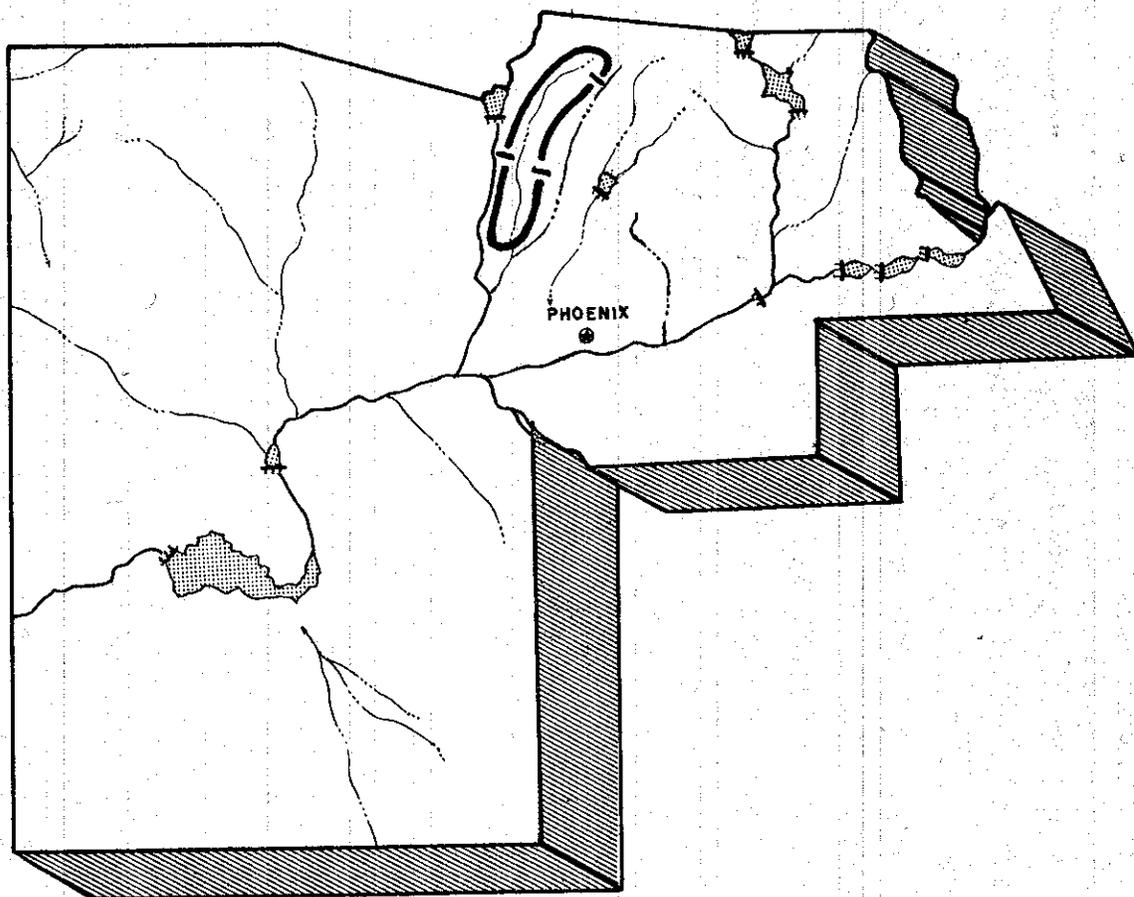
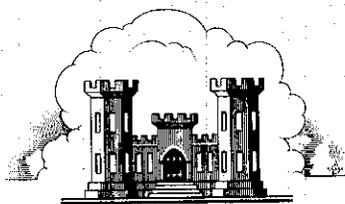


FLOOD--PLAIN INFORMATION STUDY
FOR
MARICOPA COUNTY, ARIZONA

135



VOLUME V
NEW RIVER REPORT



U. S. ARMY ENGINEER DISTRICT, LOS ANGELES
CORPS OF ENGINEERS
APRIL 1967

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FLOOD-PLAIN-INFORMATION STUDY
FOR
MARICOPA COUNTY, ARIZONA

VOLUME V
NEW RIVER REPORT

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CONTENTS

	<u>Page</u>
Summary.....	1
General.....	1
Authorization.....	1
Purpose of study.....	3
Scope.....	3
Use of the report.....	4
Acknowledgement.....	5
Glossary of selected terms.....	5
Bibliography.....	5
Description of study area.....	6
General description.....	6
Prospective developments affecting the flood plain.....	7
Nature and extent of flood problem.....	8
Rainfall and floods.....	17
General.....	17
Types of storms.....	17
Past storms and floods.....	17
New River.....	18
Standard project flood.....	18
Flood frequency.....	19
Flood limits delineated in this report.....	20
General.....	20
Standard project flood.....	20
100-year flood.....	21
50-year flood.....	21
Flood cross sections.....	21
Flood profiles.....	21
Floodway-encroachment limits.....	22
Guidelines for reducing future flood damages.....	24
General.....	24
Corrective measures.....	25
Flood control.....	25
Other corrective measures.....	26

CONTENTS--Continued

	<u>Page</u>
Guidelines for reducing future flood damages--Continued	
Preventive measures.....	27
General.....	27
Flood-plain regulations.....	27
Zoning ordinances.....	28
Flood-plain-zoning laws.....	28
Designated floodway.....	28
Restrictive zones.....	30
Selecting the designated flood.....	30
Subdivision regulations.....	31
Building codes.....	31
Other preventive measures.....	31
Need for continuing observation.....	32
Continuing assistance of the Corps of Engineers.....	32
Conclusions.....	33

PICTURES

Picture No. 1.....	11
Picture No. 2.....	12
Picture No. 3.....	12
Picture No. 4.....	13
Picture No. 5.....	14
Picture Nos. 6, 7, and 8.....	15
Picture No. 9.....	16

PLATES

<u>No.</u>	<u>Title</u>
1.	Index map of study areas in Maricopa County.
2.	Study-area location.
3.	Hydrologic map.
4.	Index of flood areas, concentration points, frequencies, sheet 1 of 2 sheets.
5.	Index of flood areas, concentration points, frequencies, sheet 2 of 2 sheets.
6.	Flood area, reach 1.
7.	Flood area, reach 2.
8.	Flood area, reach 3.
9.	Flood area, reach 4.

CONTENTS--Continued

PLATES--Continued

<u>No.</u>	<u>Title</u>
10.	Flood area, reach 5.
11.	Flood area, reach 6.
12.	Flood area, reach 7.
13.	Flood area, reach 8.
14.	Flood area, reach 9.
15.	Flood area, reach 10.
16.	Cross sections - reaches 1 to 4, inclusive.
17.	Cross sections - reaches 5 to 7, inclusive.
18.	Cross sections - reaches 8 to 10, inclusive.

APPENDIXES

<u>No.</u>	<u>Title</u>
1.	Authorization.
2.	Glossary of Selected Terms.
3.	Bibliography.

FLOOD-PLAIN-INFORMATION STUDY
FOR
MARICOPA COUNTY, ARIZONA

VOLUME V
NEW RIVER REPORT

SUMMARY

General

1. The Flood Control District of Maricopa County requested that the U.S. Army Corps of Engineers provide information about the flood hazard in flood plains along several streams in the County. An index map of the study areas in Maricopa County is shown on plate 1. This report, the fifth in the series on Maricopa County, presents the results of the study made of a reach of approximately 27 miles of the New River flood plain.

Authorization

2. This report was prepared under the authority granted in section 206, Public Law 86-645, approved 14 July 1960. That section is quoted in appendix 1.

3. The authority of the Flood Control District of Maricopa County to participate in flood-control planning is derived from article 5, sections 45-2351 to 45-2370, inclusive, title 45, chapter 10, Arizona Revised Statutes - and from a resolution of the Board of Supervisors of Maricopa County dated 3 August 1959, which established the flood-control district pursuant to the cited statutes.

4. Furthermore, Arizona has adopted state statutes enabling counties and cities to zone through the use of properly adopted resolutions and ordinances. Such zoning laws must be in the interest of promoting health, safety, morals, or general welfare, and are generally placed on referendum in a public election. Maricopa County has adopted zoning laws, but not in regard to flood hazards. However, flood-plain zoning could be adopted by the County because it would be in the interest of promoting health, safety, morals, and general welfare.

5. On 26 September 1960 and 11 December 1961, the Board of Supervisors of Maricopa County and the Board of Directors of the Flood Control District of Maricopa County adopted resolutions requesting the U.S. Army Corps of Engineers to make a flood-plain-information study for Maricopa County - and giving assurances that the information in this report would be made available to all interested persons and organizations, and that the availability of the report would be adequately publicized. Those resolutions are quoted in appendix 1. On 14 April 1961, the Chief of Engineers, Department of the Army, Washington, D.C., approved the request for these Maricopa County studies.

6. The Arizona State Land Commissioner has been designated by the Governor of Arizona to coordinate and to assign priority to applications for flood-plain-information studies. Upon approval for release of this report by the Arizona State Land Commissioner on 21 December 1966, the Division Engineer, South Pacific Division, Corps of Engineers, Department of the Army, San Francisco, California, approved release of this report for publication on 31 January 1967.

Purpose of Study

7. The purpose of the study presented in this report is to provide information on flood hazards in the flood plain on a 27-mile reach of New River. This information is for the guidance of the State of Arizona and the Flood Control District of Maricopa County in (a) advising county and city planning organizations and private land developers about those hazards and (b) setting up appropriate controls to insure optimum and prudent use of the flood plain. The purpose of this report is not to discourage the use of the flood plain - but rather to encourage development that will insure an optimum balance between the needs of man for use of the flood plain and the needs of nature for the discharge of floodwaters.

Scope

8. The Flood Control District of Maricopa County requested a flood-plain-information study on New River, a tributary of the Agua Fria River. The reach of New River finally selected for this report is the flood plain which extends upstream from Greenway Road (near the confluence with Skunk Creek about 8 miles upstream from the confluence with Agua Fria River) to the narrows about 5 miles upstream from where Black Canyon Highway (Arizona State Highway 69) crosses New River at the community of New River. The study area is shown on plate 2 and the drainage area is shown on plate 3.

9. Outside the study reach in this report, flood-hazard discharges are available for the 50-year flood, 100-year flood, and standard project flood for the downstream reach of New River extending from Greenway Road

to the confluence with Agua Fria River. These flood-hazard discharges are in the interim survey report prepared by the Los Angeles District, Corps of Engineers, for the area of Phoenix, Arizona, and vicinity. As a result of the survey report, Congress has authorized future flood-control improvements for this downstream reach of New River.

10. The study included consideration of past floods and of future floods in whose overflow area methods of regulating development or construction of flood-control facilities might be warranted.

Use of the Report

11. The information in this report is presented for consideration and use by the State of Arizona, Maricopa County, other local agencies, and flood-plain users for planning the use and regulation of the flood plain along New River between Greenway Road and the narrows (about 5 miles upstream from the community of New River). The State and County have agreed to make this information available for interested persons and organizations. Further information on the use or availability of this report should be requested from the Flood Control District of Maricopa County, in Phoenix, Arizona.

12. Any regulation for flood-plain use resulting from this report would be undertaken by the State, by the County, or by some other local agency. This report is not intended to extend any Federal authority over zoning or other regulation of flood-plain use, and the information study and report are not to be construed as committing the Federal Government to investigating, planning, designing, constructing, operating, or

maintaining any facilities discussed, or to imply any intent to undertake such activities unless specifically authorized by Congress.

Acknowledgment

13. The cooperation of the Flood Control District of Maricopa County and of individuals who directly or indirectly aided in the preparation of this report is gratefully acknowledged. Topographic and aerial mosaic maps prepared by Yost and Gardner, Engineers, and Kenney Aerial Mapping, and aerial topographic maps prepared by the Arizona Highway Department were the basic maps used for the study. These maps, supplied by the Flood Control District of Maricopa County, Arizona, were used for the delineation of flood areas (see pls. 6 to 15, inclusive). Additional aerial mosaic coverage utilized aerial photos and mosaics from Aerial Mapping Company. General highway maps prepared by the Arizona Highway Department were used in preparing the map showing the location of the New River study area (see pl. 2).

Glossary of Selected Terms

14. A glossary of selected terms used in this report is included as appendix 2.

Bibliography

15. A bibliography of references used in preparing this report is included as appendix 3.

DESCRIPTION OF STUDY AREA

General Description

16. The New River, which is the major tributary of the Agua Fria River, rises in the Cook Mesa area of the New River Mountains about 45 miles north of Phoenix and flows generally southward, crossing the Black Canyon Highway approximately 5 miles southwest of the New River Mountains and joining Agua Fria River about 15 miles northwest of Phoenix. The total length of the stream is approximately 48 miles with a total drainage area of about 350 square miles (including 190 square miles upstream from the confluence with Skunk Creek).

17. The reaches considered in this study (see pls. 6 to 15, inclusive) extend for about 27 miles upstream from Greenway Road (just upstream from the confluence with Skunk Creek) to the narrows about 5 miles upstream from the Black Canyon Highway Bridge. Invert elevations along New River in the report area range from 1,175 feet at Greenway Road to 2,290 feet at the upstream limits of study. In the report area, the major tributaries are Deadman Wash, which enters New River from the northeast about 3 miles northwest of Hedgpeth Hills, and an unnamed tributary that enters New River from the northwest about 5 miles upstream from Deadman Wash.

18. In the upstream part of the area under study, New River flows through an area that is typically desert in character, the natural channel is generally narrow and well defined, and the maximum width of the flood plain is about 2,000 feet. (See pictures 1 to 4, inclusive; and pls. 6 to 8, inclusive.) In the middle reaches New River flows through

a fairly level and extensive flood plain where flows are in several generally parallel channels. In this middle reach the flood plain reaches a *maximum* width of about 6,000 feet. (See pictures 5; and pls. 9 to 11 inclusive.) In the downstream area under study, New River flows through an area that is mostly agriculture, the natural channel is generally shallow and floodflows near the confluence with Skunk Creek merge with floodflows of Skunk Creek. (See pictures 6 to 9, inclusive; and pls. 12 to 15, inclusive.)

Prospective Developments Affecting the Flood Plain

19. The study area has not yet experienced the expanding residential and urban development that has occurred to the south and east. However, the general area in and around the town of Peoria on New River, downstream from Greenway Road, is developing at a tremendous rate. Rapid development has taken place in other parts of Arizona as well as in Maricopa County, including areas adjacent to the Phoenix metropolitan area of which Peoria is a part. Arizona was among the leaders in population growth from 1950 to 1960 and was the actual leader among the States during the period from 1946 to 1950. Approximately half of Arizona's people live in Maricopa County. By 1970, the population of Maricopa County is expected to be almost double the 1960 figure. In 1960, the census count for Maricopa County was 663,500. The population of Maricopa County in 1980 is estimated at 2,000,000. With this resultant residential expansion in Maricopa County, population growth would be expected to move into the study area.

20. The development that has already taken place in the New River area has resulted in the encroachment of agricultural areas on and adjacent to the flood plain in the report area. Some of these agricultural areas have been damaged several times in recent years by high water flows. The potential threat to life and property will increase if random development takes place on the flood plain.

Nature and Extent of Flood Problem

21. Maricopa County is experiencing a rapid increase in population and in urban development. This increase has sometimes led to the development on the flood plains of streams without due regard to the existence of flood hazards. The hazard that exists in the flood plain of the study area is not always apparent to the layman because the land is semiarid and because only agricultural and road developments have experienced damaging floods. However, storms in this area have caused - and will continue to cause - floods resulting in the inundation of extensive flood plains. The flood plain considered in this study is the area subject to complete flooding by the standard project flood and to partial flooding by the lesser 100-year and 50-year floods, as shown on the flood-area maps (pls. 6 to 15, inclusive). Pertinent information on the nature and extent of the flood problem in and along New River is given in the following paragraphs.

22. The upstream 10 miles of the New River study area, beginning near Table Mountain and Tee Ranch, is generally in a well-defined channel and the flood overflow and damages to improvements would be limited to

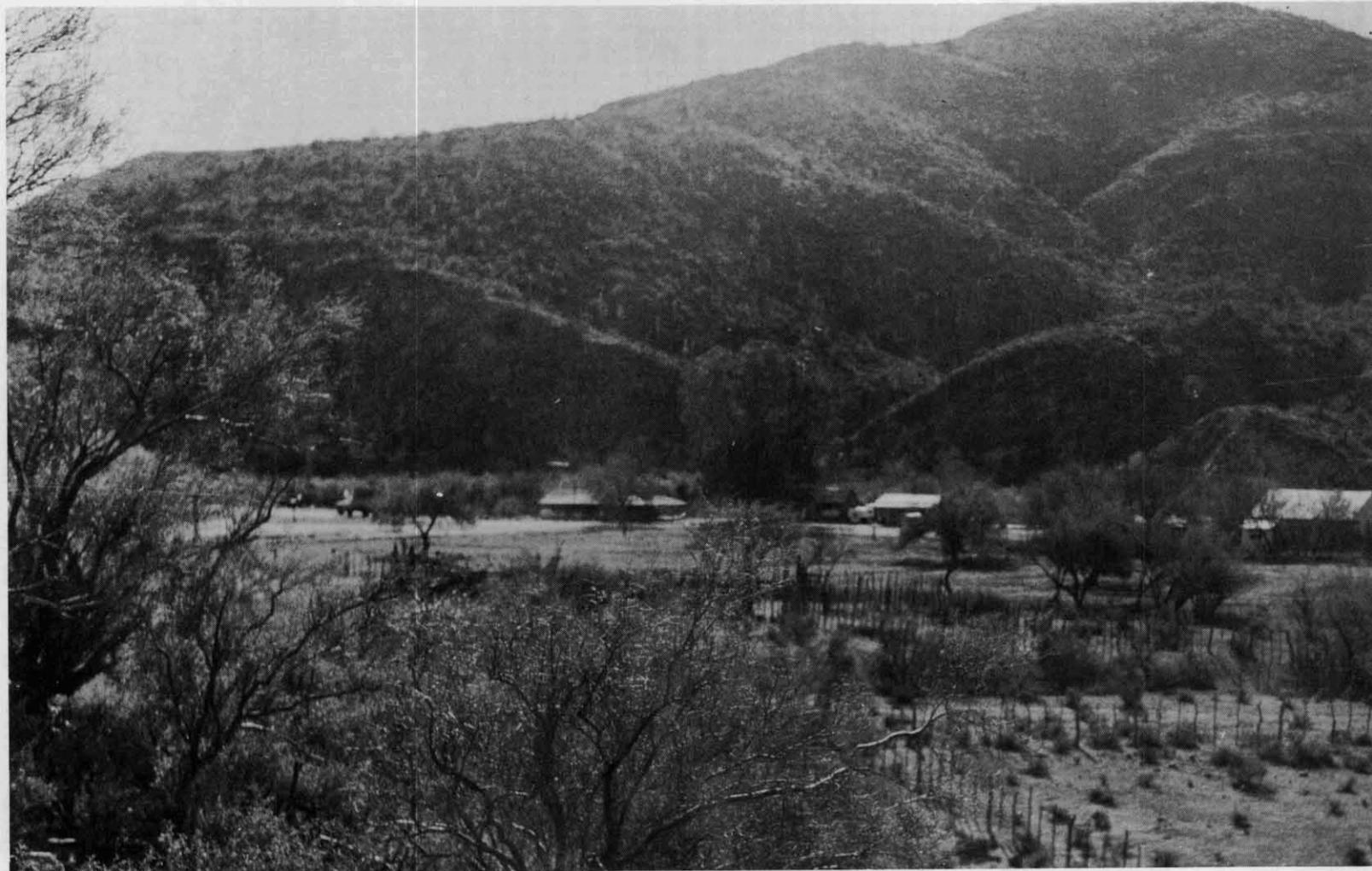
Tee Ranch and the New River Road ford areas. (See pictures 1, 2, 3, and 4; pls. 6, 7, and 8; and cross sections A, B, and C shown on pl. 16.)

