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HYDROLOGY UPDATE

NOVEMBER 15, 1986
NEW RIVER BELOW SKUNK CREEK
MARICOPA COUNTY, ARIZONA

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HYDROLOGY UPDATE

NOVEMBER 15, 1986
NEW RIVER BELOW SKUNK CREEK
MARICOPA COUNTY, ARIZONA

Prepared For:
New River Flood Insurance Study
Flood Control District of Maricopa County
3335 W. Durango
Phoenix, AZ 85009

Prepared By:
Coe & Van Loo Consulting Engineers, Inc.
4550 North 12th Street
Phoenix, AZ 85014



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November 14, 1986

Mr. John Matticks, Acting Chief
Federal Emergency Management Agency
Risk Studies Division
Federal Insurance Administration
500 C Street, SW Room 422
Washington, D.C. 20472

Certified Mail

Attn: Mr. Philip Myers

Re: New River Hydrology, Restudy
New River Downstream of Skunk Creek Confluence
Maricopa County, AZ (Community No. 040037)

Gentlemen:

Enclosed with this letter please find hydrology update for the referenced restudy. We have evaluated available hydrologic data from the Corps of Engineers (Corps) and recommend that the Corps data be adopted by FEMA for the use of Floodplain study. The data from the Corps, however, lacked floodpeaks for the 10- and 500-years. In the hydrology update, therefore, we have defined flood-frequency curve to be used for the restudy. We respectfully request your early review and response regarding our recommendations. Additionally, the hydrology update has been submitted to the Corps for their review, comment and approval.

Should you have any questions regarding the subject data, please do not hesitate to call.

Very truly yours,

COE & VAN LOO
Consulting Engineers, Inc.

Ashok C. Patel, P.E., L.S.
Senior Vice President

ACP/1s
2/29/44

CC: Ray Lenaburg, FEMA
Chief, Planning, Corps
Bob Schaetzel, Corps
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APPENDIX

Figure 1 - Figure Depicting Study Limits

Plate 1 - Frequency-Discharge Curve

ATTACHMENTS:

1. U.S. Army Corps of Engineers, Los Angeles District, "Summary of Discharge-Frequencies for New River". Letter Dated October 31, 1986. (Ref. 3).
2. U. S. Department of Housing and Urban Development, Flood Insurance Agency, "Flood Insurance Study, Maricopa County, Arizona, Unincorporated Areas," May, 1979. (Partially printed) (Ref. 4).
3. Coe and Van Loo Consulting Engineers, Inc., "New River Hydrology, New River Downstream of Skunk Creek Confluence, Maricopa County, Arizona." Letter Dated October 2, 1986. (Ref. 5).

HYDROLOGY UPDATE
NEW RIVER FLOOD INSURANCE STUDY

Introduction

The Corps of Engineers has developed a program for the implementation of a comprehensive flood control plan to protect parts of metropolitan Phoenix. The final plan will include the construction of four earthfill dams, the construction of 16.5 miles of channelization along the Arizona Canal, acquisition of flowage easements and improved floodplain management. The four dams, Dreamy Draw Dam, Cave Buttes Dam, Adobe Dam and New River Dam have all been completed (Ref. 1). The Arizona Canal Diversion Channel (A.C.D.C.) is partially complete but is designed to ultimately intercept runoff from the north and divert it parallel to the Arizona Canal, outletting to Skunk Creek.

As a result of the construction of the New River and Adobe Dams, the 100-year peak discharge within New River has been substantially reduced over the natural conditions. This is a temporary condition and after completion of the A.C.D.C. additional floodwater will be diverted to Skunk Creek and consequently the New River.

The Corps of Engineers has completed hydrologic studies (Ref. 2) for the entire project area for both existing and future flow conditions. The established flood-frequency discharges have been reiterated and summarized in a recent letter to Coe and Van Loo (CVL) (Ref. 3).

Scope of Study

In light of recent and future changes in the floodplain usage for the New River, due to flood control improvements, the Flood Control District of Maricopa

County (MCFCD) has requested CVL to perform a floodplain study and redelineation for New River from its confluence with the Agua Fria River to Skunk Creek (South Reach, See Figure 1). A Flood Insurance Study performed for the Federal Emergency Management Agency (FEMA) in May, 1979 (Ref. 4) is the present basis for floodplain regulation on New River. As a result of the dynamic nature of metropolitan Phoenix, undeveloped floodplains are increasingly under pressure to be developed. The Corps of Engineers has already established future condition hydrology and a floodplain analysis for the 100-year peak discharges, along New River these have not been adopted by FEMA. The purpose of this recent effort by CVL is to obtain official acceptance of a revised floodplain delineation based upon future flood conditions. This was agreed upon in concept with Mr. Philip Myers, FEMA representative, Washington, D.C., as confirmed in a letter dated October 2, 1986 (Ref. 5).

