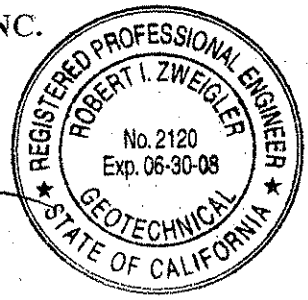
Response: The current grading plan shows Buildings 1, 2, 5, and 6 will transition from cut to deeper fill areas. To reduce the potential for differential settlement, it is recommended the cut portions of these building pads be undercut a minimum of five feet below the bottom of the future footings.

6. *The consultant should discuss the reasons for recommending a sump for collecting backdrain water from behind retaining walls.*

Response: It is recommended that all retaining wall subdrains daylight to the atmosphere. Following review of the current grading plan, it appears that this is achievable by gravity flow and pumping will not be necessary.

Should you have any questions, please call on the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.



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

JET:RIZ:flh
S:\FINAL\ADDENDUM\19884_Komar_Investments_Addendum_Geologic_Update.wpd

Enc: City of Agoura Hills - Geotechnical Review Sheet, dated March 30, 2006 (3 Pages)
Sections A - F (6 Sheets)

In Pocket: Geologic Map

xc: (2) Addressee (Fax and Mail)
(4) Westland Civil, Inc. (Fax and Mail)

Date: March 30, 2006
GDI #: 06.00103.0043

CITY OF AGOURA HILLS
2006 APR -7 PM 3:01
CITY CLERK

CITY OF AGOURA HILLS - GEOTECHNICAL REVIEW SHEET

To:	Sally Schneider
Project Location:	PM 65503, Agoura Hills, California.
Planning Case #:	06-CUP-003/06-OTP-005
Building & Safety #:	None
Geotechnical Report:	The J. Byer Group, Inc. (2005), "Rippability Study, Proposed Commercial Development, Lot 37 and 38, LS 15-8-9, 28000 Canwood Street, Agoura Hills, California," JB 19884-Z, dated August 1, 2005. The J. Byer Group, Inc. (2004), "Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Portions of Lot "H" of The Partition of The Rancho Las Virgenes, Across From 28720 Canwood Street, Agoura Hills, California," JB 19884-Z, dated August 19, 2004. The J. Byer Group, Inc. (1996), "Geologic and Soils Engineering Exploration, Proposed Commercial Development, Portions of Lot "H" of The Partition of The Rancho Las Virgenes, East of 29001 Canwood Street, Agoura Hills, California,," JB 19884-Z, dated October 18, 1996.
Plans:	Westalnd Civil, inc. (2005b), "Preliminary Grading Sections, Agoura hills Business Park, 28000 Canwood St., Agoura Hills, California 91301," Scale: 1"=5', dated December 8, 2005. Westalnd Civil, inc. (2005a), "Preliminary Site/Grading Plan, Agoura hills Business Park, 28000 Canwood St., Agoura Hills, California 91301," Scale: 1"=20', dated November 21, 2005.
Previous Reviews:	None

FINDINGS

Planning/Feasibility Issues

☐ Acceptable as Presented

☒ Response Required

Geotechnical Report

☐ Acceptable as Presented

☒ Response Required

REMARKS

The J. Byer Group, Inc. (BGI; consultant) prepared the above referenced reports for the proposed commercial development at Tentative Parcel Map 65503, Agoura Hills, California. The proposed development includes construction of eight commercial buildings, an access road and parking areas, retaining walls up to 13.5 ft high, and manufactured fill and cut slopes at 2(h):1(v) gradients up to heights of 25 and 30 feet respectively.

The City of Agoura Hills – Planning Department reviewed the referenced report from a geotechnical perspective for compliance with applicable codes, guidelines, and standards of practice. GeoDynamics, Inc. (GDI) performed the geotechnical review on behalf of the City.

Based upon a review of the submitted reports and plans, the consultant should adequately respond to the following comments prior to consideration by the Planning Commission of approval of Case Nos. 06-CUP-003/06-OTP-005. The Consultant should respond to the following Report Review Comments prior to Building Plan Approval. Plan-Check comments should be addressed in Building & Safety Plan Check, and a separate geotechnical submittal is not required for plan-check comments.

Planning/Feasibility Comments

1. The latest geotechnical update report is over one year old. The consultant should provide a geotechnical update letter/report. Any changes in the geotechnical conditions and/or the proposed development at the site should be discussed. Additional recommendations should be provided as necessary. (**Note**: the grading plan submitted to the City appears to significantly differ from the grading plan used as a base map to the geotechnical map).

2. The consultant recommends in the rippability report (BGI 2005) that "Cut slopes may be created as steep as 1½:1." Manufactured slopes steeper than 2:1 gradient exceed the City's requirements for slope gradient. Any slope steeper than 2:1 gradient should be evaluated for gross (static and seismic) and surficial stability using site specific data. Stringent slope maintenance recommendations should also be provided.

3. The consultant recommends on page 15 of the August 19, 2004 report that "Cantilevered retaining walls up to 15 feet high may be designed for an equivalent fluid pressure of 62 pounds per cubic foot, which is the at-rest earth pressure of the earth materials to be retained." The consultant should clarify the following comments regarding the above quoted statement:

   - Is the recommended value of 62 pcf the active earth pressure (cantilevered retaining wall) or the at-rest earth pressure?
   - The consultant should specify the type of backfill materials to be used for backfilling behind retaining walls. On-site materials are highly expansive. If used for backfilling behind retaining walls, the type of backfill materials should be considered in determining the earth pressure on retaining walls (e.g.: Navy Manual NAVAC or Soil Mechanics in Engineering Practice by Karl Terzaghi and Ralph Peck).
   - Grading plans and cross-sections show that some of the retaining walls have a sloping backfill behind. The consultant should clarify if the recommended earth pressure value is for level backfill or for sloping backfill.

4. The grading plan depicts a closely located stack of retaining walls and retaining walls close to buildings. The consultant should evaluate the potential for lateral surcharge on retaining walls due to closely located foundations/structures. The 1:1 criterion is not acceptable unless substantiated with analyses and references (. (e.g.: 1- Spangler & Handy (1982), Soil Engineering, fourth Edition, Harper & Row, New York. 2- Navy Design Manual NAVFAC DM-7.2, Figure 18).

5. The fill slope proposed at the northeast corner of property appears to toe out against an existing offsite fill. The consultant should address any specific recommendations appropriate for grading in this area.

6. The consultant recommends a three-foot cap of compacted fill on the cut part of the building pad. The cut part of the building pad is likely to be underlain by highly to critically expansive bedrock and areas where non-expansive bedrock (Conejo Volcanics) lies immediately adjacent to highly expansive bedrock (certain horizons in the Topanga Formation). The consultant should discuss whether a three foot cap of compacted fill is adequate to mitigate hazards associated with these conditions.

7. The City of Agoura Hills has special setback requirements. The grading plans and sections indicate that the proposed setback may not meet the city's requirements. The consultant should discuss and provide geotechnical recommendations for foundations to slope setback, and substantiate with sections and analyses as necessary, any deviation from the City requirements for setback.

8. On the signature page of the August 1, 2005 report is signed by Robert I. Zweigler and stamped by the stamp of Jon A. Irvine. The consultant should reconcile this discrepancy.

Report Review Comments

1. Considering the highly to critically high expansive nature of on-site materials, the consultant should discuss and substantiate the adequacy of the recommended values for footings depth and width.

2. Considering the highly to critically high expansive nature of on-site materials, the consultant should discuss and substantiate the adequacy of the recommended thickness of sand underneath slabs-on-grade

3. Considering the highly to critically high expansive nature of on-site materials, the consultant should discuss the need for deepened edges at the end of slabs-on-grade to reduce the potential for moisture fluctuation underneath the slabs.

4. The consultant provides geotechnical recommendations for the degree of compaction of fill materials at the site. Considering the expansive nature of some of the on-site materials, the consultant should discuss the need to moisture condition fill materials above the optimum moisture content.

5. The consultant should evaluate the potential for differential settlement of buildings that would be underlain by differential fill thickness. Mitigation measures should be recommended as necessary.

6. The consultant should discuss the reasons for recommending a sump for collecting backdrain water from behind retaining walls.

Plan-Check Comments

1. The name, address, and phone number of the Consultant and a list of all the applicable geotechnical reports shall be included on the building/grading plans.

2. The grading plan should include the limits and depths of overexcavation of the building pad and flatwork areas as recommended by the Consultant.

3. The following note must appear on the grading and foundation plans: "*Tests shall be performed prior to pouring footings and slabs to determine the expansion index of the supporting soils, and foundation and slab plans should be reviewed by the Geotechnical Consultant and revised, if necessary, accordingly.*"

4. The following note must appear on the grading and foundation plans: "*All cut-slopes should be mapped during grading. Stabilization measures should be applied where future cuts expose adversely oriented joint surfaces or intersections of joint surfaces.*"

5. The following note must appear on the grading and foundation plans: "*Excavations shall be made in compliance with CAL/OSHA Regulations.*"

6. The following note must appear on the foundation plans: "*All foundation excavations must be observed and approved, in writing, by the Project Geotechnical Consultant prior to placement of reinforcing steel.*"

7. Foundation plans and foundation details shall clearly depict the embedment material and minimum depth of embedment for the foundations.

8. Drainage plans depicting all surface and subsurface non-erosive drainage devices, flow lines, and catch basins shall be included on the building plans.

9. Final grading, drainage, and foundation plans shall be reviewed, signed, and wet stamped by the consultant.

10. Provide a note on the grading and foundation plans that states: "*An as-built report shall be submitted to the City for review. This report prepared by the Geotechnical Consultant must include the results of all compaction tests as well as a map depicting the limits of fill, locations of all density tests, outline and elevations of all removal bottoms, keyway locations and bottom elevations, locations of all subdrains and flow line elevations, and location and elevation of all retaining wall backdrains and outlets. Geologic conditions exposed during grading must be depicted on an as-built geologic map.*"

If you have any questions regarding this review letter, please contact GDI at (805) 496-1222.

Respectfully Submitted,

GeoDynamics, INC.

Ali Abdel-Haq
Geotechnical Engineering Reviewer
GE 2308 (exp. 12/31/07)

Christopher J. Sexton
Engineering Geologic Reviewer
CEG 1441 (exp. 11/30/06)

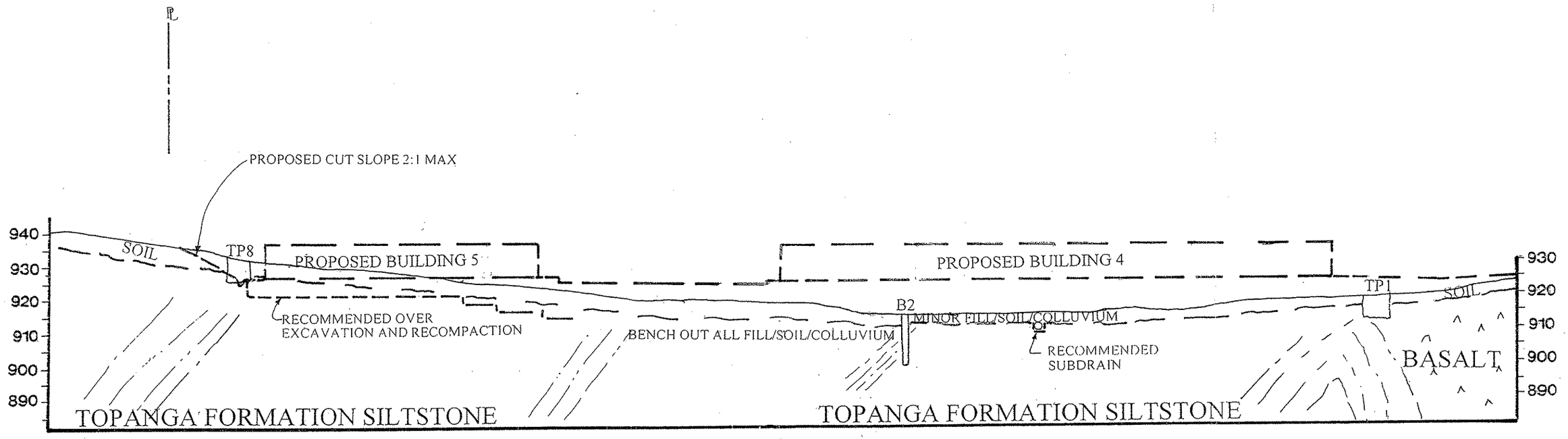
JULY 12, 2006

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

SECTION A

JB 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ SCALE: 1" = 30'



SECTION A-A

JULY 12, 2006

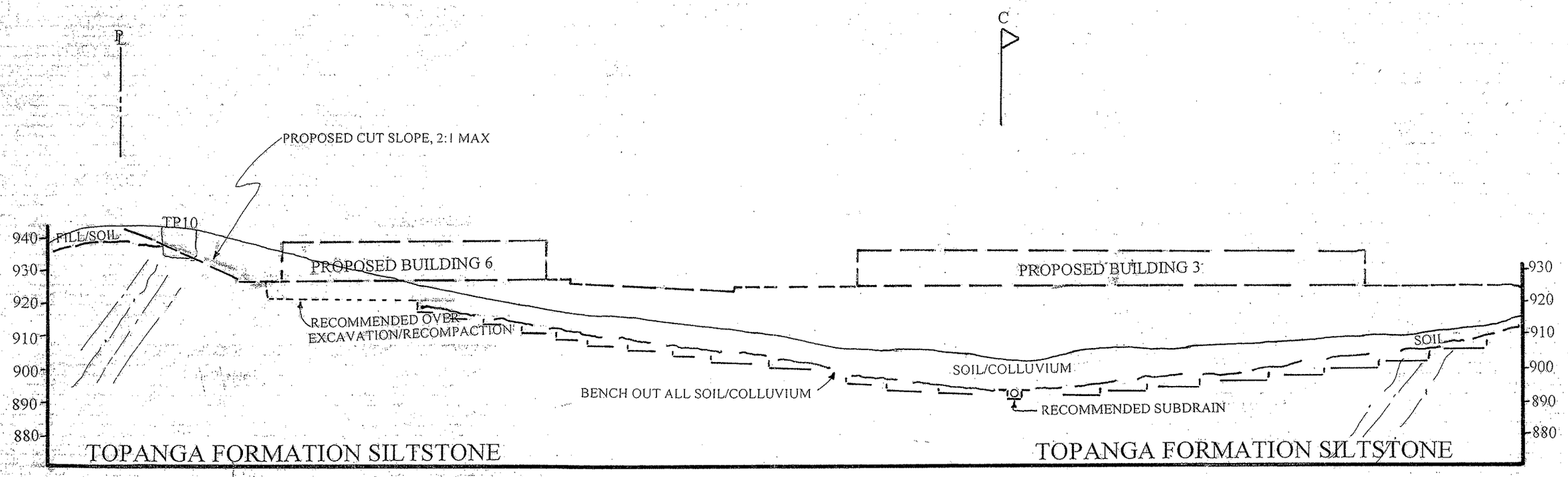
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206
(818) 549-9959 Tel • (818) 543-3747 Fax

SECTION B

JB: 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ

SCALE: 1"=30'



SECTION B-B

JULY 12, 2006

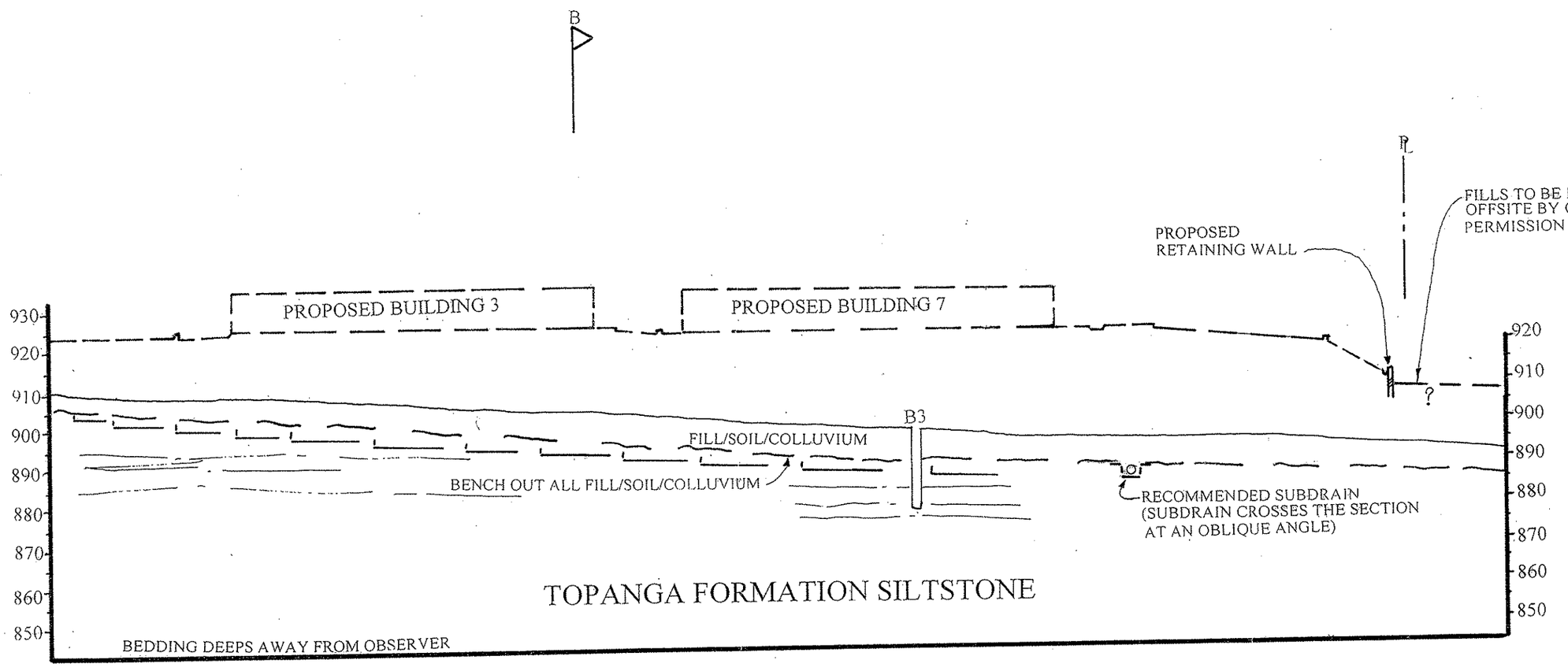
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206
(818) 549-9959 Tel • (818) 543-3747 Fax

SECTION C

JB: 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ

SCALE: 1"=30'



