Findings - The data recorded (Figure 6) is displayed in Time-Distance plot format in order to complete layer assignments (Figure 7). The curves for the forward, mid and reverse shots are displayed in the same graph. Two layers are exhibited in the curve for Line 5. Also there is significant irregularity in the portion of the curve representing the deeper layer. Part of this irregularity is due to the undulatory nature of the layer boundaries.

After layers are identified in the time-distance plots, the redundant data provided by forward and reverse shots over each spread, are input into the iterative, ray tracing modeling program. The resulting geologic structure sections are illustrated on Figures 8 through 13. All of the seismic lines (Lines 1-6) collected illustrate a two-layer case. These layers are interpreted to represent alluvium/colluvium overlying weathered bedrock. The velocities of these layers are also well defined:

Layer	Velocity (ft/sec)	Material
1	1000-1400	Alluvium/Colluvium
2	2500-3650	Weathered bedrock

Note: The measured seismic velocities represent average velocities of the subsurface materials, and significant local variations related to locally unfractured zones or other causes may be present at any level.

Conclusions - The interpretation for the seismic lines collected agree well. Depths to weathered bedrock for Lines 1 – 6 will range between 3 and 16 feet b.g.s.. Based on the measured seismic velocities, material in layer 1 and 2 would be classified as rippable. These conditions should be expected throughout the depth of investigation achieved for each seismic spread. In most cases a line length of 240 feet was employed (Lines 2, 3, 4, & 6) which results in a depth of investigation of approximately 80 feet b.g.s.. However, in two cases, field conditions dictated a shorter spread length of approximately 150 feet (Lines 1 & 5) resulting in a depth of investigation of approximately 50 feet b.g.s..

All data acquired in these surveys are in confidential file in this office, and are available for review by your staff, or by us at your request, at any time. We appreciate the opportunity to participate in this project. Please call, if there are questions.

Lawrence J. Favilla, GP 969
Senior Geophysicist

APPENDIX H

LABORATORY TESTING

APPENDIX H

LABORATORY TESTING PROCEDURES

VISUAL CLASSIFICATION OF SOILS

As a part of the routine laboratory soil testing, the soil samples are visually classified in accordance with the Unified Soil Classification System by experienced laboratory technicians. If necessary, in order to verify the visual classification, selected samples are classified utilizing the results of Standard Classification tests performed in accordance with ASTM D2487-98.

MOISTURE CONTENT AND DRY DENSITY DETERMINATION

Moisture content and dry density determinations were performed on relatively undisturbed samples obtained during our field exploration. The field moisture content is obtained by methods described in ASTM D2216-98. The in-situ dry unit weight was computed using the net weight and volume of the relatively undisturbed samples. The results of these tests are presented on the borings logs. Where applicable, only the moisture content is determined from relatively undisturbed or bulk samples.

SIEVE ANALYSIS

Representative samples were dried, weighed, and soaked in water until individual soil particles were separated, and then washed on the No. 200 sieve. That portion of the material retained on the No. 200 sieve was oven-dried and then run through a standard set of sieves in accordance with ASTM D422-63. The grain size distribution data are attached to the Laboratory Summary.

MAXIMUM DENSITY TESTS

The maximum dry density and optimum moisture content of typical materials is determined in accordance with ASTM D1557-00 (five layers). The results of these tests are presented in the Laboratory Summary.

DIRECT SHEAR TESTS

Direct shear tests were performed in general accordance with ASTM D3080-98 on selected remolded and undisturbed samples that were pre-soaked for a minimum of 24 hours. The samples were then tested under various normal loads with a different specimen being used for each normal load. The samples were sheared in a motor driven, strain-controlled direct shear testing apparatus at a strain rate of 0.05 inches per minute. The results of this test are presented in the Laboratory Summary and graphically as an attachment in this Appendix.

SOLUBLE SULFATES

Soluble sulfate tests determined in general accordance with California Test Method No. 417 were also performed on representative samples collected during the field investigation. Soils with a sulfate concentration greater than 0.07% may be corrosive to metals; concentrations greater than 0.10% are considered potentially harmful to concrete and would require following the current U.B.C. for "moderate" or worse sulfate exposure requirements.

APPENDIX H

LABORATORY TESTING PROCEDURES

MAXIMUM DENSITY
ASTM D1557-00

Sample	Soil Description	Maximum Density (pcf)	Optimum Moisture (%)
#1	Grayish Brown Silty Sand with Gravel	134.0	7.5
#2	Olive Brown Silty Sand with Gravel	128.5	9.5

SOLUBLE SULFATE CONTENT
California Test Method 417

Sample	Soluble Sulfate Content
#1	15 ppm
#2	15 ppm

Project Number : 00189-00 Tested by RMC Date 28-Jan-03

Project Name : CANYON HILLS Sampled by _____ Date _____

Sample No. BULK#2 Depth/Elev. _____ Location: _____

Sample Descriptions / Classification : BROWN POORLY GRADED SAND WITH GRAVEL (SP)

HYDROMETER ANALYSIS (ASTM STD HYDROMETER 152H)

Temp.(°C)	Meniscus Corr.	K Value	Hygroscopic Moisture		Wt.of Air Dry Sample, (g)	-
			Wet Weight of Soil,(g)		Wt.of Oven Dry Sample,(g)	-
			Dry Weight of Soil,(g)		Material Passing Sieve No.	10
			Moisture Content,(%)			

Specific Gravity (γ) = 2.7 (Assumed) Correction Factor (α) = 0.99

Date	Time	Elapsed Time(min)	Temp. (°C)	R'	C	R	% P	% P Corrected	L (cm)	k Value	L / T (cm/min)	Diameter (mm)
		0.25										
		0.50										
		1.00										
		2.00										
		4.00										
		5.00										
		15.0										
		30.0										
		60.0										
		240.0										
		1440.0										

N/A

SIEVE ANALYSIS

Sieve		Weight Retained		Cummulative		Specification
Size	Opening (mm)	Individual (g)	Cummulative (g)	% Retained	% Passing	% Passing
3"	75.0		0		100	
2"	50.0					
1-1/2"	38.1		168.8	5.2	94.8	
1"	25.0					
3/4"	19.0		475.9	14.8	85.2	
1/2"	12.5					
3/8"	9.5		832.8	25.9	74.1	
#4	4.75		1084.6	33.7	66.3	
#8	2.36		1341.9	41.7	58.3	
#10	2.00					
#16	1.18		1782.8	55.4	44.6	
#30	0.600		2252.6	70.0	30.0	
#50	0.300		2642.0	82.1	17.9	
#100	0.150		2931.6	91.1	8.9	
#200	0.075		3070.00	95.4	4.6	

Total Wt. of Dry Soil,(g)	3218.00

	Moist	Dry
(+)#10 Sieve,(g)	-	-
(-)#10 Sieve,(g)	-	-

Sand & Gravel Particle Descriptions

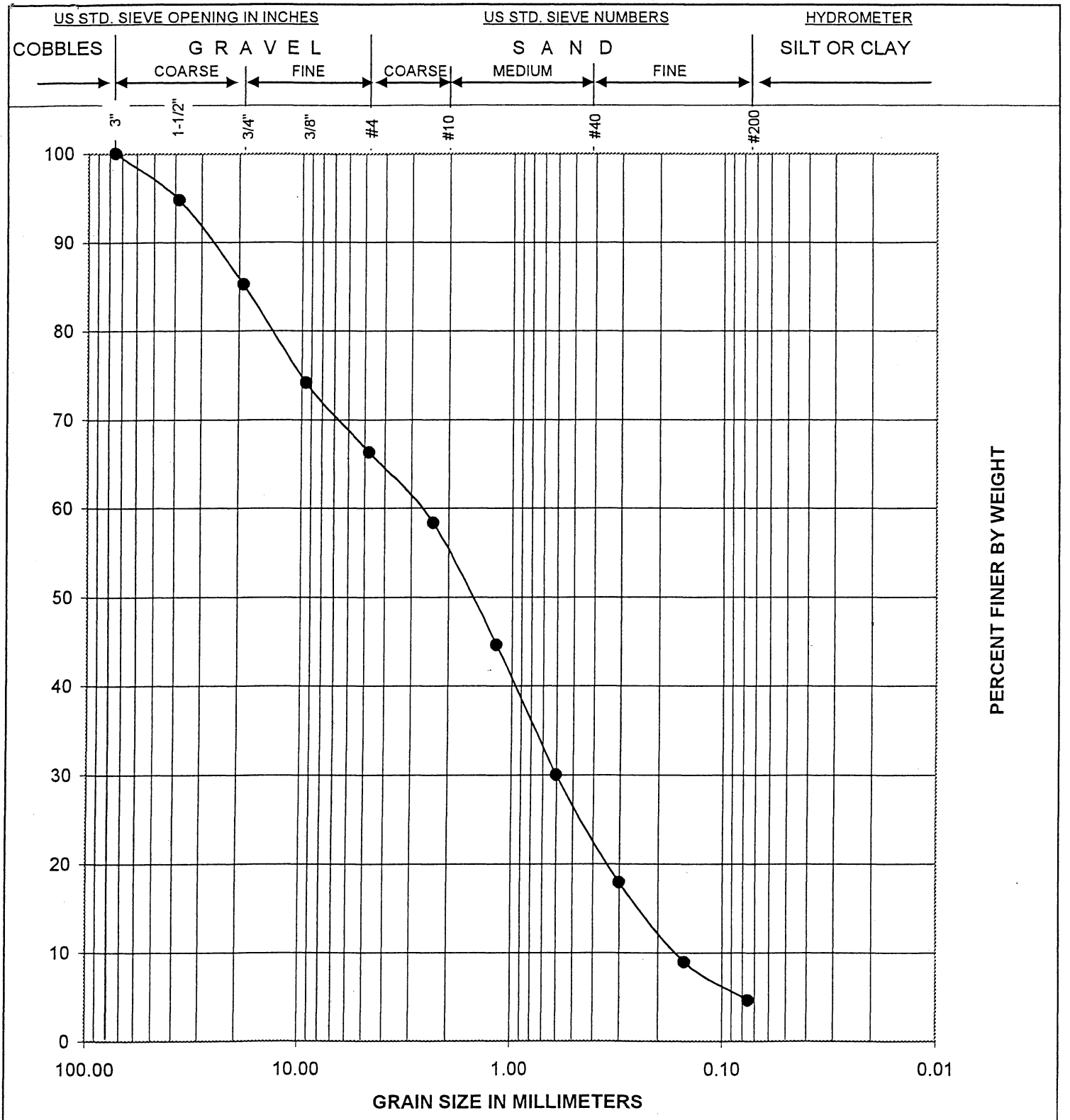
Shape	Rounded	
	Angular	X
Hardness	Hard & Durable	X
	Soft	
	Weathered & Friable	

