HYDROLOGY E17/D3 ONE PLAN

E 17/04

1 PLAN

ALBUQUERQUE NATIONAL BANK

ALBUQUERQUE, NEW MEXICO

VERNON DOAK, Vice President

November 3, 1978

Mr. Dwayne Sheppard
City Engineer
City of Albuquerque

Dear Sir:

It is our intent to install an errosion protection device, such as rip-rap, along the Arroyo del Oso channel adjacent to our property at San Mateo and Academy.

We cannot be specific as to design since the engineering for the upstream improvements has not been finalized.

We are anxious to proceed with the construction of our new branch building at that location and would appreciate your approval of our plan.

Sincerely,

Vernon Doak

Vernon Doak
Vice President

VD/lt

APPROVED BY:

C. D. Sheppard 11/7/78

C. D. Sheppard, P.E.
Acting City Engineer

P. O. BOX 1344 ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 505/765-2211

STEVENS, MALLORY, PEARL & CAMPBELL
ARCHITECTS
115 AMHERST DRIVE, S.E.
ALBUQUERQUE, NEW MEXICO
505 255-8668
87106

June 26, 1978

Mr. Bruno Conegliano
City of Albuquerque
City Engineer's Office
P. O. Box 1293
Albuquerque, New Mexico 87103

Subject: Albuquerque National Bank
San Mateo Blvd. & Academy Branch Bank
Albuquerque, New Mexico
Storm Drainage Study

Dear Mr. Conegliano:

Transmitted herewith are two copies of a storm drainage study relative to development of Albuquerque National Bank, San Mateo & Academy Branch, Albuquerque, New Mexico.

We are submitting this report for your review and approval prior to submitting plans to the Building Inspection Department for a building permit.

Sincerely,

Robert A. Moraga

RAM:dd

Encl.

DONALD P. STEVENS A.I.A.
ROBERT C. MALLORY A.I.A.
GEORGE CLAYTON PEARL A.I.A.
C. ROBERT CAMPBELL A.I.A.

STORM DRAINAGE STUDY

RELATIVE TO DEVELOPMENT OF

ALBUQUERQUE NATIONAL BANK - SAN MATEO BRANCH

ALBUQUERQUE, NEW MEXICO

JUNE 21, 1978

E17-D4

Boyle Engineering Corporation

consulting engineers / architects

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APPENDIX:

Calculations (2 Sheets)

Drainage - Run-off - 1

Bear Canyon Arroyo

Plot Plan

Boyle Engineering Corporation

consulting engineers

1721 Girard Boulevard, N.E.
Albuquerque, New Mexico 87106

505 / 266-7789

June 21, 1978

Bob Moraga
STEVENS, MALLORY, PEARL & CAMPBELL
115 Amherst SE
Albuquerque, New Mexico 87106

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Thank you for the opportunity of participating in your project.

BOYLE ENGINEERING CORPORATION

Fred Burns

Fred Burns, PE

Enclosures

VJC:mmr

STORM DRAINAGE STUDY
RELATIVE TO DEVELOPMENT OF
ALBUQUERQUE NATIONAL BANK - SAN MATEO BRANCH
ALBUQUERQUE, NEW MEXICO

I. PURPOSE:

The purpose of this report is to transmit data relative to a storm drainage study completed for the proposed improvements of the Albuquerque National Bank Branch Office located at the intersection of San Mateo and Academy, NE, Albuquerque, New Mexico.

II. SCOPE:

This report is to establish existing storm drainage conditions at the site and to determine developmental constraints, if any, required to comply with AMAFCA Resolution 1972-2. Information incorporated in this study is that provided in the "Drainage Management Plan for the Northeast Heights" as prepared by Leonard Rice Consulting Water Engineers, Inc. for the Albuquerque Metropolitan Arroyo Flood Control Authority.

III. SITE DESCRIPTION:

The study site is located in the Southeast ¼ of the Southeast ¼ of Section 26, Township 11 North, Range 3 East, NMPM. The site is bounded on the east by San Mateo Boulevard, NE, and on the west by the Bear Canyon Arroyo.