SECTION C-C

JULY 12, 2006

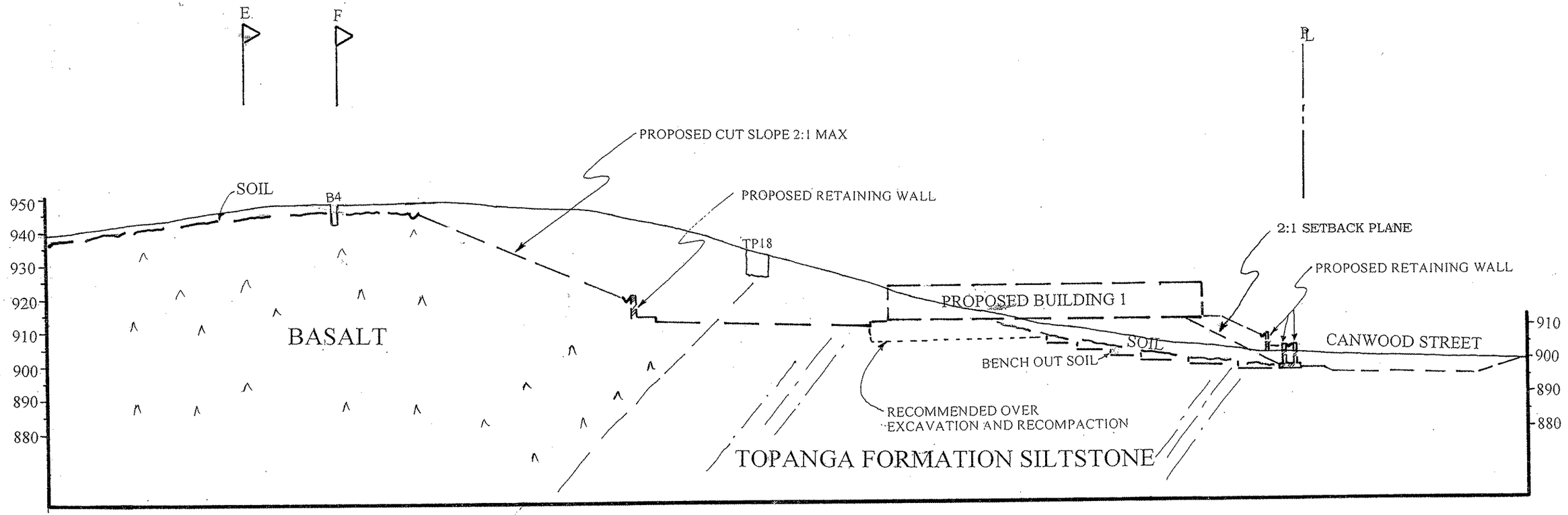
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206
(818) 549-9959 Tel • (818) 543-3747 Fax

SECTION D

JB: 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ

SCALE: 1"=30'



SECTION D-D

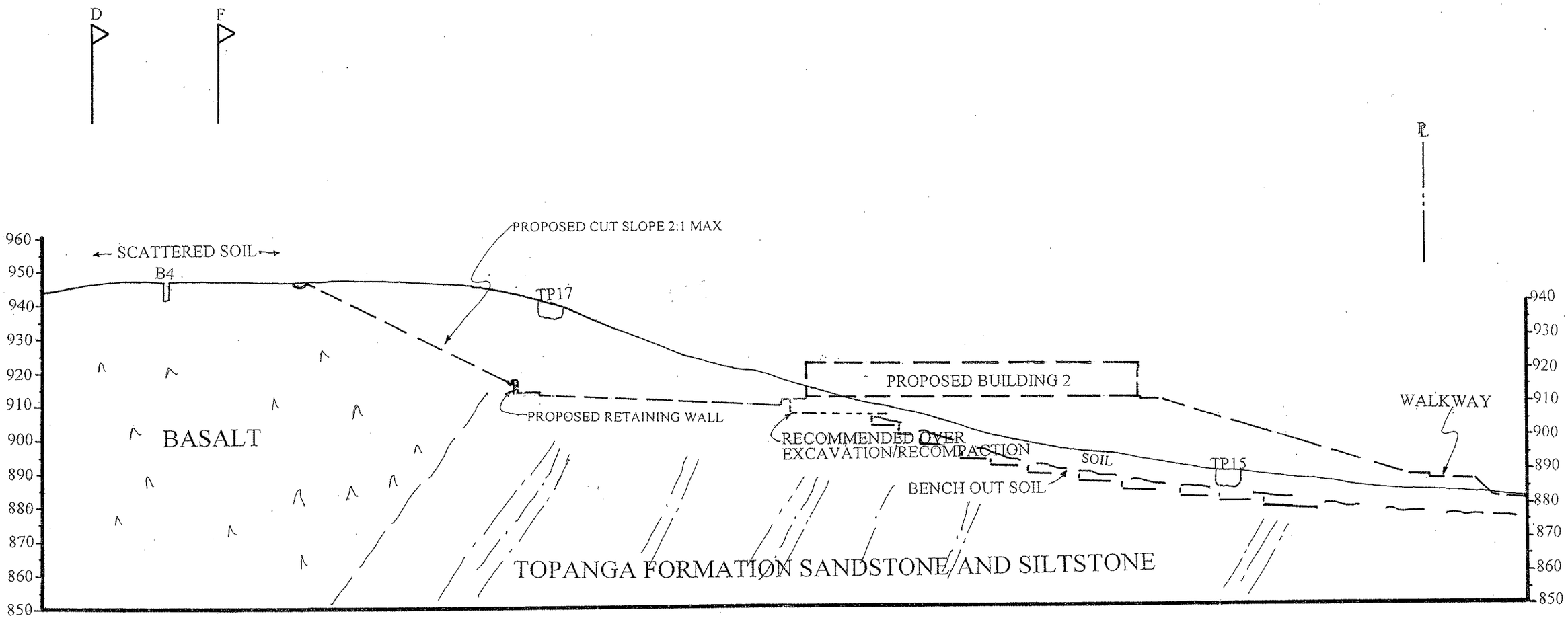
JULY 12, 2006

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

SECTION E

JB: 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ | SCALE: 1"=30'



SECTION E-E

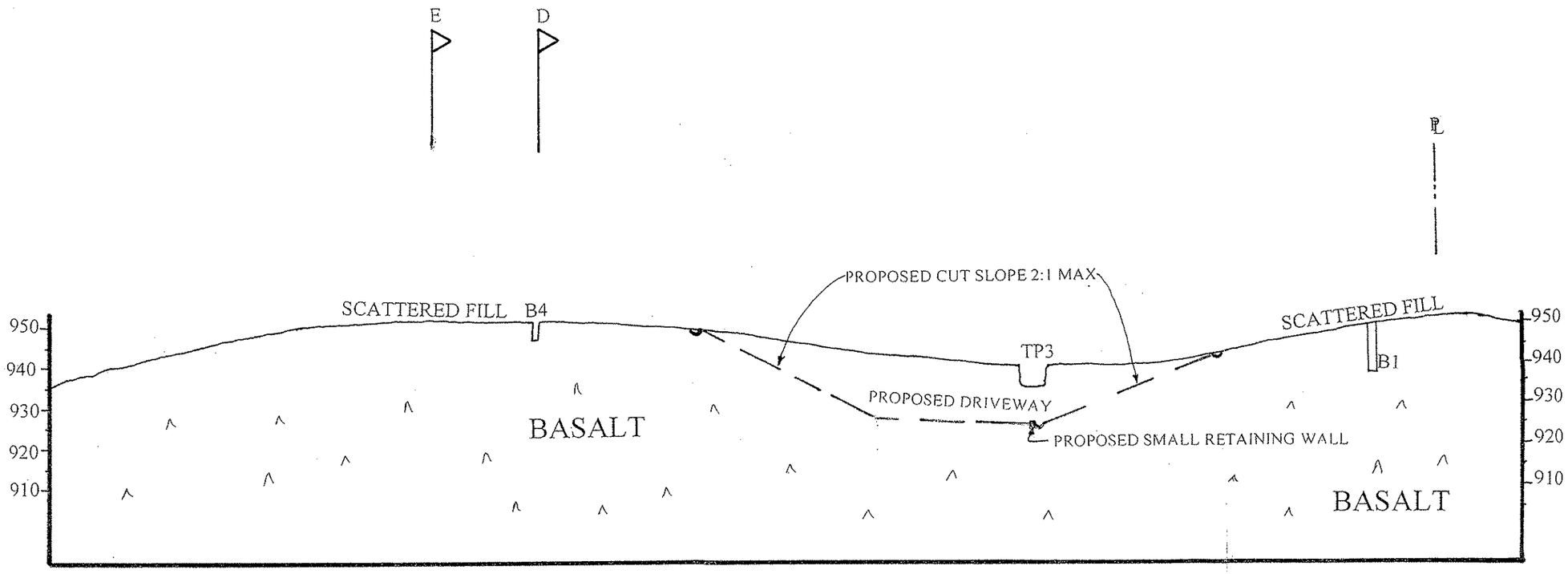
JULY 12, 2006

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

SECTION F

JB: 19884-Z KOMAR INVESTMENTS

CONSULTANT: RIZ | SCALE: 1"=30'



SECTION F-F

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
"Trust the Name You Know"

March 1, 2007
JB 19884-Z

Komar Investments, LLC
5581 Daniels Street, Unit A
Chino, California 91710

Attention: Zaven Hanessian

Subject

Addendum Geologic and Soils Engineering Exploration Update
Proposed Commercial Development
Parcel Map 65503
28000 Canwood Street
Agoura Hills, California

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

Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California, dated August 19, 2004;

Additional Comments, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California, dated October 21, 2004;

Rippability Study, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California, dated August 1, 2005;

Addendum Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California, dated July 12, 2006; and

Addendum Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California, dated September 29, 2006.

Response by City of Agoura Hills:

Geotechnical Review Sheet by GeoDynamics, Inc., dated August 8, 2006.

Gentlepersons:

The J. Byer Group, Inc., has prepared these additional comments to provide the information requested in item 2 of the Environmental Review section of the February 2, 2007, City of Agoura Hills, Conditional Use Permit Approval Status letter. The Environmental Review specifications request information from The J. Byer Group, Inc., concerning the effects of "landslide, soil erosion, lateral spreading, subsidence, and expansive soils" on the project.

Topography on the subject property consists of an east-west trending ridge, with an east draining canyon to the north. Specifically, on the site, a 2:1 to 10:1 slope ascends from Canwood Street to the ridge. Two knobs on the ridge in the central and western portions of the site are separated by a saddle. The knobs are 50 to 70 feet above Canwood Street. North of the ridge, the slope descends 35 to 55 feet at gradients ranging from 3:1 to 5:1 to the east-trending, broad, drainage course. The drainage extends offsite, to the east and the south, to Canwood Street. A slope ascends to the north of the drainage course at a 4:1 to flatter than 10:1 gradient, 15 to 50 feet, to the northern property line and a row of offsite, single-family residences. Proposed slopes to create the project included creating compacted fill slopes at a 2:1 gradient up to 25 feet high, and 2:1 cut slopes up to 15 feet high. Since the existing and proposed slopes are no steeper than 2:1, the proposed project is considered to be grossly, seismically, and surficial stable.

Concerning soil erosion, future graded slopes are to be landscaped. Also, retaining walls supporting slopes are to be provided with a paved swale and freeboard. Drainage will not be allowed to flow uncontrolled over slopes. Therefore, the potential for soil erosion is considered to be very low.

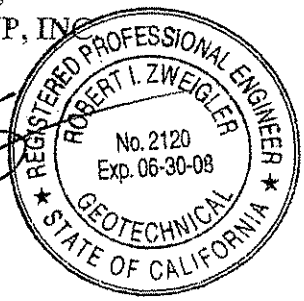
Lateral spreading is a concern for sites underlain by soft, sandy soils on or adjacent to a descending slope. Should liquefaction occur as a result of seismic shaking, the soil can move laterally towards the slope (spreading). The existing fill and alluvium are to be entirely excavated and recompacted, so no soft soil is to remain and therefore, the potential for lateral spreading is considered to be nil.

Subsidence can also result from liquefaction of soft, sandy soils. Since the surficial materials are to be removed to bedrock and recompacted, the potential for seismically induced subsidence is nil. The project will include moderately deep compacted fill. Over-excavation of cut portions of the building pads has been recommended to mitigate differential settlement.

The earth materials underlying the site are known to be moderately to critically expansive. Mitigating measures have been recommended in the referenced reports to address the expansive soil condition. These include deepened footings, reinforcement of slabs, and drainage control.

Should you have any questions, please call on the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.



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

RIZ:flh
S:\FINAL\LETTERS\19884_Komar_Investments_Additional_Comments.wpd

Enc: City of Agoura Hills - Geotechnical Review Sheet, dated August 8, 2006 (3 Pages)

xc: (1) Addressee (Fax and Mail)
(2) Westland Civil, Inc. (Fax and Mail)
(4) Komar - Newport Beach Office, Attention: Clint Knox

GeoDynamics, Inc.

Applied Earth Sciences
Geotechnical Engineering & Engineering Geology Consultants

Date: August 8, 2006
GDI #: 06.00103.0143

CITY OF AGOURA HILLS - GEOTECHNICAL REVIEW SHEET

To:	Doug Hooper
Project Location:	PM 65503, Agoura Hills, California.
Planning Case #:	06-CUP-003/06-OTP-005
Building & Safety #:	None
Geotechnical Report:	The J. Byer Group, inc. (2006), "Addendum Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California," JB 19884-Z, dated July 12, 2006. The J. Byer Group, Inc. (2005), "Rippability Study, Proposed Commercial Development, Lot 37 and 38, LS 15-8-9, 28000 Canwood Street, Agoura Hills, California," JB 19884-Z, dated August 1, 2005. The J. Byer Group, Inc. (2004), "Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Portions of Lot "H" of The Partition of The Rancho Las Virgenes, Across From 28720 Canwood Street, Agoura Hills, California," JB 19884-Z, dated August 19, 2004. The J. Byer Group, Inc. (1996), "Geologic and Soils Engineering Exploration, Proposed Commercial Development, Portions of Lot "H" of The Partition of The Rancho Las Virgenes, East of 29001 Canwood Street, Agoura Hills, California," JB 19884-Z, dated October 18, 1996.
Plans:	Westaind Civil, inc. (2005b), "Preliminary Grading Sections, Agoura hills Business Park, 28000 Canwood St, Agoura Hills, California 91301," Scale: 1"=5', dated December 8, 2005. Westaind Civil, inc. (2005a), "Preliminary Site/Grading Plan, Agoura hills Business Park, 28000 Canwood St, Agoura Hills, California 91301," Scale: 1"=20', dated November 21, 2005.
Previous Reviews:	None

FINDINGS

Planning/Feasibility Issues	Geotechnical Report
☐ Acceptable as Presented	☐ Acceptable as Presented
☒ Response Required	☒ Response Required

REMARKS

The J. Byer Group, Inc. (BGI; consultant) prepared the above referenced reports for the proposed commercial development at Tentative Parcel Map 65503, Agoura Hills, California. The proposed development includes construction of eight commercial buildings, an access road and parking areas, retaining walls up to 13.5 ft high, and manufactured fill and cut slopes at 2(h):1(v) gradients up to heights of 25 and 30 feet respectively.

The City of Agoura Hills – Planning Department reviewed the referenced report from a geotechnical perspective for compliance with applicable codes, guidelines, and standards of practice. GeoDynamics, Inc. (GDI) performed the geotechnical review on behalf of the City.

Based upon a review of the submitted reports and plans, the consultant should adequately respond to the following comments prior to consideration by the Planning Commission of approval of Case Nos. 06-CUP-003/06-OTP-005. The Consultant should respond to the following Report Review Comments prior to Building Plan Approval. Plan-Check comments should be addressed in Building & Safety Plan Check, and a separate geotechnical submittal is not required for plan-check comments.

Planning/Feasibility Comments

1. The consultant recommends on page 15 of the August 19, 2004 report that "Cantilevered retaining walls up to 15 feet high may be designed for an equivalent fluid pressure of 62 pounds per cubic foot, which is the at-rest earth pressure of the earth materials to be retained." The consultant should clarify the following comments regarding the above quoted statement:

   Note: The response is not acceptable. An at-rest earth pressure for highly to critically expansive backfill at a 2:1 gradient appears to be low compared with values recommended by the Navy manual or by Terzaghi and others. The consultant should provide analyses to substantiate the recommended value. Any method of analyses must be referenced. The use of a high cohesion intercept in the analyses should be substantiated with appropriate consolidated drained tests at low overburden pressure.

2. The fill slope proposed at the northeast corner of the property appears to toe out against an existing offsite fill. The consultant should address any specific recommendations appropriate for grading in this area.

   Note: The consultant should clarify if overexcavation for the keyway will extend outside the toe of the slope a distance equal the depth of overexcavation (area of stress influence due to the proposed fill) and if so, will grading outside the property be possible.

3. Cross-section E-E' shows that Building 2 will be underlain by approximately 5 ft and 30 ft of fill at the eastern and western sides, respectively. The consultant should discuss the adequacy of the recommended overexcavation (5 ft) to mitigate the potential for differential vertical movement (expansion or settlement) due to the differential fill thickness. Additional mitigation measures should be recommended as necessary.

Report Review Comments

1. Considering the highly to critically high expansive nature of on-site materials, the consultant should discuss and substantiate the adequacy of the recommended values for footing depth and width.

   Note: The recommended 24-inch depth of embedment for highly to critically expansive soils appears to be low. The consultant should provide justification for the recommended value or revise the depth of embedment as necessary.

Plan-Check Comments

1. The name, address, and phone number of the Consultant and a list of all the applicable geotechnical reports shall be included on the building/grading plans.
2. The grading plan should include the limits and depths of overexcavation of the building pad and flatwork areas as recommended by the Consultant.
3. The following note must appear on the grading and foundation plans: "*Tests shall be performed prior to pouring footings and slabs to determine the expansion index of the supporting soils, and foundation and slab plans should be reviewed by the Geotechnical Consultant and revised, if necessary, accordingly.*"
4. The following note must appear on the grading and foundation plans: "*All cut-slopes should be mapped during grading. Stabilization measures should be applied where future cuts expose adversely oriented joint surfaces or intersections of joint surfaces.*"
5. The following note must appear on the grading and foundation plans: "*All foundations should meet the minimum requirements of the City of Agoura Hills for setback requirements.*"
6. The following note must appear on the grading and foundation plans: "*Excavations shall be made in compliance with CAL/OSHA Regulations.*"

7. The following note must appear on the foundation plans: *"All foundation excavations must be observed and approved, in writing, by the Project Geotechnical Consultant prior to placement of reinforcing steel."*

8. Foundation plans and foundation details shall clearly depict the embedment material and minimum depth of embedment for the foundations.

9. Drainage plans depicting all surface and subsurface non-erosive drainage devices, flow lines, and catch basins shall be included on the building plans.