D_{10}	0.175	D_{60}	2.75
D_{30}	0.61		
Coefficient of Uniformity, C_u			15.7
Coefficient of Curvature, C_c			0.8

Remarks : _____

ZEISER KLING CONSULTANTS, INC.
1221 E. Dyer Road, Suite 105; Santa Ana, CA 92705
Tel: (714) 755-1355; Fax: (714) 755-1366

GRAIN - SIZE ANALYSIS



PROJECT NUMBER 00189-00 PROJECT NAME CANYON HILLS

SAMPLE NO.	DEPTH	SYMBOL	CLASSIFICATION	NAT.W%	LL	PL	PI
BULK#2	0	SP	GRAYISH BR. POORLY GRADED GRAVEL W/ SILT & SAND		-	-	-

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GRAIN - SIZE CURVE

Project Number : 00189-00 Tested by RMC Date 28-Jan-03

Project Name : CANYON HILLS Sampled by _____ Date _____

Sample No. BULK#1 Depth/Elev. _____ Location: _____

Sample Descriptions / Classification : GRAYISH BROWN SILTY SAND WITH GRAVEL (SM)

HYDROMETER ANALYSIS (ASTM STD HYDROMETER 152H)

Temp.(^{0}C)	Meniscus Corr.	K Value	Hygroscopic Moisture		Wt.of Air Dry Sample, (g)	-
			Wet Weight of Soil,(g)		Wt.of Oven Dry Sample,(g)	-
			Dry Weight of Soil,(g)		Material Passing Sieve No.	10
			Moisture Content,(%)			

Specific Gravity (γ) = 2.7 (Assumed) Correction Factor (α) = 0.99

Date	Time	Elapsed Time(min)	Temp. (^{0}C)	R'	C	R	% P	% P Corrected	L (cm)	k Value	L / T (cm/min)	Diameter (mm)
		0.25										
		0.50										
		1.00										
		2.00										
		4.00										
		5.00										
		15.0										
		30.0										
		60.0										
		240.0										
		1440.0										

N/A

SIEVE ANALYSIS

Sieve Size	Sieve Opening (mm)	Weight Retained Individual (g)	Weight Retained Cummulative (g)	Cummulative % Retained	Cummulative % Passing	Specification % Passing
3"	75.0		0		100	
2"	50.0					
1-1/2"	38.1		113.7	4.1	95.9	
1"	25.0					
3/4"	19.0		396.6	14.2	85.8	
1/2"	12.5					
3/8"	9.5		726.9	26.0	74.0	
#4	4.75		1037.2	37.1	62.9	
#8	2.36		1242.4	44.4	55.6	
#10	2.00					
#16	1.18		1499.8	53.6	46.4	
#30	0.600		1776.8	63.5	36.5	
#50	0.300		2028.6	72.5	27.5	
#100	0.150		2266.5	81.0	19.0	
#200	0.075		2453.90	87.7	12.3	

Total Wt. of Dry Soil,(g)	2798.10

	Moist	Dry
(+)#10 Sieve,(g)	-	-
(-)#10 Sieve,(g)	-	-

Sand & Gravel Particle Descriptions

Shape	Rounded	
	Angular	X
Hardness	Hard & Durable	X
	Soft	
	Weathered & Friable	

D_{10}		D_{60}	
D_{30}			
Coefficient of Uniformity, C_u			
Coefficient of Curvature, C_c			

Remarks : _____

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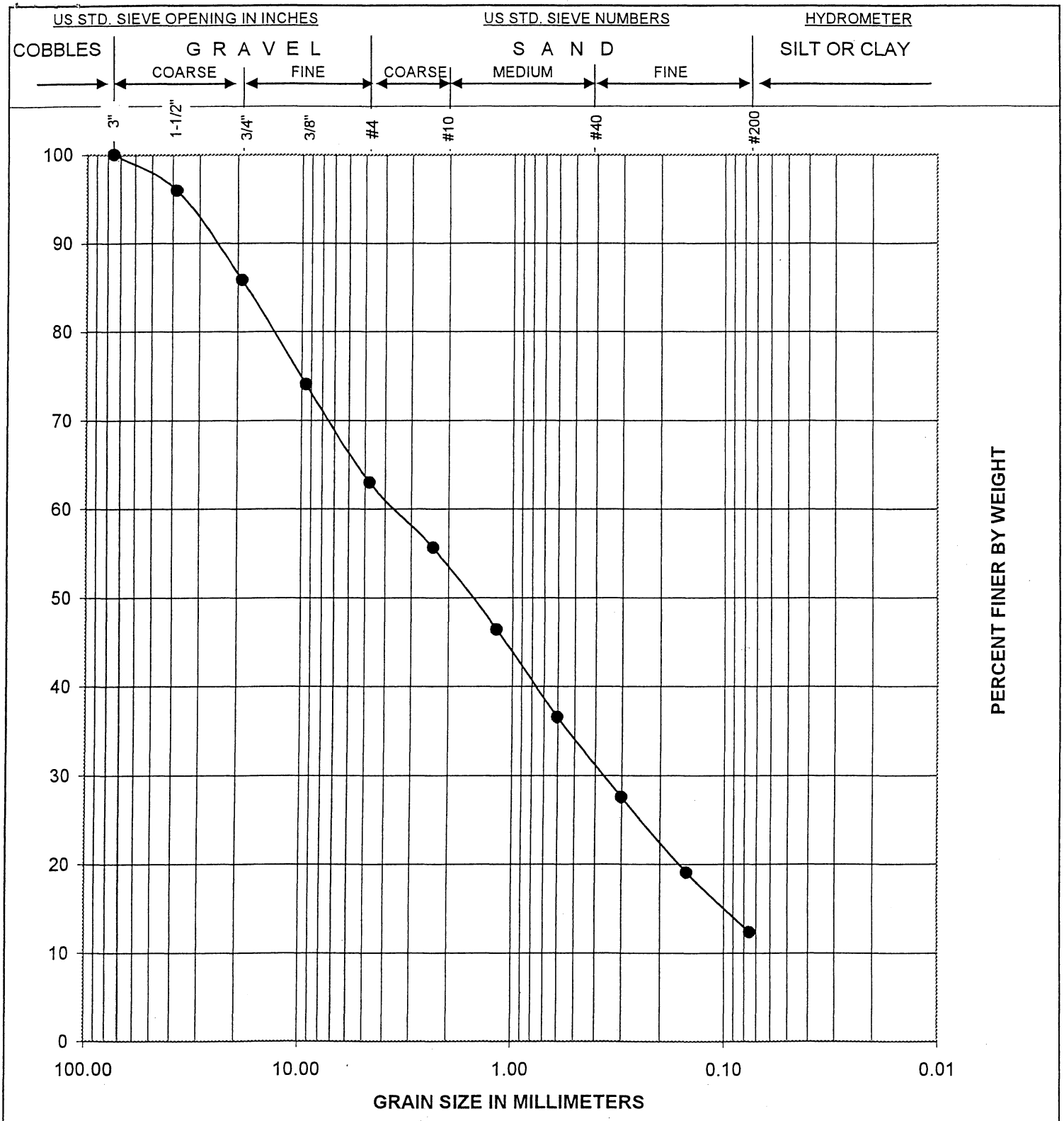
1221 E. Dyer Road, Suite 105; Santa Ana, CA 92705
Tel: (714)-755-1355; Fax: (714) 755-1366

GRAIN - SIZE ANALYSIS



PROJECT NUMBER 00189-00 PROJECT NAME CANYON HILLS

SAMPLE NO.	DEPTH	SYMBOL	CLASSIFICATION	NAT.W%	LL	PL	PI
BULK#1	0	SM	GRAYISH BR. POORLY GRADED GRAVEL W/ SILT & SAND		-	-	-

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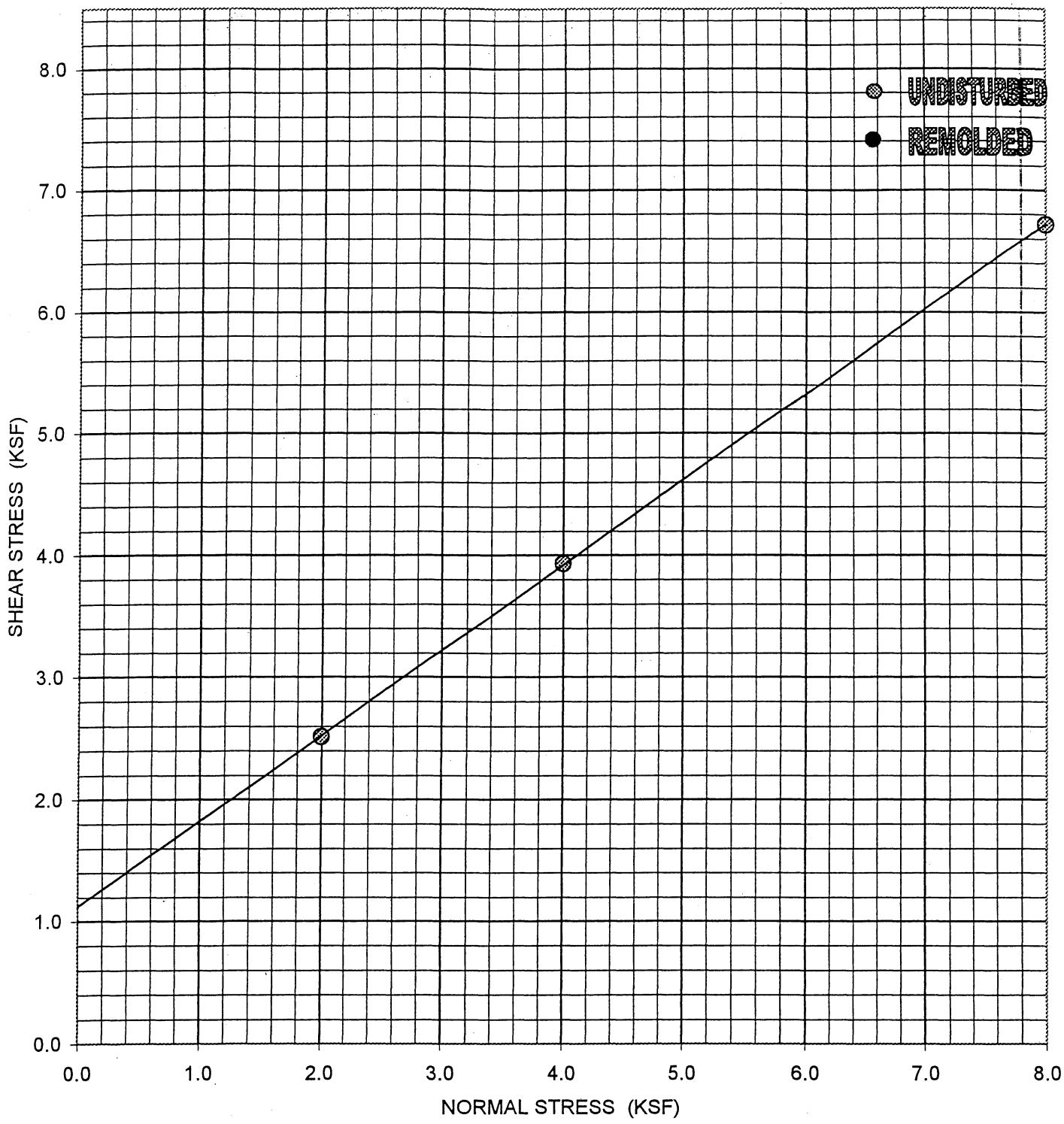
GRAIN - SIZE CURVE