Existing conditions on approximately 24 percent of the site include a temporary banking structure and both paved and unpaved parking areas. The remainder of the site is undeveloped and is covered by sparse vegetation which is common to the area. The surface of the site slopes from east to west with the highest point being at elevation 5205. The south boundary of the site is from six to ten feet above the invert of the Bear Canyon Arroyo and is not encroached upon

by the 100-year W.S. Elevation as shown on Sheet 5 of the above referenced study. Run-off from the partially developed areas on the site is presently allowed to enter the adjacent arroyo with no provisions for ponding. Local flows upstream of the site are diverted by San Mateo Boulevard to the Bear Canyon Arroyo.

IV. PROPOSED DEVELOPMENT:

Proposed development plans for the site include a permanent banking facility with drive-up lanes and paved parking areas. Approximately 20 percent of the site will be landscaped resulting in an average coefficient of run-off of .84.

Finish grading will provide for drainage to the southwest corner of the property as shown on the attached drawing. A paved outlet will be provided to transport flows to the arroyo while minimizing erosion along the north arroyo bank. Curbs surrounding the site will prevent flow from the site to adjacent properties.

V. DRAINAGE CRITERIA:

A. General: Resolution No. 1972-2, Albuquerque Metropolitan Arroyo Flood Control Authority.

B. Design Storm: 100-year frequency duration, as shown on Chart 1, "1963 Master Plan of Drainage for the City of Albuquerque and Envirions", as prepared by Gordon Herkenhoff and Associates, Inc., Consulting Engineers.

VI. PROPOSED DRAINAGE MANAGEMENT:

The attached plot plan indicates the extent of the 100-year flood plain

as shown on Sheet 5 of the "Drainage Management Plan for the Northeast Heights" referenced earlier in this report. The existing 100-year W.S. Elevation will equal the elevation of the crossing structure at San Mateo. The elevation downstream of the structure will be within the existing arroyo bed and will not cause flooding of the study site. Water surface elevations adjacent to the site will vary from 5192.5 on the east end to 5189 at the west end. Finished grade on the site will vary from 5205 on the east end to 5193 at the west end. The entire site will be a minimum of four feet above the maximum anticipated 100-year water surface elevation.

Included in the referenced report is a hydrograph of the anticipated flows at the North Diversion Channel including the effect of the Arroyo del Oso Dam. The first peak will be due to local run-off between the Arroyo del Oso Dam and the North Diversion Channel. This peak will occur approximately one hour following the initial precipitation. Flows from areas upstream of the dam are slightly larger than those developed by the local run-off and will peak approximately five and one-half hours following the initial peak.

With the anticipated velocities of 8 fps indicated in the referenced report, the lag time between the study site and the North Diversion Channel is approximatley eleven minutes. Should the Authority choose to limit the peak velocity to 3 fps, lag time will still be approximately thirty minutes. At the time that the initial upstream peak reaches the site, the increase in flow from the site due to the proposed changes will be approximately 1.46. Stream flow at that time will be approximately 1300 cfs.

VII. CONCLUSIONS AND RECOMMENDATIONS:

On the basis of this study and in accordance with AMAFCA Resolution 1972-2,

it is the conclusion of this report that facilities for maintaining existing topography, drainage pattern and perviousness are not required, as the proposed changes will not exceed the storm drainage facilities downstream of the site.

It is the recommendation of this report that sufficient elevation be provided at the new driveways along San Mateo to prevent local flows from entering the site, and that erosion protection be provided at the point that run-off leaves the site as shown on the attached drawing.

With the implementation of these recommendations, it is concluded that the site will not be in danger of flooding, will not increase the threat of flooding to downstream areas, and will comply with the intent of AMAFCA Resolution 1972-2.

