GEOTECHNICAL ENGINEERING INVESTIGATION REPORT
CONFLUENCE WEST ART PROJECT
SANTA CLARA AND N. AUTUMN STREET
SAN JOSE, CALIFORNIA

For

City of San Jose
Office of Cultural Affairs
291 South Market Street
San Jose, California 95113

PARIKH CONSULTANTS, INC.
481 Valley Way, Milpitas, Ca 95035
(408) 945-1011

July 1995

Job No. 95130.10

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Geotechnical Engineering Investigation Report
Confluence West Art Project
Santa Clara and N. Autumn Street
San Jose, California

INTRODUCTION

This report presents the results of our geotechnical engineering investigation for the proposed Confluence West Art project near the junction of Santa Clara and N. Autumn Street in San Jose, California. Our work was performed in accordance with the scope of work as outlined in our proposal dated April 28, 1995. The general location of the site and its vicinity are shown on the Project Location Map, Plate 1.

PURPOSE AND SCOPE

The purpose of this investigation was to determine the nature of the soils underlying the proposed site, to evaluate their engineering properties and to provide recommendations for slab-on-grade, retaining walls and independent structures/columns.

The scope of work performed for this investigation included review of a previous soils report, dated 4/21/89, by Woodward-Clyde Consultants (WCC) for the general San Jose Arena development which covers the proposed project site; readily available soil and geologic literature pertaining to the site; obtaining representative samples and logging soil materials encountered in two borings; laboratory testing of the collected samples; engineering analysis of the field and laboratory data; and preparation of this report. The geotechnical investigation report prepared by WCC was used as a reference basis for our site specific work.

The basis for this investigation was a survey plan provided by the City of San Jose. The proposed slab-on-grade plaza with terrazzo finish and independent structures/columns were indicated on this plan. We have added the approximate locations of our exploratory borings as shown on the Site Plan, Plate 2.

Due to limitations inherent in geotechnical investigations, it is neither uncommon to encounter unforeseen variations in the soil conditions during construction nor is it practical to determine all such variations during an acceptable program of drilling and sampling for a project of this scope. Such variations, when encountered, generally require additional engineering services to attain a properly constructed project. We, therefore, recommend that a small contingency fund be provided to accommodate additional charges resulting from technical services that may be required during construction.

PROPOSED CONSTRUCTION

It is anticipated that the proposed development will include an oval shaped slab-on-grade plaza with terrazzo finish. The plaza will have a concrete bench at its perimeter. It is our understanding that the terrazzo slab may be placed at the existing finish grade or constructed in a 32" deep excavation. In addition to the plaza, five 5' diameter, 20' tall independent structures/columns will be constructed. These columns will be clad with tiles. Three independent pedestals/"winning circles" are also proposed.

SITE CONDITIONS

The proposed slab and independent structures/columns are located on the east side of the San Jose Arena across N. Autumn Street. Santa Clara Street is on the south of the project site. At the time of our exploration, the site was vacant and was under earthwork construction. It appeared that the site had been recently graded/filled, and some trench work for the irrigation system was under way.

FIELD EXPLORATION

The field exploration program consisted of drilling two borings to depths of 16.5 and 26.5 feet below the existing site grade. The approximate boring locations are shown on the Site Plan, Plate 2. The previous geotechnical report prepared for the Arena contained two deep borings (Boring Nos. 2 & 3, both 85+ feet) near the project site on the western side of N. Autumn Street. These two borings are used as reference for preparation of this report. A plan showing the locations of the existing borings and the boring logs are provided in Appendix C. Weighing design considerations against costs of further explorations, we believe that adequate soils information has been obtained in order to evaluate subsurface conditions and to provide the geotechnical recommendations.

The current borings were advanced with a truck mounted drill rig using 8-inch diameter hollow stem augers to depths up to 26.5 feet. Samplers of 2.5 inches I.D. (Modified California Sampler) were used to retrieve soil samples at various depths. The sampler was driven into subsurface soils under the impact of a 140-pound hammer having a free fall of 30 inches. The blow counts are presented on the "Log of Borings". (When correlating standard penetration data in similar soils, the blow counts for the Modified California Sampler can be taken as roughly twice that for the Standard Penetration Test in similar soils). The samples were sealed and transported to our laboratory for further evaluation and testing.

SUBSURFACE CONDITIONS

The borings generally encountered an upper fill layer consisting of approximately 5 feet of loose to medium dense silty fine sand/sandy silt overlying stiff sandy clay to about 12 to 15 feet. Medium dense silty sand was then encountered through about 25-foot depth where the soils changed to silty clay. The maximum boring depth is 26.5 feet.

Groundwater was encountered ranging from 15 to 20 feet below existing site grade during our exploration. It should be noted that the elevation of water table may change with the passage of time due to seasonal ground water fluctuations, weather conditions, and other factors.

Descriptions of the subsoils encountered are presented in the "Log of Borings", Appendix A. Laboratory test results including moisture/density, gradation analyses and unconfined compression are presented on Appendix B. The Log of Borings and locations by WCC are also included for reference, in Appendix C.

GEOLOGY

The general surficial geology of the project area is referenced to the Quaternary Geologic Map (San Jose West Quadrangle) by Wesling and Helley (USGS OFR 89-672, 1989). The project site is generally underlain by Natural Levee Deposits (Qhl) - sandy or clayey silt grading to sandy or silty clay. The Qhl deposits along the Guadalupe River are generally fine grained (sandy or silty clay). The general geologic features are shown in the Geologic Map, Plate 3.

CONCLUSIONS AND RECOMMENDATIONS

General

Based on the findings of our investigation, the site is feasible for the proposed construction provided the recommendations presented herein are incorporated into the final design and construction. The upper fill materials are loose and should be properly re-worked for support of the new structures.

This report was prepared specifically for the proposed development as discussed, and generally shown on Plate 2. Normal construction procedures were assumed throughout our analysis and represent one of the basis of recommendations presented herein. Our design criteria have been based upon the existing conditions at the site and the proposed work. Therefore, we should be notified in the event that these conditions are changed, so as to modify or amend our recommendations.

Seismicity and Site Coefficient

The San Francisco Bay Area is recognized as one of the most active seismic regions in the United States. No active or inactive faults are known to pass through the site. However, there are several active faults in the region, including the San Andreas, Hayward, Calaveras and San Gregorio faults which are mapped, respectively, about 11 miles SW, 6.6 miles NE, 7.9 miles NE and 26 miles SW of the project site. It is reasonable to assume that the site will be subjected to severe ground shaking caused by a major earthquake during the life of the structure. During such an earthquake, however, the potential risk from fault offset through the site is considered low.

The site coefficient (S) was determined using the generalized soil characteristics given in Table No. 23-J of the 1991 Uniform Building Code. Based on our knowledge of the site, the soil profile is categorized as S_2.

Liquefaction

Soil liquefaction is a phenomenon in which saturated cohesionless soils are subject to total loss of shear strength under the reversing cyclic shear stress associated with earthquake shaking. Based on the previous report for the San Jose Arena, the deep layer of sandy gravel to gravelly sand below about Elevation 50 are generally dense to very dense and are not considered to be susceptible to liquefaction. The upper layer of sandy material, which is also encountered in the current exploration, is somewhat variable in relative density. In general, the material appears to be medium dense to very dense and contain relatively high clay content in some locations.

Based on current investigation and previous borings in the vicinity of the project area, it appears that ground failure risks in the form of liquefaction, excessive settlement, lateral spreading or lurch cracks are considered relatively low. Special measures for mitigating such conditions are not required for the proposed construction.

Slab-on-Grade with Terrazzo

Due to upper loose fill, it is recommended to support the slab-on-grade on an engineered fill pad. The pad should consist of at least 3 feet of relatively non-expansive granular fill material compacted to at least 95% of maximum dry density as determined by ASTM D1557. This pad should also extend at least 18" beyond the edge of the slab or the wall, whichever is greater.

The subgrade soils should be moisture conditioned, scarified and recompacted prior to placement of the fill. The fill material should meet the recommendations in the "grading" section. A reinforcing fabric, such as Mirafi 600X or equal, should be placed on the subgrade soils prior to the construction of the fill pad. An additional layer of the reinforcing fabric should be placed on top of the fill pad to provide a "sandwich" layer to reduce potential differential movements of the underlying soils and damage to the terrazzo.

The slab should have a minimum thickness of 6 inches with a minimum reinforcement of 6 x 6 #6 welded wire mesh or the equivalent in deformed bars. Structural requirements and/or other special design requirements for terrazzo may necessitate a thicker concrete slab and additional reinforcement. For slab construction, a maximum spacing of 8 feet is recommended for control joints.