PROJECT NUMBER : 00189-00

PROJECT NAME : CANYON HILLS

SAMPLE LOCATION: HS-1 @ 20'

SAMPLE DESCRIPTIONS / CLASSIFICATION : GRAYISH BR. SILTY SAND "DG"(SM)

SHEAR RATE : 0.01 "/MIN.

COHESION (C) : 1100 PSF

FRICTION ANGLE (ϕ): 35 °

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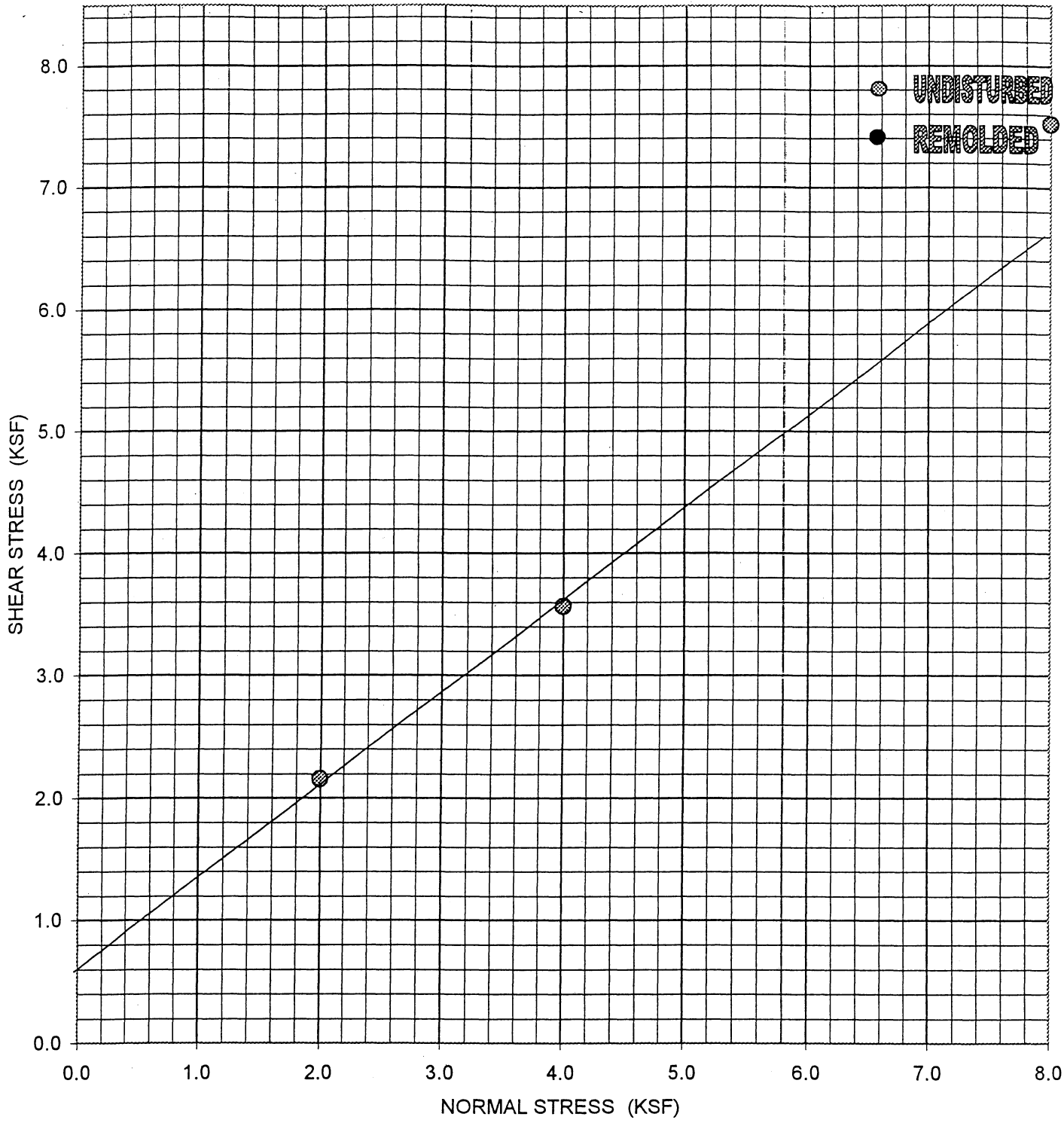
DIRECT SHEAR CURVE



PROJECT NUMBER : 00189-00

PROJECT NAME : CANYON HILLS

SAMPLE LOCATION: HS-2 @ 15'

SAMPLE DESCRIPTIONS / CLASSIFICATION : GRAYISH BROWN SILTY SAND (SM)

SHEAR RATE : 0.01 "/MIN.

COHESION (C) : 600 PSF

FRICTION ANGLE (ϕ): 37 °

ZEISER KLING CONSULTANTS,INC.
1221 E. Dyer Road, Suite 105; Santa Ana, CA 92705
Tel: (714) 755-1355; Fax: (714) 755-1366

DIRECT SHEAR CURVE

APPENDIX I

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 GENERAL INTENT

These specifications present general procedures and requirements for grading and earthwork as shown on the project grading plans, including preparation of areas to be filled, placement of fill, installation of subsurface drainage, and excavations. The recommendations contained in the geotechnical report(s) are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict. Evaluations performed by the geotechnical consultant during the course of grading may result in new specifications or recommendations in addition to those contained in the geotechnical report(s).

2.0 EARTHWORK OBSERVATION AND TESTING

Prior to the commencement of grading, a qualified geotechnical consultant (soils engineer and engineering geologist, and their representatives) shall be employed for the purpose of observing earthwork procedures and testing the fills for conformance with the recommendations of the geotechnical report and these specifications. It will be necessary that the geotechnical consultant provide adequate testing and observation so that he may determine that the work was accomplished as specified. If conditions exposed during grading differ significantly from those interpreted during the preliminary design investigation, the geotechnical consultant shall inform the client, recommend appropriate changes in the geotechnical design to account for the observed conditions, and notify City or County grading authorities, as necessary. It shall be the responsibility of the contractor to assist the geotechnical consultant and keep him apprised of work schedules and changes so that he may schedule his personnel accordingly.

The Project Geotechnical Consultant shall observe processing, moisture conditioning, and compaction of fill and subgrade materials. Testing of compacted fill in representative locations shall be performed by the Project Geotechnical Consultant's field representative. Daily reports and test results shall be provided to the client representative on a regular and frequent basis. Maximum dry density tests used to determine the degree of compaction and optimum moisture content shall be performed in accordance with the latest edition of the American Society for Testing and Materials test method ASTM D1557.

It shall be the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the work in accordance with the geotechnical report(s) applicable grading codes and project grading plans. If, in the opinion of the geotechnical consultant, unsatisfactory conditions, such as questionable soil, poor moisture condition, inadequate compaction, adverse weather, etc., are resulting in the quality of work less than required in these specifications, the geotechnical consultant will be empowered to reject the work and recommend that construction be stopped until the conditions are rectified.

3.0 PREPARATION OF AREA TO BE FILLED

3.1 Clearing and Grubbing

All brush, vegetation, trash, debris and other deleterious material shall be removed from fill areas and disposed of off site. Vegetation cleared from the site shall not be placed within engineered compacted fill areas.

3.2 Processing

The existing ground which is determined to be satisfactory for support of fill shall be scarified to a minimum depth of six (6) inches. Existing ground which is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until the soils are broken down and free of large clay lumps or clods and until the working surface is reasonably uniform and free of uneven features which would inhibit uniform compaction.

3.3 Overexcavation

Soft, dry, spongy, highly fractured or otherwise unsuitable ground, extending to such a depth that surface processing cannot adequately improve the condition, shall be overexcavated to firm ground, and verified by the project geotechnical consultant.

3.4 Moisture Conditioning

Overexcavated and processed soils shall be watered, dried-back, blended, and/or mixed as required to attain a uniform moisture content near optimum.

3.5 Recompaction

Overexcavated and processed soils which have been properly mixed and moisture-conditioned shall be recompacted to a minimum relative compaction of 90 percent.

3.6 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal:vertical units), the ground shall be stepped or benched. The lowest bench shall be a minimum of 15 feet wide, shall be at least 2 feet deep, shall expose firm material, and shall be verified by the geotechnical consultant. Other benches shall be excavated in firm material for a minimum width of 4 feet. Ground sloping flatter than 5:1 shall be benched or otherwise overexcavated when considered necessary by the geotechnical consultant.