23. The next 9 miles of the New River study downstream to about West Wing Mountain, is not contained in a well-defined channel, but flows across a fairly extensive flat flood plain, with split flows being common. (See pictures 5, 6, 7, and 8; pls. 8, 9, 10, 11, and 12; cross sections D, E, F, and G shown on pls. 16 and 17.)

24. The downstream 8 miles of the New River study area, from West Wing Mountain to Greenway Road near the junction with Skunk Creek, consists mainly of a small natural channel insufficient in size to contain even the 50-year flood. The flows extend over the flat agricultural areas in this reach and mainly consist of sheet flows with some ponding. (See picture No. 9; pls. 12, 13, 14, and 15; and cross sections H, I, and J shown on pl. 18.) Floodflows leaving the small natural channel spread across the flood plain and continue downstream in parallel flows.

25. Flood-plain-zoning regulations have been prepared but are not adopted at this date. There are no formal flood-control works in the area except for bank protection at bridges. Agricultural interests have constructed some levees. This is evident by the fact that since the initiation of the New River flood-plain-information study, it has been noted that a levee holding and protecting an irrigation ditch, runs east $\frac{1}{4}$ -mile north of the south line of Section 14 from 83rd Avenue, approximately 4,400 feet, to the channel of New River. This area has been checked several times by Maricopa County engineers and it is believed that any

flow that exceeds the width of the New River channel is impeded by this dike and other dikes in the area. When this occurs and the water heights are increased sufficiently, the overland flow from the north is diverted to the west by the east-west dike and crosses 83rd Avenue above Union Hills Drive and continues to flow westward to a swale about 1 mile west of 83rd Avenue whence it flows almost due south, rejoining New River north of the Sante Fe railroad. This reveals that agriculture developments have encroached within the flood plain of New River and those responsible have constructed levees to protect these encroaching developments. Plate 14 does not delineate this condition because some of the levees in this area were constructed after the topography was prepared for this study. These situations show the need for adopting flood-plain-zoning regulations to prevent encroachment within the flood plain.



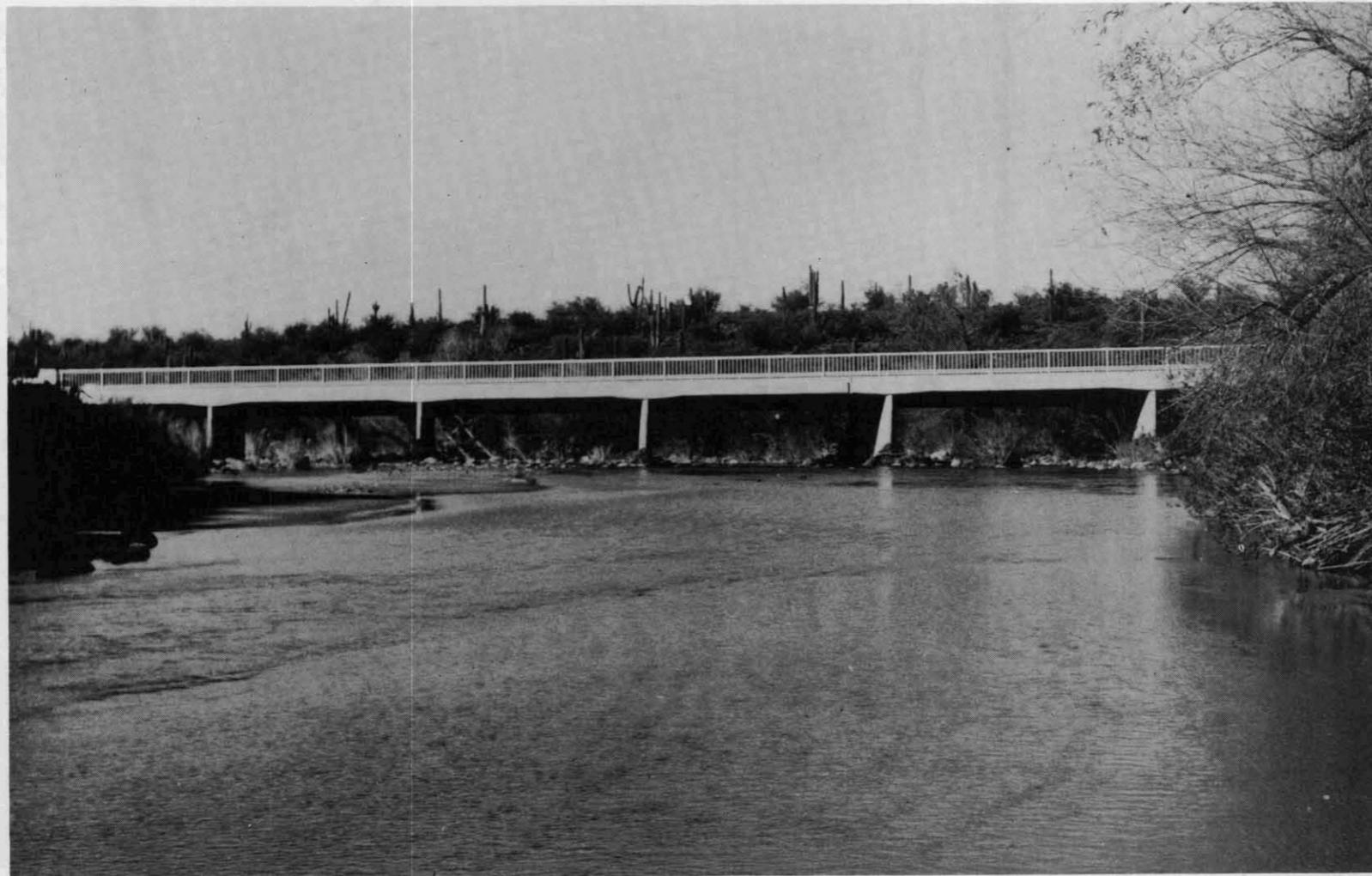
Picture No. 1 - View looking south east toward New River back of Tee Ranch, which would be in the flood plain. (See Pl. 6.) Left side of picture is the upstream study limits, which are approximately thirty four miles upstream from the confluence with the Agua Fria River.



12 Picture No. 2 - View looking south west from north side of New River. (See Pl. 6.) Table Mountain, approximately eight tenths of a mile downstream from beginning of study, is shown at left of picture.

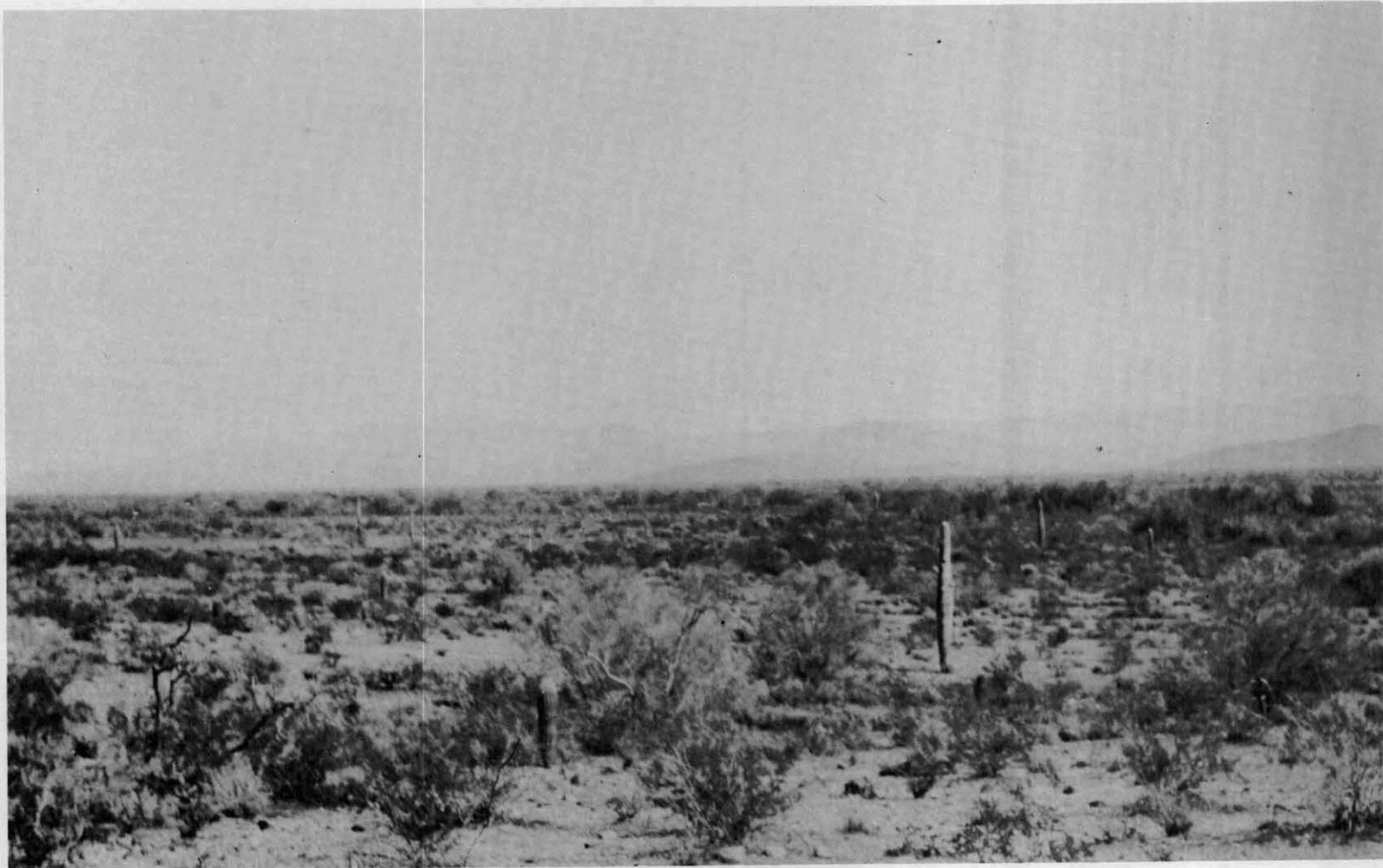


Picture No. 3 - View showing New River Road ford, (See Pl. 7.) which is approximately five miles downstream from beginning of study, crossing New River and is impassable when storms occur in this area. Black Canyon Highway is on top of first rise in the background.

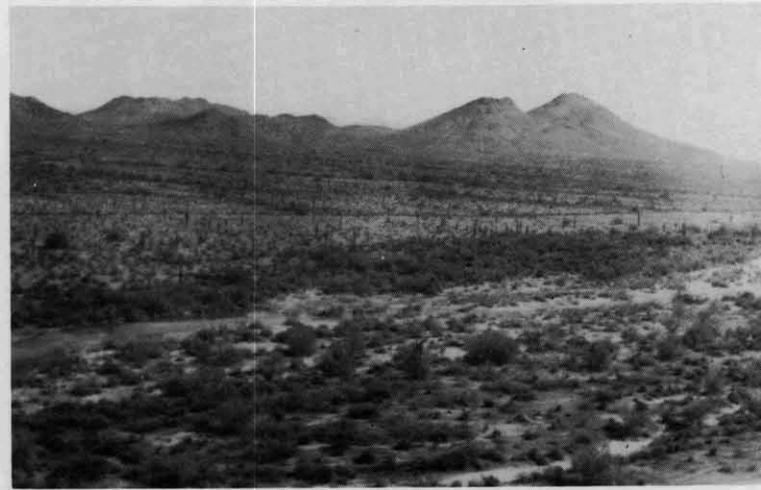
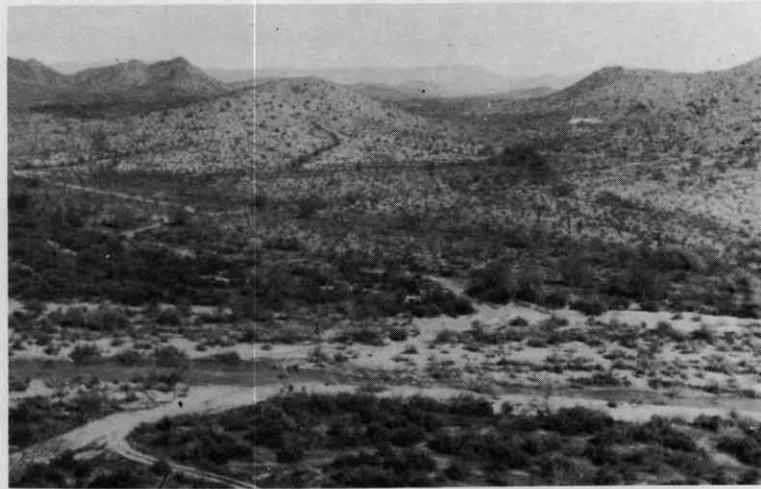


Picture No. 4 - View looking at the upstream side of Black Canyon Highway Bridge which is approximately five and two tenths miles downstream from the upstream limits of study. (See Pl. 7.) New River flood plain is fairly well confined in this area.

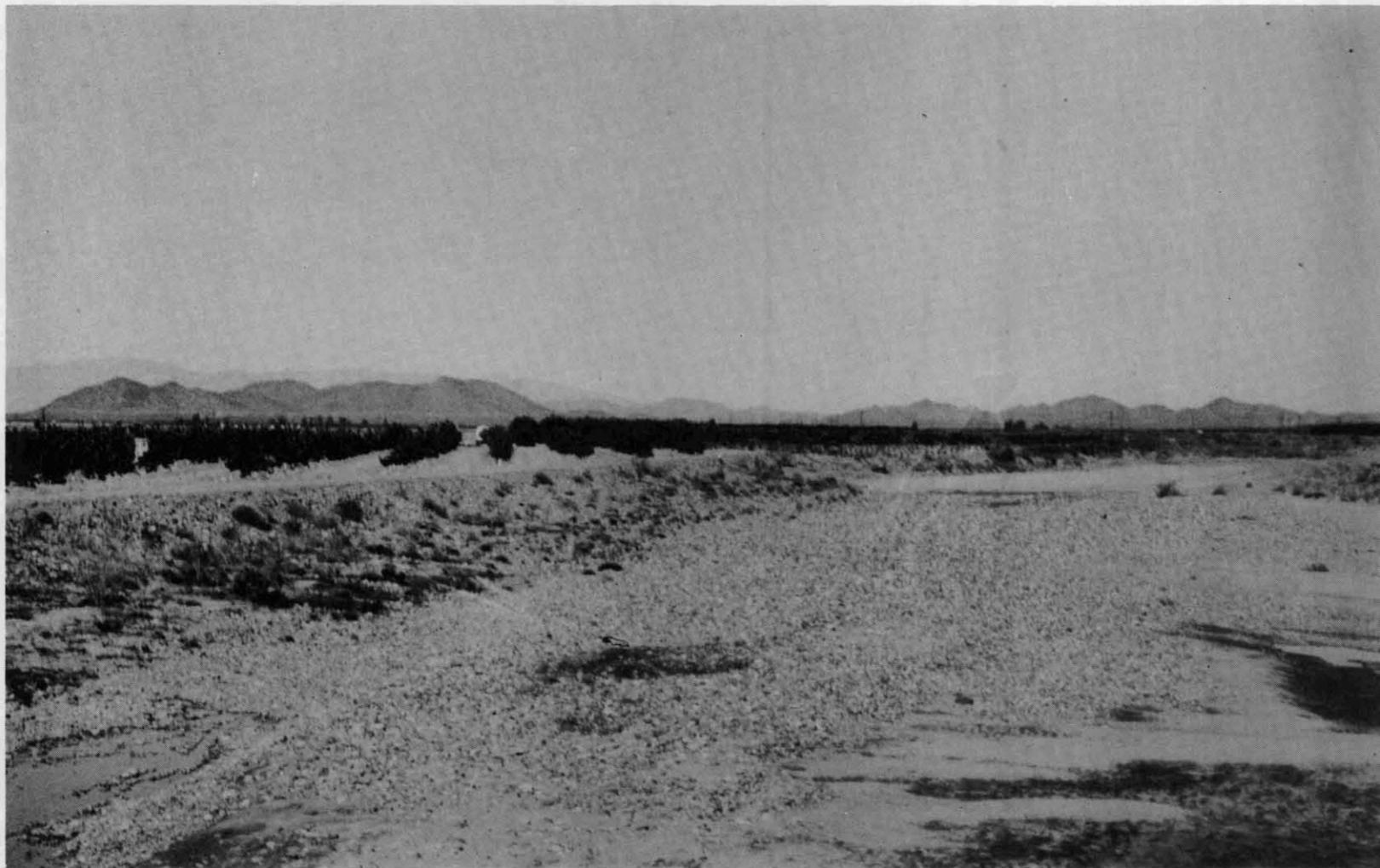
14



Picture No. 5 - View taken from approximately fifteen miles downstream from upstream limits of study looking east (See Pl. 11.) This area of the New River flood plain, to a great extent, is mostly flat. Split flows are common in this part of the flood plain.



Picture Nos. 6, 7, and 8,
from top to bottom of
page, are looking north-
east, east, and south-
east, respectively. Pic-
tures were taken from
top of West Wing Mountain
at the right abutment of
authorized New River de-
tention dam. (See Pl. 12).
West Wing Mountain is
approximately nineteen
miles downstream from
the upstream limits of
study. The northeast
picture shows split-flow
country. In the east and
southeast, the New River
becomes one main stream
again. In the background
on the right side of the
southeast picture, the
encroachment of agricul-
ture begins.