10. Final grading, drainage, and foundation plans shall be reviewed, signed, and wet stamped by the consultant.

11. Provide a note on the grading and foundation plans that states: *"An as-built report shall be submitted to the City for review. This report prepared by the Geotechnical Consultant must include the results of all compaction tests as well as a map depicting the limits of fill, locations of all density tests, outline and elevations of all removal bottoms, keyway locations and bottom elevations, locations of all subdrains and flow line elevations, and location and elevation of all retaining wall backdrains and outlets. Geologic conditions exposed during grading must be depicted on an as-built geologic map."*

If you have any questions regarding this review letter, please contact GDI at (805) 496-1222.

Respectfully Submitted,

GeoDynamics, INC.

Ali Abdel-Haq
Geotechnical Engineering Reviewer
GE 2308 (exp. 12/31/07)

Christopher J. Sexton
Engineering Geologic Reviewer
CEG 1441 (exp. 11/30/06)

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
"Trust the Name You Know"

September 29, 2006
JB 19884-Z

Komar Investments, LLC
5581 Daniels Street, Unit A
Chino, California 91710

Attention: Zaven Hanessian

Subject

Addendum Geologic and Soils Engineering Exploration Update
Proposed Commercial Development
Parcel Map 65503
28000 Canwood Street
Agoura Hills, California

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

Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California, dated August 12, 2004;

Additional Comments, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California, dated October 21, 2004;

Rippability Study, *Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California,* dated August 1, 2005; and

Addendum Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California, dated July 12, 2006.

City of Agoura Hills - Geotechnical Review Sheet:

By GeoDynamics, Inc., dated August 8, 2006.

Dear Mr. Hanessian:

As requested, The J. Byer Group, Inc., has prepared this Addendum Geologic and Soils Engineering Exploration Update to provide the information requested in the August 8, 2006 review letter. The information requested is stated below, followed by our response.

PLANNING/FEASIBILITY COMMENTS

1. *The consultant recommends on page 15 of the August 19, 2004 report that "Cantilevered retaining walls up to 15 feet high may be designed for an equivalent fluid pressure of 62 pounds per cubic foot, which is the at-rest earth pressure of the earth materials to be retained." The consultant should clarify the following comments regarding the above quoted statement:*

   Note: *The response is not acceptable. An at-rest pressure for highly to critically expansive backfill at a 2:1 gradient appears to be low compared with values recommended by the Navy manual or by Terzaghi and others. The consultant should provide analyses to substantiate the recommended value. Any method of analyses must be referenced. The use of a high cohesion intercept in the analyses should be substantiated with appropriate consolidated drained tests at a low overburden pressure.*

Response: The at-rest pressure was calculated using the following formula:

$$\sigma_r = [\sigma_z * k_r * \sin\phi * \cos\beta]/(\sin\phi - \sin^2\beta)$$

The calculated at-rest earth pressure for a 2:1 backslope is 93 pounds per cubic foot.

2. *The fill slope proposed at the northeast corner of the property appears to toe out against an existing offsite fill. The consultant should address any specific recommendations appropriate for grading in this area.*

   Note: *The consultant should clarify if overexcavation for the keyway will extend outside the toe of the slope a distance equal the depth of overexcavation (area of stress influence due to the proposed fill) and if so, will grading outside the property be possible.*

Response: The toe of the keyway should extend beyond the footprint of the building equal to the depth of fill underlying the building. This will require offsite grading which we understand is anticipated. If this is not possible, the footings for the future buildings must be deepened to below a 1:1 plane projected up from the limits where the removals exposed bedrock, or into bedrock which would require friction piles.

3. *Cross-section E-E' shows that Building 2 will be underlain by approximately 5 ft and 30 ft of fill at the eastern and western sides, respectively. The consultant should discuss the adequacy of the recommended overexcavation (5 ft) to mitigate the potential for differential vertical movement (expansion or settlement) due to the differential fill thickness. Additional mitigation measures should be recommended as necessary.*

Response: In order to reduce the potential for differential settlement it is recommended that for Building 2, the cut area should be over-excavated a minimum of 10 feet below grade.

REPORT REVIEW COMMENTS

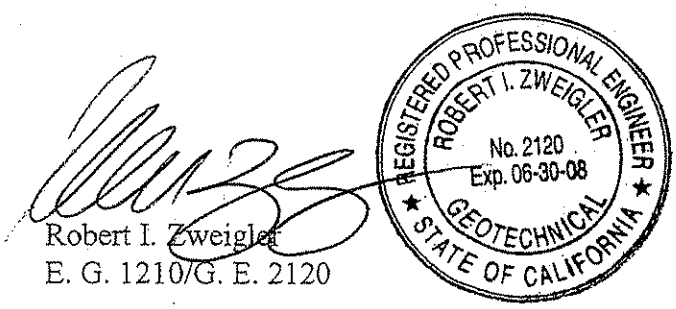
1. *Considering the highly to critically high expansive nature of on-site materials, the consultant should discuss and substantiate the adequacy of the recommended values for footing depth and width.*

Note: The recommended 24-inch depth of embedment for highly to critically expansive soils appears to be low. The consultant should provide justification for the recommended value or revise the depth of embedment as necessary.

Response: It is recommended that the finished building pads be tested for expansion potential, where the pads have a high to critical expansion potential, the footings shall be deepened a minimum of 36 inches below the lowest adjacent grade.

Should you have any questions, please call on the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.



James E. Tucker
R. G. 6628

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

JET:RIZ:flh:cj
S:\FINAL\UPDATE\19884_Komar_Investments_Addendum_Update.wpd

Enc: City of Agoura Hills - Geotechnical Review Sheet, dated August 8, 2006 (3 Pages)

xc: (4) Addressee (Fax and Mail)
(2) Westland Civil, Inc. (Fax and Mail)

GeoDynamics, Inc.

Applied Earth Sciences
Geotechnical Engineering & Engineering Geology Consultants

Date: August 8, 2006
GDI #: 06.00103.0143

CITY OF AGOURA HILLS - GEOTECHNICAL REVIEW SHEET

To:	Doug Hooper
Project Location:	PM 65503, Agoura Hills, California.
Planning Case #:	06-CUP-003/06-OTP-005
Building & Safety #:	None
Geotechnical Report:	The J. Byer Group, Inc. (2006), "Addendum Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Parcel Map 65503, 28000 Canwood Street, Agoura Hills, California," JB 19884-Z, dated July 12, 2006. The J. Byer Group, Inc. (2005), "Rippability Study, Proposed Commercial Development, Lot 37 and 38, LS 15-8-9, 28000 Canwood Street, Agoura Hills, California," JB 19884-Z, dated August 1, 2005. The J. Byer Group, Inc. (2004), "Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, Portions of Lot "H" of The Partition of The Rancho Las Virgenes, Across From 28720 Canwood Street, Agoura Hills, California," JB 19884-Z, dated August 19, 2004. The J. Byer Group, Inc. (1996), "Geologic and Soils Engineering Exploration, Proposed Commercial Development, Portions of Lot "H" of The Partition of The Rancho Las Virgenes, East of 29001 Canwood Street, Agoura Hills, California,," JB 19884-Z, dated October 18, 1996.
Plans:	Westalnd Civil, Inc. (2005b), "Preliminary Grading Sections, Agoura hills Business Park, 28000 Canwood St., Agoura Hills, California 91301," Scale: 1"=5', dated December 8, 2005. Westalnd Civil, Inc. (2005a), "Preliminary Site/Grading Plan, Agoura hills Business Park, 28000 Canwood St., Agoura Hills, California 91301," Scale: 1"=20', dated November 21, 2005.
Previous Reviews:	None

FINDINGS

Planning/Feasibility Issues	Geotechnical Report
☐ Acceptable as Presented	☐ Acceptable as Presented
☒ Response Required	☒ Response Required

REMARKS

The J. Byer Group, Inc. (BGI; consultant) prepared the above referenced reports for the proposed commercial development at Tentative Parcel Map 65503, Agoura Hills, California. The proposed development includes construction of eight commercial buildings, an access road and parking areas, retaining walls up to 13.5 ft high, and manufactured fill and cut slopes at 2(h):1(v) gradients up to heights of 25 and 30 feet respectively.

The City of Agoura Hills – Planning Department reviewed the referenced report from a geotechnical perspective for compliance with applicable codes, guidelines, and standards of practice. GeoDynamics, Inc. (GDI) performed the geotechnical review on behalf of the City.

Based upon a review of the submitted reports and plans, the consultant should adequately respond to the following comments prior to consideration by the Planning Commission of approval of Case Nos. 06-CUP-003/06-OTP-005. The Consultant should respond to the following Report Review Comments prior to Building Plan Approval. Plan-Check comments should be addressed in Building & Safety Plan Check, and a separate geotechnical submittal is not required for plan-check comments.

Planning/Feasibility Comments

1. The consultant recommends on page 15 of the August 19, 2004 report that "Cantilevered retaining walls up to 15 feet high may be designed for an equivalent fluid pressure of 62 pounds per cubic foot, which is the at-rest earth pressure of the earth materials to be retained." The consultant should clarify the following comments regarding the above quoted statement:

   Note: The response is not acceptable. An at-rest earth pressure for highly to critically expansive backfill at a 2:1 gradient appears to be low compared with values recommended by the Navy manual or by Terzaghi and others. The consultant should provide analyses to substantiate the recommended value. Any method of analyses must be referenced. The use of a high cohesion intercept in the analyses should be substantiated with appropriate consolidated drained tests at low overburden pressure.

2. The fill slope proposed at the northeast corner of the property appears to toe out against an existing offsite fill. The consultant should address any specific recommendations appropriate for grading in this area.

   Note: The consultant should clarify if overexcavation for the keyway will extend outside the toe of the slope a distance equal the depth of overexcavation (area of stress influence due to the proposed fill) and if so, will grading outside the property be possible.

3. Cross-section E-E' shows that Building 2 will be underlain by approximately 5 ft and 30 ft of fill at the eastern and western sides, respectively. The consultant should discuss the adequacy of the recommended overexcavation (5 ft) to mitigate the potential for differential vertical movement (expansion or settlement) due to the differential fill thickness. Additional mitigation measures should be recommended as necessary.

Report Review Comments

1. Considering the highly to critically high expansive nature of on-site materials, the consultant should discuss and substantiate the adequacy of the recommended values for footing depth and width.

   Note: The recommended 24-inch depth of embedment for highly to critically expansive soils appears to be low. The consultant should provide justification for the recommended value or revise the depth of embedment as necessary.

Plan-Check Comments

1. The name, address, and phone number of the Consultant and a list of all the applicable geotechnical reports shall be included on the building/grading plans.
2. The grading plan should include the limits and depths of overexcavation of the building pad and flatwork areas as recommended by the Consultant.
3. The following note must appear on the grading and foundation plans: "*Tests shall be performed prior to pouring footings and slabs to determine the expansion index of the supporting soils, and foundation and slab plans should be reviewed by the Geotechnical Consultant and revised, if necessary, accordingly.*"
4. The following note must appear on the grading and foundation plans: "*All cut-slopes should be mapped during grading. Stabilization measures should be applied where future cuts expose adversely oriented joint surfaces or intersections of joint surfaces.*"
5. The following note must appear on the grading and foundation plans: "*All foundations should meet the minimum requirements of the City of Agoura Hills for setback requirements.*"
6. The following note must appear on the grading and foundation plans: "*Excavations shall be made in compliance with CAL/OSHA Regulations.*"

7. The following note must appear on the foundation plans: *"All foundation excavations must be observed and approved, in writing, by the Project Geotechnical Consultant prior to placement of reinforcing steel."*
8. Foundation plans and foundation details shall clearly depict the embedment material and minimum depth of embedment for the foundations.
9. Drainage plans depicting all surface and subsurface non-erosive drainage devices, flow lines, and catch basins shall be included on the building plans.
10. Final grading, drainage, and foundation plans shall be reviewed, signed, and wet stamped by the consultant.
11. Provide a note on the grading and foundation plans that states: "*An as-built report shall be submitted to the City for review. This report prepared by the Geotechnical Consultant must include the results of all compaction tests as well as a map depicting the limits of fill, locations of all density tests, outline and elevations of all removal bottoms, keyway locations and bottom elevations, locations of all subdrains and flow line elevations, and location and elevation of all retaining wall backdrains and outlets. Geologic conditions exposed during grading must be depicted on an as-built geologic map.*"

If you have any questions regarding this review letter, please contact GDI at (805) 496-1222.

Respectfully Submitted,

GeoDynamics, INC.

Ali Abdel-Haq
Geotechnical Engineering Reviewer
GE 2308 (exp. 12/31/07)

Christopher J. Sexton
Engineering Geologic Reviewer
CEG 1441 (exp. 11/30/06)

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
"Trust the Name You Know"

August 1, 2005
JB 19884-Z

Komar Investments, LLC
14144 Central Avenue, Unit B
Chino, California 91710

Attention: Zaven Hanessian

Subject

Rippability Study
Proposed Commercial Development
Lots 37 and 38, LS 15-8-9
28000 Canwood Street
Agoura Hills, California

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

Geologic and Soils Engineering Exploration Update, Proposed Commercial Development, dated August 12, 2004; and

Additional Comments, Proposed Commercial Development, dated October 21, 2004.

Dear Mr. Hanessian:

As requested, The J. Byer Group has contracted with SubSurface Surveys & Associates, Inc., An Applied Geophysical Company to perform a rippability study. The report is enclosed. Line 1 was positioned along the crest of the ridge which consists of very hard volcanic bedrock and is to be lowered. Line 2 was positioned along the alignment of the proposed retaining wall, where the depth of cut is at a maximum. The locations of the lines are shown on the enclosed Geologic Map.

In general, the upper 19 feet of earth materials should be rippable. The hard material at 19 feet and below is considered marginally rippable.

Your civil engineer is exploring ways to create a cut slope/retaining wall along the uphill side of the future roadway. Cut slopes may be created as steep as 1½:1. A battered retaining system consisting of soil walls may also be feasible.

Should you have any questions, please call on the undersigned.

Respectfully submitted,
THE J. BYER GROUP, INC.

Robert I. Zweigler
E. G. 1210/G. E. 2120 EG1691

RIZ:flh:cj
S:\FINAL\LETTERS\19884_Komar_Investments_Letter.wpd

Enc: Seismic Refraction Survey for Rippability by SubSurface Surveys & Associates, Inc., dated July 17, 2005 (9 Pages)

In Pocket: Geologic Map

xc: (2) Addressee (Fax and Mail)
(2) Westland Civil, Inc. (Fax and Mail)

SubSurface Surveys & Associates, Inc.
An Applied Geophysical Company

215 S. Hwy 101, Suite 203
Solana Beach, CA 92075

Office: (858) 481-8949
Fax: (858) 481-8998

July 17, 2005

The J. Byer Group, Inc.
1461 East Chevy Chase Drive, #200
Glendale, California 91206

Project/Invoice No. 05-268

Attn: Robert Zweigler

Re: Seismic Refraction Survey for Rippability, 28720 Canwood Ave, Augora Hills

This brief letter report is to present the findings of a seismic refraction survey carried out over portions of property located at 28720 Canwood Avenue in Augora Hills, California (Figs. 1 and 2). The survey was performed on July 11, 2005, and its purpose was to determine depths and rippabilities of the various subsurface lithologies. The survey was made up of two separate lines of nearly identical orientations, each 240 feet long.

A Bison 9024, 24 channel seismograph system, was applied to the task. This instrument has DIFP, digital instantaneous floating point. This translates into a computer-controlled seismograph that records incoming signals at all instrument settings, and these are analyzed by the computer, which then outputs optimum, balanced traces with maximum informational content.

Survey Design – The location of the lines, along with orientations, were shot and recorded as suggested by the client (Fig. 2). The lack of brush, extreme topography, and other above-ground cultural features at this site caused no deviations in survey design from the client's original intentions.

Twenty-four geophones were used for each of the two survey lines, and were deployed linearly at an interval of 10 feet. Shots were also 10 feet from end geophones, and in addition to these forward and reverse off-end shots, a split-spread shot was fired between geophones 12 and 13. The geophone gap at the split-spread shot was 20 feet in order to accommodate the shot, and this layout arrangement was, therefore, a total length of 240 feet, and permitted an investigation to depths of at least 60 feet.

The energy source was a heavy-duty 16 pound sledge hammer with an inertial switch, and the hammer was slammed onto a metal plate that was coupled directly to the ground. Because of the relatively short spreads, the sledge hammer source was entirely adequate. Five vertical stacks at each shotpoint was carried out to build energy and to serve as a "noise" abatement strategy. Elevations of all shot and geophone positions were also surveyed in, and then input into the modeling program. The elevation of the forward shot point for each individual line was arbitrarily taken to be 100 feet, and then all other elevations along the given spread were relative to this assumed value for the forward shot point. While the elevations are considered accurate, it should be understood that they are only relative.