3.7 Evaluation of Areas to Receive Fill

All areas to receive fill, including processed areas, removal areas and toe-of-fill benches shall be observed, tested, and/or mapped by the geotechnical consultant prior to fill placement. A written evaluation of the area to be filled shall be obtained by the Contractor prior to placement of fill.

4.0 FILL MATERIAL

4.1 General

Material to be placed as fill shall be free of roots, grasses, branches, wood or other organic matter and other deleterious materials, and shall be tested by the geotechnical consultant prior to use as fill. Soils of poor gradation, expansion, or strength characteristics shall be placed in areas designated by the geotechnical consultant or shall be mixed with other soils to serve as satisfactory fill material.

4.2 Oversize Material

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 12 inches, shall not be buried or placed in fills, unless the location, materials, and disposal methods are specifically recommended by the geotechnical consultant. Oversized disposal operations shall be such that nesting of oversize material does not occur, and such that the oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet vertically of finish grade or construction, unless specifically recommended by the geotechnical consultant.

4.3 Import

If importing of fill material is required for grading, the import material shall meet the requirements of Section 4.1. Samples of import soils shall be provided for testing a minimum of 48 hours before the import materials are brought on site.

5.0 FILL PLACEMENT AND COMPACTION

5.1 Fill Lifts

Fill material shall be placed in prepared areas in near-horizontal layers not exceeding 8 inches in loose thickness. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to attain uniformity of material and moisture in each layer.

5.2 Fill Moisture

Fill layers at a moisture content less than optimum shall be watered and mixed, and wet fill layers shall be aerated by scarification or shall be blended with drier material. Moisture-conditioning and mixing of fill layers shall continue until the fill material is at a uniformly processed at a minimum of 125 percent of the optimum moisture content.

5.3 Fill Compaction

After each layer has been evenly spread, moisture-conditioned, mixed, and shall be uniformly compacted to not less than 90 percent of the maximum dry density at a minimum of 125 percent of the optimum moisture content. Compaction equipment shall be adequately sized and shall be either specifically designed for soil compaction or of proven reliability, to efficiently achieve the specified degree of compaction.

5.4 Fill Slopes

Compacting of slopes shall be accomplished, in addition to normal compacting procedures, by overfilling and compacting the slope face a minimum of four feet horizontally from finish grade, and cutting the slope face back to the core of compacted fill. In restricted spaces where overfilling is not possible, fill slopes may be compacted by backrolling of slopes with sheepsfoot rollers at frequent increments of 2 to 3 feet in fill elevation gain, or by other methods producing satisfactory results. At the completion of grading, the relative compaction of the slope out to the slope face shall be a minimum of 90 percent.

5.5 Compaction Testing

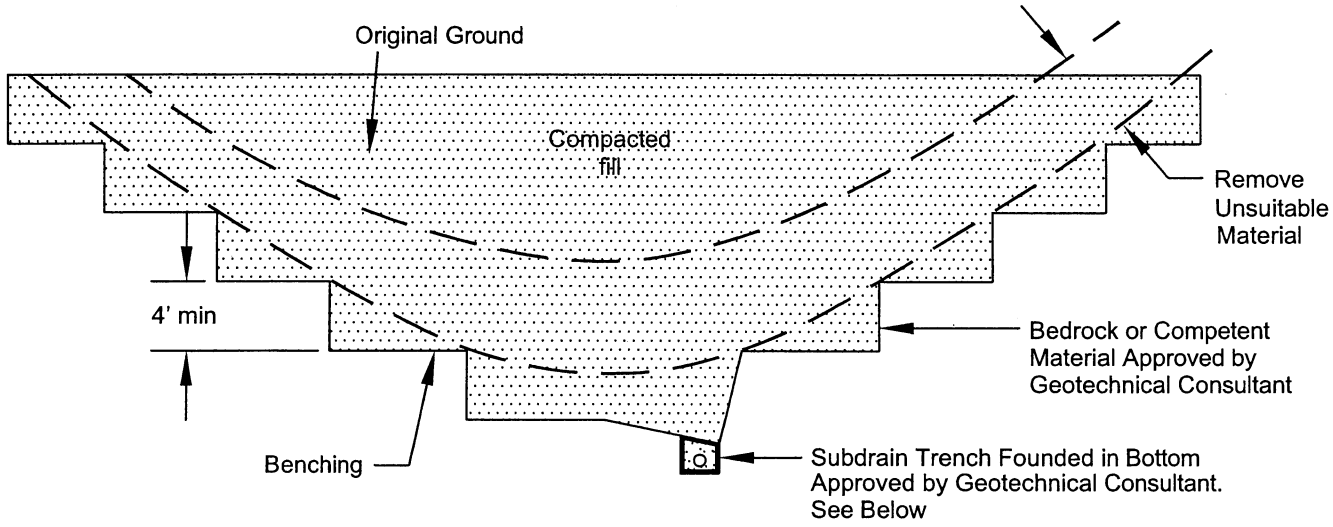
Field tests to check the fill moisture and degree of compaction will be performed by the geotechnical consultant. The location and frequency of tests shall be at the geotechnical consultant's discretion. In general, the tests will be taken at an interval not exceeding 2 feet in vertical elevation and/or 1,000 cubic yards of fill placed.

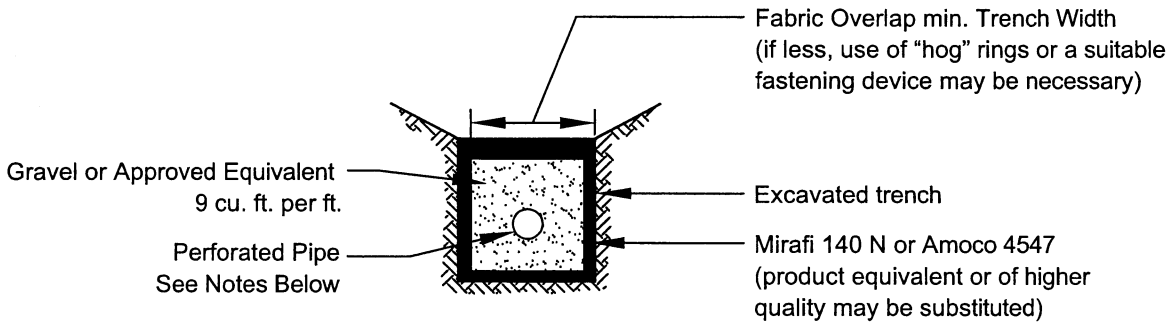
6.0 SUBDRAIN INSTALLATION

Subdrain systems shall be installed in locations recommended by the geotechnical consultant to conform to the approximate alignment and details shown on the plans or herein. The subdrain location or materials shall not be changed or modified without the recommendation of the geotechnical consultant. The geotechnical consultant, however, may recommend changes in subdrain line, grade or material. All subdrains should be surveyed for line and grade after installation. Sufficient time shall be allowed for the surveys, prior to commencement of filling over subdrains areas.

7.0 EXCAVATION

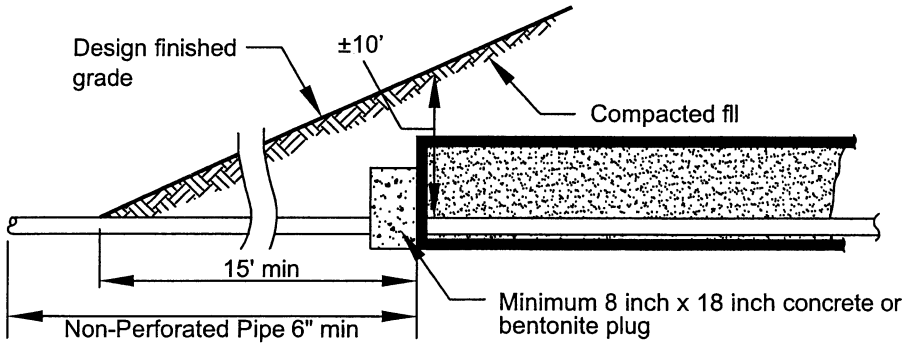
Excavation and cut slopes will be geologically mapped and examined during grading. Sufficient time shall be allowed by the contractor to permit geologic mapping of excavation bottoms and cut slopes. If directed by the geotechnical consultant, further excavation or overexcavation and refilling of cut areas shall be performed, and/or remedial grading of cut slopes. All fill-over-cut slopes are to be graded, unless otherwise stated, shall be constructed as a fill slope with the use of minimum width stabilization fills, as necessary.





SUBDRAIN

Perforated Pipe and Gravel
Gravel Wrapped in Filter Fabric



CANYON SUBDRAIN TERMINAL

SUBDRAIN INSTALLATION: Subdrain pipe shall be installed with perforations down. Pipe diameter shall increase as length of subdrain increases as follows: up to 600 ft. - 6" pipe; 600ft. To 1200 ft. - 8" pipe; greater than 1200 ft. as evaluated and approved by Geotechnical Consultant. Pipe joint bells should point upstream and be glued with the appropriate adhesive.

SUBDRAIN TYPE: Subdrain pipe type shall be PVC Schedule 40* for fills of less than 100 ft., and PVC Schedule 80* for fills over 100 ft., ASTM D1785 (*product equivalent or of increased quality may be substituted). Perforations shall conform to ASTM F758. Connecting elements shall consist of materials of equal quality compatible to the subdrain pipe.

INFORMATION DEPICTED ON THIS DETAIL IS FOR TYPICAL CONDITIONS AND ARE SUBJECT TO CHANGE BY THE GEOTECHNICAL CONSULTANT.

