Historic

# FLOOD PLAIN INFORMATION

# MUDDY RIVER

## VICINITY OF OVERTON

# CLARK COUNTY, NEVADA

PREPARED FOR
CLARK COUNTY
BY
CORPS OF ENGINEERS, U S ARMY
LOS ANGELES DISTRICT, CALIFORNIA
JUNE 1974

FLOOD PLAIN INFORMATION - MUDDY RIVER - VICINTIY OF OVERTON - CLARK COUNTY, NEVADA

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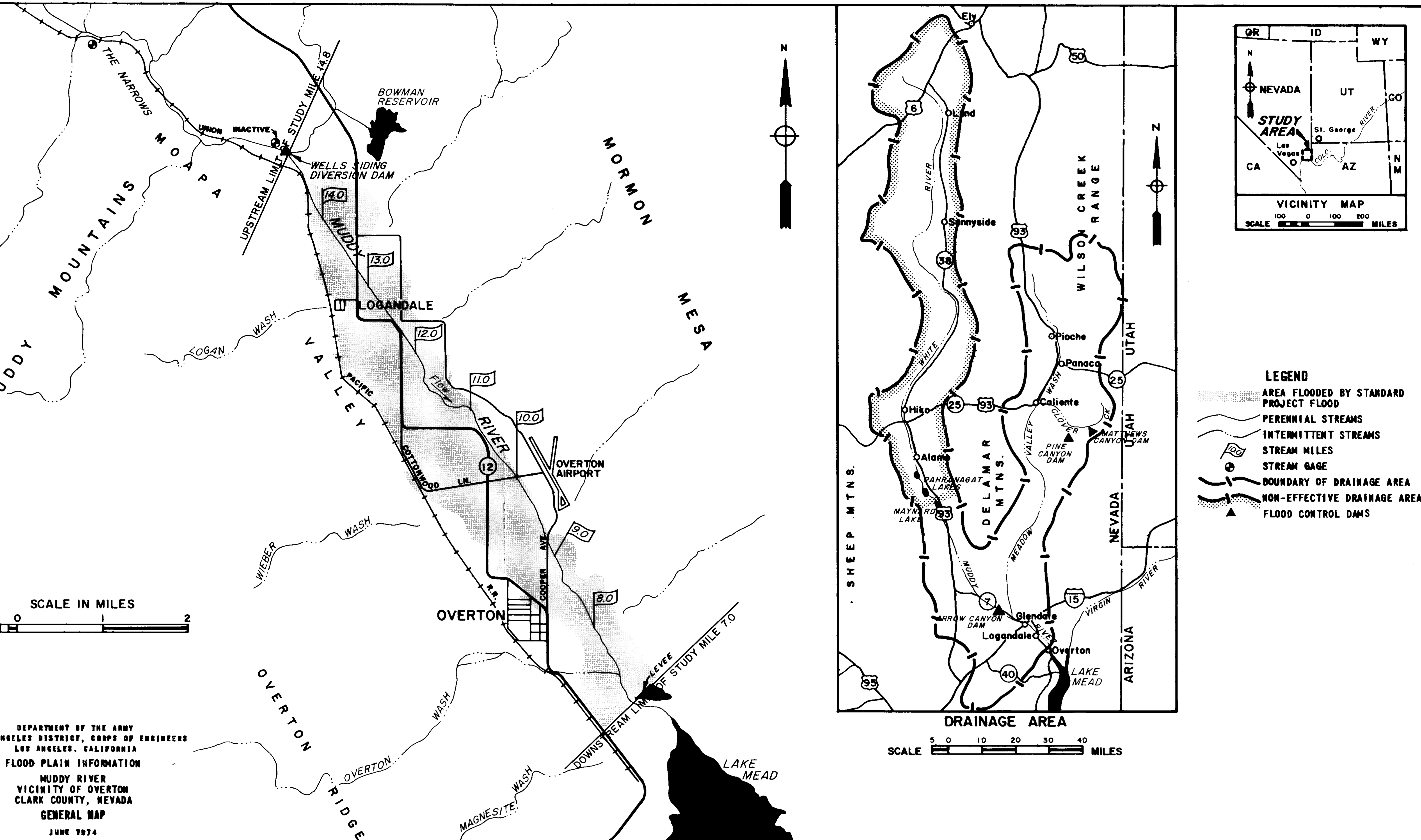
Cover Photograph: Inconvenience caused to local residents by flooding in 1960 on the Muddy River between Overton and Logandale, Nevada.




DEPARTMENT OF THE ARMY
...NGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER
VICINITY OF OVERTON
CLARK COUNTY, NEVADA

GENERAL MAP

JUNE 1974

## *PREFACE*

*The part of Clark County in the vicinity of Overton and Longandale covered by this report is subject to flooding from the Muddy River. The properties along these streams are primarily agricultural and have been severely damaged by floods in 1910, 1914, 1938, 1941, 1945, 1946, and 1960. Numerous other floods have caused slight to moderate damage in the study area. The open spaces in the flood plains which may come under pressure for future development are extensive.*

*This report has been prepared because a knowledge of flood potential and flood hazards is important in land use planning and for management decisions concerning flood plain utilization. It includes a history of flooding in and around the study area and identifies those areas that are subject to possible future floods. Special emphasis is given to these floods through maps, photographs, profiles, and cross sections. The report does not provide solutions to flood problems; however, it does furnish a suitable basis for the adoption of land use controls to guide flood plain development and thereby prevent intensification of the loss problems. It will also aid in the identification of other flood damage reduction techniques such as works to modify flooding or adjustments like flood proofing, which might be embodied in an overall flood plain management program. Other flood plain management program studies, –those of environmental attributes and the current and future land use of the flood plain as part of its surroundings – would also profit from this information. Flood plain management can help prevent future flood losses, since large floods have occurred in the past and studies indicate that even larger floods are possible.*

*At the request of the Department of Public Works of Clark County, Nevada and the endorsement of the Director of the Department of Conservation and Natural Resources of the State of Navada, this report was prepared by the Corps of Engineers, Los Angeles District, under the continuing authority provided in Section 206 of the 1960 Flood Control Act, as amended.*

*The assistance and cooperation of the Department of Public Works of Clark County, Nevada, Lois Perkins, Las Vegas Sun correspondent, and other individuals and agencies who directly or indirectly aided in the preparation of this report, are gratefully acknowledged.*

*Additional copies of this report can be obtained from the Department of Public Works of Clark County, Nevada. The Corps of Engineers, Los Angeles District, upon request, will provide technical assistance to planning agencies in the interpretation and use of the data presented as well as planning guidance and further assistance, including the development of additional technical information.*

## BACKGROUND INFORMATION

### Settlement

The Overton, Nevada area lies in the eastern section of Clark County in southern Nevada and is about 50 miles northeast of Las Vegas. Communities within the study area include Overton and Logandale. The population of the area is about 2,000.

The portion of Moapa Valley in the study area attracted Mormon Settlers in the late 1860's primarily because the area contained swamps and spring fed, year-round flow of water which could be used to irrigate crops. Indians are known to have lived in and farmed the area in the early 1800's. The early settlers were plagued by floods which caused crop damage and washed out irrigation systems. The construction of the Union Pacific Railroad through the valley in 1905 opened some local markets such as in Las Vegas and parts of Utah.

Agriculture remains the dominant factor in the areas economy today. About 25 families are employed in two silica sand operations south of Overton. The Nevada Power Company employes some residents of the area for their plant in the upper part of the valley. This area also provides services to tourists because of its proximity to Lake Mead National Recreation Area and the Valley of Fire State Park.

### The Streams and Their Valleys

The Muddy River and tributaries drain an area of about 4,400 square miles. The drainage area (see pl. 1) is bounded on the east by the Virgin River Basin, on the north by the Wilson Creek Range, on the west by the Sheep and Delamar Mountains, and on the south by the Muddy Mountains and Lake Mead.

The Muddy River rises in the west part of the basin south of Maynard Lake, Nevada, flows southeastward about 60 miles, and empties into Lake Mead near Overton, Nevada. The drainage area of the White River (see shaded area on inset, pls. 1 and 2) upstream from Maynard Lake does not contribute to runoff in the Muddy River Basin.

The stream gradients along the Muddy River range from about 60 feet per mile in the upper reaches of the study to about 30 feet per mile in the lower reaches downstream from Overton.

The basin climate is described in the report entitled "Interim Report on Survey, Flood Control, Meadow Valley Wash and the Lower Muddy River, Nevada" U.S. Army Corps of Engineers, 1948 as follows "The climate of the drainage areas of the lower Muddy River is typical of the southwest desert area and ranges from subtropical and arid in the valleys to temperate and semiarid at the higher elevations. In general, the summers are long and hot and the winters are short and mild. The humidity is low and the rate of evaporation is high. The length of the growing season is almost 12 months at the lower elevations and about 5 to 8 months in the mountains valleys. Recorded extremes of temperature range from about 120 degrees above zero at Logandale, in the lower Moapa Valley, to about 30 degrees below zero at Caliente, along Meadow Valley Wash." Drainage areas at several points along the Muddy River are shown in table 1.

## TABLE 1

## DRAINAGE AREAS

| Location | Drainage area* sq miles |
|---|---|
| White River Basin at Lower Pahranagat Lake | 2,580 |
| Muddy River | |
| At Lake Mead | 4,450 |
| Upstream from Overton Wash | 4,400 |
| Downstream from Overton Airport | 4,350 |
| Mile 12.0 | 4,300 |
| Downstream State Highway 12 crossing | 4,250 |
| At upstream limit of study | 4,200 |

*The White River Basin (see pl. 1) does not contribute to runoff downstream from the Pahranagat Lakes as these lakes have sufficient storage volume to retain the floods considered in this report. The listed figures for the Muddy River Basin are exclusive of the White River Basin.

### Developments on the Flood Plain

Agriculture is the primary land use within the flood plain with small town urbanization occuping about 1 percent of the flood plain. Neveda State Highway 12 passes through the flood plain for a distance of about 4 miles with a three span concrete bridge over the Muddy River about 1/2-mile north of Logandale. The Union Pacific Railroad is located on the western fringe of the flood plain.

Planned uses for the flood plain in the study area include farming and limited residential and commercial development.

About 3,000 acres (4.7 sq miles) within the study limits of the report will be covered by the intermediate regional flood. Of these, 30 acres (0.05 sq miles) are in built up areas.

## FLOOD SITUATION

### Sources of Data and Records

One stream-gaging station has been maintained at the Narrows along the Muddy River as shown on plate 1. The gage is presently located about 5 miles upstream from Logandale and has been in continuous operation since 1947. It was also in operation from 1913 to 1916 at points, about 15 miles downstream from its present location, which are presently inundated by Lake Mead. A presently inactive stream gage is located near the left end of the Wells Siding Diversion Dam just upstream from the study limits as shown on figure 1. Records for this gage are available for the periods of 1913 to 1916 and 1947 to 1954. Several other stream gages are located upstream from the study area. Upstream dams and agricultural diversions have a minor effect on downstream major floodflows.

To supplement stream-gage data for the Muddy River Basin, stream-gage data from other basins were used for the hydrologic analysis.

In addition to stream-gage records, information on past floods was obtained from newspapers, reports published by State and Federal agencies and statements of local interests.

The maps prepared for this report were based on maps developed by the U.S. Department of the Interior, Bureau of Reclamation, dated June 13, 1965. Structural data for the State Highway 12 bridge over the Muddy River 1/2-mile north of Logandale was furnished by the State of Nevada Department of Highways. Supplemental information was obtained in the field by Corps of Engineers personnel during the course of the study. Overflow areas, cross sections, and flood profiles were developed from this collective data.

**Flood Season and Flood Characteristcs**

The watershed climate ranges from arid to semiarid depending largely on elevation. The average annual precipitation ranges from about 5 inches in the lower elevation to about 20 inches in the mountains. Most of the precipitation occurs in the winter months; however, summer precipitation is normal and often results in flooding.

Precipitation in the watershed can occur in the form of rain or snow. The snow in the lower elevation rarely remains on the ground for longer than a few days. The snow accumulation in the mountians is normally less than 3 feet.

Year-to-year departures from the mean rainfall values are usually large, reflecting flood condition 1 year and drought the next.

Floodflow stages can rise from a nearly dry streambed to extreme flood peaks in a matter of hours. The floodflows are accompained by sediment deposition that is extremely damaging to crops, as well as to structures.

**Factors Affecting Flooding and Their Impact**

**Obstructions to floodflows**– Natural obstructions to floodflows include trees or dense vegetation growing along the stream banks or on the flood plain. Man-made obstructions include the bridges and culverts listed in table 5, and shown in figures 1 through 4, in addition to numerous small private bridges and low flow culverts. These small stream crossings would be destroyed during major floods and washed downstream, further contributing to flood debris. Other man-made obstructions consist of irrigation ditches and levees crossing the flood plain.

In general, obstructions restrict floodflows and result in overbank flows and unpredictable areas of flooding, destruction of or damage to bridges and culverts, and increased velocity of flow immediately downstream. During floods, obstructions in the channel and overbank impede floodflows, thus creating backwater and increased flood heights. Brush and trees may be washed away and carried downstream to collect on bridges and on other obstructions to flow. As floodflow increases, masses of debris may break loose and a wall of water and debris could surge downstream until another obstruction is encountered. Debris may collect against a bridge, creating a damming effect, until the load exceeds its structural capability and the bridge is destroyed. The limited capacity of obstructive bridges retards floodflows and results in flooding upstream, erosion around bridge approach embankments, and possible damage to the overlying roadbed.

**Flood damage reduction measures** – There are two Corps of Engineers flood control dams in the upper parts of the drainage area. These are Pine Canyon and Mathews Canyon dams near the town of Caliente. Because of their distance from the study area, their effect on major floodflows in the study area is small.

The U.S. Soil Conservation Service and the U.S. Forest Service, utilizing Civilian Conservation Corps labor, completed some improvements in the study area including enlargement of the main channel of the Muddy River for about 2 miles in the vicinity of Logandale and the Wells Siding diversion dam located at the upper limit of study. This dam diverts water via a feeder canal with a capacity of 1,000 cubic feet per second to Bowman Reservoir about 1 mile east of the dam. This reservoir, which has a capacity of 1,000 acre-feet, is operated for flood control and water conservation. The effect of the reservoir in reducing floods is small because of the small capacity of the feeder canal. However the reservoir has a small natural drainage area and reduces flood discharges on the Muddy River by about 1,000 cubic feer per second.

### Other Factors and Their Impacts

**Flood warning and forecasting** – The National Oceanic and Atmospheric Administration (NOAA) maintains year-round surveillance of weather conditions. Storm forecasts made by the National Weather Service are supplied to the National Weather Service district offices for distribution to Federal, State, and local agencies and to the public. The intensity and duration of storm activity can be estimated from radar and satellite reports, and, if conditions warrant, flood warnings can be issued. Local news media and law enforcement agencies disseminate these warnings to the public.

**Flood fighting and emergency evacuation plans** – There are no specific flood fighting or emergency evacuation plans for the Muddy River area. If the need arises, emergency procedures would be activated by the county, the State and upon request, by the Federal Government. State and local law enforcement agencies, local fire department, street and highway maintenance crews, and civil defense groups could assist in the rescue of stranded persons and perform other flood fighting activities.

**Material storage on the flood plain** – During a major flood on the Muddy River, unconfined floatable materials on the flood plain would be transported downstream. Floatable debris consists primarily of boxes, small empty tanks, wood, and agricultural cutting. The amount is considered small in relation to the natural debris.

## PAST FLOODS

### Summary of Historical Floods

The records indicate that damaging floods occurred in the Meadow Valley Wash and the Muddy River Basins in 1906, 1907, 1908, 1910, 1911, 1912, 1913, 1914, 1919, 1922, 1923, 1924, 1925, 1926, 1928, 1934, 1935, 1937, 1938, 1939, 1941, 1945, 1946, and 1960. The peak flow of the 1941 flood, the largest flood of record, was estimated at 12,000 cubic feet per second at Glendale. Figures 5 through 15 illustrate past floods.

## Flood Records

Records of the several stream-gaging stations at various points along the stream in the vicinity of the Muddy River at the Narrows are for short periods of time only. Estimates of significant floods on the Muddy River at the Narrows between 1906 and 1947 were made for the interim report entitled "Interim Report on Survey, Flood Control, Meadow Valley Wash and Lower Muddy River, Nevada," U.S. Army Corps of Engineers, 1948. Records of stream gages on the Muddy River near Glendale and near Overton indicate that only one significant flood (1961) has occurred since 1947. Estimates of discharges from 1906 to 1960 are given in table 2.

**TABLE 2**

**PEAK FLOWS**

**MUDDY RIVER**

| Date | at Glendale (cfs) | Source* |
|---|---|---|
| March 25, 1906 | 8,800 | 1 |
| February 23, 1907 | 9,000 | 2 |
| January 1, 1910 | 7,000 | 1, 3 |
| January 25, 1911 | 5,000 | 2 |
| 1912 | 3,500 | 2 |
| 1913 | 2,800 | 2 |
| February 22, 1914 | 9,100 | 4 |
| January 2, 1922 | 8,100 | 3 |
| 1923 | 4,300 | 2 |
| 1924 | 3,600 | 2 |
| September 18, 1925 | 11,100 | 3 |
| 1937 | 2,500 | 2 |
| March 3, 1938 | 10,000 | 1, 3 |
| August 11, 1941 | 12,000 | 5, 6 |
| October 28, 1946 | 8,400 | 2 |
| November 6, 1960 | 7,400 | 2 |

*See bottom of page 8 for source of data.

## Flood Descriptions

The following descriptions of past floods were obtained by research of newspaper accounts, historic documents, gage records, personal interviews, and numerous reports by Federal, State and county agencies.

**Floods of 1906 through 1946** – Table 3 is reproduced from the Corps of Engineers report entitled "Interim Report on Survey, Flood Control, Meadow Valley Wash and Lower Muddy River, Nevada, – Appendix 6" and describes the various floods, both in the Moapa Valley and other areas within the Muddy River watershed.

## TABLE 3

### History of Floods (1906-47), Meadow Valley Wash and Muddy River Basin, Nevada

| Year | Description | Source of data* |
|---|---|---|
| 1906 | Medium to large flood on Mar. 25 caused considerable damage to the Union Pacific Railroad. Peak discharge was estimated at 8,850 cubic feet per second near the Narrows on the Muddy River (river mile 18). | 1 |
| 1907 | Medium to large flood on Feb. 23 and Mar. 5 caused greater damage to Union Pacific Railroad than 1906 flood. | 2 |
| 1908 | Minor washout occurred on Union Pacific Railroad. | 2 |
| 1910 | Largest general flood known prior to 1910 occurred on January 1, and almost completely destroyed about 84 miles of railroad along Clover Creek and Meadow Valley Wash and severely damaged agricultural property in the lower Moapa Valley and in the Panaca Valley. Peak discharges were estimated at 11,000 cubic feet per second at Caliente on Meadow Valley Wash (stream mile 73), and at 7,000 cubic feet per second at the Wells Siding Dam site on the Muddy River (river mile 15). | 1, 3 |
| 1911 | Small floods occurred on Jan. 25 and Mar. 9, and damaged about 8 miles of railroad along Meadow Valley Wash and agricultural property in the lower Moapa Valley. | 2 |
| 1912 | Small flood damaged farm property and crops in the lower Moapa Valley. | 2 |
| 1913 | Minor flood damaged farm property and crops in the lower Moapa Valley. | 2 |
| 1914 | Flood of Feb. 22 was recorded as a destructive flood. Extensive damage to agricultural property occurred throughout the Meadow Valley Wash basin and the lower Moapa Valley. Peak discharge was estimated at 6,500 cubic feet per second near St. Thomas, now submerged by Lake Mead. | 4 |
| 1919 | Minor flash floods of the cloudburst type occurred on July 18 and 28, and damaged the railroad in the vicinity of Rox on Meadow Valley Wash (stream mile 18). | 2 |

TABLE 3 (Continued)

History of Floods (1906-47), Meadow Valley Wash and Muddy River Basin, Nevada

| Year | Description | Source of data* |
|---|---|---|
| 1922 | Medium flood on Jan. 2 damaged roads, railroads, and agricultural property along Clover Creek, Meadow Valley Wash, and the lower Muddy River. Peak discharge was estimated at 8,110 cubic feet per second at Wells Siding Dam site on the Muddy River (river mile 15). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 3 |
| 1923 | Small flood caused some damage in the lower Moapa Valley . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 2 |
| 1924 | Minor flood caused slight damage in the lower Moapa Valley . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 2 |
| 1925 | Medium to large flood on Sept. 18 caused damage throughout the Muddy River basin. Peak discharges were estimated at 1,500 cubic feet per second at Arrowhead Canyon Dam on the Muddy River and 10,200 cubic feet per second at spreading grounds on Meadow Valley Wash (stream mile 7). . . . . . . . . . . . . . . . . . | 3 |
| 1926 | Flood on July 27 caused damage on the upper Muddy River. No record of magnitude of flood or extent of damage is available. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 2 |
| 1928 | Largest known flood on the upper Muddy River occurred. . . . . . . . . | 2 |
| 1934 | Second largest known flood on the upper Muddy River occurred . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 2 |
| 1935 | Small flood of the cloudburst type occurred in August in the vicinity of Delmue on Spring Valley Creek and caused moderate damage. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . | 2 |
| 1937 | Small flood caused slight damage to roads, bridges, and farmland in the lower Moapa Valley. . . . . . . . . . . . . . . . . . . . . . . . . . . | 2 |
| 1938 | Largest general flood in the history of the Muddy River Basin occurred on Mar. 3. The flood severely damaged the railroad; inundated a large residential section of Caliente on Meadow Valley Wash (stream mile 73) and stores and homes in Logandale on the Muddy River (river mile 12); and severely damaged irrigation works, crops, roads, bridges, farmland, and dwellings in the lower Moapa Valley, in the Panaca Valley, and between Joseco and Rox, a distance of 77 miles. Peak discharges were | |

## TABLE 3 (Continued)

### History of Floods (1906-47), Meadow Valley Wash and Muddy River Basin, Nevada

| Year | Description | Source of data* |
|---|---|---|
| | estimated at 15,000 cubic feet per second at Caliente, 3,500 cubic feet per second a few miles below Panaca on Meadow Valley Wash (stream mile 88), and 10,000 cubic feet per second at Wells Siding Dam site on the Muddy River (river mile 15). . . . . . . . . . . . | 1, 3 |
| 1939 | Flash flood occurred in the upper Moapa Valley in September and caused most severe damage to the Moapa Indian Reservation. Peak discharge was estimated at 1,700 cubic feet per second at Arrowhead Dam on the Muddy River. . . . . . . . . . . . . . . . . . . . | 1 |
| 1941 | Flood, which originated in a small wash near Panaca, occurred on July 24. The flood damaged much farmland and destroyed part of the highway and railroad in the Panaca Valley, and washed out the Union Pacific Railroad main line near Farrier. Peak discharge was estimated at 2,000 cubic feet per second near Panaca on Meadow Valley Wash (stream mile 88). . . . . . . . . . . . . | 5 |
| 1941 | Intense, short-duration storm occurred on Aug. 11 in the lower Muddy River Basin and resulted in largest, estimated peak flow known on California Wash and the lower Muddy River. The flood severely damaged the town of Overton by floodwaters from Overton Creek and also damaged agricultural and railroad property. Peak discharges were estimated at 10,000 cubic feet per second in California Wash near mouth, and at 12,000 cubic feet per second in the Muddy River channel in the lower Moapa Valley.. . . . . . . . . . . | 6, 5 |
| 1945 | Small to medium flood occurred in July and caused considerable damage in the lower Muddy River Basin, especially to the town of Overton. The flood washed out part of the main line of the Union Pacific Railroad along lower Meadow Valley Wash, delaying trains for several hours. . . . . . . . . . . . . . . . . . . . . . . . . . . . | 2 |
| 1946 | Medium to large flood occurred on Oct. 28 and caused extensive damage to the Union Pacific Railroad, agricultural property, and highways in the Meadow Valley Wash and the lower Muddy River Basins. Peak discharge was estimated at 8,400 cubic feet per second in Meadow Valley Wash near mouth.. . . . . . . . . . . | 7 |

*Source of data:
1. Estimated by Corps of Engineers from known high-water marks.
2. Includes newspaper accounts and statements of local interests.
3. Estimated by Nevada State Engineer Office.
4. Estimated by U.S. Geological Survey.
5. Estimated by U.S. Soil Conservation Service.
6. Estimated by U.S. Office of Indian Affairs.
7. Estimated by U.S. Bureau of Reclamation.