Sub Surface Surveys

SITE LOCATION MAP

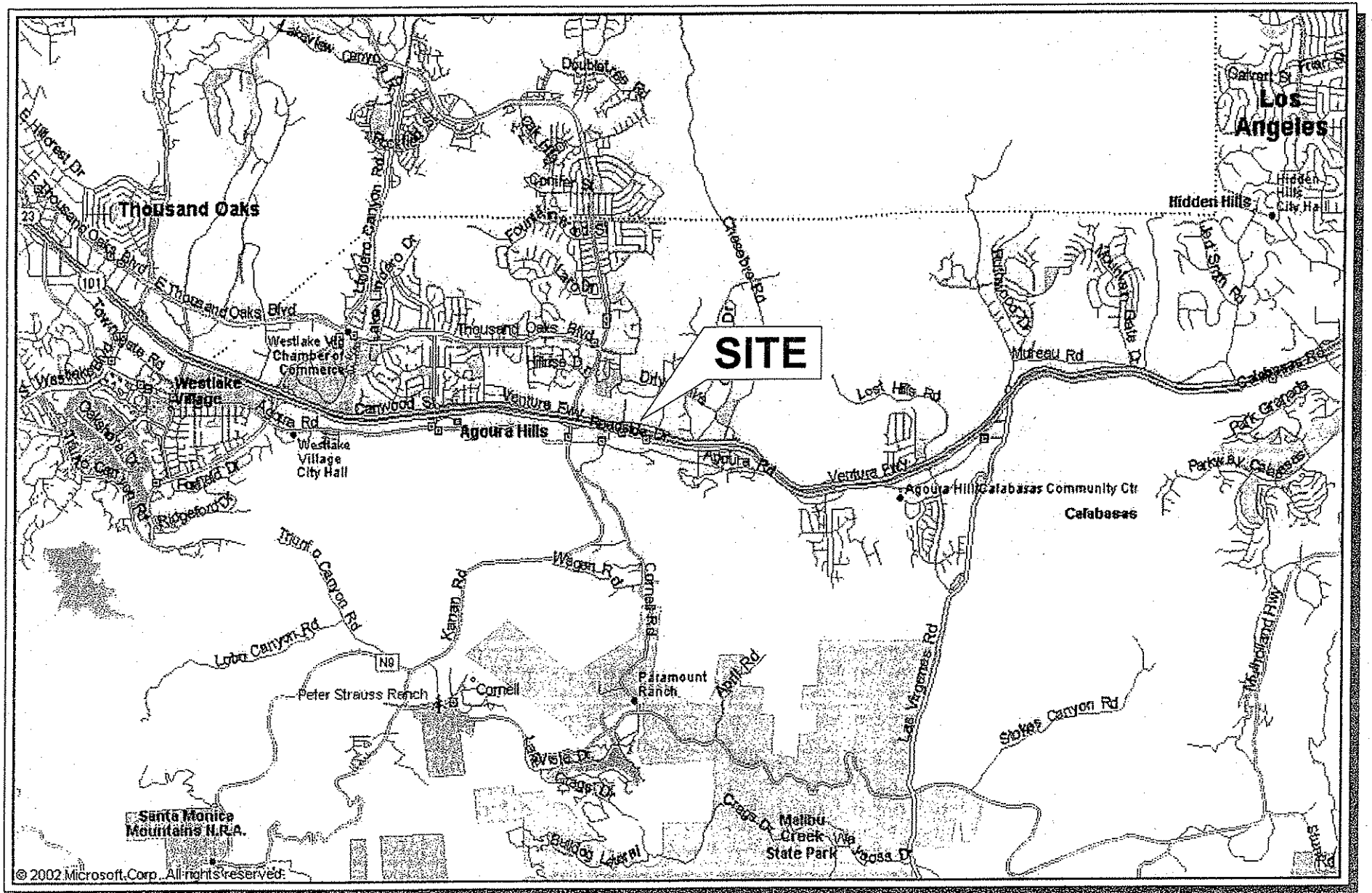
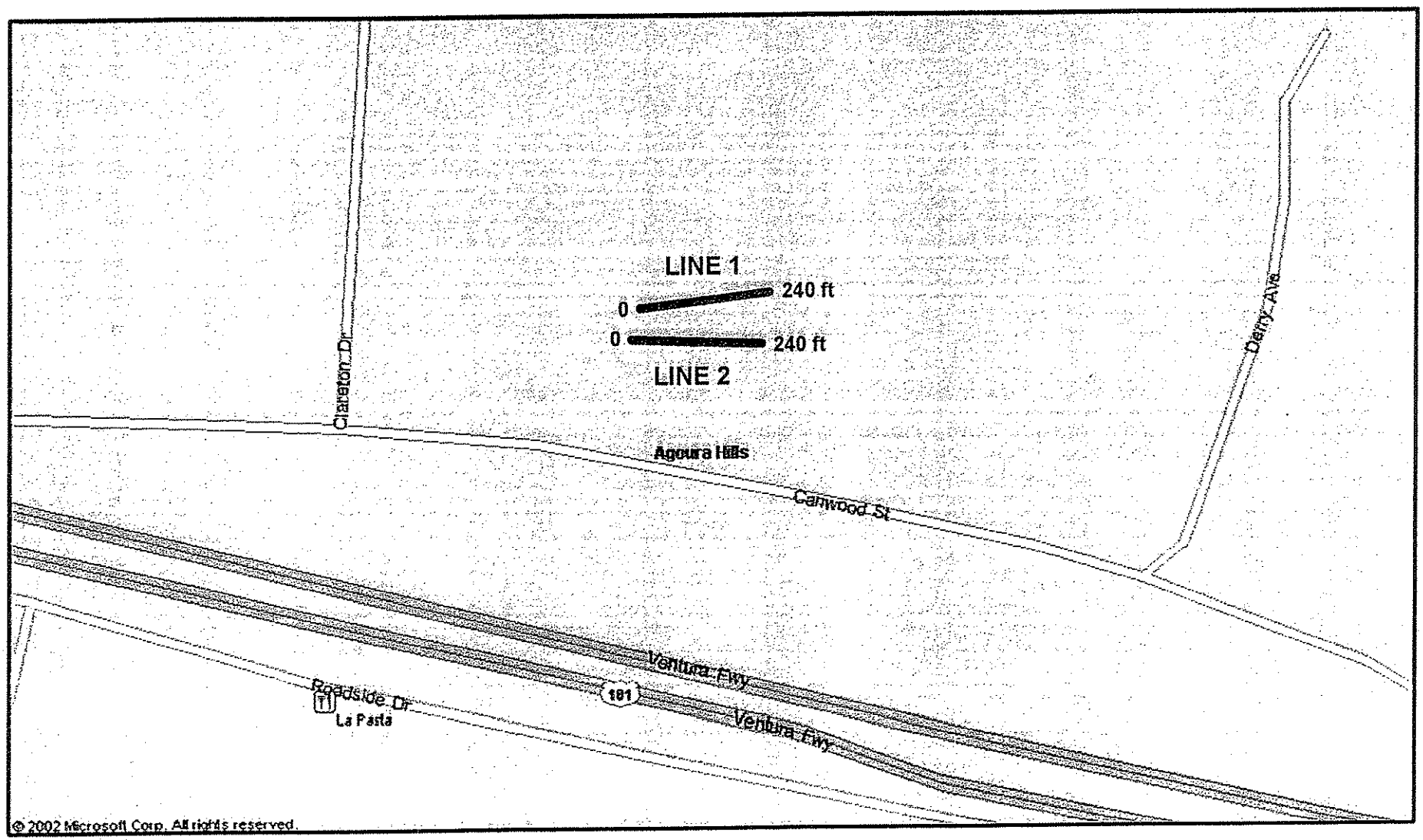


FIGURE 1

SEISMIC LINE LOCATION MAP



SCALE

0 270ft

FIGURE 2

Lastly, labeled and painted wooden stakes were planted in the ground at the positions of the first and last geophones for each line. Line locations are further documented with the following Lat/Long coordinates (corresponding to the centers of each line, distance 120 feet) and their compass orientations.

Line Number	**Lat/Long (deg)**		**Line Orientation (deg)**
Line/Spread 1	N34.14643	W118.75151	083
Line/Spread 2	N34.14622	W118.75156	092

Note: Map datum WGS 84 used when recording GPS coordinates

Brief Description of the Geophysical Method Applied – Seismic refraction investigates the subsurface by generating arrival time and offset distance information to determine the path and velocity of an elastic disturbance in the ground. This disturbance can be created by shot, hammer, weight drop, or some comparable method for the purpose of putting impulsive energy into the ground. Detectors are laid out at regular intervals in a line to measure the first-arrival energy and the time of that arrival. Shot are normally reversed from one end of the line to the other, to determine whether or not the layering is horizontal or dipping. And the split-spread shot, usually in the middle, gives redundancy to improve the interpretation.

Determining the velocity of, and depth to, layers is possible because, for near-offset geophones, the first-arrival rays (a continuum point on an expanding wave front) follow a direct route through the shallow subsurface. Simultaneously, additional rays travel downwards and are refracted across layer boundaries where there is a difference in elastic and density properties. The critically refracted ray travels along the layer interface, at the speed of the deeper layer, and continuously "feeds" energy back to the surface, to be successively detected, usually, by the far-offset geophones. Therefore, rays originating from the same shotpoint can sample both shallow and deeper parts of the subsurface provided that a correctly deployed array of geophones is used.

In order use this data to produce a correct model of the subsurface, a picking program is first used to determine the precise time of the first-arrival. This program applies such features as zoom, filtering, time stretching, separation of traces, AGC, and balancing of traces. This first-arrival information, geophone positions, shot locations, and layer assignments are then input to a ray-tracing computer program, namely SIP version 4.2 by Rimrock Geophysics, which iteratively honors all refracting surfaces and velocities, and can consider a large number of layers where they are present. A model of the subsurface, showing these detected layers and their velocities, is the end result.

Refraction Survey – Presented here are the final subsurface models for Lines 1 and 2 (Appendix A). The values for both elevation and distance are in feet. Velocities are in feet/sec.

For both lines, three layers were detected. In both cases, the first shallow layer is clearly soil, colluvium, and other highly weathered material. This layer ranges in thickness from 3 to 22 feet, but averages about 10 feet, and its velocities average about 1650 feet/sec.

Layer 2's thicknesses range from all little as 6 feet to as much as 30 feet in some areas. Partly because of its slow to moderate velocities, averaging around 3300 feet/sec, this layer is believed to be due to weathering of the underlying bedrock. This is further indicated by the fact that the contacts between

Layers 2 and 3 are irregular, experience large changes in elevation over short distances, and generally mimic the overlying topography.

The third layer is continuous downward to, and presumably significantly beyond, the depth of investigation, approximately 60 feet. Velocity of this material is on average approximately 8100 feet/sec, and its depth below ground surface ranges from 19 to 40 feet. Its average depth appears to be about 30 feet

It is clear from the Caterpillar Rippability Chart (Fig. 3) that Layer 1 and 2 material is rippable everywhere. For planning purposes, Layer 3 should be considered marginally-rippable. The Caterpillar Chart is empirical, but is based on thousands of samples of velocity vs. rippability in terms of performance of various sized Cats. The chart illustrated is for a D9 Caterpillar.

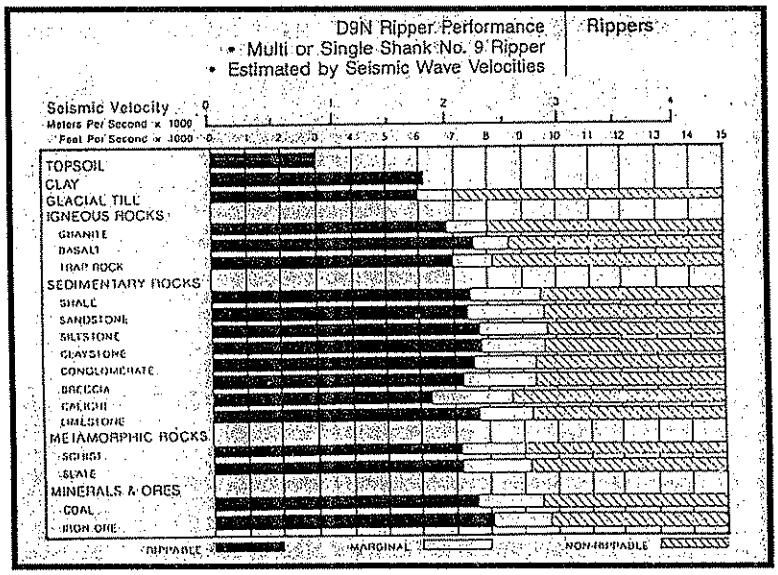
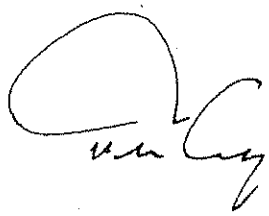


Figure 3. Caterpillar Rippability Chart

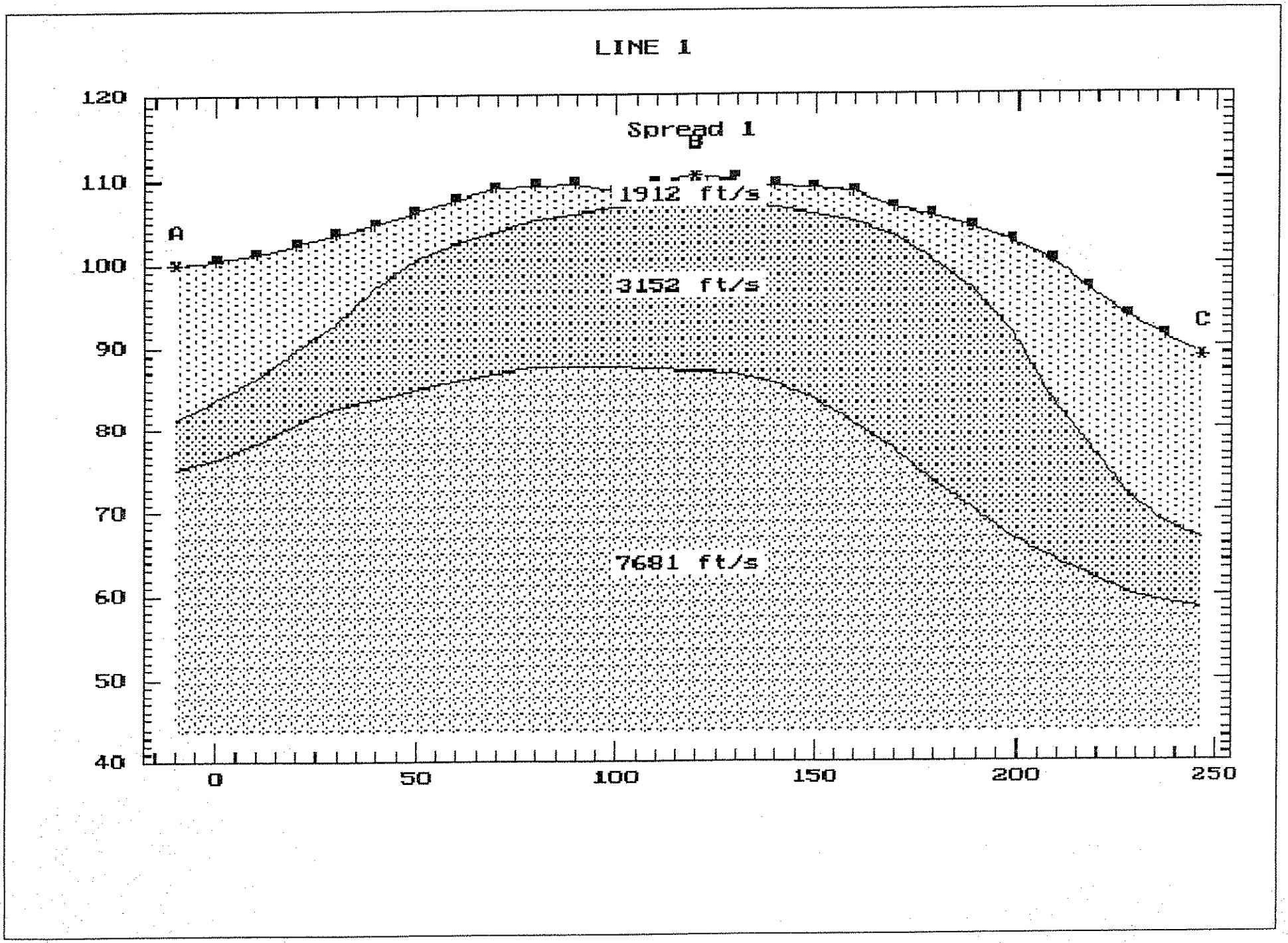
SubSurface Surveys' professional personnel are trained and experienced and have completed thousands of projects since the company's inception in 1988. It is our policy to work diligently to bring this training and experience to bear to acquire quality data sets, which in turn, can provide clues useful in formulating our interpretations. Still, non-uniqueness of interpretations, methodological limitations, and non-target interferences are prevailing problems. SubSurface Surveys make no guarantee either expressed or implied regarding the accuracy of the interpretations presented. And, in no event will SubSurface Surveys be liable for any direct, indirect, special, incidental, or consequential damages resulting from interpretations presented herewith.

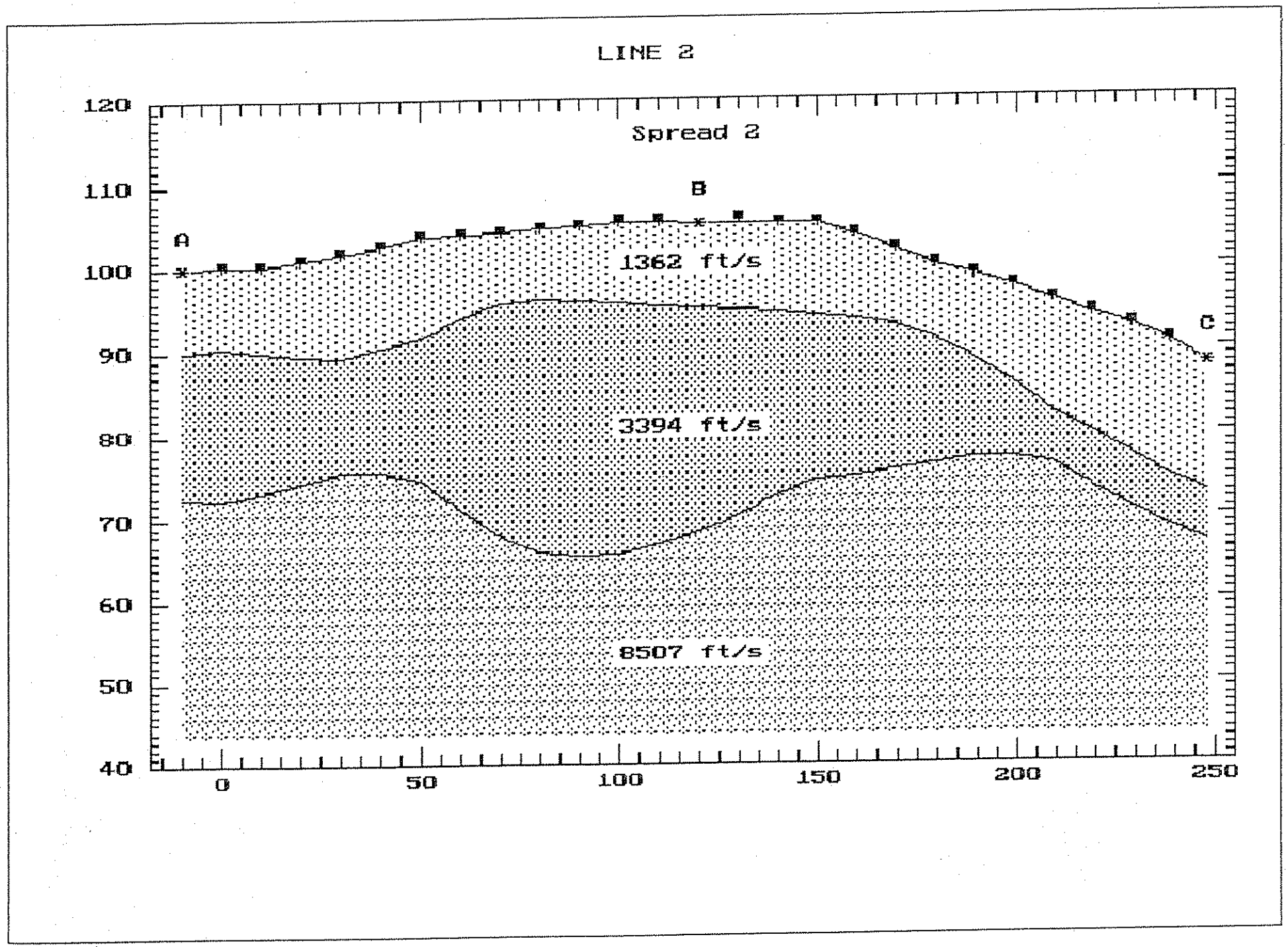
All data acquired in this project are in confidential file in the office. They are available for review by authorized persons at any time. The opportunity to participate in this project is very much appreciated. Please call, if there are questions.



