SERGENT, HAUSKINS & BECKWITH

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AGUA FRIA RIVER CHANNELIZATION

SLA Job No. AZ-MC-05

Thomas Road to Indian School Road

Maricopa County, Arizona

SHB Job No. LT83-3753
Report No. 2 - Final Report

Consulting Geotechnical Engineers

PHOENIX • ALBUQUERQUE • SANTA FE • SALT LAKE CITY

A109.912

SERGENT, HAUSKINS & BECKWITH CONSULTING GEOTECHNICAL ENGINEERS

APPLIED SOIL MECHANICS • ENGINEERING GEOLOGY • MATERIALS ENGINEERING

B. DWAINE SERGENT, P.E.
NORMAN H. WETZ, P.E.
WAYNE A. ERICSON, P.E.
JOHN B. HAUSKINS, P.E.
DALE V. BEDENKOP, P.E.
ROBERT L. FREW
DONALD L. CURRAN, P.E.
GEORGE H. BECKWITH, P.E.
ROBERT R. KOONS, P.E.
DONALD G. METZGER, P.G.
ALLON C. OWEN, JR., P.E.
ROBERT D. BOOTH, P.E.
ROBERT W. CROSSLEY, P.E.
RALPH E. WEEKS, P.G.

September 26, 1983

Simons, Li & Associates, Inc.
P. O. Box 2713
Tucson, Arizona 85702

Job No. LT83-3753
Report No. 2
Final Report

Attention: John B. Lynch, P.E.

Re: Agua Fria River Channelization
SLA Job No. AZ-MC-05
Thomas Road to Indian School Road
Maricopa County, Arizona

Gentlemen,

Transmitted herewith are results of field sampling and laboratory testing performed on Agua Fria River channel materials for analysis of unconfined compressive strength of a sand-gravel-cement mixture.

Gradation analyses indicate the channel area samples, obtained at locations as noted on the site plan in Appendix A, are primarily poorly graded sands with very little gravel (plus No. 4). Unconfined compressive strength (psi) results indicate a relatively high cement demand to achieve strength in excess of 500 psi.

REPLY TO: 3940 W. CLARENDON, PHOENIX, ARIZONA 85019

PHOENIX (602) 272-6848
ALBUQUERQUE (505) 884-0950
SANTA FE (505) 471-7836
SALT LAKE CITY (801) 566-5411

Strength and density could be significantly improved by attempting a blend of import materials to compliment an aggregate base course gradation band.

Should specific questions arise concerning results of testing performed, please do not hesitate to call.

Respectfully submitted,
Sergent, Hauskins & Beckwith Engineers

By _____
Dale V. Bedenkop, P.E.

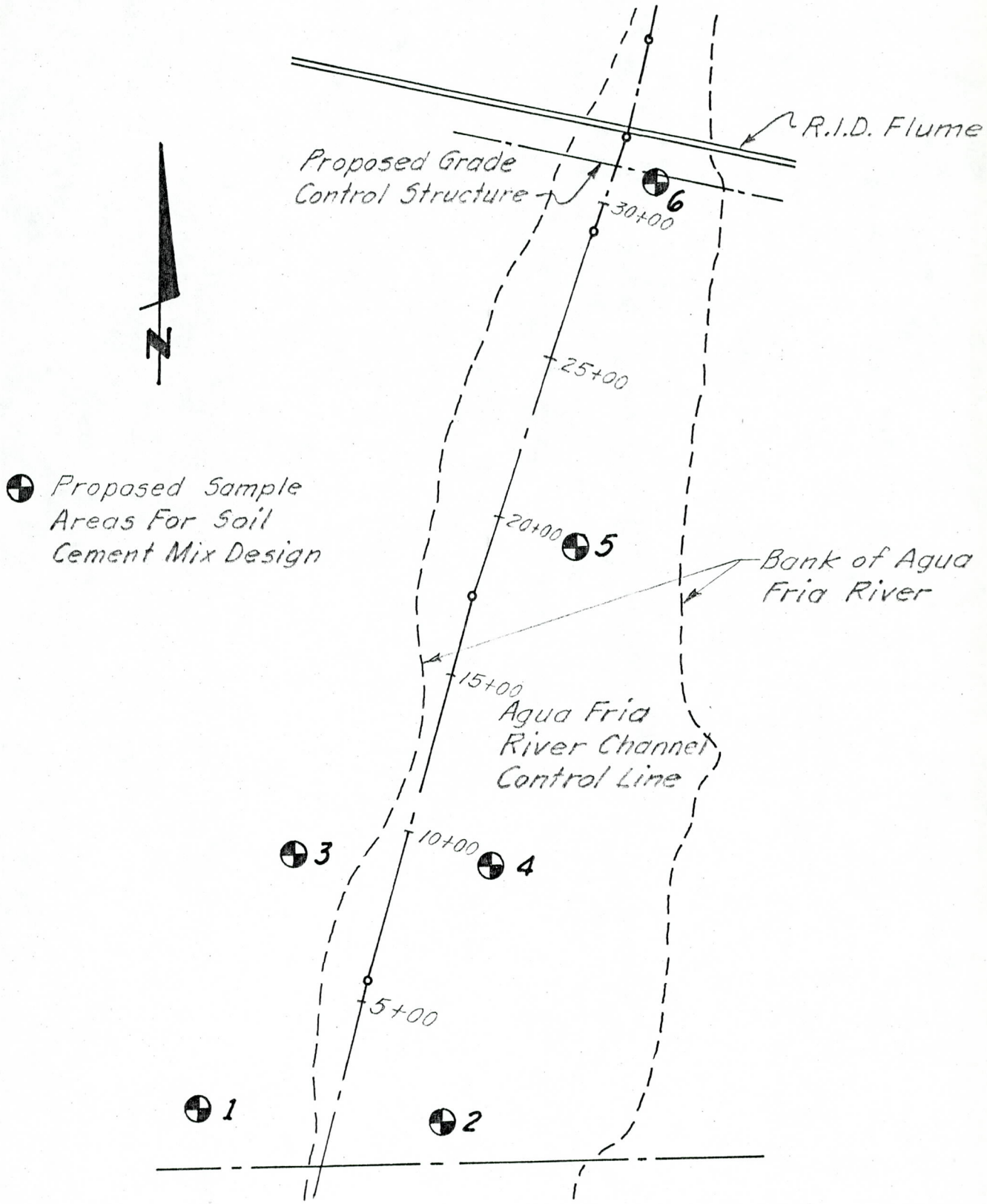
Registered Professional Engineer (Civil) CERTIFICATE NO. 5634 DALE V. BEDENKOP Date Signed 9-26-83 ARIZONA, U.S.A.

Copies: Addressee (3)

APPENDIX A

SITE PLAN

SHOWING LOCATIONS OF TEST BORINGS



S.H.B. Job No. LT83-375

SERGENT, HAUSKINS & BECKWITH

CONSULTING SOIL AND FOUNDATION ENGINEERS
PHOENIX • TUCSON • ALBUQUERQUE

PROJECT SLA Job No. AZ-MC-05

JOB NO. LT83-3753 DATE 8-24-83

LOG OF TEST PIT NO. 1

Backhoe Type Case 580B

Location

Elevation

Datum

GROUND WATER

DEPTH	HOUR	DATE

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0							SILT, nonplastic
2½		X			ML		
5		X			SP-SM		SAND, poorly graded, sand-silt mixture, nonplastic, very few cobbles
							Backhoe stopped at 6'

DATE 8-24-83

LOG OF TEST PIT NO. 2

Backhoe Type Case 580B

Location

Elevation

Datum

GROUND WATER

DEPTH	HOUR	DATE

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0							SAND, poorly graded, nonplastic
					SP		
2½		X					
5		X			GP		GRAVEL, poorly graded, nonplastic, very few cobbles
							Backhoe stopped at 5½'

SAMPLE TYPE

B — Undisturbed Block Sample

D — Disturbed Bulk Sample

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PHOENIX • ALBUQUERQUE • SANTA FE • SALT LAKE CITY

PROJECT SLA Job No. AZ-MC-05

JOB NO. LT83-3753 DATE 8-24-83

LOG OF TEST PIT NO. 3

Backhoe Type Case 580B

Location

Elevation

Datum

GROUND WATER

DEPTH	HOUR	DATE

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0							SILTY SAND, nonplastic, very few cobbles
2½		X			SM		
5							
							Backhoe stopped at 6'

DATE 8-24-83

LOG OF TEST PIT NO. 4

Backhoe Type Case 580B

Location

Elevation

Datum

GROUND WATER

DEPTH	HOUR	DATE

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0							SAND, poorly graded, nonplastic, very few cobbles
2½		X			SP		
5							
							Backhoe stopped at 6'

SAMPLE TYPE

B — Undisturbed Block Sample

D — Disturbed Bulk Sample

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS

PHOENIX • ALBUQUERQUE • SANTA FE • SALT LAKE CITY

PROJECT SLA Job No. AZ-MC-05

JOB NO. LT83-3753 DATE 8-24-83

LOG OF TEST PIT NO. 5

Backhoe Type Case 580B

Location

Elevation

Datum

GROUND WATER

DEPTH	HOUR	DATE

Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0					SP		SAND, poorly graded, nonplastic, trace of clay 1½'-2½'
2½		X			SP		SAND, some gravel, poorly graded, non-plastic, very few cobbles
5							Backhoe stopped at 6'