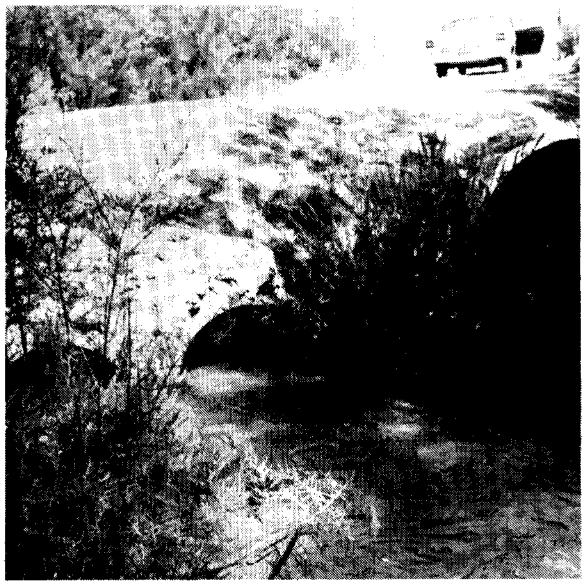


Figure 1 — Downstream side of Cooper Avenue culvert at river mile 9.16.

Figure 2 — Downstream side of unnamed road culvert at river mile 12.53.

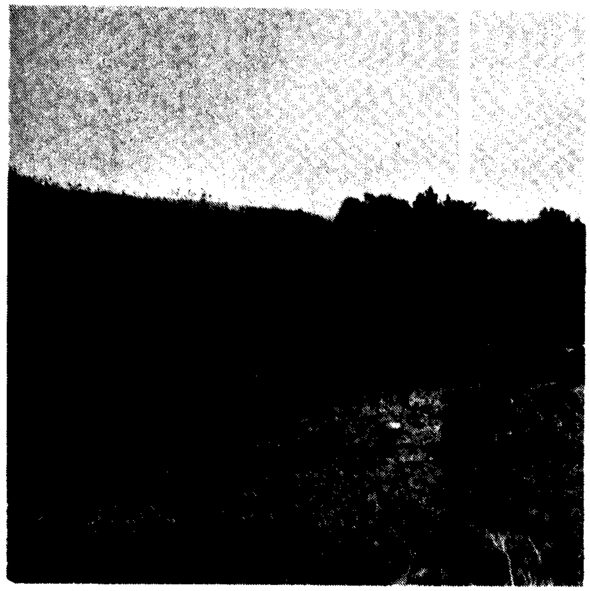


Figure 3 — Vegetation in channel looking upstream from unnamed road culvert at river mile 12.53.

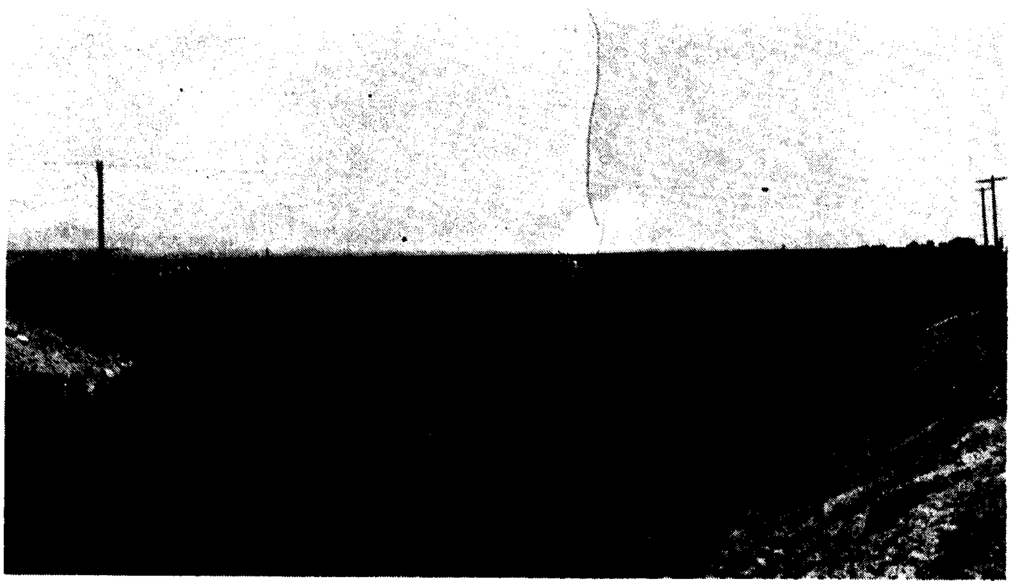


Figure 4 — Upstream side of Nevada State Highway 12 bridge north of Logandale at river mile 13.34

**Flood of 1960** – The flood of November 6, 1960 was reported to have been a major disaster in the Moapa Valley area. The Las Vegas Sun issue of November 7, 1960, reported that the Muddy River spilled its banks to a distance of 1/2-mile in both directions, unleashed a torrent of destruction, drove people from their homes, and put highways and farmlands under more than 2 feet of water in many places. The Las Vegas Sun correspondent, Lois Perkins, reported that the Muddy River around Overton was tumbling big trees end-over-end and was making its own channel in many places. The Las Vegas Review Journal indicated that local farmers saw their years work destroyed when the raging floods covered fields of growing vegetables. The Union Pacific Railroad reported that service on its Moapa Valley branch was at a standstill because of a large number of small washouts.

The U.S. Geological Survey gaged the floodflow at 7,400 cfs at Glendale.

Figures 5 through 15 indicate the damage resulting from the 1960 flood.

## FUTURE FLOODS

Floods of the same magnitude or larger than those that have occurred in the past could occur in the future. Larger floods have been experienced in the past on streams with geographic and physiographic characteristics similar to those found in the study area. Similar combinations of rainfall and runoff that caused these floods could occur in the study area. Therefore, to determine the flooding potential of the study area, it was necessary to consider storms and floods that have occurred in regions of like topography, watershed cover, and physical characteristics. Discussion of the future floods in this report is limited to those that have been designated as the intermediate regional flood and the standard project flood. The standard project flood represents a reasonable upper limit of expected flooding in the study area. The intermediate regional flood may reasonably be expected to occur more frequently, although it would not be as severe as the infrequent standard project flood.

### Intermediate Regional Flood

The intermediate regional flood is one that could occur on the average of once in 100 years, although it could occur in any year or more than once in 1 year. Usually the peak flow of such a flood is developed from statistical analyses of streamflow and precipitation records and the runoff characteristics of the stream basin. The historic estimates and stream-gage records were analyzed and, from these data, peak flows were developed for the intermediate regional flood at selected points in the study area and are shown in table 4.

### Standard Project Flood

The standard project flood is a major flood that can be expected to occur from the most severe combination of meteorologic and hydrologic conditions that are considered reasonably characteristics of the geographic area in which the study area is located, excluding extremely rare combinations. The flood potential was determined by transposing to the basin the most severe strom recorded in the region that could have occurred over the basin, assuming watershed conditions reasonably conducive to runoff. The storm from October 27 through October 30, 1946, which was centered in the Clover Creek area east of Caliente, Neveda, was considered the most severe for this area and an equivalent storm was used in the determination of the standard project flood. Peak discharges for the standard project flood at selected locations in the study area are shown in table 4.

TABLE 4

PEAK FLOWS FOR INTERMEDIATE REGIONAL AND STANDARD PROJECT FLOODS

| Location | Miles upstream from mouth | Drainage* area (sq miles) | Intermediate regional flood (cfs) | Standard project flood (cfs) |
|---|---|---|---|---|
| Muddy River: | | | | |
| At entrance to Lake Mead | 7.0 | 4,450 | 20,000 | 44,000 |
| Upstream from confluence with Overton Wash | 7.5 | 4,400 | 20,000 | 44,000 |
| Downstream from Overton Airport | 9.3 | 4,350 | 20,000 | 45,000 |
| Downstream end of improved channel | 12.0 | 4,300 | 21,000 | 46,000 |
| Downstream from State Hwy 12 bridge near Logandale | 13.3 | 4,250 | 21,000 | 47,000 |
| Upstream limit of study | 14.8 | 4,200 | 21,000 | 47,000 |

*The White River Basin (see Plate 1) will not contribute to runoff downstream from Pahranagat Lakes, as these lakes have sufficient storage volume to retain the floods considered in this report. The listed figures are for the Muddy River basin, exclusive of White River Basin.

**Frequency**

Flow frequency curves on the stream under study were developed from recorded streamflow data. The frequency of occurrence of the 1941 flood was about 35 years. The November, 1960 flood was a 15-year-frequency flood. The standard project flood would, of course, be a rather infrequent flood, although floods greater than this magnitude have been known to occur in other areas. Greater floods, such as the probable maximum flood (see glossary for definition) could occur in the study area, but the combination of factors necessary to produce such large flows would be extremely rare.

**Hazards of Large Floods**

The amount and extent of damage caused by any flood depend on the topography of the area flooded, depth and duration of flooding, velocity of flow, rate of rise, and development on the flopd plain. An intermediate regional or standard project flood on the Muddy River would result in inundation of agricultural, residential, and commercial lands.

Deep floodwater flowing at a high velocity and carrying floating debris would create conditions hazardous to persons and vehicles attempting to cross flooded areas. In general, floodwater 3 or more feet deep and flowing at a velocity of 3 or more feet per second (about 2 miles per hour) could sweep a person off his feet, thus creating definite dangers of injury or drowning. Rapidly rising and swiftly flowing floodwater may trap persons in homes that could be ultimately destroyed or in vehicles that could be ultimately submerged. Decaying flood-deposited garbage or other organic materials could create health hazards. Further health hazards could result from ruptured water supply or sanitary sewerlines which are proposed for the Overton area. Isolation of areas by floodwaters could create hazards in terms of medical, fire, or law enforcement emergencies.

An additional hazard is the erosive and depositional character of the floods. Streambanks could be eroded away and this material deposited some distance downstream. The erosion of the banks is a severe hazard to children who like to play along the banks during a flood, as well as a hazard to any improvements near the bank. It is possible for the stream to erode a new channel some distance from the original channel, and in doing so, structures on the flood plain could be undermined and destroyed. If the structure is floatable, such as a house trailer, the item could lodge in a downstream bridge. This could cause failure of the bridge or the roadway adjacent to the bridge. Severe deposition of debris could prevent use of structures for considerable periods of time and could cause considerable damage.

**Flooded areas and flood damages** – The areas along the Muddy River that would be flooded by a standard project flood are shown on plate 2, which is an index map to plates 3 through 13. Areas that would be flooded by the intermediate regional and standard project floods are shown in detail on plates 3 through 13. These areas include agricultural and residential sections and the associated streets, roads and public utilities in the study reach.

Because of the greater depth of flooding, a higher velocity of flow, and a longer duration of flooding during a standard project flood, damage would be more severe than during an intermediate regional flood. Extensive deposits of silt and debris would occur in many parts of the flooded areas. Plates 14 through 17 show flood profiles of the intermediate regional and standard project floods. Depth of flow in the channel can be estimated from these illustrations. Typical cross sections of the flood plain at selected locations, together with the water surface elevation and lateral extent of the intermediate regional and standard project floods, are shown on plate 18.

Limits of overflow indicated on plates 3 through 13 may vary from actual locations on the ground because of map scale limitations, deposition, erosion, inaccuracy of original topographic maps, and recent development.

The flooded area maps and profiles for the streams in the report are an envelopment of the worst probable condition for the floods considered. During a major flood some of the areas indicated as flooded could remain unflooded while others will be flooded as we have shown. However, in the next major flood the opposite may be true. In many cases it is not known whether the waters will flood any point at any one instant, but it is possible for that area to be flooded. It is also known that flooding has occurred there in the past. This uncertainty in location of flooding is characteristic of rivers on alluvial cones. Erosion, sedimentation, and inundation of structures on the flood plain are unpredictable events that contribute to the variable location of flooded areas. The worst probable conditions are shown so that the user of this report can determine for himself the susceptibility of an area to damage by flooding.

Some areas cited in this report may be subject to flooding from tributaries to the Muddy River (including Bowman Reservoir, see pls. 1 and 2) and local runoff. This flooding could occur independently or simultaneously with the Muddy River flooding, causing considerable flood damage, particularly in the developed communities of Overton and Logandale. The areas and depths of possible flooding from these sources are not indicated in this report. Only the overflow from the Muddy River is cited in this report.

**Obstructions** — During fooods, debris collection or deposition at bridges and culverts could decrease their carrying capacity and cause greater water depths (backwater effect) upstream from these structures, as well as overflow of adjacent areas. The great amount of debris deposited is, in itself, an obstruction; and the depth of flow will increase as deposition increases until the water either begins eroding the deposited material or finds a new path around the area. Data on known bridge obstructions are shown in table 5. The location of some debris collecting points can be readily predicted, for example, at bridges or embankments. The majority of the debris collection points will vary from flood to flood and could act either as debris collectors or as debris contributors (erosive area) during the same flood. Prediction of the exact locations of erosion or deposition for any one flood is not always possible. However, all sites shown as flooded will experience both erosion and deposition in the future, as they have in the past. The flood depths shown in this report reflect these obstructions at all points that have a probability of debris accumulation.

TABLE 5

ELEVATION DATA

BRIDGES AND CULVERTS ACROSS MUDDY RIVER

| | | | | | Elevation (feet above mean sea level) | |
|---|---|---|---|---|---|---|
| | River mile | Streambed | Low chord (a) | Roadway (b) | Intermediate regional flood | Standard project flood |
| Cooper Avenue culvert (2 36-inch CMP) (1 60-inch CMP) | 9.15 | 1263.0 | 1268.0 | 1269.0 | 1275.0 | 1276.5 |
| Farm Road culvert (1 60-inch CMP) | 10.79 | 1298.5 | 1303.0 | 1307.0 | 1308.5 | 1320.0 |
| Farm Road culvert (1 60-inch CMP) | 12.56 | 1335.0 | 1340.0 | 1344.0 | 1359.5 | 1360.5 |
| State Highway 12 bridge | 13.34 | 1350.5 | 1378.0 | 1384.5 | 1376.0 | 1382.0 |

(a) Elevation of bottom of bridge structure or top of culvert.
(b) Average elevation.

**Velocities of flow** – Occurrence of the intermediate regional or standard project floods would result in high velocity flows. During an intermediate regional or standard project flood, the average velocity of channel flow would range from 4 to 10 feet per second and overbank average velocities would range from 3 to 8 feet per second. Water flowing at this rate is capable of causing erosion to streambanks and transporting large rocks. It is expected that velocity of flow during a standard project flood would be slightly higher than that during an intermediate regional flood. Water flowing at almost 2 feet per second or less would deposit debris and silt. Table 6 shows average velocities at several points in the study area.

## TABLE 6

## VELOCITIES OF FLOW
## MUDDY RIVER

| | | Intermediate regional flood | | Standard project flood | |
|---|---|---|---|---|---|
| | River mile | Channel fps* | Overbank fps* | Channel fps* | Overbank fps* |
| Downstream from Overton | 7.49 | 4 | 3 | 4 | 4 |
| Vicinity of Overton Airport | 9.66 | 6 | 4 | 7 | 5 |
| Downstream from Logandale | 11.98 | 9 | 4 | 10 | 4 |
| Near upstream limit of study | 14.52 | 9 | 7 | 10 | 8 |

*fps — feet per second.

**Rate of rise and duration of flooding** — Intense rainfalls result in a rapid rise in the streamflow. The runoff increases rapidly in response to rainfall excess. The peak flow for the major floods considered in this report would occur about 31 hours after the beginning of intense rainfall. (See fig. 16.) Table 7 lists the rate of rise, height of rise (from flood stage level to maximum floodflow level), time of rise (time corresponding to height of rise), and duration of flood stage (period of time flooding is above flood stage level). The discharge hydrographs of the two future floods considered in this report are shown on figure 16.

## TABLE 7

## RATE OF RISE AND DURATION OF FLOODING

| Flood | Rate of rise ft/hr | Height of rise ft | Time of rise hrs | Duration of flood stage hrs |
|---|---|---|---|---|
| Intermediate Regional Flood | 0.10 | 0.5 | 5 | 20 |
| Standard Project Flood | 0.14 | 1.0 | 7 | 28 |

**Photographs, future flood heights** — The levels that the intermediate regional and standard project floods are expected to reach at various locations in the study area are indicated in figures 17 through 20.

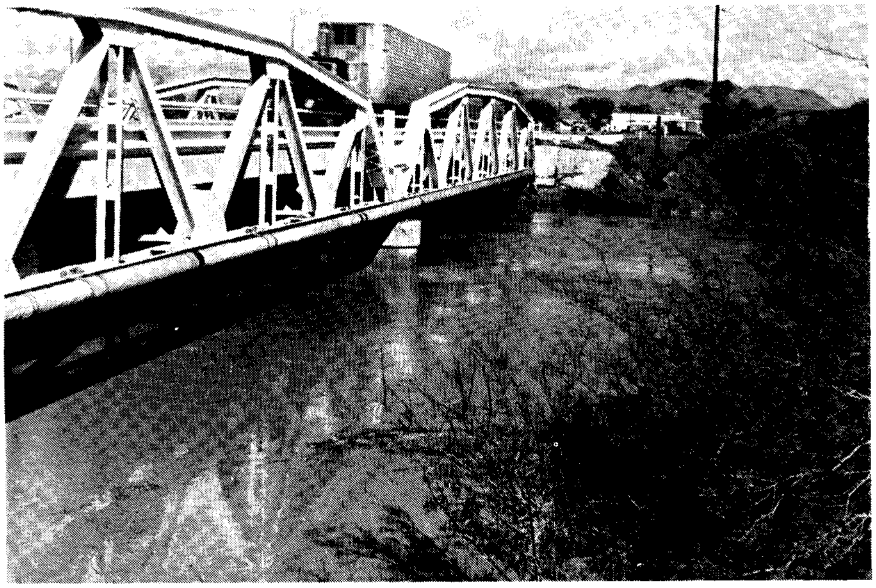


Figure 5 — Flooding at the Highway 91 bridge in Glendale (about 5 miles upstream from study area) during the flood of 1960.

Figure 6 — Railroad damage due to flooding in the Narrows between upstream limit of study and Glendale during the flood of 1960.

Figure 7 – Repair of railroad damage due to flooding in the Narrows between upstream limit of study and Glendale during the flood of 1960.

Figure 8 – Flooding on the Muddy River between Overton and Logandale during 1960 flood.

Figure 9 – The 1960 flood laid to waste the Yamashita onion field located at about river mile 10.2.

Figure 10 – Roy Yamishita inspects sediment damage to head lettuce after 1960 flood. Location is at river mile 10.2


Figure 11 – Flooding on the Muddy River during 1960 flood at river mile 10.8 about 2-1/2 miles north of Overton.

Figure 12 – A field of radishes covered by silt deposited during the 1960 flood. The location is about 3 miles north of Overton.

Figure 13 — Railroad embankment washout being repaired after the 1960 flood. The site is north of the study area and about 10 miles north of Overton.

Figure 14 — Flood of 1960 along the Muddy River resulted in eroded banks and a large amount of debris piled against a tree. The debris reflects the depth of water during the flood. The site is about 3 miles north of Overton.

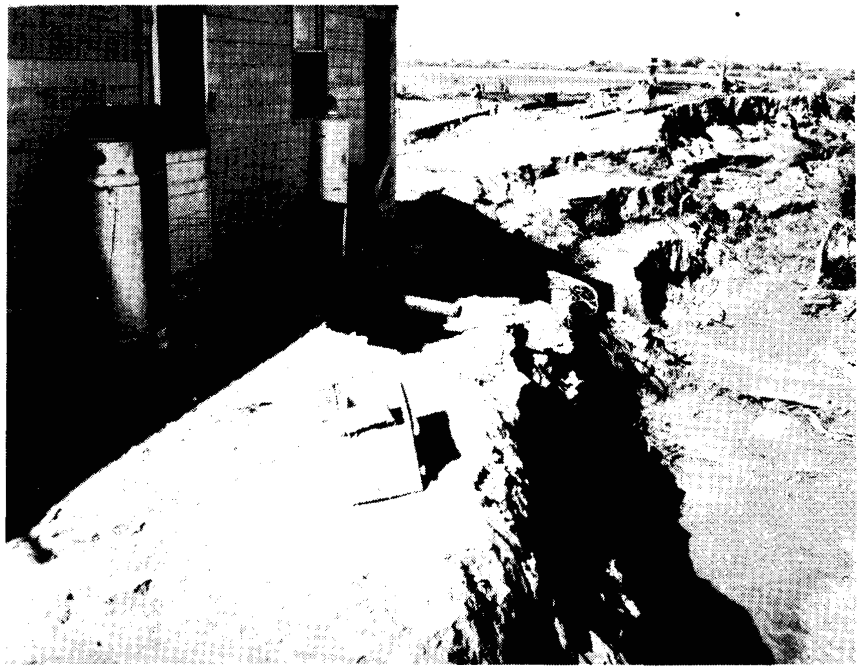
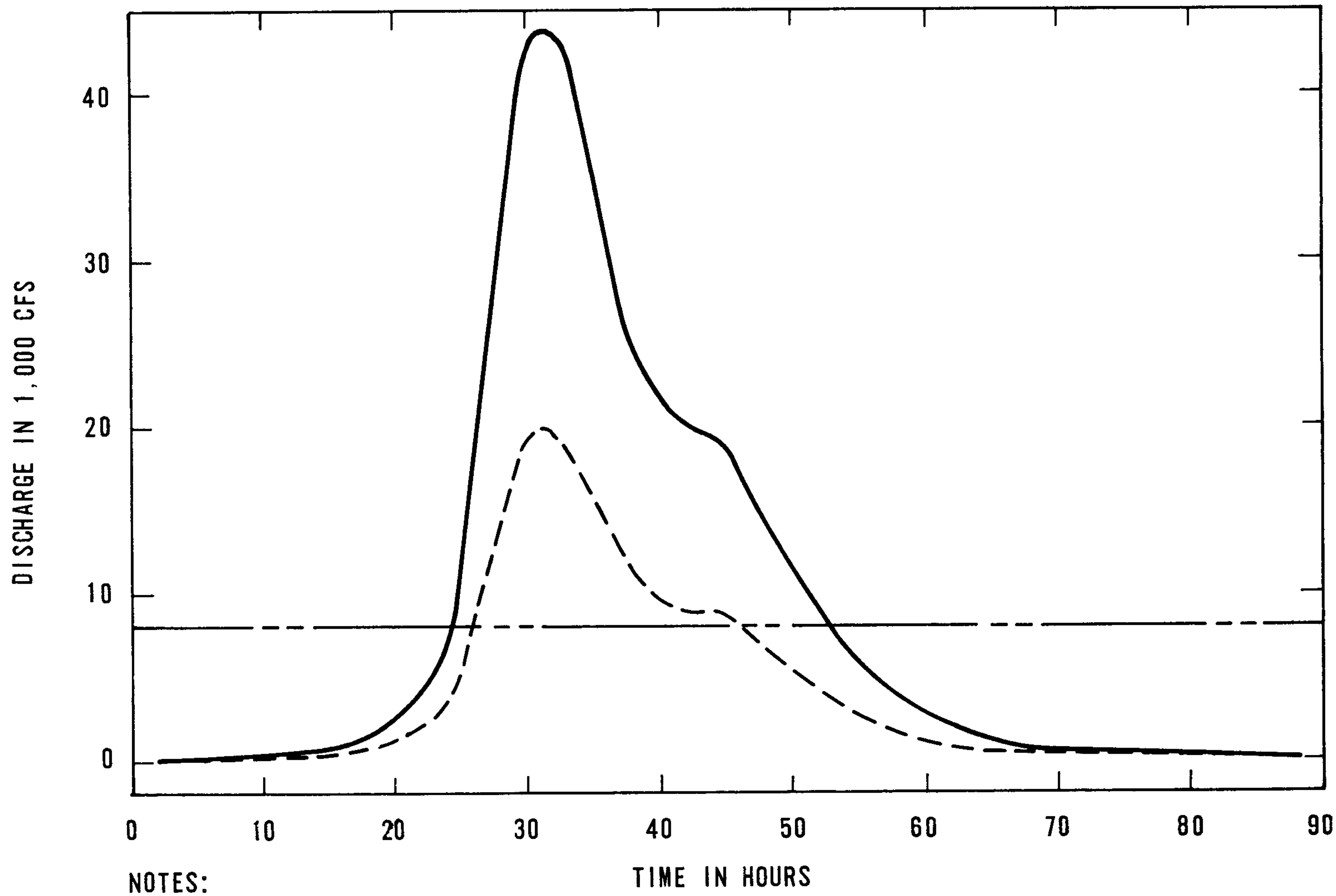


Figure 15 — A closeup view of bank erosion damage shown in Fig. 14.




