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FINAL REPORT - JANUARY 5, 1981

IDENTIFICATION OF
TRANSPORTATION ROUTE ALTERNATIVES
and
ENGINEERING FEASIBILITY STUDIES
for
CACHE CREEK & LITTLE GRANITE CREEK EIS DATA

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FINAL REPORT

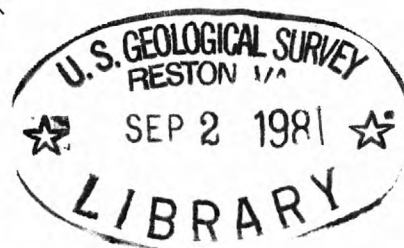
IDENTIFICATION OF
TRANSPORTATION ROUTE ALTERNATIVES
and
ENGINEERING FEASIBILITY STUDIES

for

BRIDGER-TETON NATIONAL FOREST
CACHE CREEK and LITTLE GRANITE CREEK

Open-file report
(United States
Geological Survey)

EIS DATA GATHERING and EVALUATION



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January 5, 1981

OPEN-FILE REPORT 81-858

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CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. SUMMARY	2
III. MODIFICATIONS TO WORK PLAN & STAFFING PLAN	3
IV. ALTERNATIVE ROUTES & SELECTION OF PREFERRED ACCESS	
Area Map (Exhibit A - reduction)	4
NCRA Site	5
GETTY-RESERVE Site	8
V. NCRA SITE, GAME-CACHE CREEK ACCESS	
Area Map	10
Plan and Profile Data Sheets	10
Soil Sampling, Testing and Classifications	10
Construction Cost Estimate	12
Maintenance Cost Estimate	12
Restoration Cost Estimate	12
Vehicle Operating Cost Estimate	12
VI. GETTY-RESERVE SITE, LITTLE GRANITE CREEK ACCESS	
Area Map	13
Plan and Profile Data Sheets	13
Soil Sampling, Testing and Classifications	13
Construction Cost Estimate	15
Maintenance Cost Estimate	15
Restoration Cost Estimate	15
Vehicle Operating Cost Estimate	15
VII. MITIGATING MEASURES	16
VIII. RECLAMATION POSSIBILITIES	17
IX. EXHIBITS	
A. Alternative Routes Map, Scale 1" = 2000'	Separate Document
B. NCRA Site, Game-Cache Creek Access Route	
B-1. Area Map, Scale 1" = 1000'	Separate Document
B-2. Plan & Profile Sheets, 12 sheets	Separate Document
B-3. Cost Data Sheets	18
C. GETTY-RESERVE Site, Little Granite Creek Access Route	
C-1. Area Map, Scale 1" = 1000'	Separate Document
C-2. Plan & Profile Sheets, 13 sheets	Separate Document
C-3. Cost Data Sheets	21
D. Soil Test Reports	24
E. Work Plan	51
F. Staffing Plan	53

INTRODUCTION

This portion of the Cache Creek-Little Granite Creek EIS Data Gathering and Evaluation Study had two central objectives.

The first was to review all land access possibilities to the NCRA Cache Creek and to the Getty-Reserve Little Granite Creek proposed drilling sites. Based on this review, the preferred access corridor to each site was selected.

The second objective was to perform a reconnaissance survey of a feasible route within the selected corridor. Soils and design data were collected for the development of cost estimates and for use in studies being performed by other disciplines.

SUMMARY

NCRA - Cache Creek

The preferred access corridor to the NCRA proposed drilling site was selected along Game Creek, over the gap to Cache Creek, then following Cache Creek.

This route follows the existing Game Creek Forest Service Road for four miles from US Highway 26 to the USFS road closure. It then involves 2.8 miles of new construction to cross the ridge into the Cache Creek drainage. Once alongside Cache Creek, it follows the existing jeep trail for 0.9 miles to the site.

Construction costs on this route, from Scott's Horse Palace to the site, are estimated to be \$785,000.00 for a 14 foot wide, all-weather road.

Restoration costs from the existing road closure to the site are estimated to be \$150,000.00.

GETTY-RESERVE

The preferred access corridor to the GETTY-RESERVE proposed drilling site was selected along Little Granite Creek, the North Fork of Little Granite Creek, then climbing back to the Upper Little Granite Creek Meadows, and finally to the divide with Horse Creek.

This route follows the Granite Creek Forest Service Road for 1.4 miles from US Highway 189 at Battle Mountain in the Hoback River Canyon to the junction with Little Granite Creek. It then follows the existing Little Granite Creek Road for 1.7 miles to the USFS road closure. The route then involves 5.8 miles of new construction along or paralleling existing pack trails to the site.

Construction costs on this route, from the existing USFS road closure to the site, are estimated to be \$819,000.00 for a 14 foot wide, all-weather road.

Restoration costs from the existing road closure to the site are estimated to be \$232,000.00.

MODIFICATIONS TO WORK PLAN and STAFFING PLAN

The proposed Work Plan, Appendix E, and Staffing Plan, Appendix F, were carried out as proposed in the consultant's proposal with the following modifications.

WORK PLAN MODIFICATIONS

VI. Field Review

This was performed by the Project Manager and Lew Clark of Clark's Ready-Mix and Construction. This change was made to take advantage of Mr. Clark's road construction expertise in this type of terrain.

VIII. Soil Testing and Classification

This work was performed by Chen and Associates, Inc., Soil and Foundation Engineers, at their Casper, Wyoming laboratory.

STAFFING PLAN MODIFICATIONS

Lewell H. Clark, an owner of Clark's Ready-Mix and Construction in Jackson, Wyoming and a Registered Professional Engineer in Wyoming, participated in reviewing the terrain and developing cost estimates for both routes.

Mr. Clark's entire professional career has been spent in the highway and bridge construction industry.



EXHIBIT A

ALTERNATIVE ROUTES & SELECTION OF PREFERRED ACCESS

AREA MAP

Exhibit A is a composite of orthographic prints of the Bull Creek, Turquoise Lake, Cache Creek and Camp Davis USGS quad sheets at a scale of 1" = 2000'. The alternative corridors considered to access each drilling site are indicated on this map.

A reduction of Exhibit A, to 1" = 8000', is included in this bound report on page 4.

NCRA SITE

Three alternative access corridors to this site were identified utilizing USGS quad sheets, orthophoto quad sheets, color aerial photography and reports of previous studies.

The first route, identified in Table 1, page 7 and on Exhibit A, as Alternative A, Cache Creek Route, parallels Cache Creek along the existing USFS Cache Creek Road from the Town of Jackson to the proposed drilling site. The characteristics of this route are shown in Table 1, page 7.

The second route, identified in Table 1, page 7 and on Exhibit A, as Alternative B, Game Creek Route, parallels Game Creek along the existing USFS Game Creek Road, departs from that road to climb and cross the divide into Cache Creek, where it follows the same alignment as Alternative A to the proposed drilling site. The characteristics of this route are shown in Table 1, page 7.

The third route, identified in Table 1, page 7 and on Exhibit A, as Alternative C, Curtis Canyon Route, is only partially shown on Exhibit A. It follows the existing USFS Curtis Canyon Road and jeep trails to Goodwin Lake then would cross the Gros Ventre Range divide and descend into Cache Creek. The characteristics of this route are shown in Table 1, page 7.

On the basis of the road engineering characteristics of the alternatives, the routes would be ranked in order of preference: as A, most desirable; B, second due to adverse grade and greater length of re-opening, rehabilitation and new construction; and C, clearly least desirable in nearly all categories except as it would access additional terrain in the event of oil and gas field development. Since the objective of this EIS is access to the exploratory sites, Alternative C was not considered further.

A consideration of other than engineering characteristics of Alternatives A and B resulted in the selection of Alternative B, the Game

Creek Route, as the corridor on which the reconnaissance survey would be made. There were two reasons for this decision. First, the Game Creek Route avoids any access through the Town of Jackson and along the lower 4.5 miles of the Cache Creek drainage and secondly, there would be few engineering constraints along Alternative A, and therefore it would be preferable to perform the reconnaissance survey along Alternative B and identify possible engineering constraints on that route.

TABLE 1

NCRA SITECharacteristics of Alternative Routes
(all distances are in miles)

	A Cache Creek	B Game Creek	C Curtis Canyon
Total Length from State, County or City Road to Site	5.49	7.28	18.00
Length Presently Open as a Forest Road	3.00	3.98	9.00
Length Involving Re-opening and Re-habilitation of Presently Closed Forest Road	2.09	0.76	0.00
Length Involving New Construction	0.4	2.54	9.00
Length Involving Re-opening, Re- habilitation or New Construction	2.49	3.30	9.00
Along Creeks	1.78	0.76	-
Along Side Slopes	0.4	2.12	-
Along Flat Areas	0.31	0.42	-
Switchbacks	no	no	many
Adverse Grade	no	yes, over 240 vert. ft.	yes, over 2400 vert. ft.
Avalanche Chutes	no	no	yes
Ranking by Geologist	1 (tie)	1 (tie)	not considered

GETTY-RESERVE SITE

Three alternative access corridors to this site were identified utilizing USGS quad sheets, ortho-photo quad sheets, color aerial photography and reports of previous studies.

The first route, identified in Table 2, page 9 and on Exhibit A, as Alternative A, Horse Creek Route, parallels Horse Creek for most of its length. The characteristics of this route are shown in Table 2, page 9.

The second route, identified in Table 2, page 9 and on Exhibit A, as Alternative B, Little Granite Creek Route, follows the USFS Granite Creek Road from Battle Mountain to Little Granite Creek where it parallels the creek on the USFS Little Granite Creek Road to the existing road closure. From the closure, the route continues along Little Granite Creek, North Fork of Little Granite Creek, then climbs to the Upper Little Granite Creek Meadows and finally climbs the Horse Creek Divide to the site. The characteristics of this route are shown in Table 2, page 9.

The third route, identified in Table 2, page 9 and on Exhibit A, as Alternative C, Rough Hollow Route, follows Alternative B, Little Granite Creek Route to the USFS road closure, at which point it proceeds up Rough Hollow to a headwall, then traverses and switchbacks on the west slope of Rough Hollow to the site. The characteristics of this route are shown in Table 2, page 9.

On the basis of the road engineering characteristics of the alternatives, the routes would be ranked in order of preference as B, most desirable; C, second because of avalanche exposure; and A, least desirable because of narrow creek bottom to be followed, avalanche exposure and unstable side slopes to be traversed.

This ranking led to selection of Alternative B, Little Granite Creek Route as the corridor on which the reconnaissance survey would be made. This route could also provide access to the southwest side of the Gros Ventre Range in the event of an oil and gas field development.

TABLE 2

GETTY-RESERVE SITECharacteristics of Alternative Routes
(all distances are in miles)

	A Horse Creek	B Little Granite Creek	C Rough Hollow
Total Length from State, County or City Road to Site	10.90	8.59	8.10
Length Presently Open as a Forest Road	2.95	2.72	2.72
Length Involving Re-opening and Re-habilitation of Presently Closed Forest Road	0.00	0.00	0.00
Length Involving New Construction	7.95	5.87	5.00
Length Involving Re-opening, Re- habilitation or New Construction	7.95	5.87	5.00
Along Creeks	5.68	3.98	2.20
Along Side Slopes	2.27	1.59	2.80
Along Flat Areas	0.00	0.30	0.00
Switchbacks	2*	7	4*
Adverse Grade	no	no	no
Avalanche Chutes	yes	no	yes
Ranking by Geologist	3rd	1st	2nd

*Estimated from preliminary office study

NCRA SITE, GAME-CACHE CREEK ACCESS

AREA MAP

Exhibit B-1 is a copy of portions of the appropriate USGS quad sheets enlarged to a scale of 1" to 1000'. The alignment of the road study corridor is plotted with every tenth P.I. numbered. A table is included on the map listing station numbers for each P.I.

The reconnaissance survey was performed along the USFS Game Creek Road to the road closure location at the beaver ponds. From that point the alignment goes northeasterly up a 9 to 10% grade to a saddle on the divide into Cache Creek, essentially following an existing pack trail. The route descends into the Cache Creek drainage on an 8% grade across a moderate cross-slope. After a crossing of Cache Creek, the route follows the existing jeep trail along the north side of Cache Creek to the site.

PLAN and PROFILE SHEETS

Exhibit B-2 consists of 11 sheets of plan and profile drawings of the reconnaissance line at a scale of 1" = 100' (horizontal). These sheets indicate survey line tangents on the plan portion and representative ground-line grades on the profile portion.

SOIL SAMPLING, TESTING and CLASSIFICATION

Soil samples were collected along the alignment to represent dominant subsoil classes. The locations for this sampling were determined in consultation with Bill Glenn, Soil Scientist. Locations of the sample sites are noted on the cover sheet, Sheet 1, of Exhibit B-2.

Testing of the samples was performed by Chen and Associates in Casper, Wyoming. Test results comprise Exhibit D, page 24, and are summarized in Table 3, page 11.

TABLE 3

SOILS CLASSIFICATIONSGAME-CACHE CREEK ROUTE

<u>Sample No.</u>	<u>Station Sampled</u>	<u>AASHTO Classification</u>	<u>Unified Classification</u>
1	15' N. of Station 9+90	A-1-b(o)	GM
2	15' N. of Station 31+50	A-5(3)	ML
3	5' E. of Station 68+90	A-1-b(o)	GM
4	5' E. of Station 93+70	A-2-4(o)	GM
5	5' E. of Station 107+50	A-1-a(o)	GP-GM
6	5' E. of Station 115+30	A-4(o)	GM
7	5' W. of Station 124+00	A-4(o)	GM
8	5' W. of Station 134+50	A-4(o)	GM
9	5' W. of Station 148+00	A-4(o)	GM
10	50' W. of Station 165+70	A-8	OL
11	5' E. of Station 176+10	A-2-4(o)	SM
12A	Station 198+00	A-2-5(o)	GM
12B	30' N. of Station 198+00	A-2-4(o)	GM
13	Station 224+60	A-4(o)	ML-CL
14	Station 233+60	A-4(3)	ML
15	Station 239+50	A-2-6(o)	GM
16	Station 263+20	A-4(8)	CL
17	Station 275+80	A-4(o)	GM
18	Station 293+90	A-2-7(o)	GM
19	10' N. of Station 327+90	A-5(1)	GM
20	50' N. of Station 346+50	A-7-6(17)	ML
21	60' S. of Station 356+40	A-7-6(11)	ML

CONSTRUCTION COST ESTIMATE

The construction cost estimate for the Game-Cache Creek Route is detailed in Exhibit B-3, pages 18 and 19.

These costs assume a 14 foot wide finished roadway from Scott's Horse Palace to the proposed NCRA site. There are drainage and surfacing needs on that portion of the USFS Game Creek Road from US Highway 26 to Scott's Horse Palace.

Gravel sources for sub-base and base were assumed to be Evans gravel pit, one mile south on US Highway 26 from the intersection with USFS Game Creek Road. Since this is a private pit, a royalty charge has been included in the estimate.

MAINTENANCE COST ESTIMATE

The maintenance cost estimate for the Game-Cache Creek Route is detailed in Exhibit B-3, page 20.

Necessary maintenance equipment is shown for less than full-time because of the route's proximity to contractors' yards in the Jackson area. Necessary equipment could be dispatched on an as-needed basis.

RESTORATION COST ESTIMATE

The restoration cost estimate for the Game-Cache Creek Route is detailed in Exhibit B-3, page 20.

This estimate is based on restoration of the original ground section and does not include salvage of crushed gravel.

VEHICLE OPERATING COST ESTIMATE

The vehicle operating cost estimate for the Game-Cache Creek Route is detailed in Exhibit B-3, page 20.

GETTY-RESERVE SITE, LITTLE GRANITE CREEK ACCESS

AREA MAP

Exhibit C-1 is a copy of portions of the appropriate USGS quad sheets enlarged to a scale of 1" to 1000'. The alignment of the road study corridor is plotted with every tenth P.I. numbered. The stationing begins with 0+00 and P.I. 1 at the proposed drilling site.

The reconnaissance survey was performed along the route of the pack trail along Little Granite Creek and the North Fork of Little Granite Creek, beginning at the USFS road closure at Rough Hollow. The alignment leaves the North Fork of Little Granite Creek and switches up to the Upper Meadow of Little Granite Creek. From this meadow, it traverses to the divide with Horse Creek and the proposed drilling site.

Between P.I. 150 and 136, the alignment climbs sharply to by-pass a narrow, steep-walled section of Little Granite Creek. Several switchbacks of minimal radius will be necessary in this area. There are suitable stable locations for these switchbacks.

Additional reconnaissance was performed along the creek bottom and above the east bank to examine possible alternative locations for this sector. The creek bottom was no wider than the creek itself and the side walls were steep, high slopes. The possible route above the east bank was higher than the selected west route and would cross steep side slopes for over one-half mile.

PLAN and PROFILE SHEETS

Exhibit C-2 consists of 12 sheets of plan and profile drawings of the reconnaissance line at a scale of 1" = 100' (horizontal). These sheets indicate survey line tangents on the plan portion and representative ground-line grades on the profile portion.

SOIL SAMPLING, TESTING and CLASSIFICATION

Soil samples were collected along the alignment to represent dominant subsoil classes. The locations for this sampling were determined in consultation with Bill Glenn, Soil Scientist. Locations of the sample sites are noted on the cover sheet, Sheet 1, of Exhibit C-2.

Testing of the samples was performed by Chen and Associates in Casper, Wyoming. Test results comprise Exhibit D, page 24, and are summarized in Table 4, page 14.