DATE 8-24-83

LOG OF TEST PIT NO. 6

Backhoe Type Case 580B

Location

Elevation

Datum

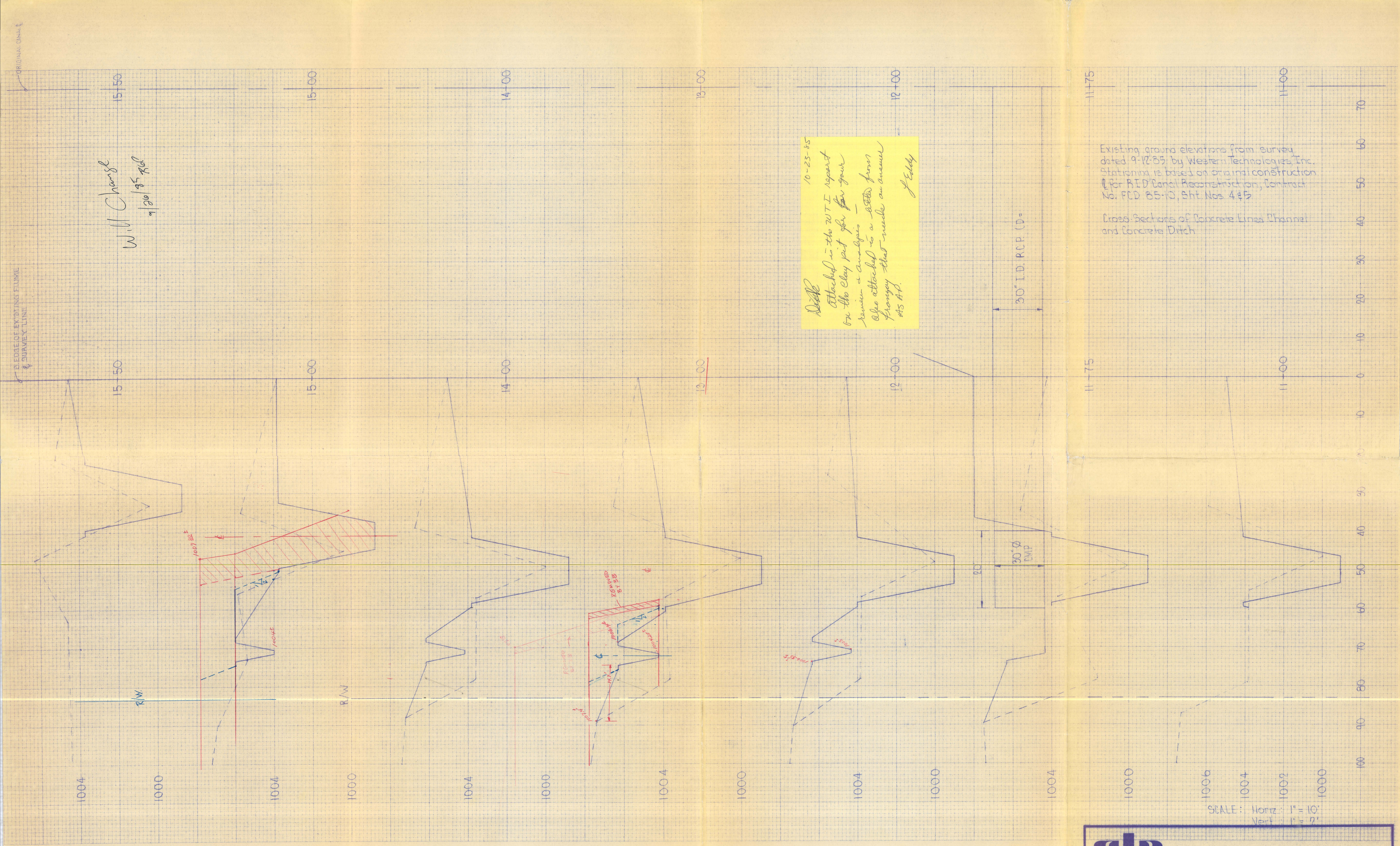
GROUND WATER

DEPTH	HOUR	DATE

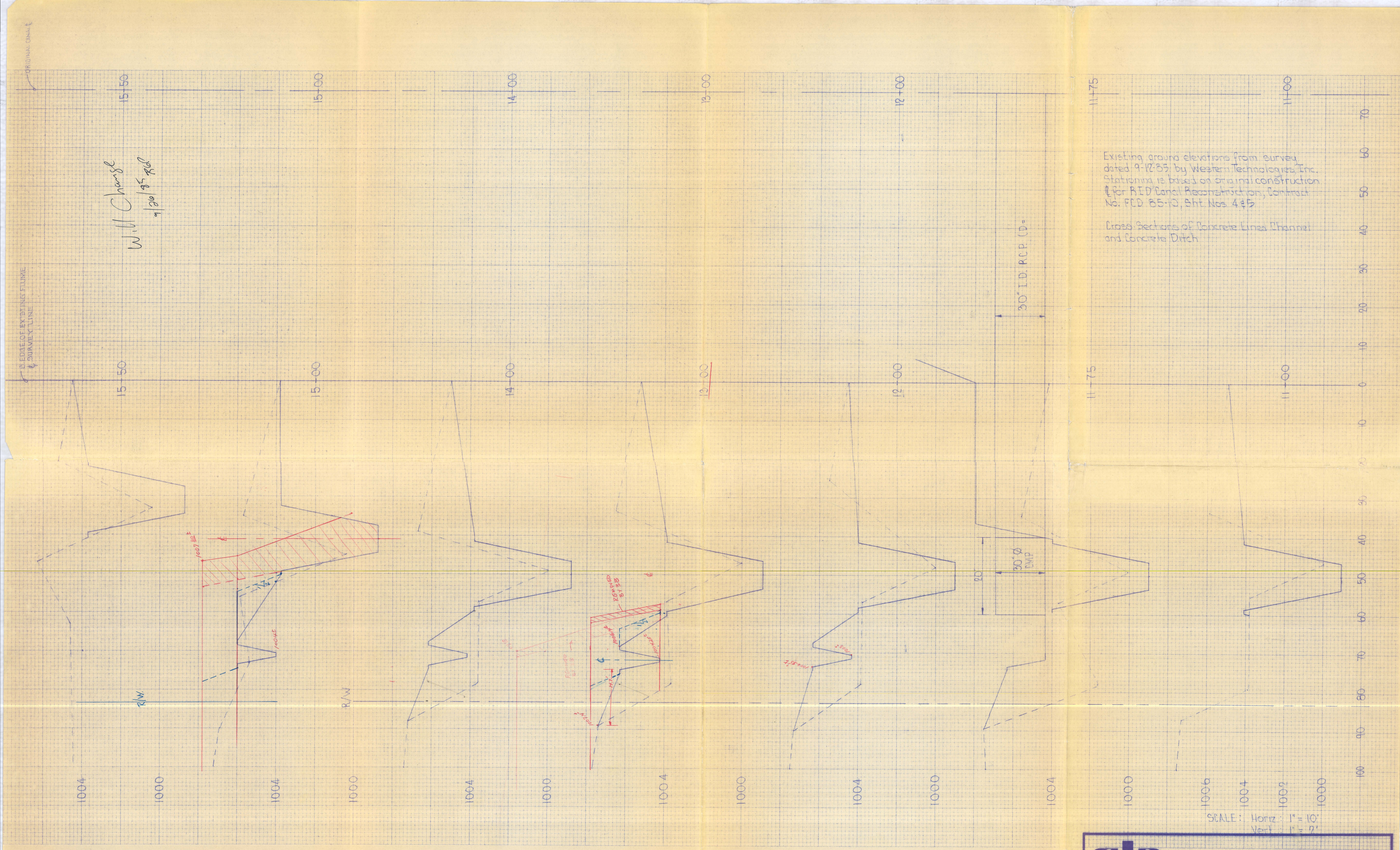
Depth in Feet	Graphical Log	Sample	Sample Type	Moisture Content Per Cent of Dry Wt.	Unified Soil Classification	REMARKS	VISUAL CLASSIFICATION
0							SAND, poorly graded, nonplastic, very few cobbles
2½		X			SP		
5							Backhoe stopped at 6'

SAMPLE TYPE
B — Undisturbed Block Sample
D — Disturbed Bulk Sample

SERGENT, HAUSKINS & BECKWITH
CONSULTING GEOTECHNICAL ENGINEERS
PHOENIX • ALBUQUERQUE • SANTA FE • SALT LAKE CITY



sla
SIMONS, LI & ASSOCIATES, INC.
FORT COLLINS • CHEYENNE • DENVER • TUCSON • NEWPORT BEACH • PITTSBURGH
P.O. BOX 2712, TUCSON, ARIZONA 85702 PHONE 602-884-9594



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SIMONS, LI & ASSOCIATES, INC.
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P.O. BOX 2712, TUCSON, ARIZONA 85702 PHONE 602-884-9594

WESTERN TECHNOLOGIES INC.

3737 East Broadway Road
P.O. Box 21387
Phoenix, Arizona 85036
(602) 437-3737

Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

September 12, 1985

Attn: Chief, Construction & Contracting Branch

Re: Agua Fria River Improvements
Thomas Road to 1/2 Mile N of Indian School Road
Contract FCD 85-12 (Construction Engineering)
Contract FCD 85-10 (Construction)
R.I.D. CANAL REALIGNMENT AT JSJ POND

Job No. 2155J020B

Submitted herewith is a report by Western Technologies Inc. Geotechnical Services Department. The report recommends that the toe berm in the pond area from R.I.D. Canal station 11+75 to station 17+00 be eliminated if the alignment of the canal is shifted 40 feet south as we have proposed.

Your approval of this recommendation is requested. Approval will enable Simons, Li & Associates to proceed with detailing relocation of the JSJ irrigation ditch and complete the canal realignment proposal.

WESTERN TECHNOLOGIES INC.

Dal N. Wakefield

Dal Wakefield
Resident Engineer

DNW:sdl

Distribution: Addressee (1)
Simons, Li & Associates/John Lynch
Franzoy-Corey/R. Williams
File/Correspondence
File/36._.1

attch: Western Technologies Inc. Geotechnical report

FLOOD CONTROL DISTRICT
RECEIVED
SEP 13 '85

	CH ENG		HYDRO
	ASST		LMgt
	ADMIN		SUSP
	C & O		FILE
	ENGR		DESTROY
	FINANCE		
REMARKS			

WESTERN TECHNOLOGIES INC.

3737 East Broadway Road
P.O. Box 21387
Phoenix, Arizona 85036
(602) 437-3737

Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

September 11, 1985

Attn: Chief, Construction and Contracting Branch

Re: Agua Fria River Improvement Project
Thomas Road to North of Indian School Road
Construction Contract 85-10
Consultant Contract 85-12

Job No. 2155J020-B

This report presents the results of a slope stability analysis performed on a portion of the proposed RID canal embankment (Sta. 11+00 to Sta. 17+00) which crosses an existing gravel pit on the above referenced project. The purpose of this analysis was to provide stability information on the embankment as designed, and on a proposed realignment of 40 feet to the south.