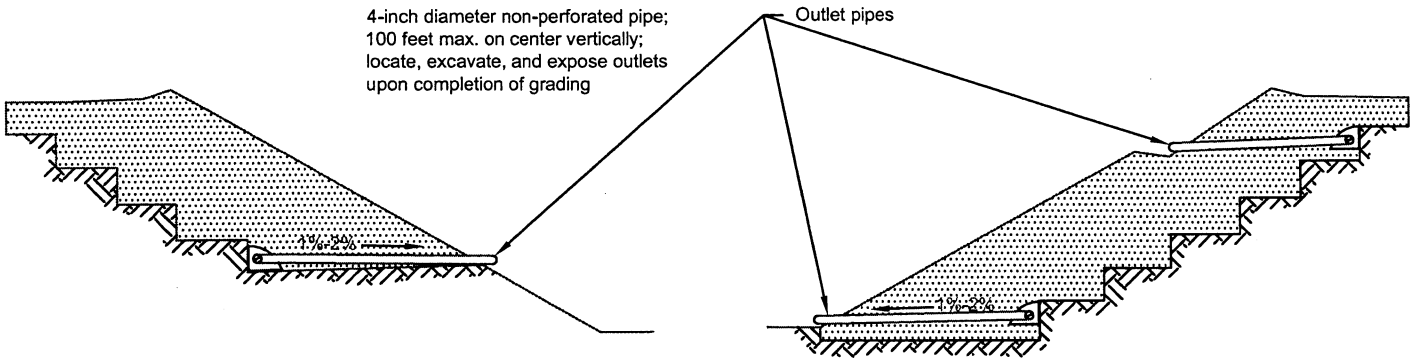
ZEISER KLING Consultants, Inc.

CANYON FILL AND SUBDRAIN DETAIL

GD-1

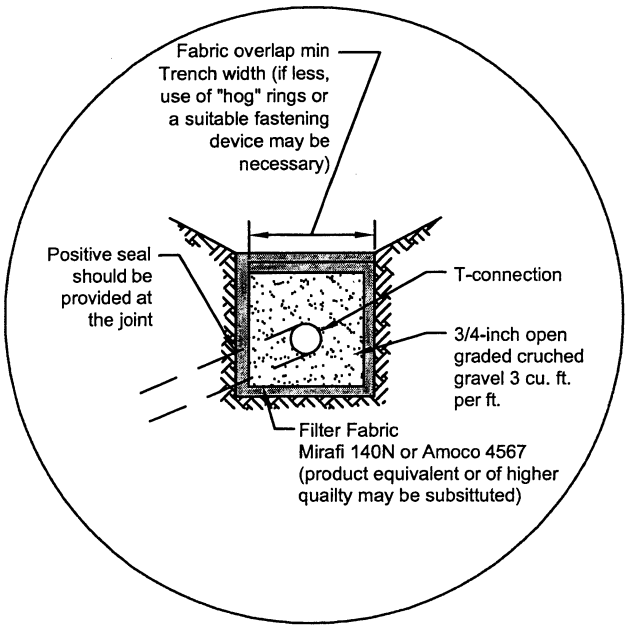
REVISION DATE: 10/01

STANDARD PLATES.DWG

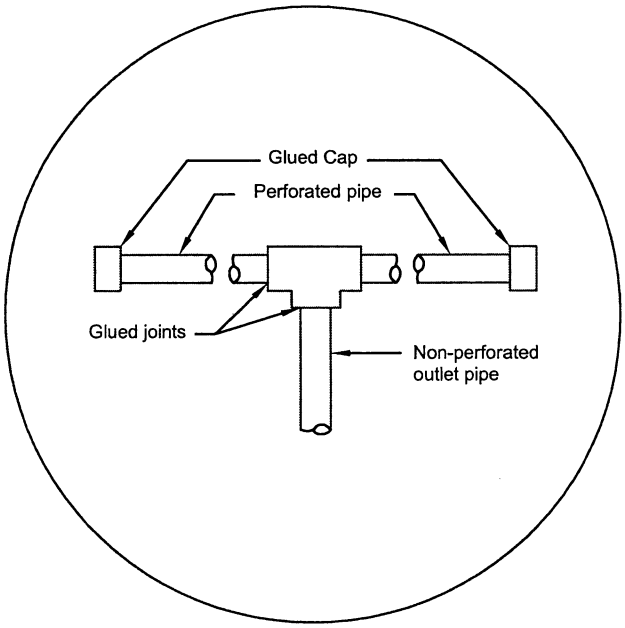


TYPICAL FILL OVER
CUT KEYWAY SUBDRAIN

TYPICAL BUTTRESS AND
STABILIZATION FILL SUBDRAINS



GRAVEL WITH
FILTER FABRIC



T-CONNECTION

NOTES:

1. Trench for outlet pipes to be backfilled with on-site soil.
2. **SUBDRAIN INSTALLATION:** Subdrain pipe shall be installed with perforations down or non-perforated pipe shall be used at locations indicated by the Geotechnical Consultant.
3. **SUBDRAIN TYPE:** Subdrain type shall be PVC Schedule 40 ASTM D1785 (equivalent or of increased quality may be substituted), for fills of less than 30 feet and PVC Schedule 80, ASTM D1785 (product equivalent or of increased quality may be substituted). Connecting elements shall consist of materials of equal quality compacted to the subdrain pipe. Pipe joint bells are to point upstream and be glued with the appropriate adhesive. Connecting elements shall consist of materials of equal quality compatible to the subdrain pipe.

INFORMATION DEPICTED ON THIS DETAIL IS FOR TYPICAL CONDITIONS AND ARE SUBJECT TO CHANGE BY THE GEOTECHNICAL CONSULTANT.

ZEISER KLING Consultants, Inc.

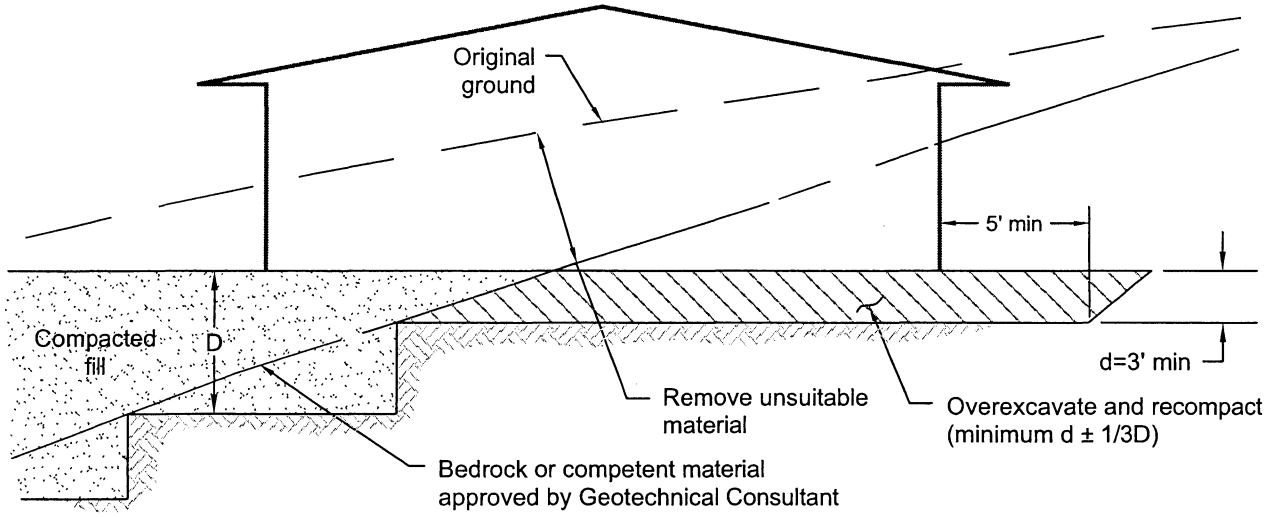
KEYWAY AND SIDEHILL SUBDRAIN DETAILS

GD-2

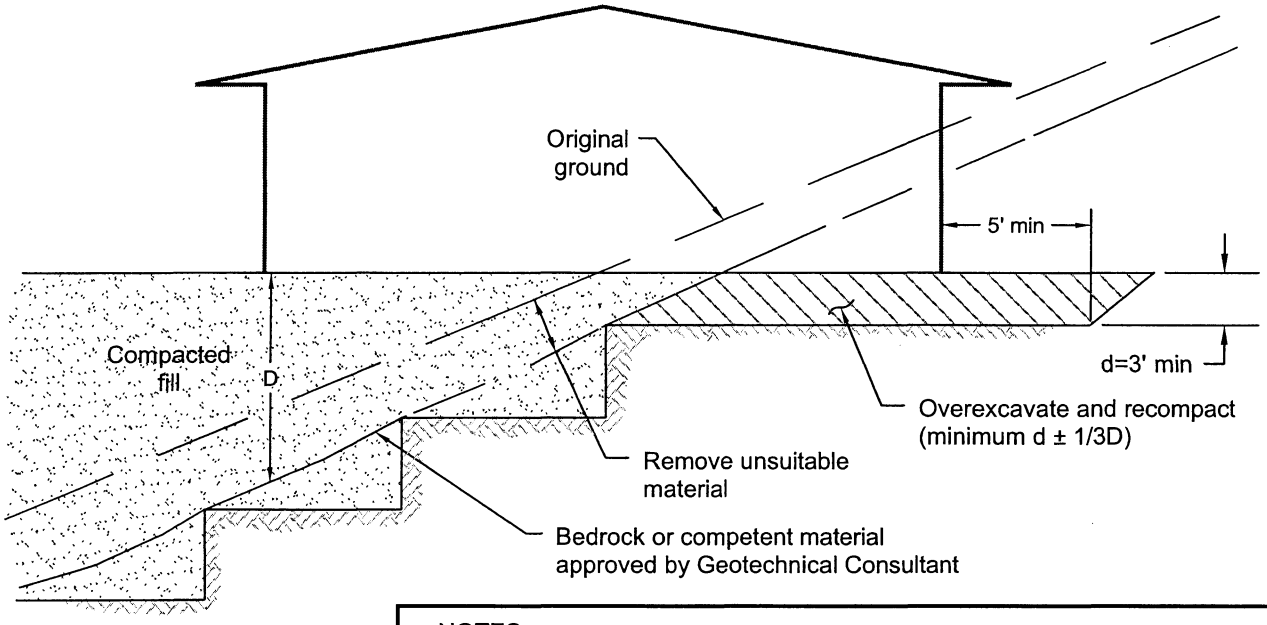
REVISION DATE: 10/01

STANDARD PLATES.DWG

CUT LOT
(Removal of unsuitable material may create a Transition Lot)



CUT FILL LOT (Transition)
AND FILL OVER STEEP TERRAIN



NOTES

1. Depth of overexcavation to be approved by the Geotechnical Consultant.
2. "d" is equal to 3 feet minimum (or as approved by the Geotechnical Consultant) from finish pad grade when not involved with steep fill/transition lots.
3. STEEP FILL/TRANSITION LOTS:
   D = Deepest fill on the pad, in feet
   d = D/3 (feet) required for overexcavation of same pad.
   For example:
   D = 15 feet therefore d = 15 feet/3; d = 5 feet
4. "D" to be measured at the property line when the precise structure location

INFORMATION DEPICTED ON THIS DETAIL IS FOR TYPICAL CONDITIONS AND ARE SUBJECT TO CHANGE BY THE GEOTECHNICAL CONSULTANT.