TABLE 4

SOILS CLASSIFICATIONSLITTLE GRANITE CREEK ROUTE

<u>Sample No.</u>	<u>Station Sampled</u>	<u>AASHTO Classification</u>	<u>Unified Classification</u>
1A	Station 287+60	A-2-4(o)	SM
1B	Station 296+10	A-4(7)	ML
2	Station 254+10	A-2-6(o)	GP-GM
3	Station 235+10	A-1-b(o)	GM
4A	Station 223+70	A-4(o)	ML
4B	Station 221+10	A-1-c(o)	GP
5	Station 214+00	A-4(6)	CL
6	Station 194+70	A-6(10)	CL
7A	Station 179+30	A-1-6(o)	GM
7B	Station 182+40	A-5(2)	SM
8	Station 141+10	A-1-6(o)	GM
9	Station 100+70	A-2-4(o)	SC
10	Station 86+30	A-1-a(o)	GP-GM
11	Station 75+10	A-4(4)	ML-CL
12	Station 64+50	A-1-a(o)	GP-GM
13	Station 31+70	A-4(1)	ML-CL
14	Station 10+60	A-4(2)	ML-CL

CONSTRUCTION COST ESTIMATE

The construction cost estimate for the Little Granite Creek Route is detailed in Exhibit C-3, pages 21 and 22.

These costs assume a 14 foot wide finished roadway from the USFS road closure on Little Granite Creek Road to the proposed Getty-Reserve site. There are drainage, grading and surfacing needs on that portion of the USFS Little Granite Creek Road from the Granite Creek Road to the road closure.

Gravel sources for sub-base and base were assumed to be the previously used pit above the roadway at Battle Mountain Lodge.

MAINTENANCE COST ESTIMATE

The maintenance cost estimate for the Little Granite Creek Route is detailed in Exhibit C-3, page 23.

Necessary maintenance equipment is shown for full-time because of the route's distance from contractors' yards in the Jackson area. Necessary equipment would have to be committed to the project on a full-time basis.

RESTORATION COST ESTIMATE

The restoration cost estimate for the Little Granite Creek Route is detailed in Exhibit C-3, page 23.

This estimate is based on restoration of the original ground section and does not include salvage of crushed gravel.

VEHICLE OPERATING COST ESTIMATE

The vehicle operating cost estimate for the Little Granite Creek Route is detailed in Exhibit C-3, page 23.

MITIGATING MEASURES

Location of the reconnaissance survey avoided major identifiable unstable slopes, steep side slopes and marshy or boggy areas.

The most important future actions which can be taken to mitigate adverse impacts of the roadway will be in establishing the construction center-line and grades for the road. Guidelines for this effort include keeping the constructed road prism as far from creek banks as possible, consistent with avoiding steep cut slopes on the other side of the roadway. Where steep toe slopes adjacent to creeks cannot be avoided and/or there exist roads (trails), i.e. P.I. 143 to P.I. 156 along Cache Creek, the necessary road prism should be excavated and the excavated material end hauled to a stockpile area for later replacement. This would avoid the casting of any soil material onto banks adjacent to creeks.

Road cross-drains should be placed frequently enough to avoid scouring velocities along ditched sections.

All outlets of cross-drain culverts should incorporate filter strips to avoid eroded material being carried to creeks.

Other mitigating measures are contained in the Bridger-Teton Roading Guidelines for Oil and Gas Access Roads.

RECLAMATION POSSIBILITIES

NCRA SITE, GAME-CACHE CREEK ACCESS

Reclamation of this route, up to and including complete restoration of the original ground cross-section, could be effectively accomplished along the entire route except for two sections where steep side cross slopes exist along water courses.

The first area is from P.I. 76 to 79, a distance of approximately 600 lineal feet, where the existing pack trail is at the base of a steep slope alongside a beaver pond.

The second area is from P.I. 143 to 155, a distance of approximately 2400 lineal feet, where the existing abandoned roadway is at the base of a steep slope alongside Cache Creek.

In both of these areas, minimal width, one-way roads should be constructed entirely by excavation to avoid filling into the water course and the resulting cutslopes should be well stabilized.

GETTY-RESERVE SITE, LITTLE GRANITE CREEK ACCESS

Reclamation of this route, up to and including complete restoration of the original ground cross-section, could be effectively accomplished along the entire route with the following exception:

From P.I. 9 to 13, a distance of approximately 700 feet, the alignment crosses a slump area where ground movement is likely to occur during road construction and use. Even though the original cross-section could not be re-established, future ground movement would effectively obliterate this section.

EXHIBIT B-3

NCRA SITE, GAME CREEK-CACHE CREEK ACCESS ROUTEConstruction Cost Estimate

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
CLEARING & GRUBBING			
P.I. 100 to 111 @ 42' = 2.0 acres			
P.I. 117 to 119 @ 42' = 0.4 acres			
P.I. 121 to 143 @ 42' = 3.6 acres			
P.I. 145 to 148 @ 42' = 0.4 acres			
P.I. 152 to 155 @ 42' = 0.3 acres			
P.I. 161 to 165 @ 42' = 0.8 acres			
	7.5 acres	\$3,000/acre	\$ 22,500.00
GRADING - SHAPING EXISTING TRAIL			
P.I. 1 to P.I. 60	13,750'	\$6/ft.	\$ 82,500.00
GRADING - CLASS I <u>1/</u>			
P.I. 60 to 74	2,700		
P.I. 111 to 114	846		
P.I. 121 to 134	2,744		
	6,290'	\$8/lin.ft.	\$ 50,320.00
GRADING - CLASS II <u>2/</u>			
P.I. 74 to 111	8,456		
P.I. 114 to 121	1,330		
P.I. 134 to 167	6,052		
	15,838'	\$16/lin.ft.	\$253,408.00
GRADING - END HAUL (EXTRA) <u>3/</u>			
P.I. 76 to 80	865		
P.I. 143 to 150	1,733		
	2,598'	\$5.40/lin.ft.	\$ 14,000.00
DRAINAGE - 24" CMP			
7 per mile @ 24' each = 1142 ft.		\$15/lin.ft.	\$ 17,100.00
DRAINAGE - 36" CMP			
1 @ 26'		\$24/lin.ft.	\$ 624.00
DRAINAGE - 10' CLEAR SPAN STRUCTURE			
1 @ 16' width = 160 sq.ft.		\$65/sq.ft. (permanent)	\$ 10,400.00
		\$50/sq.ft. (temporary)	
DRAINAGE - 20' CLEAR SPAN STRUCTURE			
2 @ 16' width = 640 sq.ft.		\$50/sq.ft. (permanent)	\$ 32,000.00
		\$35/sq.ft. (temporary)	
		SUBTOTAL	\$482,852.00

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
CARRIED FORWARD			\$482,852.00
DRAINAGE - 40' CLEAR SPAN STRUCTURE 1 @ 16' width = 640 sq.ft.		\$47.50/sq.ft. (permanent) \$30/sq.ft. (temporary)	\$ 30,400.00
SUB-BASE - 6" MINUS PIT-RUN Screen, Load & Place: $\frac{0.67 \times 16 \times 35,907}{27} = 14,256$ cu.yd.		\$4/cu.yd. (royalty) \$0.50/cu.yd. <u>\$4.50/cu.yd.</u>	\$ 64,150.00
Haul: 14,256 x (3.4 + 2) = 72,982 cu.mi.		\$0.30/cu.mi.	\$ 23,100.00
BASE - 1" MINUS - CRUSHED Crush, Load & Place: $\left(\frac{.33 \times 15 \times 35,907}{27} \right) \times 1.8 =$ 11,850 tons		\$5/ton (royalty) \$0.30/ton <u>\$5.30</u>	\$ 62,800.00
Haul: 11,850 x (3.4 + 2) = 64,000 ton mi.		\$0.20/ton mi.	\$ 12,800.00
SEEDING & MULCHING 35,907 x 15/43,560 = 12.4 acres		\$3,000/acre	<u>\$ 37,200.00</u>
		SUBTOTAL	\$713,302.00
MISCELLANEOUS	10% of SUBTOTAL		<u>71,330.00</u>
	TOTAL		\$784,632.00

1/ GRADING - CLASS I involves the construction of a roadway x-section on cross-slopes of less than 20% and soils containing little rock. A majority of the earthwork can be performed by motor patrol.

2/ GRADING - CLASS II involves the construction of a roadway x-section on cross-slopes of greater than 20% and on lesser slopes which contain appreciable rock.

3/ GRADING - END HAUL involves the construction of a roadway x-section on a side hill immediately adjacent to a stream. The entire section is excavated to avoid filling in the creek and hauled back along the constructed roadway to a stockpile area where sufficient width exists for such a stockpile.

NCRA SITE, GAME CREEK-CACHE CREEK ACCESS ROUTE

Other Cost Estimates

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
RESTORATION	P.I. 70 to 167 = 20,000'	\$7.50/lin.ft.	<u>\$150,000.00</u>
MAINTENANCE - SUMMER			
	Motor Patrol - 8 hrs/day		
	22 days/month = 176 hrs/month	\$45/hr.	<u>\$8,000/month</u>
MAINTENANCE - WINTER			
	Motor Patrol with Blade & Wing		
	8 hrs/day, 15 days/month		
	= 120 hrs/month	\$50/hr.	\$ 6,000/month
	Rotary Plow		
	8 hrs/day, 10 days/month		
	= 80 hrs/month	\$50/hr.	<u>\$ 4,000/month</u>
			<u>\$10,000/month</u>
VEHICLE OPERATING COSTS			
	25 Ton Truck	\$0.08/ton mi.	<u>\$2.00/mile</u>

EXHIBIT C-3

GETTY-RESERVE SITE, LITTLE GRANITE CREEK ACCESS
Construction Cost Estimate

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
CLEARING & GRUBBING			
P.I. 7 to 41 @ 42' =	5.0 acres		
P.I. 55 to 60 @ 28' =	0.8 acres		
P.I. 68 to 109 @ 42' =	5.1 acres		
P.I. 118 to 112 @ 28' =	0.4 acres		
P.I. 126 to 152 @ 42' =	3.6 acres		
P.I. 163 to 170 @ 28' =	0.8 acres		
	<u>15.7 acres</u>	\$3,000/acre	\$ 47,100.00
GRADING - CLASS I ^{1/}			
P.I. 1 to 7	2,453		
P.I. 50 to 75	5,456		
P.I. 111 to 126	3,678		
P.I. 153 to 176	4,242		
	<u>15,829'</u>	\$8/lin.ft.	\$126,632.00
GRADING - CLASS II ^{2/}			
P.I. 7 to 50	6,529		
P.I. 75 to 111	4,658		
P.I. 126 to 153	3,872		
	<u>15,059'</u>	\$16/lin.ft.	\$240,944.00
DRAINAGE - 24" CMP			
7 per mile @ 24' each = 982'		\$15/lin.ft.	\$ 14,700.00
DRAINAGE - 36" CMP or CMPA			
1 @ 30'		\$24/lin.ft.	\$ 720.00
DRAINAGE - 48" CMP or CMPA			
1 @ 30'		\$50/lin.ft.	\$ 1,500.00
DRAINAGE - 30' CLEAR SPAN STRUCTURE			
1 @ 16' width = 480 sq.ft.		\$50/sq.ft. (permanent)	\$ 24,000.00
		\$35/sq.ft. (temporary)	
DRAINAGE - 40' CLEAR SPAN STRUCTURE			
4 @ 16' width = 2560 sq.ft.		\$47.50/sq.ft. (permanent)	\$121,600.00
		\$30/sq.ft. (temporary)	
		SUBTOTAL	\$577,196.00

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
CARRIED FORWARD			\$577,196.00
SUB-BASE - 6" MINUS PIT-RUN			
Screen, Load & Place:			
	$\frac{0.67 \times 16 \times 30,900}{27} = 12,300 \text{ c.y.}$	\$4/cu.yd.	\$ 49,200.00
Haul: 12,300 x (2.9 + 3.2) = 75,000 c.y.mi.		\$0.30/c.y.mi.	\$ 22,500.00
BASE - 1" MINUS - CRUSHED			
Crush, Load & Place:			
	$\left(\frac{.33 \times 15 \times 30,900}{27} \right) \times 1.8 =$		
	10,197 tons	\$5/ton	\$ 51,000.00
Haul: 10,200 x (2.9 + 3.2) = 62,200 ton mi.		\$0.20/ton mi.	\$ 12,400.00
SEEDING & MULCHING			
30,900 x 15/43,560 = 10.64 acres		\$3,000/acre	\$ 31,920.00
		SUBTOTAL	\$744,216.00
		10% of SUBTOTAL	<u>74,422.00</u>
		TOTAL	\$818,638.00

1/ GRADING - CLASS I involves the construction of a roadway x-section on cross-slopes of less than 20% and soils containing little rock. A majority of the earthwork can be performed by motor patrol.

2/ GRADING - CLASS II involves the construction of a roadway x-section on cross-slopes of greater than 20% and on lesser slopes which contain appreciable rock.

GETTY-RESERVE SITE, LITTLE GRANITE CREEK ACCESS

Other Cost Estimates

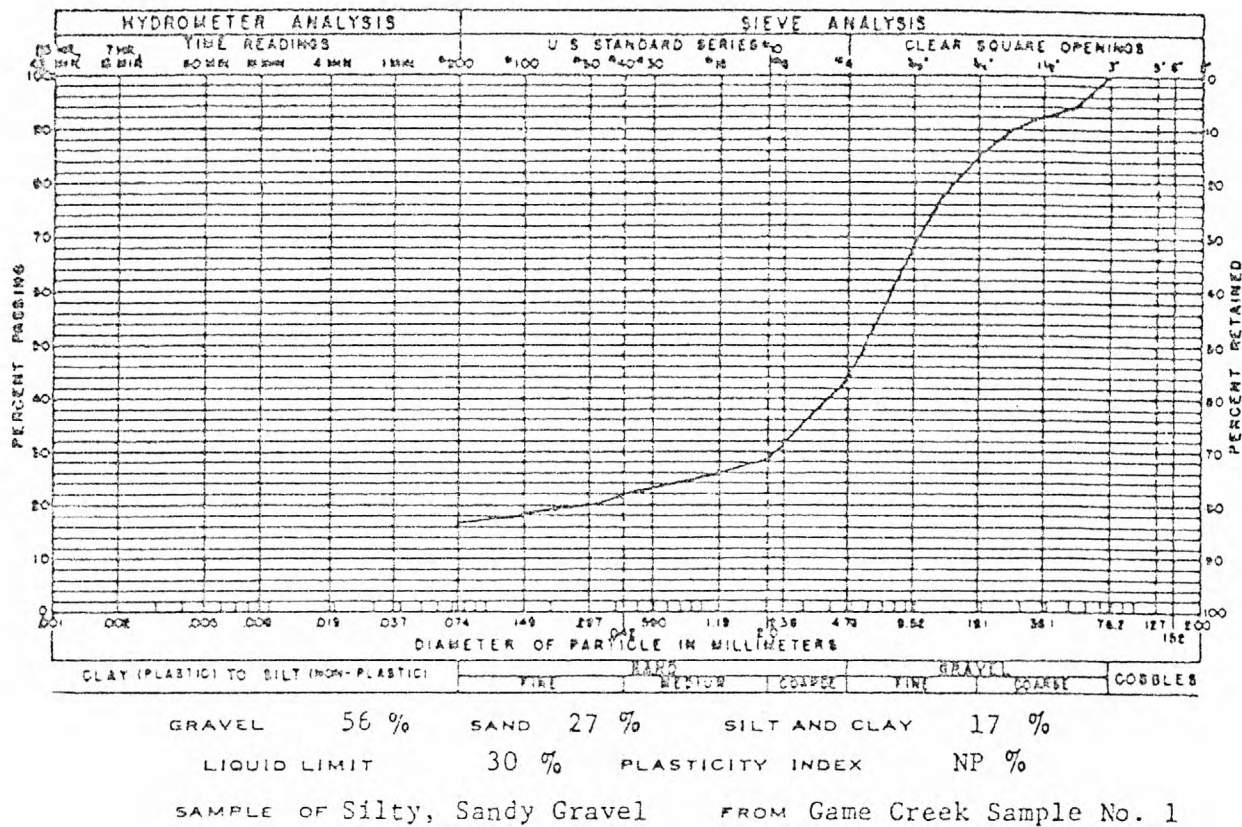
<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Cost</u>
RESTORATION	30,900 lin. ft.	\$7.50/lin.ft.	<u>\$232,000.00</u>
MAINTENANCE - SUMMER			
Motor Patrol - 8 hr/day			
22 days/month = 176 hr/month		\$45/hr.	<u>\$8,000/month</u>
MAINTENANCE - WINTER			
Motor Patrol with Blade & Wing			
8 hr/day, 30 days/month			
= 240 hr/month		\$50/hr.	\$12,000/month
Rotary Plow			
8 hr/day, 30 days/month			
= 240 hr/month		\$50/hr.	<u>\$12,000/month</u>
			<u>\$24,000/month</u>
VEHICLE OPERATING COSTS			
25 Ton Truck		\$0.08/ton mi.	<u>\$2.00/mile</u>