A cross-section at Station 13+00 was selected as a representative section for this portion of the embankment. The soil information given in the original project geotechnical report was used in the analysis with the exception of a very soft silt layer, recently identified in the field by our personnel, which extends from the surface of the pit to a depth of approximately 13 feet. This layer was modeled as a cohesive material with a low shear strength (200 psf). Both the original and realigned sections were analyzed with and without the proposed toe berm. Static factors of safety ranged from 1.18 to less than 1.0. The following conclusions and recommendations were drawn from the analysis:

- On the original alignment, the proposed toe berm would be required to provide additional slope stability, but has

the effect of forcing the calculated failure circle to intersect the north side of the irrigation canal.

- On the realigned section, the toe berm has no significant impact on stability, and the calculated failure circle intersects only the northern slope of the main embankment.

- Based on this analysis, it is recommended that the embankment be realigned 40 feet to the south, as proposed, and that the toe berm may be eliminated over this portion of the embankment.

It is our understanding that preloading the embankment foundation in the pit area is being considered. We concur that preloading would help to improve the situation from both the slope stability and settlement standpoints. Due to the extremely soft nature of the near-surface soils in the pit area, the most feasible method of construction appears to be placement of a granular material off the edge of the pit perpendicular to the alignment, thereby displacing as much of the soft material as possible. This should be continued until a stable base is obtained on which to start the mass fill placement.

Details of the slope stability analysis are available in our project files. If you have any questions concerning this information, please contact us.

Sincerely,
WESTERN TECHNOLOGIES INC.
Geotechnical Services

Craig P. Wiedeman, P.E.

Reviewed by: Kenneth L. Ricker, P.E.

Copies to: Addressee

FLOOD CONTROL DISTRICT of Maricopa County

Interoffice Memorandum

CMT. NO.	SUBJECT: Agua Fria Reach 1 Canal Realignment 85-10	☐ FILE ☐ DESTROY

TO: Dick Perreault via Bob Payette MP

FROM: Eddy

DATE: 1-6-86

Dick:

attached is a letter, sketches, calculations and drawings received from WTI. These dwgs were never utilized because other interferences further delayed the canal realignment.

These drawings were sent to John Lynch of SLA and were to be utilized in the final realignment being done by SLA.

Dal Wakefield informed me that the dwgs he received from SLA in Colorado did not have any of the attached information on them.

Dal & I both feel it is vital that these dwgs be utilized in the final design & if necessary more copies can be sent to all involved persons.

Please let me know the status of this situation

Thank You

S Eddy. 1/6

6JAN85
Talked to LCE & JOHN LYNCH
LCE WILL HAVE WTI SEND COPY OF
EACH TO LYNCH! Ft. Collins already
has this information.
RGP

Form: 29-3
11/78

WESTERN TECHNOLOGIES INC.

3737 East Broadway Road
P.O. Box 21387
Phoenix, Arizona 85036
(602) 437-3737

Flood Control District of Maricopa County
3335 West Durango Street
Phoenix, Arizona 85009

September 30, 1985

Attn: Chief, Construction & Contracting Branch

Re: Agua Fria River Improvements
Thomas Road to 1/2 Mile N of Indian School Road
Contract FCD 85-12 (Construction Engineering)
Contract FCD 85-10 (Construction)
R.I.D. CANAL REALIGNMENT AT J.S.J. POND

Job No. 2155J020B

Reference:
(1) Drawings, Sheets 5A & 5B (attached)
(2) Drawing, Cross-section for Realigned Irrigation Ditch (attached)
(3) Three Sheets, Estimate of Cost Effects for R.I.D. Canal Realignment at Pond (attached)
(4) Five Sheets, Canal Realignment Quantities (attached)

Referenced attachments represent:

1. Our proposed details for inclusion in a contract change order to accomplish subject canal realignment.
2. Our preliminary estimate of a $112,000.00 increase to construction contract cost by this change.

Your review and approval of the proposed details are requested.

Upon receipt of your approval of the details, we will negotiate cost agreement with the contractor for the contract adjustment. However, there is a 45-day lead time to accomplish delivery of the reinforced earth retaining system materials; therefore, we propose to direct the Contractor to order the materials from the Reinforced Earth Company immediately.

Reference (3), Sheet 3 of 3, Parts 6.1 through 6.6, shows our estimate of costs for the retaining system. The price of $44,524.50 plus State and local taxes is based on a unit price of $15.00 per square foot of retaining wall surface. They have promised delivery of the materials listed in Part 6.1 within 45 days of receiving an executed purchase order.

We hereby request authority to direct the Contractor to issue a purchase order to the Reinforced Earth Company immediately. This would result in the materials being received at the site in mid-November, a lead time to be of advantage if the R.I.D. dry-up starts earlier than the contractual December 1, 1985 date.

FLOOD CONTROL DISTRICT
RECEIVED
OCT 01 '85

CH ENG	HYDRO
ASST	LMgt
ADMIN	SUSP
1	5 FILE FCD 85-10
ENGR	DESTROY
FINANCE	2
REMARKS	3

We are forwarding References (1) and (2) to Franzoy-Corey by separate transmittal, for R.I.D. approval of the details.

WESTERN TECHNOLOGIES INC.

Dal N. Wakefield

Dal N. Wakefield
Resident Engineer

DNW:sdl

Distribution: Addressee (2)
File/36.__.1

Attachment(s): see "Reference"

INTERNAL WORK SHEETS

Project/Subject Agua Fria River, Proj. FCD 85-10 Job No. 2155J020B
ESTIMATE OF COST EFFECTS FOR Date 9/29/85 Sheet 1 of 3
R.I.D. CANAL REALIGNMENT AT POND By Dal N. Wakefield

1.0 COSTS FOR CANAL EMBANKMENT (NOT INCLUDING REINF'D EARTH EMBANKMENT:

1.1 Quantity decrease of Item 215.2, Embankment (R.I.D.):

$= \langle 103.67(0.5)(11)(22) + (78.58+53.85)(0.5)(0.5)(11)(22) + \cdots$

$\cdots + 103.67(11)(20) + (78.58+53.85)(0.5)(11)(20)\rangle/27 + \cdots$

$= \langle 2146 \text{ CY}\rangle + 324 \text{ CY}$ (See Quan. Calc's)

$= \langle 1822 \text{ CY}\rangle$

Decrease Item 215.2 $= \langle 1{,}822(\$0.50)\rangle = \langle \$911.00\rangle$

1.2 Cost Increase for Item 215.2 due to double shift work to meet Dryup Deadline. Estimate based on 50% increase in the unit cost for half the embankment West of the River.

~~Increase Item 215.2 by holding $0.50/C.Y. yard price & doubling the quantity:~~

$= +45{,}000 \text{ CY} @ \$0.25/\text{CY} = +\$11{,}250^{00}$

1.3 Cost decrease for eliminating berm at the Pond $= \langle \$0.50(7{,}613 \text{ C.Y.})\rangle = \langle \$3{,}806.50\rangle$
Item 215.2

1.4 Cost decrease for not having to remove 4' depth of clay in pond:

Estimate $\frac{300' \times 40' \times 4'}{27} = 1780$ CY

Estimate $\$10^{00}/\text{CY} \times 1780 \text{ CY} = \langle \$17{,}800^{00}\rangle$

1.5 Quantity Decrease For Item 203, Channel Excavation Cost $= \langle \$0.96(-324 \text{ CY} + 7{,}613 \text{ CY})\rangle = \langle \$6{,}997^{00}\rangle$

1.6 Cost Increase for Item 203 Channel Excavation due to double shift work to meet Dryup deadline. Estimate based on 50% increase in the unit price for half the quantity:

$45{,}000 \text{ CY} \times \$0.48 = +\$21{,}600^{00}$

Sheet Subtotal $= +\$3{,}336^{00}$

WESTERN TECHNOLOGIES INC.

INTERNAL WORK SHEETS

Project/Subject Agua Fria River, Proj. FCD 85-10 Job No. 2155J020B

ESTIMATE OF CANAL REALIGNMENT CHANGE ORDER COSTS (CONT'D) Date 9/29/85 Sheet 2 of 3

By Don M. Wakefield

2.0 DECREASE ITEM 215.3, GEOTEXTILE FABRIC:

$= \langle \frac{300(40)}{9}(\$0.50) \rangle = \langle \$667.00 \rangle$

3.0 COSTS FOR REALIGNING J.S.J. IRRIGATION DITCH:

~~3.1 Item 505.1 Struc. Concrete (Class AA) Increase~~

3.1 CONSTRUCT CMP SADDLE, ESTIMATE = +$1,500.00

3.2 CONSTRUCT CMP/RCP SADDLE & COLLAR, ESTIMATE = +$2,000.00

3.3 FURNISH & INSTALL 20' x 36"Ø CMP = 20 x $30.00 = +$600.00

3.4 Increase Item 618.1, 36" R.C. by 45 L.F. = 45.0($90.00) = +$4,050.00

3.5 Decrease Item 527, slipform Conc. Ditch by 170 L.F. = ⟨170($15.00)⟩ = ⟨$2,550.00⟩

~~3.6 Cost Increase for Item 527, slipform concrete ditch, due to double shifting to meet dryup deadline. Estimate labor cost doubles & that labor = 50% of price. Half of the West side quantity expected to be on overtime. Overtime unit price = 0.5($5.00) + 2(0.5)($5.00) = $7.50/S.Y.~~

~~½ Q = 5,877 S.Y.~~

~~Cost Increase = $2.50 x 5,877 S.Y. = +$14,692.00~~

3.6 Increase Item 527, Slipform Ditch for Embankment Construction: Q = 50(250)/27 ≈ 500 CY
ESTIMATED Cost = $5.00(500) = +$2,500.00

4.0 An Increase in Item 350.2, Removal Exist. Flume, Price:
$= \frac{595}{1040} \times \$25,000.00 = +\$14,303.00$

5.0 REMOVE EXIST. 30" CMP. LT OF STA. 17+50 ESTIMATED L. Sum = +$200.00

Sheet Subtotal = +$21,936.00

WESTERN TECHNOLOGIES INC.