Travis Crosby, GP# 1044
Staff Geophysicist

Appendix A


LINE 1
Spread 1
A
B
C
1912 ft/s
3152 ft/s
7681 ft/s
120
110
100
90
80
70
60
50
40
0
50
100
150
200
250


LINE 2
Spread 2
A
B
C
1362 ft/s
3394 ft/s
8507 ft/s
120
110
100
90
80
70
60
50
40
0
50
100
150
200
250

Appendix D

Water Quality

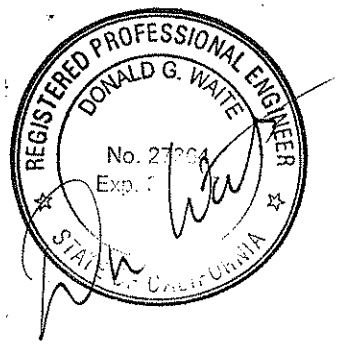
CITY OF AGOURA HILLS

AGOURA HILLS BUSINESS PARK

28000 Canwoood Street

PRELIMINRY

DRAINAGE STUDY



PREPARED BY:

WESTLAND CIVIL, INC.
100 North Rancho Road, Suite 7
Thousand Oaks, CA. 91362

February 2006

Agoura Hills Business Park
Preliminary Drainage Study

LOCATION

The proposed project is located on approximately 10 acres of land along the northerly side of Canwood Street, approximately 600 feet westerly of Derry Avenue in the City of Agoura Hills. The project site is presently a natural rolling undeveloped hillside land. The southerly boundary of the property is frontage along the fully improved Canwood Street. The site it bounded on the west by an existing industrial development and on the north by an existing residential development. Along the easterly boundary of the site the property is presently partially graded undeveloped land with a proposed industrial development currently in the planning phase.

The existing drainage pattern for the majority of the site is primarily overland sheet flow from the northerly and westerly boundary of the site, southerly and easterly towards a broad natural and graded swale that conveys the drainage to an existing inlet structure located along the northerly side of Canwood Street, approximately 300 feet westerly of Derry Avenue. No drainage enters this site from the adjacent developments on the northerly or westerly sides of the site. The southerly portion of the property currently surface drains into Canwood Street. There is a high point in Canwood Street approximately 80 feet from this properties westerly boundary.

There are two existing storm drains that currently intercept the drainage from this site. The first storm drain is PD No. 1693 which is a 36-inch storm drain constructed in an easement northerly of the current Canwood Street and westerly of Derry Avenue. A trashrack inlet connected to this storm drain intercepts the drainage from the natural & graded swale on the property to the east of this site. Approximately 7.0 acres of this site along with approximately 5.0 acres of the property to the east, currently drain to this inlet. Approximately 2.5 acres of this site along with approximately 1.3 acres of the property to the east, currently surface drains directly into Canwood street and is intercepted by the second existing storm drain, Line "F" of MTD No. 1184. This storm drain is a 27-inch storm drain that extends approximately 200 feet westerly from Derry Avenue. This

existing storm drain storm is was constructed in the current Canwood Street and currently terminates with two street inlets located approximately 250 feet westerly of Derry Avenue.

Approximately 0.5 acres at the south westerly corner of the site currently surface drains into Canwood Street westerly of the high point in the street. This flow is directed westerly in Canwood Street.

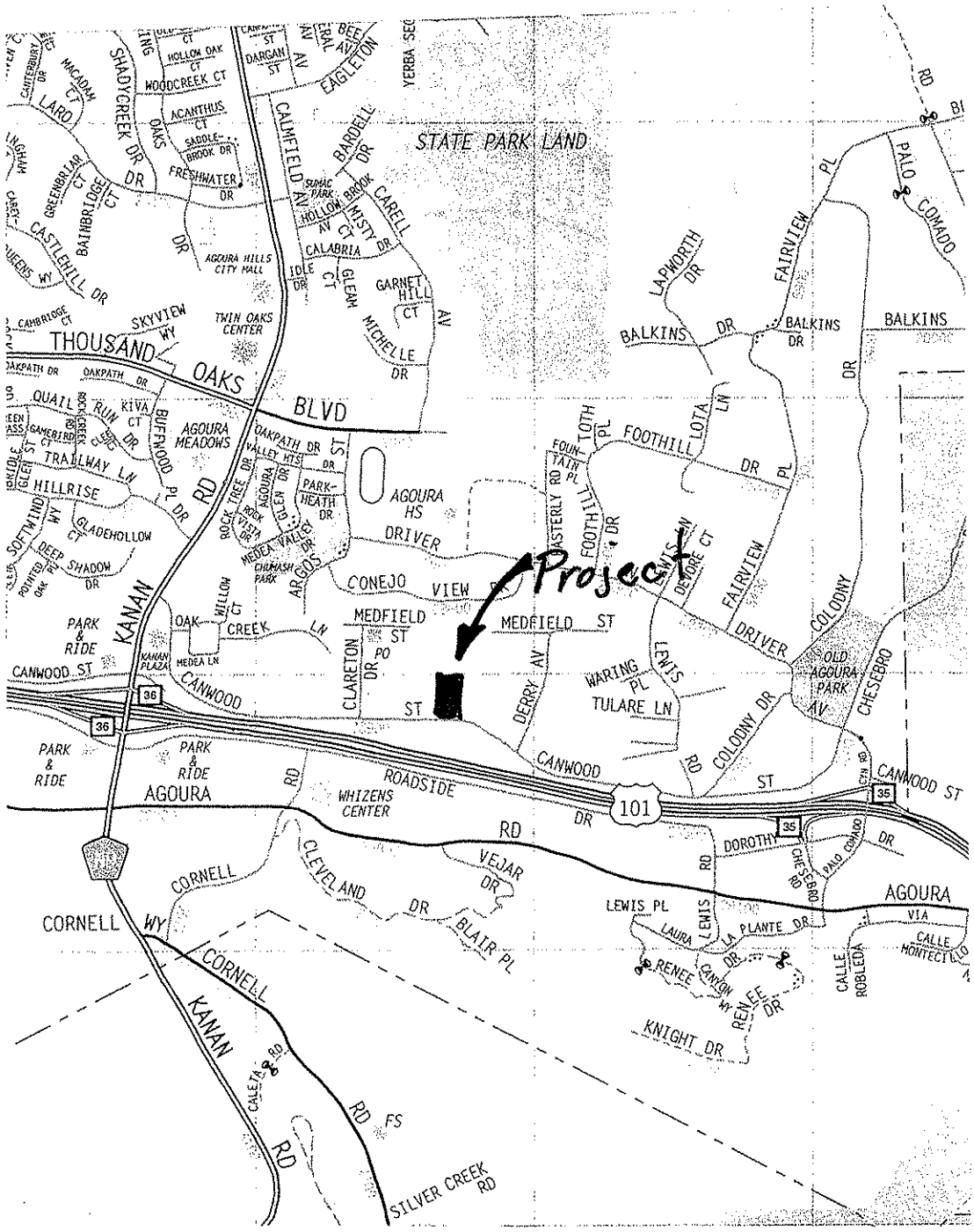
The proposed development consists of building structures and paved parking area covering the approximately 75 percent of the site. Portions of the hilltop knolls where existing oak trees are located will remain undeveloped. The majority of the drainage from the site will be collected by a private onsite storm drain systems that will be connected to an extension of the existing 36-inch storm drain in P.D. No. 1693.

The southwesterly portion of the site will be discharged into Canwood Street through two parkway culverts outleting through the curb faces. Additionally, a small portion of the site, consisting primarily of the perimeter landscaping and slope areas adjacent to the streets will be allowed to surface drain into Canwood Street. Subarea 15 C, the portion of the site that drains westerly in Canwood Street is approximately 0.5 acres. The remainder of the site will drain easterly towards MTD No. 1184.

HYDROLOGY

The developed condition peak runoff rates from the site have been calculated using the Los Angeles County Department of Public Works design criteria and hydrology methodology. The hydrology for use in the design of the onsite storm drain system has been prepared for a 50-year frequency design storm.

The Peak Mitigation Flow Rate (Q_{PM}) represents the 0.75-inches of rainfall that is required to be treated in order to comply with the SUSMP requirements. The Q_{PM} was calculated using the methodology and data presented in the Los Angeles County Department of Public Works "Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP)", dated July 2000.



LOCATION MAP

NO SCALE

PRE DEVELOPMENT CONDITION

With the pre-development condition, approximately 7.0 acres of this site along with approximately 5.0 acres of the property to the east, currently drain to the existing inlet connected to the P.D. No. 1693. The pre developed peak flows at this inlet are estimated to be 26 cfs, 32 cfs, and 50, cfs for the clear, burned, and burned & bulked 50-year flows, respectively. The plans for the existing P.D. No. 1693 indicates the inlet was originally designed for a flow of 38.2 cfs.

Approximately 2.5 acres of this site along with approximately 1.3 acres of the property to the east, currently surface drains directly into Canwood street. This along with the approximately 0.5 acres of street drainage area is intercepted by the existing catch basin inlet on the northerly side of Canwood Street, constructed by M.T.D. No. 1184. The pre developed peak flows at this inlet are estimated to be 14 cfs, 16 cfs, and 24, cfs for the clear, burned, and burned & bulked 50-year flows. The plans for the existing M.T.D. No. 1693 indicates the inlet was originally designed for 23.3 cfs.

POST DEVELOPMENT CONDITION

With the development of the site, almost all of the onsite drainage will be collected within the property in a private storm drain system and directed southerly towards Canwood Street. No significant drainage from the developed portion of this site will be discharged onto the adjacent property to the east. The private storm drain system will be connected to an offsite extension of the existing Storm Drain line in P.D. No. 1693. Provided permission from the adjacent property to the east can be obtained, the drainage from the portion of that property that currently drains into Canwood Street will be intercepted and connected to the new storm drain extension. If permission cannot be obtained the drainage will be allowed to surface drain into Canwood Street as it currently does. Approximately 9.4 acres of this development and 1.0 acres of the property to the east will be tributary to the proposed offsite storm drain extension. The remaining 0.3 and 0.5 acres of the site will be discharged into Canwood Street near the southwesterly corner of the site. The westerly most 0.5 acre watershed will be allowed to flow westerly in Canwood Street as it currently does.

EXISTING STORM DRAIN SYSTEM CAPACITIES

The plans for the existing storm drain, P. D. No. 1693, indicate the storm drain was designed for a total flow of 59.9 cfs. Approximately 38.2 cfs was to be intercepted by the existing trashrack inlet and 21.7 cfs was to be intercepted by the catch basin located in Canwood Street. With the construction of M.T.D. No. 1184, the street was realigned and the street catch basin provided by PD 1693 was abandoned and replaced by the new storm drain mainline and new catch basins constructed by MTD 1184. The plans for the new MTD 1184 mainline show that system was designed for 36.2 cfs. Therefore at the upper reaches of the two existing storm drain systems, PD 1693 and MTD 1184, the total capacity available is 38.2 cfs + 36.2 cfs = 74.4 cfs. This exceeds the estimated total post development flow of 43 cfs, 46 cfs, and 56 cfs for the clear, burned, and burned & bulked flows. The drainage from this site's development and the future development on the property to the east, will need to utilized the capacities of both of the existing storm drain systems to adequately convey the total drainage.

WATER QUALITY

In order to comply with the Standard Urban Stormwater Mitigation Plan (SUSMP) requirements established by the Los Angeles Regional Water Quality Control Board, the drainage system for the site will be provided with Structural Best Management Practices (BMP) to remove the target pollutants contained in the runoff from the site. For the majority of the site, the proposed private onsite storm drain system will be provided with a mainline Treatment Control Facility, before the runoff from this property will enter the proposed offsite storm drain extension. For the southwesterly portion of the site, catch basin insert filters will be provided at several locations before the drainage from the site discharges into Canwood Street.

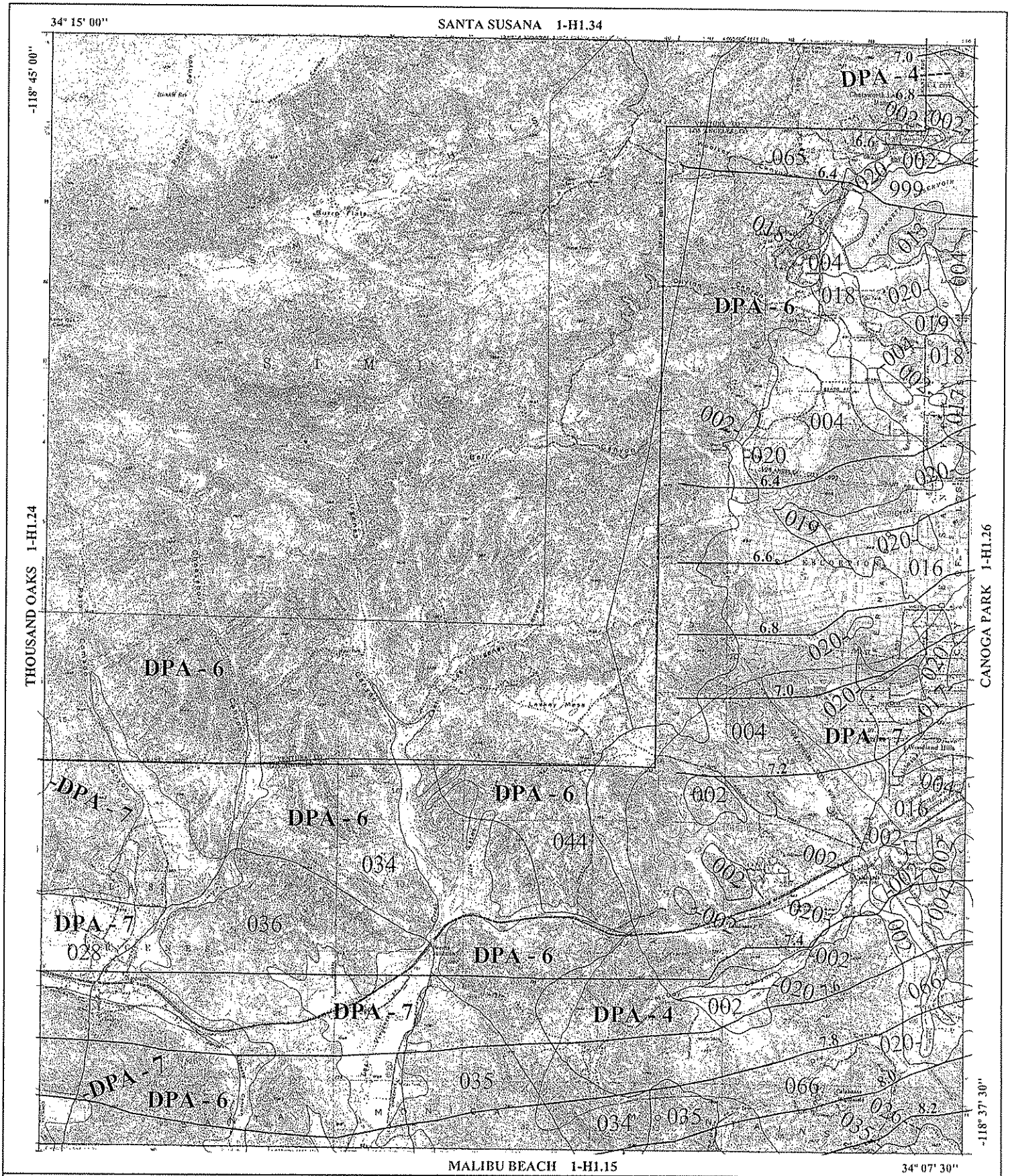
The peak mitigation flow rate (Q_{PM}) for the main watershed tributary to the private mainline treatment point was calculated to determine the treatment flow rate required. The mainline treatment BMP selected is the Continuous Deflective Separation provided by CDS Technologies. The preliminary peak mitigation flow

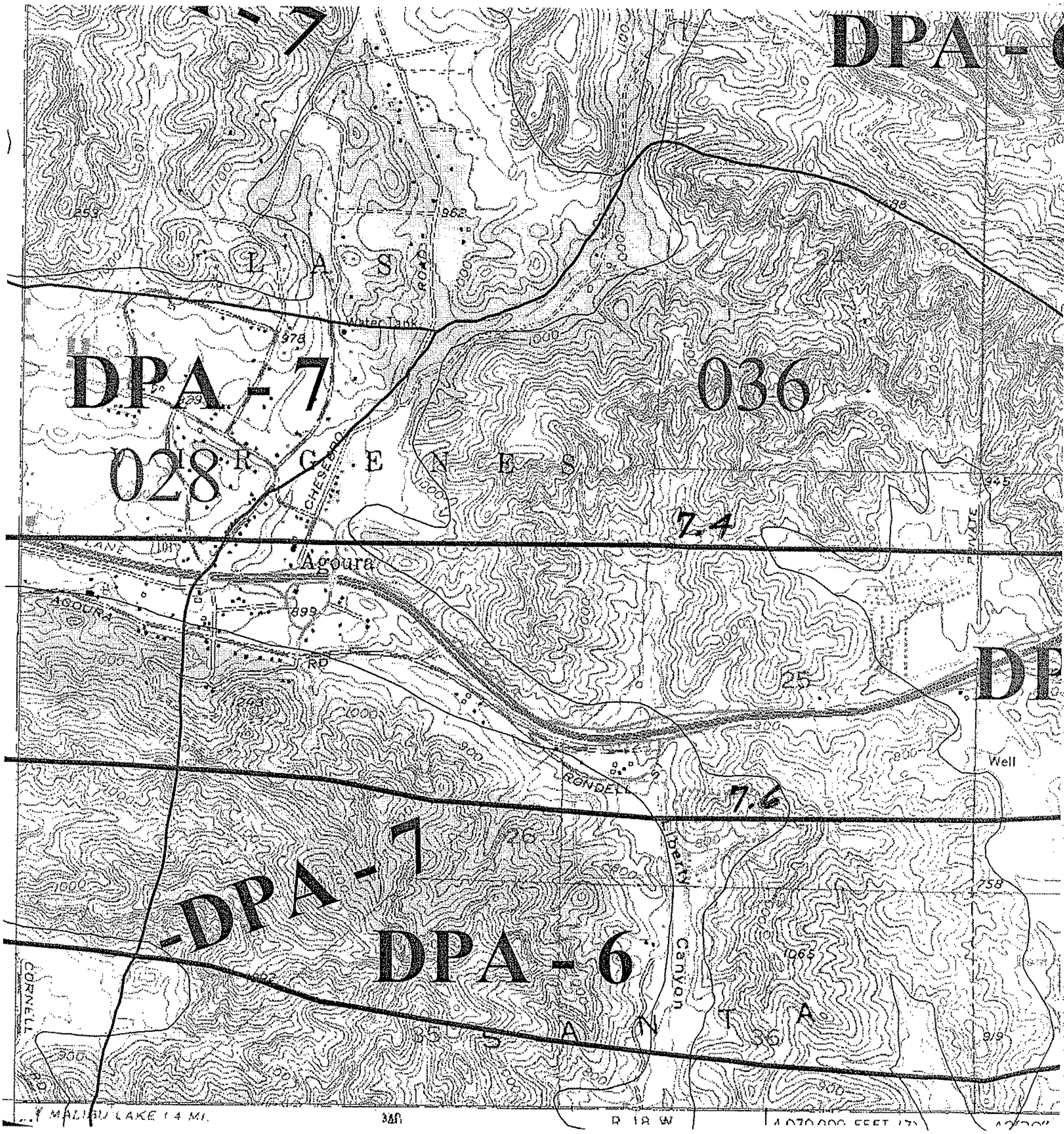
at this location is estimated to be approximately 1.3 cfs. For the catch basin filters proposed in the southwesterly portion of the site, Drain Pac catch basin filter, as manufactured by United Storm Water, Inc. are proposed to be installed.