NOTES:
HYDROGRAPH AT RIVER MILE 8.33
STANDARD PROJECT FLOOD ————
INTERMEDIATE REGIONAL FLOOD — — — —
FLOOD STAGE FLOW —— - - ——

MUDDY RIVER AT OVERTON
HYDROGRAPH

FIGURE 16

## FUTURE FLOOD HEIGHTS


Figure 17 — Future flood heights at Moapa Valley Community Center.

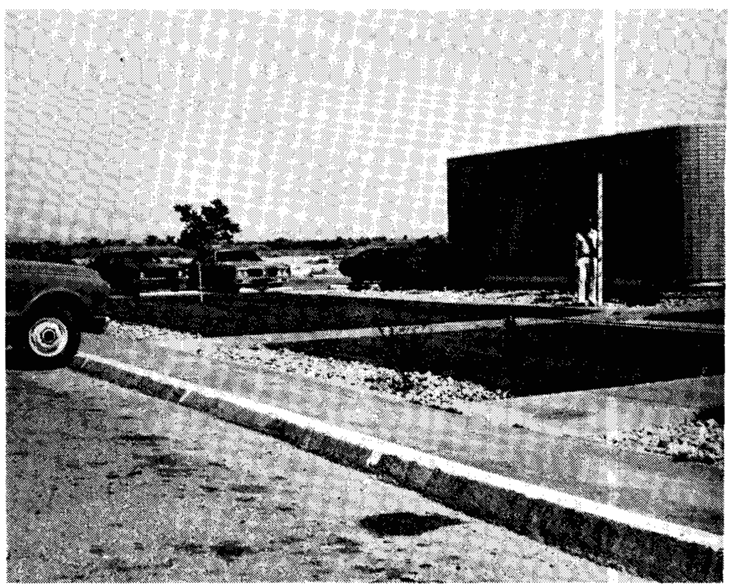
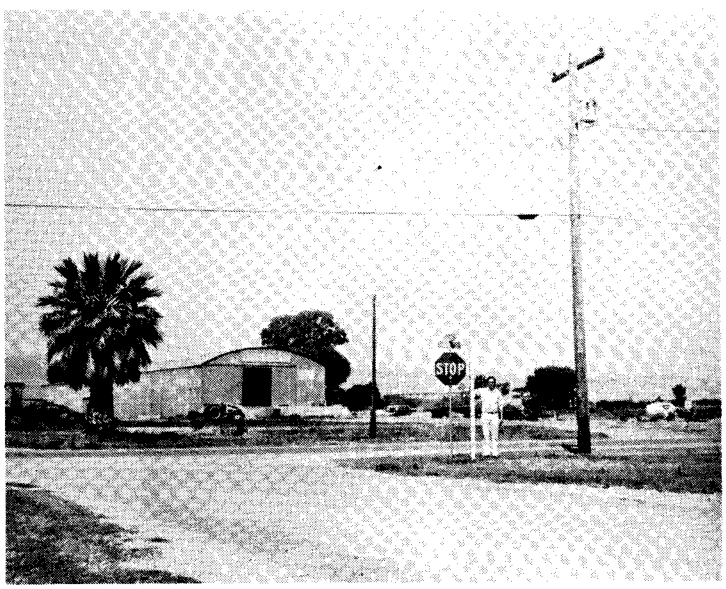


Figure 18 – Future flood heights at Cooper Avenue and Shurtliff Street.

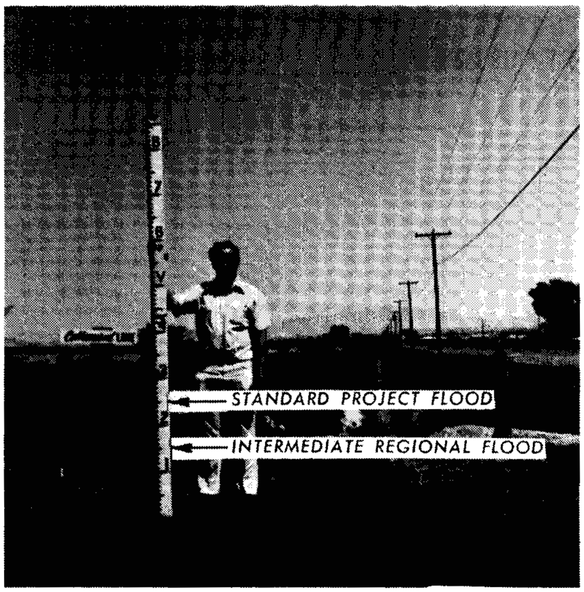



Figure 19 – Future flood heights at Nevada State Highway 12 and Cottonwood Lane.

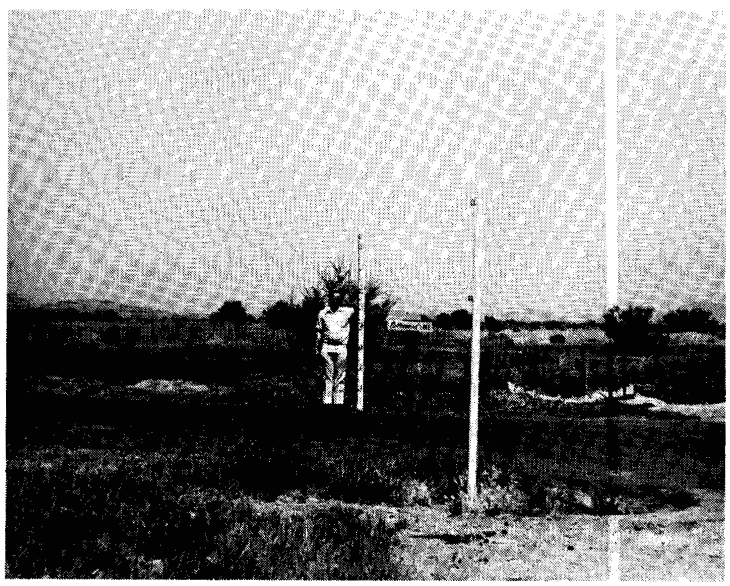
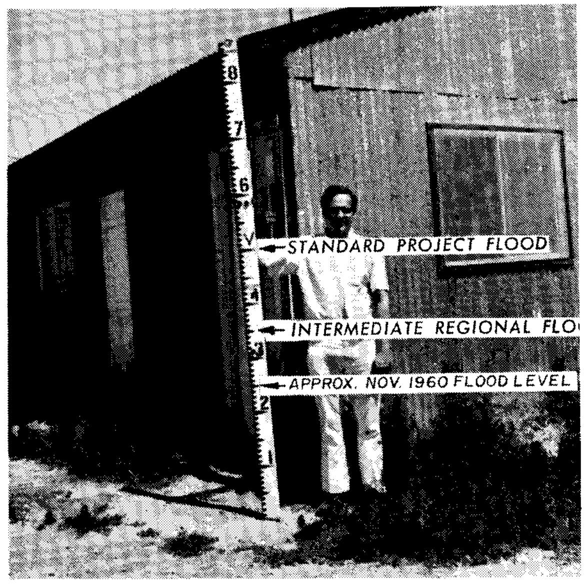
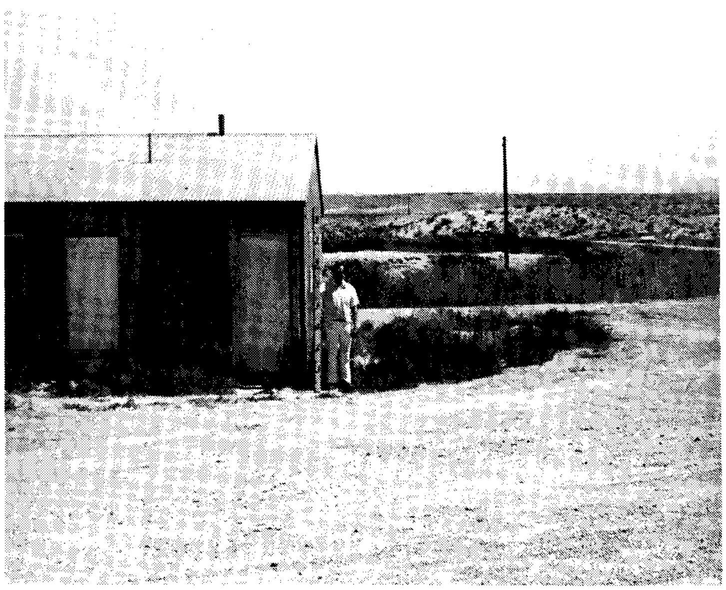


Figure 20 – Future flood heights at farm on Nevada State Highway 12, 0.8 miles north of Cottonwood Lane (at river mile 10.80).



## GLOSSARY

**Backwater** — The resulting high water surface in a given stream due to a downstream obstruction or high stage in an intersecting stream.

**Flood** — An Overflow of lands not normally covered by water and that are used or usable by man. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river or a stream, an ocean or a lake or other body of standing water.

Normally, a "flood" is considered as any temporary rise in streamflow or stage (not the ponding of surface water) that results in significant adverse effects in the vicinity. Adverse effects may include damage from overflow of land areas, temporary backwater effects in sewers and local drainage channels, creation of unsanitary conditions or other unfavorable situations by deposition of materials in stream channels during flood recessions, rise of ground water coincident with increased streamflow, and other problems.

**Flood Crest** — The maximum stage or elevation reach by the waters of a flood at a given location.

**Flood Peak** — The maximum instantaneous discharge of a flood at a given location. It usually occurs at or near the time of the flood crest.

**Flood Plain** — The relatively flat area or lowlands adjoining the channel or a river, a stream, or a watercourse, an ocean, or a lake or other body of standing water that have been or may be covered by floodwaters.

**Flood Profile** — A graph showing the relationship of water surface elevation to location, the latter generally expressed as distance above mouth for a stream of water flowing in an open channel. It is generally drawn to show surface elevation for the crest of a specific flood, but may be prepared for conditions at a given time or stage.

**Flood Stage** — The stage or elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.

**Flood Stage Level** — The elevation that corresponds to flood stage.

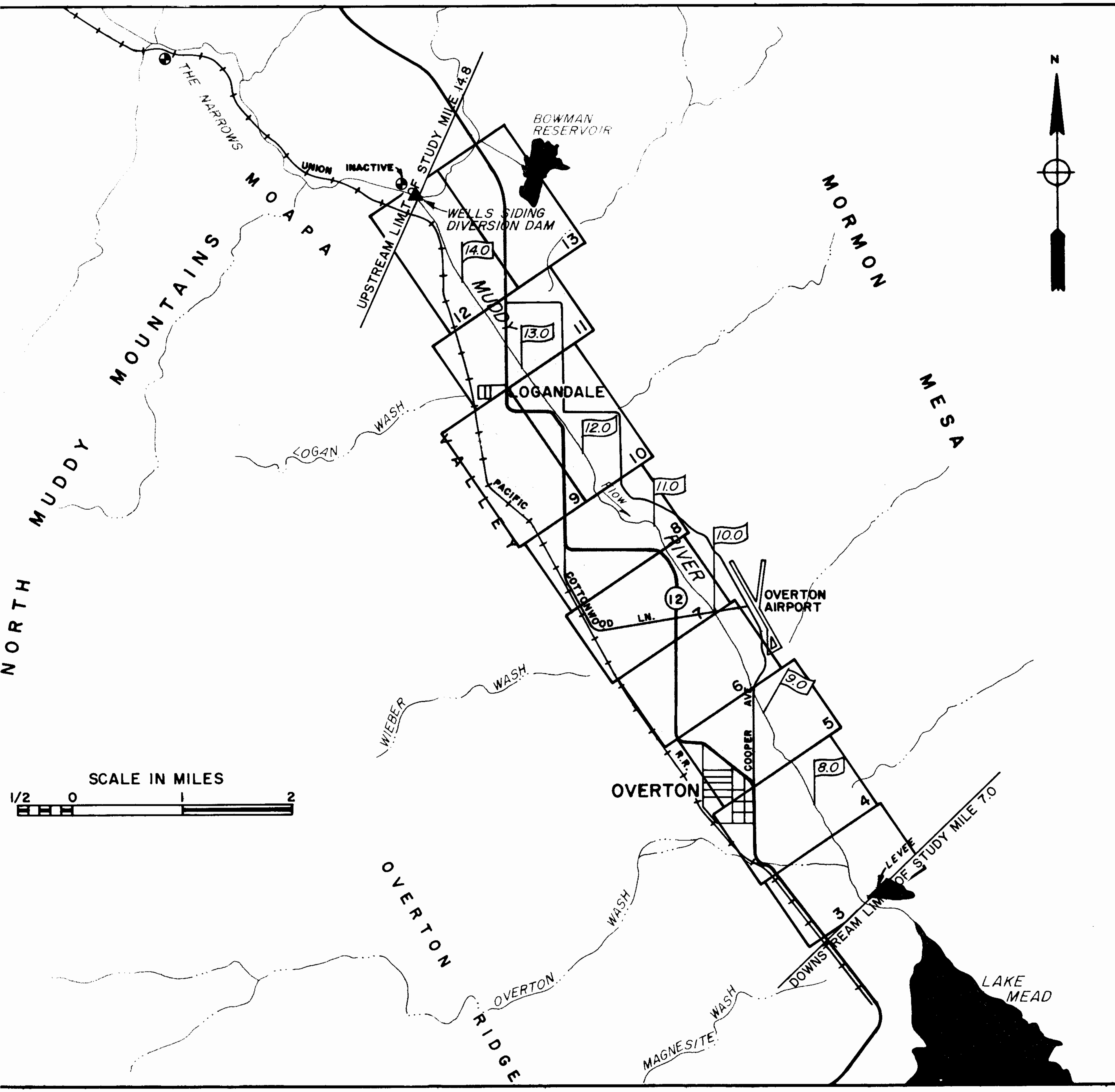
**General Winter Storm** — A widespread storm usually occurring in the months of December through March, characterized by heavy and prolonged rainfall over a large area.

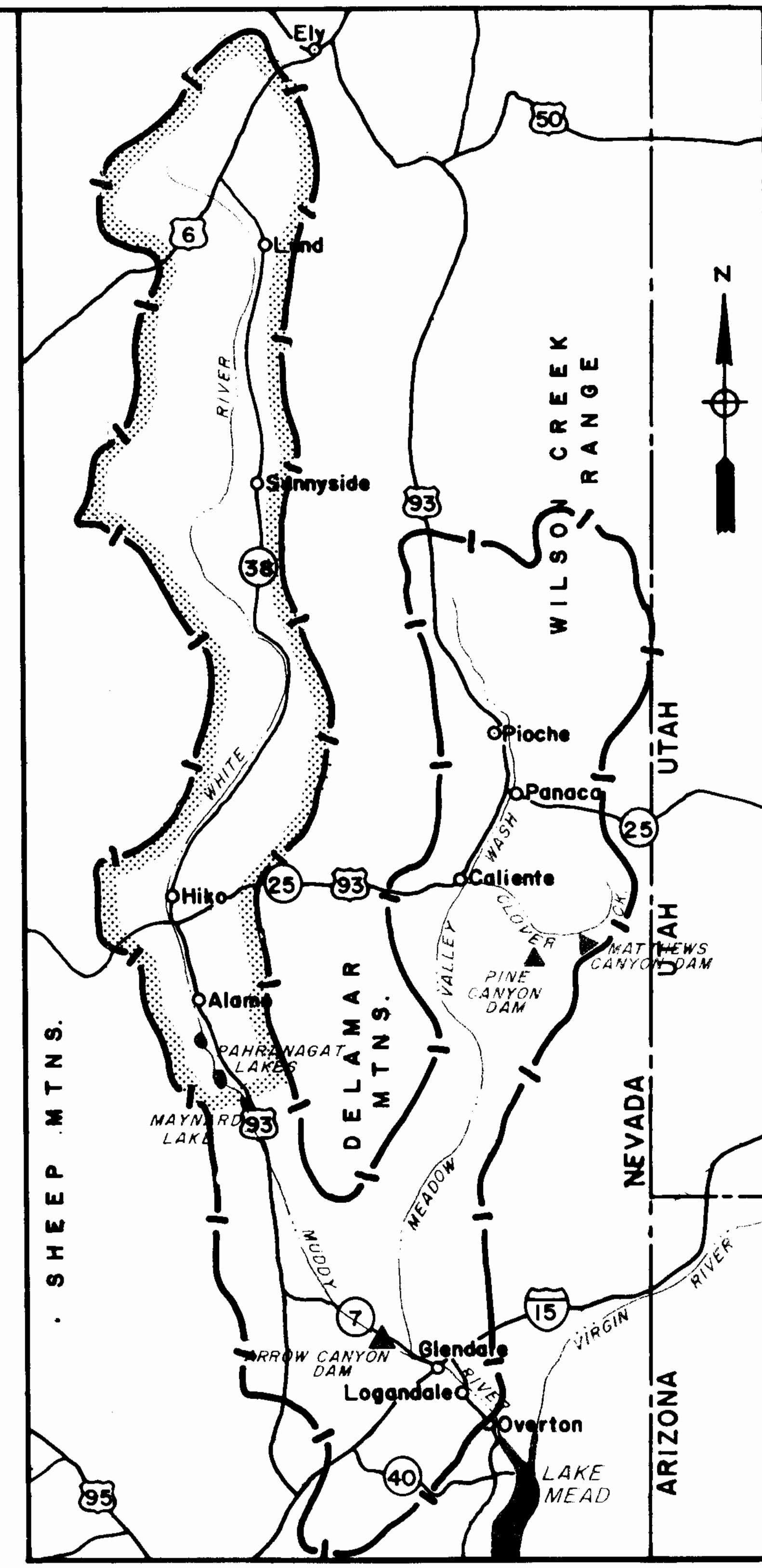
**Intermediate Regional Flood** — A flood having an average frequency of occurrence of once in 100 years, although the flood may occur in any year or more than once in 1 year. It is based on statistical analyses of streamflow records available for the watershed and analyses of rainfall and runoff characteristics in the general region of the watershed.

**Probable Maximum Flood** — A hypothetical flood representing the most severe flood with respect to volume, concentration of runoff, and peak discharge that may be expected from a combination of the most severe meteorologic and hydrologic conditions in the region.

**Standard Project Flood** — The flood that may be expected from the most severe combination of meteorologic and hydrologic conditions that is considered reasonably characteristics •of the geographic area in which the drainage basin is located, excluding extremely rare combinations. Peak discharges for these floods are generally about 40 to 60 percent of the probable maximum flood for the same basins. As used by the Corps of Engineers, standard project floods are intended as practicable expressions of the degree of protection that should be sought in the design of flood control works, the failure of which might be disastrous.

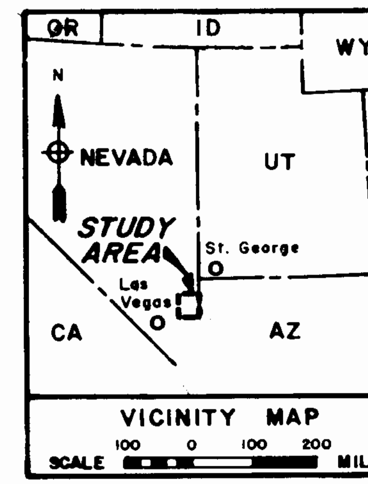
**Thunderstorn** — A high-intensity, convective-type rainstorm of short duration that is characterized by extremely heavy rainfall. As used in this report, "severe local storm" and "thunderstorm" are estentially synonymous.