Methodology

The Corps of Engineers has already established hydrology for both present and future conditions as follows (taken from Ref. 3):

TABLE 1: DISCHARGE-FREQUENCIES FOR NEW RIVER

LOCATION	CONDITION	10	25	50	100	SPF	500
		discharges in cfs					
New River Downstream of Skunk Creek	Present: with Adobe and New River Dams without ACDC	4600	_____	13,000	21,000	44,000	53,000
New River Downstream of Skunk Creek ^{1,2}	Future: with Adobe, New River and Cave Buttes Dams with ACDC	_____	_____	_____	41,000	68,000	_____
New River Upstream of Agua Fria River ^{1,2}	Future: with Adobe, New River and Cave Buttes Dams with ACDC	_____	21,000	29,000	39,000	69,000	_____

Notes: 1. These flows include 2000 cfs from the Agua Fria River Basin to account for potential future development.



2. For future conditions there is less than 5 percent difference between the two location.

The floodplain has already been established for the future condition (after completion of the ACDC) by the Corps of Engineers using the above discharge information. Since an existing Flood Insurance study is in effect for this river reach, the standards used in the original Flood Insurance Study must be adhered to. The present study defined the 10-year and 100-year flood profiles and established Flood Hazard Factors (FHF's) for the floodplain. As a result, this study needs to establish the 10-year frequency discharges. This information is not available from the original COE reports and thus needs to be established.

Frequency-discharge information available from Table 1 was plotted on log-probability paper as indicated in Plate 1 for both New River downstream of Skunk Creek⁽²⁾ and also upstream of the confluence with the Agua Fria River.⁽¹⁾ Three plotting points were available for New River upstream of the Agua Fria River producing a relatively straight line, the 10-year and 500-year discharges were then obtained by extrapolation. The New River downstream of Skunk Creek only has an established discharge value for the 100-year event. Considering that the actual change in contributing drainage area is insignificant, and in the absence of better information, it appears appropriate to extrapolate the curve for (2) based upon the frequency-discharge curve developed for (1).

Recommendations & Conclusions

The Corps of Engineers has performed extensive studies to obtain the hydrologic information for the New River presented in Table 1. The 100-year frequency peak discharges thus developed will be utilized in future floodplain management. The 10-year peak discharges obtained from extrapolation are

proposed to be used in the study for the purpose of defining Flood Hazard Factors. The additional flood frequencies presented for the 50-, and 500-year discharges will not be utilized for future floodplain regulation but are included for reference.

The peak discharges proposed for use in this Flood Insurance Study are thus as follows:

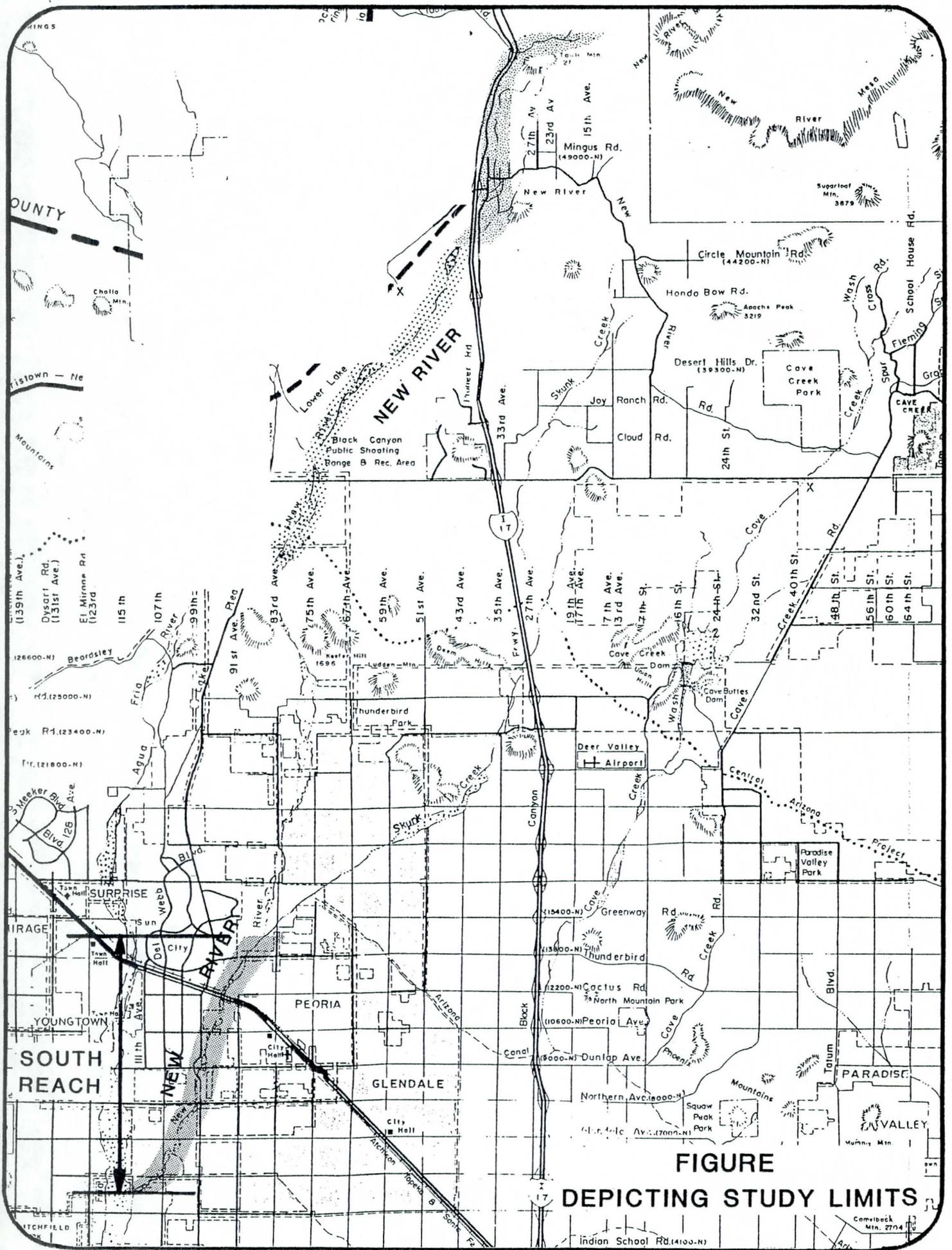
TABLE 2: PROPOSED PEAK DISCHARGES-NEW RIVER
(Discharge in cfs)