EXHIBIT D

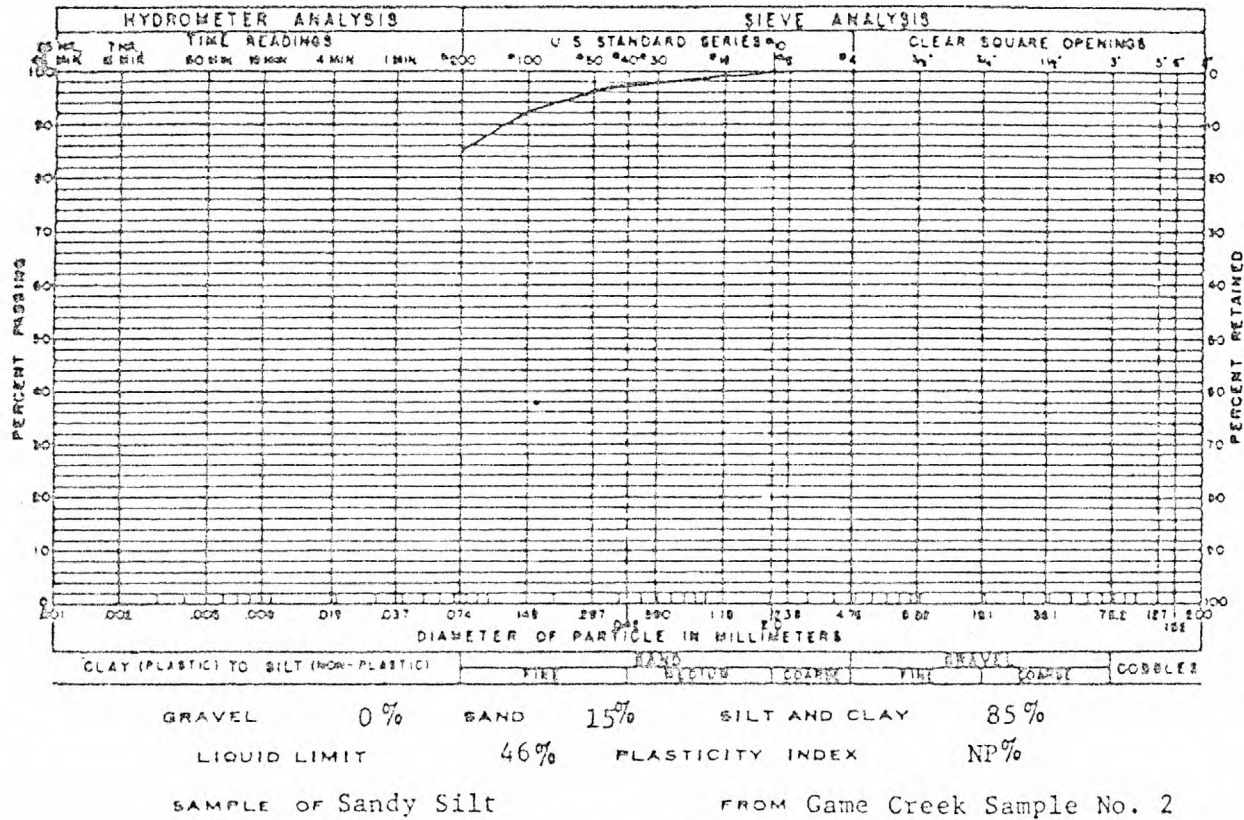
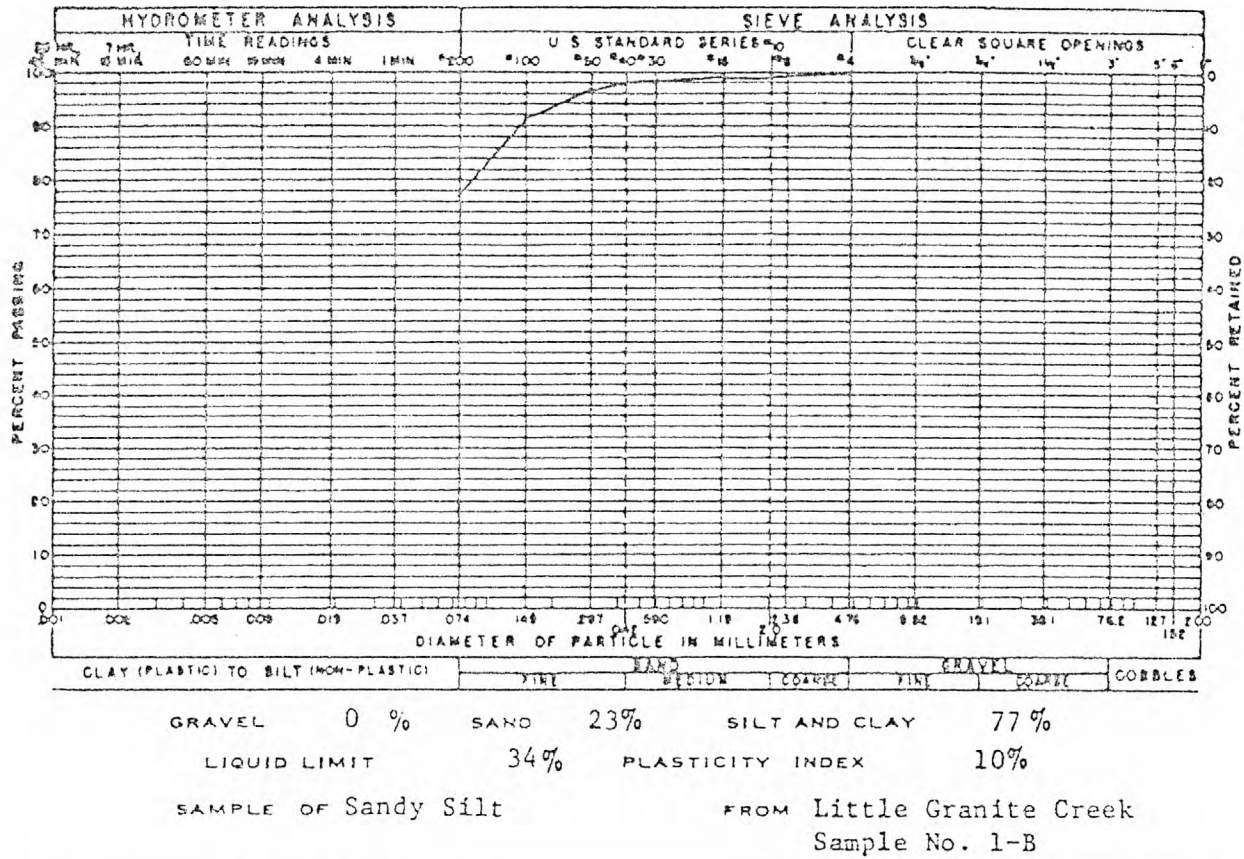
SOIL TEST REPORTS

CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers



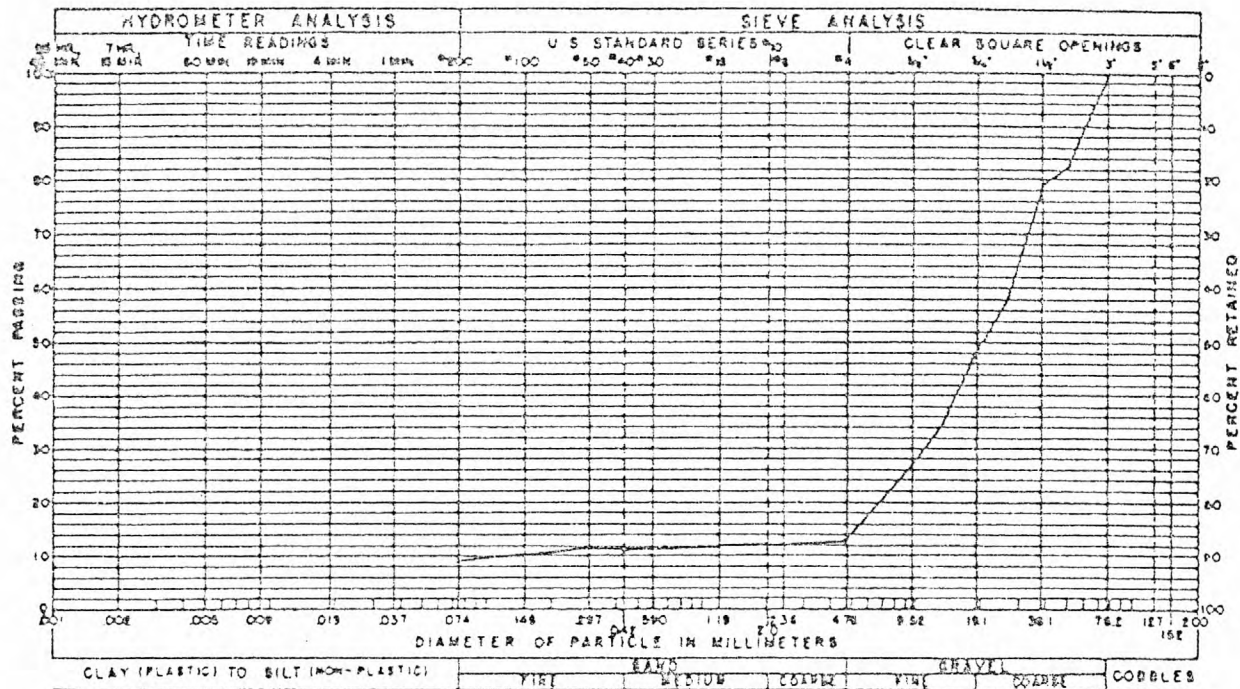
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GRADATION TEST RESULTS

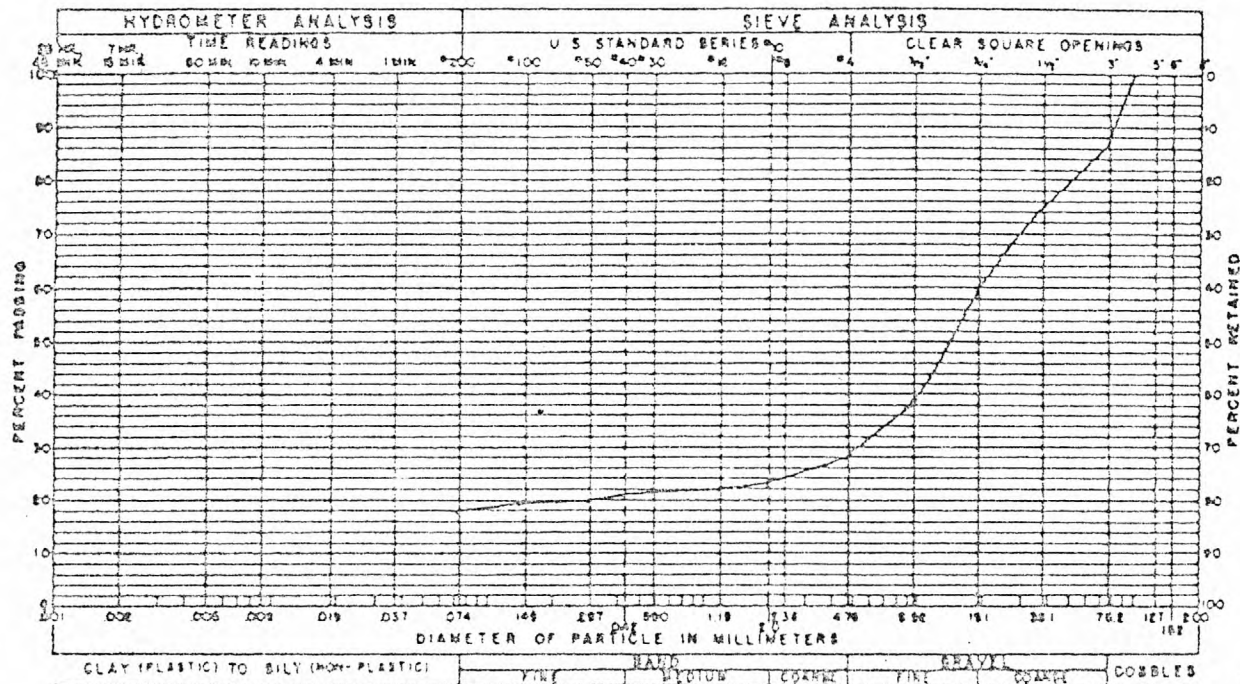
CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers



GRAVEL 87 % SAND 4% SILT AND CLAY 9 %
LIQUID LIMIT 38% PLASTICITY INDEX 12 %

SAMPLE OF Slightly Silty Gravel FROM Little Granite Creek
Sample No. 2



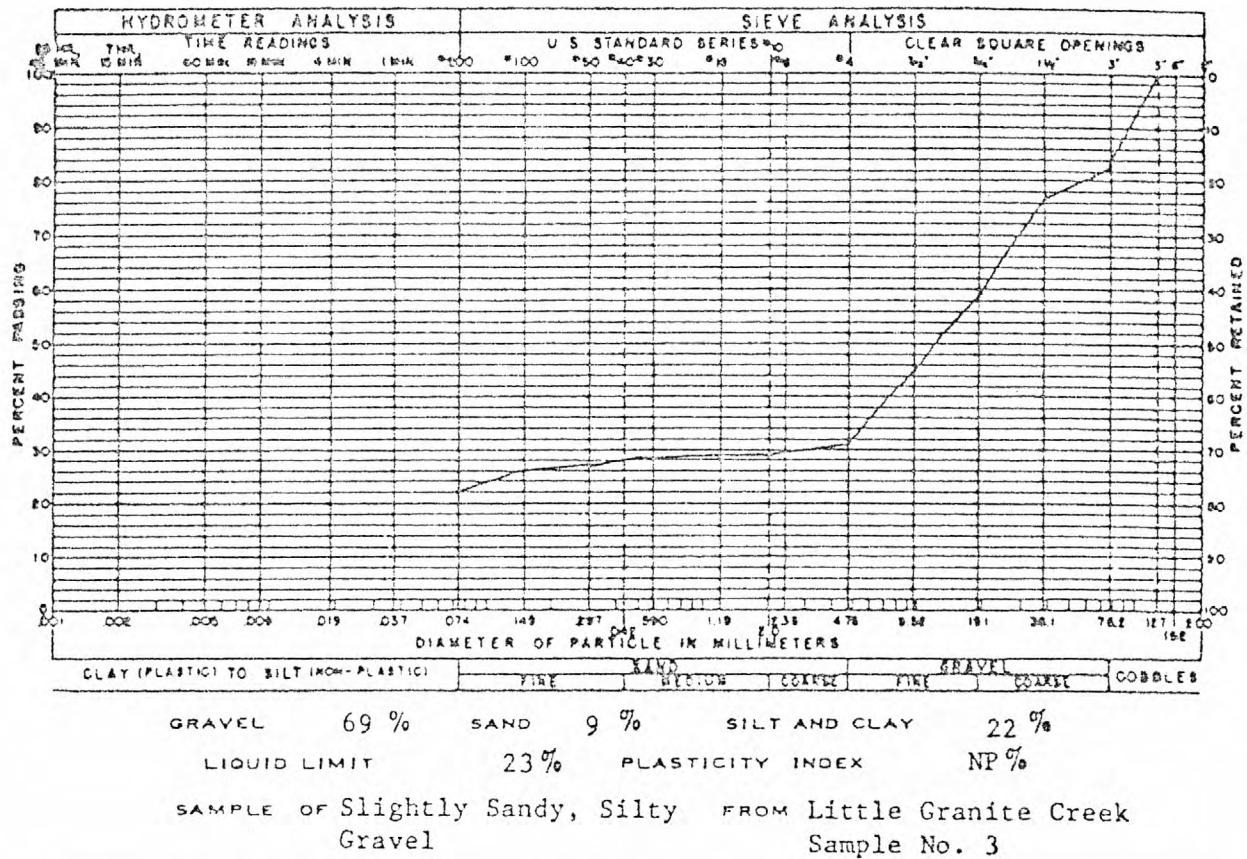
GRAVEL 72 % SAND 10 % SILT AND CLAY 18 %
LIQUID LIMIT 45% PLASTICITY INDEX NP%

SAMPLE OF Slightly Sandy, Silty FROM Game Creek Sample No. 3
Gravel

GRADATION TEST RESULTS

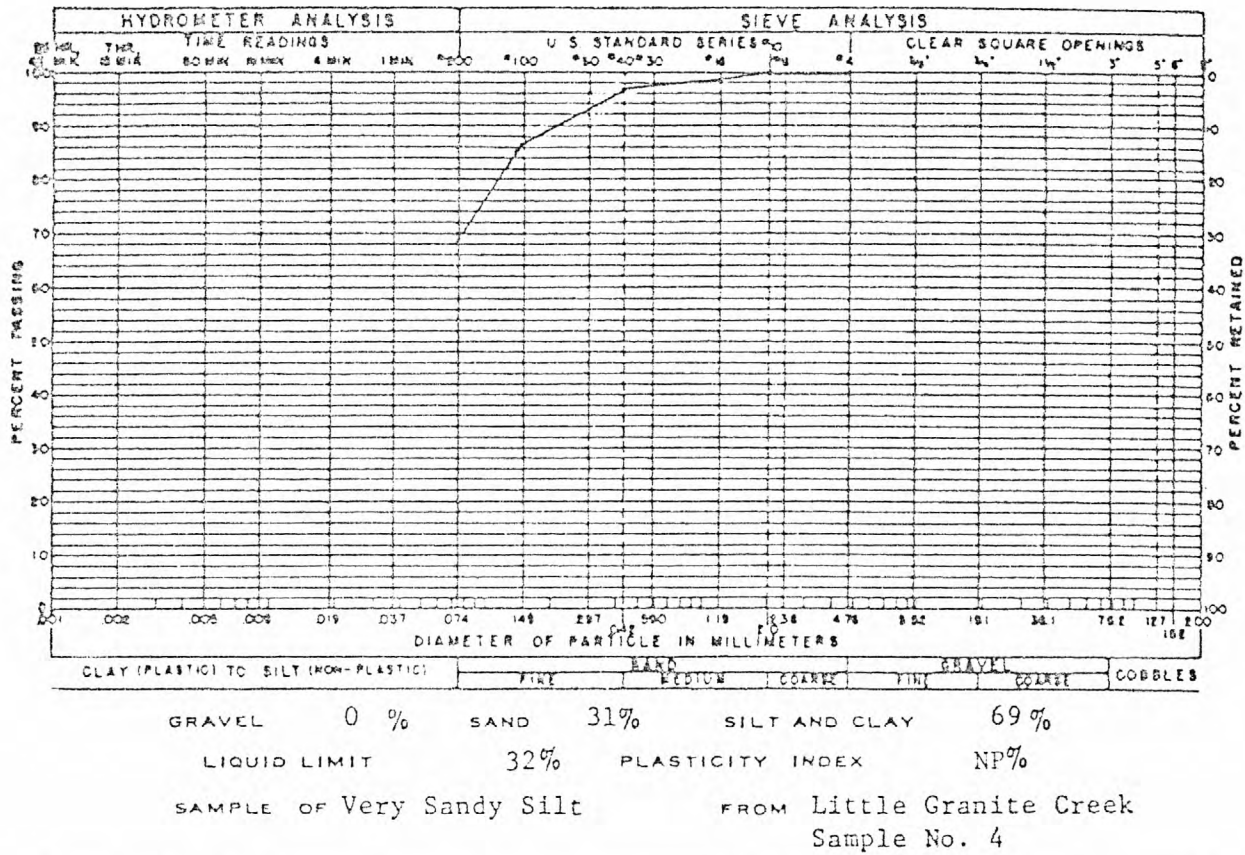
CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers



