FLOOD INSURANCE STUDY

CITY OF SALINAS, CALIFORNIA
MONTEREY COUNTY

MAY 4, 1981

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 060202

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1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Salinas, Monterey County, California, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert Salinas to the regular program of flood insurance by the Federal Insurance Administration. Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 24 CFR, 1910.1(d). In such cases, however, it shall be understood that the State (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by George S. Nolte and Associates, for the Federal Insurance Administration, under Contract No. H-4722. This work, which was completed in July 1980, covered all significant flooding sources affecting Salinas.

1.3 Coordination

Streams requiring detailed study were identified at a meeting attended by representatives of the study contractor, the Federal Insurance Administration, and the City of Salinas Planning Department in April 1978. Results of the hydrologic analyses were coordinated with the U.S. Army Corps of Engineers.

The following public agencies were contacted during the study to obtain basic data or information concerning previous studies and proposed construction or development within the flood plain: U.S. Army Corps of Engineers, San Francisco District; U.S. Geological Survey; U.S. Soil Conservation Service; State of California Department of Water Resources; State of California Department of Transportation; and Monterey County. In addition, local newspapers and private individuals also contributed information.

On July 8, 1980, the results of the study were reviewed at an intermediate/final meeting attended by representatives of the study contractor, the Federal Insurance Administration, and the City of Salinas.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated areas of the City of Salinas, Monterey County, California. The area of study is shown on the Vicinity Map (Figure 1).

Portions of streams and reaches agreed upon for study by detailed methods are as follows:

Gabilan Creek, from the confluence with Reclamation Ditch to the City of Salinas corporate limits

Natividad Creek, approximately 1350 feet within the City of Salinas corporate limits

Reclamation Ditch, from the downstream Salinas corporate limits to the corporate limits at the airport to the southeast

Santa Rita Creek, from U.S. Highway 101 to Russell Road

Those areas studied by detailed methods were chosen with consideration given to all known flood hazard areas and areas of proposed construction and forecasted development through 1985.

2.2 Community Description

The City of Salinas is located at the northern end of the Salinas Valley in northern Monterey County, in west-central California. The Gabilan and Santa Lucia Ranges form the limits of the valley as it extends southward. The city encompasses an area slightly in excess of 15 square miles. Salinas is located approximately 100 miles southeast of San Francisco, 350 miles northwest of Los Angeles, and 15 miles from the City of Monterey and the Pacific Ocean. The City of Salinas is entirely surrounded by unincorporated areas of Monterey County.

Prehistorically, the region that would ultimately become Monterey County was inhabited by Indians of the Costanoan group. The designation Costanoan is from the Spanish, Costanos, or "coast people" (Reference 1). The descendants of these indigenous peoples preferred the name Ohlone, "people of the west," which was given to them by the Yokuts, the Indian group living to the east in the San Joaquin Valley.