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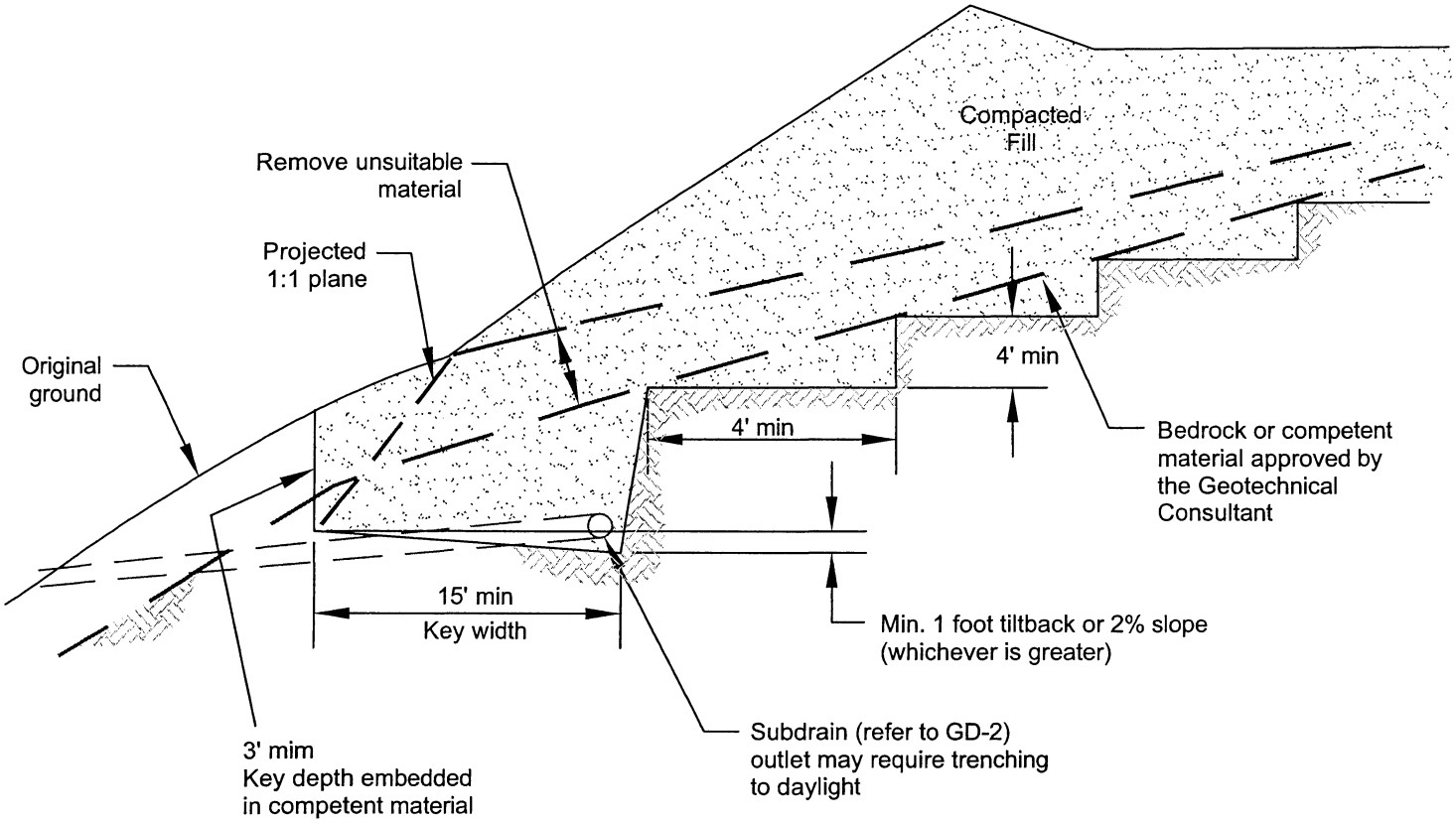
TRANSITION LOT DETAILS
GD-3

REVISION DATE: 10/01

STANDARD PLATES.DWG



NOTES

Benching shall be required when natural slopes have a slope ratio of 5:1 or greater. When the natural slope approaches or exceeds the design slope ratio, special recommendations will be provided by the Geotechnical Consultant. In the case of a design cut pad, over-excavation and recompaction may be required (refer to GD-3).

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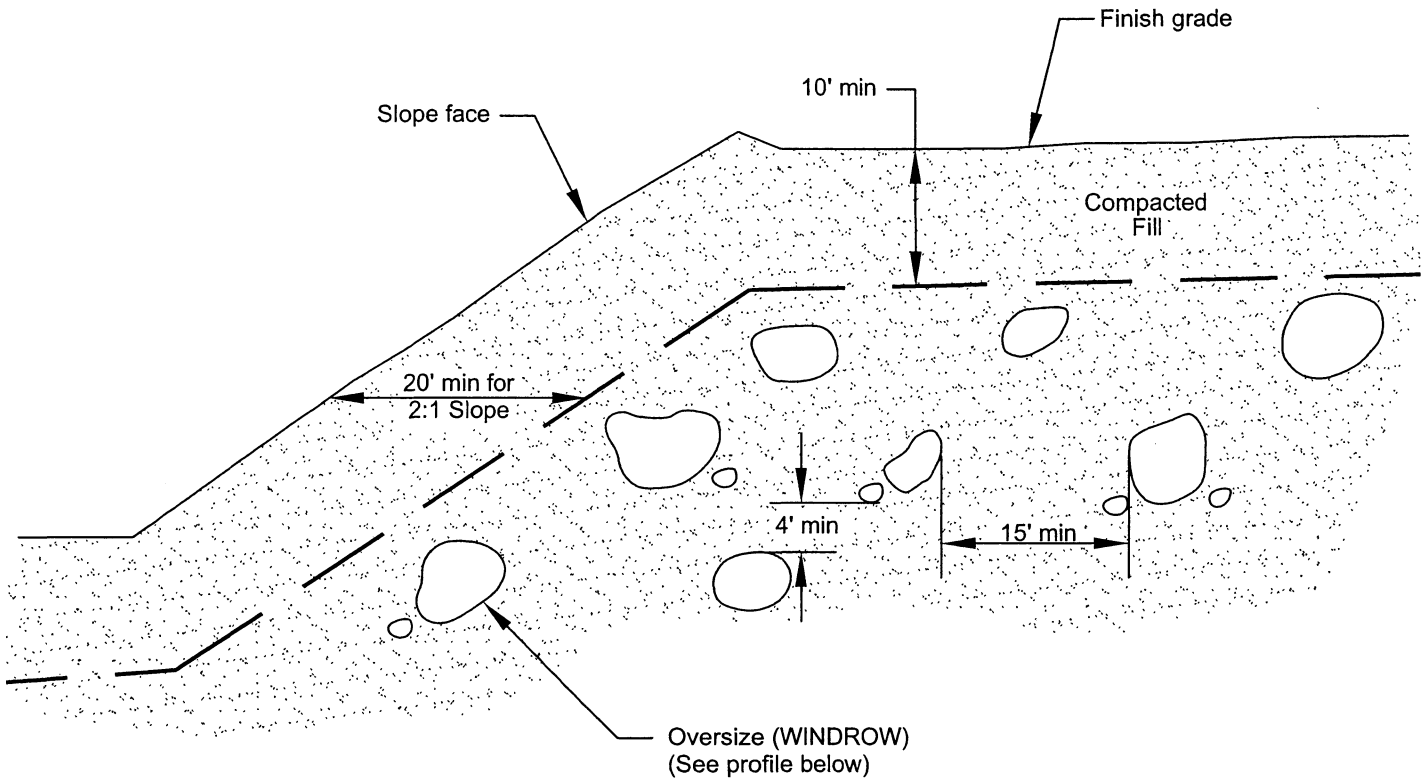
ZEISER KLING Consultants, Inc.

FILL ABOVE NATURAL SLOPE DETAIL

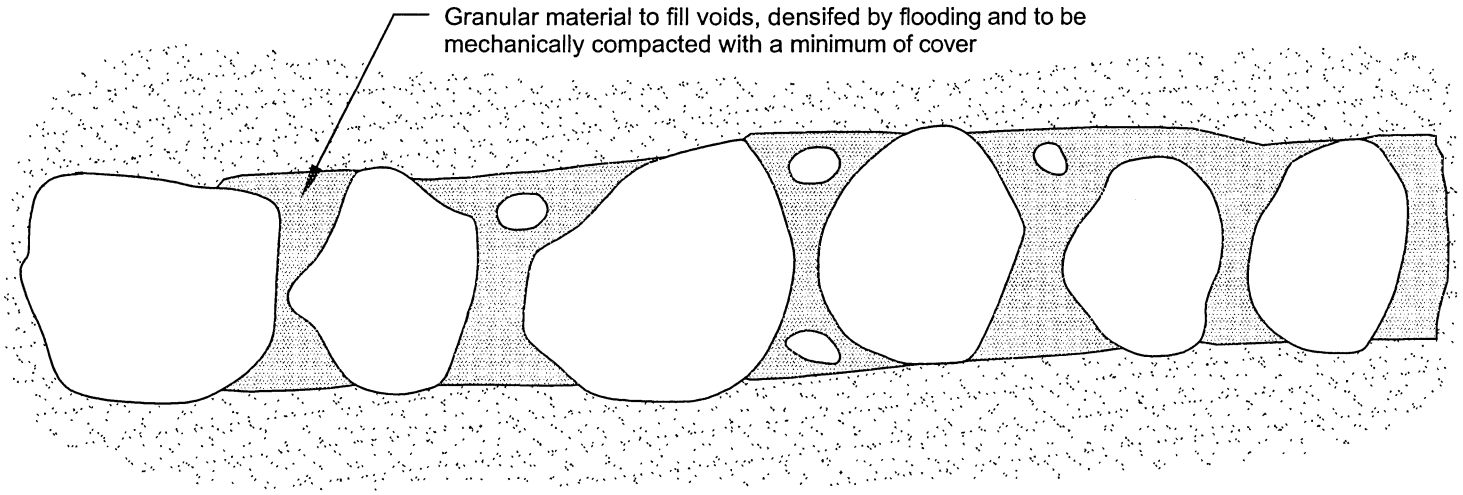
GD-4

REVISION DATE: 10/01

STANDARD PLATES.DWG



PROFILE ALONG WINDROW



NOTES

Oversized material is defined as rock or other irreducible material with any dimension greater than 12 inches. Granular materials shall consist of sandy or gravely soils with a sand equivalent of 30 or greater, but not to exceed 1 inch in diameter or as approved by the Geotechnical Consultant.