Respectfully submitted,

BOYLE ENGINEERING CORPORATION

Fred Burns

Fred Burns, PE

June 21, 1978

VJC:mmr

Boyle Engineering Corporation

BY V.J.C. DATE 6/14/78 SUBJECT A.N.B. San Mateo Branch Drainage Study SHEET NO. 1 OF ____
CHKD. BY ____ DATE ____ JOB NO. ____

Study Site Area = 2.13 Ac = 92,766 ft^2

Present Conditions:

Paved Parking	20982	(.95)	=	19932
Roof	1680	(.95)	=	1596
Undeveloped	70104	(.4)	=	28041
	92766			49569

Coeff. of Runoff = .534

Developed Conditions

Paved Parking	67190	(.95)	=	63,830
Roof	7476	(.95)	=	7,055
Grass Area.	18100	(.4)	=	7,240
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From Fig. H t_c = 6 min

i_{100} = 189/25+6 = 6.1 in/hr.

$Q_{pres.}$ = .534 (6.1)(2.13) = 6.94 cfs.

$Q_{dev.}$ = .842 (6.1)(2.13) = 10.94 cfs.

Vol. pres. = .534 (3/12) 92,766 = 12,384 ft^3

Vol. dev. = .842 (3/12) 92,766 = 19,527 ft^3

Boyle Engineering Corporation

BY VJC DATE 6/14/78 SUBJECT ANB Sonmate Branch Drainage Study SHEET NO. 2 OF ___
CHKD. BY ___ DATE ___ JOB NO. ___

Channel length from North Diversion Ditch to the Study Site is 5,500 feet.

Assuming Max. Vel. of 3 f.p.s.

Max. time req. to reach Div. Ditch = $\frac{5500 ft}{3 ft/sec} \frac{min}{60 sec}$ = 30 min.

Time Req. for peak arroyo flow to reach North Ditch = 1 hr.

See Fig. 3 "Bear Canyon Arroyo" N.E. Heights D.M.P.

Design overflow for Peak Runoff. (10.94 cfs)

$Q = C L H^{3/2}$

C = 3.087 for P = 0
L = 4.0 ft.
H = .5 ft.

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$= 3.087 (4)(.354) = 4.37$

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Use 2 outlets.

DRAINAGE — RUNOFF — I

FIG. A. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 2 YEARS.

FIG. B. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 10 YEARS.

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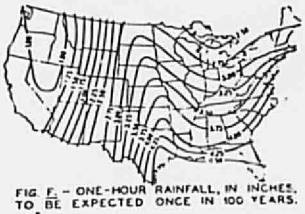
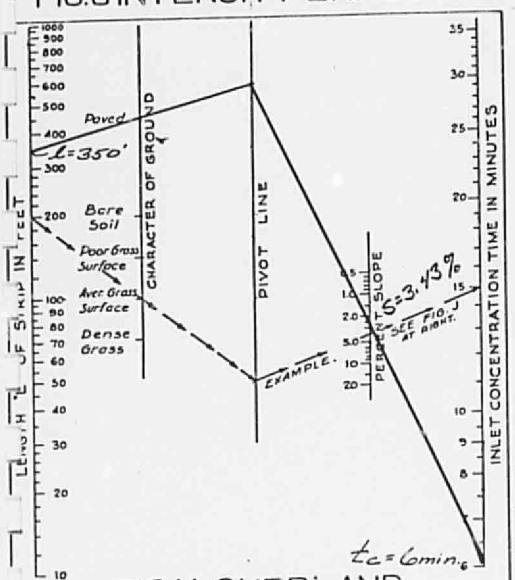


FIG. F. – ONE-HOUR RAINFALL, IN INCHES, TO BE EXPECTED ONCE IN 100 YEARS.

COMPUTATION OF i IN RATIONAL FORMULA.

EXAMPLE: Assume expectancy period = 5 years. See Fig. D, assume locality, find 1 hour intensity = 1.75 in. per hour.

FIG. G-INTENSITY EXPECTATION FOR ONE-HOUR RAINFALL.