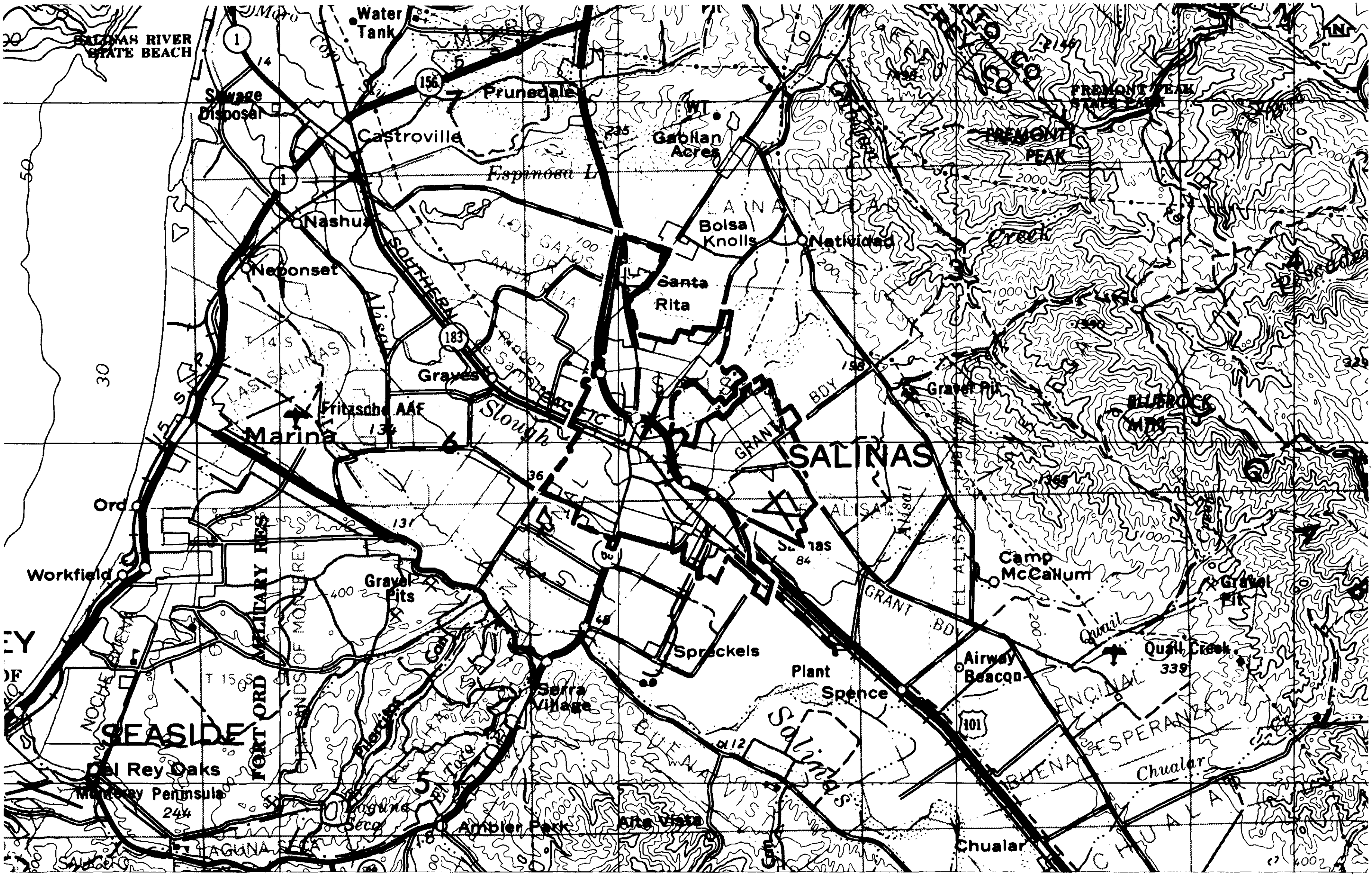

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

APPROXIMATE SCALE

2 0 2 4 6 MILES

VICINITY MAP

The Ohlone lived within the watershed lands from the Carquinez Straits on the north to Carmel River on the south. Their eastern boundary was the interior chain of the coast ranges, the Diablo Range. Thus, their territory included not only portions of Monterey County, but what is now San Francisco, San Mateo, Contra Costa, Alameda, San Benito, Santa Cruz, and Santa Clara Counties. Probably no more than 10,000 Ohlone were living in this large domain at any one time (Reference 1).

Recorded history began in the Salinas area with the coming of the Spanish. The earliest account of Monterey County dates back to 1542, when Juan Rodriquez Cabrillo, a Portuguese navigator sailing for Spain, briefly visited Monterey Bay and claimed it in the name of God and Philip II. He also named the small projection at the southern end of the bay, Punta de los Pinos (the Point of the Pines).

The next recorded visit was in 1602 when another Spanish ship sailed into Monterey Bay. This time a landing party led by Sebastian Vizcaino came ashore and claimed the land for Spain, naming it after the Count of Monterey.

In 1769, Don Gaspar de Portola, a career soldier and governor of the Californias, entered Monterey County by land with a group of conquistadores and padres. Approaching Monterey Bay from the Salinas Valley, at a point near present King City, Portola did not recognize it from Vizcaino's description, and, therefore, he traveled on and discovered San Francisco Bay.