A minimum 2-inch layer of clean sand is recommended beneath all concrete slabs to aid in curing the concrete. This 2-inch sand layer should be followed by a vapor barrier, 6-inch compacted Aggregate Base (Class 2) and 6-inch of Permeable Material (either ATPB or CTPB, Caltrans) on top of the "sandwich" fill pad. An edge drain consisting of 4"ϕ slotted PVC pipe with fabric-wrapped permeable material is also recommended along the perimeter. A sketch of the slab-on-grade and fill pad construction is provided on Plate 4.

The permeable material (drainage blanket) and edge drain is recommended due to the anticipated subsurface seepage from the landscaping and other sources. The 2" sand should be slightly moist just prior to pouring the slab. The backfill against the slab should be compacted and graded to shed water away from the slab perimeter.

Minor cracking and maintenance problems are not uncommon for slab-on-grade construction; however, separation from structure with concentrated loads wherever possible, providing the engineered fill pad and keeping the subgrade moist during construction can greatly reduce the amount of eventual cracking. The upper 12 inches of slab subgrade should be kept moist to about 2 to 4% above optimum moisture content with frequent light watering. Prior to concrete placement, any dry cracked subgrade should be sealed with appropriate watering or should be excavated and recompacted. These conditions and construction procedures should be observed by the Geotechnical Engineer.

Retaining Walls

Retaining walls may be required if the plaza (slab-on-grade with terrazzo) is to be depressed 32 inches. For design of the retaining walls, an active lateral earth pressure of 36 pcf and 80 pcf (Equivalent Fluid Pressure) may be used for drained and undrained conditions, respectively.

For vertical design, a bearing capacity of 1800 psf is recommended. The value can be increased by one third for temporary wind and seismic loading conditions. The backfill directly behind the retaining walls should consist of free draining granular material such as pea gravel or Class II filter material. This drain should include a perforated pipe near the bottom to carry any collected water to an approved discharge point. The drain could be independent of the edge drain system for the terrazzo slab. The upper one foot of backfill should consist of compacted clayey soil or concrete cap placed over the drain rock.

Independent Structures/Columns

The independent structures for "winning circles" and columns may be supported on spread footing foundations bearing on properly engineered fill pad. A minimum footing embedment of 2 feet is recommended below the lowest adjacent finish grade. Construction of the fill pad will require over-excavation below the footing subgrade.

The fill pad should be at least 18 inches thick and consist of relatively non-expansive granular fill material compacted to at least 95% of maximum dry density as determined by ASTM D1557. The pad should extend a minimum of 18 inches beyond the footing perimeter. The subgrade soils should be moisture conditioned, scarified and recompacted prior to placement of the fill. The fill material should meet the recommendations in the "grading" section. A reinforcing fabric, such as Mirafi 600X or equal, should be placed on the subgrade soils prior to the construction of the fill pad. An additional layer of the reinforcing fabric should be placed at about 9 inches below the anticipated footing bottom elevation to provide a "sandwich" layer to reduce potential differential movements of the underlying soils and damage to the columns. For vertical design, an allowable bearing capacity of 1800 psf is recommended. The value can be increased by one third for temporary wind and seismic loading conditions.

Resistance to lateral loading may be provided by friction acting on the base of shallow foundations and by passive earth pressure. A coefficient of friction of 0.30 may be used for the on-site material with respect to dead load forces only.

Passive earth pressure may be computed as an equivalent fluid having a density of 310 pcf to a maximum of 3000 pounds. This assumes that the footing backfill is properly compacted. When combining passive earth pressure and friction for lateral resistance, the passive component should be reduced by one-third. A one-third increase in the passive value may be used for wind or seismic loads.

For footings and fill pad properly constructed as recommended above, the anticipated settlement due to dead plus live loads is expected to be within tolerable limits (less than 1/4 inch) for the individual columns.

Grading

Final grading plans are not available at this time. However based on our recommendations it is apparent that grading will be required to build engineered fill pad. All grading operations should be performed in accordance with the criteria given in our "Recommended General Grading Specifications" in Appendix D.

After stripping, slab and footing subgrades and areas to receive engineered fill should be excavated of any and all loose/soft soils. The resulting surface upon which fill is to be placed should be observed by the Geotechnical Engineer. Areas receiving fill should be scarified to a depth of 6 inches, moisture conditioned and compacted to not less than 95% of maximum dry density as determined by ASTM D1557.

As discussed in the above sections, it is recommended that the structural elements be supported on engineered fill pads. The thickness of the fill pad is recommended to be 3 feet underneath the permeable material of the slab-on-grade and footing bottom elevation. It is also recommended that a reinforcing fabric, such as Mirafi 600X or equal, be placed as recommended in the above sections during construction of the fill pad to provide uniform support to the slab and columns and mitigate some of the uncertainties in the field.

Engineered fill should consist of relatively non-expansive granular material, having a P.I. of less than 15 and Sand Equivalent greater than 20. The recommended fill should be placed in loose lifts not over 8 inches in thickness and compacted to at least 95% of relative compaction under slabs determined by ASTM D1557.

A representative from our office should observe all excavated area during grading and perform moisture and density tests on all fill material. Any fill material imported onto the site should be relatively non-expansive granular material meeting the aforementioned requirements and should be reviewed by the Geotechnical Engineer. The on-site material may be used for fill provided that it meets the above criteria.

Should there be any alterations of the proposed development which will affect the stated bases of our recommendations, we should be informed so that we can review such changes and amend or submit additional recommendations. Should there be any conflict between the General Grading Specifications and the recommendations included herein, the recommendations should supersede the specifications.

Drainage

Because soils, in general, tend to lose strength when they become wet, it is essential that drainage be properly controlled. Grading should be performed so as to provide positive drainage away from the structure and so that water is not allowed to collect or discharge near the foundation lines.

Runoff from slab areas, paved areas and other impervious surfaces should be collected and discharged in a manner that will not cause the surface soils to become overly saturated and cause erosion. Usually, surface runoff is discharged into the local storm drains.

Corrosion

Corrosion tests were performed on representative samples obtained from the field. The laboratory data indicated pH value of 7.7, resistivity value of 780 ohm-cm, water soluble chloride of 6.9 ppm and water soluble sulfate of 252 ppm. Due to the corrosive environment, Type II Modified Cement should be used for concrete substructure. Aluminum and aluminized steel pipes/culverts should not be used. The corrosion test results are attached in Appendix B.

Plan Review

Plans for foundations and grading should be reviewed by this office prior to grading and building construction so that the intent of our recommendations is included in the project plans and specifications and to further see that no misunderstandings or misinterpretations have occurred.

Construction Observation & Testing

To a degree, the performance of any structure is dependent upon construction procedures and quality. Hence, observation of subgrade preparation, density testing of fill and subgrades, and observation of foundation excavations should be carried out by this firm in order to minimize misunderstandings by the involved parties of both the letter and the spirit of our report as well as to note any subsurface conditions different from those forming the basis of our recommendations. Therefore, the recommendations presented in this report are contingent upon these geotechnical observations and tests during construction.

INVESTIGATION LIMITATIONS

Our services consist of professional opinions and recommendations, based on our site reconnaissance, exploration and the assumption that the subsurface information does not deviate from observed conditions. All work done is in accordance with generally accepted geotechnical engineering principles and practices. No warranty, expressed or implied, of merchantability or fitness, is made or intended in connection with our work or by the furnishing of oral or written reports or findings. The scope of our services did not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in structures, soil, surface water, groundwater or air, below or around this site. Unanticipated soil conditions are commonly encountered and cannot be fully determined by taking soil samples and excavating test borings; different soil conditions may require that additional expenditures be made during construction to attain a properly constructed project. Some contingency fund is thus recommended to accommodate these possible extra costs.

This report has been prepared in order to assist in the evaluation of the proposed project and to assist the architect and engineer in the design of this project. In the event any changes in the design or location of the facilities are planned, or if any variations or undesirable conditions are encountered during construction, our conclusions and recommendations shall not be considered valid unless the changes are reviewed and the recommendations modified or approved by us in writing.

This report is issued with the understanding that it is the client's responsibility to ensure that the information and recommendations contained herein are called to the attention of the designer for the project, and that necessary steps are also taken to see that the recommendations are carried out in the field. Some maintenance is expected after the development.

The findings in this report are valid as of the present date. However, changes in the conditions of the property can occur with the passage of time, whether they be due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or from the broadening of knowledge. Therefore, this report is subject to review by the controlling government agencies.

Very truly yours,
PARIKH CONSULTANTS, INC.