The mainline treatment facility and the catch basin filter BMP's will be owned and maintained by the property owner and will not be the responsibility of the City of Agoura Hills. A maintenance covenant will be recorded to insure continuing maintenance of the treatment control facilities.

CONCLUSIONS

With the drainage improvements proposed by this project, the runoff from the site will be intercepted by a private onsite storm drain system and the majority of the drainage will be connect to the existing storm drain systems in Canwood Street. A minor portion of the drainage will be allowed to discharge into Canwood Street through parkway culverts. The total discharges from this project are compatible with the design discharges of the existing storm drain system. The drainage conditions in Canwood Street will be improved from the present condition where the northerly half street conveys the drainage from approximately 4.3 acres of watershed. With the development of this site drainage conveyed in that portion of the street will be reduced to a total watershed of 0.9 acres. Structural BMP's will be provided to reduce the target pollutants from the project's runoff prior to leaving the site.


34° 15' 00"
SANTA SUSANA 1-H1.34
-118° 45' 00"
THOUSAND OAKS 1-H1.24
CANOGA PARK 1-H1.26
-118° 37' 30"
MALIBU BEACH 1-H1.15
34° 07' 30"
DPA - 4
DPA - 6
DPA - 7
016
7.2
SOIL CLASSIFICATION AREA
INCHES OF RAINFALL
DEBRIS POTENTIAL AREA
1 0 1 2 Miles
25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714
CALABASAS
50-YEAR 24-HOUR ISOHYET
1-H1.25
LOS ANGELES COUNTY PUBLIC WORKS
Public Service That Works


DPA - 7
DPA - 7
DPA - 6
036
028
L A S
R G E N E S
S A N T A
Agoura
Water Tank
CHESEBRO
ROAD
AGOURA
RD
RONDELL
Canyon
CORNELL
Well
7.4
7.6
25
35
36
MALIBU LAKE 1.4 MI.
R 18 W

HYDROLOGY CALCULATIONS

PRE - DEVELOPMENT CONDITION

(50-Year Frequency)

AGOURA HILLS BUSINESS PARK
PRE DEVELOPED CONDITION SUMMARY

Subarea	Subarea				Total				
	Acres (Ac)	Q 50 (c) (cfs)	Q 50 (b) (cfs)	Q 50 (b &b) (cfs)	Acres (Ac)	Q 50 (c) (cfs)	Q 50 (b) (cfs)	Q 50 (b &b) (cfs)	Debris (cu.yds.)
1 A	7.0	19	23	36	7.0	19	23	36	306
2 A	5.0	11	13	20	12.0	26	32	50	525
3 B	3.8	12	14	22	3.8	12	14	22	166
4 B	0.5	2	2	-	4.3	14	16	24	225
5 C	0.5	2	2	3	0.5	2	2	3	22

AGOURA HILLS BUSINESS PARK
PRE DEVELOPMENT CONDITION
Time of Concentration
DATA SUMMARY

Project	Subarea	Area	%imp	Frequency	Soil Type	Length	Slope	Isohyet	Elev @ Top	Elev @ Bottom
Canwood	1A	7.0	0.01	50	28	680	0.0838	7.4	951	894
Canwood	2A	5.0	0.01	50	28	1120	0.0625	7.4	945	875
Canwood	3B	3.8	0.01	50	28	480	0.1354	7.4	948	883
Canwood	4B	0.5	0.95	50	28	750	0.0387	7.4	905	876
Canwood	5C	0.5	0.01	50	28	260	0.1346	7.4	940	905

AGOURA HILLS BUSINESS PARK

PRE DEVELOPMENT CONDITION
Tc CALCULATION SUMMARY

Project	Subarea	Area (Ac.)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calc'd (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
Canwood	1A	7.0	0.01	50	28	680	0.0838	7.4	6	4.05	0.67	0.67	19.0
Canwood	2A	5.0	0.01	50	28	1120	0.0625	7.4	9	3.35	0.63	0.63	10.6
Canwood	3B	3.8	0.01	50	28	480	0.1354	7.4	5	4.42	0.69	0.69	11.6
Canwood	4B	0.5	0.95	50	28	750	0.0387	7.4	6	4.05	0.67	0.89	1.8
Canwood	5C	0.5	0.01	50	28	260	0.1346	7.4	5	4.42	0.69	0.69	1.5

Tc Equation
Tc=(10)^-0.507*(Ix)^-0.519*(L)^0.483*(S)^-0.135

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50

Agoura Hills Business Park, Pre Dev., Q 50 c, (AHBPEc) 2/09/06

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1	1A	7.0	19.	7.0	19.	5	760.	.02500	10.00	2.00	0.	28	6	A37	.01
1	2A	5.0	11.	12.0	26.	0	0.	.00000	.00	.00	0.	28	9	A37	.01
1	3B	3.8	12.	3.8	12.	0	0.	.00000	.00	.00	0.	28	5	A37	.01
1	4B	.5	2.	4.3	14.	0	0.	.00000	.00	.00	0.	28	6	A37	.95
1	5C	.5	2.	.5	2.	0	0.	.00000	.00	.00	0.	28	5	A37	.01
1	6C	.0	0.	.5	2.	0	0.	.00000	.00	.00	0.	28	99	A37	.00

Clear Flow
Pre Development

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50

Agoura Hills Business Park, Pre Dev., Q 50 b, (AHBPEb) 2/09/06

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1	1A	7.0	23.	7.0	23.	5	760.	.02500	10.00	2.00	0.	228	6	A37	.01
1	2A	5.0	13.	12.0	32.	0	0.	.00000	.00	.00	0.	228	9	A37	.01
1	3B	3.8	14.	3.8	14.	0	0.	.00000	.00	.00	0.	228	5	A37	.01
1	4B	.5	2.	4.3	16.	0	0.	.00000	.00	.00	0.	28	6	A37	.95
1	5C	.5	2.	.5	2.	0	0.	.00000	.00	.00	0.	228	5	A37	.01
1	6C	.0	0.	.5	2.	0	0.	.00000	.00	.00	0.	28	99	A37	.00

Burned Flow
Pre Development

BULKED FLOW CALCULATIONS

Existing Condition
At Subarea 1 A at Property Boundary

Q 50 (Burned)		-	23 cfs		
Debris Production Area-		-	7		
Total Area	A	-	7 Acres	= 0.01	Sq. Mi.
Debris Producing Area	A_u	-	7 Acres	= 0.01	Sq. Mi.
Peak Bulking Factors		BF_A	1.570		
		BF_u	1.570		
Q 50 (Burned & Bulked)		=	36 cfs		

Existing Condition
At Subarea 1 A + 2 A at Existing Inlet

Q 50 (Burned)		-	32 cfs		
Debris Production Area-		-	7		
Total Area	A	-	12 Acres	= 0.02	Sq. Mi.
Debris Producing Area	A_u	-	12 Acres	= 0.02	Sq. Mi.
Peak Bulking Factors		BF_A	1.570		
		BF_u	1.570		
Q 50 (Burned & Bulked)		=	50 cfs		

Existing Condition
At Subarea 3 B flow into Canwood Street to East

Q 50 (Burned)		-	14 cfs		
Debris Production Area-		-	7		
Total Area	A	-	3.8 Acres	= 0.01	Sq. Mi.
Debris Producing Area	A_u	-	3.8 Acres	= 0.01	Sq. Mi.
Peak Bulking Factors		BF_A	1.570		
		BF_u	1.570		
Q 50 (Burned & Bulked)		=	22 cfs		

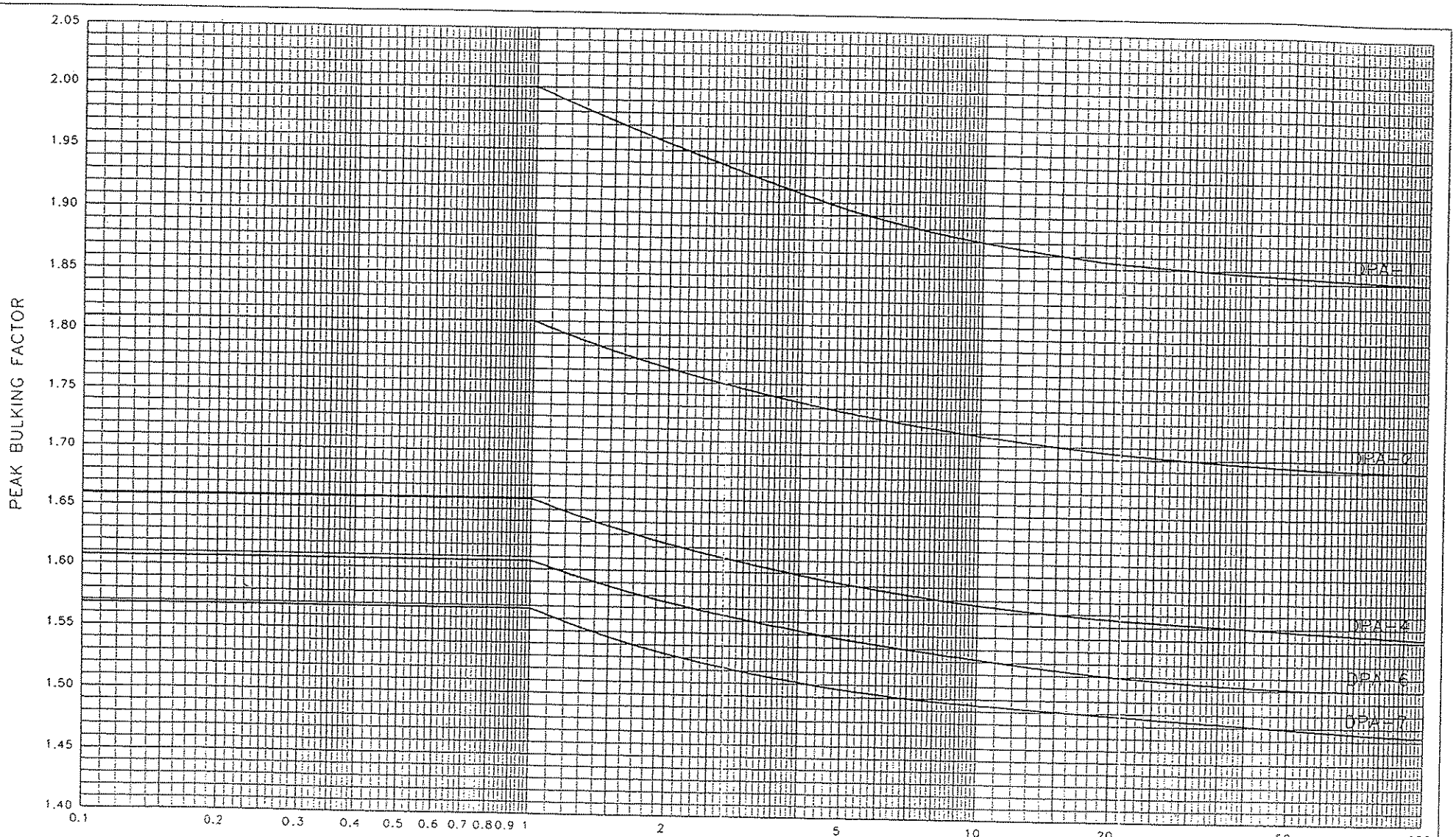
BULKED FLOW CALCULATIONS

Existing Condition
At Subarea 5 C In Canwood Street to West

Q_{50} (Burned)		-	2 cfs		
Debris Production Area-		-	7		
Total Area	A	-	0.5 Acres	= 0.00	Sq. Mi.
Debris Producing Area	A_u	-	0.5 Acres	= 0.00	Sq. Mi.

Peak Bulking Factors	BF_A	1.570
	BF_u	1.570

Q_{50} (Burned & Bulked) = 3 cfs



Los Angeles County
Department of Public Works

PEAK BULKING FACTORS
for Los Angeles Basin

DEBRIS PRODUCTION

Existing Condition
At Subarea 1 A (at Property Boundary)

Debris Production Area-	-	7				
Total Area	-	7.0	Acres	=	0.01	Sq. Mi.
Debris Producing Area	-	7.0	Acres	=	0.01	Sq. Mi.
Debris Production Rate	DPR	28,000	Cu. Yds. / Sq Mi.			
	DPR $_t$	28,000	Cu. Yds. / Sq Mi.			
Total Debris Production	-	306	Cu. Yds			

Existing Condition
At Subarea 1 A + 2 A (at Existing Inlet)

Debris Production Area-	-	7				
Total Area	-	12.0	Acres	=	0.02	Sq. Mi.
Debris Producing Area	-	12.0	Acres	=	0.02	Sq. Mi.
Debris Production Rate	DPR	28,000	Cu. Yds. / Sq Mi.			
	DPR $_t$	28,000	Cu. Yds. / Sq Mi.			
Total Debris Production	-	525	Cu. Yds			

Existing Condition
At Subarea 3 B (at Canwood Street - East)

Debris Production Area-	-	7				
Total Area	-	3.8	Acres	=	0.01	Sq. Mi.
Debris Producing Area	-	3.8	Acres	=	0.01	Sq. Mi.
Debris Production Rate	DPR	28,000	Cu. Yds. / Sq Mi.			
	DPR $_t$	28,000	Cu. Yds. / Sq Mi.			
Total Debris Production	-	166	Cu. Yds			

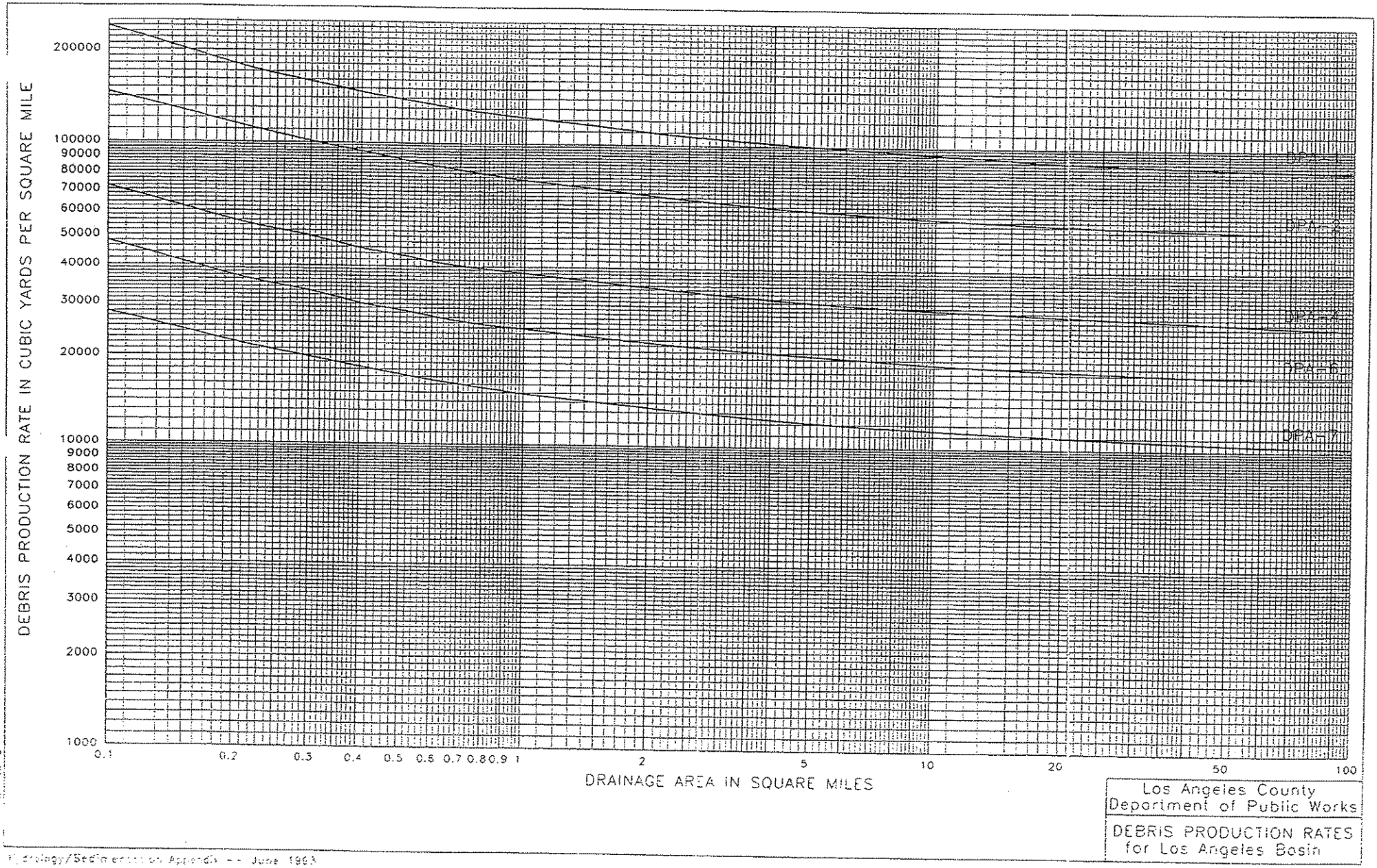
Existing Condition
At Subarea 16 C (at Outlet from Property)

Debris Production Area-	-	6				
Total Area	-	3	Acres	=	0.00	Sq. Mi.
Debris Producing Area	-	3	Acres	=	0.00	Sq. Mi.
Debris Production Rate	DPR	48,000	Cu. Yds. / Sq Mi.			
	DPR $_t$	48,000	Cu. Yds. / Sq Mi.			
Total Debris Production	-	225	Cu. Yds			