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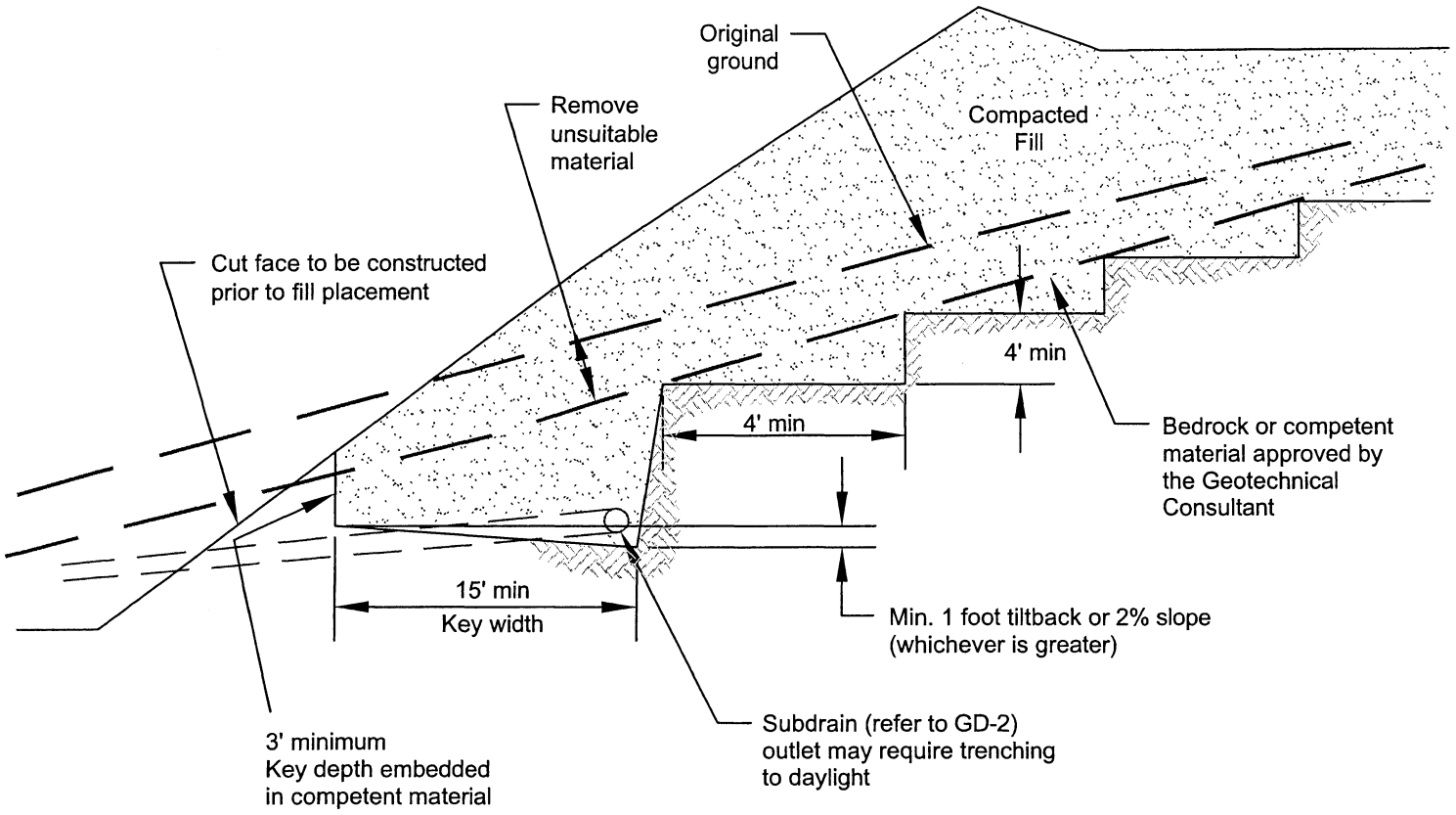
ZEISER KLING Consultants, Inc.

ROCK DISPOSAL DETAIL
GD-5

REVISION DATE: 10/01

STANDARD.DWG



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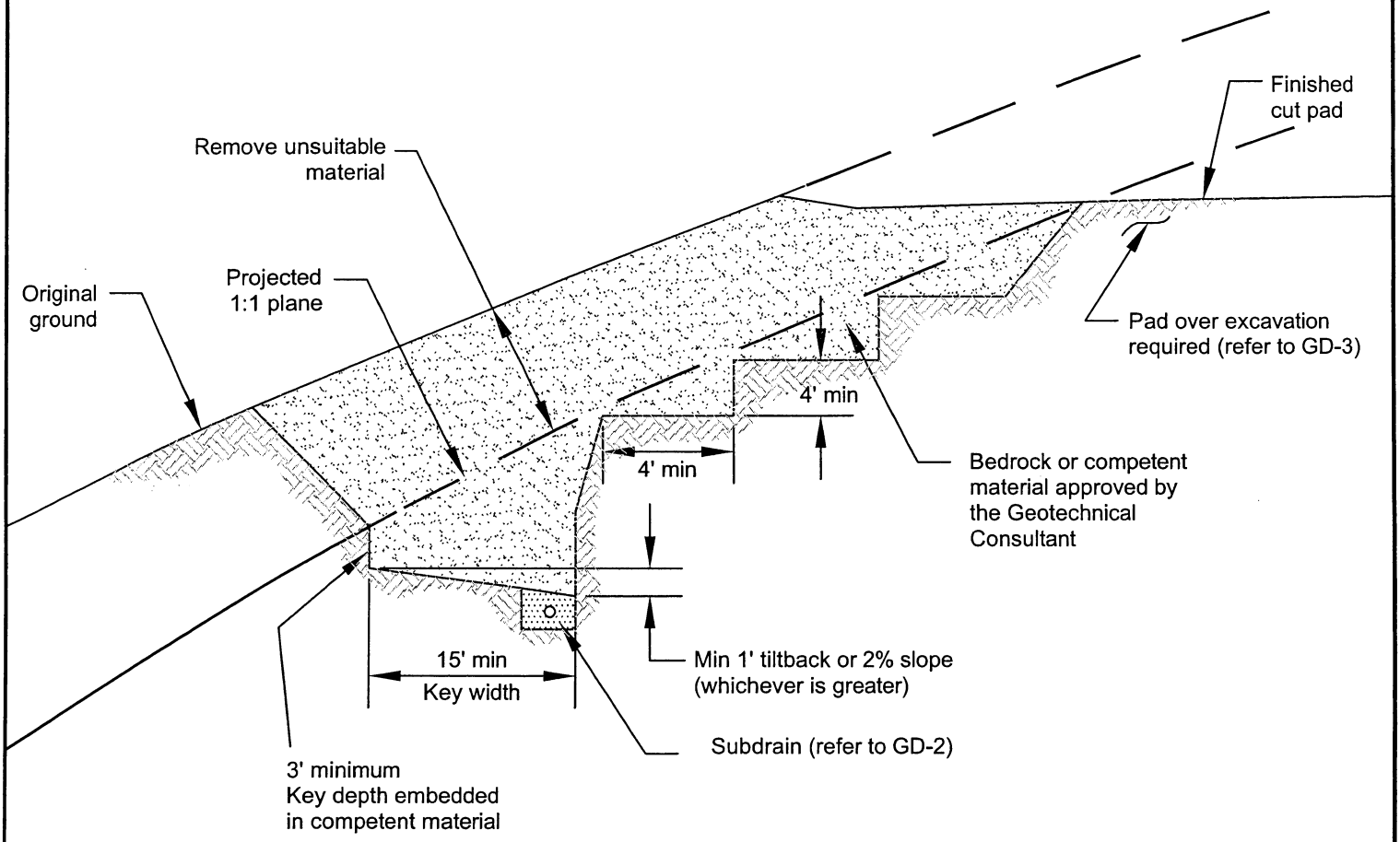
FILL OVER CUT SLOPE DETAIL

GD-6

REVISION DATE: 10/01

STANDARD PLATES.DWG



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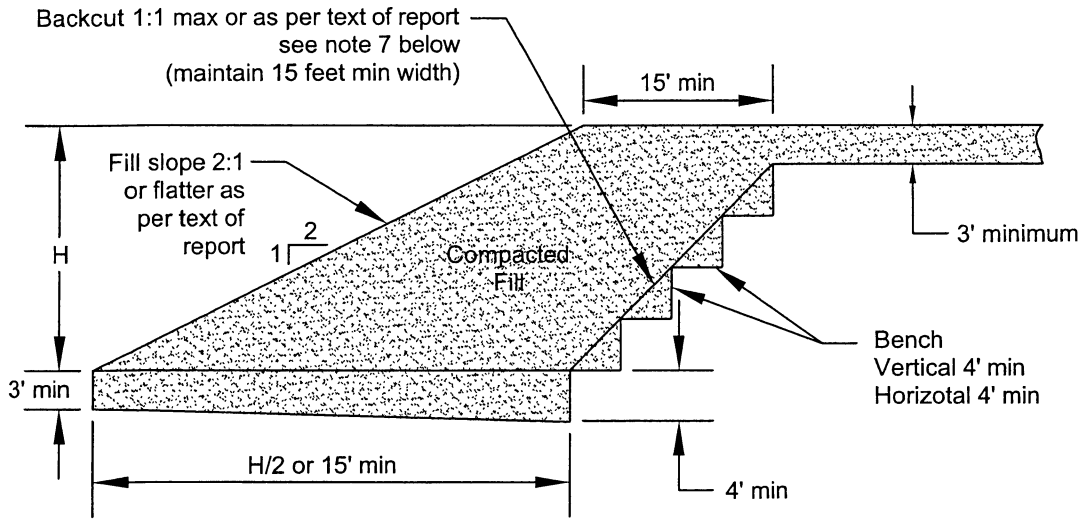
DESIGN SIDE HILL SHEAR KEY DETAIL
GD-7