Location	Frequency (Years)			
	<u>10</u>	<u>50</u>	<u>100</u>	<u>500</u>
(1) Upstream of Agua Fria River	12,500	29,000	39,000	70,000
(2) Downstream of Skunk Creek	13,500	31,000	41,000	75,000



REFERENCES

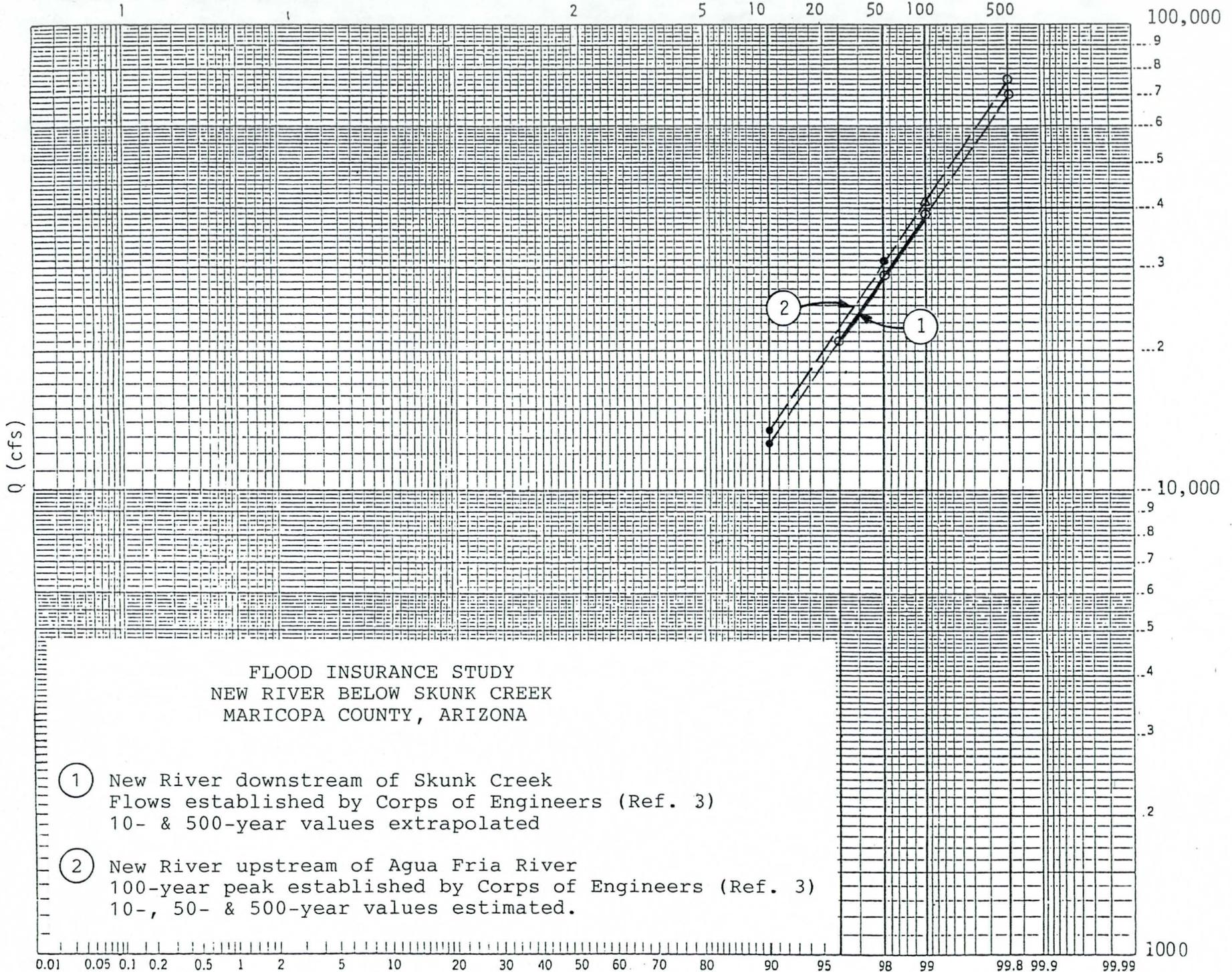
1. U.S. Army Corps of Engineers, Los Angeles District, "Gila River Basin, Phoenix, Arizona and Vicinity (including New River), Design Memorandum No. 3, Skunk Creek and the New and Agua Fria Rivers (Arizona Canal Diversion Channels to the Gila River)", July, 1985.
2. U. S. Army Corps of Engineers, Los Angeles District, "Gila River Basin, Phoenix, Arizona and Vicinity (including New River), Design Memorandum No. 2, Hydrology Part 2", 1982.
3. U. S. Army Corps of Engineers, Los Angeles District, "Summary of Discharge-Frequencies for New River". Letter Dated October 31, 1986.
4. U. S. Department of Housing and Urban Development, Flood Insurance Agency, "Flood Insurance Study, Maricopa County, Arizona, Unincorporated Areas," May, 1979.
5. Coe and Van Loo Consulting Engineers, Inc., "New River Hydrology, New River Downstream of Skunk Creek Confluence, Maricopa County, Arizona." Letter Dated October 2, 1986.
6. U. S. Army Corps of Engineers, Los Angeles District, "Hydrology for Flood Insurance Studies, Maricopa County Streams, Arizona", June, 1983. Revised May, 1985.