Picture No. 9 - View looking upstream from north side of Bell Road Bridge. (See Pl. 15.) Note encroachment of agriculture to the banks of New River. Note also that the overflow area is very flat.

RAINFALL AND FLOODS

General

26. Types of storms.--Three types of storms produce precipitation in the New River basin: general winter storms, general summer storms, and local thunderstorms. Pertinent information on these storms is given in the following subparagraphs.

(a) General winter storms, usually occurring during the months of December through March, originate over the Pacific Ocean as a result of the interaction between cool polar Pacific and warm tropical Pacific airmasses and move eastward over the area. These storms often last for several days and are accompanied by widespread rainfall.

(b) General summer storms, which usually occur during the months of July through September, are associated with the influx of moist tropical air originating over the Gulf of Mexico or the south Pacific Ocean. These storms are often accompanied by relatively heavy precipitation over large areas for periods of up to 24 hours, with light showers continuing for as long as 3 days.

(c) Local thunderstorms can occur at any time of the year, either during general storms or as isolated phenomena. However, local thunderstorms are most common from July through September, covering relatively small areas and resulting in high-intensity precipitation for durations of 3 hours or less.

27. Past storms and floods.--Many severe local storms and floods have occurred in the Phoenix area in the following years: 1921, 1935,

1936, 1939, 1943, 1951, 1954, 1956, 1957, and 1963. Pertinent information on these floods is given in the following subparagraphs:

(a) New River.--Quantitative flood records for New River are meager. The largest flood of record, with an estimated discharge of 38,000 cubic feet per second measured at the highway bridge at Peoria, occurred in August 1943; medium-sized floods were reported in August 1951, July 1955, January 1957, and July 1957. The peak discharge of the July 1955 flood was estimated at 12,000 cubic feet per second; small floods were reported in June 1955 and October 1956.

(b) The most severe storm of record occurred over the Queen Creek drainage area on 19 August 1954. This was a thunderstorm with high rainfall intensities during the first 3 hours of the storm and light rainfall during the next 3 hours. An estimated area of 100 square miles had over 5 inches of rainfall, and about 1,000 square miles had over 1 inch of rainfall. The peak discharge at Whitlow Ranch damsite (in the Queen Creek drainage area near Florence Junction on U.S. Highway Nos. 60 and 70 in Pinal County) was estimated at 42,000 cubic feet per second. If the storm had been centered to produce the standard project flood at this damsite (with suitable ground conditions) the peak discharge would have been 110,000 cubic feet per second. The drainage area upstream from the damsite is about 1,433 square miles.

28. Standard project flood.--A flood resulting from a storm of the magnitude described in the preceding paragraph for the Queen Creek drainage area, would have a high peak discharge and a relatively short duration. Estimates of the magnitude of the standard project flood for the areas considered in this report are based on calculations of runoff

that would result if a storm having characteristics of the 19 August 1954 thunderstorm, which occurred over the Queen Creek drainage area, were to center over the New River drainage area (see pl. 3) considered herein. If such a storm were centered over the New River drainage area upstream from Greenway Road, at a time when ground conditions were reasonably conducive to runoff, the peak discharge of the resulting flood at Greenway Road would be 55,000 cubic feet per second from the tributary drainage area of 190 square miles. Detailed information on the standard project flood peak discharges at various concentration points in the New River drainage area under consideration in this study is given on plate 4.

Flood Frequency

29. Information on the frequency of floods of various magnitudes is essential in planning for optimum use of the flood plain. The development of such information depends on rainfall and streamflow data. Although Maricopa County has a well-established system of precipitation and stream-gaging stations, only one such station (a stream-gaging station established in 1960 on New River at the Black Canyon Highway Bridge) is in the drainage area contributing to that reach of the river that is under consideration in this report. Developments, encroaching within the riverbanks, received major damages from high water flows in the Salt River in the Phoenix area during December 1965 and January 1966. These high flows were, with few exceptions, contained within the banks of the river. The storms that produced this high water, however, did not center to cause flooding in the New River drainage area. No floods have occurred since the establishment of that station. As a result, only incomplete and

fragmentary data - mostly from newspaper files, irrigation districts, and water-user associations - are available for floods in the report area. However, sufficient rainfall and streamflow data are available for areas near the New River drainage area to permit reasonable estimates of the frequency of occurrence of floods of various magnitudes at various concentration points along the New River drainage area upstream from Greenway Road. A table giving the size of the 100-year flood for those concentration points, together with the size of the standard project and 50-year floods at those points, is shown on plate 4. The locations of those concentration points are shown on plates 4 and 5.

Flood Limits Delineated in This Report

30. General.--Specific information on actual areas inundated by past major floods in the New River report area is unavailable because no records of streamflow in the area are in existence. Information developed in this study indicates that most of the natural channel in the study area generally is shallow and not well defined. The limit of the overflow area for the 100-year flood, together with limits of the overflow areas for the standard project and 50-year floods, are delineated on plates 6 to 15, inclusive. Other pertinent information on these floods is given in subsequent paragraphs.

31. Standard project flood.--For this study, the limits of the overflow area of the standard project flood were selected as the maximum width of the flood plain (see sketch "Suggested Flood Zones" in subsequent subparagraph titled "Designated floodway"). Also, delineating the limits of the standard project flood permits a comparison of the size of the overflow area of the standard project flood with that of the 100-year flood.

32. 100-year flood.--At the request of the Flood Control District of Maricopa County, the 100-year flood was selected as the largest flood to be used for regulation purposes. It was also used as a general basis for establishing encroachment limits (see subsequent paragraph entitled "Floodway-encroachment limits").

33. 50-year flood.--The 50-year flood is delineated to permit a comparison of the size of the overflow area of the 50-year flood with that of the 100-year flood.

34. Flood cross sections.--Typical cross sections showing the shape of the floodway and the depth of flow for the standard project flood, the 100-year flood, and the 50-year flood are shown on plates 16, 17, and 18. For convenience in reference, the locations of the cross sections are indicated by capital letters in hexagons on aerial topographic maps of the flood areas (see pls. 6 to 15, inclusive). The cross sections were used in determining the flood limits of those floods on the new River study area. Overbank flows, shown on cross sections I and J on plate 18, leave the natural channel flowing generally parallel thereto. On the easterly side these flows spread out over wide areas, merging with the Skunk Creek flood plain (see pls. 14 and 15, inclusive).

35. Flood profiles.--Flood profiles have not been shown because of the distortion in presenting water-surfaces profiles in areas - such as those under consideration in this study - where floodflows are divided and where floodflows move along a curving natural channel or in parallel flows having different water-surface elevations. A delineation of the flood profiles would show only the water surface at the centerline of the

main floodflow and would not show the water surface along other parts of the overflow area. (See "Flood Profile" in appendix 2 "Glossary of Selected Terms.")

36. Floodway-encroachment limits.--The floodway-encroachment limits generally coincide with the limits of the designated floodway for New River and represent the limits of maximum occupancy or encroachment that can be allowed on the flood plain under consideration in this study. The minimum encroachment width should not increase the depth of flooding more than 6 inches in the area immediately upstream from any floodway section constricted to encroachment width. Buildings and construction in the flood plain would not necessarily have much adverse effect on the capacity of the natural floodway outside encroachment limits. Such construction could be floodproofed either by filling the area to raise the ground elevation or by locating the floor level of buildings above the expected floodflow elevation. However, if the floodway is constricted within encroachment limits, a general rise in the upstream water surface would occur with a resultant increase in the flood hazard to the buildings, construction, and adjoining property. The area between the encroachment limits should be kept clear of further development until such time as flood-control improvements can be constructed to reduce flooding (see sketch "Suggested Flood Zones" in subsequent subparagraph titled "Designated floodway"). The floodway-encroachment limits for various reaches of New River are discussed in the following paragraphs.

37. The floodway-encroachment limits within the flood plain of the upstream reaches (from the upstream limits of study to approximately 10 miles downstream, see plates 6, 7, and 8) are the width of the flood plain plus an allowance for protection against bank caving. In this upstream area provision for 100 feet of additional encroachment area is required landward from both banks.

38. The flood plain of the middle reaches (the next 12 miles with its several diverse channels) would have an indeterminate floodway for any one flood. Therefore the flood-encroachment limits in these reaches should extend to the outer width of the standard project flood. (See pls. 9, 10, 11, 12, and 13.)

39. The floodway-encroachment limits within the flood plain of the downstream reaches (about 5 miles, see plates 14 and 15) would be the outer limits of the 100-year flood except that downstream of Bell Road, the slope from the left overbank is southeasterly and causes the flood plain for New River to merge with the Skunk Creek flood plain (see plates 14 and 15 and cross sections on plate 18). Therefore the combined flood plains are within the encroachment limits and there should be no buildings or obstructions within these combined flood plains.

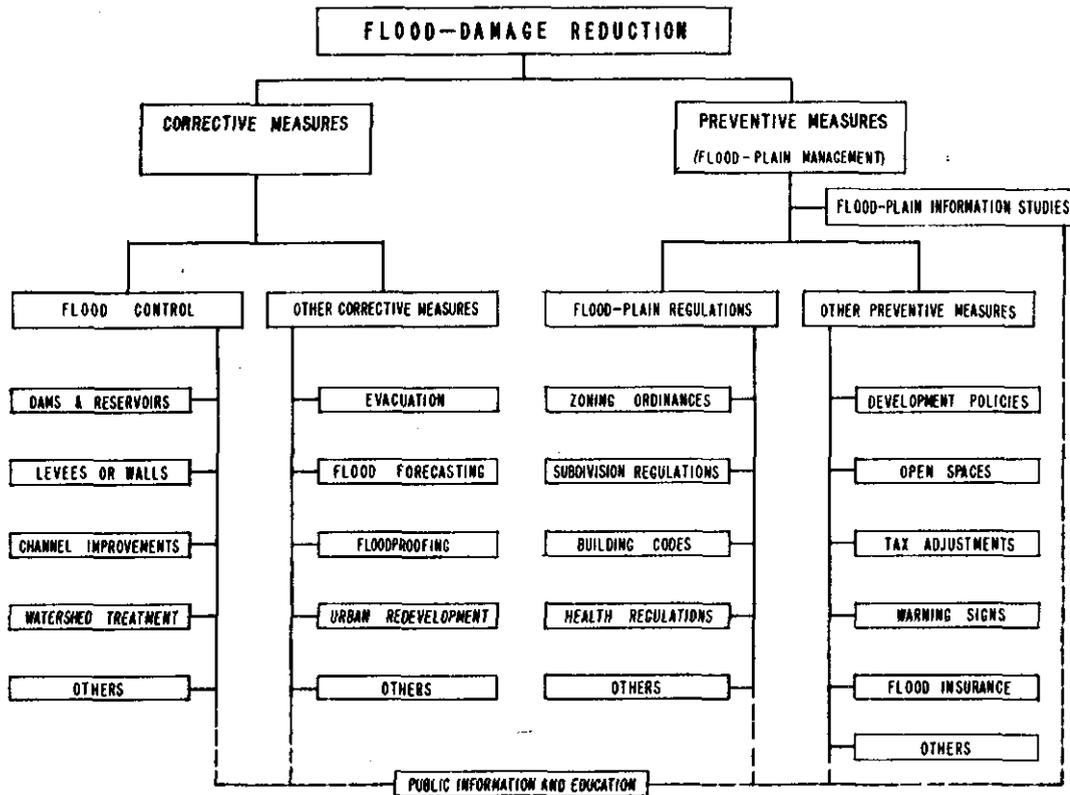
40. In these downstream reaches, buildings and obstructions on the entire westerly side and on that portion of the easterly side upstream from Bell Road would be limited to outside the 100-year flood. In these areas the flood plain is fairly level and subject to ponding and sheet flows. The floor level of any buildings should be above the elevation of the standard project flood.

GUIDELINES FOR REDUCING FUTURE FLOOD DAMAGES

General

41. The two broad categories of methods to reduce flood damages are corrective measures and preventive measures. Corrective measures are primarily the construction of dams and channel improvements. Preventive measures are primarily flood-plain-management methods - such as zoning ordinances that will preserve or establish floodways and thus provide partial protection. Flood-plain management is not only necessary in areas without corrective measures, but is also necessary after completion of corrective measures to preclude developments that would decrease the flood-carrying capacity of channels and floodways as well as to permit the development of these flood plains to the highest uses compatible with floodway needs.

42. In general, flood-plain-information studies such as those discussed in this report are concerned with developing a basis for preventive measures. However, the relationship of flood-plain-information studies to both preventive and corrective measures is shown on the following chart:



* Adapted from chart shown in bibliography item No. 5 (see appendix 3).

Corrective Measures

43. Flood control.--Flood-control works - one of the means of reducing flood damage - include dams, channel improvements, levees and floodwalls, and upstream watershed treatment. Dams and reservoirs store floodwaters and release them at rates that will not cause damage. Channel improvements include deepening, widening, or straightening existing stream channels, and constructing new channels to carry floodwaters without damage. Levees and floodwalls prevent rapidly flowing floodwaters from cutting channels across adjacent land. Upstream watershed treatment reduces flooding by permitting more rainfall to soak into the ground.

44. Consideration should be given to early planning for possible future corrective measures involving flood-control works. For example, if an improved channel is expected, the land required for rights-of-way should be reserved or acquired as soon as practicable. The early establishment of the alignment, the rights-of-way limits, and the required grades permit a better sequence of development - and at less cost. Once the type, size, and location of future channel improvements are determined, minor channel improvements might be undertaken to reduce the hazard from small floods. The earth excavated during the construction of such improvements could be used as land fill in low areas in the restrictive zones where raising the ground level would provide sites suitable for building.

45. Other corrective measures.--Among the other corrective measures that can be taken are (a) flood forecasting to provide warning of impending floods, (b) permanent evacuation of the flood plain to preclude loss of life, and (c) floodproofing of structures to reduce damage from overflow. However, flood forecasting is not considered feasible in the New River drainage area because the area is subject to flash floods.

46. Corrective measures may also be possible in connection with programs for urban redevelopment. This concludes the discussion of those corrective measures for flood-damage reduction that are charted on page 25.

Preventive Measures

47. General.--Preventive measures for reducing flood damages require management of the flood plains (see chart on page 25). Flood-plain management involves controlling the use of the flood plain by legal and logical measures. Such management should be the means of realizing maximum community benefits, taking into account the most profitable or beneficial uses to which the flood plains can be put and the flood damages to which those uses would be subject. Some uses would be subject to very little damage; for example, recreational use for parks and playgrounds. Pertinent information on flood-plain regulations and other preventive measures is given in the following paragraphs.

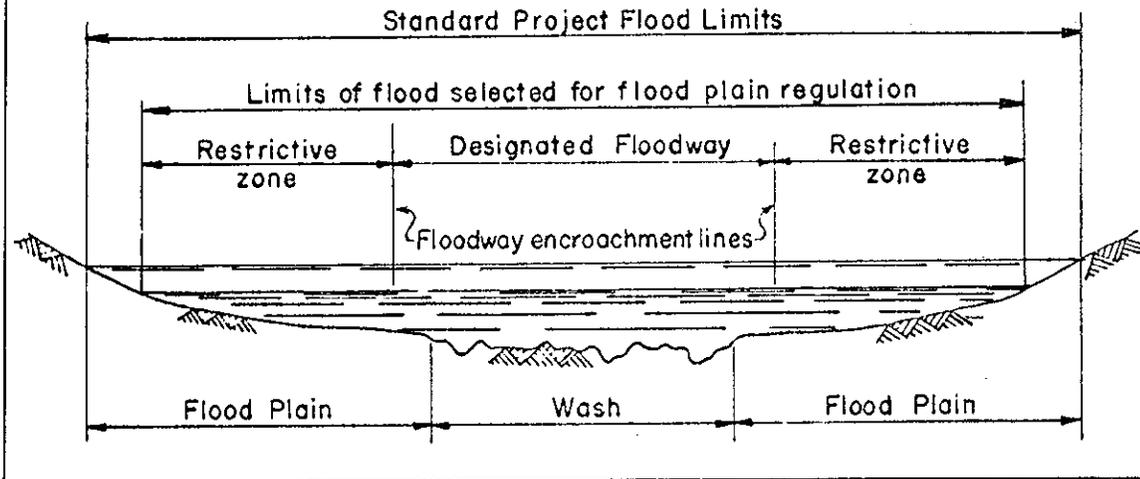
48. Flood-plain regulations.--In order to develop plans for use of flood plains, the establishment of flood-plain regulations may be necessary to accomplish the desired results. Flood-plain regulations are established by state statutes, county resolutions, and city ordinances. Such regulations include zoning ordinances (including those setting up floodway-encroachment limits), subdivision regulations, building and housing codes, and other similar regulations. The type of measures necessary to regulate use of flood plains depends on the nature of the hazard. The more restrictive measures would be used where the flood hazard might include loss of life, property damage, or floodway obstruction. Information on the relationship of some of those regulations to flood-plain zoning along New River is given in the following subparagraphs.

(a) Zoning ordinances.--The most universally accepted tools used by States, counties, and municipalities to regulate the use and development of land within their political boundaries are zoning ordinances. Arizona has adopted State statutes enabling counties and cities to zone through the use of properly adopted resolutions and ordinances. Such zoning resolutions and ordinances (i.e., zoning laws) must be in the interest of promoting health, safety, morals, or general welfare - and are customarily placed on referendum in a public election. Maricopa County has adopted zoning laws - but not in regard to flood hazards. Flood-plain-zoning laws could be adopted by the County because such zoning would be in the interest of promoting health, safety, morals, and general welfare.

(b) Flood-plain-zoning laws.--Flood-plain-zoning laws may provide for the establishment of a designated floodway but usually provide also for the establishment of restrictive zones in which the degree of restriction would depend upon the flood hazard. Pertinent information about the establishment of a designated floodway and of restrictive zones, together with pertinent information about selecting the flood to be used as the basis for flood-plain regulation, is given in the following subparagraphs.

(1) Designated floodway.--By establishing floodway-encroachment limits (see sketch on next page), a local zoning or regulatory agency could prohibit the building of permanent structures that would obstruct the natural flow of floodwaters within a designated floodway on the flood plain. That agency would determine the criteria for specifying the flood magnitude considered as the basis of flood-plain regulation:

SUGGESTED FLOOD ZONES



Note.--The suggested typical flood zones shown in the sketch are considered generally applicable to flood plains. However, in the flood plain considered in this report, two additional conditions require flood zones based on conditions other than those shown in the sketch as follows:

1. The first additional condition occurs where natural channel and flow conditions require a designated floodway that is as wide as the limits of the flood selected for flood-plain regulation (i.e., where the floodway-encroachment lines coincide with the limits of the flood selected for flood-plain regulation). Where such a condition occurs, the restrictive zones extend from the designated floodway to the limits of the flood plain (i.e., the limits of the standard project flood).