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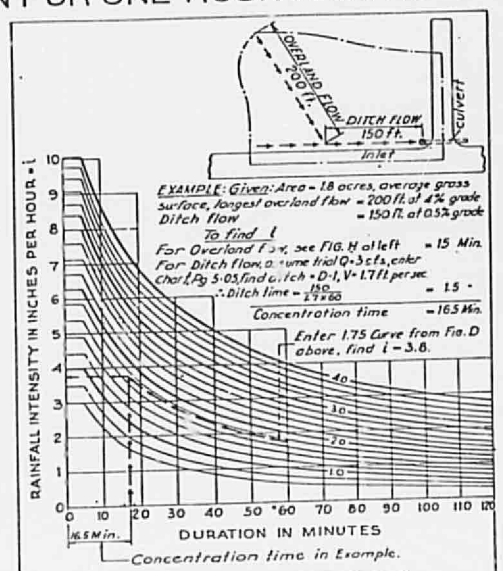

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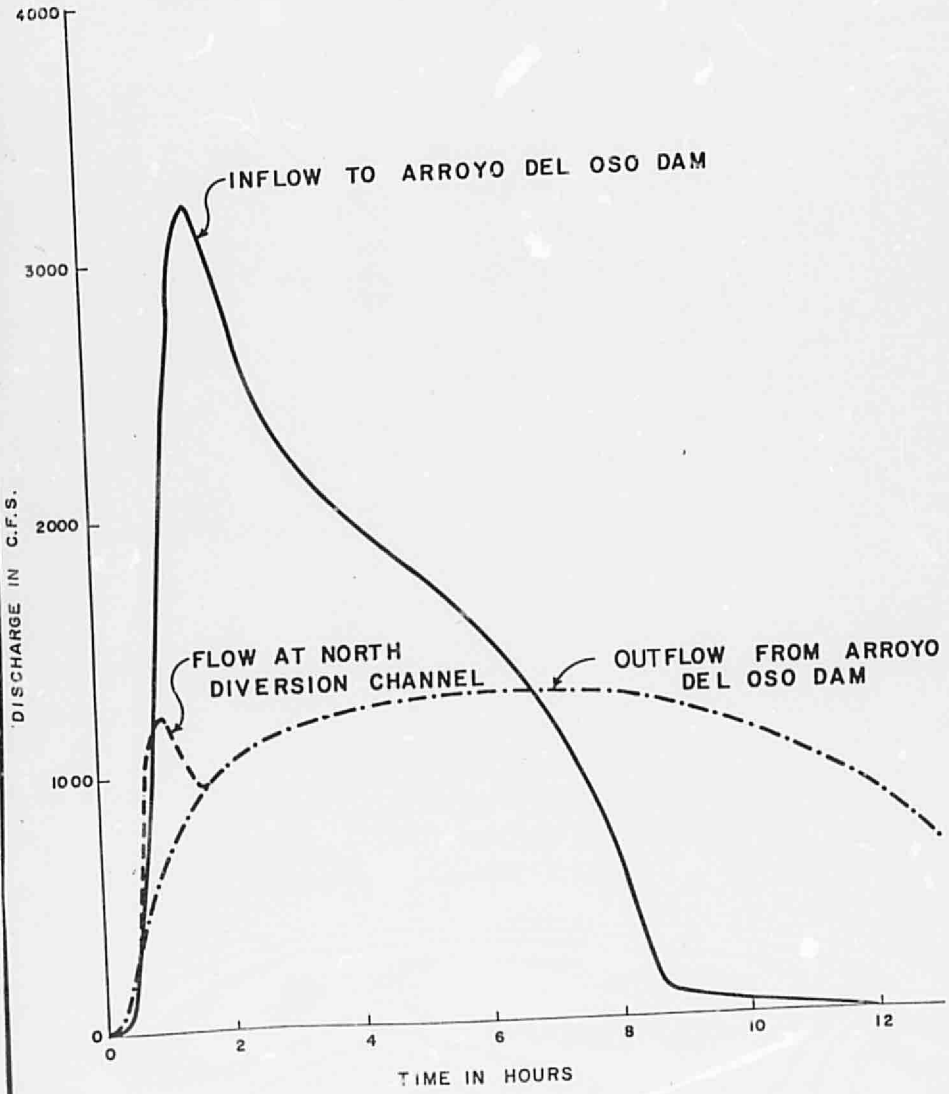
Reproduced from Miscellaneous Publication No. 204, U.S. Dept. of Agriculture, by David L. Yarnell.
+ Adapted from Engineering Manual of the War Department, Part XIII, Chap. I, Dec. '45.