The following year, with more success, Portola and his foot soldiers met renowned Franciscan Friar, Father Junipero Serra, who had arrived by sea on the shores of Monterey Bay. Mass was held under the same oak where Vizcaino had knelt 168 years before. Portola claimed Alta California again for the crown of Spain, and Father Serra formally founded the mission San Carlos Borromeo, second in the chain of 21 missions. With the assistance of the local Costanoan Indians, Father Serra later moved the mission to its present site alongside Carmel Bay.

In 1821, Mexico gained independence, an event with far reaching consequences for all of California. The missions were secularized and, under Mexican law, private citizens could petition for lands previously belonging to the missions. Hundreds of large land grants were created throughout the territory. American interest in California increased steadily. Mexico had little chance in its dispute with the United States, and with the treaty of Guadalupe Hidalgo in 1848, it surrendered all of the California Territory to the United States.

The City of Salinas was founded as the result of an accident which occurred in 1856. "Deacon Elias Howe was on his way from Monterey to the Natividad stage stop to establish a tavern. His wagon overturned on the banks of the Salinas River. He surveyed the area and the effort involved in repacking his goods and decided to establish his tavern in that location. Thus Salinas was born and named after the salt marshes which abound along the Salinas River's edge" (Reference 2).

The future of Salinas was made certain by the coming of the railroads:

> Salinas' strategic crossroads location, and the coming of the Southern Pacific Railroad in 1868, assured the City's future as a commercial, industrial and agricultural center, the choice for Monterey's county seat in 1872, and incorporation as a charted city in 1874 (Reference 2).

From the beginning, the Salinas economy has been tied to agriculture. In the 1850s and 1860s, Monterey County was devoted mostly to raising livestock. The displacement of the wild Spanish cattle by American livestock and dairy cattle brought about significant changes and altered the landscape. Towns emerged along the length of the Salinas Valley and population increased. Large ranchos were divided into smaller farms. Various crops, including hay, barley, and wheat, were grown in great quantities and dairy farms prospered. Salinas, by virtue of its strategic location, became a packing and shipping center, and a farm implement center supplying the needs of the Salinas Valley.

Agriculture and related activities continue to be dominant factors in the economy of Salinas. More than 400,000 tons of vegetables are processed annually in processing plants within the city. Each year approximately 50 million cartons and wooden crates are manufactured locally to pack and transport fresh market produce. The value of handling, processing, and marketing Salinas Valley products contributes nearly three-quarters of a billion dollars to the Monterey County economy annually. The city is developing as an industrial center as well, by virtue of its location, resources, and transportation facilities. As county seat of Monterey County, both government and education are well represented in the local economy of Salinas.

The pattern of current land uses within Salinas reflects the various elements of the economy. As noted, the city currently has an area in excess of 15 square miles, and a population of 78,100 as of January 1979. The majority of the city area is devoted to residential uses, providing homes and recreational facilities for residents.

Residential uses are served by well-developed retail business centers within the community. The original downtown area of Salinas has undergone recent transformation in the form of a mall. In addition, a new large shopping center is located in the northern section of town, the Northridge Shopping Center.

Within the city, nearly 1800 acres are zoned for select, light, and general industry. Most industrial expansion within Salinas will likely take place toward the south along U.S. Highway 101 (as shown by the Firestone Tire and Rubber Company plant, the Peter Paul Candy Manufacturing facilities, Smuckers, and similar facilities).

Salinas is served by an extensive network of highways and major arterials. U.S. Highway 101 connects Salinas with San Jose and San Francisco to the north and with King City and all points south to Los Angeles. State Highway 68 connects Salinas with the City of Monterey and the Pacific Ocean.

Major arterials within the city itself include Main Street, Abbott Street, Sherwood Drive, Natividad Road, and Sanborn Road running essentially north-south, and Market Street, Alisal Street, John Street, and Laurel Drive running east-west.

The City of Salinas is also served by rail and by air carriers. Amtrak operates two trains daily out of Salinas, and the Southern Pacific Railroad facilities carry the Salinas produce and other products north and south to San Francisco and Los Angeles and to all points across the country. The Salinas Municipal Airport, which is located on Airport Boulevard, serves private planes and charter flights. United Airlines and Hughes Air West provide interstate and intrastate flights from the Monterey Peninsula Airport located 15 miles from Salinas off State Highway 68.