Y. David Wang, Ph.D., P.E. C52911
Project Engineer

Gary Parikh, P.E., G.E. 666
Project Manager

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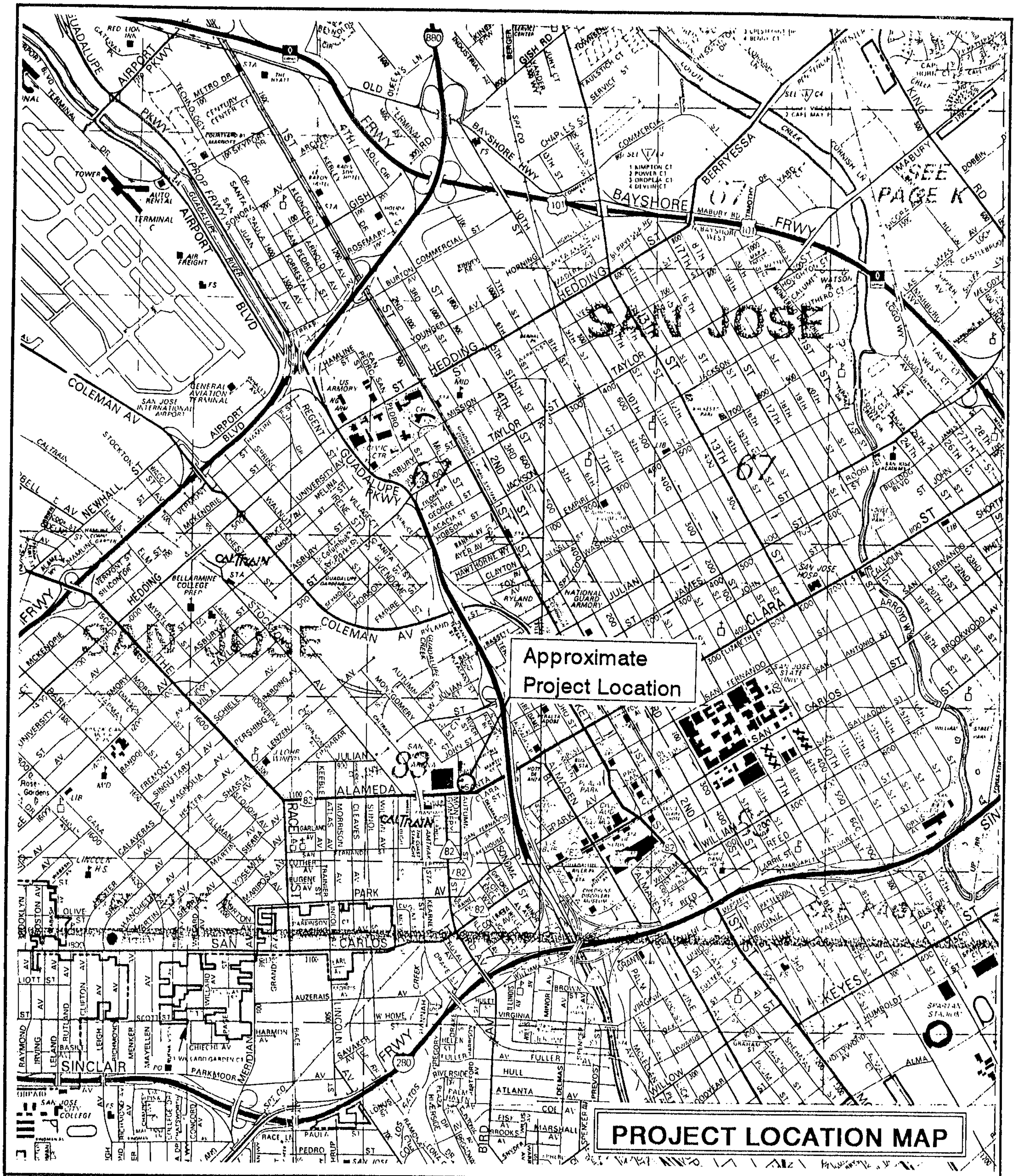

PROJECT LOCATION MAP

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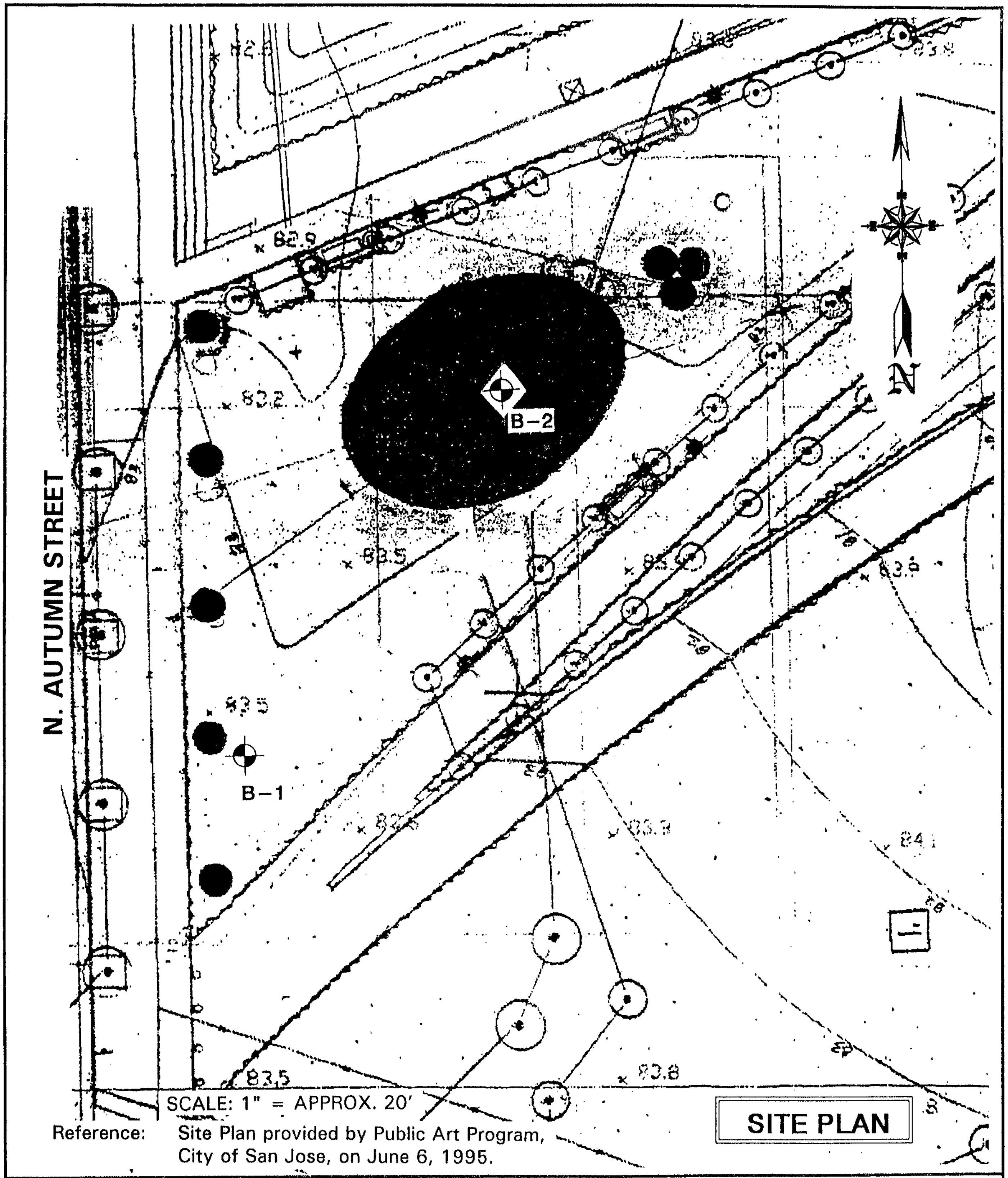
MATERIALS ENGINEERING

Confluence West Art Project
Santa Clara and Autumn Street, San Jose, CA

DATE: 7/95	**JOB NO:** 95130.10

PLATE 1



SCALE: 1" = APPROX. 20'

Reference: Site Plan provided by Public Art Program, City of San Jose, on June 6, 1995.