INTERNAL WORK SHEETS

Project/Subject Agua Fria River - Proj. FCD 85-10 Job No. 2155J020B

ESTIMATE OF CANAL REALIGNMENT CHANGE ORDER COSTS (CONT'D) Date 9/29/85 Sheet 3 of 3

By Don M. Wakefield

6.0 EARTH-REINFORCED RETAINING WALL COSTS

6.1 F.O.B. Delivered Cost of Reinf. Earth Co. mat'ls, including Reinf. Conc. Panels, reinforcing strips, fasteners, joint material, Eng'ring Design & On-Site technical assistance = $44,524.50 + Tax (6%?) = +$47,196.00
Add 15% for Contractor O.H. & Profit = + 7,080.00

6.2 Contractor Construct leveling slab:
Q = 2'x1'x 240'/27 ≈ 18 C.Y. of Concrete @ $150.00 = +$2,700.00
(Incl's grading, mat'l & placing/finishing)

6.3 Contractor Erect Panels;
Estimate 8' Wide, 30 each, @ $500.00 Ea. = +$15,000.00

6.4 Contractor Construct Reinf'd Earth Fill:
Estimate 1400 CY @ $5.00/C.Y. = +$7,000.00

6.5 Contractor Compact 2' depth below retaining system. Estimate $1.00/C.Y. x 2(240)(20)/27 ≈ +$400.00

~~Subtotal, 6.1 thru 6.5 = +$72,296.00~~

6.6 Safety Handrail on Ret. Wall ≈ 240' x $30.00 = ~~+$7,200.00~~

Sheet subtotal, 6.1 thru 6.6 = +$86,576.00

~~Say 80,000~~

SUMMARY OF COST:

Subtotal, Sheet 1 of 3 =	+$3,336.00
" " 2 of 3 =	+$21,936.00
" " 3 of 3 =	+$86,576.00
	$111,848.00

Net Increase In Contract Price, Estimated = Say +$112,000.00

WESTERN TECHNOLOGIES INC.

INTERNAL WORK SHEETS

Project/Subject: CANAL REALIGNMENT – QUANTITIES Job No. 2155 JU20

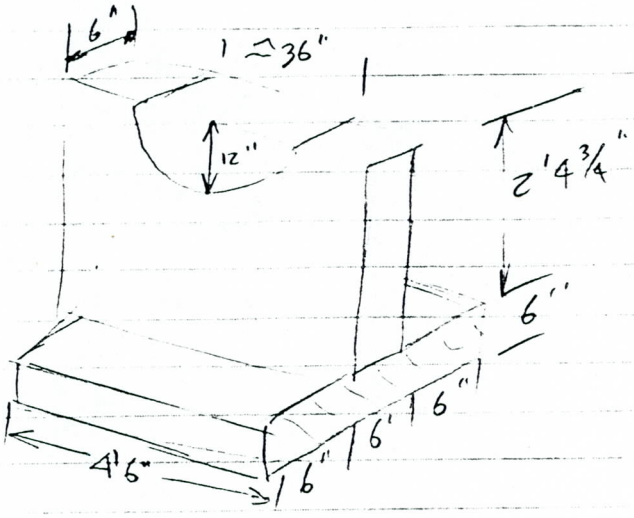
Date 9/26 Sheet 1 of

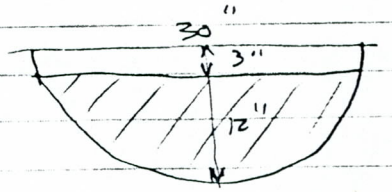
By: of ERDMAN

(1) RESTEEL: 10 – #4 – 4'6"
8 – #4 – 4'9" x 1'2"

45
47
93

(2) CONCRETE: (CLASS A)





$[\pi r^2/2] - (3'')(30'')$

$\pi(7.5'')^2/2 - 90''^2$

$353.25''^2 - 90''^2$

$263.25''^2$

$263.25 in^2 \times 6'' = 1579.50 in^3$

$\div 1728$

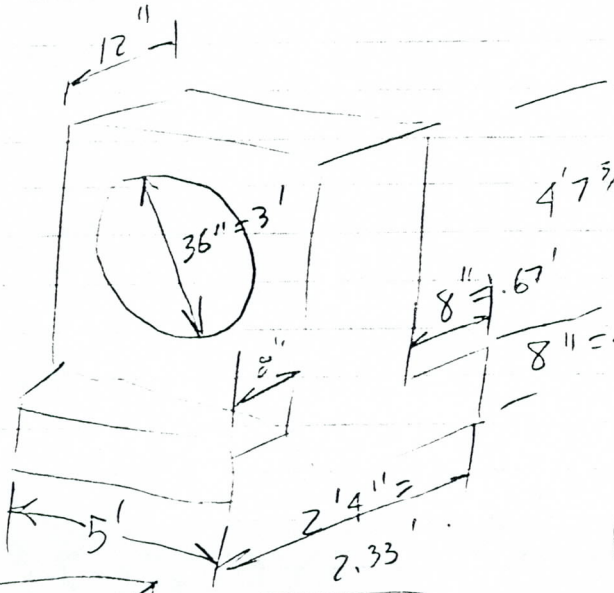
$0.914 ft$

FOOTING: $1.5' \times .5' \times 9.5' = 3.375 ft^3$

wall: $.5' \times 2.396' \times 9.5' = 5.391 ft^3$

$- 0.914$

$+ 7.852 ft^3 / 27 \frac{ft^3}{cy} =$ **0.29 C.Y.**



$4'7 3/4" = 4.646'$

hole:

$3.14(1.5')^2 \times 1' =$

$- 7.065 ft^3$

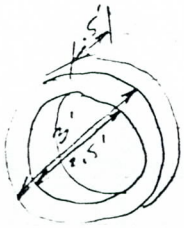
FOOTING: $5'(2.33')(.67') =$

$+ 7.806 ft^3$

WALL: $1' \; 5'(4.646') =$

$+ 23.23'$

$+ 7.806 ft^3$
$+ 23.23$
$+ 1.079$
$- 7.065$
$25.05 ft^3 / 27$



$3.14(1.5')^2 - 3.14(1.25')^2$

$.5(3.14((1.5)^2 - 1.25^2))$

$2.25 - 1.5625$

(0.6875)

$+ 1.079 ft^3$

= **0.928 C.Y** + **0.29 C.Y** =

TOTAL **1.22 C.Y**

WESTERN TECHNOLOGIES INC.

108

INTERNAL WORK SHEETS

Project/Subject CANAL REALIGNMENT - QUANTITIES Job No. 21550020

Date 9/26 Sheet 2 of

By M ERDMAN

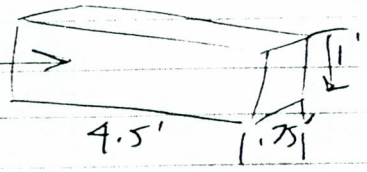
+ (3) 20 L.F. 14 GAGE C.M.P

+ (4) 6X6 -10/10 WELDED WIRE FABRIC

3' x 4' = 12 S.F. OF MESH.

- (5) CONC. OR GUNITE CHANNEL LINING (LT. SIDE CHANNEL)

deleted to accomodate "Saddle" support



= 3.375 ft^3/ —— ? possibly L.F. 4" Thick

+ (6) 30" ϕ RCP

FROM 125' TO 170' = +45 L.F.

- (7) SLIPFORMED CONCRETE LINING

FROM 900 L.F. TO 730 L.F. = 170 L.F.

+ (8) REMOVAL OF EXISTING FLUME

CONTRACT QUAN. = 1040 L.F. (250' + 90' + 250' + 175' + 275')

INCREASE [685' - 90'] = +595' Increase = $\frac{595}{1040}$ (100) = +57.21%

+ (9) REMOVAL OF EXISTING 30" CMP @ CANAL STATION ≈ 17+50, 100' LT. of ℄. (≈ 40 L.F.)

WESTERN TECHNOLOGIES INC.

INTERNAL WORK SHEETS

Project/Subject CANAL REALIGNMENT - QUANTITIES. Job No. 2155T020

Date 9/26/85 Sheet 3 of

By J. FROMAN

+ (10) EARTH RETAINING WALL

(11) R(1) CANAL EMBANKMENT

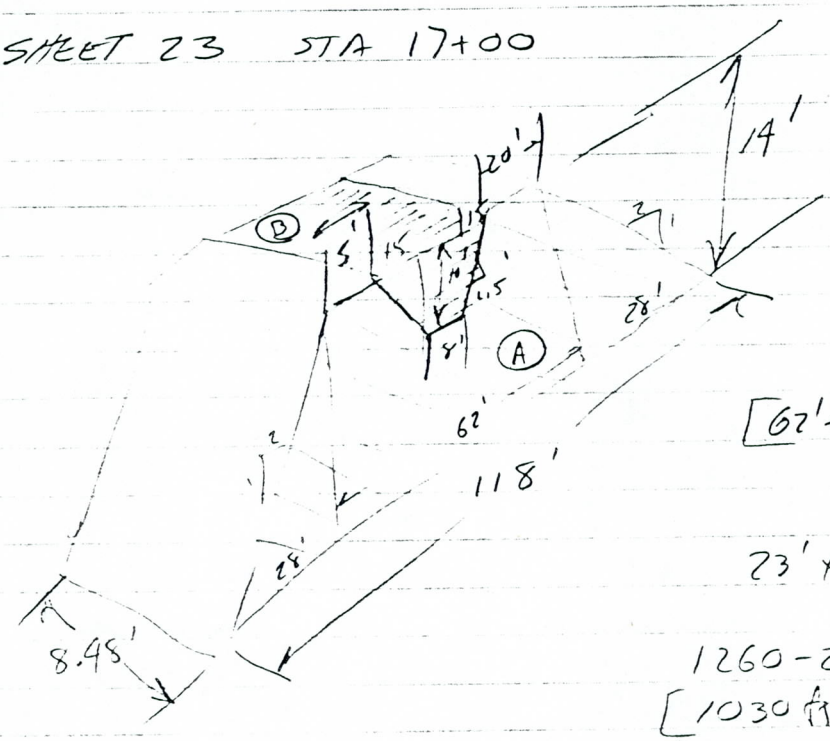
+ (A) additional length

− (B) volume deleted due to RE wall.

− (C) deleted berm 11+75 − 20+50.

+ (A) 8.48' additional length station 17+00 → 17+08.48

SEE SHEET 23 STA 17+00



[62' + 28'] 14'

90'(14') = 1260 ft²

23' × 10' = 230 ft²

1260 − 230 = 1030 ft²

[1030 ft² × 8.48 ft] ÷ 27

= 324 C.Y

area (A) [1260 (8.48)] ÷ 27 = 396 C.Y.

area (B) [230 (8.48)] ÷ 27 = −72 C.Y.

324 C.Y.

WESTERN TECHNOLOGIES INC.