2. The second additional condition occurs where bank conditions within the flood plain shown in the sketch require an allowance for protection against bank caving. Where such a condition occurs, provision for 100 feet of additional zone is necessary landward from the bank.

The floodway required for passage of the designated flood could then be determined, and the encroachment lines established.

(2) Restrictive zones.--By establishing restrictive zones (see sketch on preceding page), a local zoning or regulatory agency could so control the elevation of floors, landfill, street grades, subdivision drainage, and other improvements as to permit the most effective use of land without undue risk of damage from flooding. The storage of large quantities of floatable material should be prohibited in the restrictive zones, because such material could cause damage to downstream improvements, could cause obstruction to floodflows at bridges, and could result in widening the overflow area.

(3) Selecting the designated flood.--Flood damage in the flood plains can be reduced effectively only if the flood magnitude adopted in determining the width of the designated floodway is of infrequent occurrence, and only if the designated floodway results in raising the flood level in the restrictive zones by less than 6 inches. For the study area covered in this report, the Flood Control District of Maricopa County indicated by letter dated 17 October 1963 to the Los Angeles District that the flood-plain area to be regulated should be of sufficient size to accommodate a flood with an occurrence frequency of about once in a hundred years. The floodway encroachment limits are described under previous paragraph, "Floodway-encroachment limits," in paragraphs 36, 37, 38, 39, and 40. The restrictive zone limits conform

to the first additional condition for the sketch titled "Suggested Flood Zones" shown on page 29 and as described in the referenced paragraphs 39 and 40. Both limits should be considered together in any regulations.

(c) Subdivision regulations.--The regulation of subdivisions provides one of the most immediately effective means of reducing flood damages in generally undeveloped areas. Cities and counties should proceed early and rapidly to establish regulations because of the opportunity of producing ideal developments not hampered by non-conforming existing uses. Designated floodways and restrictive zones can be established by subdivision regulations in the same manner as with zoning ordinances.

(d) Building codes.--Building codes could be developed to provide for the safety of buildings by requiring minimum elevations for floors and installed equipment, such as furnaces, in the restrictive zones of the flood plain.

49. Other preventive measures.--Reduction of future flood damage could also be accomplished by setting aside flood-plain land for parks and recreational areas on the basis of the future needs of the city and county for these uses. Any existing buildings in those parts of such recreational areas that are within the designated floodway should be relocated outside the designated floodway. Tax adjustments could be used to encourage flood-plain use that would not add a burden on the community by increasing the need for flood fighting, relief, and expenditures for repair of flood damages to service facilities. Preventive measures that could be used to alert potential builders to the threat of flood damage include (a) the placing of warning signs in the

flood-pain areas and (b) the entering of flood-hazard information on the county land-title record for each land parcel subject to flooding. This concludes the discussion of those preventive measures for flood-damage reduction that are charted on page 25.

Need for Continuing Observation

50. Because quantitative records of precipitation and quantitative information on streamflow characteristics for the New River drainage area are inadequate, the flood-magnitude estimates used in this report are based on available information on precipitation and streamflow for comparable drainage areas. Additional precipitation and stream-gaging stations properly located would provide information needed by engineers to improve the evaluation of present conditions and the prediction of future conditions.

Continuing Assistance of the Corps of Engineers

51. The technical assistance of the Corps of Engineers will be available, upon request of the State and local governmental agencies concerned, to interpret and explain information in this report and to provide any other flood data that becomes available for the use of the local planning agencies.

CONCLUSIONS

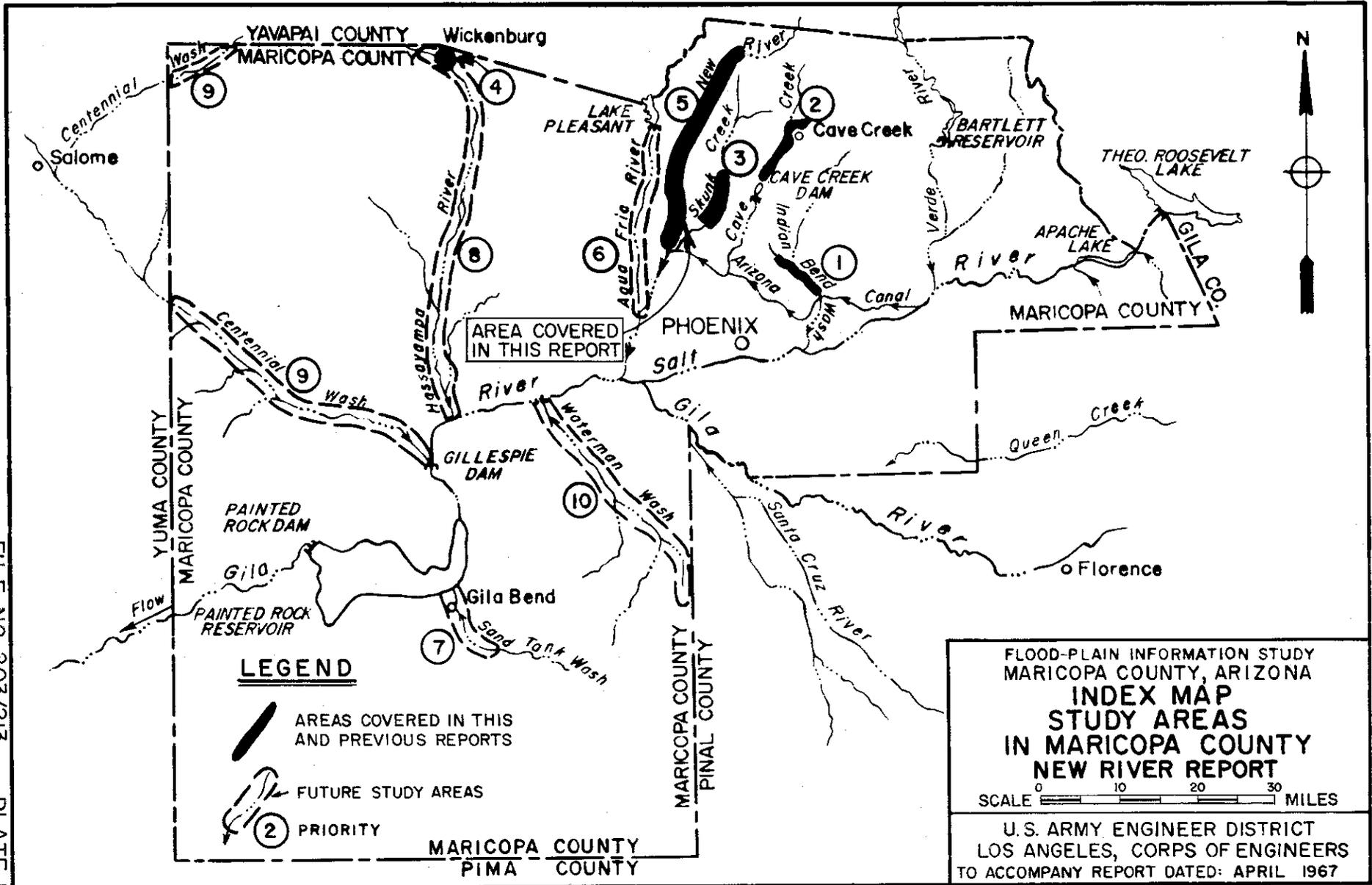
52. A potential flood hazard exists in the flood plain of New River and flood damage has occurred in the area. The hazard presents a special problem in the downstream reaches where extensive agricultural development has taken place.

53. The study indicates that large areas are subject to flooding. In the upstream reaches, bank caving can occur. In the middle reaches where the flood plain is extensive and fairly flat with split flows, the flood hazard is not easy to recognize without flood-plain information. In the downstream reaches where the flood plain covers extensive agricultural areas, the natural channel has inadequate capacity.

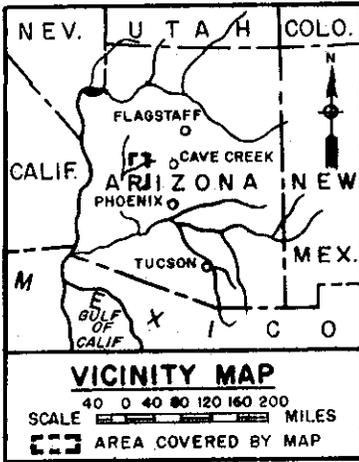
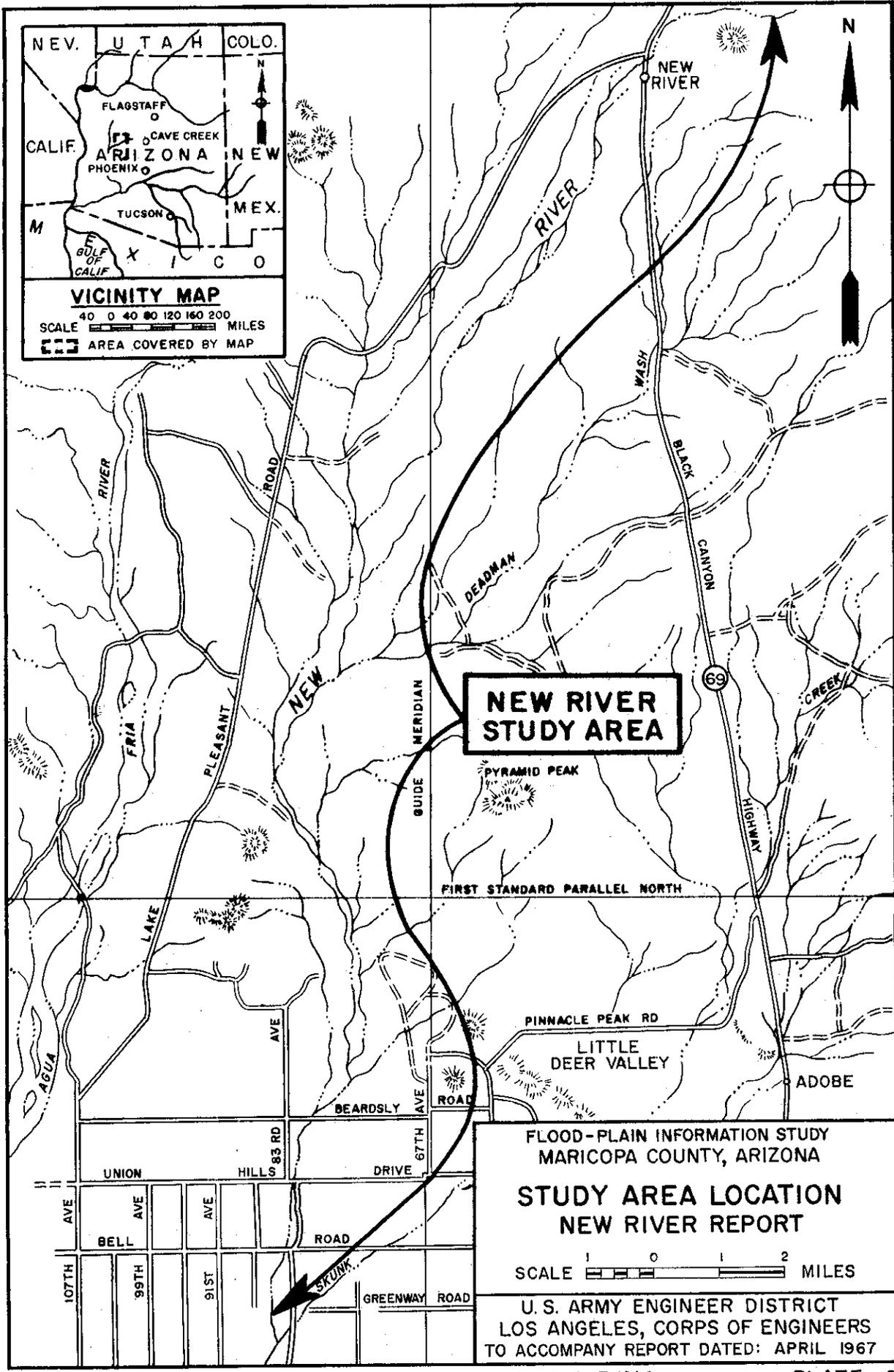
54. Although encroachment in the downstream reaches is predominantly agricultural, residential development has been increasing near the town of Peoria - just downstream of the study area. The need for increased development will grow with the rapid increase in population in the entire Phoenix area. Preventive measures should be taken as soon as possible to forestall any further encroachment that might lessen the flood-carrying capacity of the floodway.

55. The information in this report is intended to provide a factual basis for local governmental agencies in formulating appropriate regulations and measures to control development on the flood plain of New River - and to provide information for the guidance of real-estate developers or private individuals in acquiring or developing land in the flood plain.

FILE NO 203/213 PLATE 1



YAVAPAI COUNTY
 MARICOPA COUNTY
 Wickenburg
 Centennial Wash
 Salome
 9
 4
 5
 2
 3
 6
 1
 8
 Lake Pleasant
 New River
 Skunk Creek
 Cave Creek
 Cave Creek Dam
 Bartlett Reservoir
 Theo. Roosevelt Lake
 Apache Lake
 Gila Co.
 River
 Verde River
 Maricopa County
 Phoenix
 Salt
 Gila River
 Queen Creek
 Florence
 Santa Cruz River
 Pinal County
 Maricopa County
 Yuma County
 Maricopa County
 Centennial Wash
 9
 10
 Painted Rock Dam
 Gila
 Painted Rock Reservoir
 Gila Bend
 Sand Tank Wash
 Gillespie Dam
 Waterman Wash
 Hossayampa River
 Agua Fria River
 Maricopa County
 Pima County

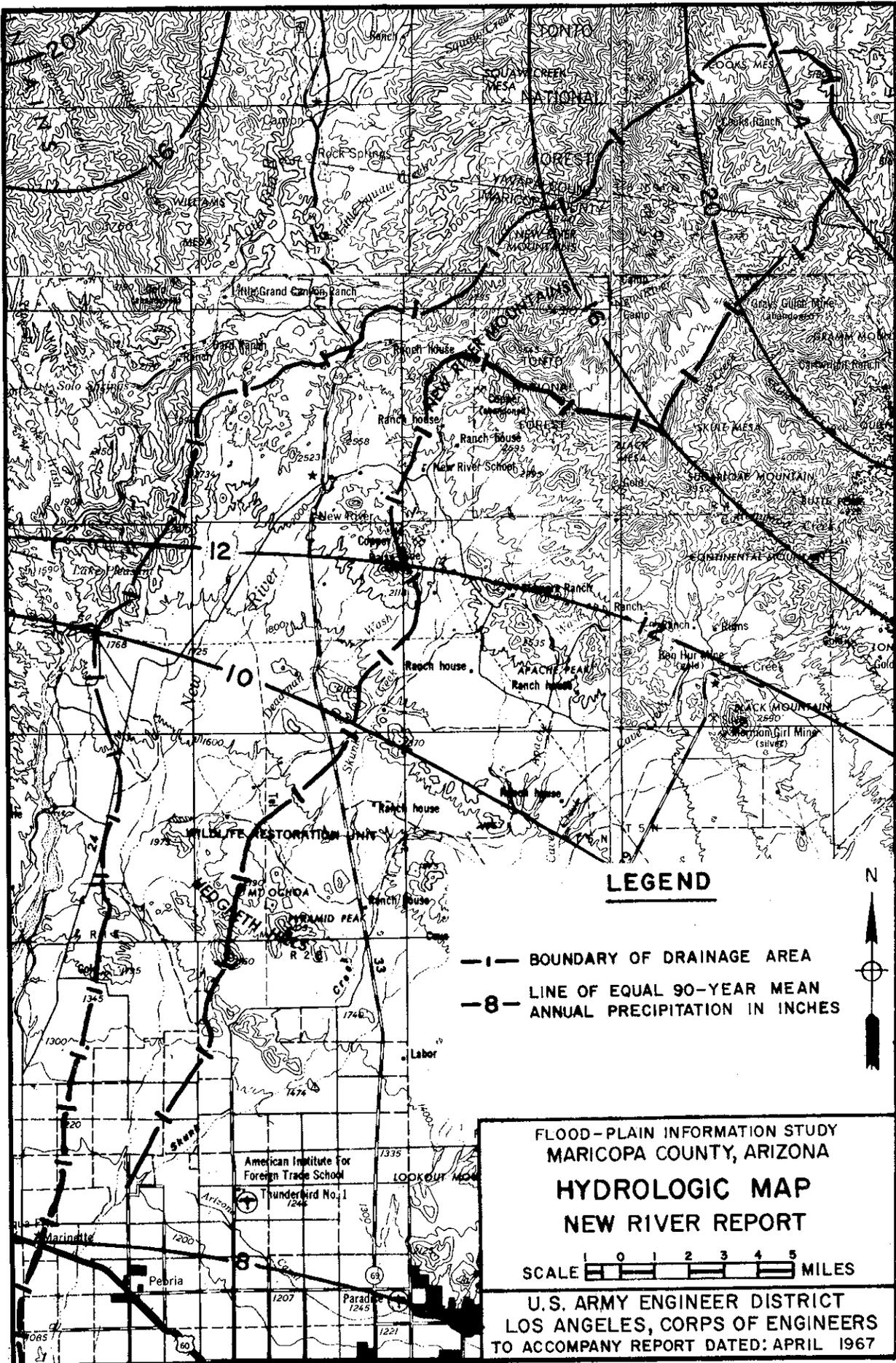


NEW RIVER STUDY AREA

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA
STUDY AREA LOCATION
NEW RIVER REPORT