DRAINAGE AREA

SCALE 5 0 10 20 30 40 MILES




VICINITY MAP

## LEGEND

AREA FLOODED BY STANDARD PROJECT FLOOD
PERENNIAL STREAMS
INTERMITTENT STREAMS
STREAM MILES
STREAM GAGE
BOUNDARY OF DRAINAGE AREA
NON-EFFECTIVE DRAINAGE
FLOOD CONTROL DAMS
5 INDEX NUMBER OF PLATE

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER
VICINITY OF OVERTON
CLARK COUNTY, NEVADA

INDEX MAP-FLOODED AREA

JUNE 1974

PL

MATCH TO PLATE 4


LEGEND

OVERFLOW LIMITS

INTERMEDIATE REGIONAL FLOOD

STANDARD PROJECT FLOOD

M+2.0 MILES ABOVE MOUTH

3 CROSS SECTION

400 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

CONTOUR INTERVAL 2 FEET

7.8 SPF
6.6 IRF
APPROXIMATE WATER DEPTH IN FEET.

NOTES

LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THE REPORT

DATE OF TOPOGRAPHY 1965

BASE TOPOGRAPHIC MAPS FURNISHED BY BUREAU OF RECLAMATION

AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

N

SCALE IN FEET
400 0 400

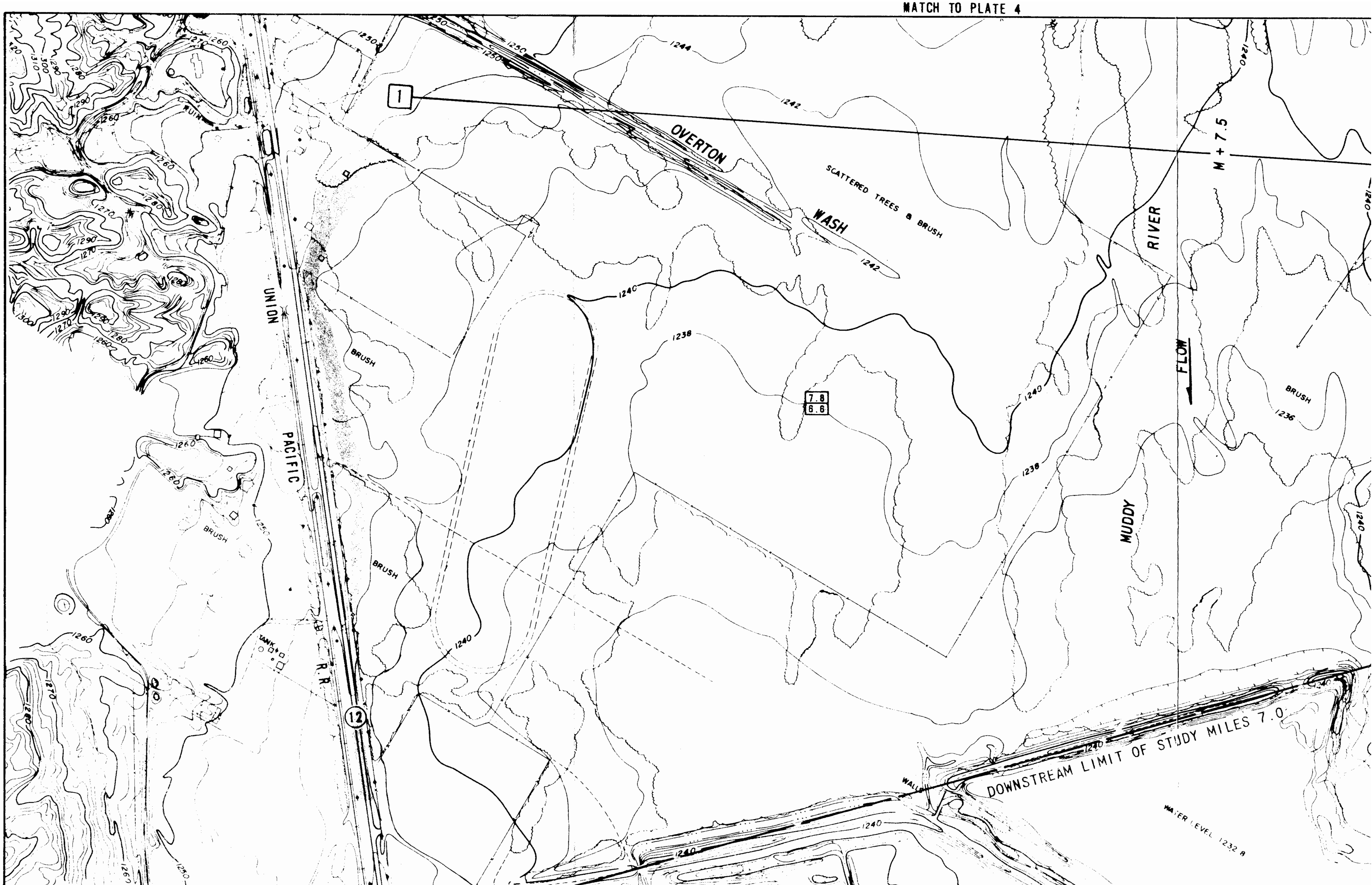
DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION
MUDDY RIVER
VICINITY OF OVERTON
CLARK COUNTY, NEVADA
FLOODED AREAS

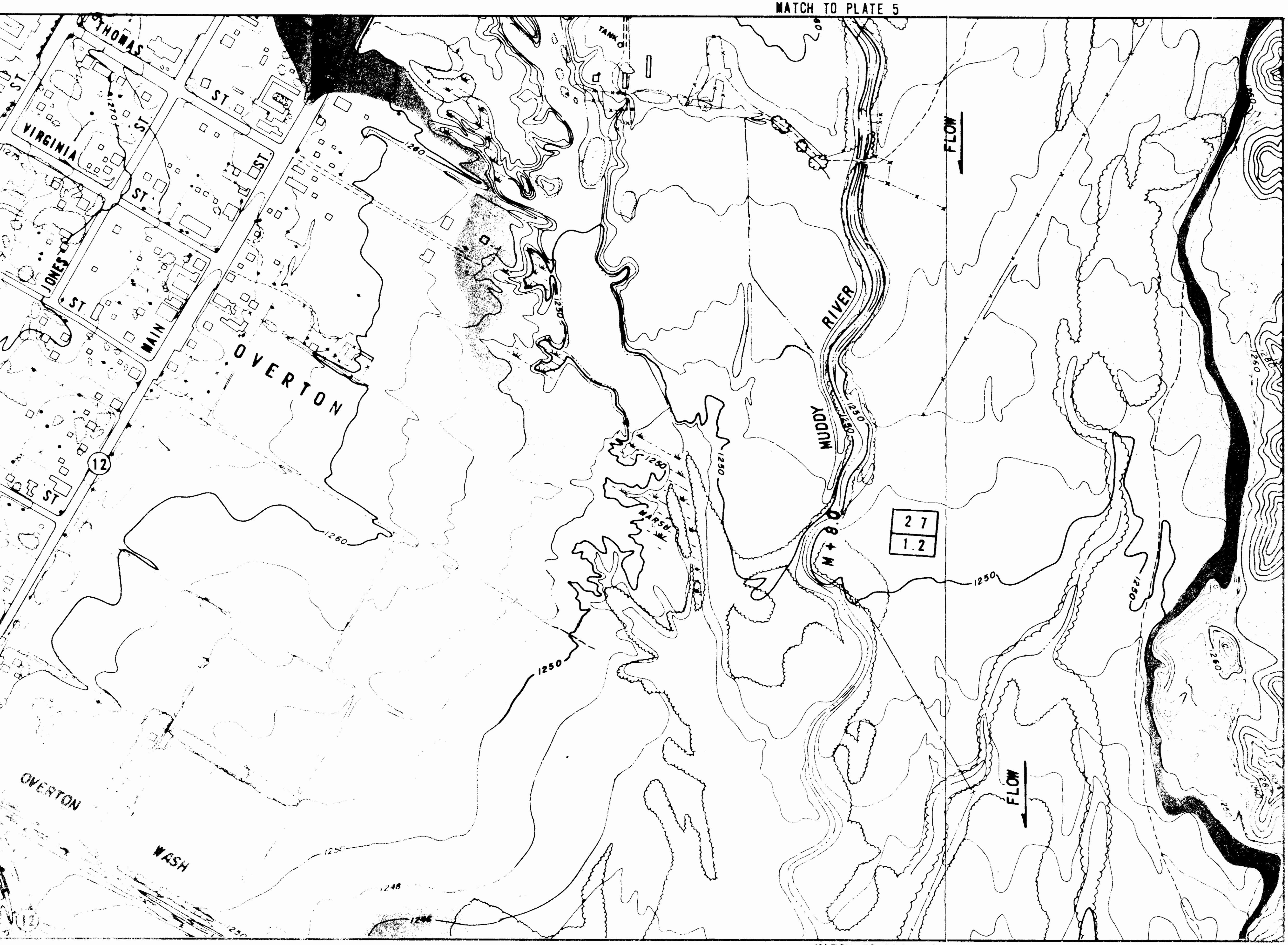
JUNE 1974

PLATE 3

MATCH TO PLATE 4



MATCH TO PLATE 5




MATCH TO PLATE 3

LEGEND

OVERFLOW LIMITS

INTERMEDIATE REGIONAL FLOOD

STANDARD PROJECT FLOOD

M+2 0 — MILES ABOVE MOUTH

3 — CROSS SECTION

400 — GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

CONTOUR INTERVAL 2 FEET

2 0 SPF / 1 0 IRF — APPROXIMATE WATER DEPTH IN FEET.

NOTES

LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THE REPORT

DATE OF TOPOGRAPHY 1965

BASE TOPOGRAPHIC MAPS FURNISHED BY BUREAU OF RECLAMATION

AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

N

SCALE IN FEET

400 0 400

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER

VICINITY OF OVERTON

CLARK COUNTY, NEVADA

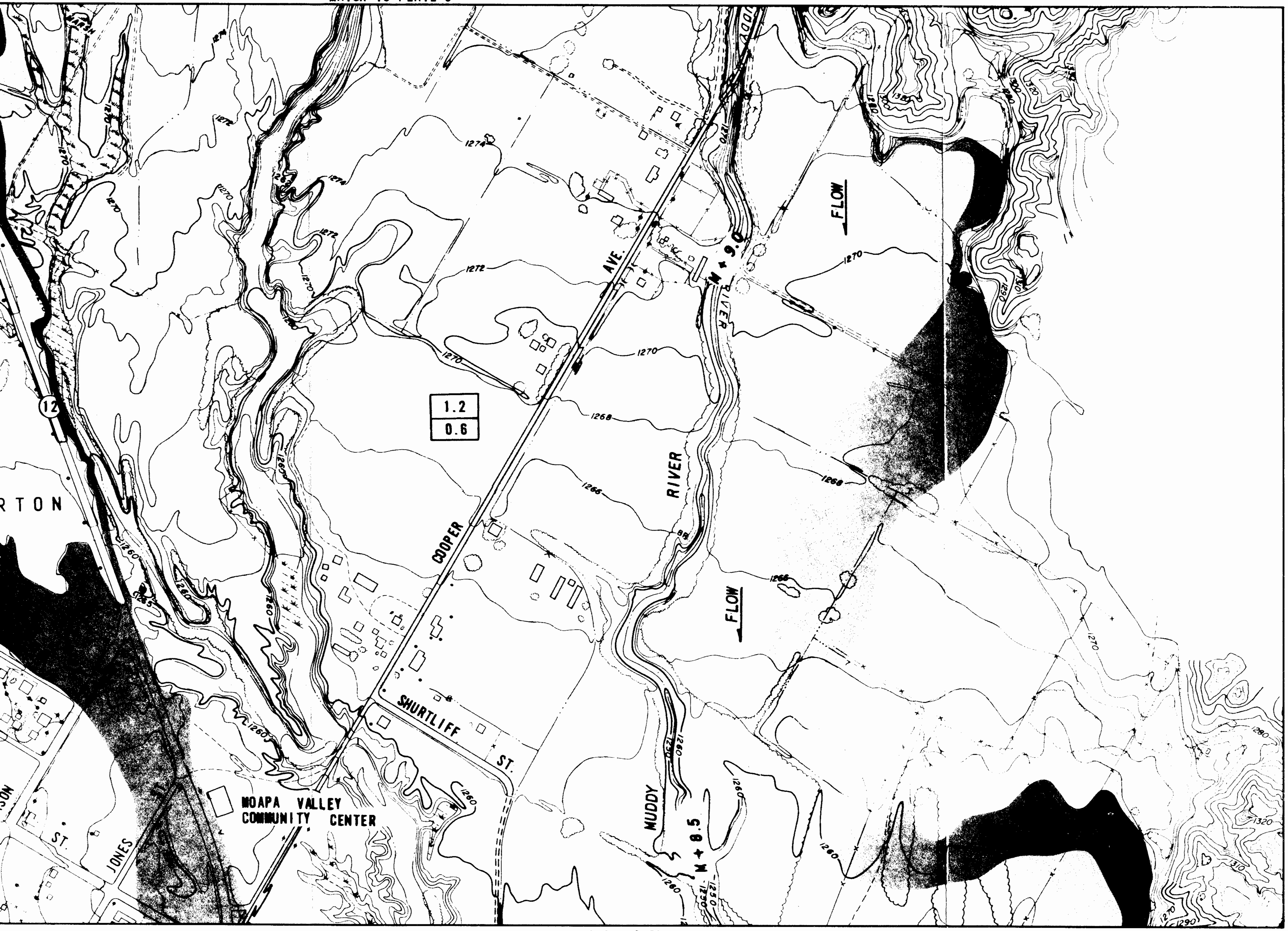
FLOODED AREAS

JUNE 1974

MATCH TO PLATE 5


MATCH TO PLATE 3

MATCH TO PLATE 6




MATCH TO PLATE 4

LEGEND:

OVERFLOW LIMITS

INTERMEDIATE REGIONAL FLOOD

STANDARD PROJECT FLOOD

M+2.0 — MILES ABOVE MOUTH

3 — CROSS SECTION

400 — GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

CONTOUR INTERVAL 2 FEET

2.0 SPF
1.0 IRF — APPROXIMATE WATER DEPTH IN FEET.

NOTES:

LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THE REPORT

DATE OF TOPOGRAPHY 1965

BASE TOPOGRAPHIC MAPS FURNISHED BY BUREAU OF RECLAMATION

AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

SCALE IN FEET

400 0 400

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

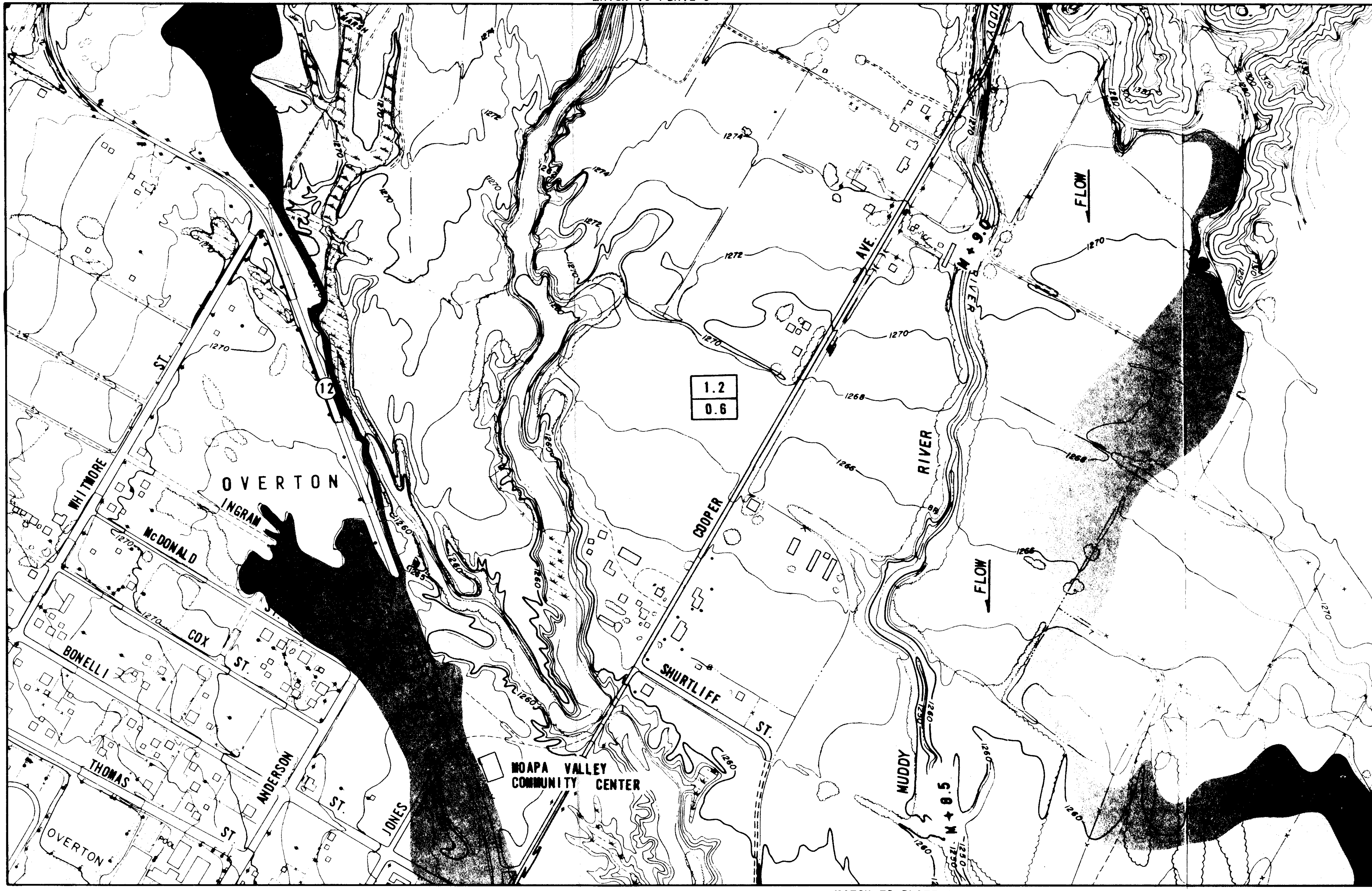
MUDDY RIVER

VICINITY OF OVERTON
CLARK COUNTY, NEVADA

FLOODED AREAS

JUNE 1974

MATCH TO PLATE 6




MATCH TO PLATE 4


STANDARD PROJECT FLOOD

ABOVE MOUTH

ABOVE MEAN SEA LEVEL

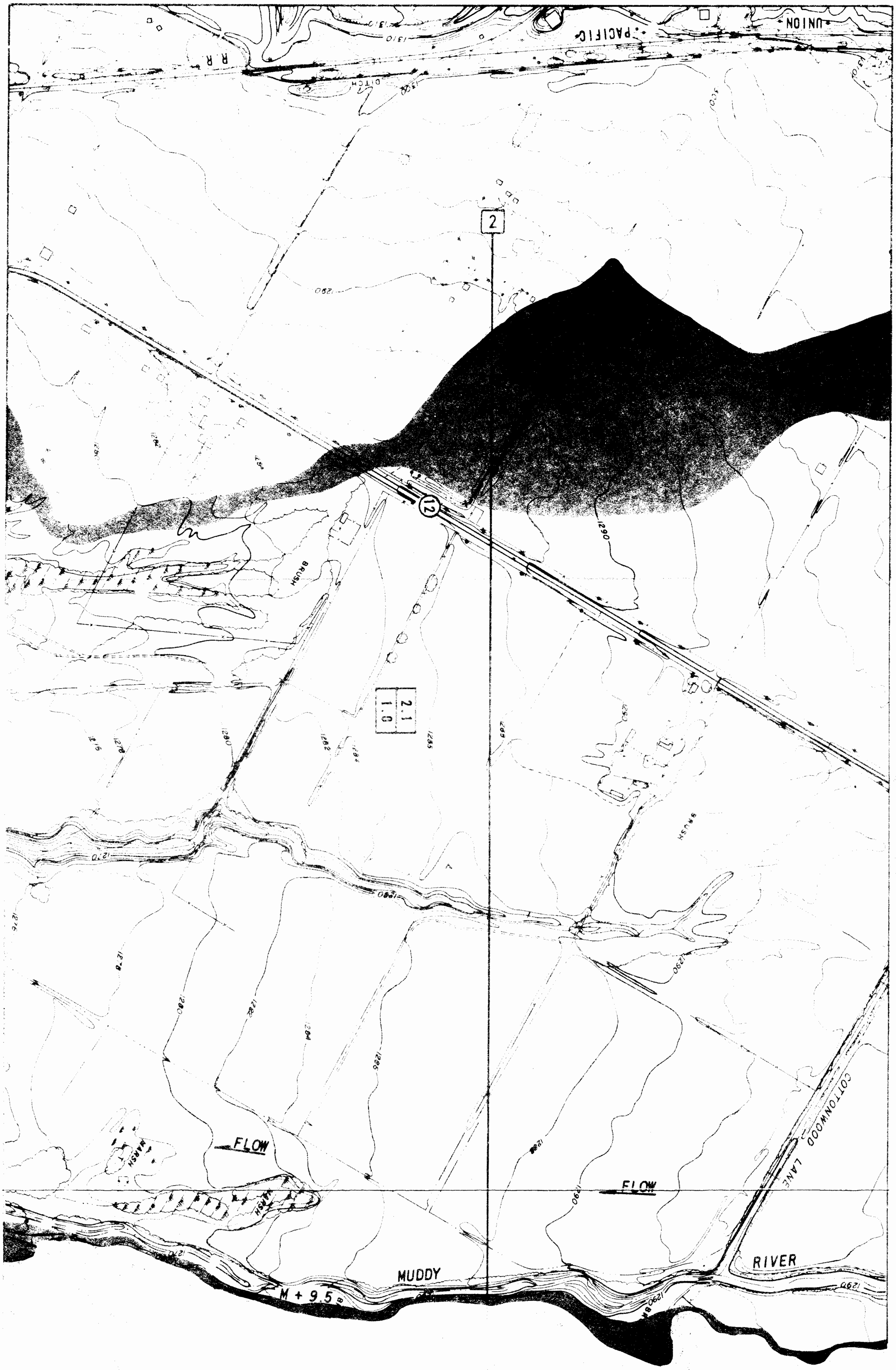
WATER DEPTH

AS EXPLAINED

PLAIN MAY BE

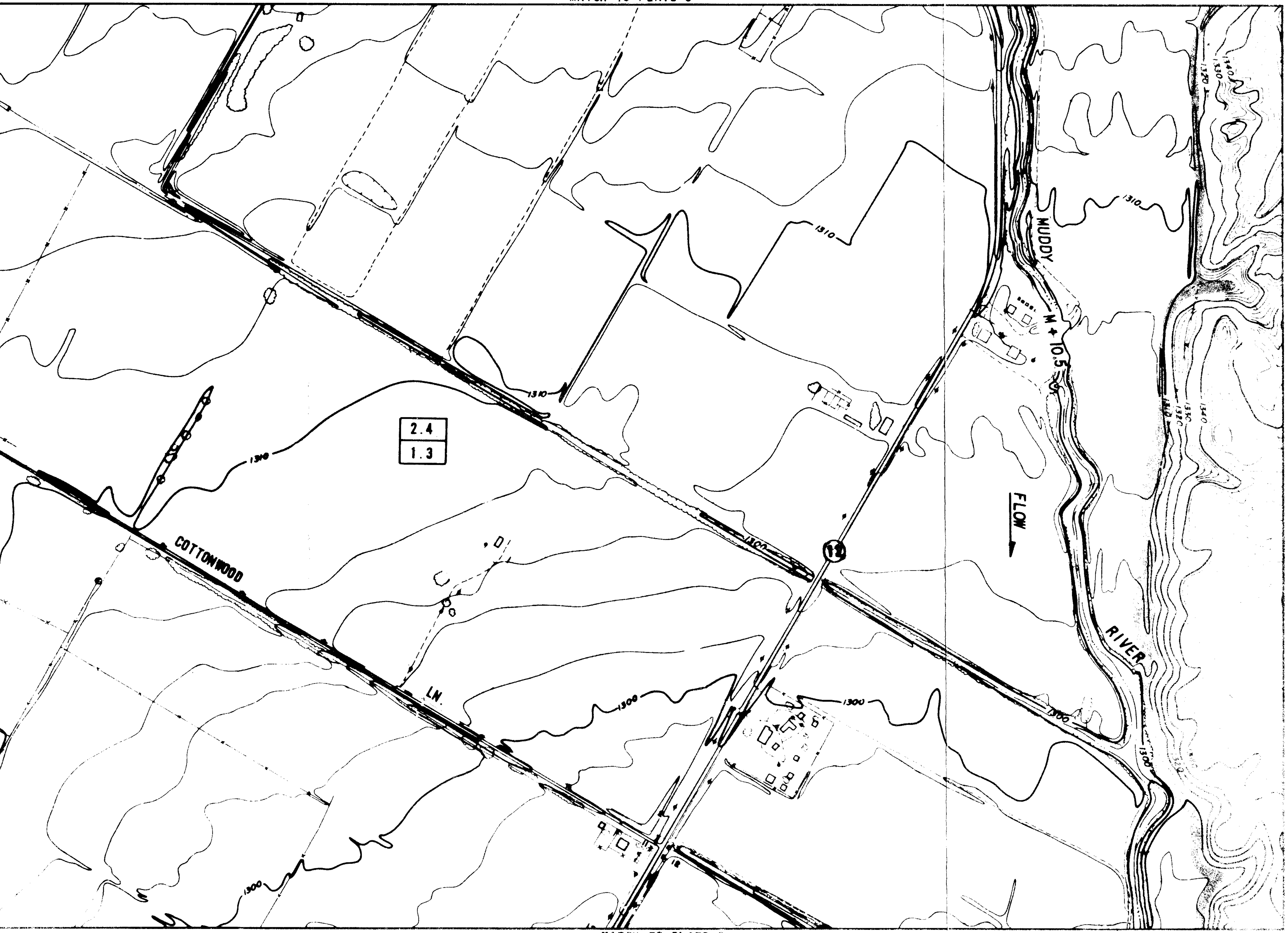
LOCAL RUNOFF

400



UNION
PACIFIC
R.R.
DITCH
COTTONWOOD LANE
MUDDY
RIVER
BRUSH
BRUSH
FLOW
FLOW
MARSH
MARSH
2
12
2.1
1.0
M+95
1290
1285
1284
1282
1280
1278