INTERNAL WORK SHEETS

Project/Subject CANAL RE-ALIGNMENT - QUANTITIES. Job No. 2155 5020

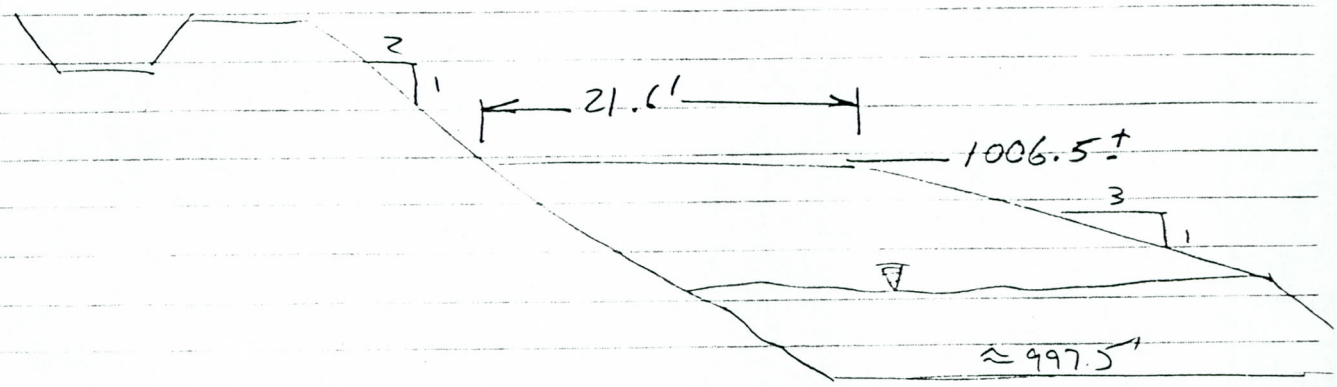
Date 9/26/85 Sheet 4 of

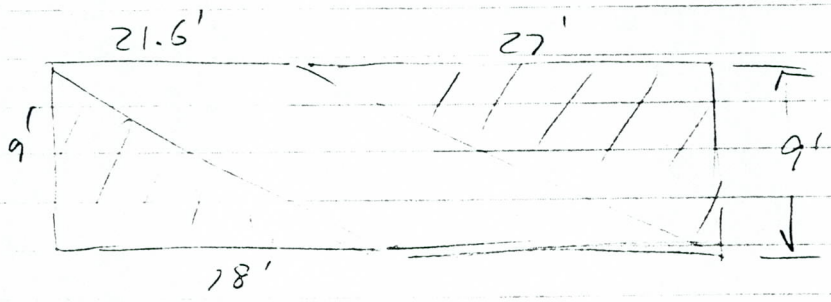
By B/ ERDMAN

(11) CONTINUED

STA 11+75 ↔ ~~[illegible]~~ 20+50

(B)





48.6' x 9' = 437.4 ft²

− 202.5

234.9 ft² x 875' =

150,336.0 ft³/27

~~5568 C.Y.~~

7613 C.Y.

− ½ 9' (18')

− ½ 9' (27')

9/2 (18 + 27)

9/2 (45) = 202.5

WESTERN TECHNOLOGIES INC.

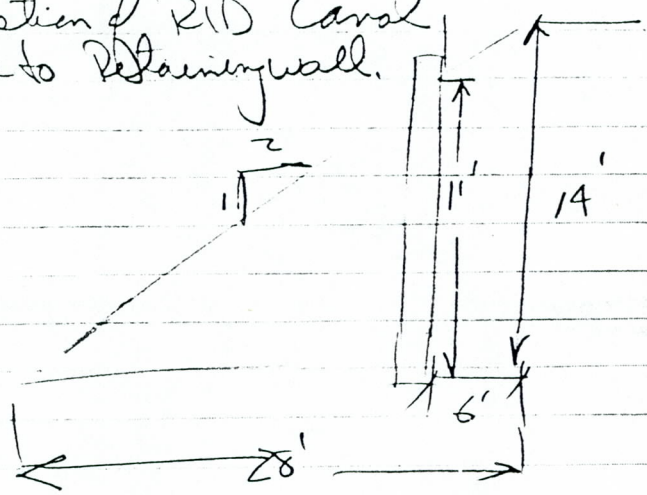
INTERNAL WORK SHEETS

Project/Subject _____ Job No. 21550020

Date 9/26/95 Sheet 5 of ____

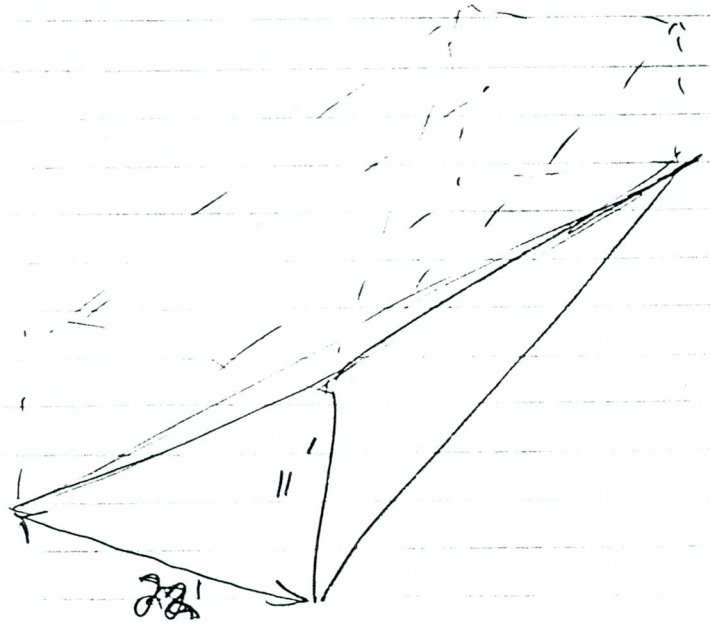
By R. ERDMAN

(11B) Deletion of RID Canal Embk. Due to Retaining wall.



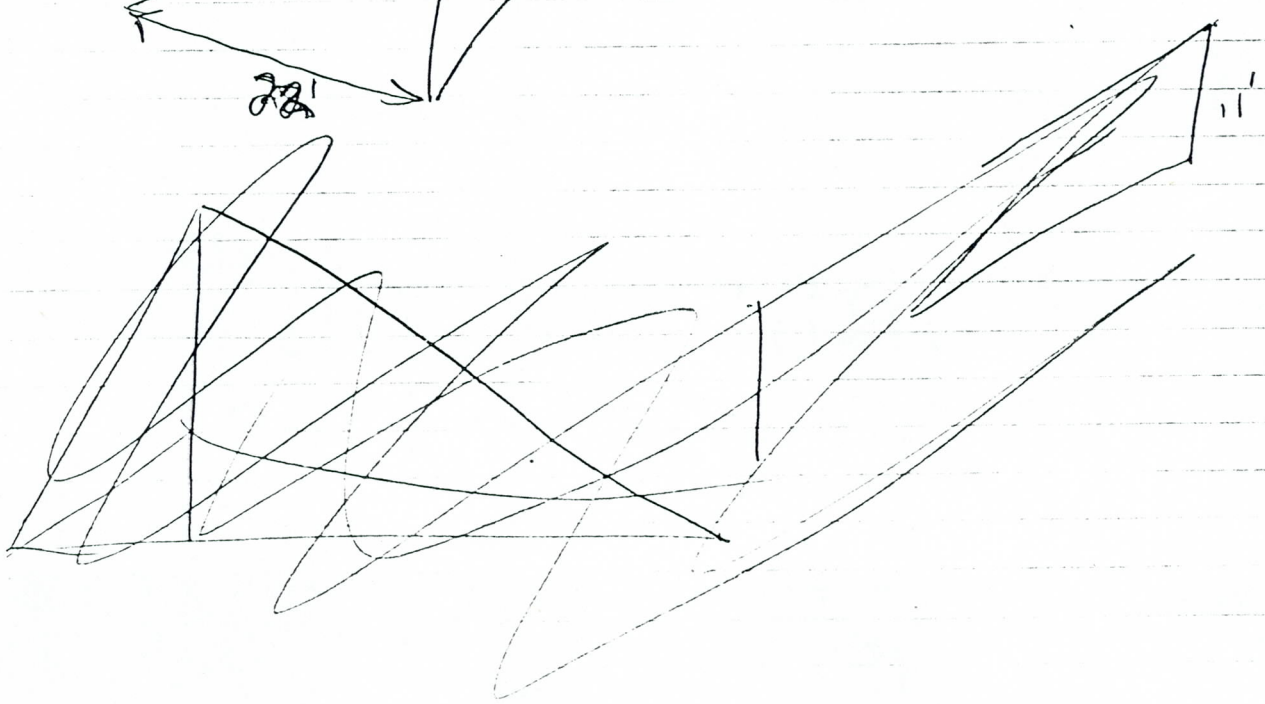
$\frac{1}{2}(28')(11')104'$

= C.Y. 466



$\frac{1}{4}\ 22'(11')(79')$

177 C.Y.



WESTERN TECHNOLOGIES INC.

MTG w/ SLA, STAFF & LJR 6 NOV 85

Re: East RID Canal Redesign

1) Redesign alignment (40 Feet) STA. 11+75 → 17+00, silt 13' ≠ 4'

2) Clay (STA 20+50 → 24+00), No boring ≈ 40' deep

3) Claim potential from 3B

4) $61,000 maintenance request from RID

5) Redesign Required.

6) Desert Earth borings @ B-7 = STA 24+40
B-8 = STA 14+70
B-10 = STA 15+00 (160' N)

7) Survey & geometric problems.

Questions:

1) Incomplete Geotech Testing?
2) Design - errors & omissions?
3) Liability for re-design?
   - claims?
   - increased constr. costs?