**FIGURE
DEPICTING STUDY LIMITS**

FIGURE 1

RECURRENCE INTERVAL (YEARS)





DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2711
LOS ANGELES, CALIFORNIA 90053-2325

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Phoenix, AZ

October 31, 1986

REPLY TO
ATTENTION OF
Office of the Chief
Water Resources Branch

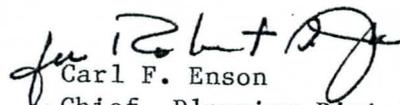
Mr. Ashok C. Patel
Coe & Van Loo Consulting Engineers
4550 North 12th Street
Phoenix, Arizona 85014-4291

Dear Mr. Patel:

Reference is made to your letter of September 5, 1986 in which you requested some hydrologic data for the New River. The data you requested is enclosed.

If we can be of further assistance or if you have any questions, please contact Mrs. Jody Fischer of our Hydrologic Engineering Section. Her telephone number is (213) 894-4759.

Sincerely,


Carl F. Enson
Chief, Planning Division

Enclosure

Location	Condition	Frequency (years)					
		10	25	50	100	SPF 500	
New River Downstream of Skunk Creek	Present: with Adobe and New River Dams without ACDC	4600	_____	13,000	21,000	44,000	53,000
New River Downstream of Skunk Creek ^{1,2}	Future: with Adobe, New River and Cave Buttes Dams with ACDC	_____	_____	_____	41,000	68,000	_____
New River Upstream of Aqua Fria River ^{1,2}	Future: with Adobe, New River and Cave Buttes Dams with ACDC	_____	21,000	29,000	39,000	69,000	_____

- NOTES: 1. These flows include 2000 cfs from the Aqua Fria River Basin to account for potential future development.
2. For future conditions there is less than 5 percent difference between the two locations.



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November 14, 1986

Mr. John Matticks, Acting Chief
Federal Emergency Management Agency
Risk Studies Division
Federal Insurance Administration
500 C Street, SW Room 422
Washington, D.C. 20472

Certified Mail

Attn: Mr. Philip Myers

Re: New River Hydrology, Restudy
New River Downstream of Skunk Creek Confluence
Maricopa County, AZ (Community No. 040037)

Gentlemen:

This letter is to confirm our telephone conversations today with Mr. Myers regarding the reference hydrology. The following was discussed:

The Flood Insurance Study (FIS) in effect was published in May, 1979 only included:

1. 100-year floodplain and floodway analysis.
2. 10- and 100-year flood profiles to establish Flood Hazard Factors. No 50- and 500-year flood profiles were included in that study (see Attachment).

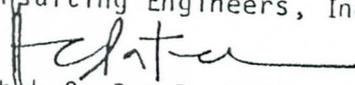
It is our understanding that the restudy which is being performed by our office will include a similar 100-year floodplain & floodway analysis together with 10- and 100-year flood profiles based on updated hydrology.

As per our contract with the Maricopa County Flood Control District, the restudy will be completed by early January, 1987. In light of the time constraints, therefore we would appreciate your immediate response, if you have any comments regarding the subject profiles.