FIGURE 3

BEAR CANYON ARROYO



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HYDROLOGY E17/D3 ONE PLAN

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ALBUQUERQUE, NEW MEXICO

VERNON DOAK, VICE PRESIDENT

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APPROVED BY:

C. D. Sheppard 11/3/78

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P. O. BOX 1344 ALBUQUERQUE, NEW MEXICO 87103 TELEPHONE 505/765-2211

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STORM DRAINAGE STUDY

RELATIVE TO DEVELOPMENT OF

ALBUQUERQUE NATIONAL BANK - SAN MATEO BRANCH

ALBUQUERQUE, NEW MEXICO

JUNE 21, 1978

E17-D4

Boyle Engineering Corporation

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Enclosures

VJC:mmr

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ALBUQUERQUE NATIONAL BANK - SAN MATEO BRANCH
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BOYLE ENGINEERING CORPORATION

Fred Burns

Fred Burns, PE

June 21, 1978

VJC:mmr

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Boyle Engineering Corporation

BY VJC DATE 6/14/78 SUBJECT ANB Sonmate Branch Drainage Study SHEET NO. 2 OF ___
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Assuming Max. Vel. of 3 f.p.s.

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Time Req. for peak arroyo flow to reach North Ditch = 1 hr.

See Fig. 3 "Bear Canyon Arroyo" N.E. Heights D.M.P.

Design over flow for Peak Runoff. (10.94 cfs)

$Q = C L H^{3/2}$

$C = 3.087$ for $P = 0$
$L = 4.0$ ft.
$H = .5$ ft.

$Q = 3.087 (4)(.5)^{1.5} =$

$= 3.087 (4)(.354) = 4.37$

for 8" depth.

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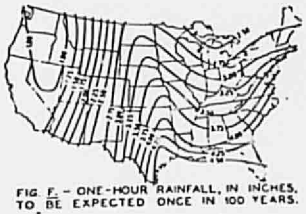

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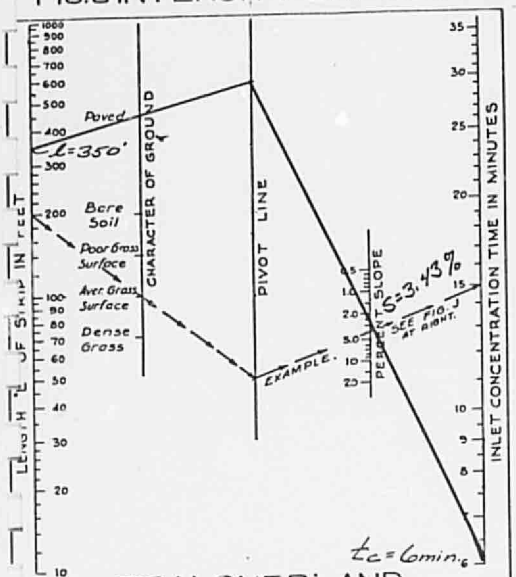

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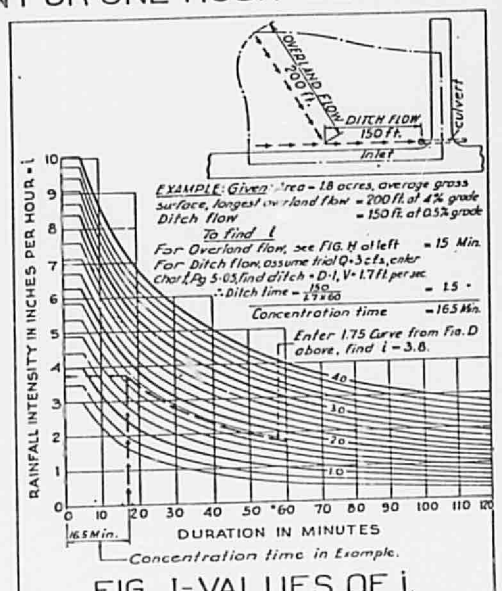