Additional Borings by Desert Earth
Dec 3, 84 Report (1 NOV 84)

B-11	17+50	(75' N of Flume)
B-12	17+50	(150' N of Flume)

⇒ 13 NOV @ 1330 hrs next meeting to discuss proposal

File 1.3.5

Franzoy•Corey
ENGINEERS & ARCHITECTS

FLOOD CONTROL DISTRICT
RECEIVED

• Agriculture • Architecture • Construction Management • Land Development • Planning • Transportation • Water Resources • Water/Waste Water

85

October 16, 1985

30800

	CH ENGR		HYDRO
	ASST		SMGR
	ADMIN		SUSP
	C & O		FILE
	ENGR		DESTROY
	FINANCE		
REMARKS			

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PHOENIX, ARIZONA

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Fred C. Corey, P.E., R.L.S.
Robert E. Forrer, P.E.
James M. Lokin, A.I.A.
Richard F. Bartholomew, P.E., R.L.S.
Jit S. Pegany, P.E., R.L.S.
Russell L. Miracle, P.E.
Jerry W. Novacek, P.E.
Timothy E. Kelty, P.E.
Q. Dorian Architect

Professional Staff
Thomas M. Koenekamp, P.E.
Richard F. Nilsen, P.E.
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J. Peter Ludwig Architect
Larry F. Sibala, P.E.
James E. Hardee, P.E.
Mark E. Courtney, P.E.
Ronald C. Williams, P.E.

Corporate Staff
Robert D. Zicafoose Marketing Director
Mark C. Voytes Business Manager

Mr. Dal Wakefield
Resident Engineer
Western Technologies, Inc.
3737 E. Broadway Road
P.O. Box 21387
Phoenix, Arizona 85036

Re: Drawing Review, Sheets 5A & 5B
Agua Fria River Improvements
Contract No. 85-10

Dear Mr. Wakefield:

Although the above drawings are no longer applicable as the entire east section of the canal is subject to redesign, we have the following comment regarding the irrigation line crossing.

Roosevelt Irrigation District will eventually grant an easement for the line to cross the RID right-of-way. At the present time RID is processing a land exchange with Continental Homes along the South Canal right-of-way line. The east-west section of the ditch (Sta. 12 to Sta. 16) is on future land of Continental Homes.

It is our understanding Mr. Perrault, of MCFCD District, has been talking with Continental, however, we are requesting we receive some written concurrence from MCFCD indicating Continental's approval of this plan.

Whenever the final plan is prepared RID will grant an easement across RID right-of-way to fulfill the needs of both MCFCD and Continental Homes.

Sincerely,

Ronald C. Williams

Ronald C. Williams, P.E.

RCW/jc

cc: Jack Conovaloff, RID
Scott Larson

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OCT 22 1985
WTF

Answer ASAP

Immediate Copy to MCFCD
File/Corres. 1.3.5
File/36.—1

Franzoy•Corey
ENGINEERS & ARCHITECTS

• Agriculture • Architecture • Construction Management • Land Development • Planning • Transportation • Water Resources • Water/Waste Water

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OCT 11 1985

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PHOENIX, ARIZONA

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Mark E. Courtney, P.E.
Ronald C. Williams, P.E.

Corporate Staff
Robert D. Zicafoose Marketing Director
Mark C. Voyles Business Manager

October 9, 1985

30800

Eddy field Copy

Mr. Dal Wakefield
Western Technologies, Inc.
3737 E. Broadway Road
Phoenix, Arizona 85036

Re: Canal Construction Problems, Sta 0+00 to Sta 25+00
Agua Fria, R.I.D. Canal Reconstruction Project
F.C.D. 85-10

Dear Mr. Wakefield:

Confirming the discussions held in the meetings with M.C.F.C.D. on October 1, and October 2, 1985, Roosevelt Irrigation District would prefer that the flume be maintained in operation an additional one year, rather than construct a temporary "S" curve connection from the flume to the new siphon inlet. This contract change would allow adequate time for M.C.F.C.D. to solve the recent problems encountered with the clay soils and the wash pond, and redesign the East Section of the canal.

The following conditions will be required by Roosevelt Irrigation District, and should be included in any agreement between M.C.F.C.D. and the contractor:

1) Maricopa County Flood Control District will reimburse Roosevelt Irrigation District an amount of $61,000 to cover additional maintenance costs presently needed to enable the flume to operate efficiently until November 1986. This additional maintenance would not have been necessary if the flume were removed from service as originally scheduled in December 1985.

No

2) The existing channel elevation shall be maintained under and alongside the flume until maintenance operations are complete.

3) The Wasteway Structure on the flume south of Sta. 25+ is to be kept in operation. Slope paving is to be constructed across the East levee to prevent possible erosion.

4) The West Side Canal, Sta. 36+, is to be completed, except the western flume connection. The completed canal and siphon are to be filled with water.

5) A temporary paved channel and flume footing protection is to be provided under the flume south of Station 9+ to convey the drainage from the 2-60 inch pipe culverts.

6) Provision is to be made to allow the East-West drainage way to flow into the new concrete channel south of Station 10+.

7) Roosevelt Irrigation District will not financially participate in any additional construction costs due to contract changes or claims caused by the problems encountered during construction of the canal between Stations 0+00 to 36+00.

Sincerely Yours,

Jack Conovaloff
Superintendent

by Ronald C. Williams
Ronald C. Williams, P.E.
Construction Manager
Franzoy Corey Engineers & Architects

RCW:bak

cc: Dan Sagramoso, MCFCD
James B. Crook, Attorney
Burch & Cracchiolo
702 E. Osborn
Phoenix, Arizona

BALL & BROSAMER, INC.
AND
BALL, BALL AND BROSAMER, INC., A JOINT VENTURE
GENERAL ENGINEERING CONTRACTORS
CALIFORNIA STATE CONTRACTORS
LICENSE NO. 302008

POST OFFICE BOX 1007
DANVILLE, CALIFORNIA 94526
TELEPHONE (415) 837-0231
TELEX NO. 9103894028

PLEASE REPLY TO:
P.O. Box 1086
Litchfield Park,
Arizona 85340

October 10, 1985

Mr. Dal Wakefield
Western Technologies, Inc.
P.O. Box 21387
Phoenix, Arizona 85036

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OCT 10 1985

cc: FCD-ALG
1.3.1

RE: Maricopa County Flood Control District
Agua Fria River Channelization
Contract Number 85-10

FLOOD CONTROL DISTRICT
RECEIVED
OCT 11 '85

	CH ENG		HYDRO
	ASST		LMgt
	ADMIN		SUSP
4	C & O	5	FILE 85-10
	ENGR		DESTROY
	FINANCE	3	EOK
REMARKS		2 WCA	

Gentlemen:

We ackowledge receipt of your letter dated October 2, 1985 relative to your suspension of work on the east portion of the RID Canal due to major redesign.

As you are aware, we have been proceeding with the required construction activities to the extent permitted to perform the work to meet the contract schedule.

This directive and previous delays for redesign has and will have a major impact on our contract.

Please accept this letter as timely notice that we reserve all of our rights concerning this matter for additional time and monetary compensation.

Please advise when we can expect the redesign will be completed and the time frame for this work.

Very Truly Yours;

Kay Worthen
Project Manager

KW/jae

c.c.
Danville
Field Office

APPENDIX B

SERGENT, HAUSKINS & BECKWITH

CONSULTING GEOTECHNICAL ENGINEERS
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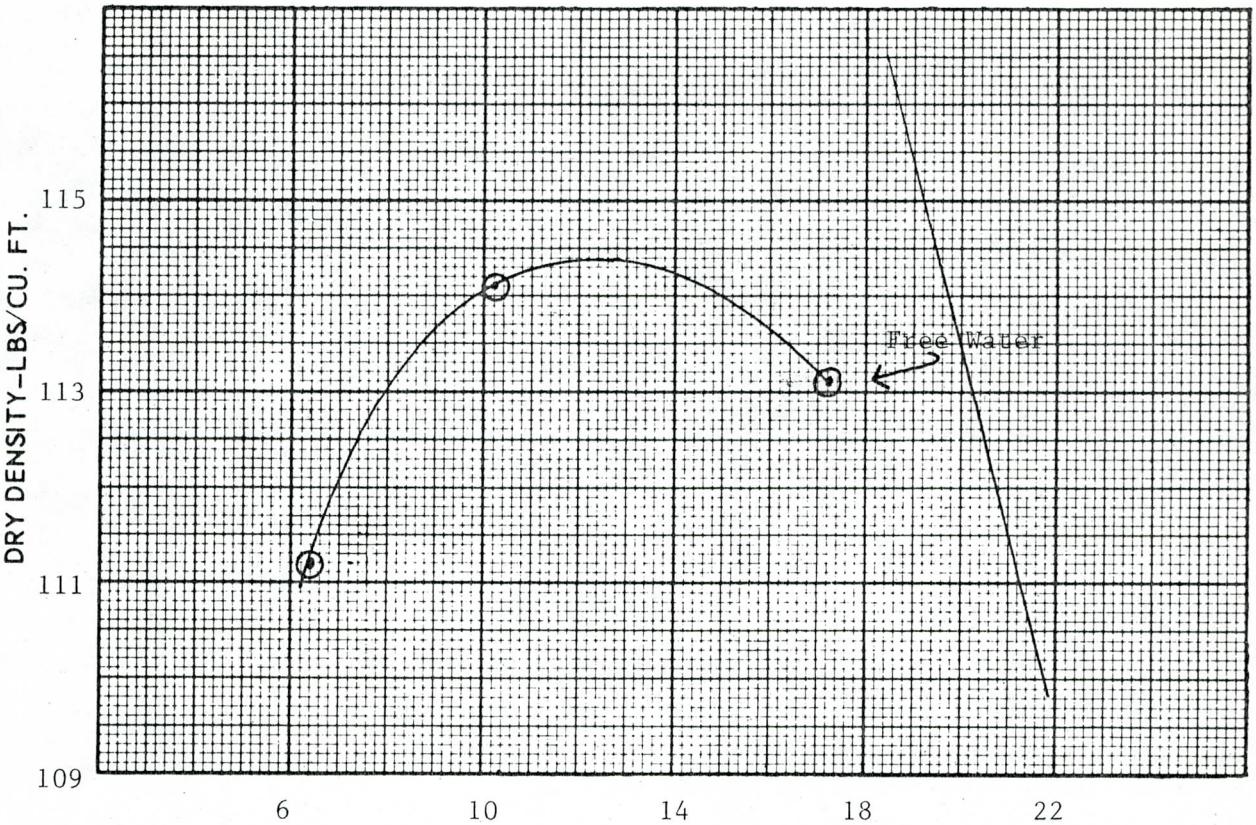
TABULATION OF TEST RESULTS