SCALE 1 0 1 2 MILES

U. S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967



LEGEND

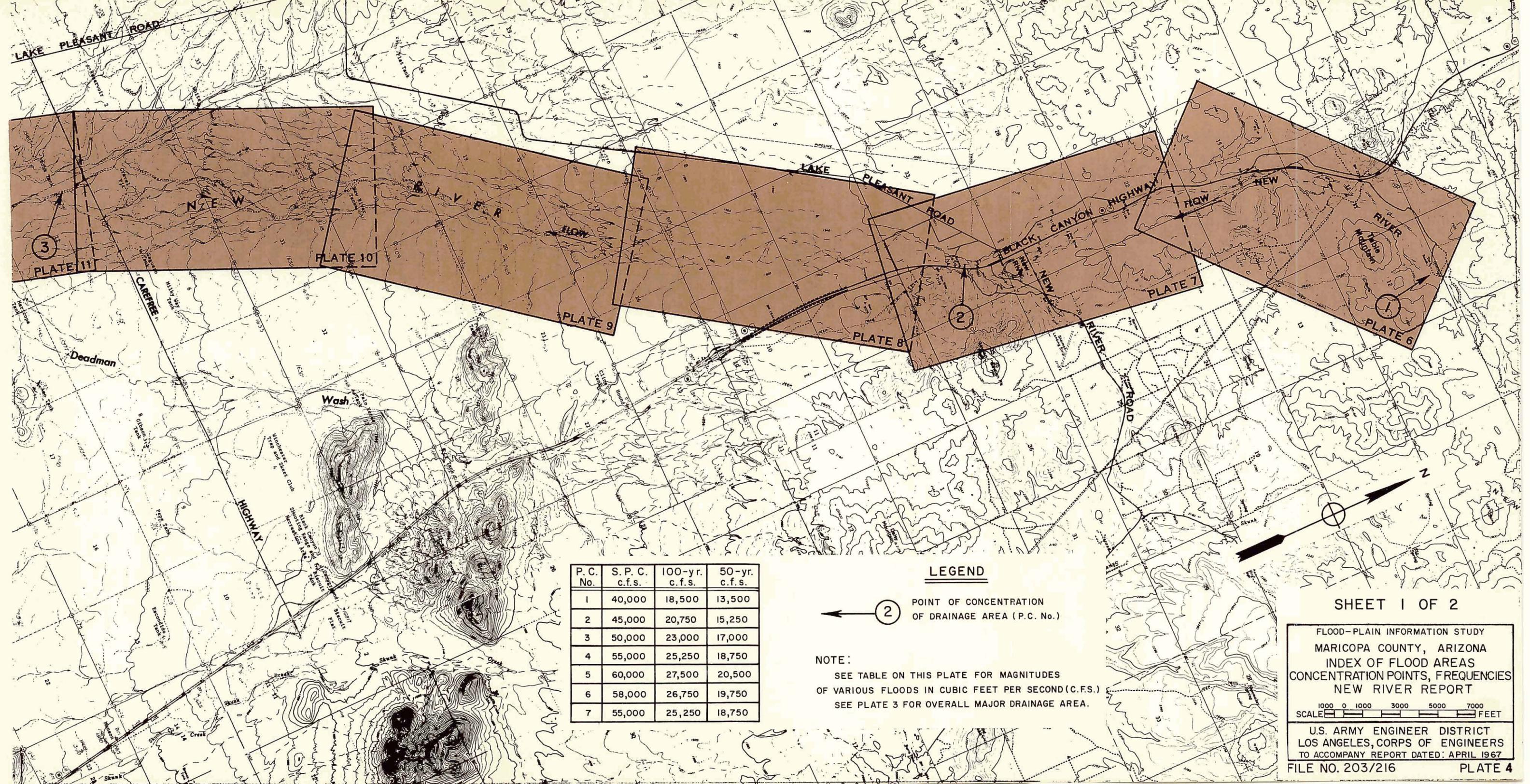
- - - BOUNDARY OF DRAINAGE AREA
- 8 - LINE OF EQUAL 90-YEAR MEAN ANNUAL PRECIPITATION IN INCHES

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA

HYDROLOGIC MAP
NEW RIVER REPORT

SCALE 0 1 2 3 4 5 MILES

U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967



P. C. No.	S. P. C. c. f. s.	100-yr. c. f. s.	50-yr. c. f. s.
1	40,000	18,500	13,500
2	45,000	20,750	15,250
3	50,000	23,000	17,000
4	55,000	25,250	18,750
5	60,000	27,500	20,500
6	58,000	26,750	19,750
7	55,000	25,250	18,750

LEGEND

② POINT OF CONCENTRATION OF DRAINAGE AREA (P.C. No.)

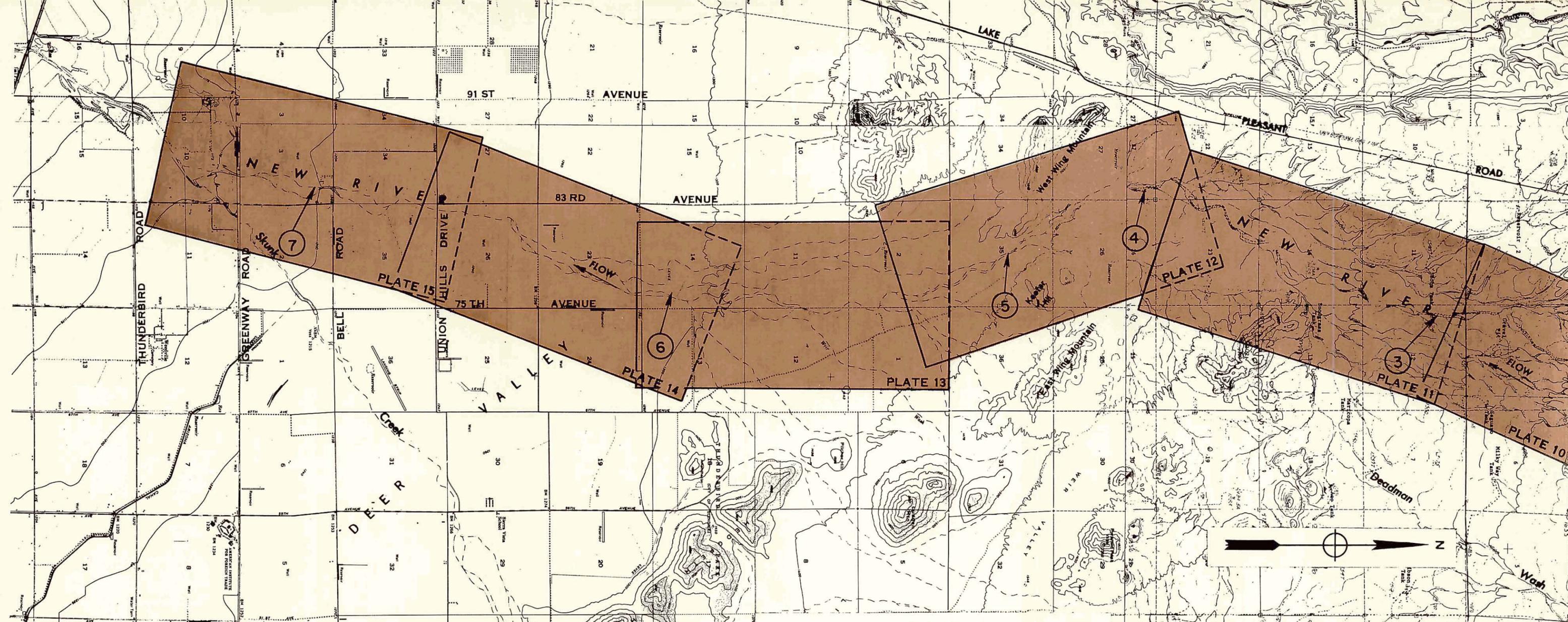
NOTE:
SEE TABLE ON THIS PLATE FOR MAGNITUDES OF VARIOUS FLOODS IN CUBIC FEET PER SECOND (C.F.S.)
SEE PLATE 3 FOR OVERALL MAJOR DRAINAGE AREA.

SHEET 1 OF 2

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA
 INDEX OF FLOOD AREAS
 CONCENTRATION POINTS, FREQUENCIES
 NEW RIVER REPORT

1000 0 1000 3000 5000 7000
 SCALE: FEET

U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967
 FILE NO. 203/216 PLATE 4



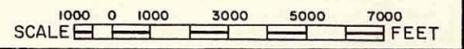
LEGEND

② POINT OF CONCENTRATION OF DRAINAGE AREA (P.C. No.)

NOTE:
 SEE TABLE PLATE 4 FOR MAGNITUDES OF VARIOUS FLOODS IN CUBIC FEET PER SECOND. (C.F.S.)
 SEE PLATE 3 FOR OVERALL MAJOR DRAINAGE AREA.

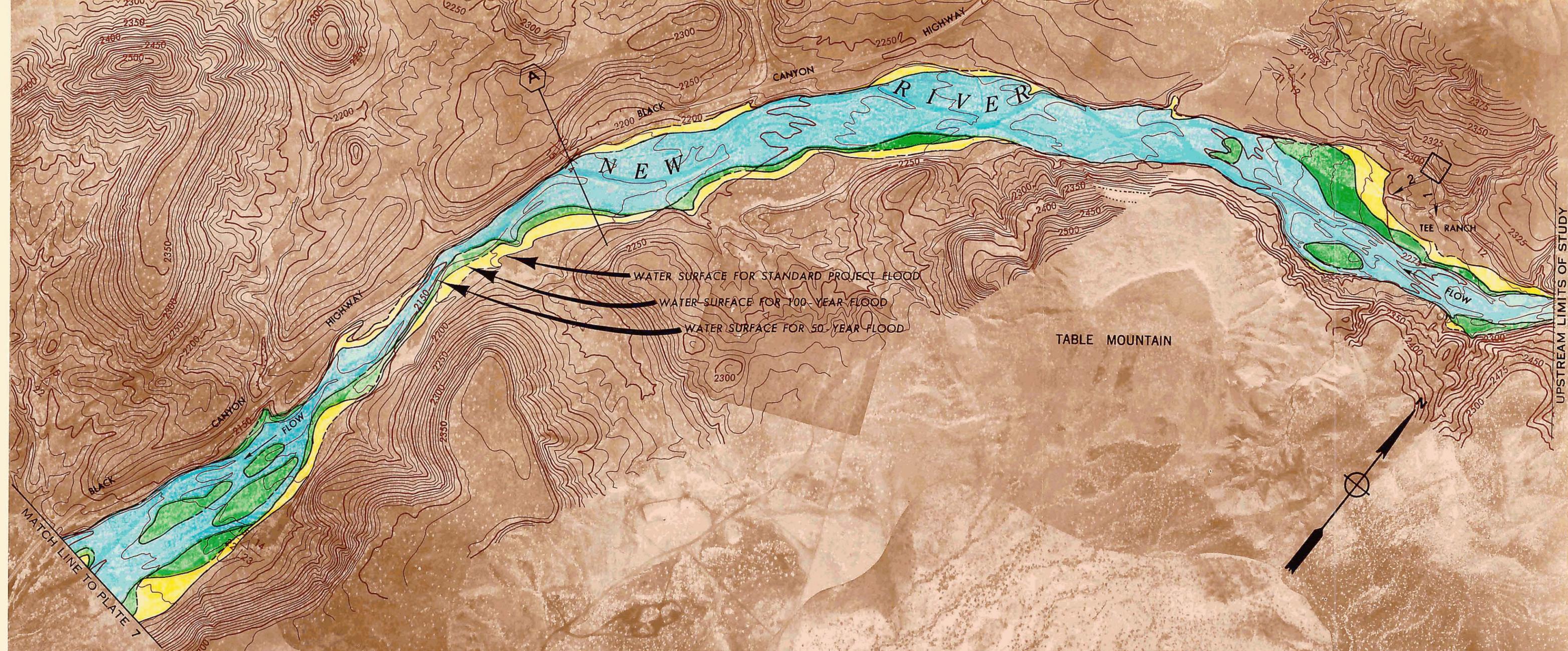
SHEET 2 OF 2

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA
 INDEX OF FLOOD AREAS
 CONCENTRATION POINTS, FREQUENCIES
 NEW RIVER REPORT



U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967

FILE NO. 203/217 PLATE 5



WATER SURFACE FOR STANDARD PROJECT FLOOD
 WATER SURFACE FOR 100-YEAR FLOOD
 WATER SURFACE FOR 50-YEAR FLOOD

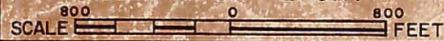
MATCH LINE TO PLATE 7

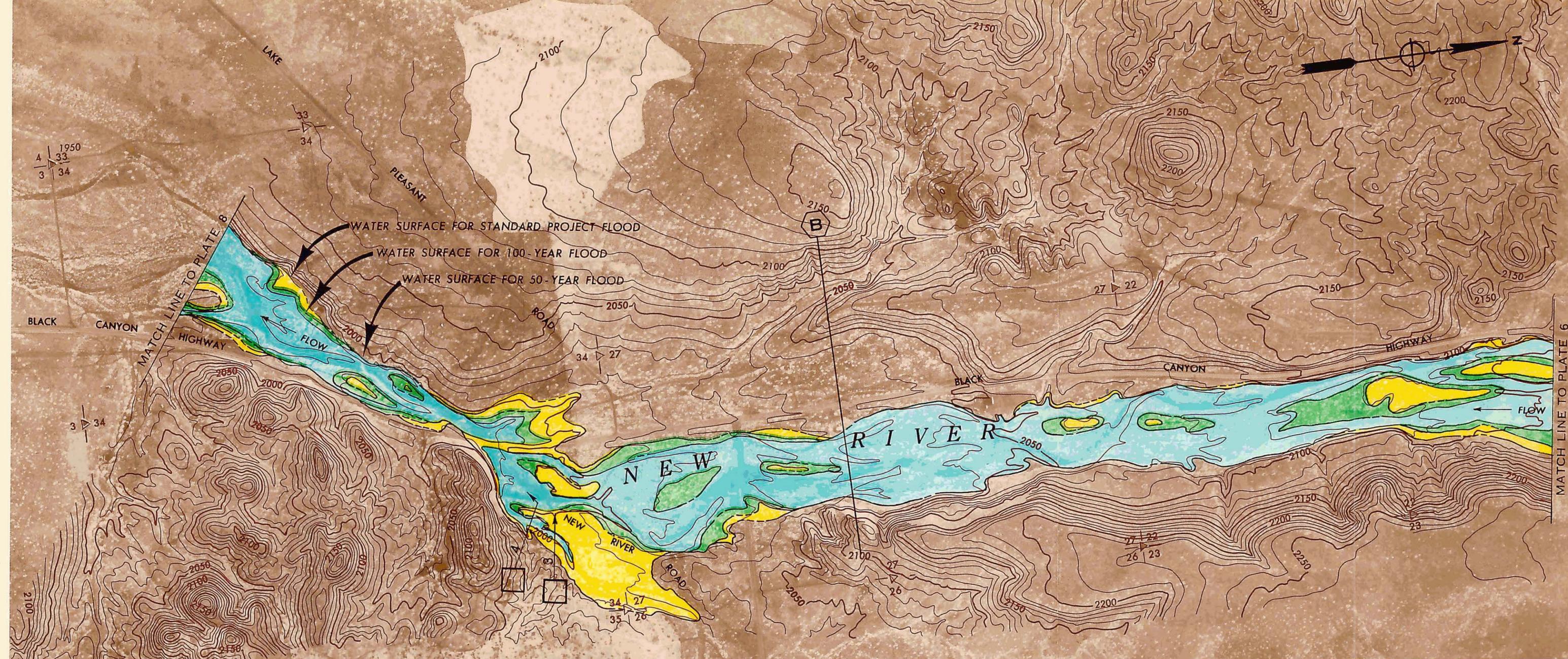
UPSTREAM LIMITS OF STUDY

GENERAL NOTES AND LEGEND:

1. FLOOD LIMITS SHOWN DO NOT INCLUDE AREAS ADJACENT TO FLOODWAY WHICH MIGHT BE FLOODED BY TRIBUTARY FLOWS.
2. LOCATION OF CROSS SECTIONS INDICATED BY 
3. APPROXIMATE LOCATION AND DIRECTION IN WHICH CAMERA IS POINTED AND PHOTOGRAPH NO. IS INDICATED BY 
4. GROUND CONTROL AERIAL PHOTOGRAPHY AND TOPOGRAPHY FURNISHED BY THE FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ARIZ. EXCEPT FOR GROUND CONTROL AND TOPOGRAPHY ALONG BLACK CANYON HIGHWAY, (PLATES 6, 7, 8) WHICH WAS PREPARED BY THE ARIZONA HIGHWAY DEPARTMENT.

NOTE: SEE PLATE 16 FOR CROSS SECTION.
 SEE TEXT FOR PHOTOGRAPHS.

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA
**FLOOD AREA
 REACH I
 NEW RIVER REPORT**
 SCALE  FEET
 U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967
 FILE NO. 203/218 PLATE 6



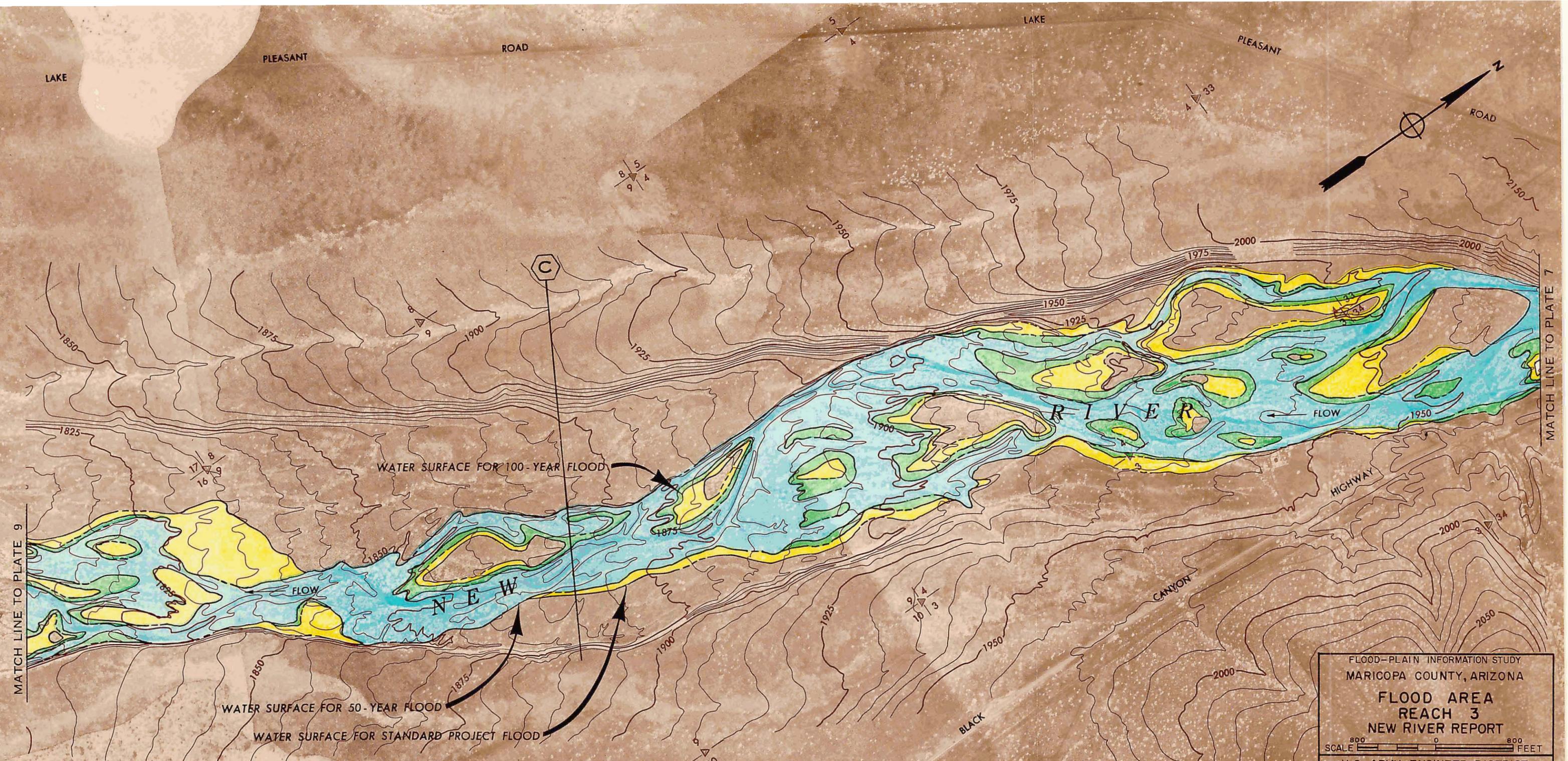
NOTE: SEE PLATE 6 FOR GENERAL NOTES AND LEGEND.
 SEE PLATE 16 FOR CROSS SECTION.
 SEE TEXT FOR PHOTOGRAPHS.