Should you need any further clarification please do not hesitate to call.

Very truly yours,

COE & VAN LOO
Consulting Engineers, Inc.


Ashok C. Patel, P.E., L.S.
Senior Vice President

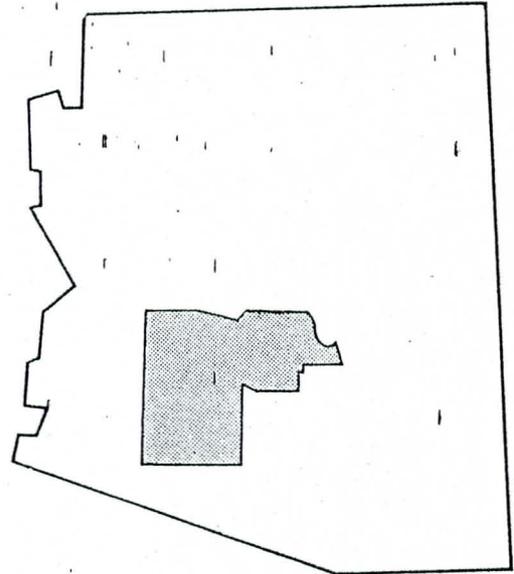
ACP/1s
2/29/41

CC: Ray Lenaburg, FEMA
Dan Sagramoso, MCFCF
Dave Johnson, MCFCF
Doug Plasencia, MCFCF

FLOOD INSURANCE STUDY



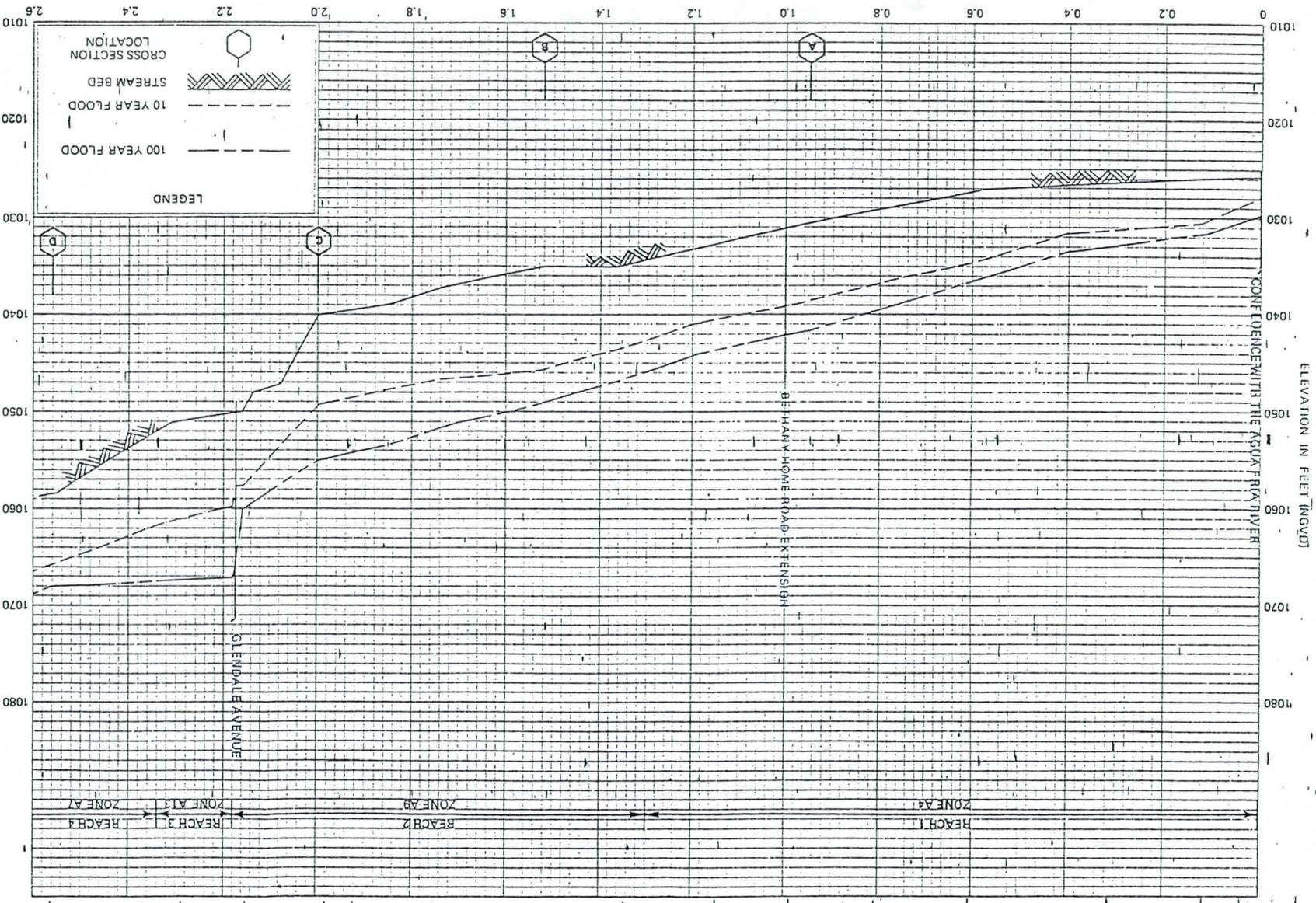
MARICOPA COUNTY,
ARIZONA
UNINCORPORATED AREAS



MAY 1979

U.S. DEPARTMENT of HOUSING & URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH THE AGUA FRIA RIVER