SITE PLAN

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Santa Clara and Autumn Street, San Jose, CA

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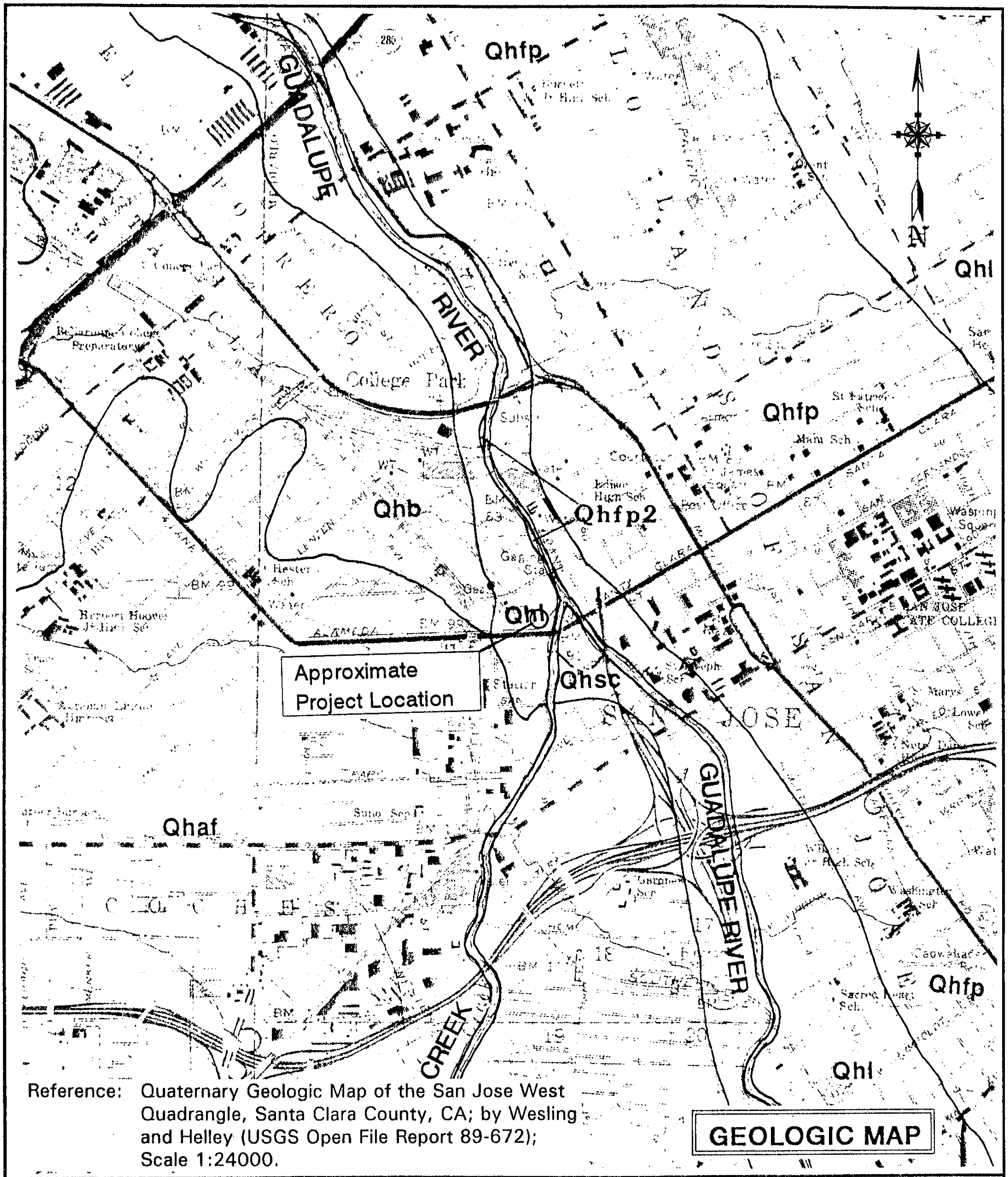

Reference: Quaternary Geologic Map of the San Jose West Quadrangle, Santa Clara County, CA; by Wesling and Helley (USGS Open File Report 89-672); Scale 1:24000.

GEOLOGIC MAP

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PLATE 3

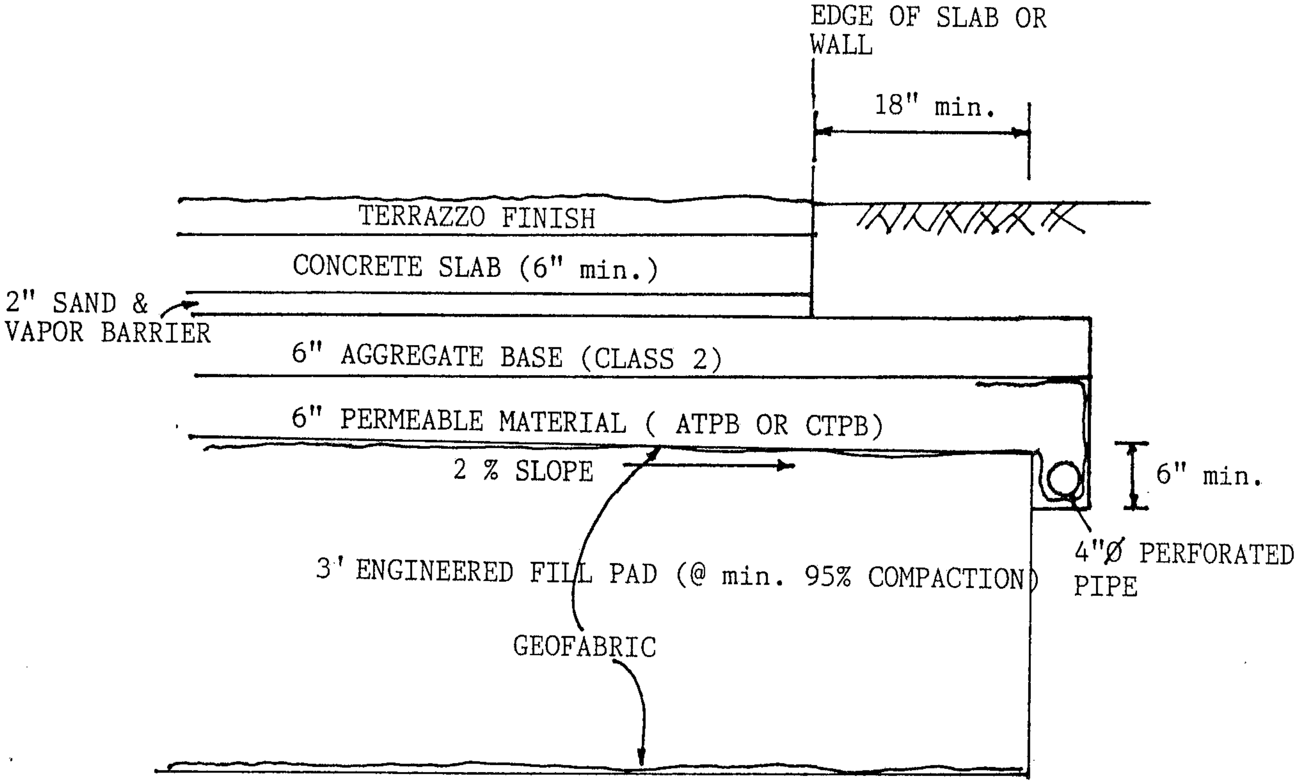

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PLATE 4

APPENDIX A

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			GROUP SYMBOLS		TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve	**GRAVELS** More than 50% of coarse fraction retained on No. 4 sieve	**CLEAN GRAVELS** Less than 5% fines	GW	∘	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	∘	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES More than 12% fines	GM	∘	Silty gravels, poorly graded gravel-sand-silt mixtures
			GC	▨	Clayey gravels, poorly graded gravel-sand-clay mixtures
	SANDS 50% or more of coarse fraction passes on No. 4 sieve	**CLEAN SANDS** Less than 5% fines	SW	⁙	Well-graded sands and gravelly sands, little or no fines
			SP	⁙	Poorly graded sands and gravelly sands, little or no fines
		SANDS WITH FINES More than 12% fines	SM	⁞	Silty sands, poorly graded sand-silt mixtures
			SC	▨	Clayey sands, poorly graded sand-clay mixtures
FINE GRAINED SOILS 50% or more passes No. 200 sieve	**SILTS AND CLAYS** Liquid Limit less than 50%		ML	▥	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity
			CL	▨	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	⁞	Organic silts and organic silty-clays of low plasticity
	SILTS AND CLAYS Liquid Limit 50% or more		MH	▥	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	▩	Inorganic clays of high plasticity, fat clays
			OH	▩	Organic clays of medium to high plasticity
HIGHLY ORGANIC			PT	≋	Peat and other highly organic soils

■ DMU, MOD. CALIFORNIA SAMPLER, driven by 140# hammer with 30" drop.

◩ Standard Penetration Test (SPT), driven by 140# hammer with 30" drop.

☒ Bulk sample

I ST, PS - Shelby Tube, Piston Sampler, pushed by hydraulic pressure.