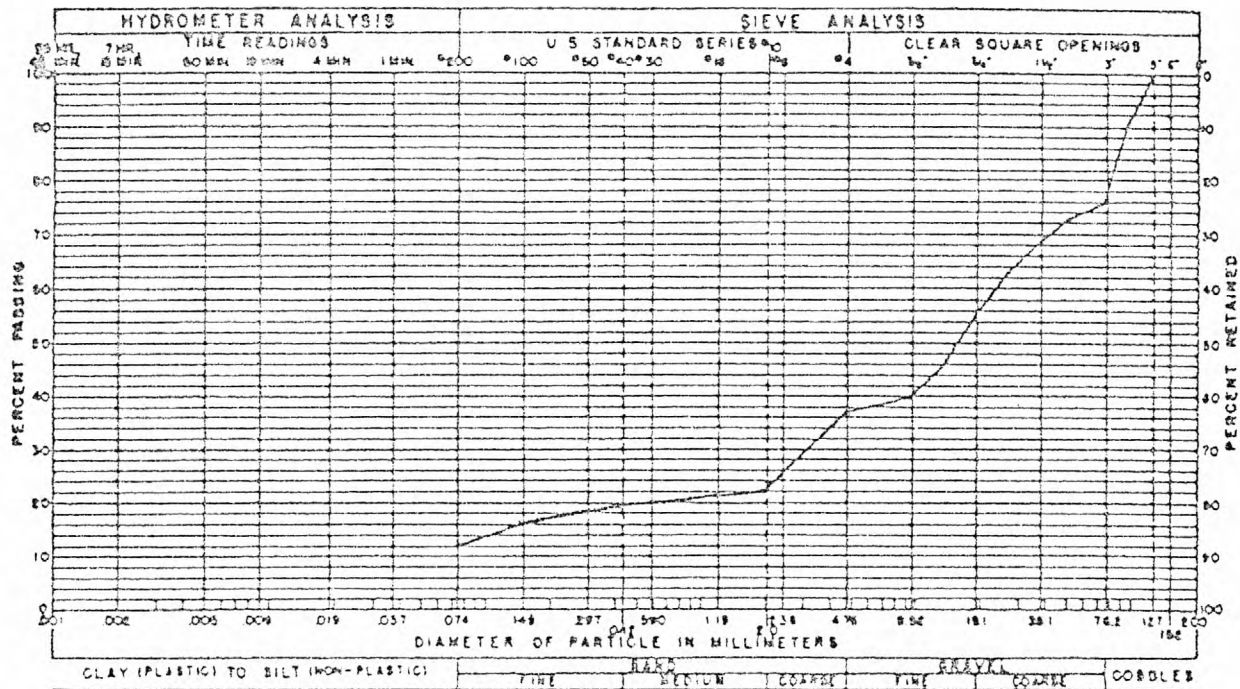
CHEN AND ASSOCIATES

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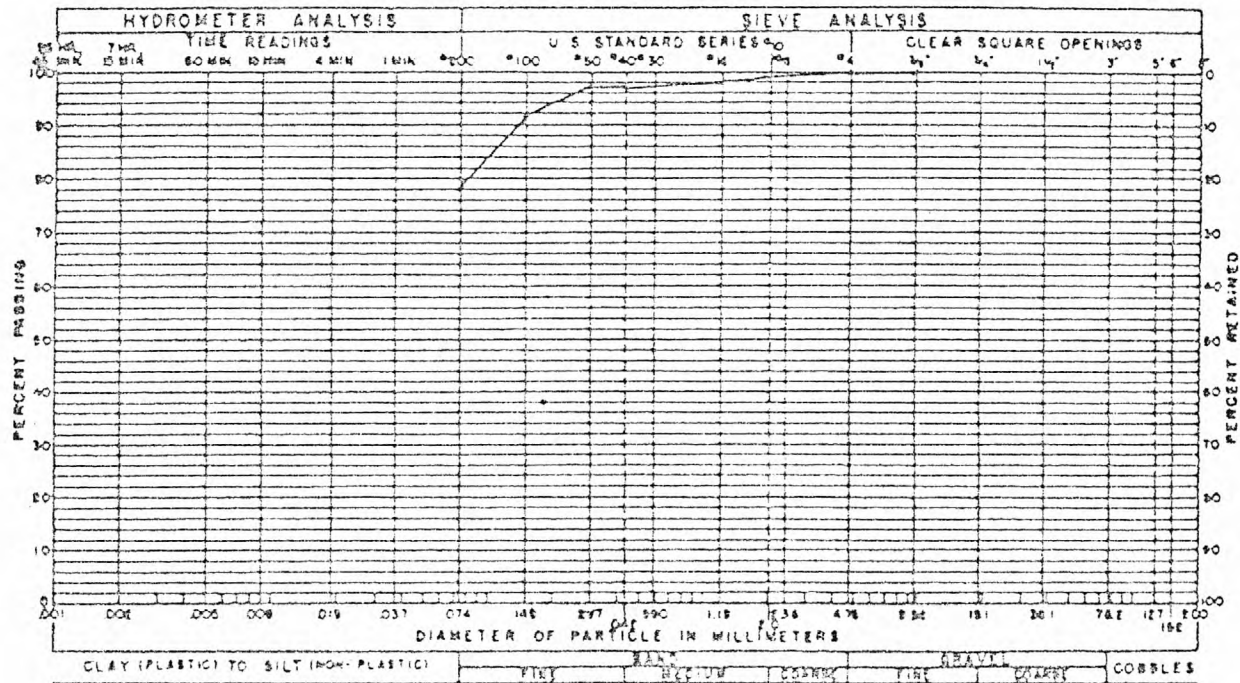
CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers



GRAVEL 63 % SAND 25% SILT AND CLAY 12 %
 LIQUID LIMIT 37 % PLASTICITY INDEX NP %

SAMPLE OF Slightly Silty, Sandy FROM Game Creek Sample No. 5
 Gravel

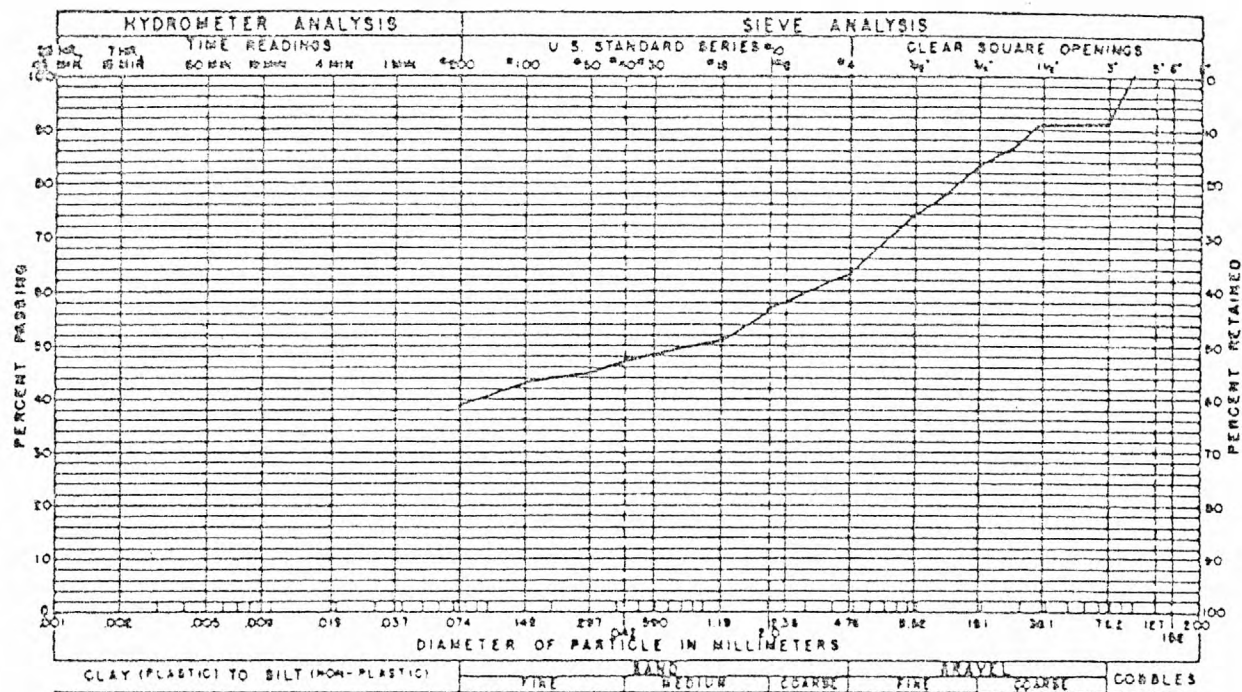


GRAVEL 0% SAND 22% SILT AND CLAY 78%
 LIQUID LIMIT 29 % PLASTICITY INDEX 10 %

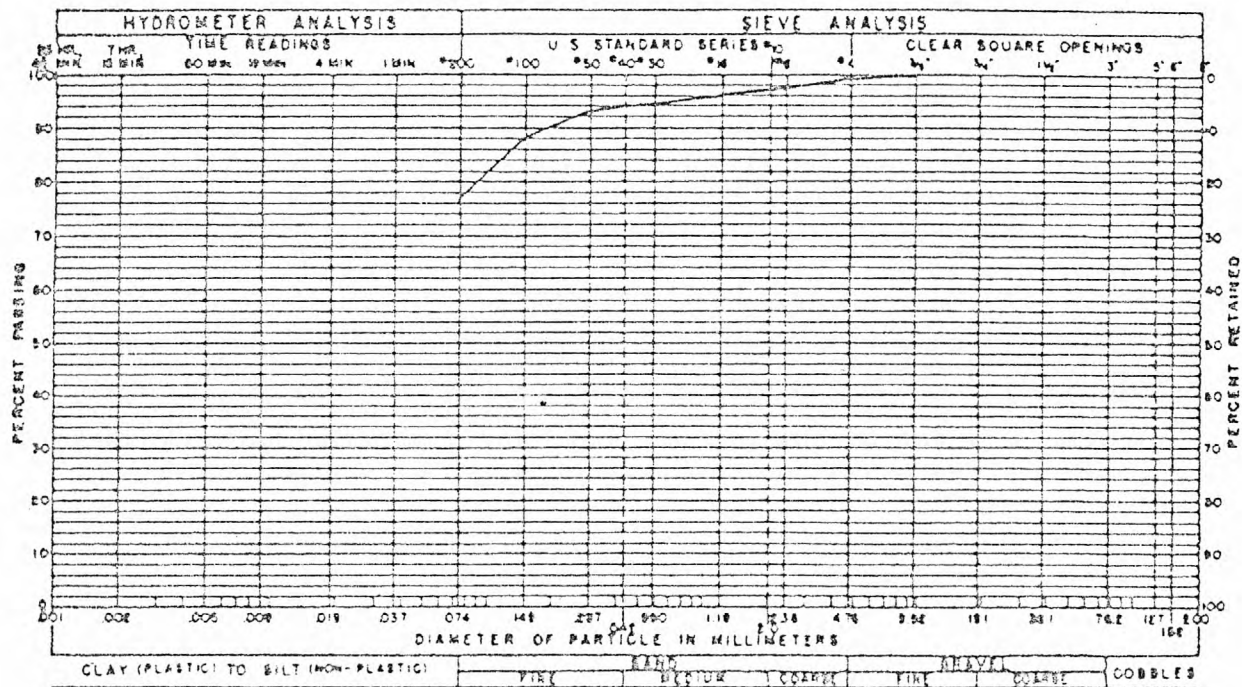
SAMPLE OF Sandy Clay FROM Little Granite Creek
 Sample No. 5

GRADATION TEST RESULTS

CHEM AND ASSOCIATES
Consulting Soil and Foundation Engineers



GRAVEL 37 % SAND 24 % SILT AND CLAY 39 %
LIQUID LIMIT 35 % PLASTICITY INDEX NP %
SAMPLE OF Very Silty, Sandy Gravel FROM Game Creek Sample No. 6

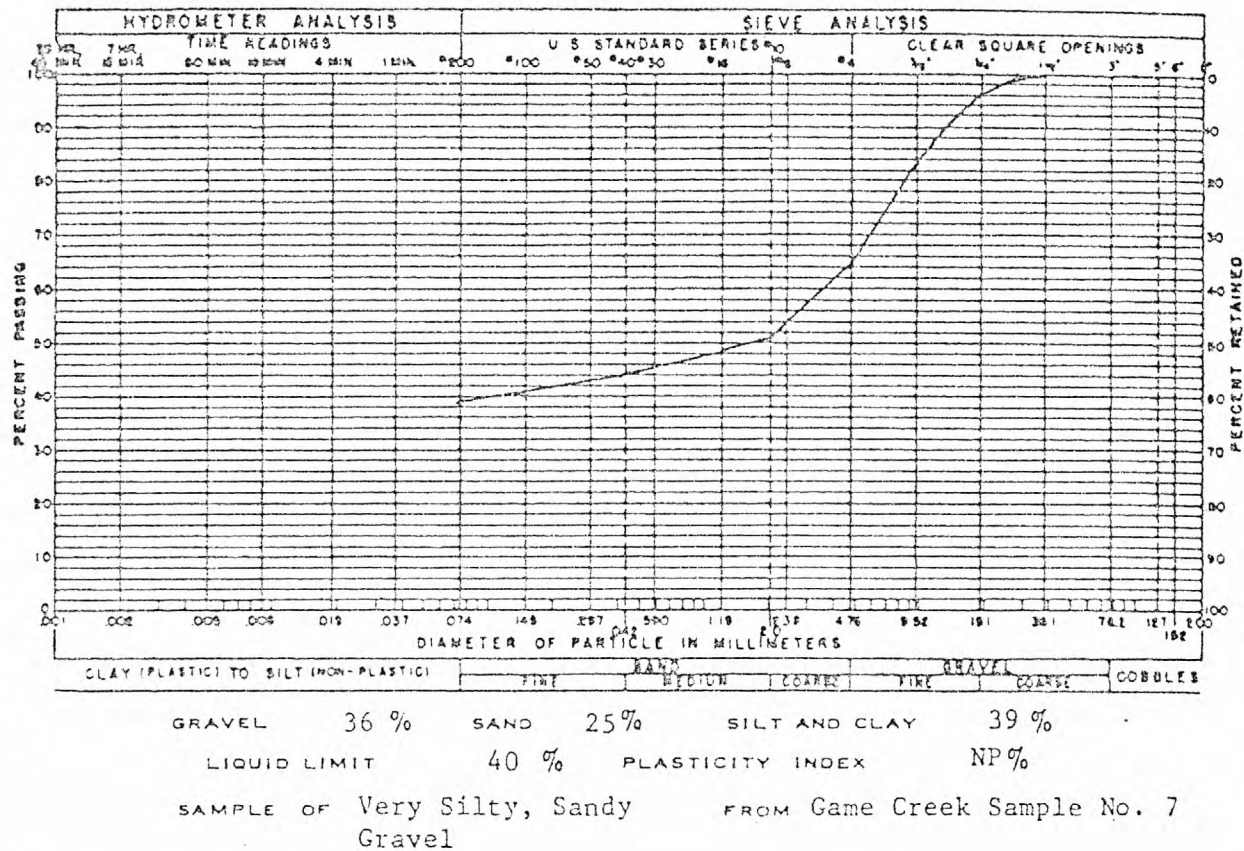


GRAVEL 1 % SAND 22 % SILT AND CLAY 77 %
LIQUID LIMIT 37 % PLASTICITY INDEX 14 %
SAMPLE OF Sandy Clay FROM Little Granite Creek Sample No. 6