REVISION DATE: 10/01

STANDARD PLATES.DWG

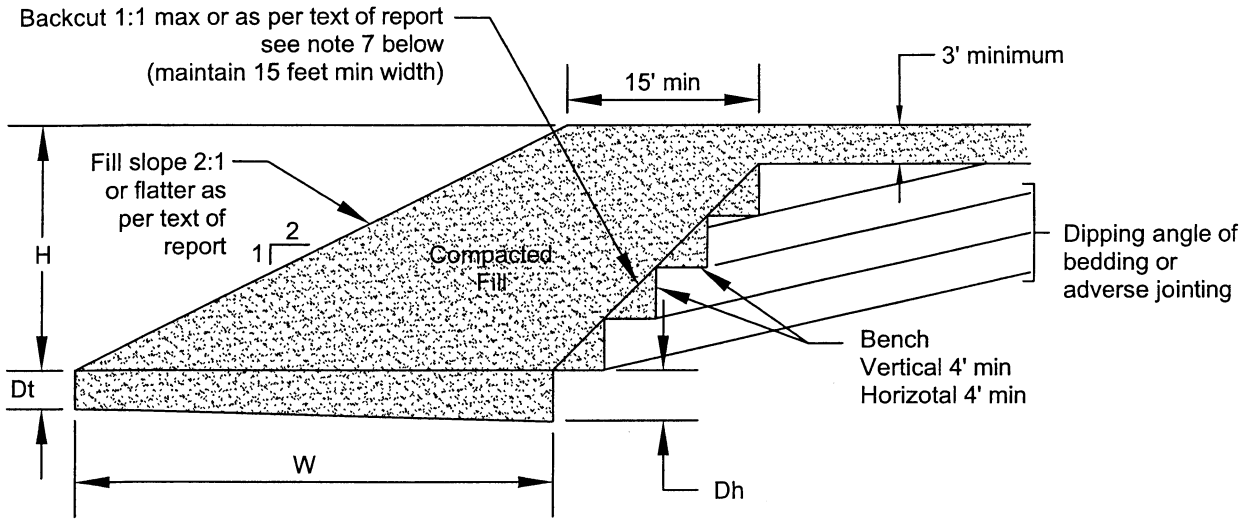
TYPICAL STABILIZATION FILL

Figure 1



TYPICAL BUTTRESS FILL

Figure 2



NOTES

1. A 3 foot blanket fill shall be provided above and adjacent to stabilization fills and/or buttress fills.
2. W= width of key as specified in Geotachnical report (no less than H/2 or 15 feet, whichever is greater).
3. Dt = Depth of key at toe.
4. Dh = Depth of key at heel.
5. With and depth of buttress key as specified in Geotechnical report.
6. For subdrain detail, see Plate GD-2.
7. Contractor is responsible for safety. Standard backcut recommedations herin may be superceded by the Geotechnical Consultant during grading.

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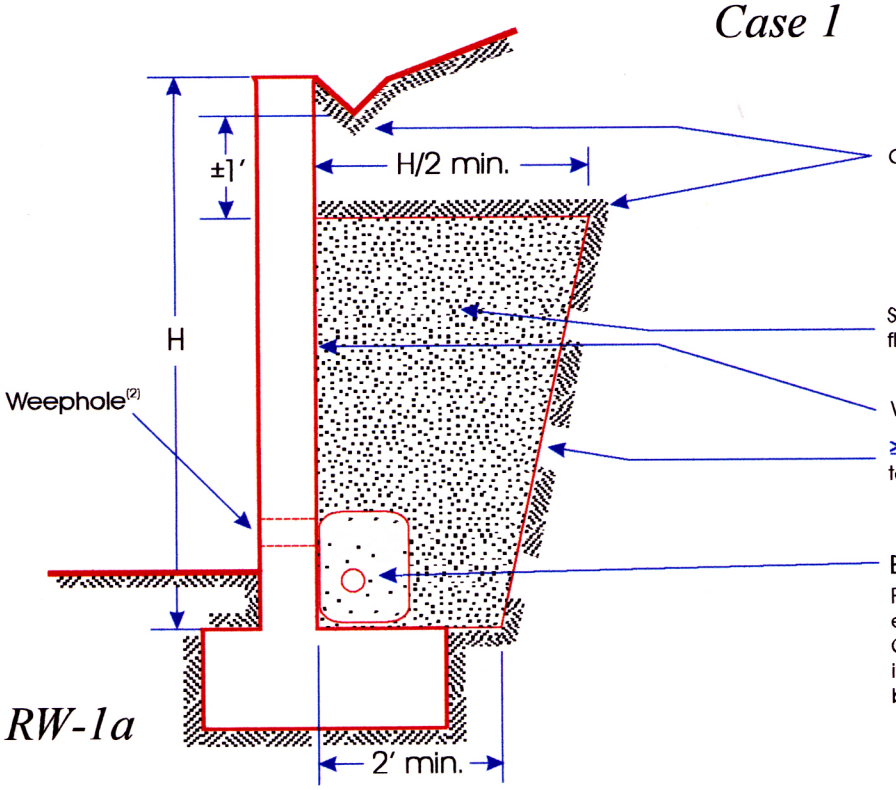
STABILIZATION & BUTTRESS FILL DETAIL

GD-8

REVISION DATE: 10/01

STANDARD PLATES.DWG

Case 1 CLEAN SAND BACKFILL



Compacted Clayey Soil

Sand backfill(SE ≥ 30), flooded or jetted.

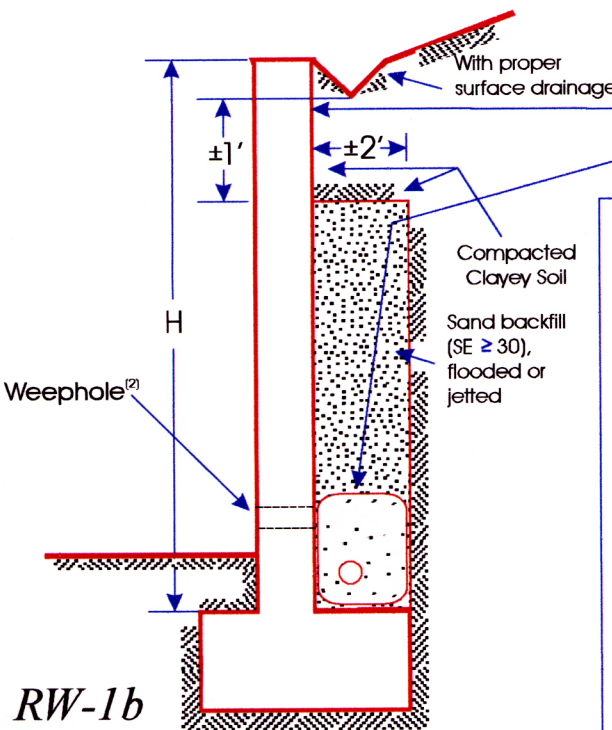
Waterproofing (optional - see note below)

≥ .75:1 backcut should conform to current Cal-OSHA standards.

BACKDRAIN SYSTEM [1,3]
Filter fabric Mirafi 140NC or Amoco 4546 (product equivalent or of higher quality may be substituted). Overlap of fabric equal to backdrain width min., or if less "hog" rings or a suitable fastening device may be necessary.

RW-1a

Case 2 LIMITED BACKCUT ACCESS CONDITION



Waterproofing (optional)

BACKDRAIN SYSTEM [1,3]
Filter fabric Mirafi 140NC or Amoco 4546 (product equivalent or of higher quality may be substituted). Overlap of fabric equal to backdrain width min., or if less "hog" rings or a suitable fastening device may be necessary.

Compacted Clayey Soil

Sand backfill (SE ≥ 30), flooded or jetted

RW-1b

IT SHOULD BE UNDERSTOOD THAT THE PURPOSE OF THE RETAINING WALL BACKDRAIN SYSTEM IS TO REDUCE THE POTENTIAL FOR HYDROSTATIC PRESSURE BUILDUP BEHIND THE WALL. THE BACKDRAIN SYSTEM IS NOT INTENDED TO BE A MEANS OF WATERPROOFING.

INFORMATION DEPICTED ON THIS DETAIL IS FOR TYPICAL CONDITIONS AND ARE SUBJECT TO CHANGE BY THE GEOTECHNICAL CONSULTANT.

NOTES (Both Cases):

1. For walls 4 ft. in height or less, open head joints (weep areas) @32" on center in the first course above adjacent finished grade or provide at a max. of 25' on center, 2" diameter weep holes. In lieu of weep holes, Schedule 40 PVC, 3/4" crushed gravel with filter fabric may be utilized[3]. Walls over 4 ft. in height see note 2.

2. Open head joints (weep areas) are not approved for L.A. County, thru pipes are required. Open head joints are recommended along with perforated pipe[3] except where nuisance water cannot be tolerated. Where nuisance water is not acceptable, install an appropriate waterproofing material and use only the perforated pipe[3] with outlets @ 100 ft. intervals max., to suitable discharge facilities.

3. 1 cubic ft. per ft. min. (Or as necessary to cover weep areas) 3/4" open graded crushed gravel, wrapped in filter fabric (type as indicated) with 4" diameter perforated pipe (perforations per ASTM F758, pointed down) PVC SDR35, ASTM D3034 (product equivalent or of increased quality may be substituted), joints are to be glued with the appropriate adhesive, drained at a slope of 1% min.

ZEISER KLING Consultants, Inc.

RETAINING WALL DETAILS
RW-1

Revised 8/02