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA

**FLOOD AREA
 REACH 2
 NEW RIVER REPORT**

SCALE FEET

U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967



WATER SURFACE FOR 100-YEAR FLOOD

WATER SURFACE FOR 50-YEAR FLOOD

WATER SURFACE FOR STANDARD PROJECT FLOOD

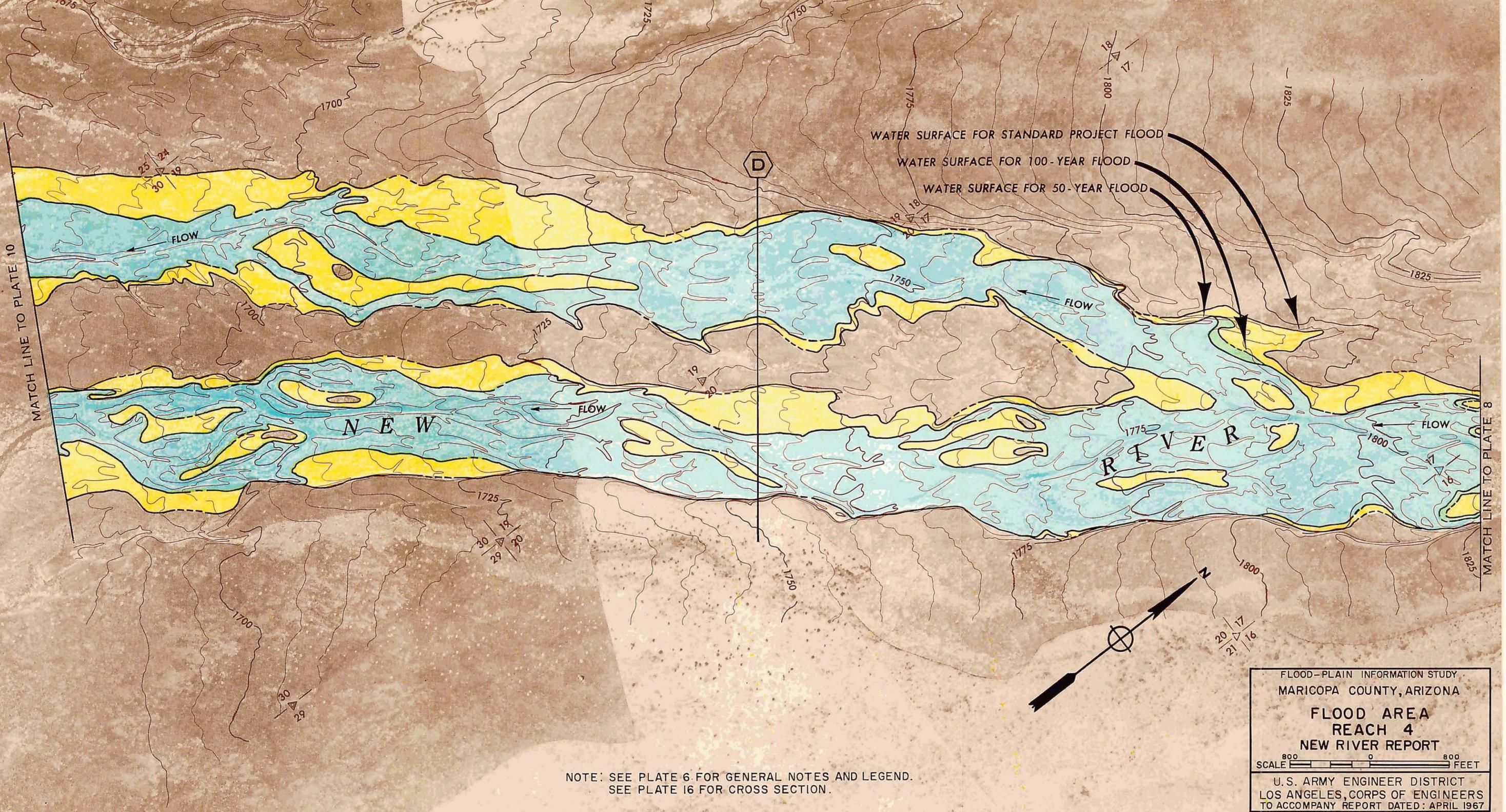
NOTE: SEE PLATE 6 FOR GENERAL NOTES AND LEGEND.
SEE PLATE 16 FOR CROSS SECTION.

FLOOD-PLAIN INFORMATION STUDY
MARICOPA COUNTY, ARIZONA

**FLOOD AREA
REACH 3
NEW RIVER REPORT**

SCALE 800 FEET

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES, CORPS OF ENGINEERS
TO ACCOMPANY REPORT DATED: APRIL 1967



WATER SURFACE FOR STANDARD PROJECT FLOOD
 WATER SURFACE FOR 100-YEAR FLOOD
 WATER SURFACE FOR 50-YEAR FLOOD

MATCH LINE TO PLATE 10

MATCH LINE TO PLATE 8

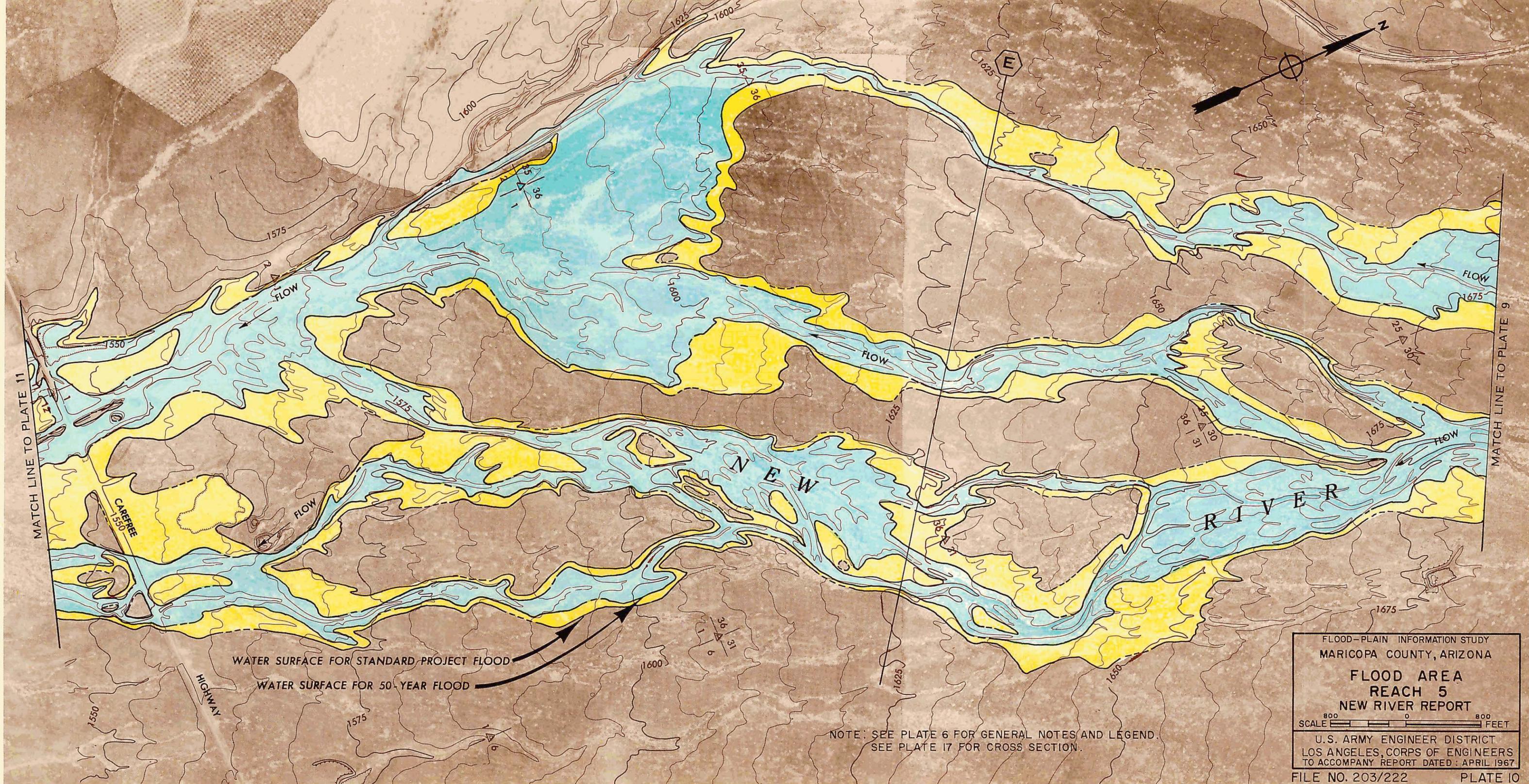
NOTE: SEE PLATE 6 FOR GENERAL NOTES AND LEGEND.
 SEE PLATE 16 FOR CROSS SECTION.

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA

**FLOOD AREA
 REACH 4
 NEW RIVER REPORT**

SCALE 800 0 800 FEET

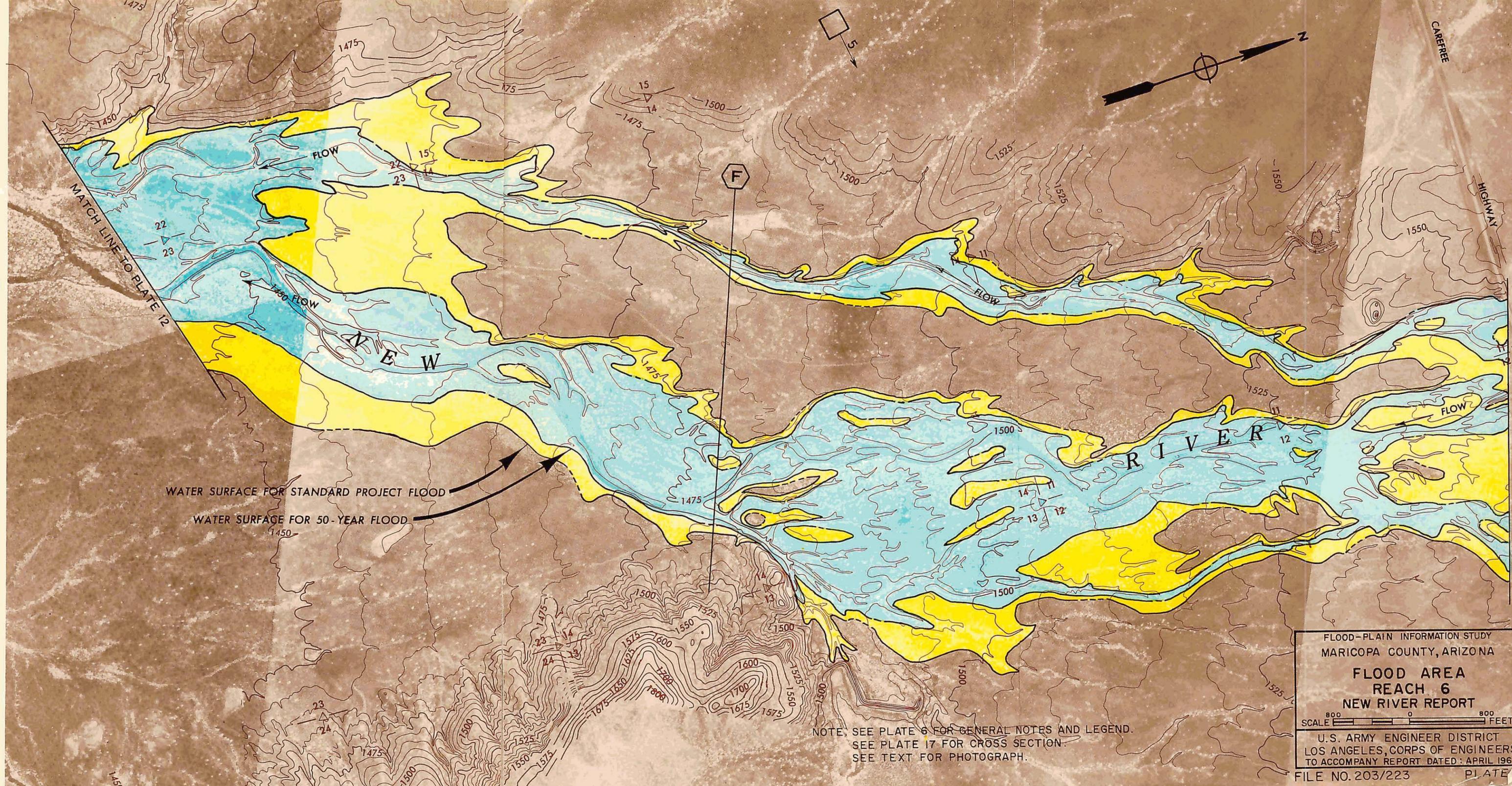
U. S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967



WATER SURFACE FOR STANDARD PROJECT FLOOD
 WATER SURFACE FOR 50-YEAR FLOOD

NOTE: SEE PLATE 6 FOR GENERAL NOTES AND LEGEND.
 SEE PLATE 17 FOR CROSS SECTION.

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA
FLOOD AREA
REACH 5
NEW RIVER REPORT
 SCALE 800 0 800 FEET
 U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967
 FILE NO. 203/222 PLATE 10



WATER SURFACE FOR STANDARD PROJECT FLOOD

WATER SURFACE FOR 50-YEAR FLOOD

NOTE: SEE PLATE 6 FOR GENERAL NOTES AND LEGEND.
 SEE PLATE 17 FOR CROSS SECTION.
 SEE TEXT FOR PHOTOGRAPH.

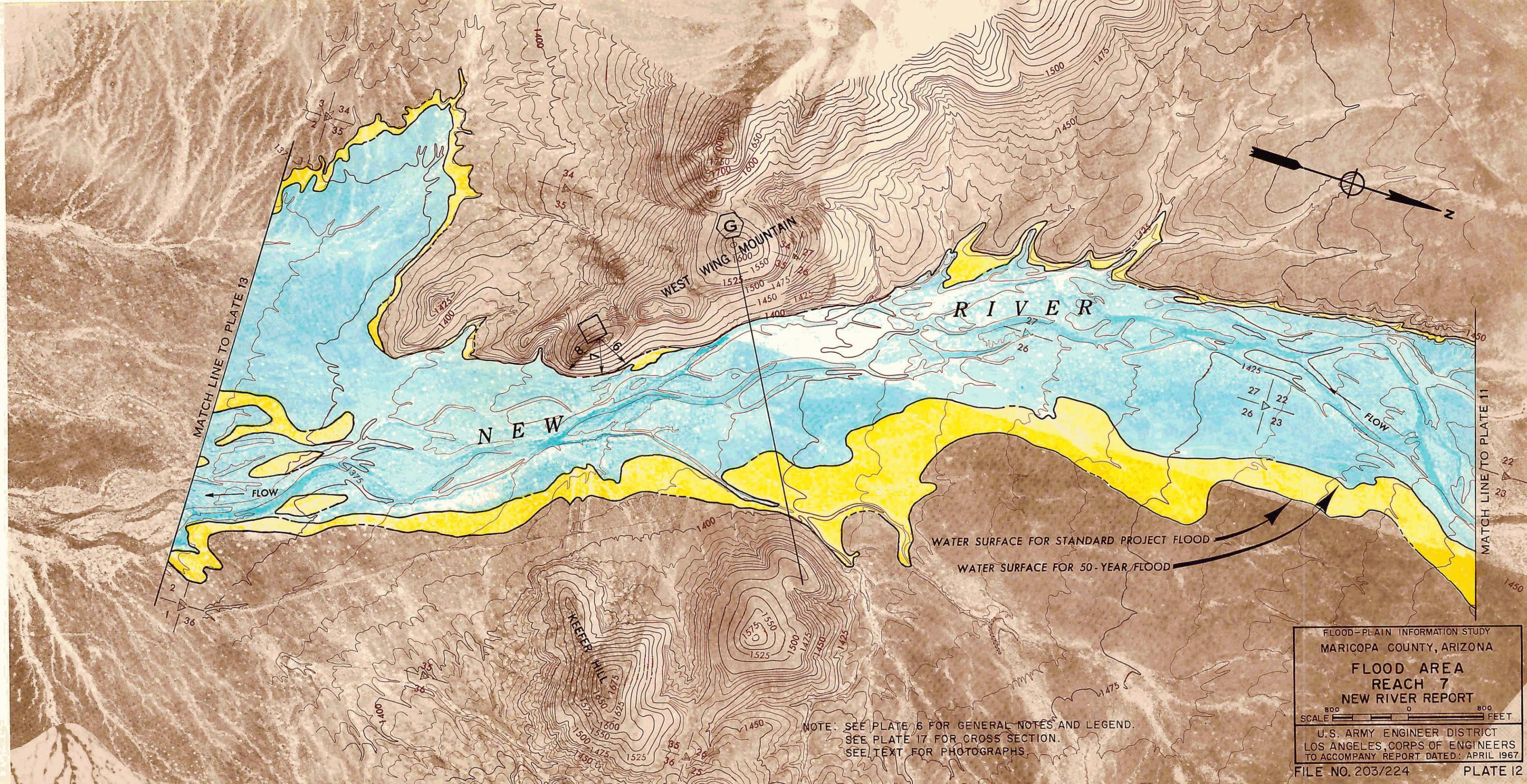
FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA

**FLOOD AREA
 REACH 6
 NEW RIVER REPORT**

SCALE 800 0 800 FEET

U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967

FILE NO. 203/223 PLATE



MATCH LINE TO PLATE 13

MATCH LINE TO PLATE 11

NEW

WEST WING MOUNTAIN

RIVER

FLOW

FLOW

WATER SURFACE FOR STANDARD PROJECT FLOOD

WATER SURFACE FOR 50-YEAR FLOOD

KEELER HILL

NOTE: SEE PLATE 6 FOR GENERAL NOTES AND LEGEND.
SEE PLATE 17 FOR CROSS SECTION.
SEE TEXT FOR PHOTOGRAPHS.