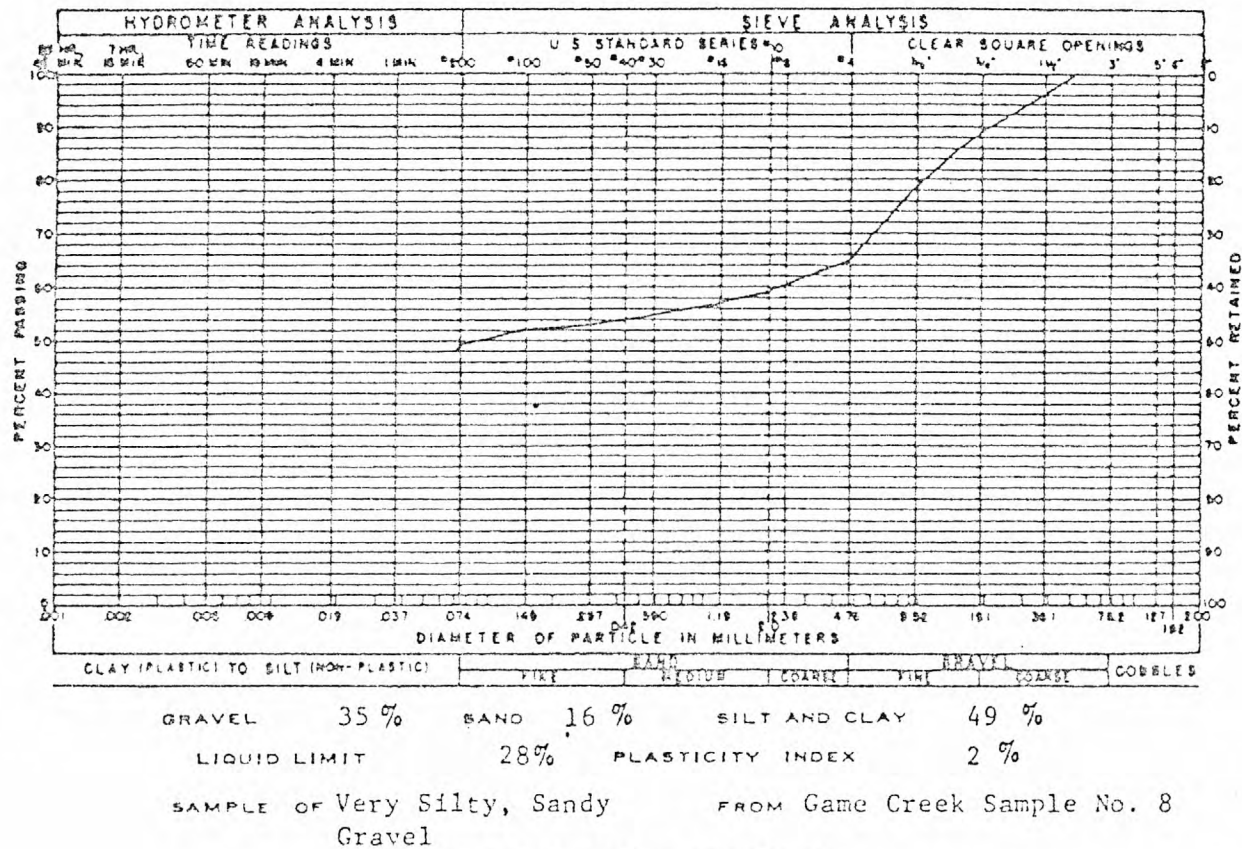
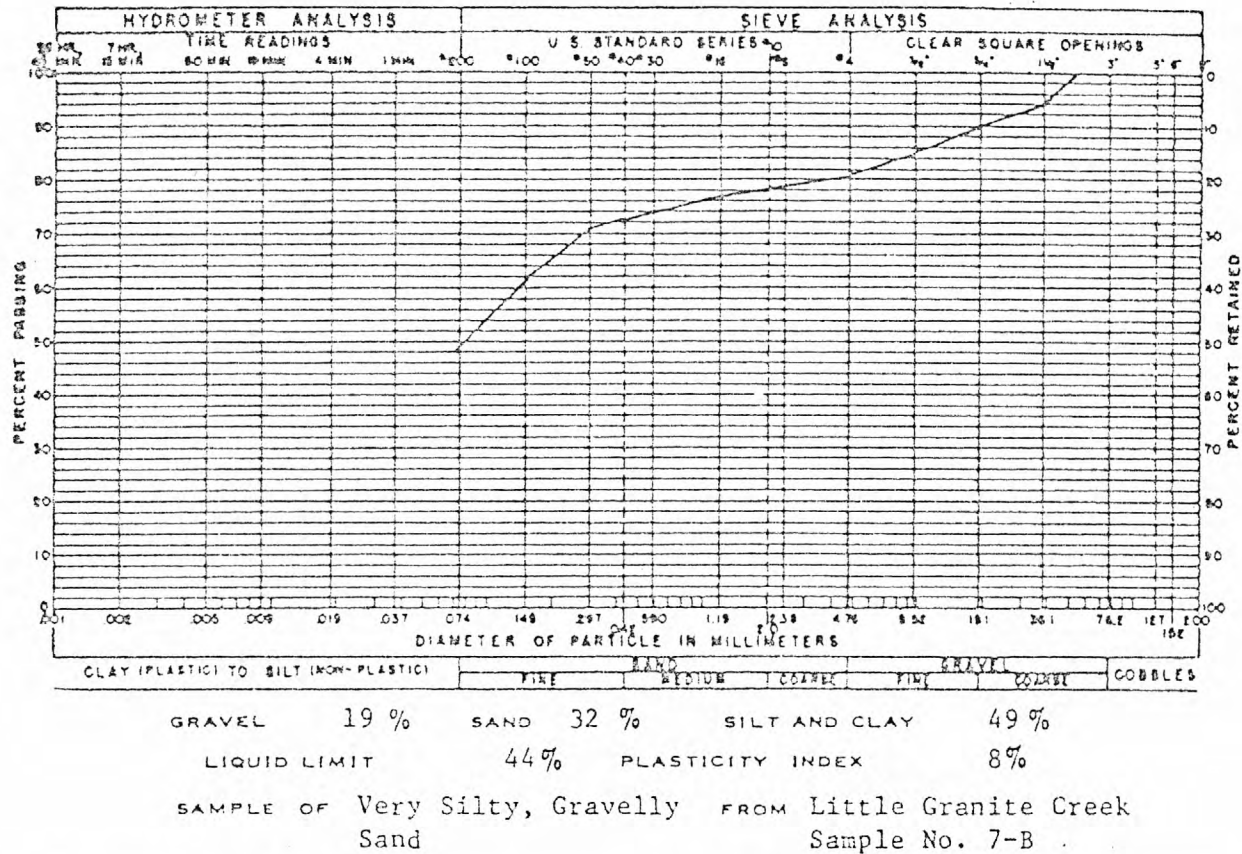
GRADATION TEST RESULTS

CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers



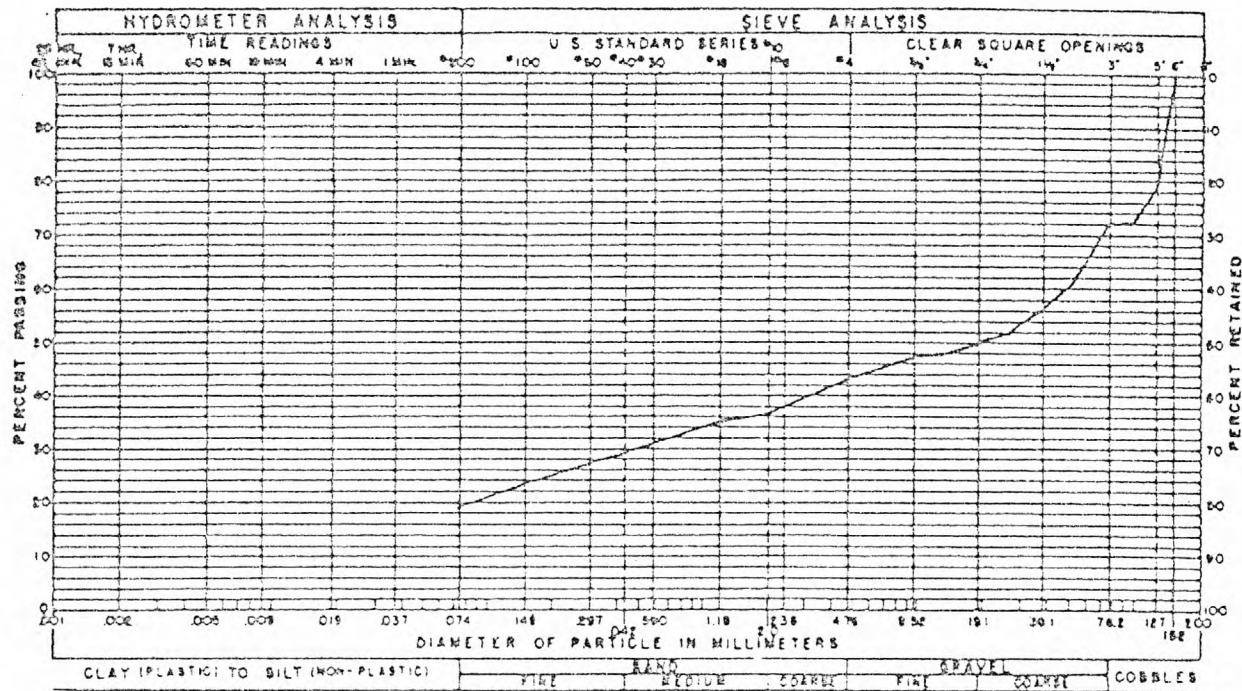
CHEM AND ASSOCIATES
Consulting Soil and Foundation Engineers



GRADATION TEST RESULTS

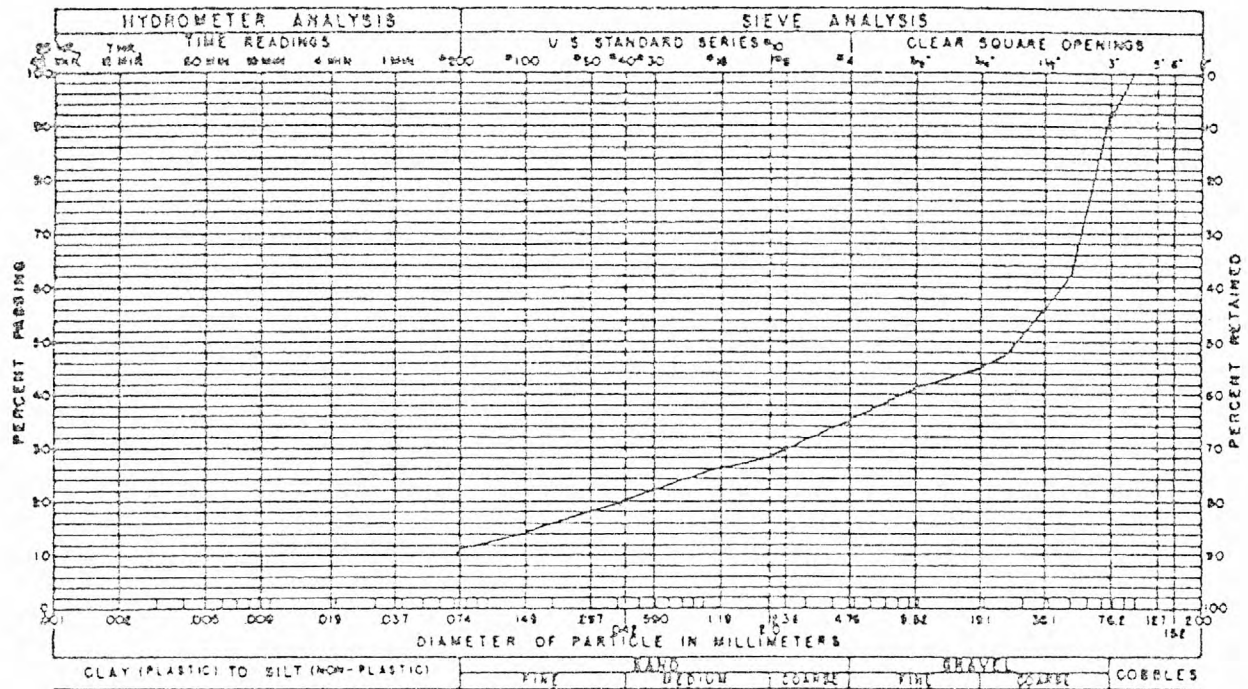
CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers



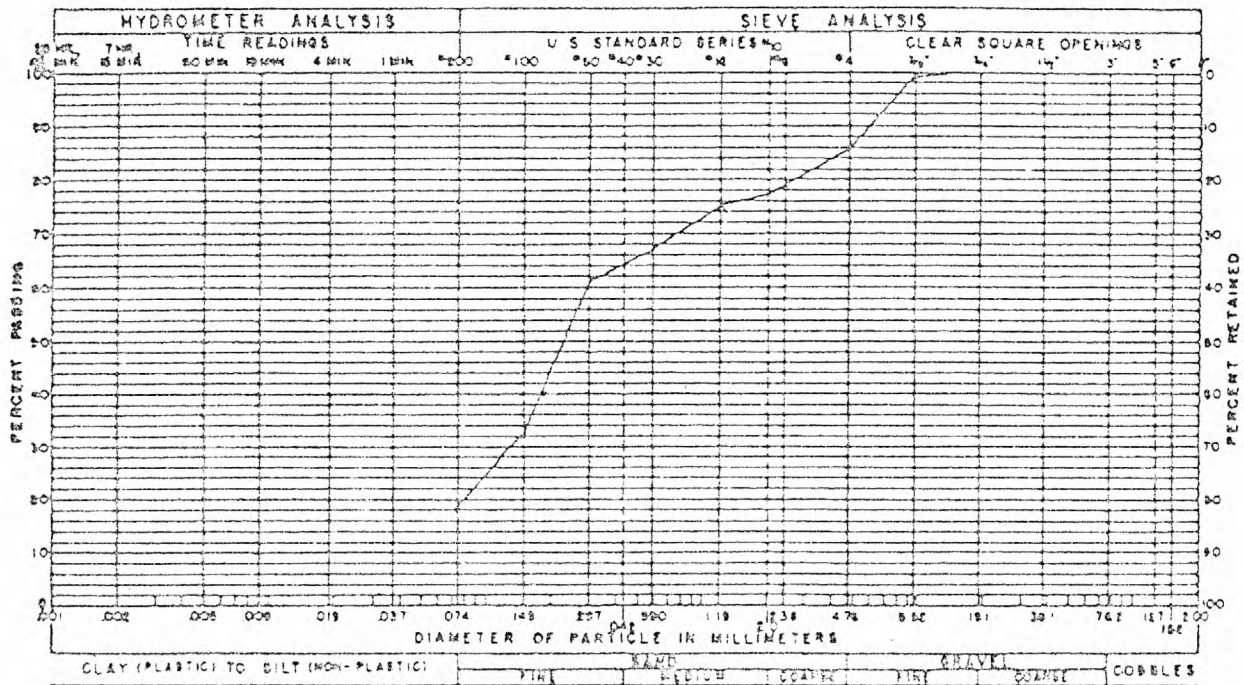
CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers



GRAVEL 65 % SAND 24% SILT AND CLAY 11 %
 LIQUID LIMIT 27 % PLASTICITY INDEX NP %

SAMPLE OF Slightly Silty, Sandy FROM Little Granite Creek
 Gravel Sample No. 10

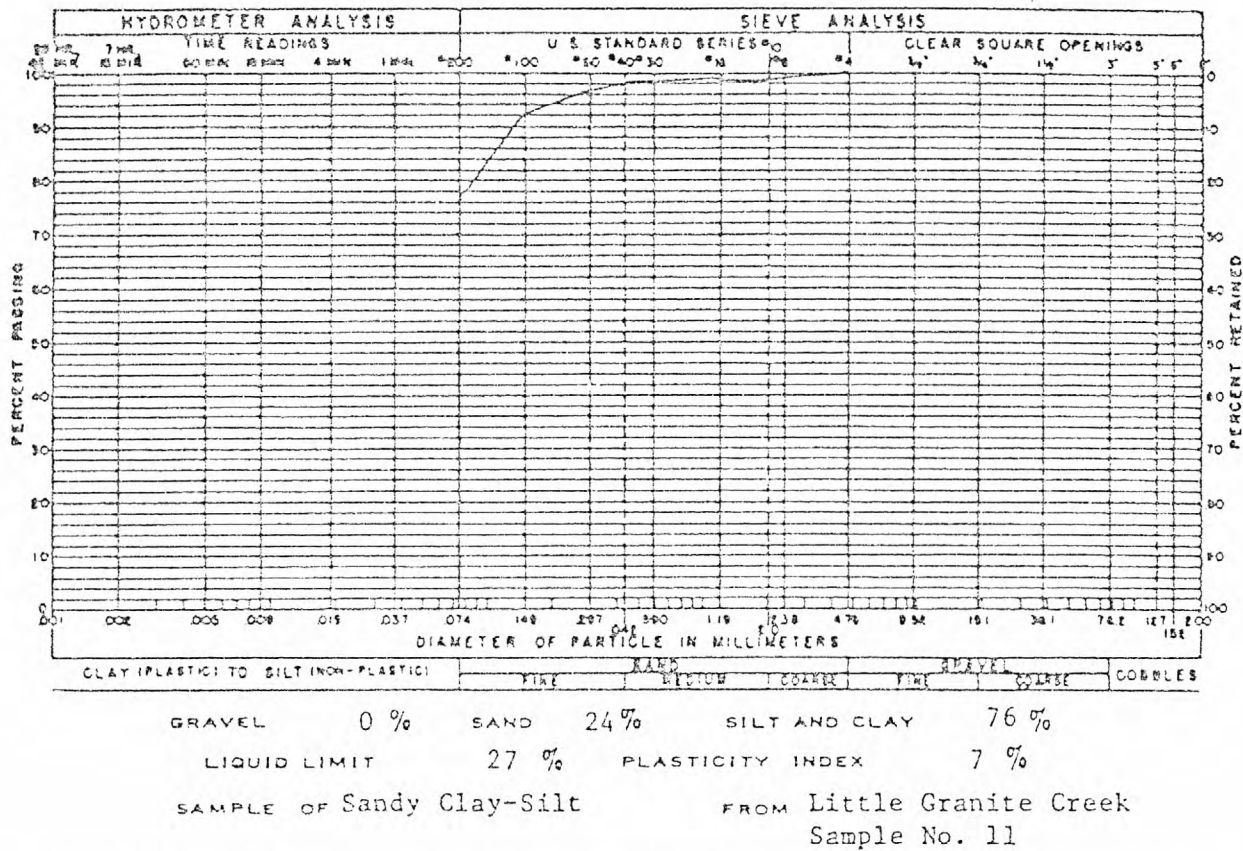


GRAVEL 15 % SAND 67% SILT AND CLAY 18 %
 LIQUID LIMIT 34% PLASTICITY INDEX 4 %

SAMPLE OF Silty, Gravelly Sand FROM Game Creek Sample No. 11

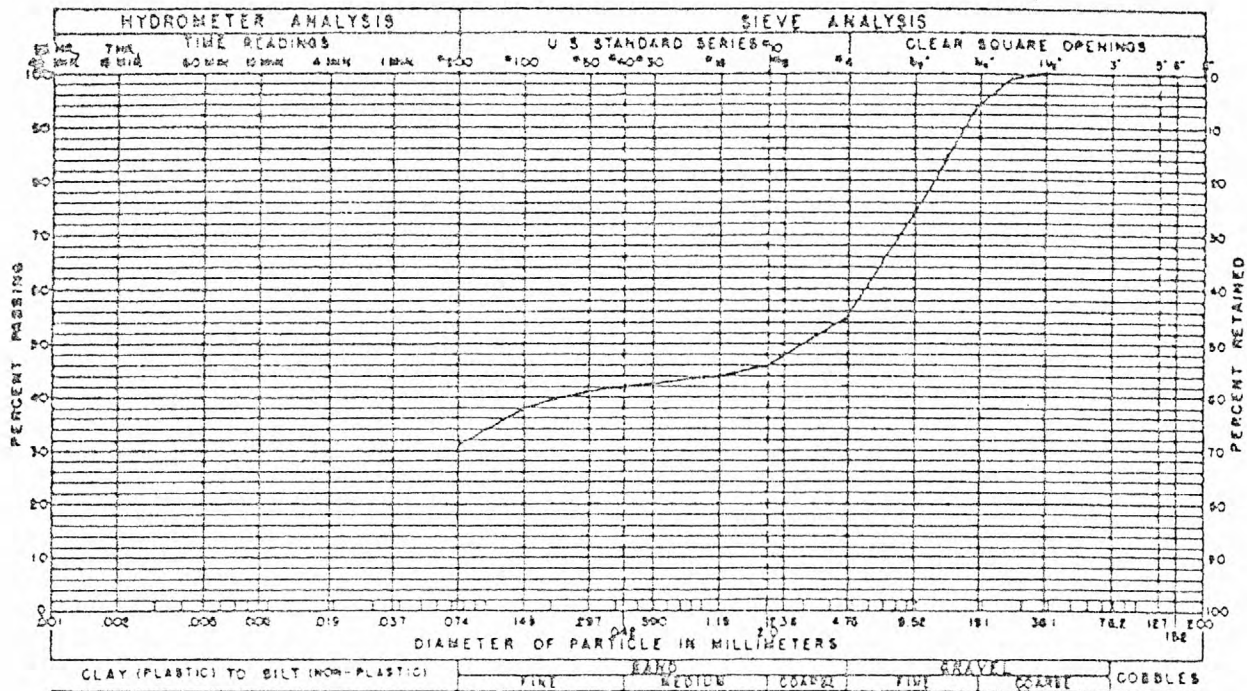
GRADATION TEST RESULTS

CHEN AND ASSOCIATES
Consulting Soil and Foundation Engineers

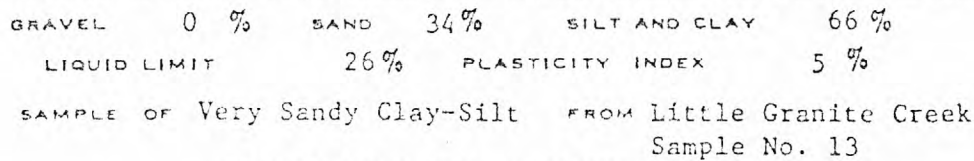
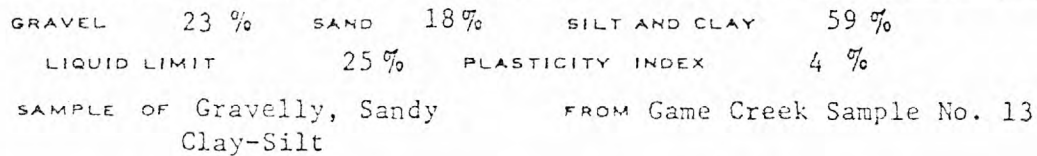


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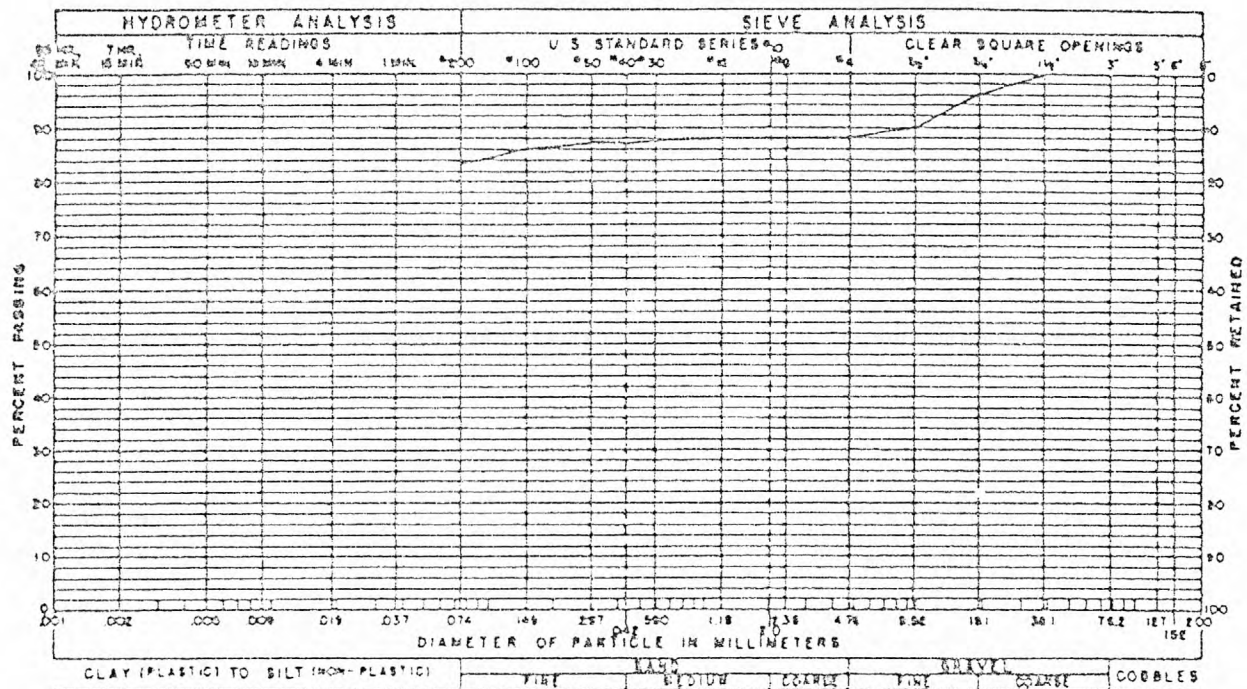
CHEN AND ASSOCIATES
Consulting Soil and Foundation Engineers



GRADATION TEST RESULTS

CHEN AND ASSOCIATES

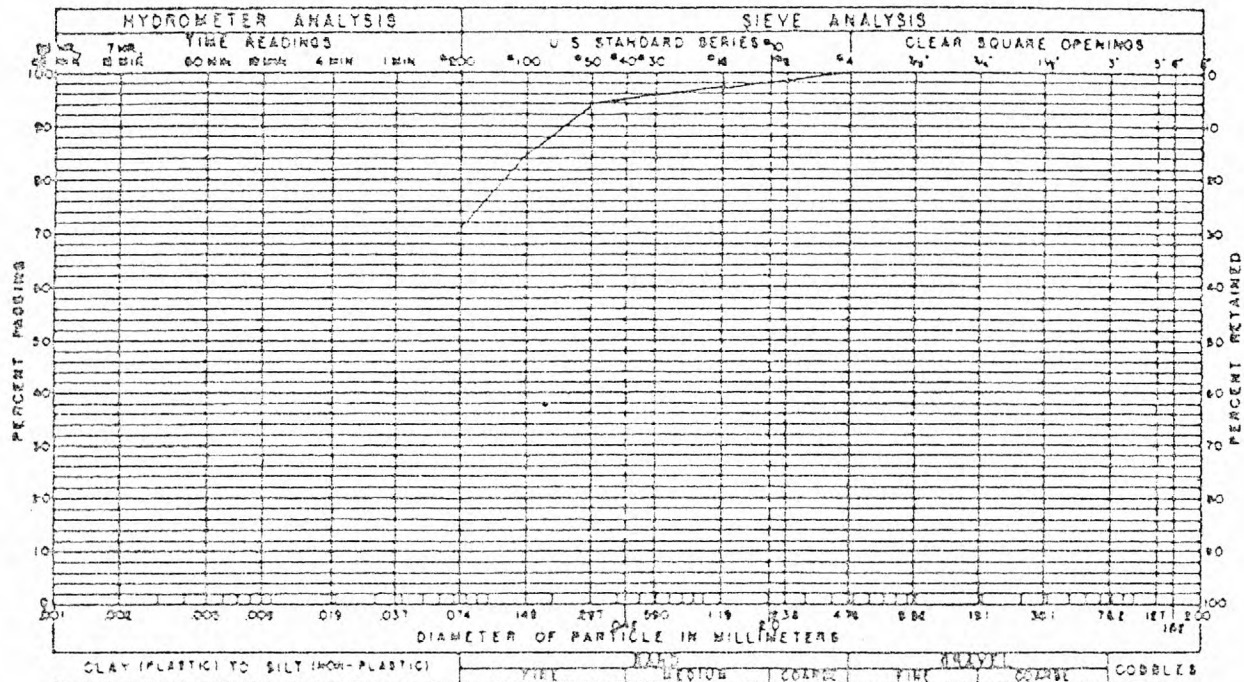
Consulting Soil and Foundation Engineers



GRAVEL 12 % SAND 5 % SILT AND CLAY 83 %
 LIQUID LIMIT 33 % PLASTICITY INDEX 3 %

SAMPLE OF Slightly Sandy,
 Gravelly Silt

FROM Game Creek Sample No. 14



GRAVEL 0 % SAND 29 % SILT AND CLAY 71 %
 LIQUID LIMIT 26 % PLASTICITY INDEX 5 %

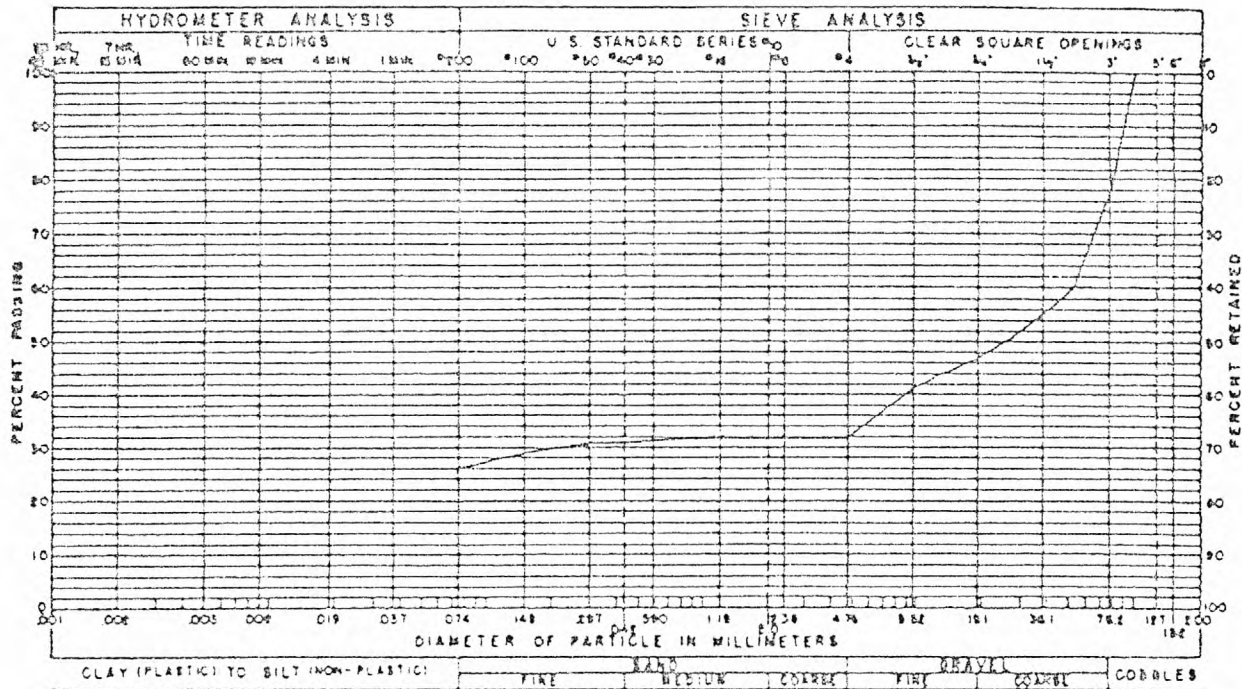
SAMPLE OF Very Sandy Clay-Silt

FROM Little Granite Creek
 Sample No. 14

GRADATION TEST RESULTS

CHEN AND ASSOCIATES

Consulting Soil and Foundation Engineers

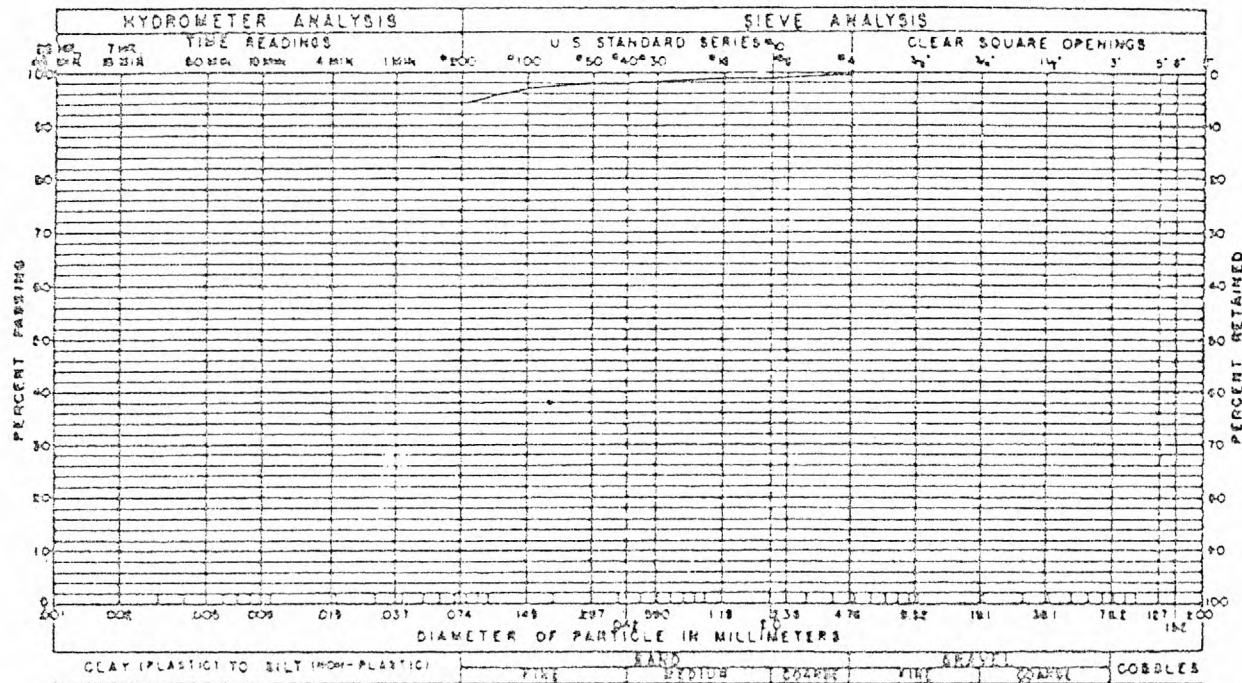


GRAVEL 68% SAND 6% SILT AND CLAY 26%

LIQUID LIMIT 38% PLASTICITY INDEX 11%

SAMPLE OF Slightly Silty Sand FROM Game Creek Sample No. 15

Gravel



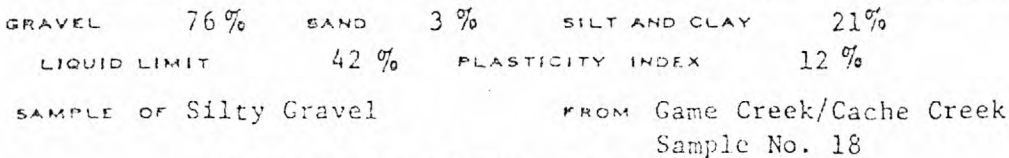
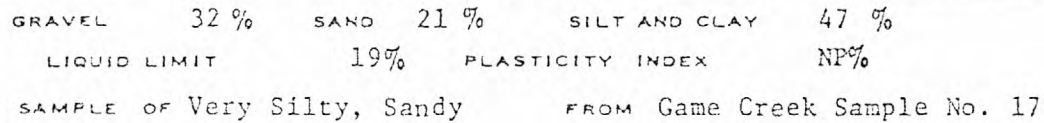
GRAVEL 0% SAND 9% SILT AND CLAY 94%