ELEVATION IN FEET (NGVD)

CONFLUENCE WITH THE AGUA FRIA RIVER

SLENDALE AVENUE

GE HANY HOME ROAD EXTENSION

12P

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

MARICOPA COUNTY, AZ
UNINCORPORATED AREAS

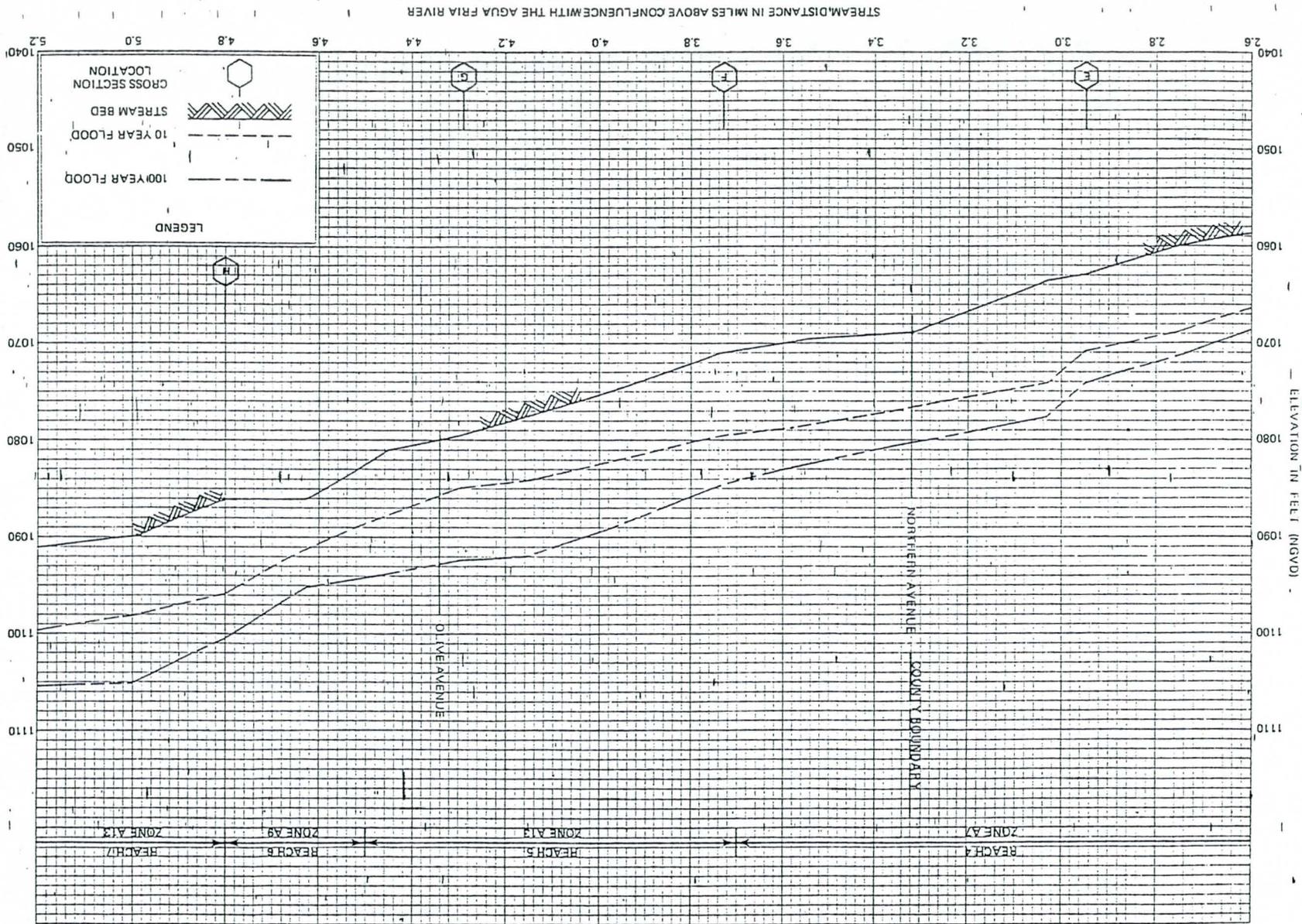
FLOOD PROFILES

NEW RIVER

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
MARICOPA COUNTY, AZ
UNINCORPORATED AREAS