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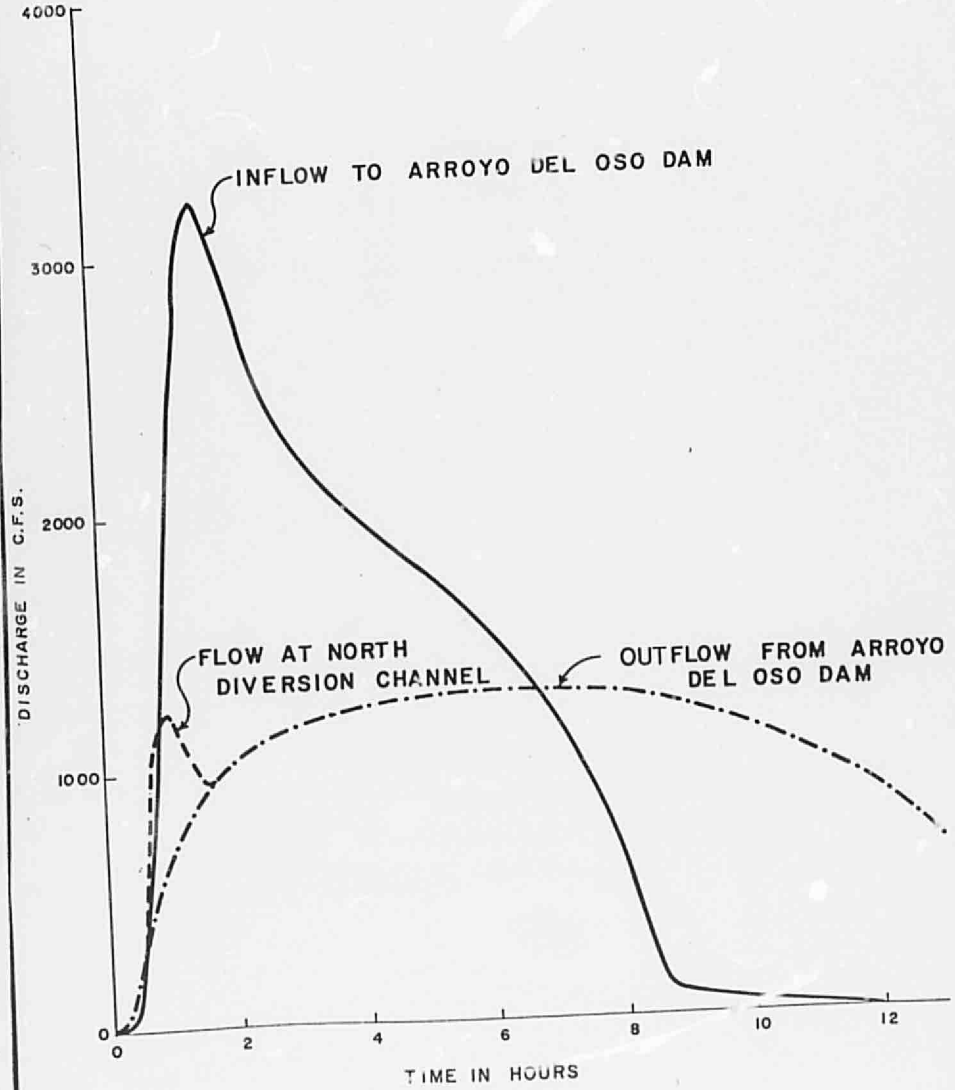
FIGURE 3

BEAR CANYON ARROYO



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