LIQUID LIMIT 30% PLASTICITY INDEX 9%

SAMPLE OF Sandy Clay FROM Game Creek Sample No. 16

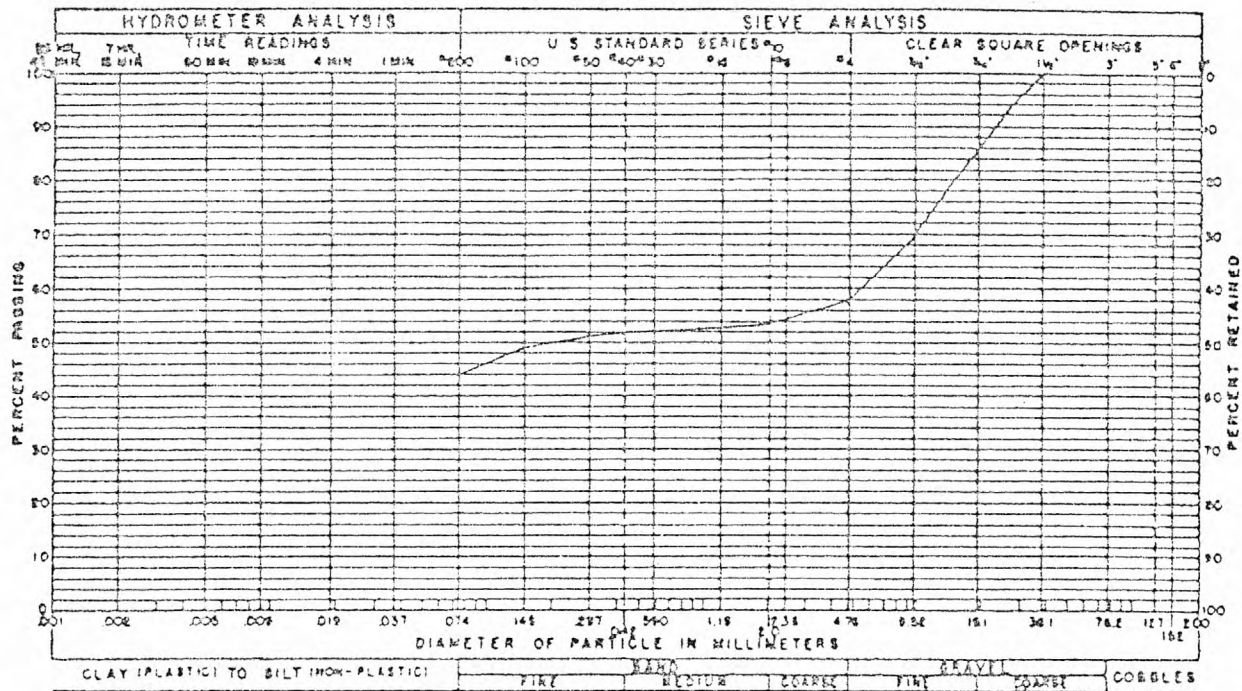
GRADATION TEST RESULTS

Consulting Soil and Foundation Engineers



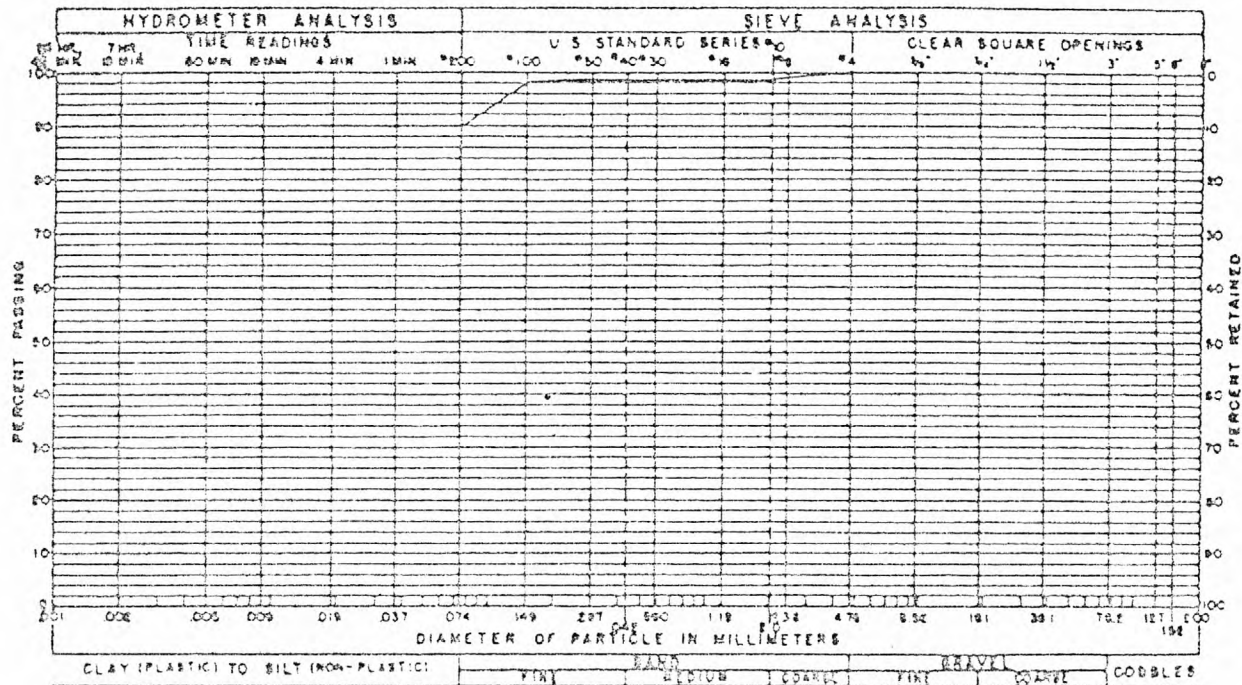
CHEN AND ASSOCIATES

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GRAVEL 42% SAND 14% SILT AND CLAY 44 %
 LIQUID LIMIT 44% PLASTICITY INDEX 5%

SAMPLE OF Very Silty, Sandy Gravel FROM Game Creek/Cache Creek
 Sample No. 19



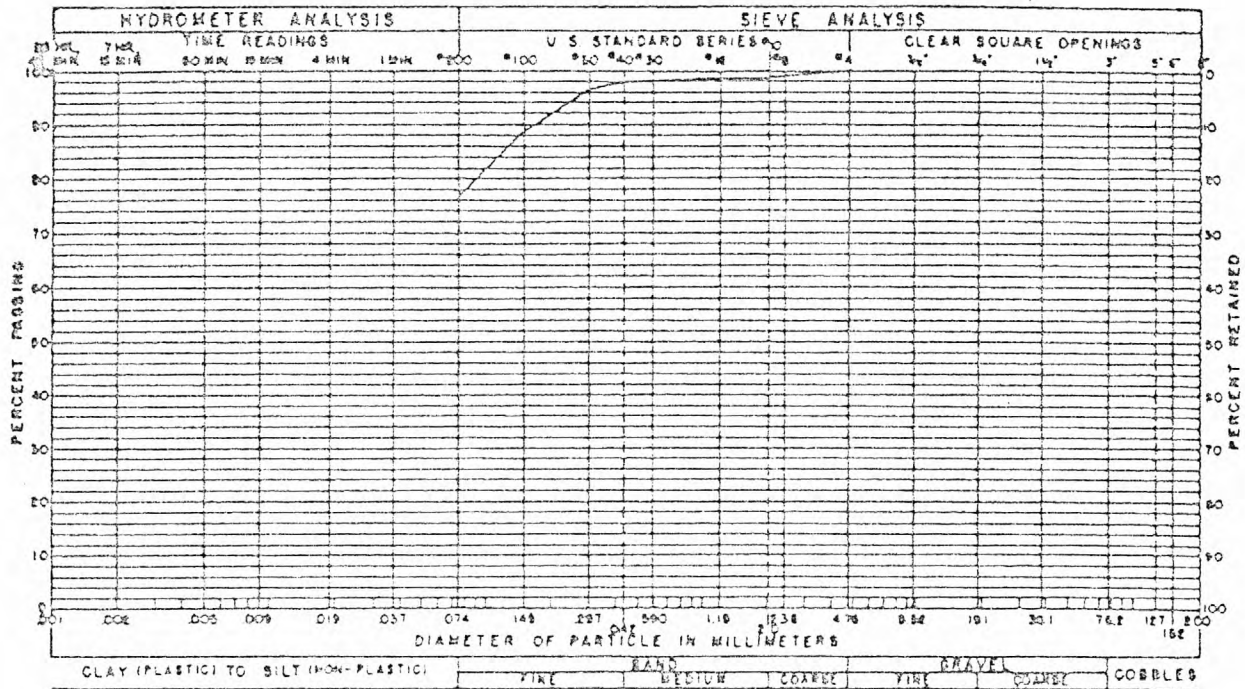
GRAVEL 0% SAND 10% SILT AND CLAY 90 %
 LIQUID LIMIT 45% PLASTICITY INDEX 16 %

SAMPLE OF Slightly Sandy Silt FROM Game Creek/Cache Creek
 Sample No. 20

GRADATION TEST RESULTS

CHEN AND ASSOCIATES

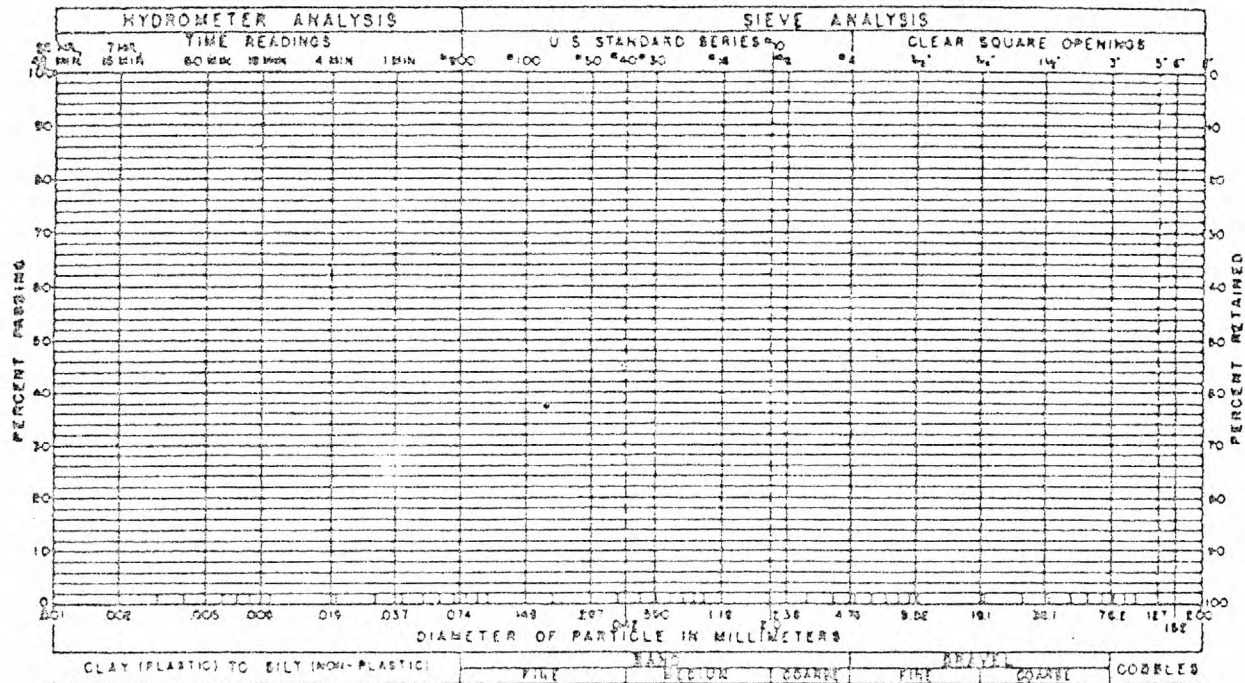
Consulting Soil and Foundation Engineers



GRAVEL 0 % SAND 24 % SILT AND CLAY 76 %
 LIQUID LIMIT 46 % PLASTICITY INDEX 13 %

SAMPLE OF Sandy Silt

FROM Game Creek/Cache Creek
 Sample No. 21



GRAVEL % SAND % SILT AND CLAY %
 LIQUID LIMIT % PLASTICITY INDEX %

SAMPLE OF

FROM

GRADATION TEST RESULTS

TABLE I Page 1 of 6

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE	Natural Moisture (%)	Natural Dry Density (pcf)	ATTERBERG LIMITS		GRADATION				Unified Soil Classi- fication	Highway Research Board Classi- fication	Soil Type
			Liquid Limit (%)	Plasticity Index (%)	+ #10 (%)	- #10 + #40 (%)	- #40 + #200 (%)	- #200 (%)			
Game Creek Sample No. 1	5.2		30	NP	71	7	5	17	GM	A-1-b(0)	Sandy, Silty Gravel
Little Granite Creek Sample No. 1	10.4		23	NP	34	10	22	34	SM	A-2-4(0)	Very Silty, Gravelly Sand
Little Granite Creek Sample No. 1-B	12.9		34	10	1	1	21	77	ML	A-4(7)	Sandy Silt
Game Creek Sample No. 2	17.6		46	NP	0	3	12	85	ML	A-5(3)	Sandy Silt
Little Granite Creek Sample No. 2	17.6		38	12	88	1	2	9	GP-GM	A-2-6(0)	Slightly Silty Gravel
Game Creek Sample No. 3	19.5		45	NP	77	2	3	18	GM	A-1-b(0)	Slightly Sandy Silty Gravel
Little Granite Creek Sample No.	11.9		23	NP	71	1	6	22	GM	A-1-b(0)	Slightly Sandy, Silty Gravel

CHEN AND ASSOCIATES

TABLE I Page 2 of 6

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE	Natural Moisture (%)	Natural Dry Density (pcf)	ATTERBERG LIMITS		GRADATION				Unified Soil Classi- fication	Highway Research Board Classi- fication	Soil Type
			Liquid Limit (%)	Plasticity Index (%)	+ #10 (%)	- #10 + #40 (%)	- #40 + #200 (%)	- #200 (%)			
Game Creek Sample No. 4	7.6		28	3	61	4	7	28	GM	A-2-4(0)	Very Silty, Sandy Gravel
Little Granite Creek Sample No. 4	6.7		32	NP	0	3	28	69	ML	A-4(0)	Very Sandy Silt
Little Granite Creek Sample No. 4-B	2.7			NP	82	6	10	2	GP	A-1-a(0)	Sandy Gravel
Game Creek Sample No. 5	11.4		37	NP	78	3	7	12	GP-GM	A-1-a(0)	Slightly Silty, Sand Gravel
Little Granite Creek Sample No. 5	16.6		29	10	1	2	19	78	CL	A-4(6)	Sandy Clay
Game Creek Sample No. 6	10.5		35	NP	44	9	8	39	GM	A-4(0)	Very Silty, Sandy Gravel
Little Granite Creek Sample No.	20.8		37	14	3	3	17	77	CL	A-6(10)	Sandy Clay

CHEN AND ASSOCIATES

TABLE 1 Page 3 of 6

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE	Natural Moisture (%)	Natural Dry Density (pcf)	ATTERBERG LIMITS		GRADATION				Unified Soil Classi- fication	Highway Research Board Classi- fication	Soil Type
			Liquid Limit (%)	Plasticity Index (%)	+ #10 (%)	- #10 + #40 (%)	- #40 + #200 (%)	- #200 (%)			
Game Creek Sample No. 7	11.3		40	NP	49	7	5	39	GM	A-4(0)	Very Silty, Sandy Gravel
Little Granite Creek Sample No. 7-A	5.4		29	NP	57	11	15	17	GM	A-1-6(0)	Very Sandy, Silty Gravel
Little Granite Creek Sample No. 7-B	17.6		44	8	22	5	24	49	SM	A-5-(2)	Very Silty, Gravelly Sand
Game Creek Sample No. 8	8.6		28	2	41	5	5	49	GM	A-4(0)	Very Silty, Sandy Gravel
Little Granite Creek Sample No. 8	6.1		21	1	63	8	10	19	GM	A-1-b(0)	Silty, Sandy Gravel
Game Creek Sample No. 9	5.3		24	2	52	4	4	40	GM	A-4(0)	Very Silty, Sandy Gravel
Little Granite Creek Sample	20.4		29	8	1	1	65	33	SC	A-2-4(0)	Very Clayey Sand

TABLE I Page 4 of 6

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE	Natural Moisture (%)	Natural Dry Density (pcf)	ATTERBERG LIMITS		GRADATION				Unified Soil Classi- fication	Highway Research Board Classi- fication	Soil Type
			Liquid Limit (%)	Plasticity Index (%)	+ #10 (%)	- #10 + #40 (%)	- #40 + #200 (%)	- #200 (%)			
ame Creek Sample No. 10	50.1		54	NP	3	2	5	90	OL	A-8	Slightly Sandy Organic Silt
ittle Granite reek Sample No. 0	11.8		27	NP	72	8	9	11	GP-GM	A-1-a(0)	Slightly Silty, Sandy Gravel
ame Creek Sample No. 11	21.3		34	4	23	10	49	18	SM	A-2-4(0)	Silty, Gravelly Sand
ittle Granite reek Sample No. 1	10.7		27	7	1	1	22	76	ML-CL	A-4(4)	Sandy Clay-Silt
ittle Granite reek Sample No. 2	11.8		18	NP	79	2	9	10	GP-GM	A-1-a(0)	Slightly Silty, Sandy Gravel
ame Creek Sample o. 12-A	17.1		46	NP	54	4	11	31	GM	A-2-5(0)	Very Silty, Sandy Gravel
ame Creek Sample o. 12-B	10.3		34	5	58	3	8	31	CM	A-2-4(0)	Very Silty, Sandy Gravel

TABLE 1 Page 5 of 6

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE	Natural Moisture (%)	Natural Dry Density (pcf)	ATTERBERG LIMITS		GRADATION				Unified Soil Classi- fication	Highway Research Board Classi- fication	Soil Type
			Liquid Limit (%)	Plasticity Index (%)	+ #10 (%)	- #10 + #40 (%)	- #40 + #200 (%)	- #200 (%)			
ame Creek Sample No. 13	10.7		25	4	27	3	11	59	ML-CL	A-4(0)	Gravelly, Sandy Clay- Silt
ittle Granite reek Sample No. 3	13.7		26	5	1	1	32	66	ML-CL	A-4(1)	Very Sandy Clay-Silt
ame Creek Sample No. 14	20.1		33	3	12	1	4	83	ML	A-4(3)	Slightly Sandy, Gravel Silt
ittle Granite reek Sample No. 4	13.9		26	5	2	3	24	71	ML-CL	A-4(2)	Very Sandy Clay-Silt
ame Creek Sample No. 15	21.5		38	11	68	1	5	26	GM	A-2-6(0)	Slightly Sandy, Silty Gravel
ame Creek Sample No. 16	11.1		30	9	1	1	4	94	CL	A-4(8)	Sandy Clay
ame Creek Sample No. 17	8.2		19	NP	37	4	12	47	GM	A-4(0)	Very Silty, Sandy Gravel

[illegible]

EXHIBIT E

WORK PLAN

I. Research

The initial phase of work will involve familiarization with all available data and previous studies as that information is supplied by the Bridger-Teton National Forest.