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Boring Location, Elevation & Date Drilled:	Drilling Method:	BORING NUMBER
Near the proposed individual columns along Autumn St,; Elev. 83.5± ft.; drilled on 6-8-95	8-inch dia. Hollow Stem Auger CME 75	B-1
	Sampling Method: Standard Penet. (SPT), Mod. Calif. (MC) 140#, 30" drop	Sheet 1 of 1

Sample Type & No.	Dry Density (pcf)	Water Content (%)	Blows Per Foot	Depth (ft)	Soil Graph & U.S.C.S.	
				0	SM	Brown SILTY fine SAND with some gravel, loose, moist. With a layer of black clayey silt
MC-1	104.2	16.3	12			
SPT-2	-	22	5			
MC-3	83.7	31	18	5		
SPT-4	83.7	26.1	12		CL	Black silty SANDY CLAY, stiff, moist.
MC-5	107	18.8	25	10		Gray SANDY CLAY with brown sand stain, stiff, moist.
MC-6	129.3	10.8	34	15	SM	Dark gray SILTY SAND with trace gravel and clay, medium dense, moist.
MC-7	134.8	11	21	20	SW/ SM	Dark gray coarse grained SAND grading to fine grained silty SAND, medium dense, wet. (slight hydrocarbon odor).
MC-8	108	22.2	10	25	CL	Dark gray SILTY CLAY, medium stiff, very moist.
						Boring terminated at 26.5 feet Groundwater encountered at 20 feet on 6-8-95
				30		

LOG OF BORING

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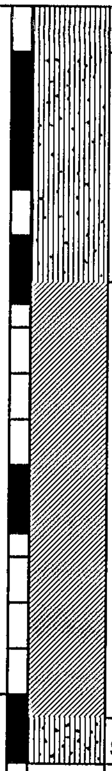
Plate A1

Boring Location, Elevation & Date Drilled:	Drilling Method:	BORING NUMBER
Near the center of the proposed slab-on-grade; Elev. 83.2± ft.; drilled on 6-8-95	8-inch dia. Hollow Stem Auger CME 75	B-2
	Sampling Method: Standard Penet. (SPT), Mod. Calif. (MC) 140#, 30" drop	Sheet 1 of 1



Sample Type & No.	Dry Density (pcf)	Water Content (%)	Blows Per Foot	Depth (ft)	Soil Graph & U.S.C.S.	
				0	ML	Brown SANDY SILT with some gravel, moist.
MC-1	96.1	12.5	40		SM	Brown SILTY SAND, grading to fine SAND at shoe, medium dense, moist.
SPT-2	-	21	5			Brown fine SILTY SAND, loose, moist.
MC-3	104.6	14.1	16	5		
					CL	Dark brown SANDY CLAY, medium stiff, moist.
MC-4	108.4	20.5	21	10		Light gray SANDY CLAY with brown sand stain, stiff, moist. (with slight hydrocarbon odor).
MC-5	123.3	13.4	20	15	SM	Dark gray medium grained SILTY SAND, medium dense, moist.
						Boring terminated at 16.5 feet. Groundwater encountered at 15 feet on 6-8-95
				20		
				25		
				30		

LOG OF BORING

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Confluence West Art Project
Santa Clara and Autumn Street, San Jose, CA

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Plate A2

APPENDIX B

LABORATORY TESTS

Classification Tests

The field classification of the samples was visually verified in the laboratory according to the Unified Soil Classification System. The results are presented on the "Logs of Borings", Plates A1 and A2.

Moisture-Density

The natural moisture contents and dry density were determined for selected undisturbed samples. This information was used to classify and correlate the soils. The results are presented at the appropriate depths on the "Log of Borings" and on the "Summary of Laboratory Test Results", Plate B1.

Gradation Analyses

Gradation tests were performed on representative samples to aid in the classification of the soil. The results are presented on Plates B4 and B5.

Strength Test

Strength test was performed on a selected undisturbed sample using unconfined compression machine. The result is presented on "Summary of Laboratory Test Results", Plate B1 and Plate B6.

Corrosion Test

Corrosivity of the on-site soils was determined by performing chemical tests on composite samples collected at about 5' depth. The tests performed include pH, resistivity, water soluble chloride, and water soluble sulfate in accordance with applicable California Test Methods. The test results are presented on Plates B2 and B3.

Sample No.	Depth (Feet)	USCS *	Grain Size Analysis			Atterberg Limits			Strength Parameters		Moisture Content %	Dry Density pcf	Remarks
			gravel %	sand %	fines %	LL %	PL %	PI %	Cohesion ksf	Phi degrees			
1–1	1										16.3	104.2	
1–2	2.5										22	–	
1–3	5										31	83.7	
1–4	6.5										26.1	83.7	
1–5	10										18.8	107	U.C. – Plate B6
1–6	15										10.8	129.3	
1–7	20	SW–SM	24	65	11						11	134.8	G. – Plate B4
1–8	25										22.2	108	
2–1	1										17.5	96.1	
2–2	2.5										21	–	
2–3	5										14.1	104.6	
2–4	10										20.5	108.4	
2–5	15	SM	18	58	24						13.4	123.3	G. – Plate B5

SUMMARY OF LABORATORY TEST RESULTS

Confluence West Art Project
Santa Clara and Autumn Street, San Jose, CA

PARIKH CONSULTANTS, INC.
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Notes:

* Unified Soil Classification System

C. = Consolidation
D.S. = Direct Shear
G. = Gradation
P.I. = Plasticity Index
R. = R–Value
U.C. = Unconf. Compression

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Plate B1

Core Sample No. & Depth	Sample Location (Station & Offset)	Compaction (Cal216; pcf)	Sand Equivalent	R-Value	Corrosion			
					pH	Resistivity (ohm-cm)	Chloride (ppm)	Sulfate (ppm)
B-1 @ 5'±	–	–	–	–	7.7	780	6.9	252

SUMMARY OF R-VALUE, CORROSION, COMPACTION AND SAND EQUIVALENT TESTS

Confluence West Art Project

Santa Clara and Autumn Street, San Jose, CA

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95130LB2.WK3 {DD}

Plate B2

AnaCon Testing Laboratories, Inc.

415 Fairchild Drive **Mountain View, California 94043**
Telephone: (415) 335-1233 **Facsimile: (415) 335-1076**

June 26, 1995/ld

Parikh Consultants, Inc.
P. O. Box 14218
Fremont, California 94539

ATL No.: 0036.01
Lab No.: 33210.1.6

Attention: Y. David Wang

Service: TESTS ON SOIL SAMPLE

Job No.: 95130 (B-1 5'-7')

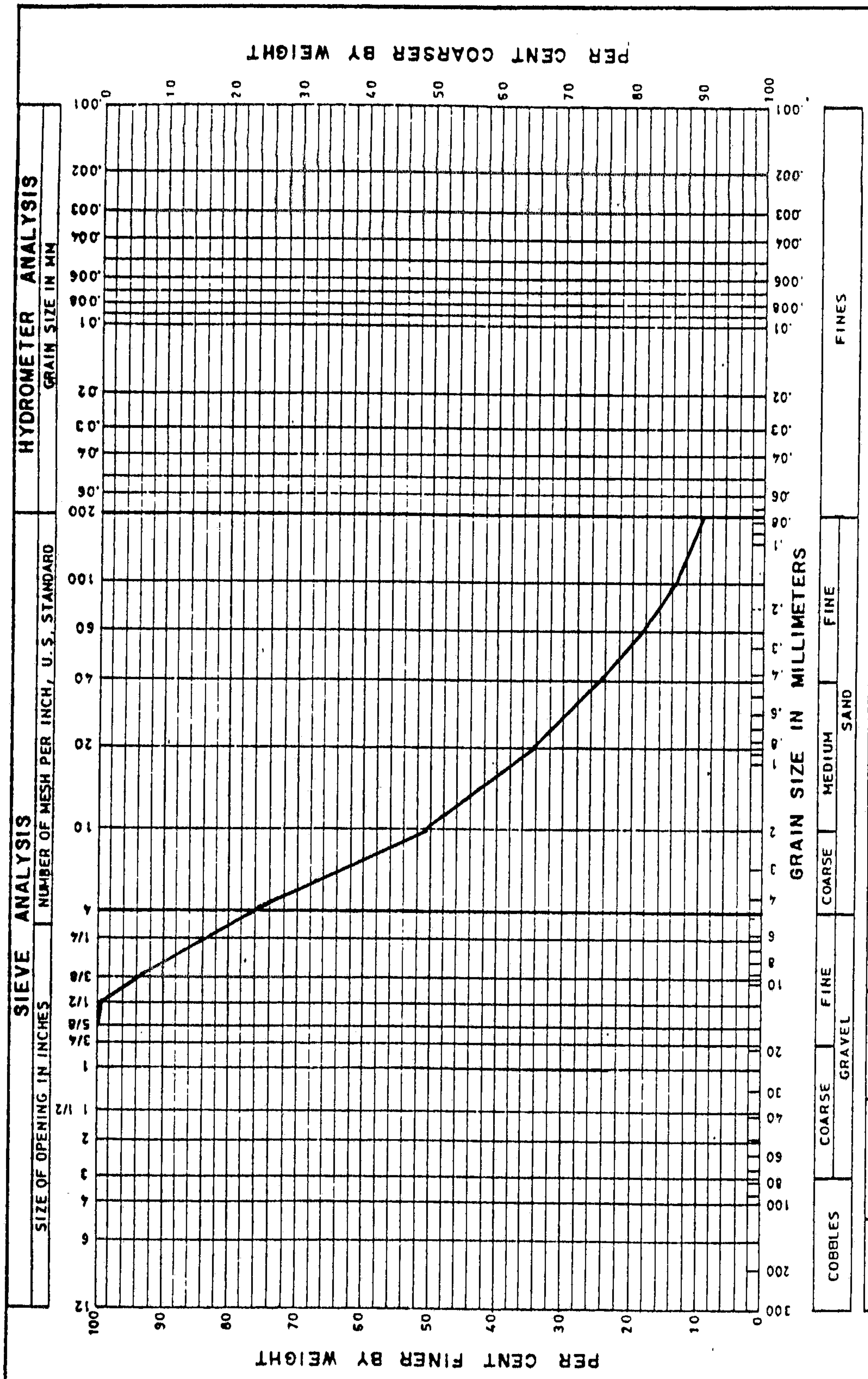
Date Received: June 23, 1995

	Found	Requirement	Calif. Test Method
Water Soluble Chloride, mg Cl/Kg Soil	6.9	500 max.	422
Water Soluble Sulfate, mg SO_4/Kg Soil	252	2000 max.	417

Respectfully submitted,
AnaCon Testing Laboratories, Inc.