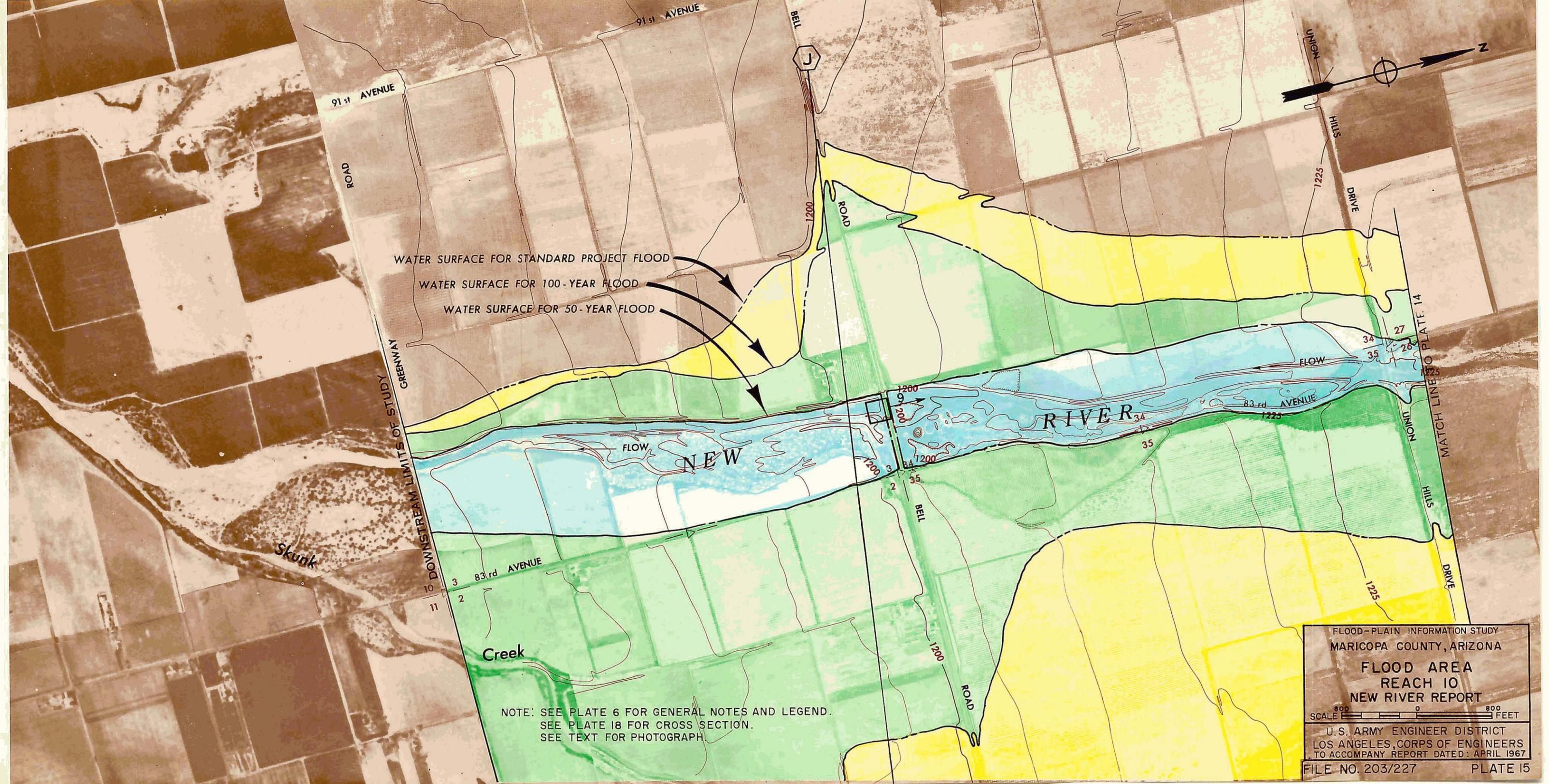
FLOOD-PLAIN INFORMATION STUDY
MARICOPA COUNTY, ARIZONA

**FLOOD AREA
REACH 7
NEW RIVER REPORT**

SCALE 0 800 FEET

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES, CORPS OF ENGINEERS
TO ACCOMPANY REPORT DATED: APRIL 1967

FILE NO. 203/224 PLATE 12



WATER SURFACE FOR STANDARD PROJECT FLOOD
 WATER SURFACE FOR 100-YEAR FLOOD
 WATER SURFACE FOR 50-YEAR FLOOD

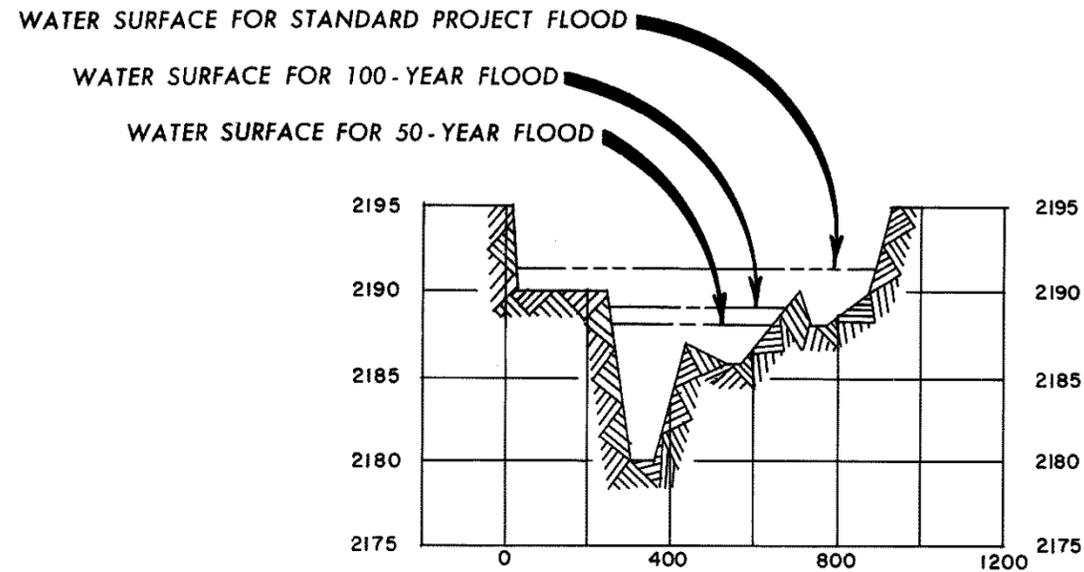
NOTE: SEE PLATE 6 FOR GENERAL NOTES AND LEGEND.
 SEE PLATE 18 FOR CROSS SECTION.
 SEE TEXT FOR PHOTOGRAPH.

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA
**FLOOD AREA
 REACH 10
 NEW RIVER REPORT**

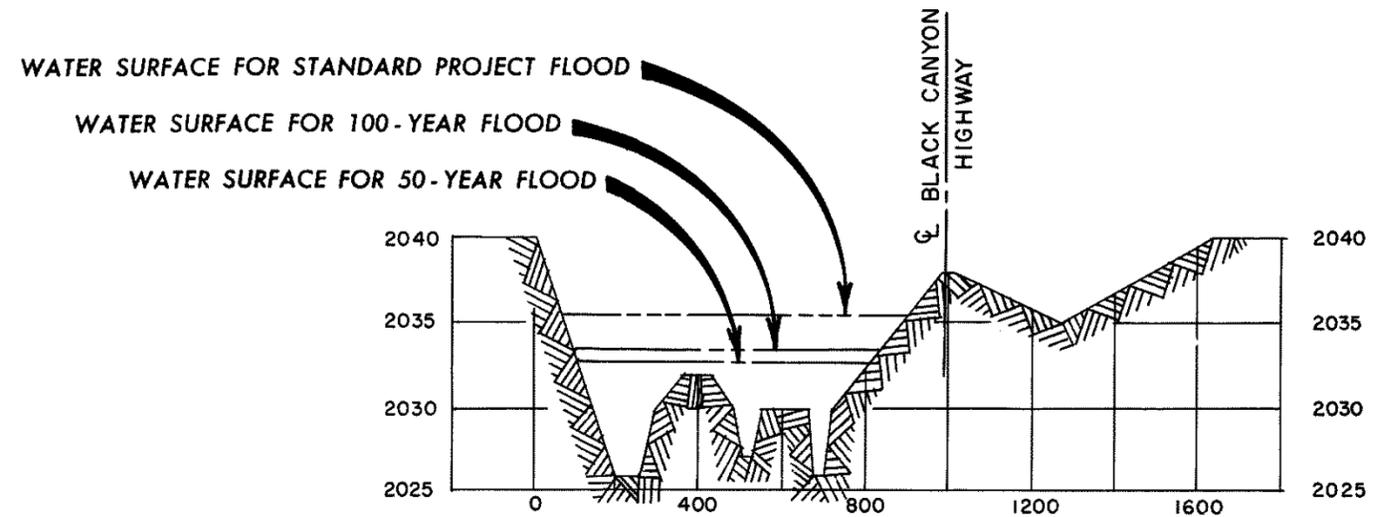
SCALE 0 800 FEET

U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967
 FILE NO. 203/227 PLATE 15

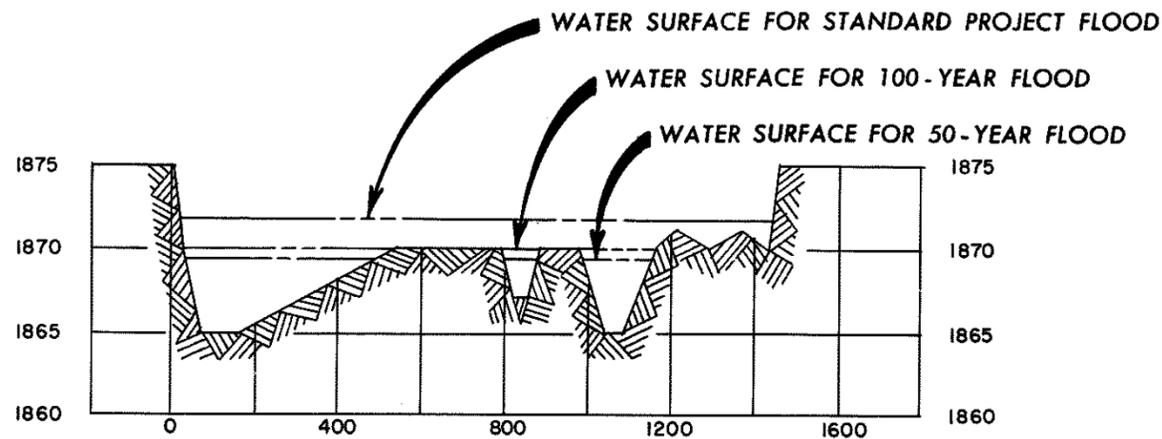
ELEVATION IN FEET ABOVE MEAN SEA LEVEL



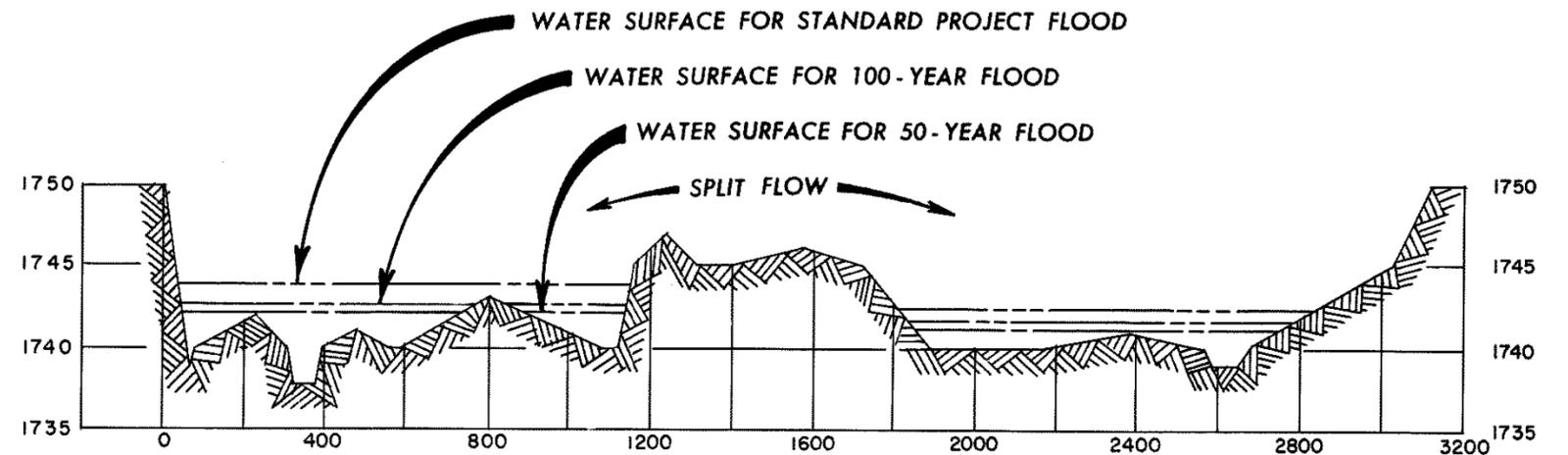
(A) SEE PLATE 6



(B) SEE PLATE 7



(C) SEE PLATE 8



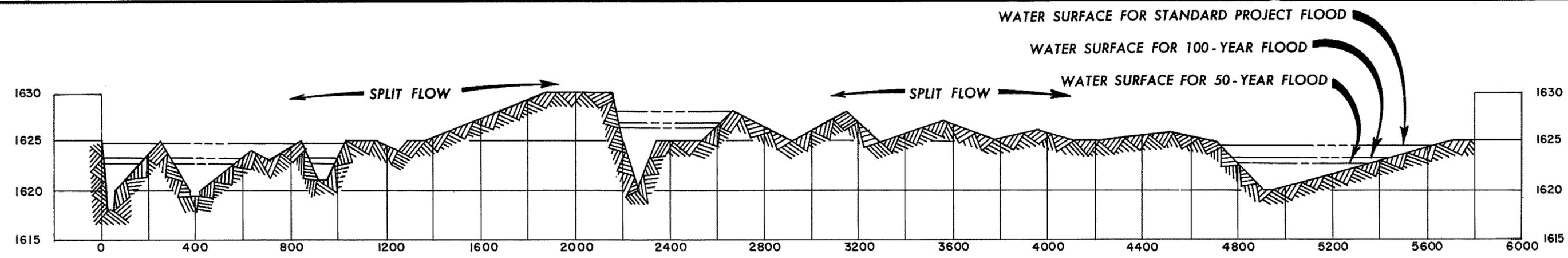
(D) SEE PLATE 9

$$\begin{array}{r} 2036 \\ 1872 \\ \hline 164 \\ 82 \end{array}$$

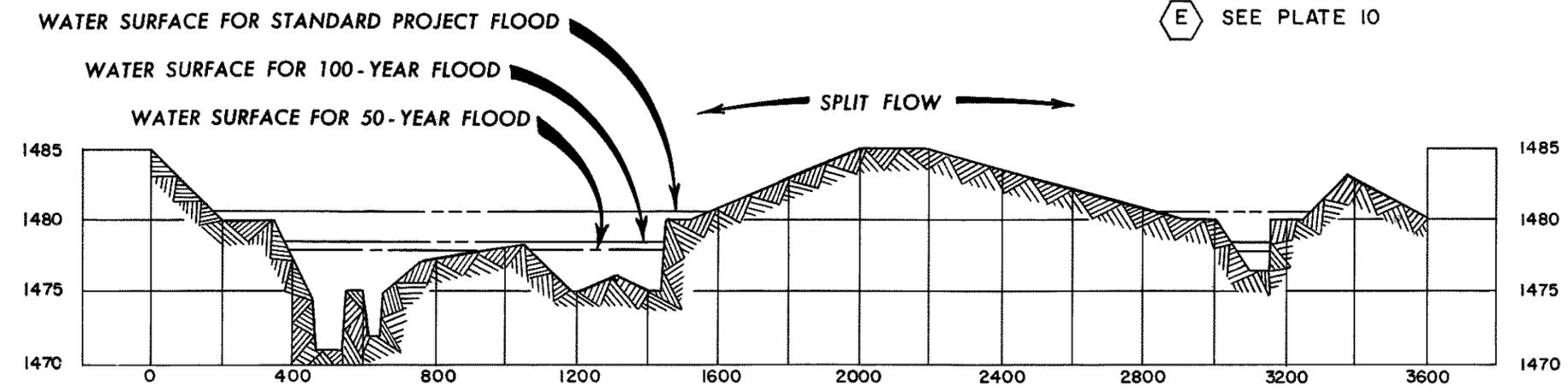
$$\begin{array}{r} 82 \\ 1872 \\ \hline 1954 \end{array}$$

FLOOD-PLAIN INFORMATION STUDY
 MARICOPA COUNTY, ARIZONA
CROSS SECTIONS
 REACHES 1 TO 4, INCLUSIVE
 NEW RIVER REPORT
 DATUM IS MEAN SEA LEVEL SCALE: AS SHOWN
 U.S. ARMY ENGINEER DISTRICT
 LOS ANGELES, CORPS OF ENGINEERS
 TO ACCOMPANY REPORT DATED: APRIL 1967