Job No. LT83-3753

HOLE NO	DEPTH	UNIFIED CLASS	L.L.	P.I.	SIEVE ANALYSIS-ACCUM % PASSING #200	#100	#50	#40	#30	#16	#10	#8	#4	.25"	.375"	.5"	LAB NO
					.75"	1"	1.5"	2"	2.5"	3"	3.5"	4"	6"	8"	10"	12"	
TEST PIT (TP) #1	2′-3′	ML	-	NP	68.9	80	89	93	95	98	99	99	100				3-3753-1
TP-1	5′-6′	SP-SM	-	NP	6.9	9	11	13	18	44	64	69	83	87	91	93	
					96	96	100										3-3753-2
TP-2	2.5′-3.5′	SP	-	NP	0	3	19	31	41	59	70	73	82	85	88	91	
					93	94	98	100									3-3753-3
TP-2	4.5′-5.5′	GP	-	NP	.4	1	2	3	6	12	17	19	29	36	47	57	
					68	72	83	90		100							3-3753-4
TP-3	2′-3′	SM	-	NP	23.6	37	58	73	83	93	95	95	96	96	97	97	
					97	100											3-3753-5
TP-4	2′-3′	SP	-	NP	.4	2	12	28	51	80	87	88	92	93	95	98	
					100												3-3753-6
TP-5	1.5′-2.5′	SP	-	NP	3.2	4	11	20	32	56	67	70	76	78	81	83	
					86	89	92	95		100							3-3753-7
TP-5	4′-5′	SP	-	NP	2.2	3	7	15	24	43	52	54	62	65	69	72	
					76	80	89	92		94		100					3-3753-8
TP-6	2′-3′	SP	-	NP	.2	1	12	25	44	81	92	94	97	98	98	100	3-3753-9

SUMMARY OF MOISTURE DENSITY RELATIONSHIP TESTS

PROJECT Agua Fria River Channelization SLA Job No. AZ-MC-05 **JOB NO.** LT83-3753



CURVE	SOURCE	OPTIMUM MOISTURE CONTENT % DRY WT.	MAXIMUM DRY DENSITY LBS./CU. FT.	TEST DESIGNATION	TEST METHOD	LAB NO.
	TP-4 @ 2'-3' & TP-6 @ 2'-3'					
	with 6.5% Cement Phoenix Type II	12.4	114.4	AASHTO T134	B	3-3753-6 & 9

MOISTURE-DENSITY RELATIONSHIP TEST METHOD DATA

AASHTO T99 and ASTM D698 (Standard Proctor)

METHOD	MATERIAL	MOLD		NO. OF LAYERS	BLOWS PER LAYER	HAMMER WEIGHT	HEIGHT OF FALL	COMPACTIVE EFFORT FT. LBS/CU. FT.
		DIAMETER	HEIGHT					
A	-#4	4"	4.58"	3	25	5.5 LBS.	12"	12,375
B	-#4	6"	4.58"	3	56	5.5 LBS.	12"	12,317
C	-3/4	4"	4.58"	3	25	5.5 LBS.	12"	12,375
D	-3/4	6"	4.58"	3	56	5.5 LBS.	12"	12,317

AASHTO T180 and ASTM D1557 (Modified Proctor)

METHOD	MATERIAL	MOLD		NO. OF LAYERS	BLOWS PER LAYER	HAMMER WEIGHT	HEIGHT OF FALL	COMPACTIVE EFFORT FT. LBS/CU. FT.
		DIAMETER	HEIGHT					
A	-#4	4"	4.58"	5	25	10.0 LBS.	18"	56,250
B	-#4	6"	4.58"	5	56	10.0 LBS.	18"	55,986
C	-3/4	4"	4.58"	5	25	10.0 LBS.	18"	56,250
D	-3/4	6"	4.58"	5	56	10.0 LBS.	18"	55,986

SERGENT, HAUSKINS & BECKWITH
CONSULTING SOIL AND FOUNDATION ENGINEERS
MATERIALS TESTING ENGINEERS
ENGINEERING ANALYSIS • PHYSICAL TESTING • QUALITY CONTROL • FIELD EXPLORATION

REPORT ON LABORATORY TESTS

DATE _____

PROJECT: Agua Fria River Channelization SLA Job No. AZ-MC-05 — JOB NO. LT83-3753

LOCATION: Thomas Rd. to Indian School Rd.; Maricopa County — LAB NO. 3-3753-6 & 9

CLIENT: Simons, Li & Associates, Inc. — ADDRESS: P. O. Box 2712 Tucson, AZ 85702

SOURCE OF SAMPLE: TP-4 @ 2'-3' & TP-6 @ 2'-3' Combined

MATERIAL: Poorly Graded Sand — SAMPLED BY: SHB/RIC

SUBMITTED BY: SHB/RIC — REQUESTED BY: John B. Lynch, P.E.

TESTED: ADOT 241/AASHTO T134 compaction — DATE RECEIVED: -

TEST RESULTS

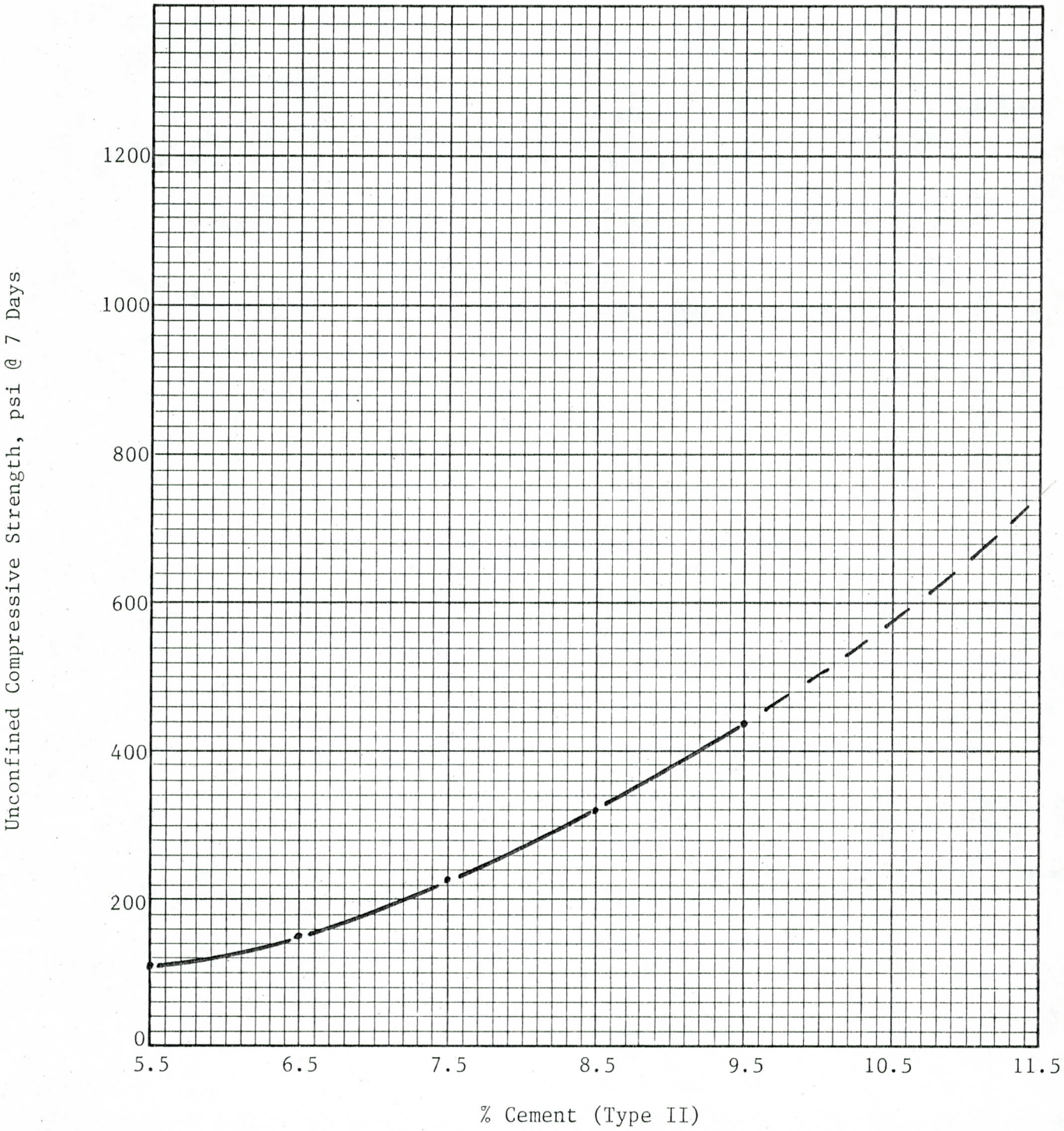
CEMENT TREATED SAND

Cement: Phoenix Type II Low Alkali

LAB NO. 3753-6 & 9	A	B	C	D	E
SAMPLE			(average of 3 specimens)		
Cement, %	5.5	6.5	7.5	8.5	9.5
MOISTURE %	11.8	12.6	12.3	10.6	11.7
DRY DENSITY (PCF)	112.1	113.3	114.5	114.6	116.7
SPECIMEN DIA. (IN.)	4.0	4.0	4.0	4.0	4.0
SPECIMEN HT. (IN.)	4.58	4.58	4.58	4.58	4.58
UNCONFINED COMPRESSIVE STRENGTH PSI @ 7 Days	106	152	225	320	439

PROJECT Agua Fria River Channelization
SLA Job No. AZ-MC-05 JOB NO. LT83-3753

Source TP-4 @ 2'-3' & TP-6 @ 2'-3' with Phoenix Type II Cement Lab No. 3-3753-6 & 9