Richard Maynez
Manager, Chemistry Laboratory

PLATE B3



SAMPLE NO.	DEPTH -FT.	U.S.C.	CLASSIFICATION	NAT. W.C.%	LL	PL	PI
B1-7		SW/SM	Grayish well graded gravelly silty sand	11.0			

GRAIN SIZE CLASSIFICATION

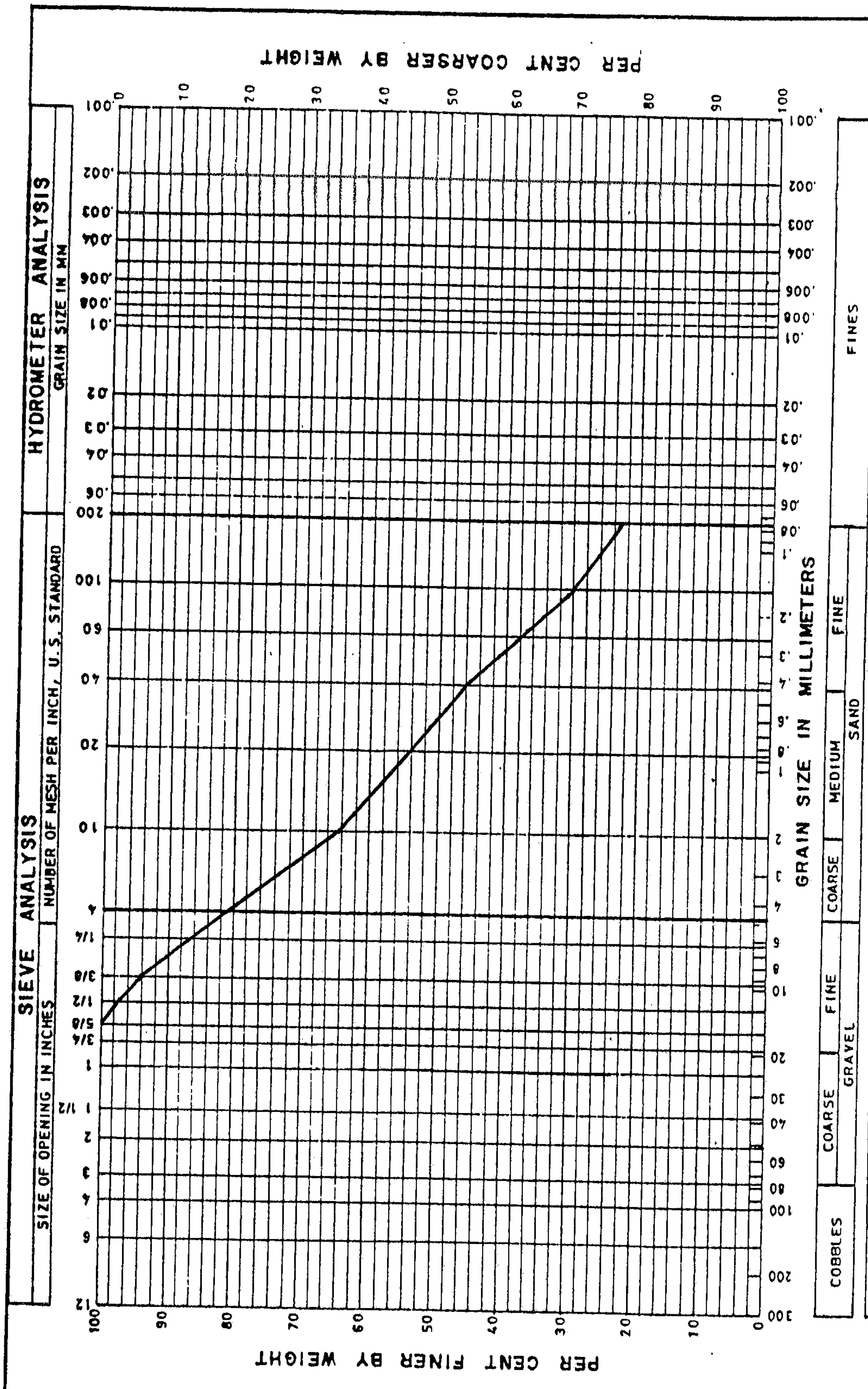
PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Confluence West Art Project
Santa Clara and Autumn Street, San Jose, CA

DATE: 07/95

JOB NO: 95130.10

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH -FT.	U.S.C.	CLASSIFICATION	NAT W.C.%	LL	PL	PI
B2-5		SM	Grayish silty sand with gravel	13.4			

PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

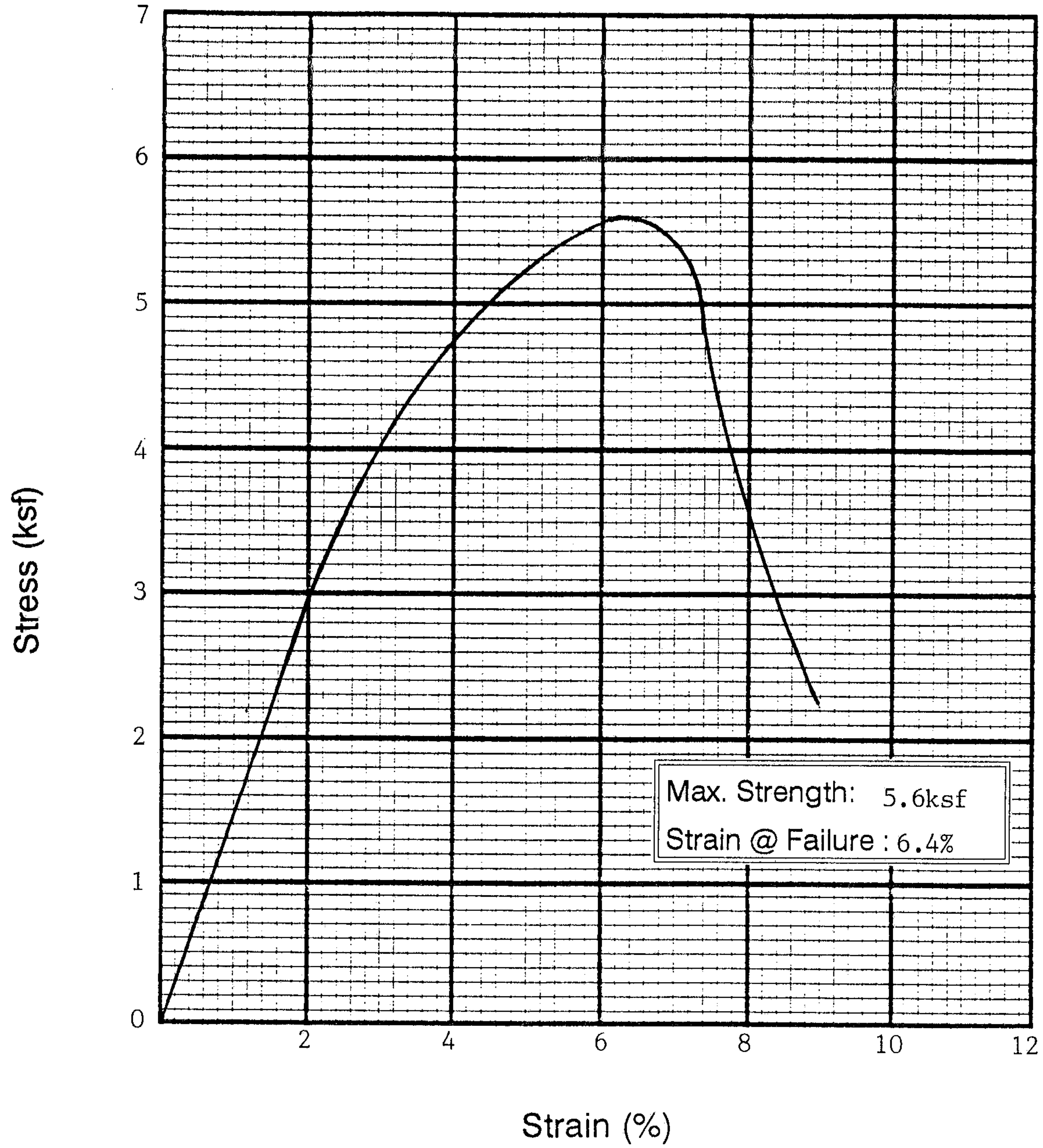
Confluence West Art Project
Santa Clara and Autumn Street, San Jose, CA