MATCH TO PLATE 8




MATCH TO PLATE 6

LEGEND

OVERFLOW LIMITS

INTERMEDIATE REGIONAL FLOOD | STANDARD PROJECT FLOOD

M+2.0 MILES ABOVE MOUTH

3 CROSS SECTION

400 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

CONTOUR INTERVAL 2 FEET

2.0 SPF
1.0 IRF
APPROXIMATE WATER DEPTH IN FEET.

NOTES

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DATE OF TOPOGRAPHY 1965

BASE TOPOGRAPHIC MAPS FURNISHED BY BUREAU OF RECLAMATION

AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

N

SCALE IN FEET
400 0 400

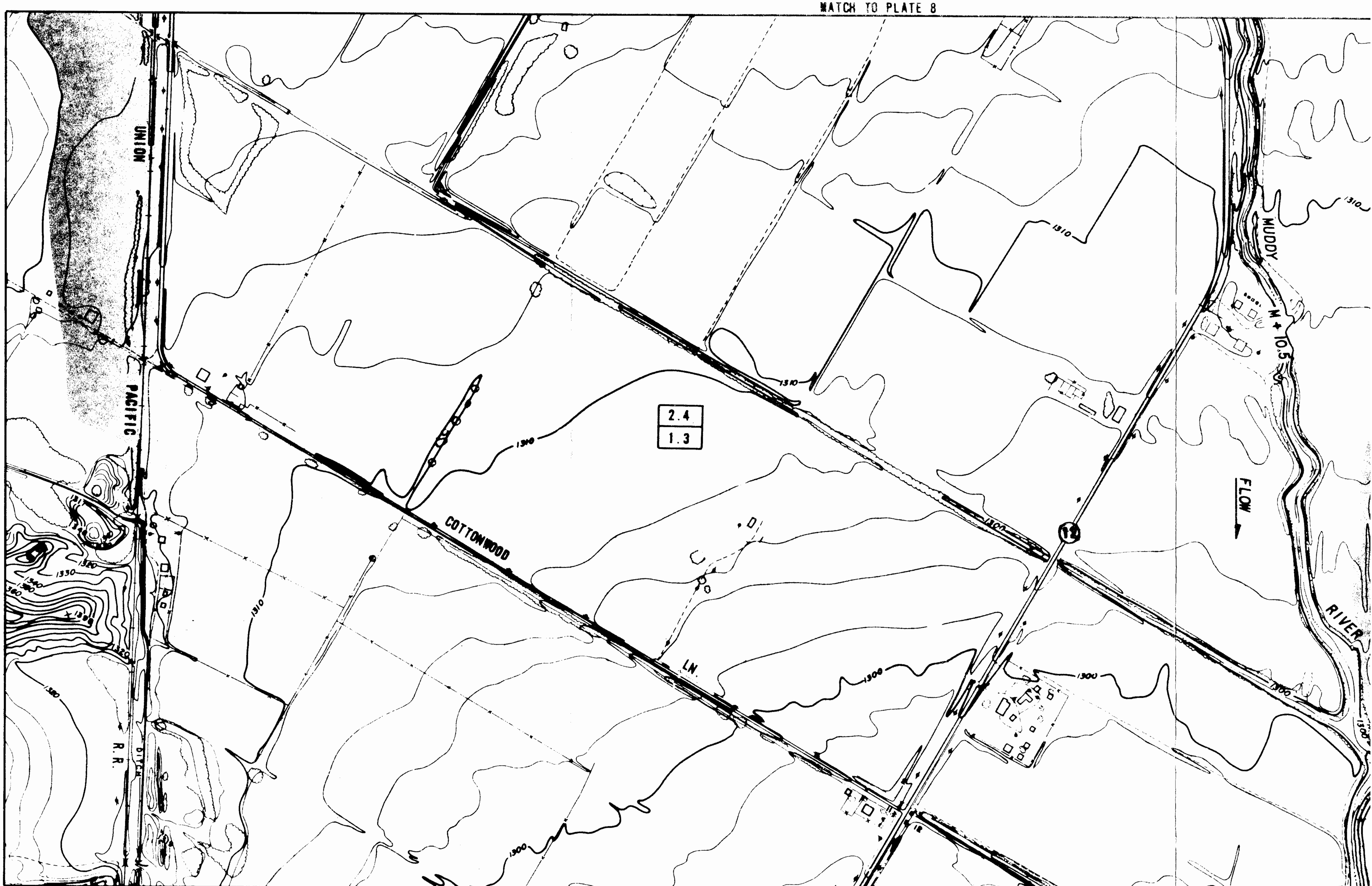
DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES CALIFORNIA

FLOOD PLAIN INFORMATION
MUDDY RIVER
VICINITY OF OVERTON
CLARK COUNTY NEVADA
FLOODED AREAS

JUNE 1974

PLATE 7

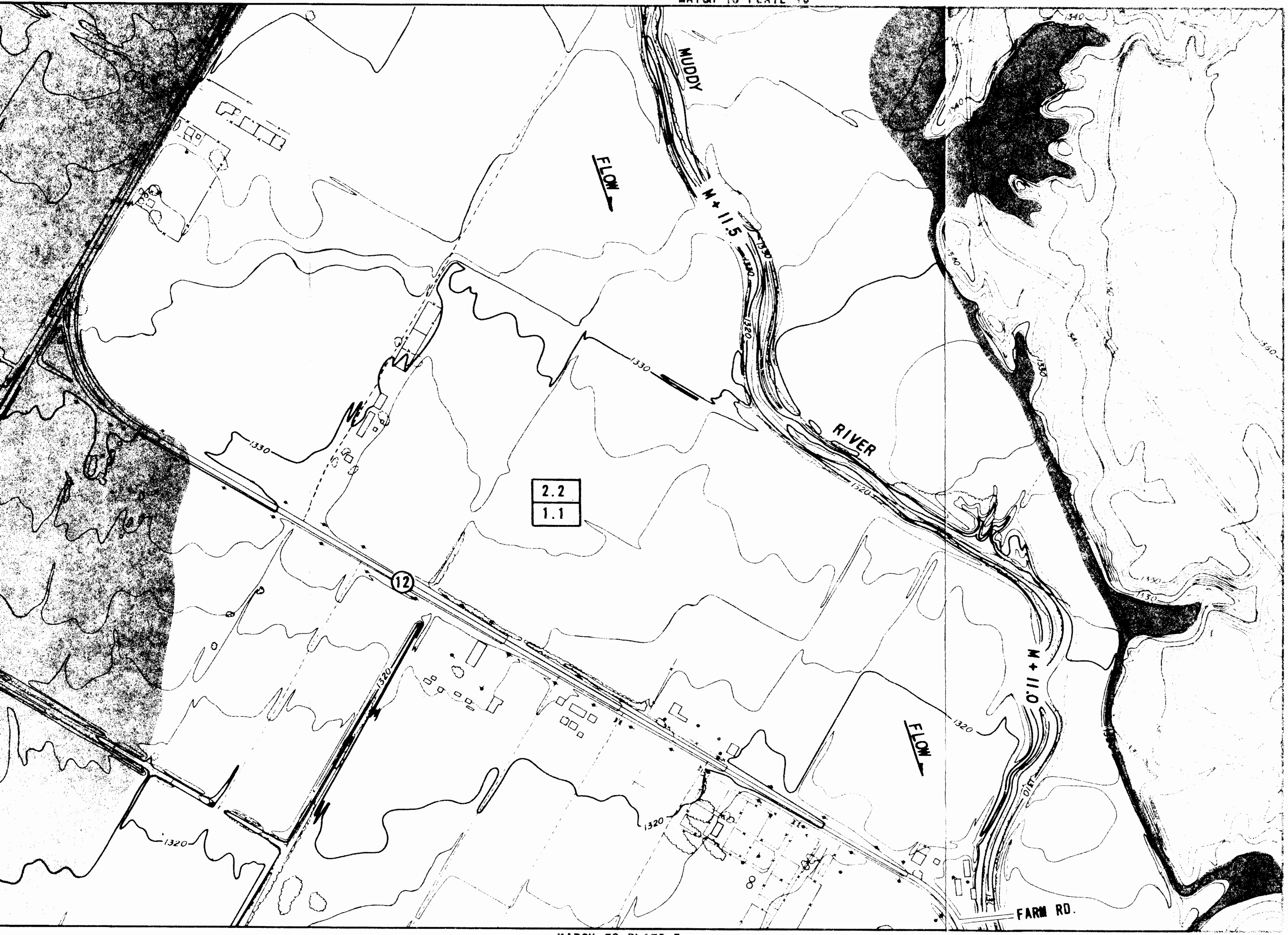
MATCH TO PLATE 8




MATCH TO PLATE 6

TE 9

MATCH TO PLATE 10




MATCH TO PLATE 7

LEGEND

OVERFLOW LIMITS

INTERMEDIATE REGIONAL FLOOD

STANDARD PROJECT FLOOD

M+2 0 — MILES ABOVE MOUTH

3 — CROSS SECTION

400 — GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

CONTOUR INTERVAL 2 FEET

| 2 0 | SPF | APPROXIMATE WATER DEPTH IN FEET. |
|---|---|---|
| 1 0 | IRF | |

NOTES

LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THE REPORT

DATE OF TOPOGRAPHY 1965

BASE TOPOGRAPHIC MAPS FURNISHED BY BUREAU OF RECLAMATION

AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

N

SCALE IN FEET

400 0 400

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER

VICINITY OF OVERTON

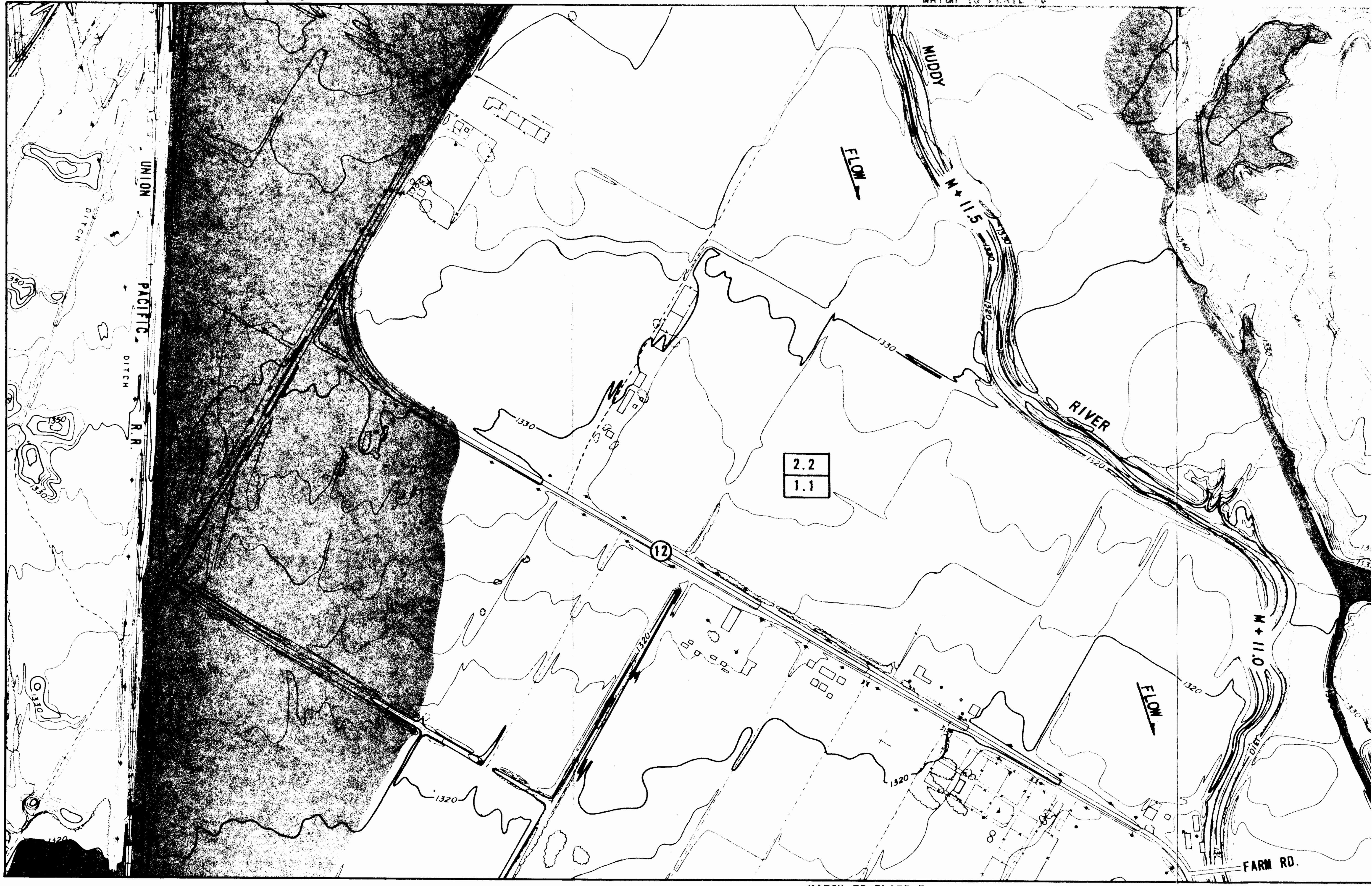
CLARK COUNTY, NEVADA

FLOODED AREAS

JUNE 1974

MATCH TO PLATE 9

MATCH TO PLATE 10




MATCH TO PLATE 7

MATCH TO PLATE 10


MATCH TO PLATE 8

LEGEND

OVERFLOW LIMITS

INTERMEDIATE REGIONAL FLOOD

STANDARD PROJECT FLOOD

M+2.0 MILES ABOVE MOUTH

3 CROSS SECTION

400 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

CONTOUR INTERVAL 2 FEET

2.0 SPF
1.0 IRF
APPROXIMATE WATER DEPTH IN FEET.

NOTES

LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THE REPORT

DATE OF TOPOGRAPHY 1965

BASE TOPOGRAPHIC MAPS FURNISHED BY BUREAU OF RECLAMATION

AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

N

SCALE IN FEET

400 0 400

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER

VICINITY OF OVERTON

CLARK COUNTY, NEVADA

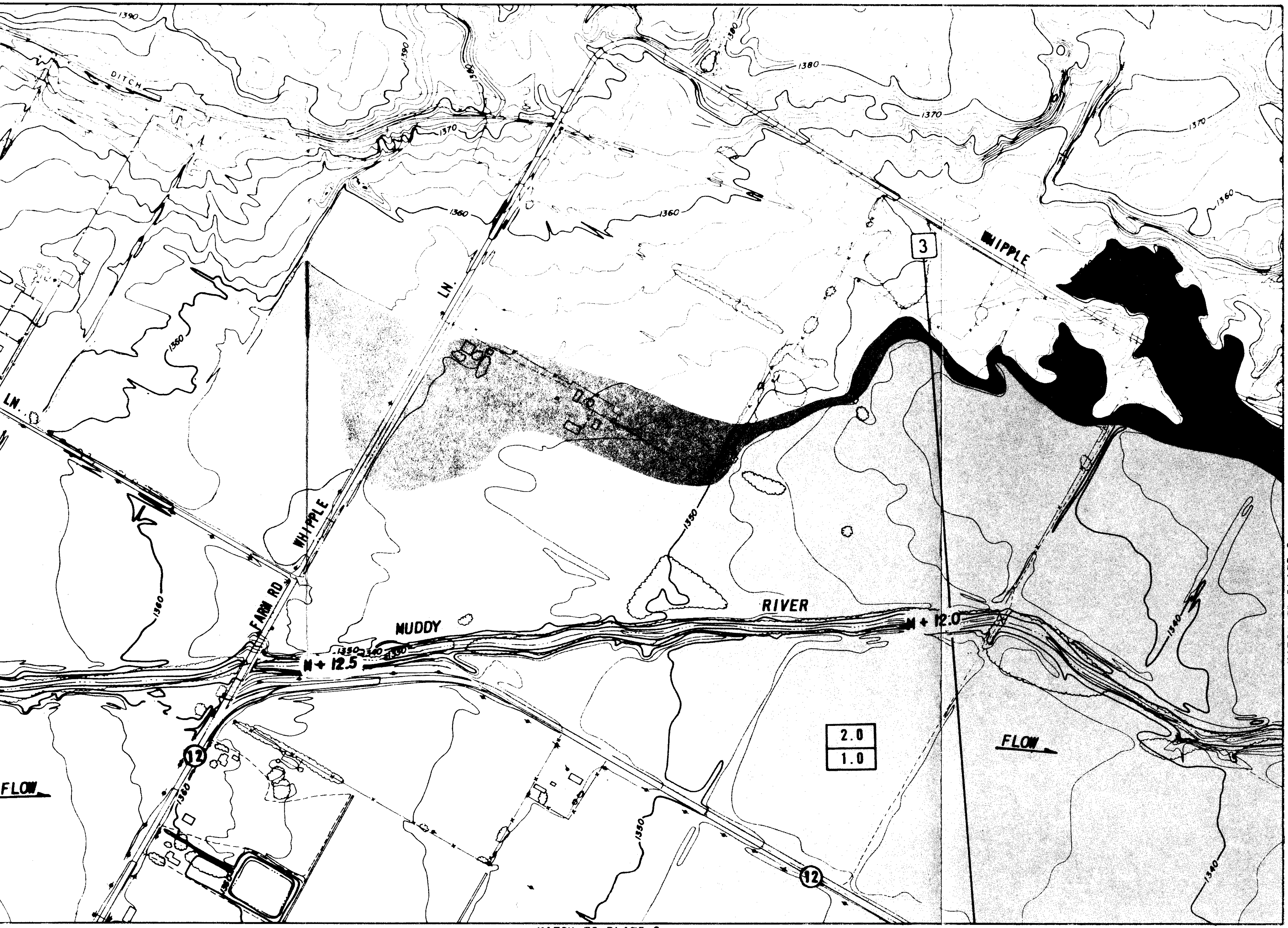
FLOODED AREAS

JUNE 1974

PLATE 9

MATCH TO PLATE 10

MATCH TO PLATE 11




MATCH TO PLATE 9

MATCH TO PLATE 8

LEGEND

OVERFLOW LIMITS

INTERMEDIATE REGIONAL FLOOD

STANDARD PROJECT FLOOD

M+2.0 MILES ABOVE MOUTH

3 CROSS SECTION

400 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

CONTOUR INTERVAL 2 FEET

2.0 SPF
1.0 IRF
APPROXIMATE WATER DEPTH IN FEET.

NOTES:

LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THE REPORT

DATE OF TOPOGRAPHY 1965

BASE TOPOGRAPHIC MAPS FURNISHED BY BUREAU OF RECLAMATION

AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

SCALE IN FEET
400 0 400

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER

VICINITY OF OVERTON

CLARK COUNTY, NEVADA

FLOODED AREAS

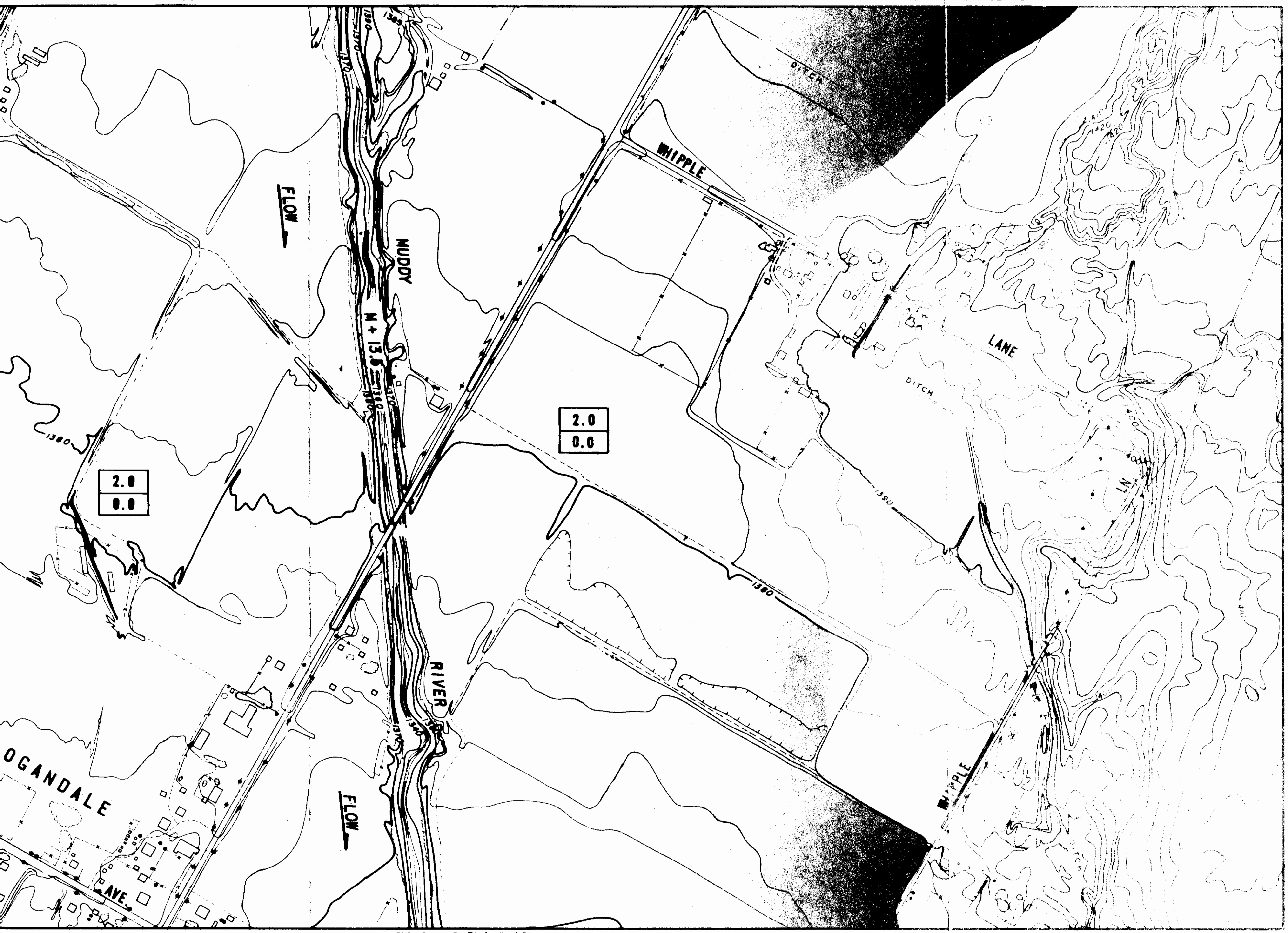
JUNE 1974

PLATE 10

MATCH TO PLATE 11


MATCH TO PLATE 9

MATCH TO PLATE 12 MATCH TO PLATE 13




MATCH TO PLATE 10

LEGEND:

OVERFLOW LIMITS

INTERMEDIATE REGIONAL FLOOD

STANDARD PROJECT FLOOD

M+2 0 MILES ABOVE MOUTH

3 CROSS SECTION

400 GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

CONTOUR INTERVAL 2 FEET

2.0 SPF
1.0 IRF
APPROXIMATE WATER DEPTH IN FEET.

NOTES:

LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THE REPORT

DATE OF TOPOGRAPHY 1965

BASE TOPOGRAPHIC MAPS FURNISHED BY BUREAU OF RECLAMATION

AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF

SCALE IN FEET

400 0 400

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER

VICINITY OF OVERTON

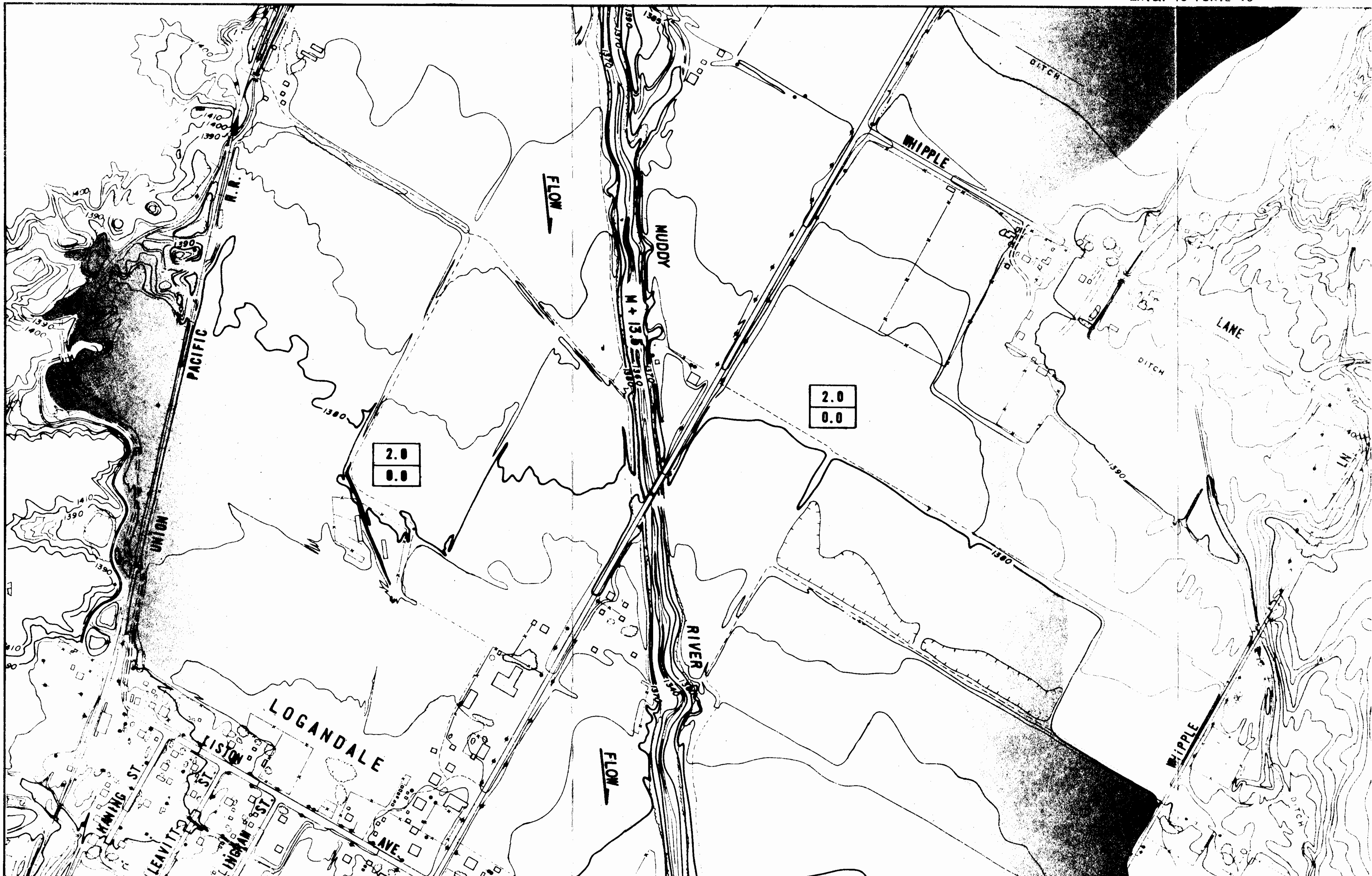
CLARK COUNTY, NEVADA

FLOODED AREAS

JUNE 1974

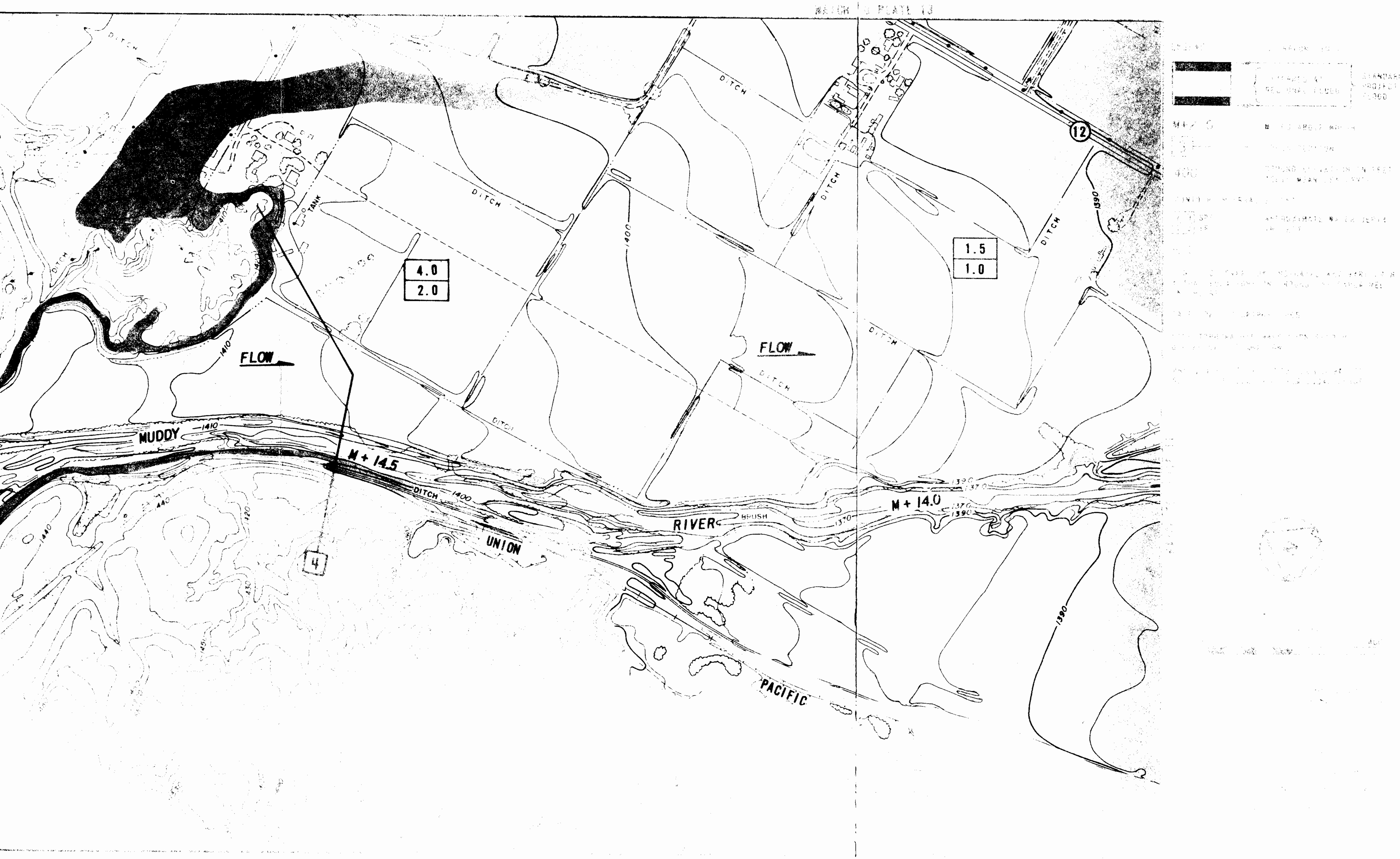
MATCH TO PLATE 12

MATCH TO PLATE 13

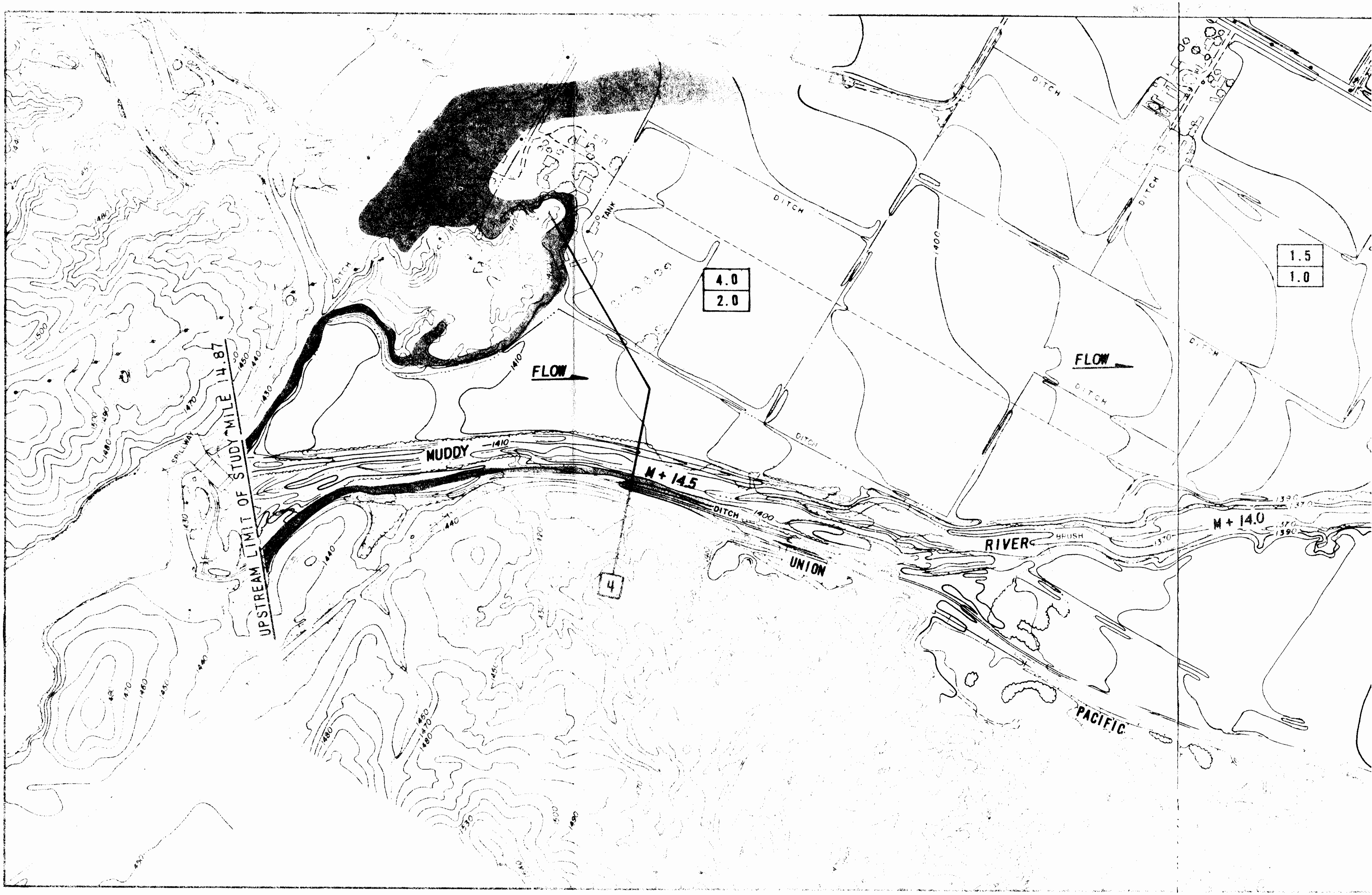



MATCH TO PLATE 9

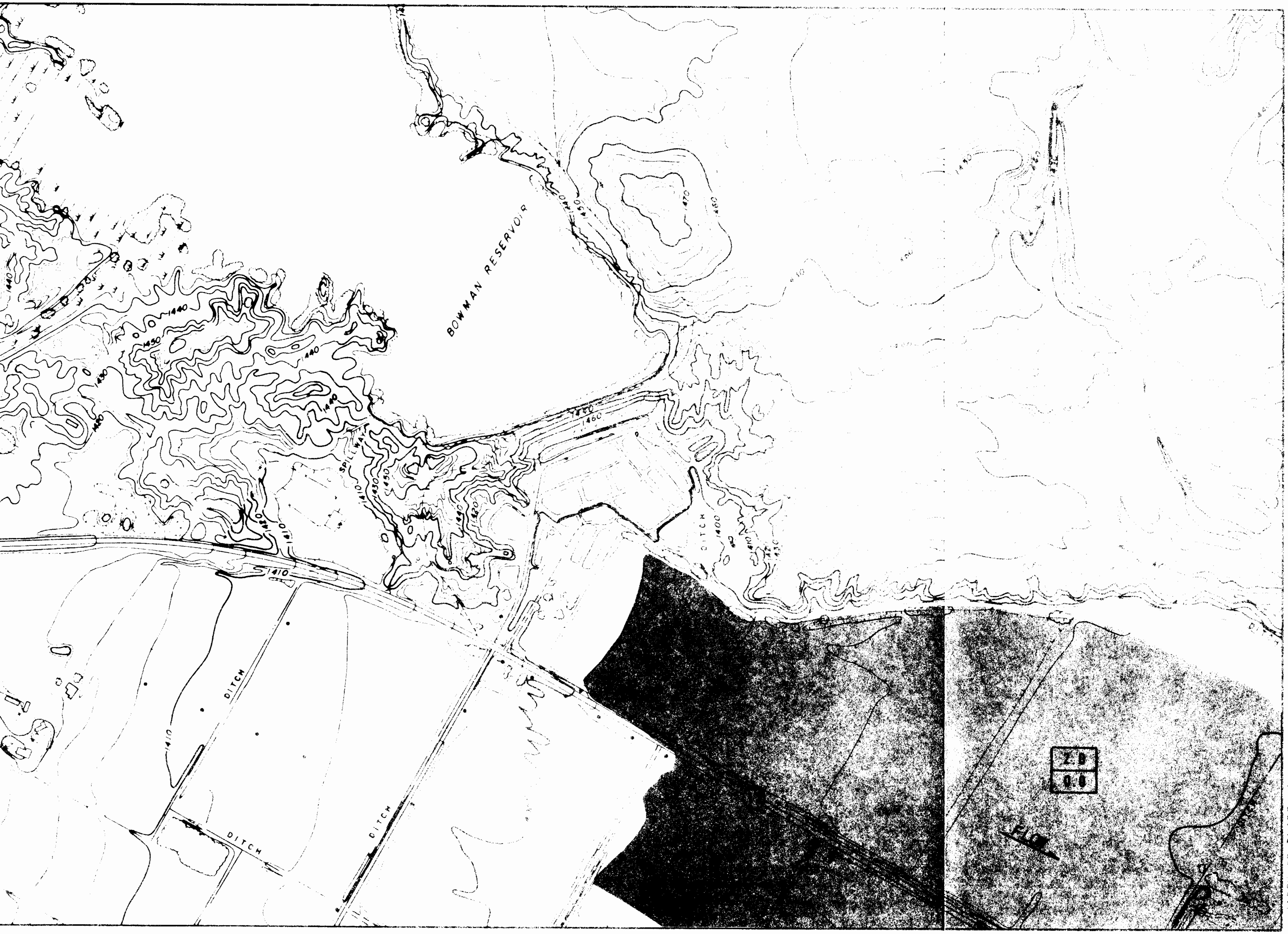
MATCH TO PLATE 10



DITCH
TANK
FLOW
FLOW
4.0
2.0
1.5
1.0
12
1410
1400
1390
1370
MUDDY
RIVER
BRUSH
M + 14.5
M + 14.0
UNION
PACIFIC
4



UPSTREAM LIMIT OF STUDY MILE 14.87
MUDDY
RIVER
M + 14.5
M + 14.0
FLOW
FLOW
UNION
PACIFIC
DITCH
TANK
SPILLWAY
BRUSH
4.0
2.0
1.5
1.0
4




MATCH TO PLATE 12

LEGEND

OVERFLOW LIMITS

INTERMEDIATE REGIONAL FLOOD — STANDARD PROJECT FLOOD

M+2.0 — MILES ABOVE MOUTH

3 — CROSS SECTION

400 — GROUND ELEVATION IN FEET ABOVE MEAN SEA LEVEL

CONTOUR INTERVAL 2 FEET

2.0 SPF / 1.0 IRF — APPROXIMATE WATER DEPTH IN FEET.

NOTES

LIMITS OF OVERFLOW INDICATED MAY VARY FROM ACTUAL LOCATIONS ON GROUND AS EXPLAINED IN THE REPORT

DATE OF TOPOGRAPHY 1965

BASE TOPOGRAPHIC MAPS FURNISHED BY BUREAU OF RECLAMATION

AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.