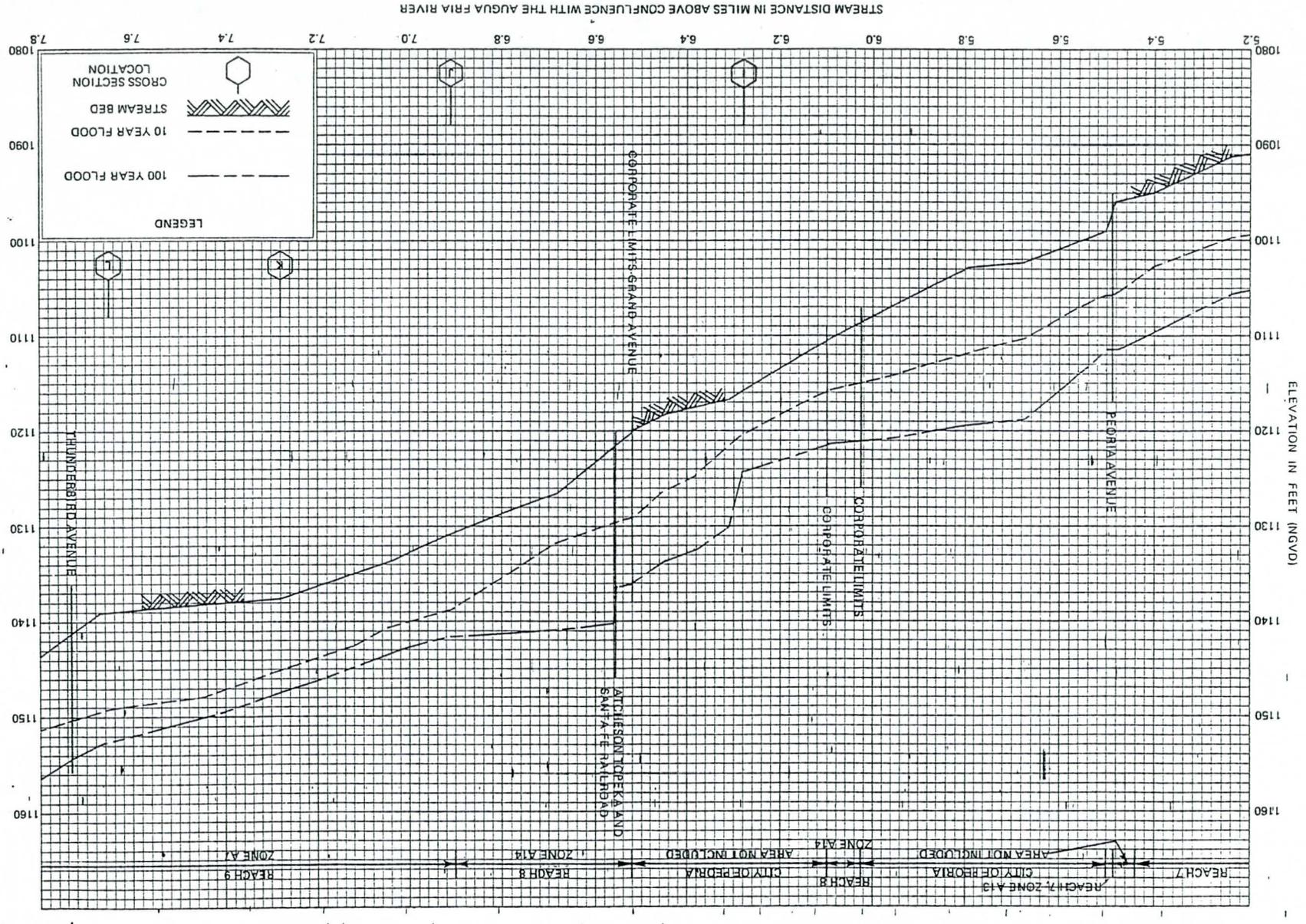
FLOOD PROFILES

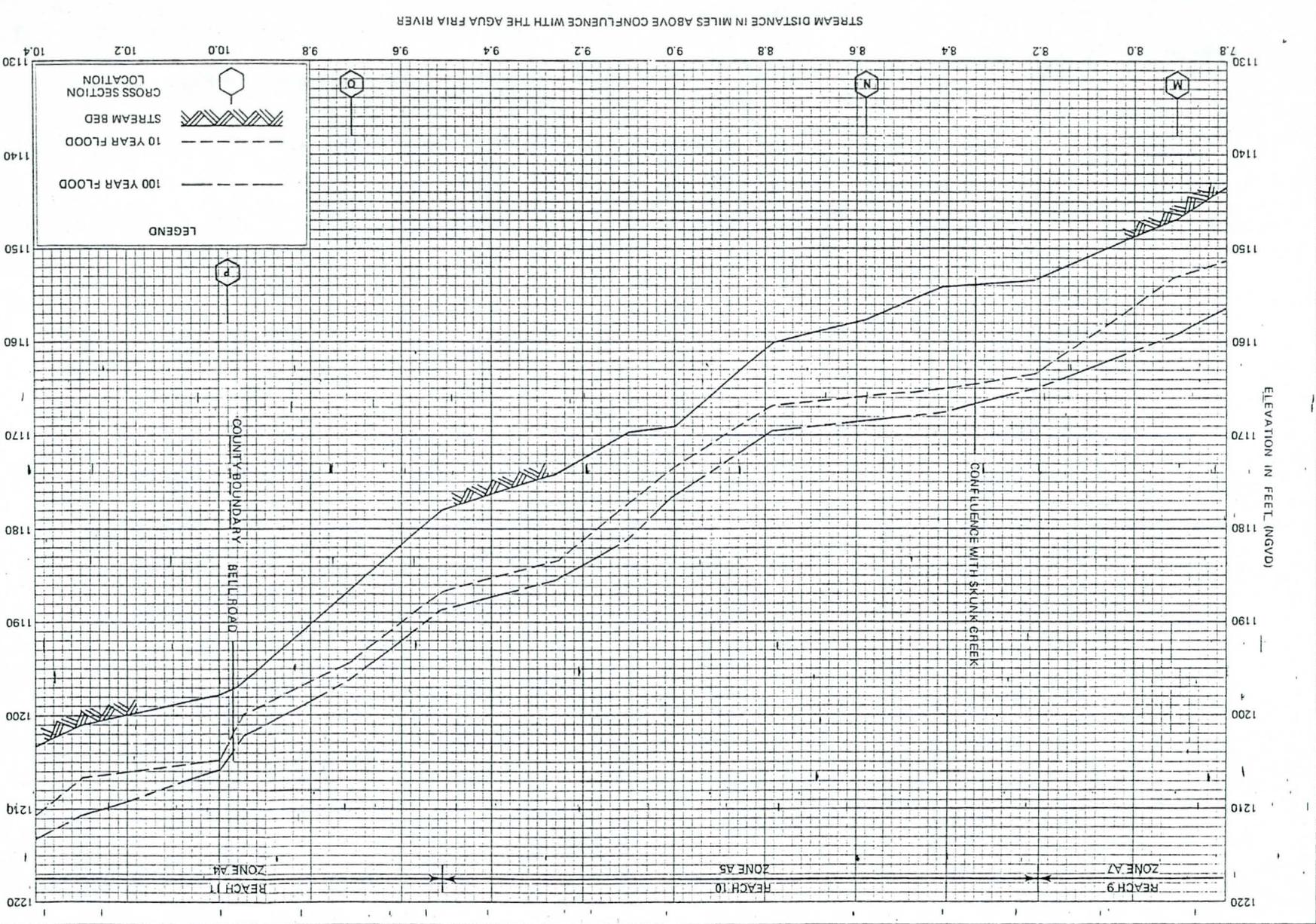
NEW RIVER



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
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FLOOD PROFILES
NEW RIVER







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October 2, 1986

Federal Emergency Management Agency (FEMA)
Washington, D.C. 20472

Attn: Mr. Philip Myers

RE: New River Hydrology
New River Downstream of Skunk Creek Confluence
Maricopa County, Arizona

Gentlemen:

This letter is to confirm our telephone conversations regarding the referenced hydrology. Accordingly, the following resolutions were made by FEMA:

1. The restudy on New River to be based on the hydrology which accounts for the Arizona Canal Diversion Channel contributing. The estimated 100-year Floodpeak at the mouth of New River is 39,000 cfs as per the Corps of Engineers.
2. The restudy limits for New River to be from its confluence with Agua Fria River at downstream side to its confluence with Skunk Creek at upstream site.