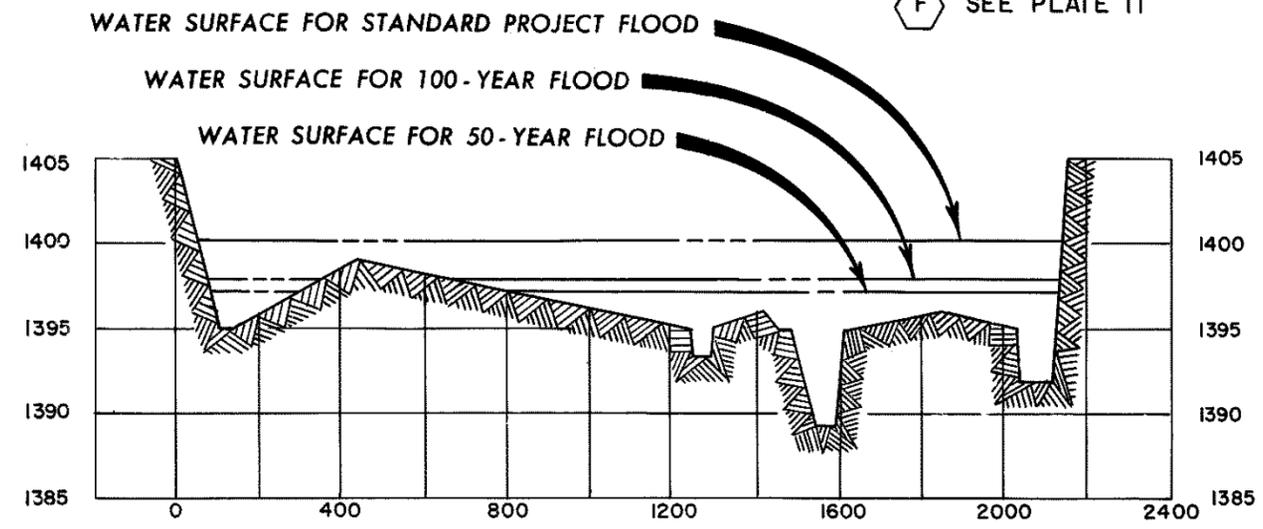
ELEVATION IN FEET ABOVE MEAN SEA LEVEL



E SEE PLATE 10



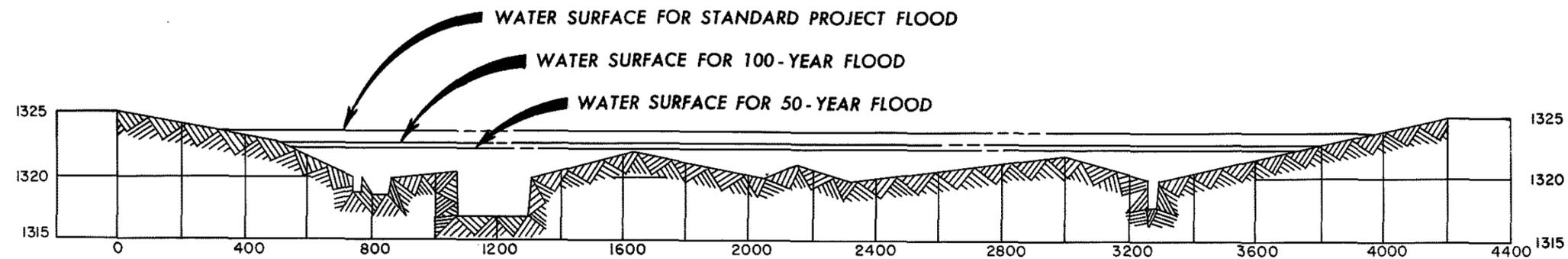
F SEE PLATE 11



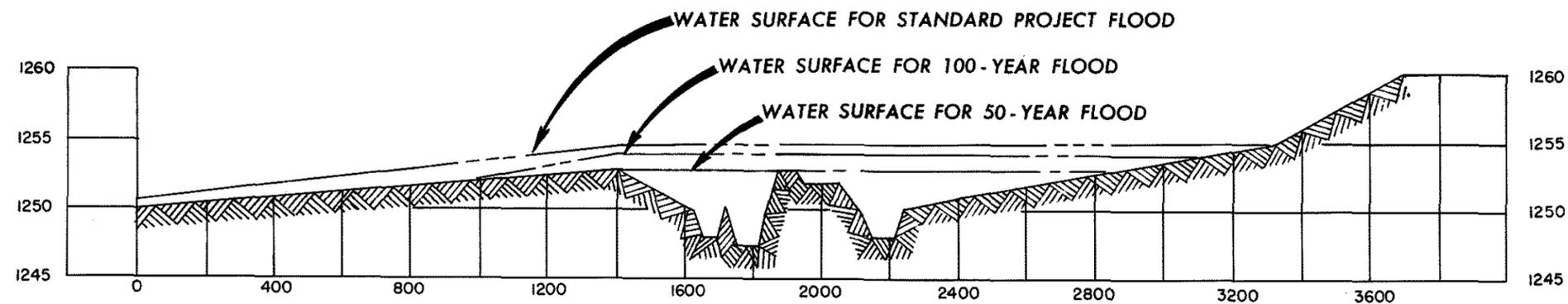
G SEE PLATE 12

FLOOD-PLAIN INFORMATION STUDY
MARICOPA COUNTY, ARIZONA
CROSS SECTIONS
REACHES 5 TO 7, INCLUSIVE
NEW RIVER REPORT
DATUM IS MEAN SEA LEVEL SCALE: AS SHOWN
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES, CORPS OF ENGINEERS
TO ACCOMPANY REPORT DATED: APRIL 1967

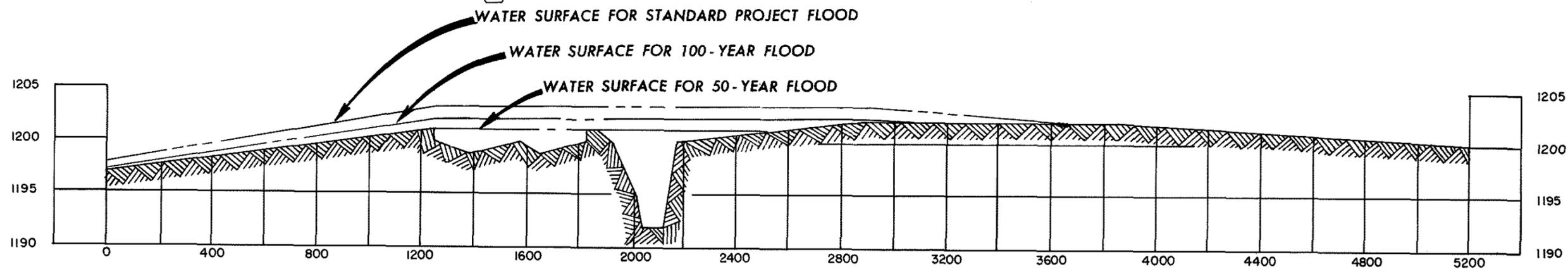
ELEVATION IN FEET ABOVE MEAN SEA LEVEL



H SEE PLATE 13



I SEE PLATE 14



J SEE PLATE 15

FLOOD-PLAIN INFORMATION STUDY
MARICOPA COUNTY, ARIZONA
CROSS SECTIONS
REACHES 8 TO 10, INCLUSIVE
NEW RIVER REPORT
DATUM IS MEAN SEA LEVEL SCALE: AS SHOWN
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES, CORPS OF ENGINEERS
TO ACCOMPANY REPORT DATED: APRIL 1967
FILE NO. 203/230 PLATE 18

APPENDIX 1 - AUTHORIZATION
FLOOD-PLAIN-INFORMATION STUDY
FOR
MARICOPA COUNTY, ARIZONA

VOLUME V
NEW RIVER REPORT

1. Scope.--This appendix presents supplemental material on (a) the congressional authorization providing authority for the U.S. Army Corps of Engineers to conduct flood-plain-information studies and (b) the Maricopa County resolutions requesting the Corps to make such studies in Maricopa County and providing assurances that information in the completed report will be disseminated and publicized.

2. Congressional authorization.--This report is prepared pursuant to act of Congress, Public Law 86-645, Eighty-sixth Congress, approved 14 July 1960, which reads in part as follows:

SEC. 206. (a) That, in recognition of the increasing use and development of the flood plains of the rivers of the United States and of the need for information on flood hazards to serve as a guide to such development, and as a basis for avoiding future flood hazards by regulation of use by States and municipalities, the Secretary of the Army, through the Chief of Engineers, Department of the Army, is hereby authorized to compile and disseminate information on floods and flood damages, including identification of areas subject to inundation by floods of various magnitudes and frequencies, and general criteria for guidance in the use of flood plain areas; and to provide engineering advice to local interests for their use in planning to ameliorate the flood hazard: Provided, That the necessary surveys and studies will be made and such information and advice will be provided for specific localities only upon the request of a State or a responsible local governmental agency and upon approval by the Chief of Engineers.

(b) The Secretary of the Army is hereby authorized to allot, from any appropriations hereafter made for flood control, sums not to exceed \$1,000,000 in any one fiscal year for the compilation and dissemination of such information.

* * * * *

3. Maricopa County resolutions.--The Board of Supervisors of Maricopa County and the Board of Directors of the Flood Control District of Maricopa County adopted resolutions on 26 September 1960 and 11 December 1961.

4. In the resolution of 26 September 1960, Maricopa County requested that the U.S. Army Corps of Engineers make a flood-plain-information study for Maricopa County. The resolution reads as follows:

R E S O L U T I O N

WHEREAS, the Flood Control District of Maricopa County is charged with responsibility for preparation of a comprehensive program of flood control within the county, and

WHEREAS, information on floods and flood damages, including identification of areas subject to inundation by floods of various frequencies, criteria for guidance in the use of flood plain areas and engineering advice for use in planning to ameliorate flood hazard are essential to the preparation of a comprehensive program of flood control, and

WHEREAS, the United States Army Corps of Engineers is authorized under Section 206 of the Flood Control Act of 1960 to furnish such information and advice

NOW, THEREFORE, BE IT RESOLVED by the Board of Supervisors of Maricopa County and the Board of Directors of the Flood Control District of Maricopa County that the Corps of Engineers is requested to provide the assistance which it is authorized to furnish by the above cited Act, and

BE IT FURTHERMORE RESOLVED that the Flood Control District of Maricopa County will assist the Corps of Engineers in obtaining basic hydrologic and topographic data required for its studies and

BE IT FURTHERMORE RESOLVED that the County of Maricopa and the Flood Control District of Maricopa County intend to use the information provided for the purpose of developing flood plain zoning plans and a comprehensive program of flood control and

BE IT FURTHERMORE RESOLVED that information and assistance will be furnished municipalities within the county for their use in implementing such flood plain zoning plans as may be recommended within their boundaries.

BE IT FURTHERMORE RESOLVED, that this resolution be entered on the minutes of the Board of Supervisors of Maricopa County and the Board of Directors of the Flood Control District of Maricopa County.

Passed and approved this 26 day of Sept., 1960.

/s/ Ruth A. O'Neil
Chairman of the Board
of Supervisors of
Maricopa County

/s/ Ruth A. O'Neil
Chairman of the Board
of Directors of the
Flood Control District
of Maricopa County

ATTEST:

/s/ Rhea Averill
Clerk of the Board

5. In the resolution of 11 December 1961, Maricopa County added more specific assurances that the flood-plain information report will be made available to all interested organizations and individuals and that the availability of the report will be adequately publicized. The resolution reads as follows:

R E S O L U T I O N

WHEREAS, the Flood Control District of Maricopa County is charged with responsibility for preparation of a comprehensive program of flood control within the county, and

WHEREAS, information on floods and flood damages, including identification of areas subject to inundation by floods of various frequencies, criteria for guidance in the use of flood plain areas and engineering advice for use in planning to ameliorate flood hazard are essential to the preparation of a comprehensive program of flood control, and

WHEREAS, the United States Army Corps of Engineers is authorized under Section 206 of the Flood Control Act of 1960 to furnish such information and advice, and

WHEREAS, the United States Army Corps of Engineers has authorized a flood plain information study of Maricopa County, Arizona, in accordance with the application of the Maricopa County Flood Control District dated July 26, 1960; project allocations covering Indian Bend Wash, Cave Creek, Skunk Creek, New River, Agua Fria River and Wickenburg area, and

WHEREAS, the United States Army Corps of Engineers require certain assurances from the Maricopa County Flood Control District before work can be initiated

NOW, THEREFORE, BE IT RESOLVED by the Board of Supervisors of Maricopa County and the Board of Directors of the Flood Control District of Maricopa County that the applicant will publicize the information report in the community and area concerned, and make copies available for use or inspection by responsible interested parties and individuals, and

BE IT FURTHERMORE RESOLVED that zoning and other regulatory, development and planning agencies, and public information media, will be provided with the flood plain information for their guidance and appropriate action, and

BE IT FURTHERMORE RESOLVED that survey markers, monuments, etc., established in any Federal surveys undertaken for Sec. 206 studies, or in regular surveys in the area concerned will be preserved and safeguarded, and

BE IT FURTHERMORE RESOLVED, that this resolution be entered on the minutes of the Board of Supervisors of Maricopa County and the Board of Directors of the Flood Control District of Maricopa County, and that the Chief Engineer and General Manager of said Flood Control District be and he is hereby directed to forward a certified copy of this resolution to the District Engineer, U.S. Army Engineer District, Los Angeles, Corps of Engineers, P.O. Box 17277 Foy Station, Los Angeles 17, California.

PASSED AND APPROVED this 11 day of December, 1961.

/s/ B. W. Burns
Chairman of the Board of
Supervisors of Maricopa
County

ATTEST:

/s/ Rhea Averill
Clerk of the Board

/s/ B. W. Burns
Chairman of the Board of
Directors of the Flood
Control District of
Maricopa County

APPROVED:

Board of Supervisors

by /s/ Charles W. Miller
Charles W. Miller
County Manager

APPENDIX 2 - GLOSSARY OF SELECTED TERMS

FLOOD-PLAIN-INFORMATION STUDY
FOR
MARICOPA COUNTY, ARIZONA

VOLUME V
NEW RIVER REPORT

The definitions in this appendix are provided for consistency of use in flood-plain-information studies and for clarification of terms for nontechnical readers. The definitions are based on definitions of terms in general technical usage.

BASIN - The region drained by a stream and its tributaries. A basin is usually separated from adjacent basins by ridges or mountain ranges.

CUBIC FEET PER SECOND (c.f.s.) - A measure of the magnitude of streamflow (i.e., the number of cubic feet of water passing a point each second).

DESIGNATED FLOODWAY - The channel of a stream and that part of the adjoining flood plain designated by a regulatory agency to reasonably provide for passage of a selected flood. (See also definition of "floodway.")

FLOOD - As used in this report, any temporary rise in streamflow or water-surface level that results in significant adverse effects in the area under study. Adverse effects of floods may include damages from overflow of land areas, effects of temporary backwater on sewers and local drainage channels, bank erosion or channel shifts, unsanitary conditions or other unfavorable conditions resulting from deposition of materials in stream channels during flood recessions, rise of ground water coincident with increased streamflow, and interruption of traffic at bridge crossings.

FLOOD FREQUENCY - The frequency of occurrence of a flood of some stated magnitude in terms of years. Based on statistical analysis of past flood records, a determination may be made of the probable number of times that a flood of some stated magnitude will be equaled or exceeded during some future period of time, say 100 years. A 25-year flood with a magnitude of 8,000 cubic feet per second is a flood that during a 100-year period probably will be equaled or exceeded four times. The term "25-year flood" does not mean that such a flood can occur only once in 25 years and that once it occurs the flood will not happen again for another 25 years. Because floods occur randomly, they may be grouped or spread out unevenly with respect to time.

FLOOD PEAK - The maximum instantaneous discharge of a flood at a given location. The discharge generally is expressed in cubic feet per second.

FLOOD PLAIN - The relatively flat area or lowlands adjoining the channel of a stream or watercourse and subject to overflow by floodwaters.

FLOOD-PLAIN REGULATIONS - A general term applied to the full range of codes, ordinances, and other regulations pertaining to land use and to construction within the channel and flood-plain areas. The term encompasses zoning ordinances, subdivision regulations, building and housing codes, floodway encroachment laws, open-area regulations, and similar controls affecting the use and development of the flood-plain areas.

FLOOD PROFILE - A graph showing the relationship of water-surface elevation to location for the centerline of a stream of water flowing in an open channel. A flood profile for an improved channel has a fairly constant slope, whereas the flood profile for a natural widening, narrowing, and turning flood plain rises and falls from location to location. Such a profile represents the water-surface elevation at the center of the main wash area, not necessarily the elevation at the edge of the flood plain.

FLOODPROOFING - Measures taken to render structures, property, and lands less vulnerable to flood losses.

FLOODWAY - The channel of a stream and that part of the flood plain inundated by a flood and, therefore, used to carry flood-flow. (See also definition of "designated floodway.")

FLOODWAY-ENCROACHMENT LINES - Those lateral lines along streams that mark the limits of the designated floodway. (See also definition of "designated floodway.") No structure or fill may be placed in the area between these lines without reducing the flood-carrying capacity of that floodway. The locations of the lines should be such that the floodway between the lines will accommodate a designated floodflow except for minor overflow into the restrictive zone.

GAGING STATION - A facility on a stream or reservoir where systematic observations of stage (water-surface level) or discharge are made.

PRECIPITATION STATION - A facility where systematic observations of depth of rainfall are made.

RESTRICTIVE ZONE - That part of the floodway within the overflow limits of a selected flood and outside the designated floodway. (See also definitions of "floodway" and "designated floodway.") The restrictive zone is established by a zoning ordinance for the purpose of reducing the flood hazard to life and property by regulating development within the zone. (See also definition of "zoning ordinance.")

STANDARD PROJECT FLOOD - A flood that would result from a storm with the most severe flood-producing rainfall pattern of any storm that is considered reasonably characteristic of the region in which the drainage area is located, giving consideration to the runoff characteristics of the drainage area and excluding extremely rare combinations of meteorologic and hydrologic conditions. Such a flood provides a reasonable upper limit to be considered in designing flood-control improvements.

ZONING ORDINANCE - An ordinance adopted by a local governing body, with authority from a State zoning enabling law, which under the police power divides an entire local governmental area into districts and - within each district - regulates the use of land; the height, bulk, type, and use of buildings or other structures; and the density of population.

APPENDIX 3 - BIBLIOGRAPHY

FLOOD-PLAIN-INFORMATION STUDY
FOR
MARICOPA COUNTY, ARIZONA

VOLUME V

NEW RIVER REPORT

The following is a sampling of published works, mostly recent, on flood-plain regulations and flood-plain-development problems.

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* Includes bibliographies and references useful for more extensive reading on the subject of flood-plain studies and related studies.

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* Includes bibliographies and references useful for more extensive reading on the subject of flood-plain studies and related studies.