SCALE IN FEET

400 0 400

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER

VICINITY OF OVERTON

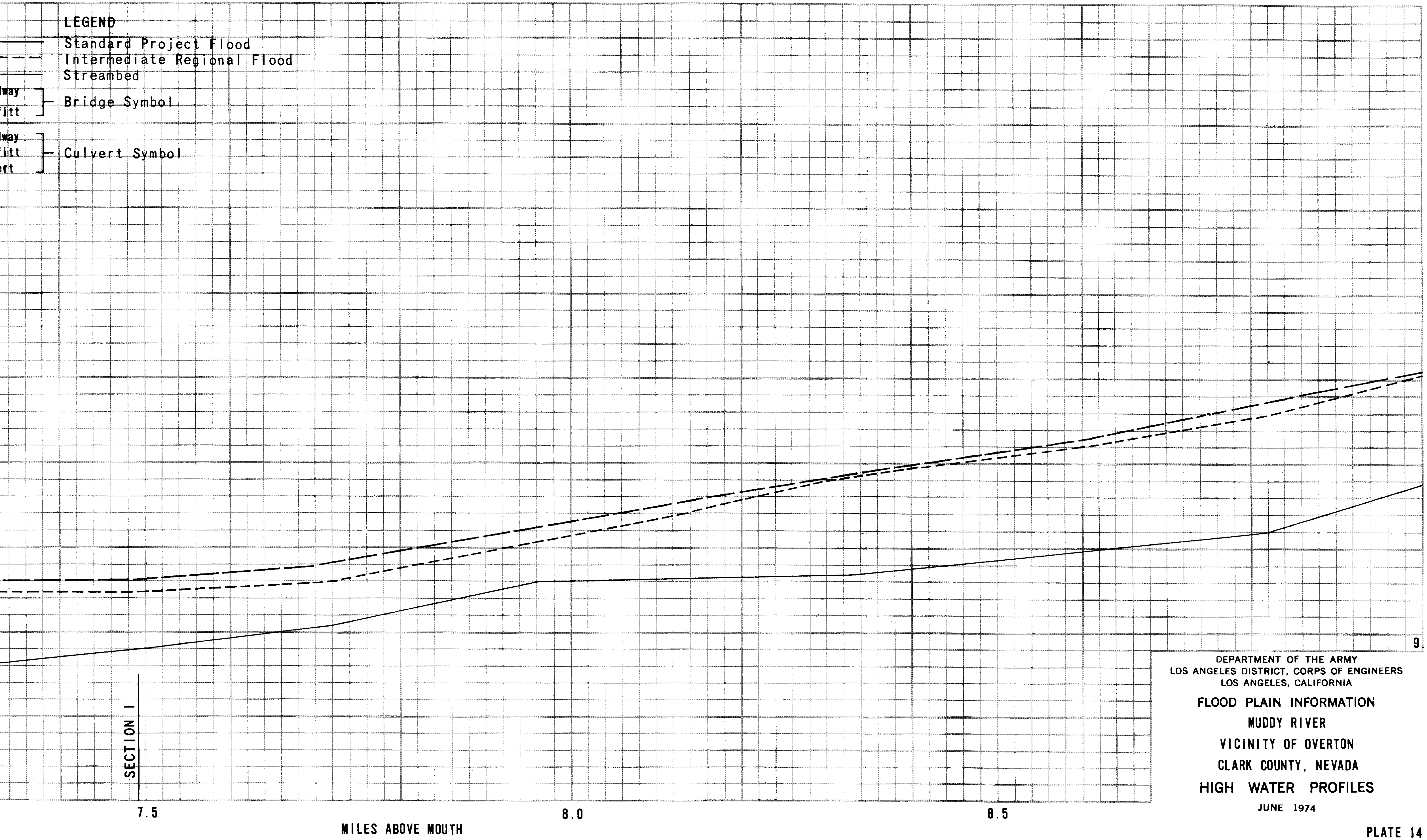
CLARK COUNTY, NEVADA

FLOODED AREAS

JUNE 1974

PLATE 13


MATCH TO PLATE 12

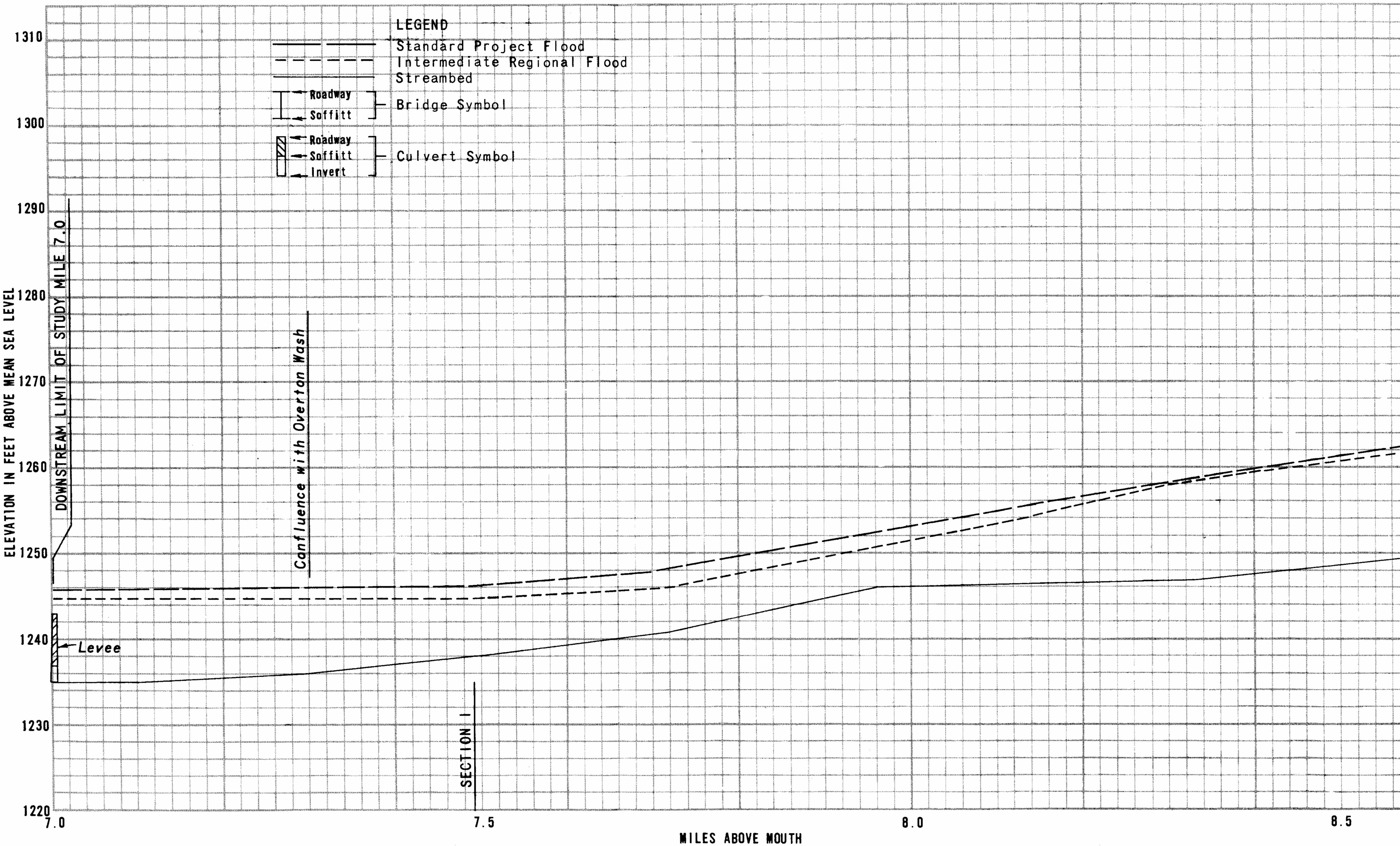


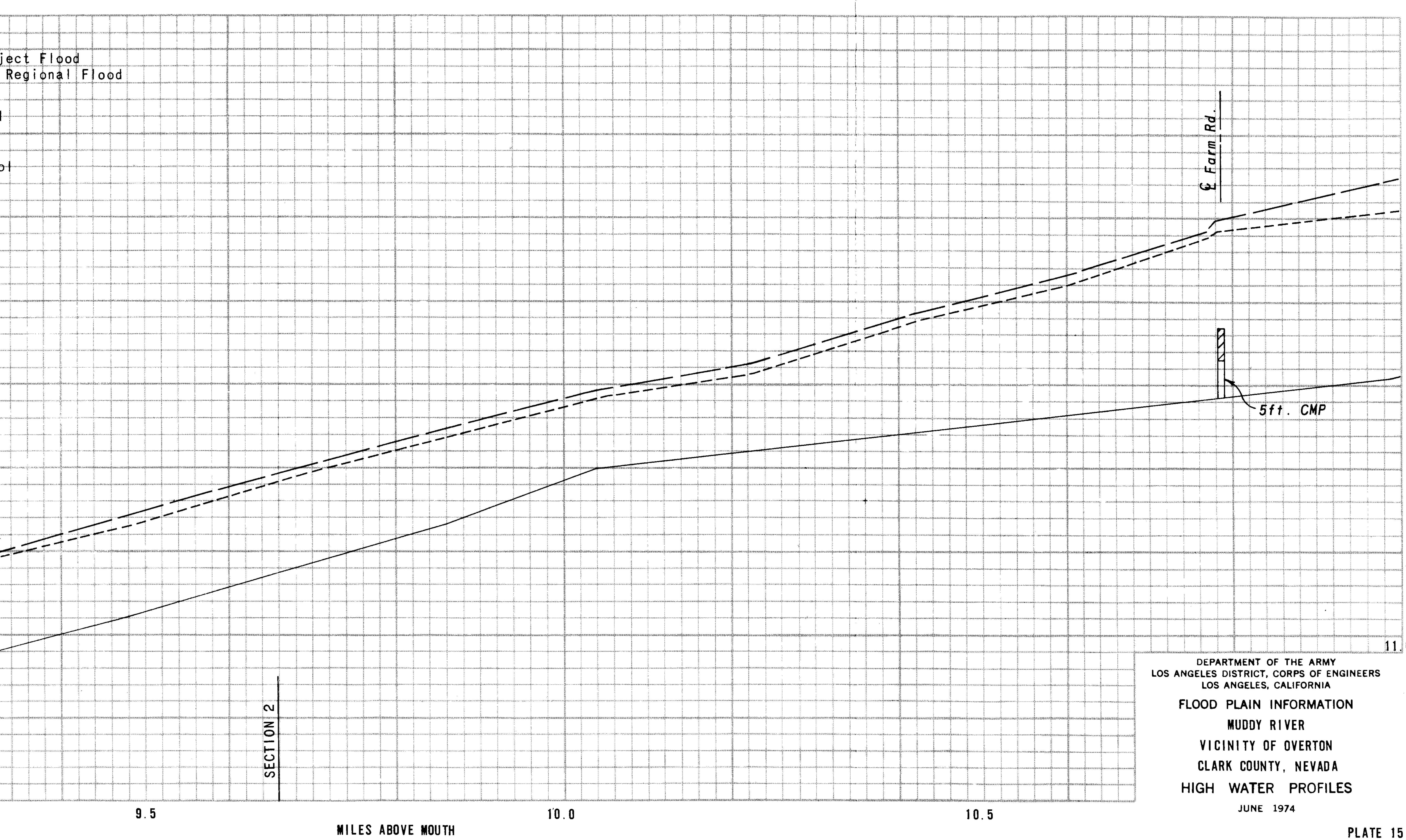

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION
MUDDY RIVER
VICINITY OF OVERTON
CLARK COUNTY, NEVADA
HIGH WATER PROFILES

JUNE 1974

PLATE 14


LEGEND
Standard Project Flood
Intermediate Regional Flood
Streambed
Roadway
Soffitt
Bridge Symbol
Roadway
Soffitt
Invert
Culvert Symbol
DOWNSTREAM LIMIT OF STUDY MILE 7.0
Confluence with Overton Wash
Levee
SECTION I
ELEVATION IN FEET ABOVE MEAN SEA LEVEL
1310
1300
1290
1280
1270
1260
1250
1240
1230
1220
7.0
7.5
8.0
8.5
MILES ABOVE MOUTH




DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER

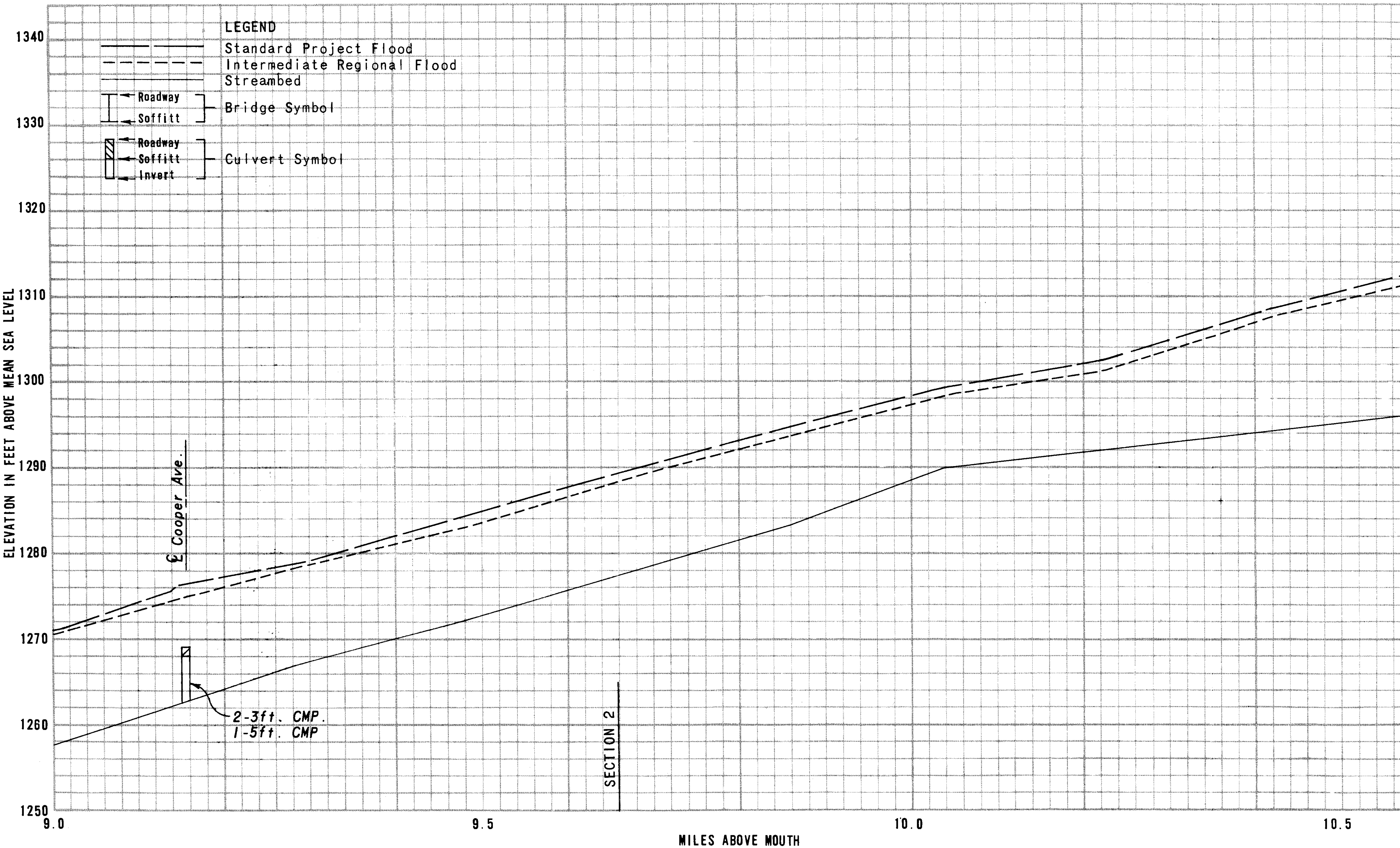
VICINITY OF OVERTON

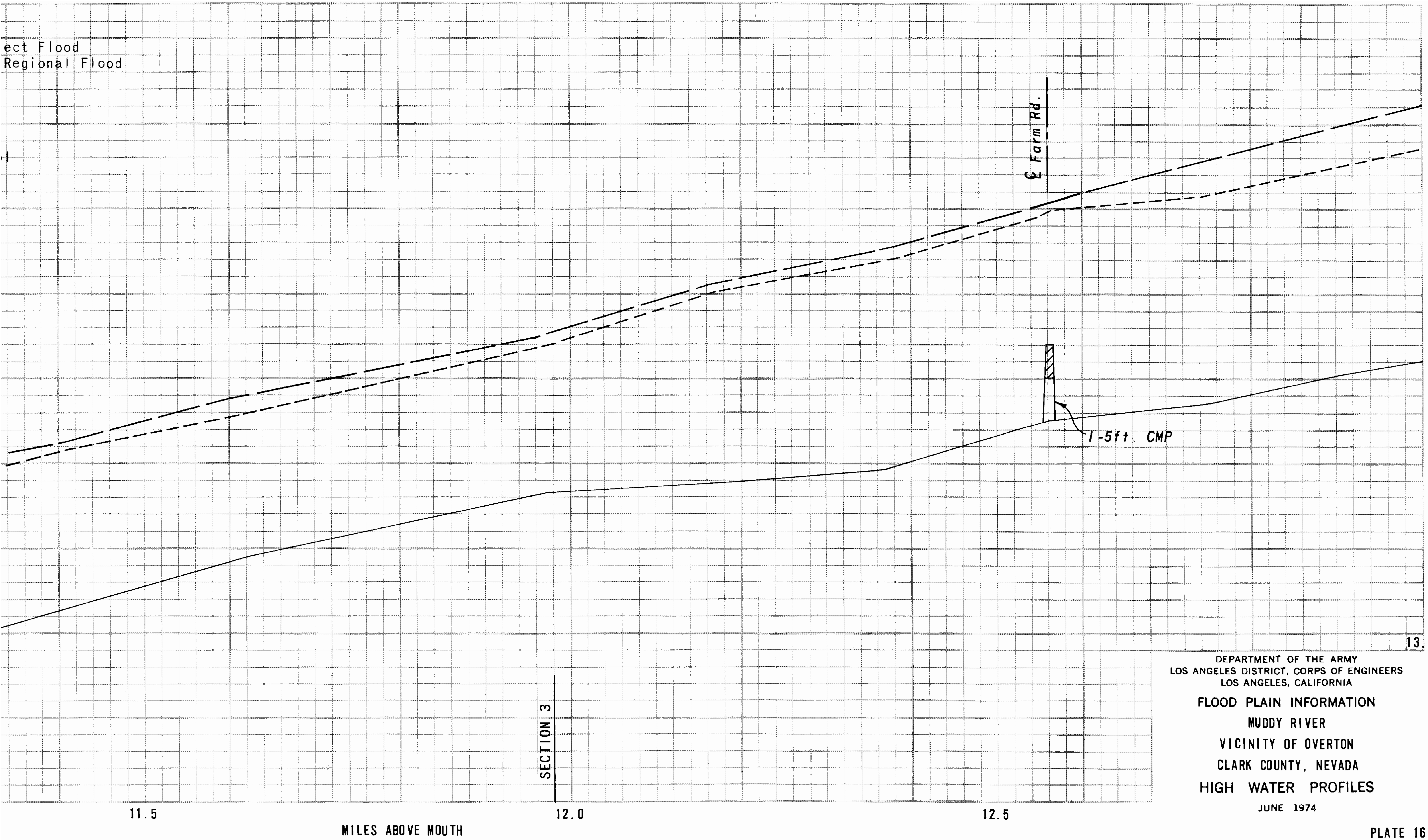
CLARK COUNTY, NEVADA

HIGH WATER PROFILES

JUNE 1974

PLATE 15


LEGEND
Standard Project Flood
Intermediate Regional Flood
Streambed
Roadway
Soffitt
Bridge Symbol
Roadway
Soffitt
Invert
Culvert Symbol
1340
1330
1320
1310
1300
1290
1280
1270
1260
1250
ELEVATION IN FEET ABOVE MEAN SEA LEVEL
℄ Cooper Ave.
2-3ft. CMP.
1-5ft. CMP
SECTION 2
9.0
9.5
10.0
10.5
MILES ABOVE MOUTH




DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

FLOOD PLAIN INFORMATION

MUDDY RIVER

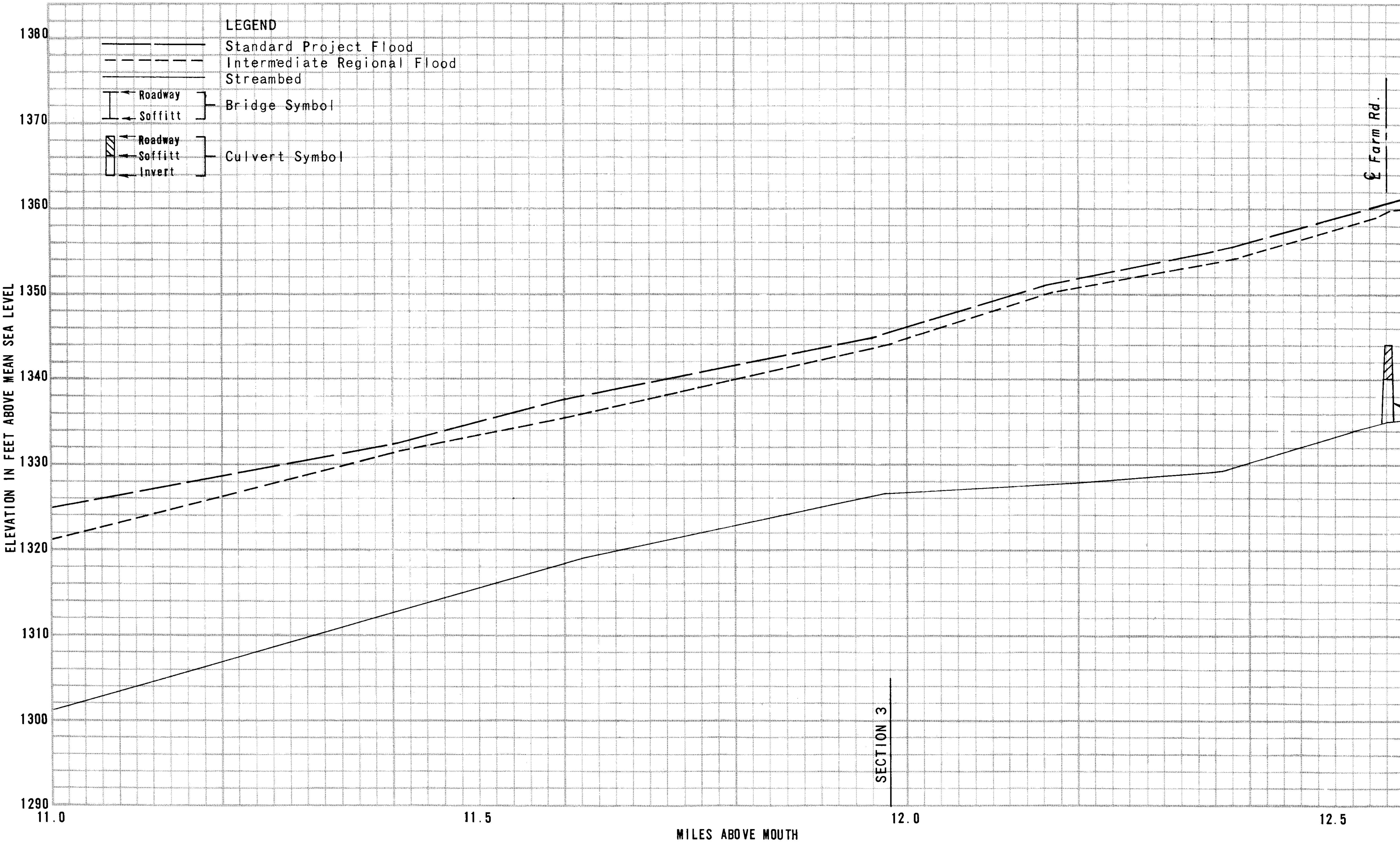
VICINITY OF OVERTON

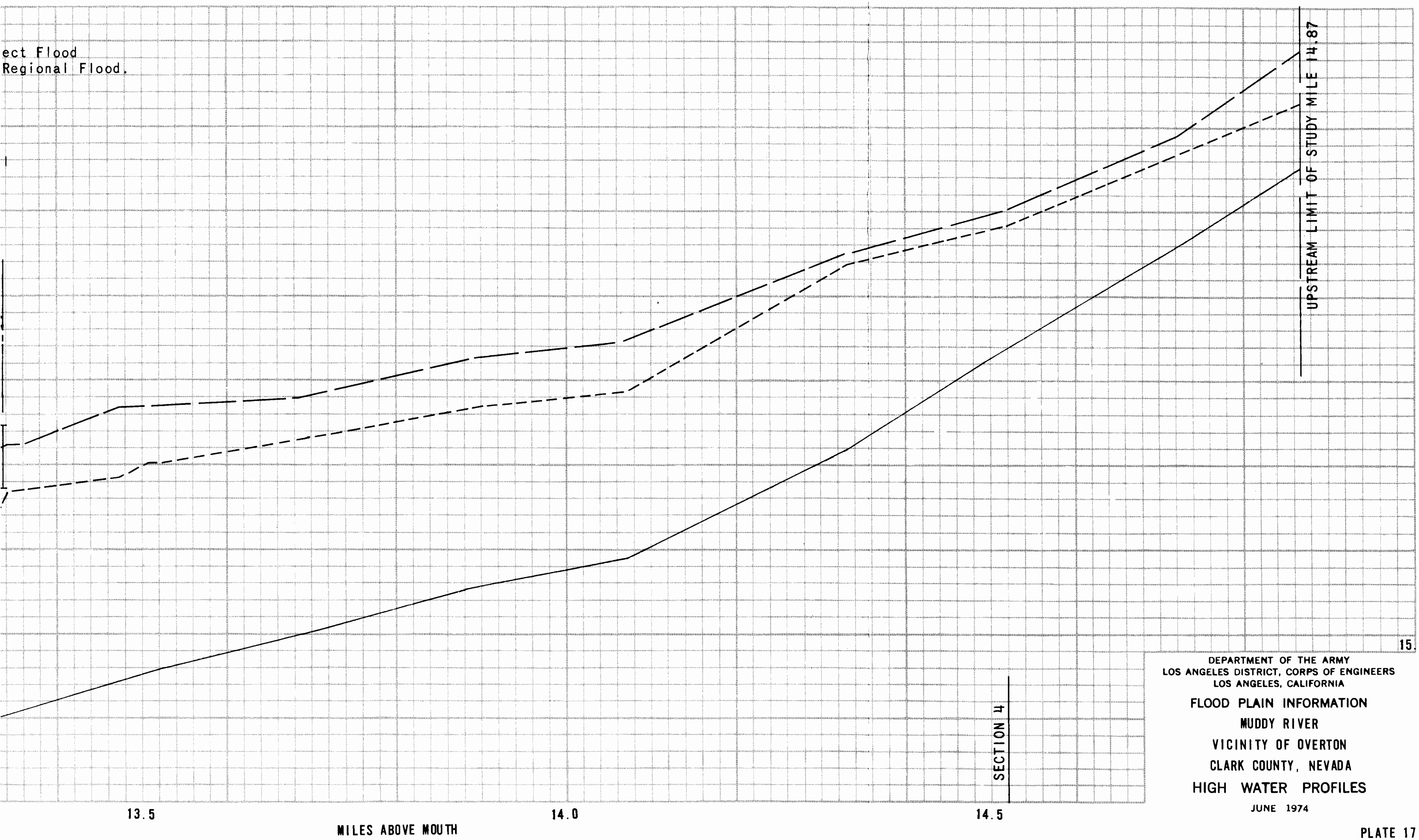
CLARK COUNTY, NEVADA

HIGH WATER PROFILES

JUNE 1974

PLATE 16

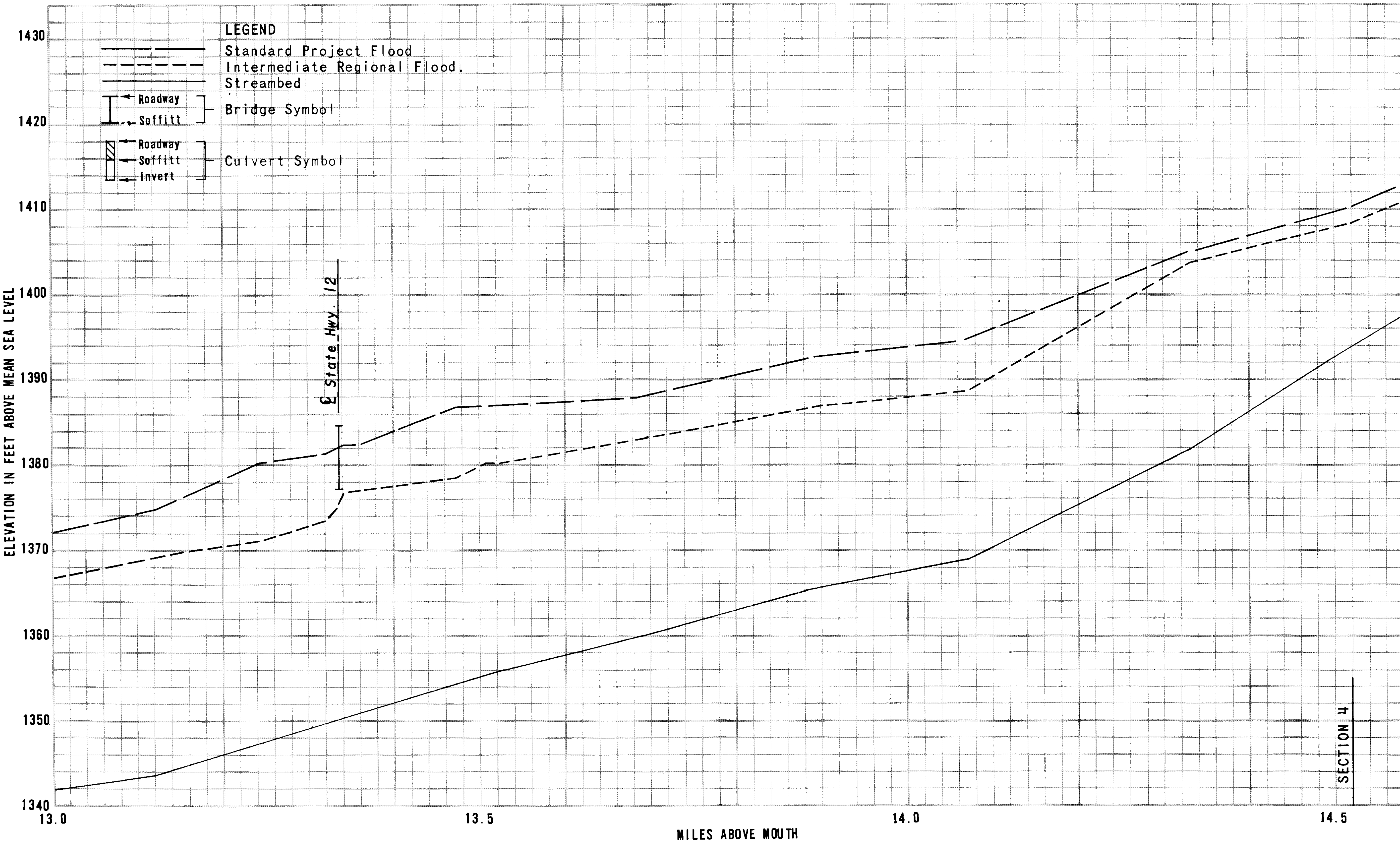

LEGEND
Standard Project Flood
Intermediate Regional Flood
Streambed
Roadway
Soffitt
Bridge Symbol
Roadway
Soffitt
Invert
Culvert Symbol
℄ Farm Rd.
SECTION 3
ELEVATION IN FEET ABOVE MEAN SEA LEVEL
1380
1370
1360
1350
1340
1330
1320
1310
1300
1290
11.0
11.5
12.0
12.5
MILES ABOVE MOUTH



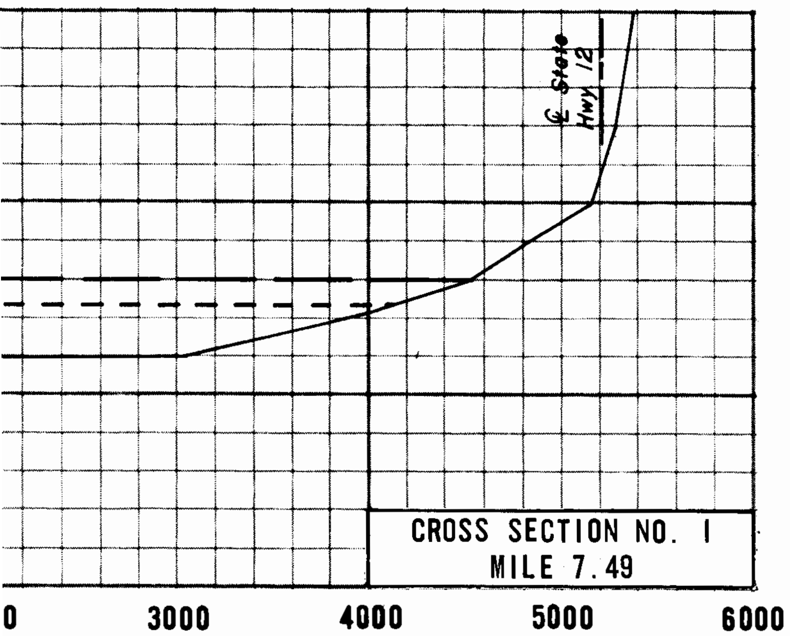

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

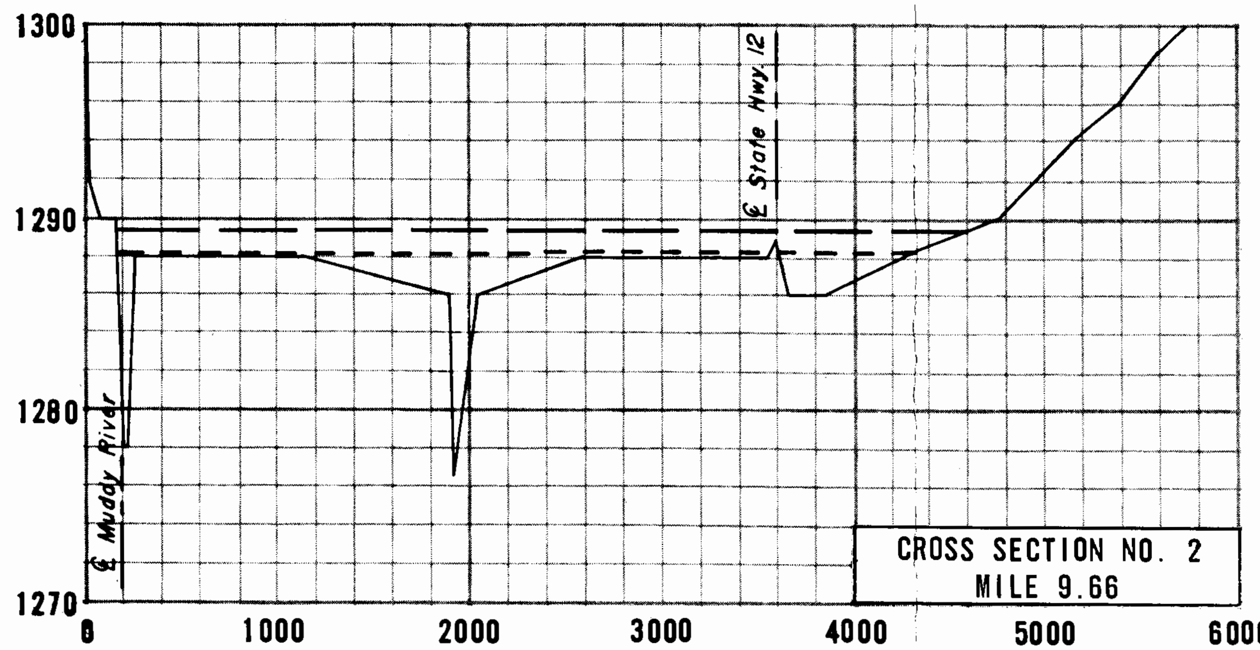
FLOOD PLAIN INFORMATION
MUDDY RIVER
VICINITY OF OVERTON
CLARK COUNTY, NEVADA
HIGH WATER PROFILES
JUNE 1974

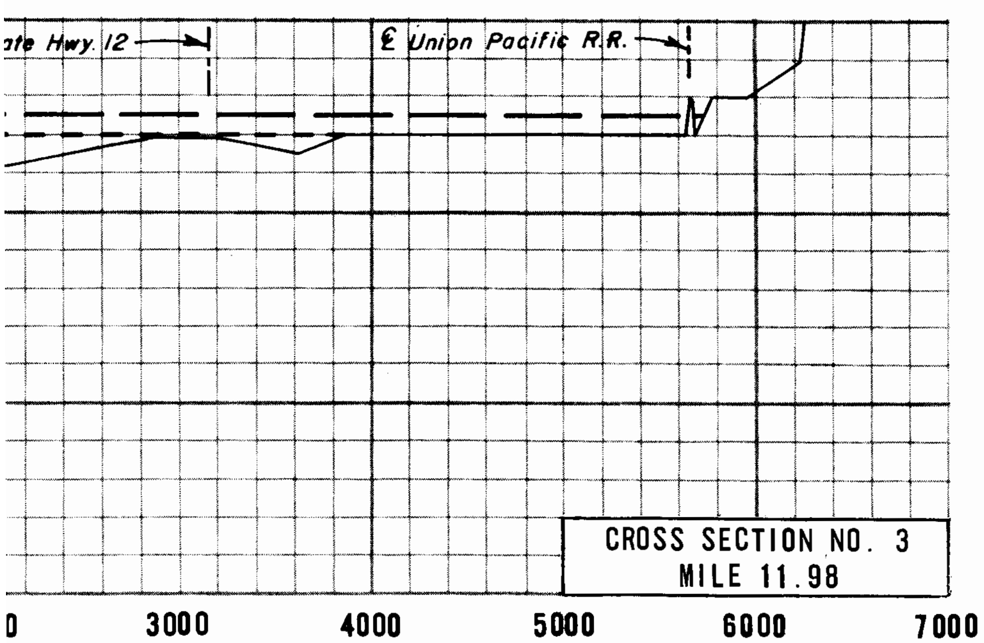
PLATE 17

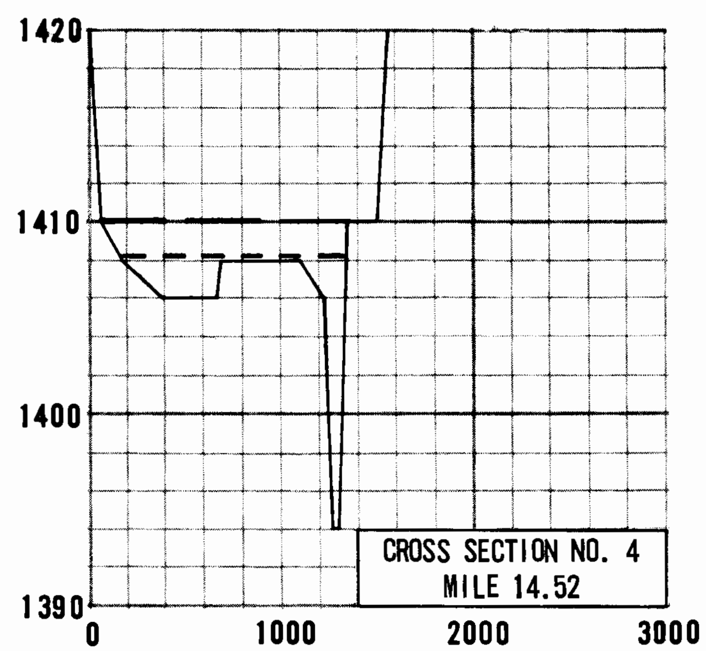


LEGEND
Standard Project Flood
Intermediate Regional Flood.
Streambed
Roadway
Soffitt
Bridge Symbol
Roadway
Soffitt
Invert
Culvert Symbol
℄ State Hwy. 12
SECTION 4
ELEVATION IN FEET ABOVE MEAN SEA LEVEL
1430
1420
1410
1400
1390
1380
1370
1360
1350
1340
13.0
13.5
14.0
14.5
MILES ABOVE MOUTH




## LEGEND

- Standard Project Flood
- Intermediate Regional Flood
- Streambed

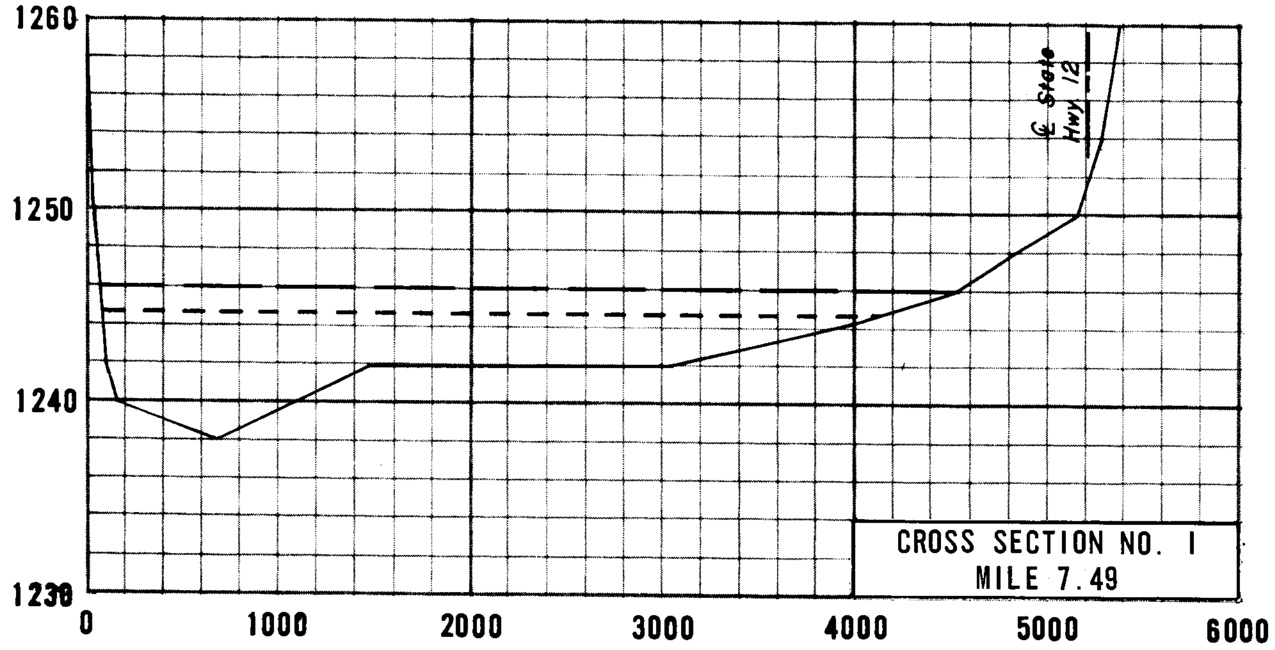
**NOTES:**

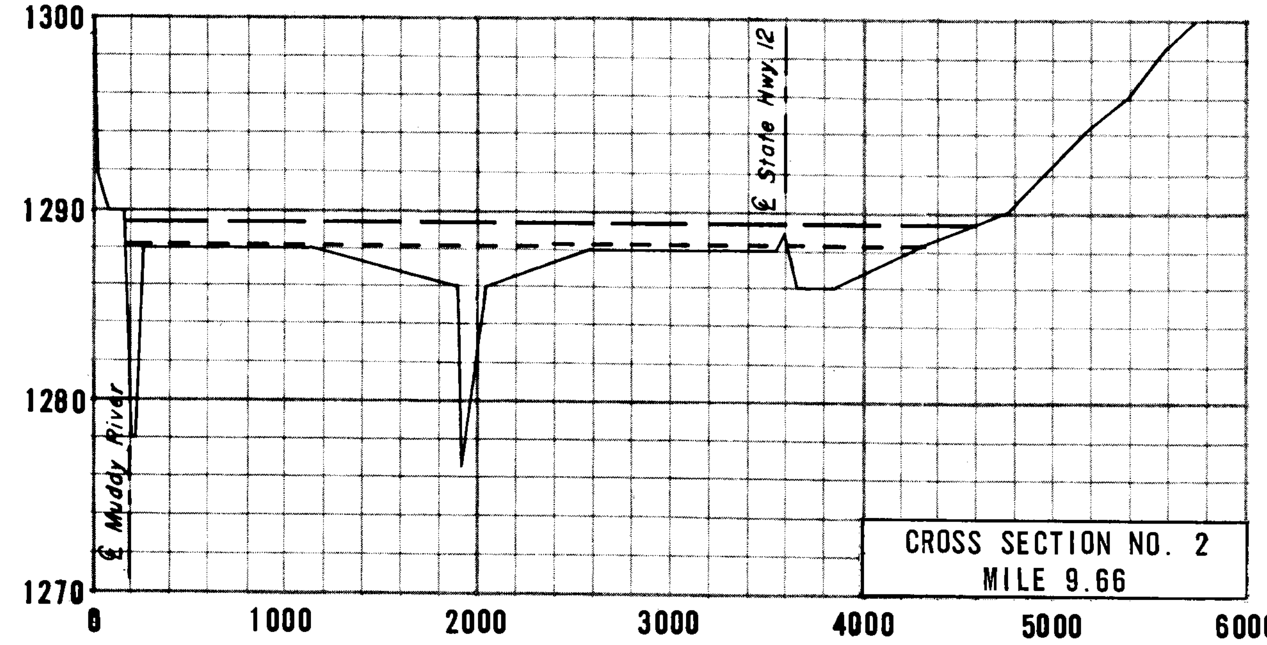
1. HORIZONTAL DISTANCE IN FEET.
2. SECTIONS TAKEN LOOKING DOWNSTREAM.
3. ADDITIONAL CROSS SECTIONS WERE TAKEN BUT NOT SHOWN AND ARE AVAILABLE AT THE DISTRICT OFFICE.

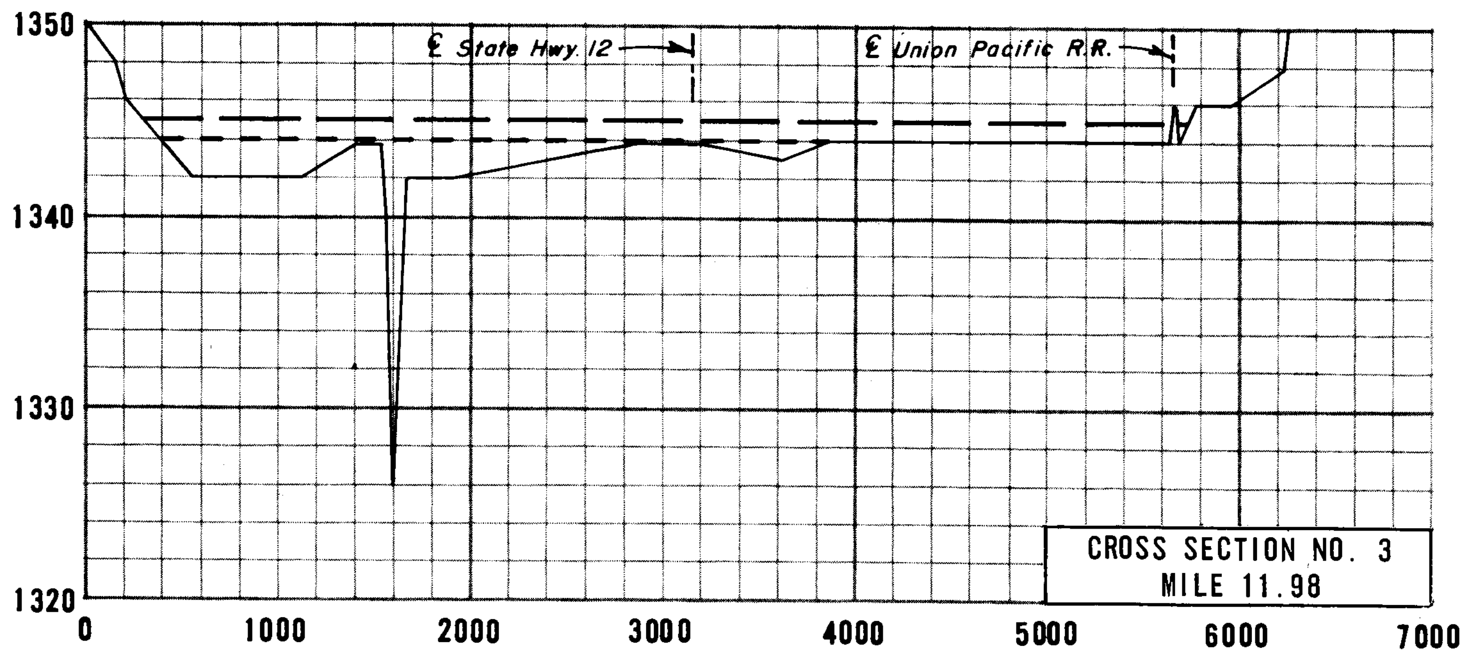
DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
LOS ANGELES, CALIFORNIA

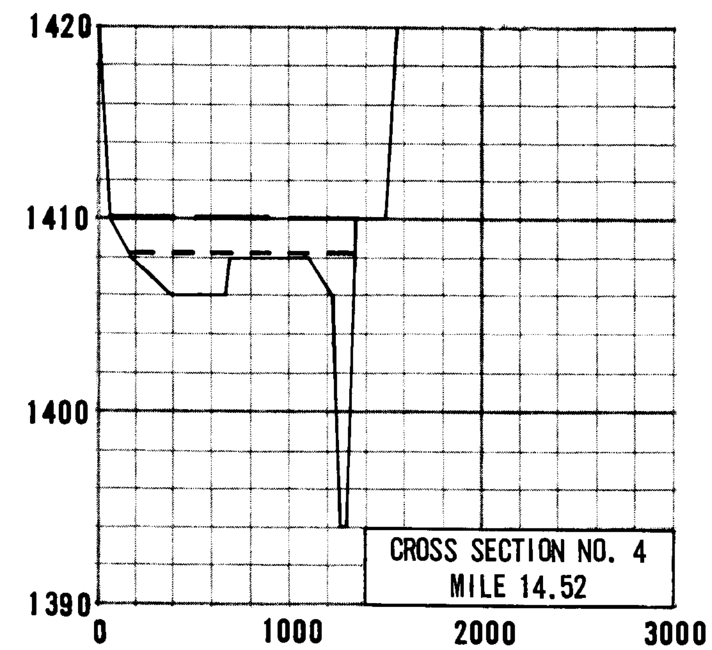
FLOOD PLAIN INFORMATION
MUDDY RIVER
VICINITY OF OVERTON
CLARK COUNTY, NEVADA
SELECTED CROSS SECTIONS
JUNE 1974

PLATE 18


1260
1250
1240
1230
0
1000
2000
3000
4000
5000
6000
℄ State Hwy 12
CROSS SECTION NO. 1
MILE 7.49


1300
1290
1280
1270
0
1000
2000
3000
4000
5000
6000
℄ Muddy River
℄ State Hwy 12
CROSS SECTION NO. 2
MILE 9.66


1350
1340
1330
1320
0
1000
2000
3000
4000
5000
6000
7000
℄ State Hwy 12
℄ Union Pacific R.R.
CROSS SECTION NO. 3
MILE 11.98


1420
1410
1400
1390
0
1000
2000
3000
CROSS SECTION NO. 4
MILE 14.52