At this stage, a study of the maps and aerial photographs will be performed to identify possible road access corridors. Following this corridor identification, the detailed study plan for evaluation, review and approval by the Contracting Officer, as called for in the Specifications, will be prepared for submission.

This research and development of the study plan will involve the Project Manager for five days.

II. Route Study - Office

Upon approval of the study plan, work will proceed on a more detailed office study to define the most suitable route to each of the two drilling sites.

This work will involve the Project Manager for five days.

III. Route Study - Field

This phase will involve location on the ground of the most suitable route to each site, considering the Bridger-Teton Roving Guidelines and other engineering design controls together with actual ground conditions.

This phase will involve the Project Manager and a field assistant for 10 days.

IV. Field Traverse

The most suitable route to each site will be traversed by transit and stadia methods to provide horizontal and vertical control data.

This phase will involve a three-man survey crew for 15 days.

V. Plan and Profile

Plan and profile sheets will be developed for each route utilizing the

data gathered by the field survey.

This phase will involve a draftsman for 10 days.

VI. Field Review

A "field review" of each alternative will be made with the plan and profile sheets, noting culvert and stream crossing requirements and cross-slopes for the development of estimated quantities.

This will involve the Hydraulic and Structural Engineer for 3-3/4 days and the Construction Cost Engineer for 3-1/2 days.

VII. Soil Sampling

Soil samples will be collected to represent the different soils encountered along each selected alternative.

This will involve a two-man crew for 10 days.

VIII. Soil Testing and Classification

Soil testing and classification will be performed by Idaho Testing Laboratories in Idaho Falls, Idaho.

IX. Estimate

An estimate of construction quantities will be prepared for the selected routes.

This will involve the Construction Cost Engineer for five days and the Hydraulic and Structural Engineer for four days.

X. Draft Final Report

The draft final report will be written for submission within 85 days of the contract time.

This will involve the Project Staff for five days.

XI. Final Report

This will incorporate any comments received from the Bridger-Teton National Forest during their review of the draft final report.

Final maps will be included with this report.

This will involve the project staff for two days.

EXHIBIT F

STAFFING

Project Manager

Peter M. Jorgensen will be Project Manager for the work described under Division 215 - Engineering and Road Access of the Specifications. He will devote 80% of his time to the project. Mr. Jorgensen's detailed resume is on Page 3-7.

Hydraulic & Structural Engineer

Robert E. Frost will perform the hydraulic reviews associated with each access alternative and specify drainage structure requirements on each route. Mr. Frost's detailed resume is on Page 3-10.

Construction Cost Engineer

Stanley L. Zaist will develop the estimated construction and operational costs associated with each access route. Mr. Zaist's detailed resume is on Page 3-12.

Draftsmen

All drafting and mapping work will be performed under the direction of Mary S. Shouf. Ms. Shouf has been employed by the firm for five years and is responsible for all research, calculations and drafting.

She will be assisted by Jim Verdone. Mr. Verdone has a degree in Landscape Architecture and has drafted most of the oil and gas access roads done by the firm.

Surveyors

Scott L. Pierson is responsible for all surveying performed by the firm. He has five years experience in engineering surveys, most of it in Teton County.

Survey crews are composed of experienced, local personnel, familiar with the Teton County terrain and accustomed to working in that terrain.

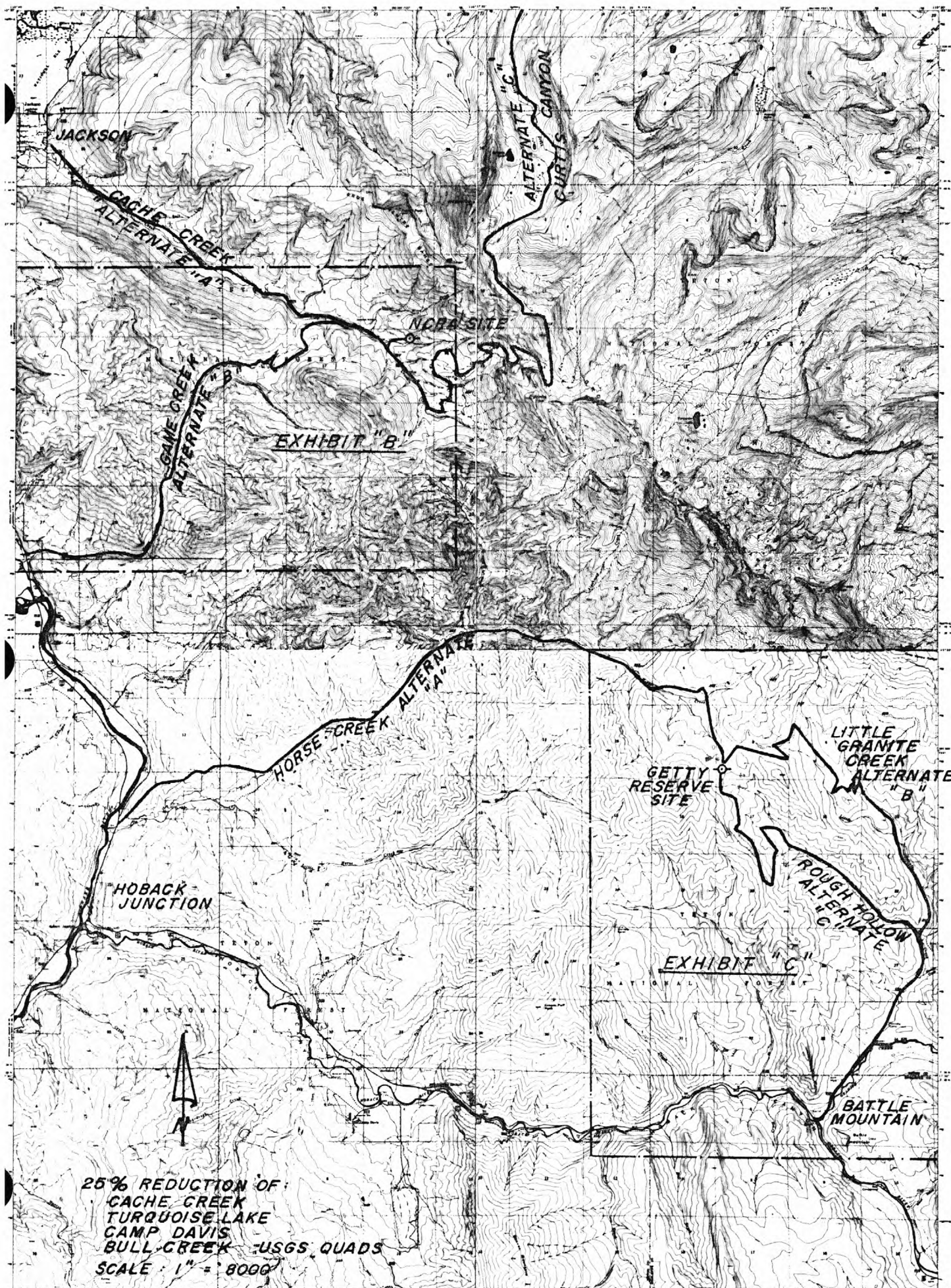
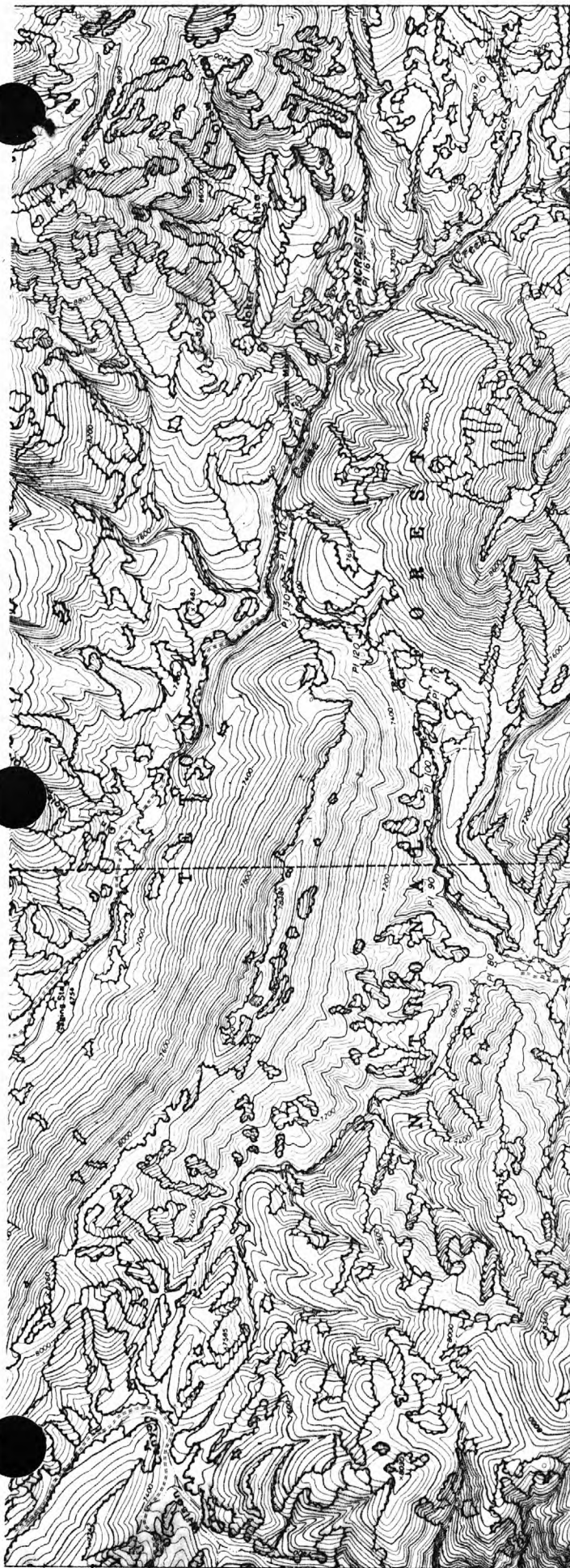


EXHIBIT A



P.I. #	STATION	P.I. #	STATION	P.I. #	STATION	P.I. #	STATION
1	0+00	43	101+63.2	85	186+37.2	127	282+06.8
2	2+21.7	44	103+61.8	86	188+35.9	128	284+02.4
3	4+54.4	45	104+76.1	87	191+91.8	129	286+44.2
4	6+30.7	46	109+25.1	88	195+09.3	130	288+03.6
5	9+10.4	47	112+81.0	89	198+36.3	131	290+08.5
6	12+89.6	48	117+42.2	90	201+90.1	132	291+50.7
7	14+85.0	49	120+47.6	91	204+97.0	133	293+50.7
8	16+92.2	50	119+55.9	92	208+14.9	134	296+55.0
9	18+75.1	51	121+31.5	93	210+19.8	135	299+28.8
10	20+69.6	52	123+92.7	94	212+05.0	136	301+20.1
11	23+46.3	53	124+29.0	95	216+70.9	137	302+57.6
12	24+66.5	54	129+96.5	96	219+11.4	138	303+66.7
13	27+74.9	55	127+87.0	97	223+65.7	139	304+75.9
14	30+29.4	56	130+45.4	98	223+77.9	140	305+56.2
15	32+70.9	57	132+12.9	99	228+46.8	141	306+54.5
16	34+36.1	58	133+97.2	100	228+15.0	142	308+13.7
17	37+42.9	59	135+85.6	101	229+62.8	143	309+80.4
18	39+25.1	60	147+50.3	102	231+90.8	144	313+09.9
19	40+92.3	61	139+01.9	103	234+03.7	145	316+71.1
20	43+74.9	62	140+67.4	104	236+64.5	146	319+11.8
21	48+18.7	63	142+63.7	105	238+60.1	147	321+28.5
22	49+51.3	64	144+55.4	106	240+30.9	148	323+55.3
23	50+85.0	65	146+36.0	107	243+32.1	149	324+80.7
24	53+62.2	66	149+17.9	108	242+97.2	150	326+14.9
25	57+30.9	67	150+07.0	109	244+77.8	151	327+12.9
26	59+59.6	68	154+02.7	110	246+49.0	152	328+06.0
27	61+24.5	69	156+80.9	111	249+35.9	153	330+31.3
28	63+44.0	70	158+96.5	112	252+32.5	154	331+71.8
29	66+34.0	71	160+04.5	113	255+15.0	155	333+38.8
30	69+51.3	72	161+09.5	114	257+00.8	156	335+25.8
31	72+88.5	73	163+46.7	115	260+79.9	157	339+27.7
32	74+55.0	74	164+50.5	116	262+55.4	158	341+44.4
33	79+07.8	75	167+43.0	117	264+76.0	159	344+09.5
34	81+27.4	76	169+24.5	118	266+52.6	160	346+02.4
35	83+97.0	77	170+48.4	119	269+51.5	161	347+45.9
36	88+18.4	78	177+62.5	120	269+31.4	162	351+41.2
37	90+16.6	79	179+35.4	121	271+11.9	163	352+79.2
38	93+27.8	80	177+89.9	122	273+71.0	164	354+42.4
39	93+50.3	81	179+55.3	123	276+15.9	165	356+09.4
40	95+20.4	82	181+06.9	124	277+71.5	166	357+06.7
41	98+00.7	83	182+54.4	125	278+97.9	167	359+07.2
42	100+82.6	84	184+56.4	126	279+92.0		



**USFS - CACHE CREEK / LITTLE GRANITE
CREEK E.I.S.**

GAME CREEK - CACHE CREEK ROUTE TO NCRA

PETER M. JORGENSEN, CONSULTING ENGINEER & LAND SURVEYOR
JACKSON, WYOMING

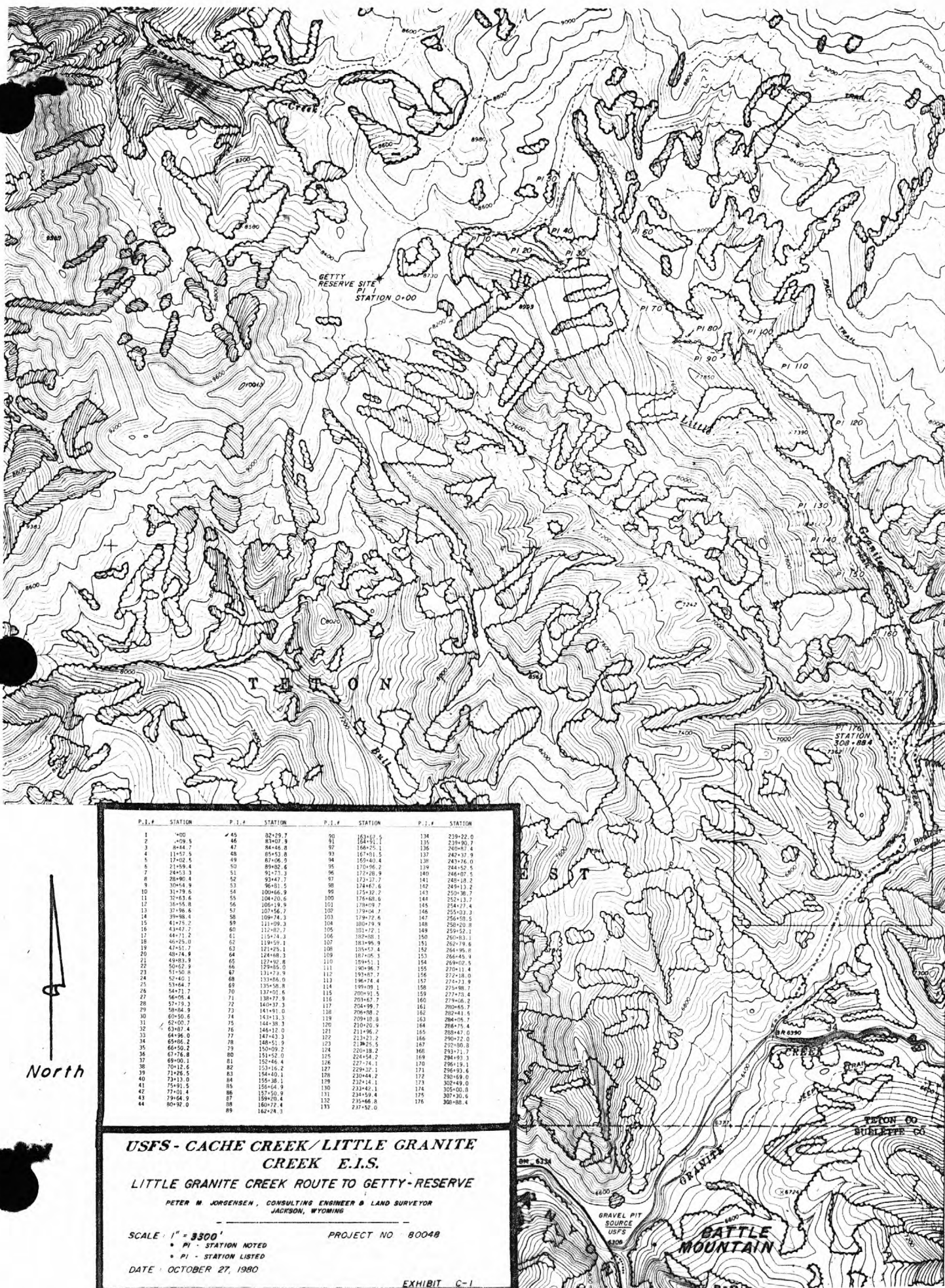
SCALE 1" = 3300'

PROJECT NO. : 80048

- PI - STATION NOTED
- PI - STATION LISTED

DATE : OCTOBER 27, 1980

EXHIBIT B-1



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