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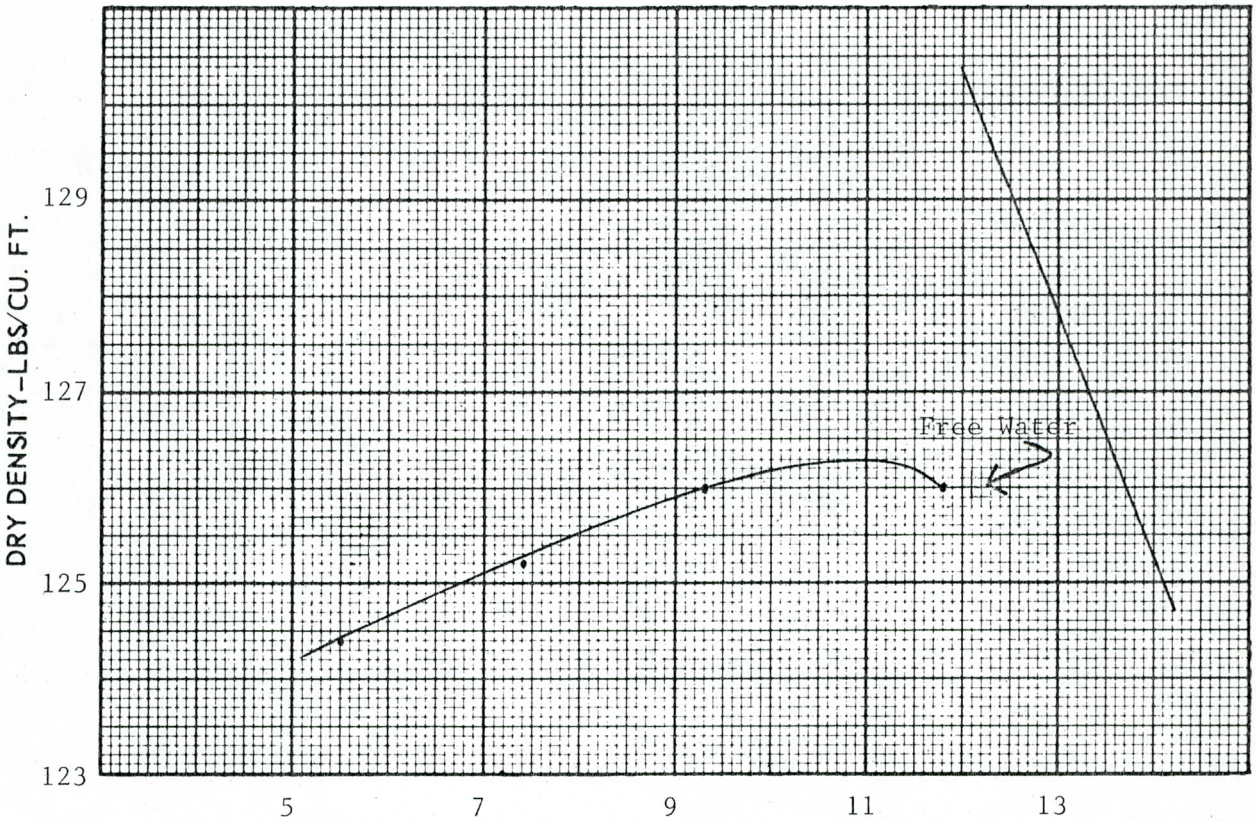
SUMMARY OF MOISTURE DENSITY RELATIONSHIP TESTS

PROJECT Agua Fria River Channelization
SLA Job No. AZ-MC-05 **JOB NO.** LT83-3753



CURVE	SOURCE	OPTIMUM MOISTURE CONTENT % DRY WT.	MAXIMUM DRY DENSITY LBS./CU. FT.	TEST DESIGNATION	TEST METHOD	LAB NO.
	TP-5 @ 1.5'-2.5' & 4'-5'					
	with 6.0% Cement Phoenix Type II	10.8	126.2	AASHTO T134	B	3-3753-7 &8

MOISTURE-DENSITY RELATIONSHIP TEST METHOD DATA

AASHTO T99 and ASTM D698 (Standard Proctor)

METHOD	MATERIAL	MOLD		NO. OF LAYERS	BLOWS PER LAYER	HAMMER WEIGHT	HEIGHT OF FALL	COMPACTIVE EFFORT FT. LBS/CU. FT.
		DIAMETER	HEIGHT					
A	-#4	4''	4.58''	3	25	5.5 LBS.	12''	12,375
B	-#4	6''	4.58''	3	56	5.5 LBS.	12''	12,317
C	-3/4	4''	4.58''	3	25	5.5 LBS.	12''	12,375
D	-3/4	6''	4.58''	3	56	5.5 LBS.	12''	12,317

AASHTO T180 and ASTM D1557 (Modified Proctor)

METHOD	MATERIAL	MOLD		NO. OF LAYERS	BLOWS PER LAYER	HAMMER WEIGHT	HEIGHT OF FALL	COMPACTIVE EFFORT FT. LBS/CU. FT.
		DIAMETER	HEIGHT					
A	-#4	4''	4.58''	5	25	10.0 LBS.	18''	56,250
B	-#4	6''	4.58''	5	56	10.0 LBS.	18''	55,986
C	-3/4	4''	4.58''	5	25	10.0 LBS.	18''	56,250
D	-3/4	6''	4.58''	5	56	10.0 LBS.	18''	55,986

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MATERIALS TESTING ENGINEERS
ENGINEERING ANALYSIS • PHYSICAL TESTING • QUALITY CONTROL • FIELD EXPLORATION

REPORT ON LABORATORY TESTS

DATE

PROJECT: Agua Fria River Channelization SLA Job No. AZ-MC-05 — JOB NO. LT83-3753

LOCATION: Thomas Rd. to Indian School Rd.; Maricopa County — LAB NO. 3-3753-7 & 8

CLIENT: Simons, Li & Associates, Inc. — ADDRESS: P. O. Box 2712 Tucson, AZ 85702

SOURCE OF SAMPLE: TP-5 Combined Samples of 1.5' to 2.5' and 4' to 5'

MATERIAL: Poorly Graded Sand w/some Gravel — SAMPLED BY: SHB/RIC

SUBMITTED BY: SHB/RIC — REQUESTED BY: John B. Lynch, P.E.

TESTED: ADOT 241/AASHTO T134 compaction — DATE RECEIVED: -

TEST RESULTS

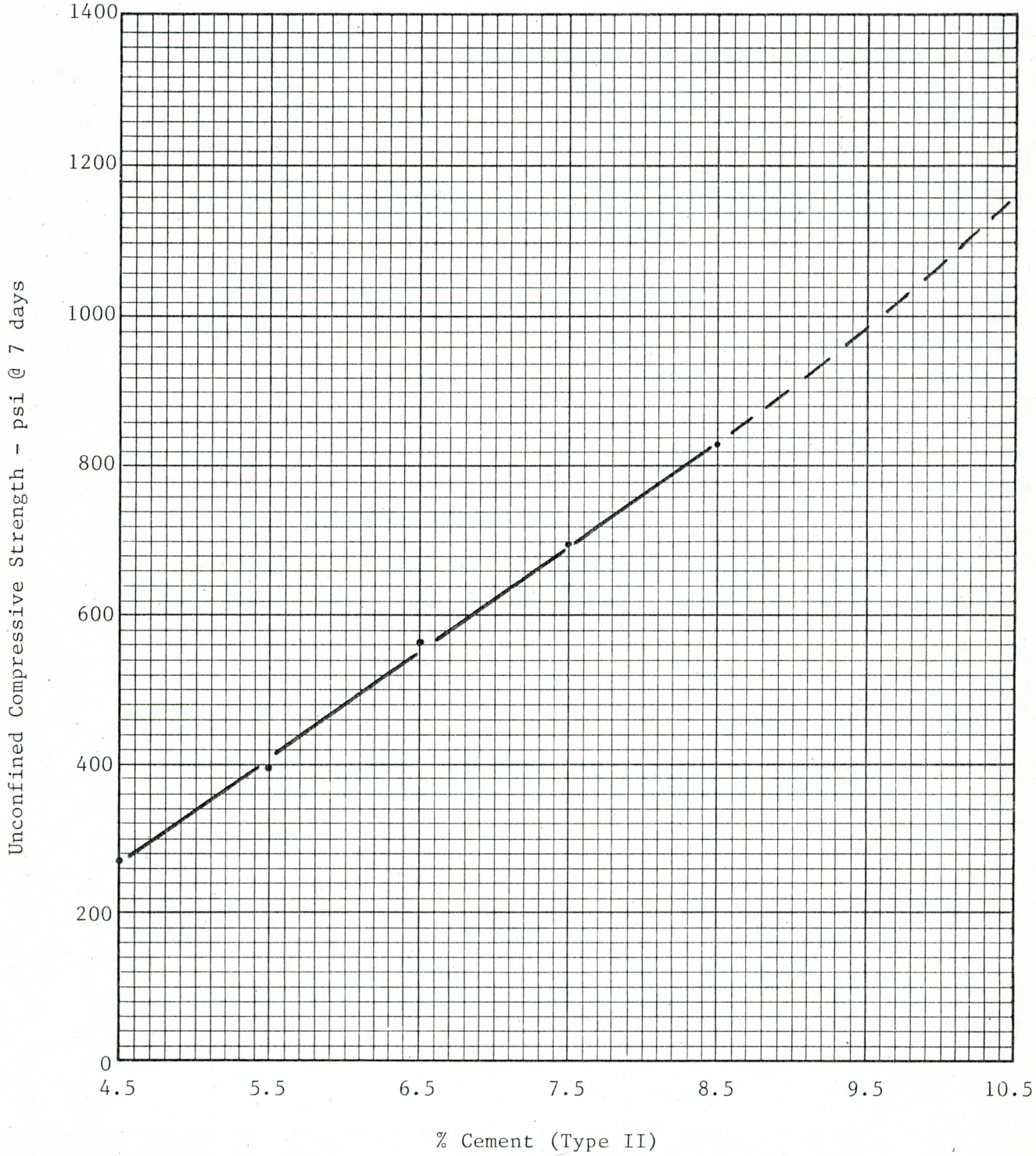
CEMENT TREATED SAND WITH SOME GRAVEL

Cement: Phoenix Type II - Low Alkali

LAB NO. 3753-7 & 8	A	B	C	D	E
SAMPLE		(average of 3 specimens)			
Cement, %	4.0	5.0	6.0	7.0	8.0
MOISTURE %	9.5	9.3	9.3	9.2	9.4
DRY DENSITY (PCF)	122.4	123.5	125.0	125.9	127.6
SPECIMEN DIA. (IN.)	4.0	4.0	4.0	4.0	4.0
SPECIMEN HT. (IN.)	4.58	4.58	4.58	4.58	4.58
UNCONFINED COMPRESSIVE STRENGTH PSI @ 7 days	269	397	561	697	831

PROJECT Agua Fria River Channelization
SLA Job No. AZ-MC-05 JOB NO. LT83-3753

Source TP-5 @ 1.5'-2.5' & 4'-5' with Phoenix Type II Cement Lab No. 3-3753-7 & 8



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