DEBRIS PRODUCTION

Existing Condition
At Subarea 5 C (at Canwood Street - West)

Debris Production Area-	-	7			
Total Area	-	0.5 Acres	=	0.00	Sq. Mi.
Debris Producing Area	-	0.5 Acres	=	0.00	Sq. Mi.
Debris Production Rate	DPR	28,000	Cu. Yds. / Sq Mi.		
	DPR u	28,000	Cu. Yds. / Sq Mi.		
Total Debris Production	-	22	Cu. Yds		


DEBRIS PRODUCTION RATE IN CUBIC YARDS PER SQUARE MILE
200000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
DPA-1
DPA-2
DPA-4
DPA-6
DPA-7
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
5
10
20
50
100
DRAINAGE AREA IN SQUARE MILES
Los Angeles County
Department of Public Works
DEBRIS PRODUCTION RATES
for Los Angeles Basin

ABH1.SPG

HYDROLOGY CALCULATIONS

POST - DEVELOPMENT CONDITION

(50-Year Frequency)

AGOURA HILLS BUSINESS PARK
POST DEVELOPED CONDITION SUMMARY

Subarea	Subarea					Total			
	Acres (Ac)	Q 50 (c) (cfs)	Q 50 (b) (cfs)	Q 50 (b &b) (cfs)	Acres (Ac)	Q 50 (c) (cfs)	Q 50 (b) (cfs)	Q 50 (b &b) (cfs)	Debris (cu.yds.)
10 A	9.4	27	27	27	9.4	27	27	27	-
11 A	1.0	3	4	6	10.4	30	30	32	44
12 A	5.0	11	13	20	15.4	40	43	53	263
13 B	0.3	1	1	1	0.3	1	1	1	-
14 B	0.6	2	2	2	0.9	3	3	3	-
15 C	0.5	2	2	2	0.5	2	2	2	-

AGOURA HILLS BUSINESS PARK
POST DEVELOPMENT CONDITION
Time of Concentration
DATA SUMMARY

Project	Subarea	Area	%imp	Frequency	Soil Type	Length	Slope	Isohyet	Elev @ Top	Elev @ Bottom
Canwood	10 A	9.4	0.75	50	28	1380	0.0333	7.4	926	880
Canwood	11 A	1.0	0.01	50	28	380	0.0842	7.4	912	880
Canwood	12 A	5.0	0.01	50	28	1120	0.0625	7.4	945	875
Canwood	13 B	0.3	0.95	50	28	140	0.0357	7.4	912	907
Canwood	14 B	0.6	0.95	50	28	750	0.0387	7.4	905	876
Canwood	15 C	0.5	0.66	50	28	380	0.0763	7.4	929	900

AGOURA HILLS BUSINESS PARK

POST DEVELOPMENT CONDITION
Tc CALCULATION SUMMARY

Project	Subarea	Area (Ac.)	%imp	Frequency	Soil Type	Length (ft)	Slope (ft/ft)	Isohyet (in.)	Tc-calc'd (min.)	Intensity (in./hr)	Cu	Cd	Flowrate (cfs)
Canwood	10 A	9.4	0.75	50	28	1380	0.0333	7.4	10	3.19	0.61	0.83	24.9
Canwood	11 A	1.0	0.01	50	28	380	0.0842	7.4	5	4.42	0.69	0.69	3.1
Canwood	12 A	5.0	0.01	50	28	1120	0.0625	7.4	9	3.35	0.63	0.63	10.6
Canwood	13 B	0.3	0.95	50	28	140	0.0357	7.4	5	4.42	0.69	0.89	1.2
Canwood	14 B	0.6	0.95	50	28	750	0.0387	7.4	6	4.05	0.67	0.89	2.2
Canwood	15 C	0.5	0.66	50	28	380	0.0763	7.4	5	4.42	0.69	0.83	1.8

Tc Equation
Tc=(10)^-0.507*(Ix)^-0.519*(L)^0.483*(S)^-0.135

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50

Agoura Hills Business Park, Developed Q 50 c, (AHBPdc) 2/09/06

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1	10A	9.4	27.	9.4	27.	0	0.	.00000	.00	.00	0.	28	10	A37	.75
1	11A	1.0	3.	10.4	30.	0	0.	.00000	.00	.00	0.	28	5	A37	.01
1	12A	5.0	11.	15.4	40.	4	270.	.01500	2.25	.00	0.	28	9	A37	.01
1	13B	.3	1.	.3	1.	3	750.	.04000	.00	.00	0.	28	5	A37	.95
1	14B	.6	2.	.9	3.	0	0.	.00000	.00	.00	0.	28	6	A37	.95
1	15C	.5	2.	.5	2.	0	0.	.00000	.00	.00	0.	28	5	A37	.66

Clear Flow

Post Development

MODIFIED RATIONAL METHOD HYDROLOGY - STORM YEAR = 50

Agoura Hills Business Park, Developed, Q 50 b, (AHBPdb) 2/09/06

LOCATION		SUBAREA AREA(Ac)	SUBAREA Q(CFS)	TOTAL AREA(Ac)	TOTAL Q(CFS)	CONV TYPE	CONV LNGTH(Ft)	CONV SLOPE	CONV SIZE(Ft)	CONV Z	CONTROL Q(CFS)	SOIL NAME	TC	STORM DAY 4 RAIN ZONE	PCT IMPV
1	10A	9.4	27.	9.4	27.	0	0.	.00000	.00	.00	0.	28	10	A37	.75
1	11A	1.0	4.	10.4	30.	0	0.	.00000	.00	.00	0.	228	5	A37	.01
1	12A	5.0	13.	15.4	43.	4	270.	.01500	2.50	.00	0.	228	9	A37	.01
1	13B	.3	1.	.3	1.	3	750.	.04000	.00	.00	0.	28	5	A37	.95
1	14B	.6	2.	.9	3.	0	0.	.00000	.00	.00	0.	28	6	A37	.95
1	15C	.5	2.	.5	2.	0	0.	.00000	.00	.00	0.	28	5	A37	.66

Burned Flow
Post Development

BULKED FLOW CALCULATIONS

Developed Condition
At Subarea 11 A

Q 50 (Burned)		-	4 cfs			
Debris Production Area-		-	7			
Total Area	A	-	1 Acres	=	0.00	Sq. Mi.
Debris Producing Area	A_u	-	1 Acres	=	0.00	Sq. Mi.
Peak Bulking Factors	BF_A	1.570				
	BF_u	1.570				
Q 50 (Burned & Bulked)		=	6 cfs			

Developed Condition
At Subarea 12 A at Existing Inlet

Q 50 (Burned)		-	13 cfs			
Debris Production Area-		-	7			
Total Area	A	-	5 Acres	=	0.01	Sq. Mi.
Debris Producing Area	A_u	-	5 Acres	=	0.01	Sq. Mi.
Peak Bulking Factors	BF_A	1.570				
	BF_u	1.570				
Q 50 (Burned & Bulked)		=	20 cfs			

Developed Condition
At Subarea 10 A thru 12 A

Q 50 (Burned)		-	43 cfs			
Debris Production Area-		-	7			
Total Area	A	-	15.4 Acres	=	0.02	Sq. Mi.
Debris Producing Area	A_u	-	6 Acres	=	0.01	Sq. Mi.
Peak Bulking Factors	BF_A	1.570				
	BF_u	1.570				
Q 50 (Burned & Bulked)		=	53 cfs			

DEBRIS PRODUCTION

Developed Condition
At Subarea 11 A

Debris Production Area-	-	7				
Total Area	-	1.0	Acres	=	0.00	Sq. Mi.
Debris Producing Area	-	1.0	Acres	=	0.00	Sq. Mi.
Debris Production Rate	DPR	28,000	Cu. Yds. / Sq Mi.			
	DPR t	28,000	Cu. Yds. / Sq Mi.			
Total Debris Production	-	44	Cu. Yds			

Developed Condition
At Subarea 12 A (at Existing Inlet)

Debris Production Area-	-	7				
Total Area	-	5.0	Acres	=	0.01	Sq. Mi.
Debris Producing Area	-	5.0	Acres	=	0.01	Sq. Mi.
Debris Production Rate	DPR	28,000	Cu. Yds. / Sq Mi.			
	DPR t	28,000	Cu. Yds. / Sq Mi.			
Total Debris Production	-	219	Cu. Yds			

Developed Condition
At Subarea 10 A thru 12 A

Debris Production Area-	-	7				
Total Area	-	15.4	Acres	=	0.02	Sq. Mi.
Debris Producing Area	-	6	Acres	=	0.01	Sq. Mi.
Debris Production Rate	DPR	28,000	Cu. Yds. / Sq Mi.			
	DPR t	28,000	Cu. Yds. / Sq Mi.			
Total Debris Production	-	263	Cu. Yds			

SUSMP WATER QUALITY

CALCULATIONS

Q_{PM}

CDS Technologies

Printable Web

ack...

Print Page

Capacities & Physical Features

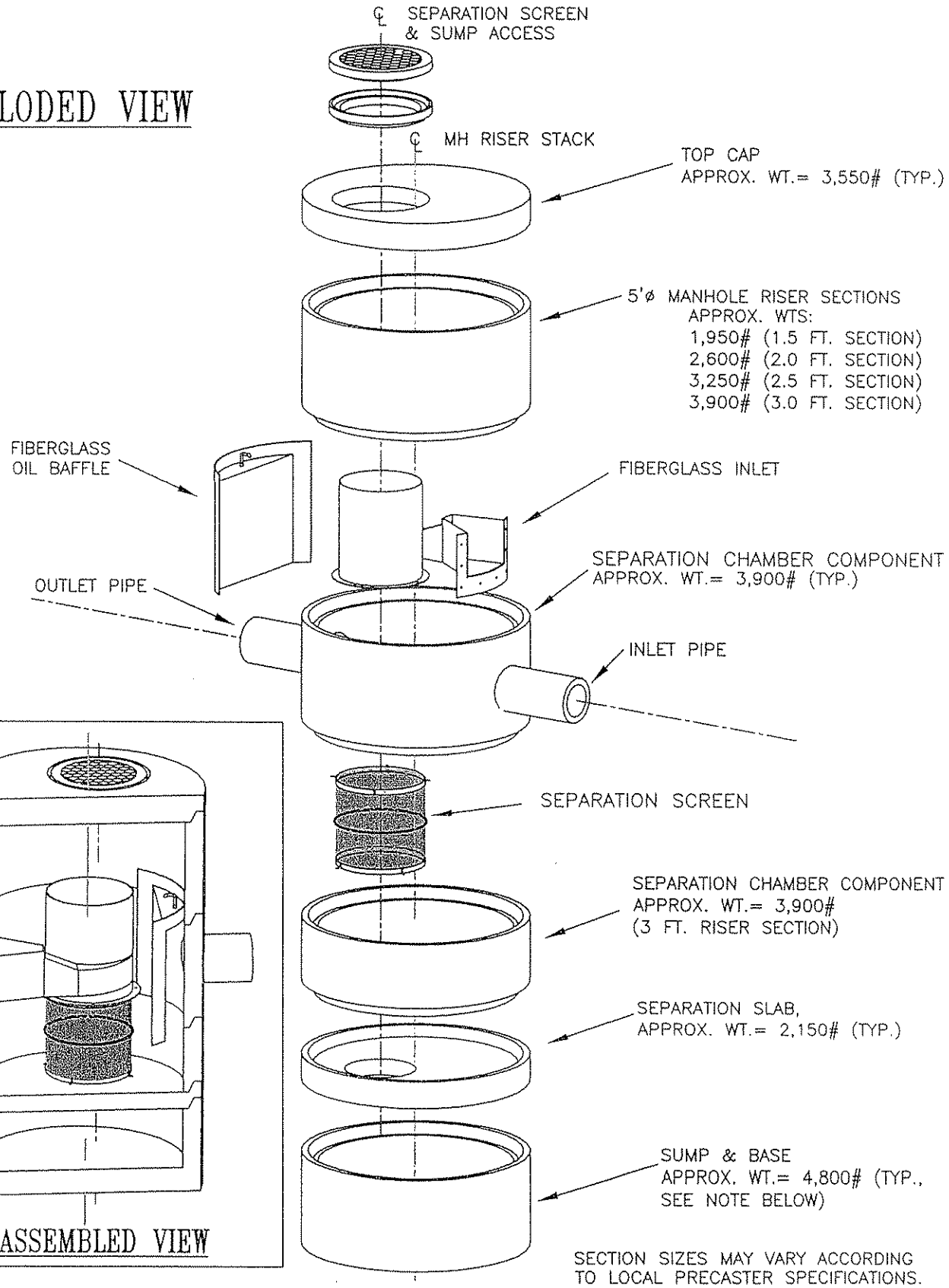
Model* Designation			Treatment Capacity Range		Screen Diameter\Height (ft)	Sump Capacity (yd^3)	Depth Below Pipe Invert (ft)	Foot Print Diameter (ft)
			cfs	MGD				
Precast**	Inline	PMIU20_15 (Drop-in Inlet)	0.7	0.5	2.0\1.5	0.5	4.2	4.8
		PMSU20_15_4	0.7	0.5	2.0\1.5	0.5	3.5 - 4	4.8
		PMSU20_15	0.7	0.5	2.0\1.5	1.1	5.1	6.0
		PMSU20_20	1.1	0.7	2.0\2.0	1.1	5.7	6.0
		PMSU20_25	1.6	1.0	2.0\2.5	1.1	6.0	6.0
		PMSU30_20	2.0	1.3	3.0\2.0	2.1	6.2	7.2
		PMSU30_30	3.0	1.9	3.0\3.0	2.1	7.2	7.2
		PMSU40_30	4.5	3.0	4.0\3.0	5.6	8.6	9.5
		PMSU40_40	6.0	3.9	4.0\4.0	5.6	9.6	9.5
	Offline	PSWC30_20	2.0	1.3	3.0\2.0	1.9	6.0	7.2
		PSW30_30	3.0	1.9	3.0\3.0	1.8	7.0	6.0
		PSWC30_30	3.0	1.9	3.0\3.0	2.1	7.0	7.2
		PSWC40_30	4.5	3.0	4.0\3.0	1.9	8.5	8.3
		PSWC30_30	6.0	3.9	4.0\4.0	1.9	9.6	8.3
		PSW50_42	9.0	5.8	5.0\4.2	1.9	9.6	9.5
		PSWC56_40	9.0	5.8	5.6\4.0	1.9	9.6	9.5
		PSW50_50	11.0	7.1	5.0\5.0	1.9	10.3	9.5
		PSWC56_53	14.0	9.0	5.6\5.3	1.9	10.9	9.5
		PSWC56_68	19.0	12.0	5.0\6.8	1.9	12.6	9.5
		PSWC56_78	25.0	16.0	5.6\7.8	1.9	13.6	9.5
		PSW70_70	26.0	17.0	7.0\7.0	3.9	14.0	12.5
		PSW100_60	30.0	19.0	10.0\6.0	6.9 or 14.1	12.0	18.0
		PSW100_80	50.0	32.0	10.0\8.0	6.9 or 14.1	14.0	18.0
		PSW100_100	64.0	41.0	10.0\10.0	6.9 or 14.1	16.0	18.0
Cast in Place		CSW150_134	148.0	95.5	15.0\13.4	14.1***	19.6***	25.5
		CSW200_164	270.0	174.0	20.0\16.4	14.1***	22.6***	34.5
		CSW240_160	300.0	194.0	24.0\16.0	14.1***	21.2***	41.0

*CDS Precast Manhole Insert Unit (PMIU), Precast Manhole Stormwater Unit (PMSU), Precast Stormwater Concentric (PSWC), Precast (P), and Cast in Place (C), Stormwater (SW)

**CDS Technologies can customize units to meet specific design flows and sump capacities

***Sump Capacities and Depth Below Pipe Invert can vary due to specific site design

EXPLODED VIEW



ASSEMBLED VIEW

SECTION SIZES MAY VARY ACCORDING TO LOCAL PRECASTER SPECIFICATIONS.