DATE: 07/95

JOB NO: 95130.10

PLATE B5

UNCONFINED COMPRESSION TEST



Max. Strength: 5.6ksf
Strain @ Failure : 6.4%

Boring No. B1 Sample No. 5 Elev. or Depth (ft.) 11
Nature Moisture Content (%) 18.8 Dry Density (pcf) 107
Specimen Diameter (in.) 2.425 Specimen Height (in.) 5
Description Brown fine Silty Clay
Remarks

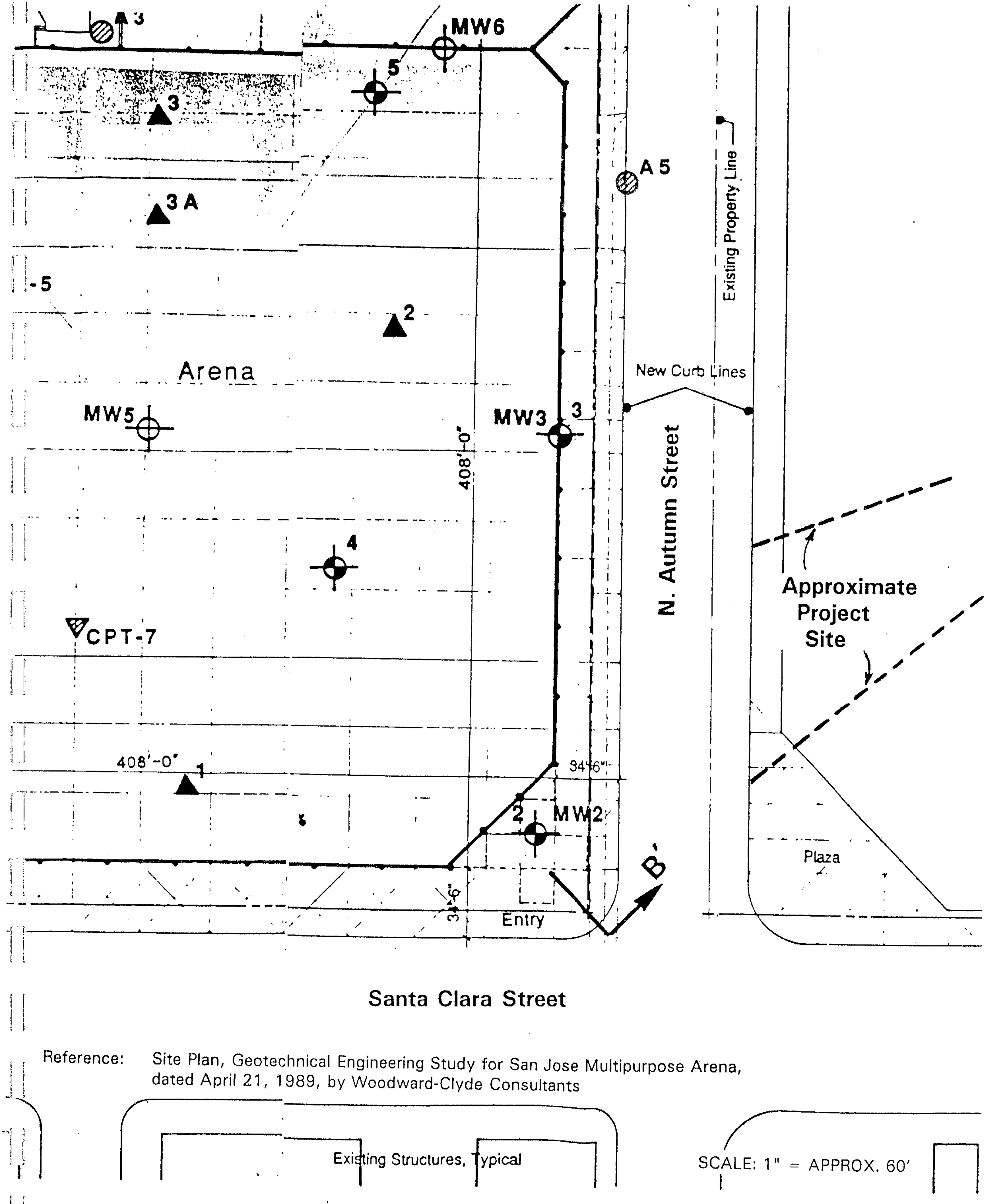
PARIKH CONSULTANTS, INC.
GEOTECHNICAL CONSULTANTS
MATERIALS ENGINEERING

Confluence West Art Project
Santa Clara and Autumn Street, San Jose, CA

DATE: 07/95 **JOB NO:** 95130.10

PLATE B6

APPENDIX C



Reference: Site Plan, Geotechnical Engineering Study for San Jose Multipurpose Arena, dated April 21, 1989, by Woodward-Clyde Consultants

Project: SAN JOSE MULTIPURPOSE ARENA
San Jose, California

Log of Boring No. 2 (MW2)

Date Drilled: August 2,1988
Type of Boring: 4-7/8 inch Rotary Wash
Hammer: 140 lbs falling 30 inches

Remarks: 2-inch diameter standpipe piezometer installed to 47 feet; slotted between 27 and 47 feet. Well was dry when readings were taken on 12-20-88, 12-29-88 & 1-26-89.

Location:

Surface Elevation: 84-1/2 ± feet

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			1-1/2 inches Asphalt Concrete			
	1	17	SILTY CLAY FILL (CL) (FILL) Poorly compacted, moist, dark gray brown, with scattered gravel and brick fragments	22	78	
			SANDY CLAYEY SILT (ML) Soft, wet, dark brown			
5	2	16	SILTY CLAY (CL-ML) Stiff, moist, brown, with lenses of Silty Sand (SM)	28	92	2930
10	3	23	SANDY CLAY (CL) Stiff, moist, light brown-gray with orange and dark brown mottling Grades to Clayey Sand (SC),Medium dense	20	106	
15	4	64	SILTY SAND (SM) Dense, moist to wet, dark gray, with scattered gravel +#4=33% -#200=21% Grading to Sandy Gravel (GW-GM) with strong gasoline odor	11	120	
20	5	26	Grading to Gravelly Sand with Silt (SW-SM), Medium dense +#4=25% -#200=9%			
			SILTY CLAY (CL/CH) Stiff, wet, dark gray			
25	6	P		29	96	2730
	7	16				
30			SILTY CLAY (CL) Stiff, moist, gray, slighty sandy, with some organic matter ▽ ATD			
35	8	12		25	98	2410
			Increasing sand content, with olive green-brown mottling			
40	9	21				

Project: 8815020R

Woodward-Clyde Consultants

Figure A-3a

Project: SAN JOSE MULTIPURPOSE ARENA
San Jose, California

Log of Boring No. 2 (MW2)

Depth Ft	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Clayey Sand (SC)	24	102	
45	10	13	Clayey Sand (SC) More plastic (CL-CH), medium	23	102	1720
50	11	16	Less plastic (CL-ML) Stiff, blue-gray and olive green-brown mottled	23	103	2600
55	12	21	Clayey Silt (ML), Dark gray	23	102	3100
60	13	19	Gray and light gray mottled	22	107	2690
65	14	18	With lenses of Sandy Silt (ML) With coarse pebbly sand	22	105	1500
70	15	69	GRAVELLY SAND TO SANDY GRAVEL (SW-SM/GW-GM) Dense, tan, with silt +#4=43% -#200=9%	9	134	
75	16	26	SANDY CLAY (CL) Medium, tan and orange mottled Increasing sand content	24	100	1530
80	17	78	GRAVELLY SAND TO SANDY GRAVEL (SW-SM/GW-GM) Very dense, brown, with silt +#4=43% -#200=10%			

Project: 8815020R

Woodward-Clyde Consultants

Figure A-3b

Project: SAN JOSE MULTIPURPOSE ARENA
San Jose, California

Log of Boring No. 2 (MW2)

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
85	18 ▨	17	SILTY CLAY (CL), Very stiff, moist, gray			
			BOTTOM OF BORING AT 86-1/2 FEET			
90						
95						
100						
105						
110						
115						
120						
125						