3. The restudy to be based upon the Corps of Engineers initial work which defines the 100-year floodplain and floodway. This work to be updted to include the 10-, 50- and 500-year floodprofiles. These profiles to match with the recently updated FEMA floodplain maps (October, 1987) prepared by Dames and Moore in the vicinity of New River and Skunk Creek confluence.

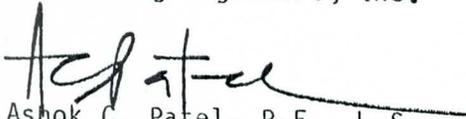
Due to the added scope of work in Items 2 and 3 above, we are presently negotiating engineering fees with our clients as well as the Maricopa County Flood Control District. It is our intent to complete the restudy in an expedited manner so that it can be incorporated with the recent floodplain maps by Dames and Moore during the 90 days appeal process.

Your timely action in regards to the New River hydrology has sincerely been appreciated.

Should you have any question regarding this letter please do not hesitate to call.

Very truly yours,

COE & VAN LOO
Consulting Engineers, Inc.



Ashok C. Patel, P.E., L.S.
Senior Vice President

ACP/lis
2/28/86

CC: Dan Sagramoso, MCFCD
F. Michael Geddes, Geddes & Co.
Bob Henchbarger, Michael Baker, Jr.