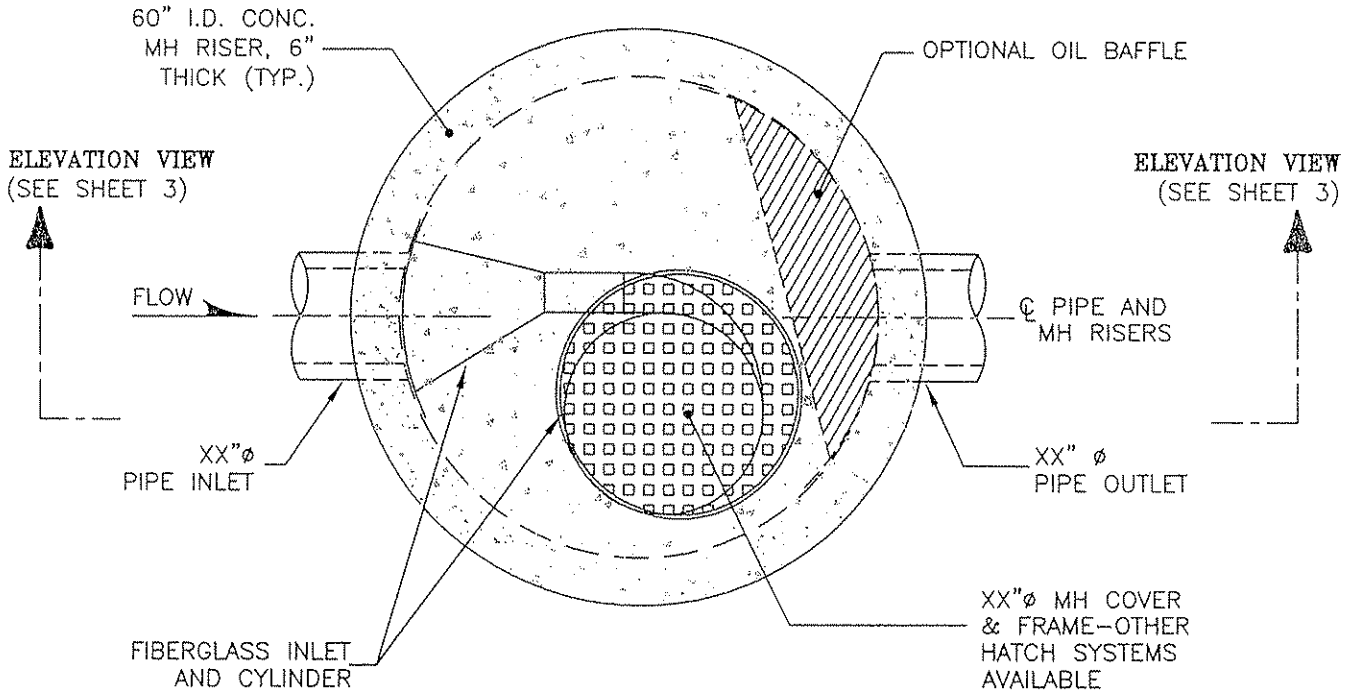
CDS™ TECHNOLOGIES

PATENTED

CDS MODEL PMSU20 TYPICAL ASSEMBLY

DATE	10/19/00	SCALE N.T.S.
DRAWN	J.S.F.	SHEET 1
APPROV.	R. HOWARD	

TYPICAL / GENERIC INSTALLATION

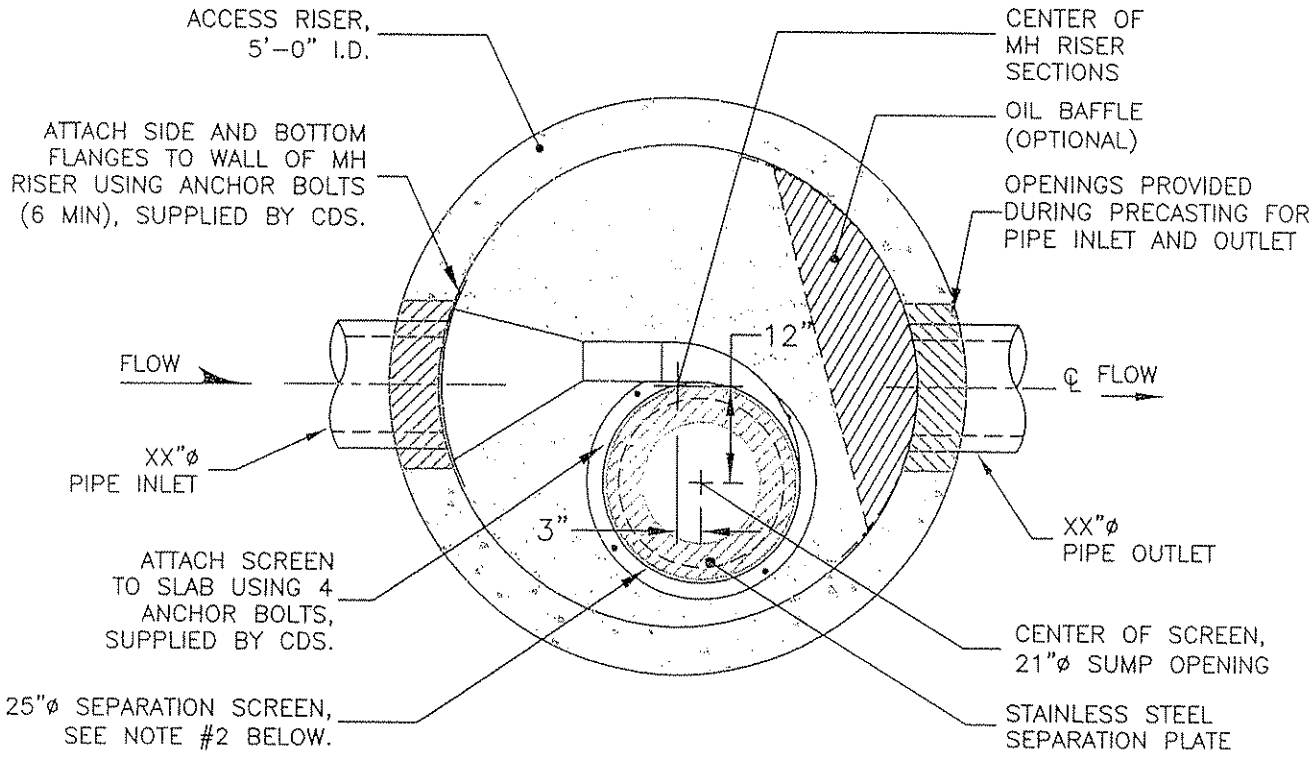


NOTE:
THE INTERNAL COMPONENTS ARE SHOWN IN THE RIGHT–HAND CONFIGURATION–THESE COMPONENTS MAY BE FURNISHED IN THE MIRROR IMAGE TO THAT SHOWN (LEFT–HAND CONFIGURATION)

CDS MODEL PMSU20_25
1.6 CFS CAPACITY
STORM WATER TREATMENT UNIT

CDS™ TECHNOLOGIES PATENTED	PROJECT NAME CITY, STATE	DATE 10/19/00	SCALE 1"=2'
		DRAWN J.S.F.	SHEET 2
		APPROV. R. HOWARD	

TYPICAL / GENERIC INSTALLATION



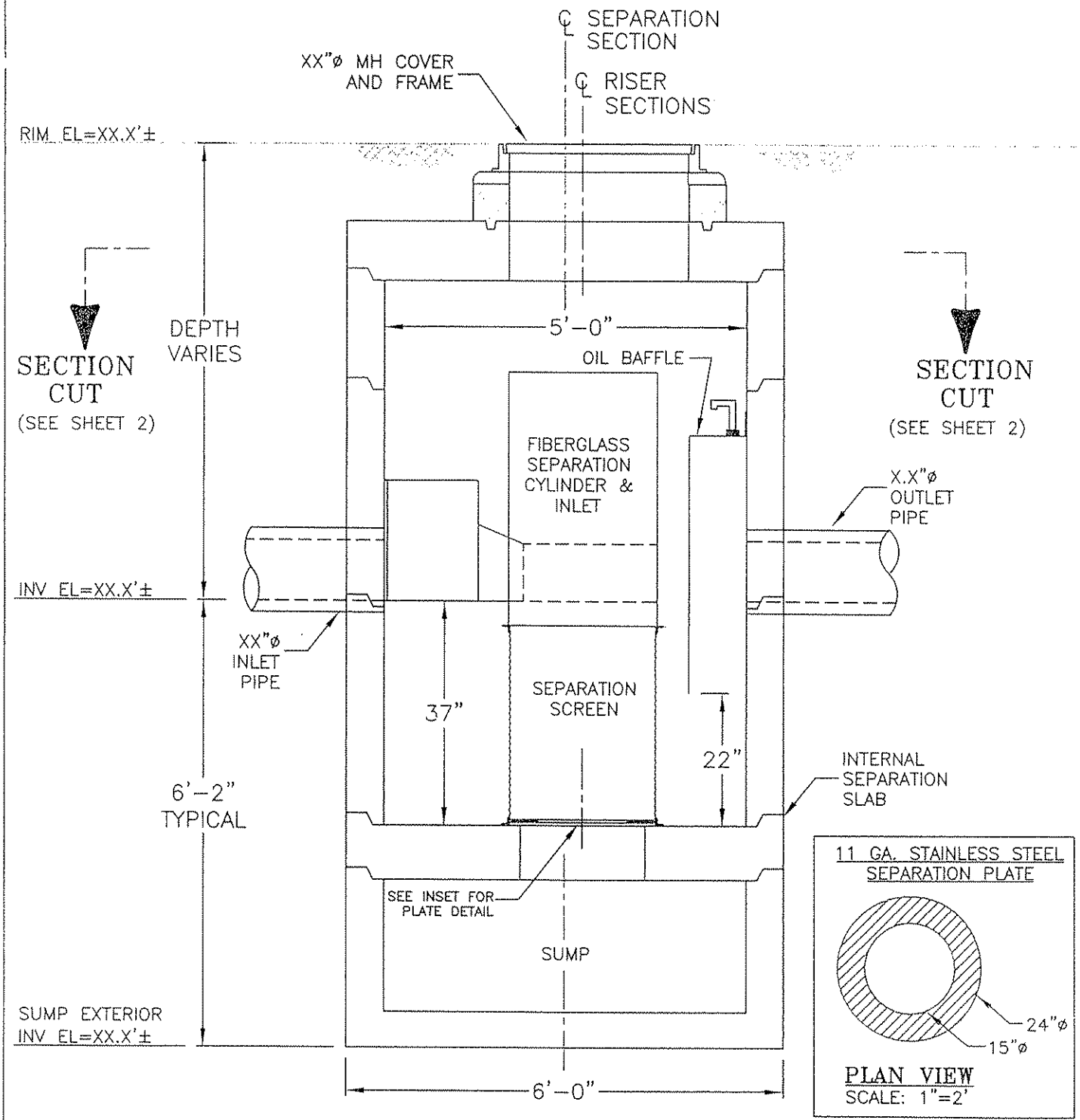
NOTES:

1. THE INTERNAL COMPONENTS ARE SHOWN IN THE RIGHT-HAND CONFIGURATION-THESE COMPONENTS MAY BE FURNISHED IN THE MIRROR IMAGE TO THAT SHOWN (LEFT-HAND CONFIGURATION).
2. FOR PROPER INSTALLATION, GREEN FLANGE ON SCREEN FACES UP, RED FLANGE ON BOTTOM.

CDS MODEL PMSU20_25
1.6 CFS CAPACITY
STORM WATER TREATMENT UNIT

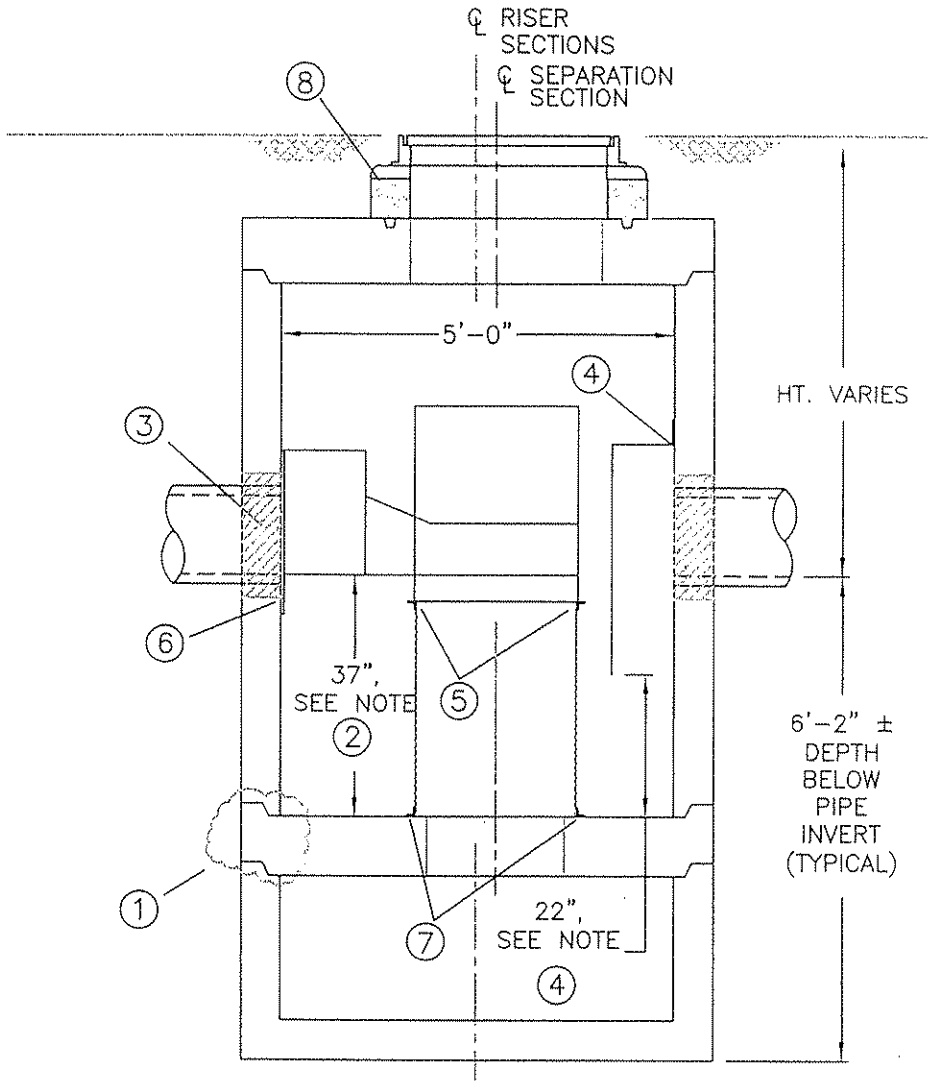
CDS™ TECHNOLOGIES PATENTED	PROJECT NAME CITY, STATE	DATE 10/19/00	SCALE 1"=2'
		DRAWN J.S.F.	SHEET 3
		APPROV. R. HOWARD	

TYPICAL / GENERIC INSTALLATION



CDS MODEL PMSU20_25
1.6 CFS CAPACITY
STORM WATER TREATMENT UNIT

CDS TECHNOLOGIES PATENTED	PROJECT NAME CITY, STATE	DATE 10/19/00	SCALE 1"=2'
		DRAWN J.S.F.	SHEET 4
		APPROV. R. HOWARD	



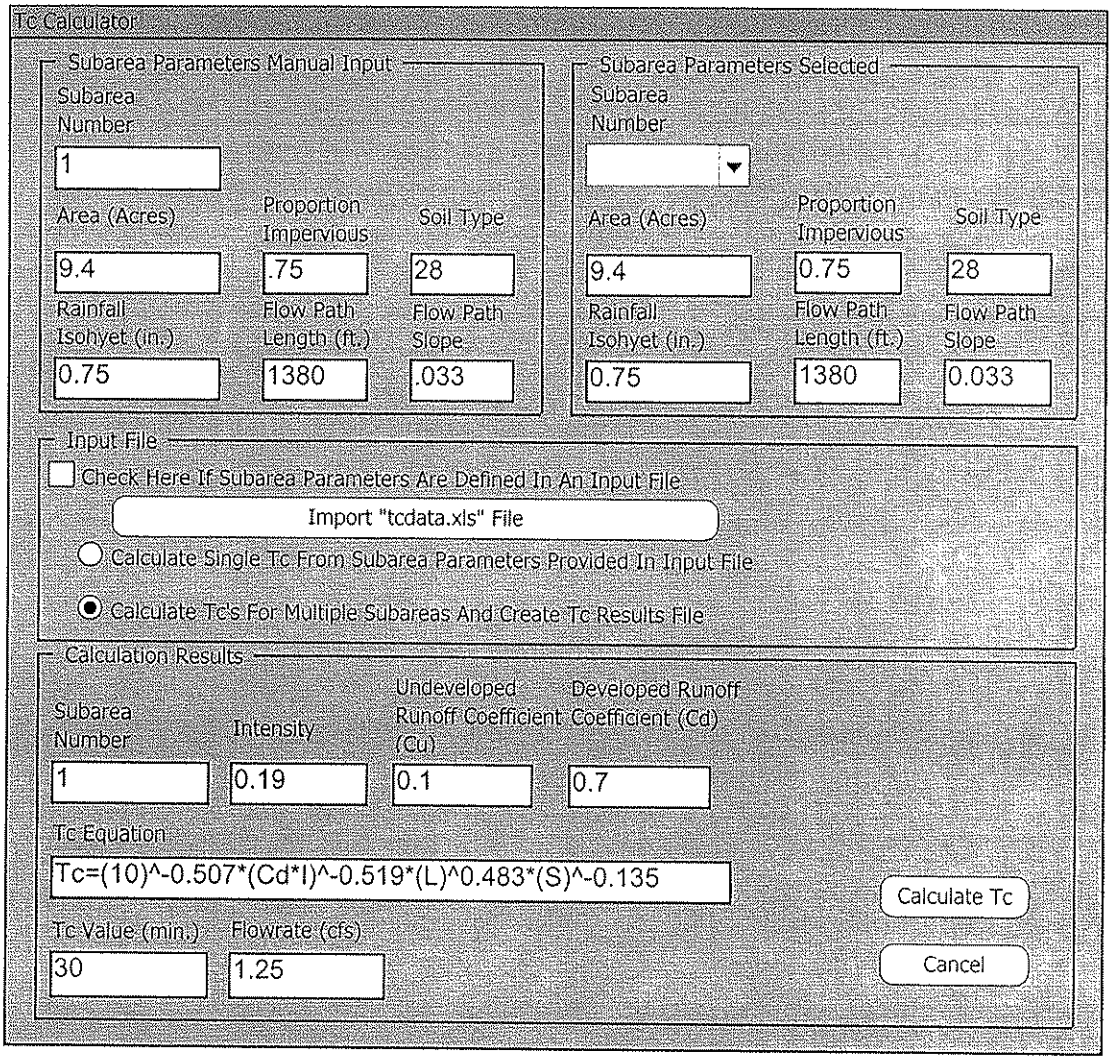
CONSTRUCTION NOTES:

1. APPLY BUTYL MASTIC TO SEAL RISER JOINTS–APPLY LOAD TO MH SECTIONS TO COMPRESS SEALANT IF NECESSARY.
2. IF SEPARATION SLAB IS NON–INTEGRAL TO THE SEPARATION SECTION OF THE UNIT, SET AND VERIFY TOP ELEVATION BEFORE PLACING MORE PRECAST COMPONENTS OR BACKFILLING. ENSURE 37" FROM TOP OF SEPARATION SLAB TO PIPE INVERT.
3. GROUT PIPE CONNECTIONS TO SEAL JOINT.
4. SET BOTTOM OF OIL BAFFLE 22" ABOVE SEPARATION SLAB FLOOR; DRILL AND INSERT A MINIMUM OF TEN (10) 3/8" x 3 3/4" SS EXPANSION BOLTS @ 12" O.C. EQUALLY SPACED TO SECURE FIBERGLASS OIL BAFFLE FLANGE TO RISER WALL–(HARDWARE SUPPLIED BY CDS TECHNOLOGIES).
5. FASTEN FIBERGLASS CYLINDER/INLET TO SCREEN ASSEMBLY USING FOUR (4) SETS OF $\frac{3}{8}$" x 1 $\frac{1}{2}$" SS HEX HEAD BOLTS W/ NUTS AND WASHERS–(HARDWARE SUPPLIED BY CDS TECHNOLOGIES).
6. CENTER SCREEN ASSEMBLY OVER SUMP OPENING AND POSITION FIBERGLASS INLET AGAINST RISER WALL; DRILL AND INSERT A MINIMUM OF SIX (6) $\frac{3}{8}$" x 3 $\frac{3}{4}$" SS EXPANSION BOLTS EQUALLY SPACED TO SECURE FIBERGLASS INLET FLANGE TO RISER WALL–(HARDWARE SUPPLIED BY CDS TECHNOLOGIES).
7. CENTER SCREEN ASSEMBLY OVER SUMP ACCESS HOLE AND FASTEN SCREEN TO SEPARATION SLAB USING FOUR (4) $\frac{3}{8}$" x 3 $\frac{3}{4}$" SS EXPANSION BOLTS–(HARDWARE SUPPLIED BY CDS TECHNOLOGIES).
8. BLOCK AND GROUT SEAL TO MATCH GRADE AS REQUIRED.

CDS™ TECHNOLOGIES
PATENTED

PROJECT NAME
CITY, STATE

DATE 6/29/00	SCALE N.T.S.
DRAWN J.S.F.	SHEET 5
APPROV. R. HOWARD	



Mainline Treatment Facility