Project: 8815020R

Woodward-Clyde Consultants

Figure A-3c

Project SAN JOSE MULTIPURPOSE ARENA
San Jose, California

Log of Boring No. 3 (MW3)

Date Drilled: August 2,1988
Type of Boring: 4-7/8 inch Rotary Wash
Hammer: 140 lbs falling 30 inches

Remarks: 2-inch diameter standpipe piezometer installed to 25 feet; slotted between 10 and 25 feet.
Location:

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			Surface Elevation: 82-1/2 ± feet			
			2 inches Asphalt Concrete over 3 inches Rock Base			
	1	14	SILTY CLAY FILL (CL) Poorly compacted, moist, brown with sand, rock fragments and burnt wood (FILL)	26	86	930
5			SANDY CLAYEY SILT (ML) Soft, wet, dark, brown			
	2	14	SILTY CLAY (CH) Stiff, moist, very dark gray to black mottled	28	93	2220
				30	88	1400
			Medium, dark gray and light gray mottled			
10	3	23	SAND (SP-SC) Medium dense, moist, brown, with trace of clay -#200=11% ATD	18	102	450
15	4	34	GRAVELLY SAND (SP-SM) Dense, moist, brown Grading to Sandy Gravel (GW-GM) +#4=47% -#200=7%			
20	5	16	SILTY SAND (SM) Medium dense, brown 1-26-89 12-20-88			
			SILTY CLAY (CL) Medium, dark gray and olive green-brown mottled			
25	6	18		26	97	1400
	7	10	SILTY CLAY (CL) Medium, light gray-brown and orange mottled	28	93	1390
30						
			SILTY SAND (SM) Medium dense, brown, with trace of clay -#200=41%			
35	8	12		24	98	1390
			SANDY GRAVEL (GP-GM) Dense, brown, with silt			
40	9	21	Sand lens +#4= 47% -#200=8%			

Project: 8815020R

Woodward-Clyde Consultants

Figure A-4a

Project SAN JOSE MULTIPURPOSE ARENA
San Jose, California

Log of Boring No. 3 (MW3)

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
			SANDY GRAVEL (GP-GM)... (CONT'D)			
45	10	13	SILTY CLAY (CL) Medium, light gray-brown and orange mottled			
	11	8	SILTY CLAY (CL) Medium, light gray mottled, with trace of fine sand; very silty	25	97	1160
50	12	12	↓ Stiff, gray and olive green-brown mottled	23	101	2090
			↓ Trace gravel			
55	13	14	↓ More plastic, medium to stiff, gray	27	96	1900
60	14	19		25	100	1760
65	15	23				
			↓ Stiff, slighty dark gray with olive mottling and lenses of Sandy Silt (ML) to Clayey Sand (SC)	22	104	2320
70	16	21	SANDY CLAY (CL) Stiff, light brown and orange mottled ↓ Increasing sand content			
75	17	30				
	18	41	SILTY GRAVEL (GM) Dense, brown-gray, with some clay	10	132	
80	19	15	} With interbedded lenses of Sandy Silt (ML) and Silty Clay (CL), Gray			

Project: 8815020R

Woodward-Clyde Consultants

Figure A-4b

Project SAN JOSE MULTIPURPOSE ARENA
San Jose, California

Log of Boring No. 3 (MW3)

Depth Ft.	Samples	Blows/Ft	MATERIAL DESCRIPTION	Moisture Content, %	Dry Density pcf	Unconfined Compress. Strength, psf
85	20	25	SANDY CLAY (CL-SC) Stiff, light brown and orange mottled; sand content increasing with depth			
	21	29		18	113	1950
90			BOTTOM OF BORING AT 88-1/2 FEET			
95						
100						
105						
110						
115						
120						
125						

Project: 8815020R

Woodward-Clyde Consultants

Figure A-4c

APPENDIX D

RECOMMENDED GENERAL GRADING SPECIFICATIONS

1.1 General Description

1.11 These specifications have been prepared for general grading and site development of this project. Parikh Consultants, Inc., hereinafter described as the Geotechnical Engineer, should be consulted at least 4 days prior to any work connected with the existence of these specifications.

1.12 The work shall include all clearing and grubbing, preparation of land to be filled including benching and keying, filling of the land, spreading, compaction, density testing of the fill, and disposal of excess materials to complete the grading of areas in conformance with the lines, grades and slopes as shown on the grading plans.

1.13 In the event that any unusual conditions, not covered by these specifications, are encountered during grading operations, the Geotechnical Engineer shall be immediately notified.

2.1 Clearing, Grubbing and Preparing Areas to be Filled

2.11 All timber, roots, brush, sod, abandoned buildings (surface and subsurface), debris and other deleterious materials shall be removed to approved disposal areas. This work includes dust control as required to alleviate any nuisance on or about the site. No burning shall be permitted in areas to be filled.

2.12 All loose soil, organic matter subject to decay, topsoil and spongy material shall be removed from the surface upon which the fill is to be placed; the exposed surface shall be free from ruts, hummocks or other uneven features which would tend to prevent uniform compaction. The subgrade shall be approved by the Geotechnical Engineer prior to placing fill.

2.13 Where ground surface to receive fill is steeper than a gradient of 5 horizontal to 1 vertical (5:1), a fill stabilizing key shall be excavated into a subgrade that is competent and suitable for receiving fill after all loose soil, organic matter, topsoil, and spongy material have been removed in accordance with paragraph 2.12. The bottom of the key should be at least 12 feet wide and should slope into the hillside at a gradient of at least 2%.

2.14 The ground upon which the fill is to be placed shall be plowed or scarified to the recommended depth (usually 6 to 8 inches). Scarification of subgrade may be waived upon written approval of the Geotechnical Engineer.

2.15 After the area to receive the fill has been cleared, approved, and scarified, it shall be diced or bladed until it is uniform and free from large clods, brought to the proper moisture content by adding water and mixing or aerating, and compacted to not less than 90% of maximum dry density as determined by ASTM Designation No. D 1557-91. Testing will be performed by the Geotechnical Engineer.

2.16 Loose soils removed in accordance with paragraph 2.12, if free from deleterious materials, may be incorporated in compacted fill.

3.1 Materials

3.11 The materials for the engineered fill shall be approved by the Geotechnical Engineer at least four days before commencement of grading operations. Any imported materials must be approved before being brought to the site. The materials used shall be free of solid lumps, clods and any deleterious substances. No rocks larger than six inches in dimension will be permitted in mass fills unless they are placed at the direction of the Geotechnical Engineer.

3.12 The native soil, if free of organic or other deleterious material, may be used as fill.

3.13 The contractor shall notify the Geotechnical Engineer at least four working days in advance of his intention to import soil from any source outside the project areas and shall permit the Geotechnical Engineer to sample as necessary for the purpose of making tests to establish the qualities of these materials. The contractor shall be responsible for all costs incurred in sampling, testing, analyzing, and determining the applicability of the materials for use on the site. The work shall be performed by the Geotechnical Engineer.

4.1 Placing, Spreading and Compacting Fill Material

4.11 The fill material shall be placed in horizontal layers which, when compacted, shall not exceed 6 inches in thickness. Each horizontal layer shall be spread evenly and shall be thoroughly mixed to minimize segregation and to provide uniformity of material in each layer.

4.12 When fill material includes oversized rock, they shall be placed according to the recommendations of the Geotechnical Engineer in areas designated as suitable for rock disposal. No rocks larger than 6 inches will be permitted closer than 5 feet below the finished grade.

4.13 When the moisture content of the fill material is below the necessary to obtain the required density, water shall be added and thoroughly mixed into the soil. When the moisture content of the fill material is above the necessary to obtain the required density, the fill material shall be aerated by blading or other methods.

4.14 After each layer has been placed, it shall be thoroughly compacted to not less than 90% of maximum dry density as determined by ASTM Designation No. D 1557-91. Testing will be performed by the Geotechnical Engineer.

4.15 Compaction of each layer shall be continuous over its entire area and continued out to the finished slope face.

5.1 Tests

5.11 The test used to define maximum densities of all compaction work shall be the ASTM Designation No. D 1557-91. All densities shall be expressed as a percentage of the maximum dry density obtained in the laboratory by the foregoing procedure.

5.12 Field density tests will be performed by the Geotechnical Engineer. The location and number of tests will be determined by the Geotechnical Engineer or applicable specifications.

5.13 Earthwork shall not be performed without approval by the Geotechnical Engineer. Deviations from these specifications will not be allowed except by written variations signed by the Geotechnical Engineer.

6.1 Seasonal Requirements

6.11 No fill shall be placed during unfavorable weather conditions as determined by the Geotechnical Engineer. After interruption of work due to heavy rain, the Geotechnical Engineer shall approve previously placed fill before resumption of earthmoving operations.