Salinas is situated on a flat, alluvial plain, which lies between the Gabilan and Santa Lucia Ranges. The city rests upon the northern valley floor. Elevations within the city range from 40 feet to 120 feet; the elevation at City Hall is 55 feet. The city proper consists of basically level terrain; however, toward both the east (the Gabilan Range) and the southwest (Santa Lucia Range), this gives way to rolling foothills. These foothill areas in turn become steeper, graduating into the mountain ranges which flank the Salinas Valley.

The climate in Salinas is characterized by hot, dry summers, and cool, moist winters. From its earliest days, Salinas was recognized for its beneficial climate; its agricultural prowess attests to the general mildness of the weather. This beneficial environment continues, maintaining the Salinas area as the "Salad Bowl" of the nation. The average temperature in the Salinas area is 56°F.

Annual precipitation in Salinas averages approximately 15 inches, although in some years, in excess of 30 inches has been recorded. Most of the annual precipitation, approximately 98 percent, occurs during the period from October through May. Violent thunderstorms, snowfall, and other extreme weather conditions are rare. The marine influence from the Pacific Ocean exerts a moderating effect on the local climate. The average length of the growing season in Salinas is approximately 250 days per year, and there are over 300 cloudless days per year in the area.

The soils in the Salinas area are rich, alluvial deposits suitable for growing numerous crops. Erosion of the Gabilan Range to the east, and the Santa Lucia Range to the west has been the source of the soils which now form the alluvial plain upon which Salinas rests.

Meandering creeks, which have their headwaters in the surrounding mountains, cross the flat, alluvial portions of Salinas. The soils which have been deposited in the area are from the most recent epoch of geological history, the Pleistocene.

Vegetation in the Salinas area is varied. The foothills are covered with a wide variety of trees and thick brush cover. The valley floor features eucalyptus, oaks, and varieties of fruit trees. Numerous cultivated trees and plants (including citrus) flourish throughout the city. Reflecting its climate, almost anything can be grown in Salinas, even palm trees.

The mountains and foothills surrounding Salinas are the source of the watercourses in the area. The principal streams which traverse the city include Alisal Slough, Gabilan Creek, Natividad Creek, Reclamation Ditch, Santa Rita Creek, and Salinas River. These watercourses have created flood conditions of varying degree on several occasions.

Drainage patterns in Salinas have been altered by urbanization; increased runoff poses a greater flood threat than in previous years. To accommodate the increasing runoff, the City of Salinas has developed an extensive system of channels and storm drains. Runoff originating in the city drains to these channels through the underground storm-drainage system. The general drainage pattern in Salinas is from south to north; all drainage is ultimately conveyed to Monterey Bay.

2.3 Principal Flood Problems

Flooding in Salinas occurs as the result of heavy rainfall and inadequate drainage. Carr Lake is a dry lake and is filled during periods of winter rainfall.

Investigation of flooding from 1911 through 1978 indicates that flood conditions and flood damage were experienced in portions of Monterey County in March 1911, January 1914, February 1922, November 1926, December 1931, February 1938, March 1941, January 1943, February 1945, January 1952, January 1956, April 1958, February 1962, December 1966, January and February 1969, February 1973, and February 1978. In rural areas, flooding in early years was often viewed as an asset rather than a liability. The need for water to irrigate agricultural crops outweighed the damage done by floodwaters. In later years, as development increased, damage became a more important consideration.

Following are descriptions of the flood years in the City of Salinas. The severity of the floods, and the relative development of the area, vary from year to year. Accordingly, the damage resulting from these floods reflects the prevailing conditions. Within the City of Salinas the most significant flood conditions occurred in the years 1911, 1914, 1941, 1952, 1958, and 1966. Flooding in January and February of 1969 was severe within portions of Monterey County, but was not particularly significant within the City of Salinas.

The headline in the March 8, 1911, issue of the Salinas Daily Index described storm conditions in the area graphically: "Disastrous effects of the storm in the Salinas Valley is unprecedented." The following account in the paper described the flood conditions within the general area:

> This storm was the most disastrous in the history of Monterey County and the damaged property is unprecedented. It is reported that more than 2,000 acres of valuable farming land has been destroyed along the course of the Salinas River by the cutting away of the banks of that stream, which is now a raging torrent, freighted with debris, from its source to its mouth on the Bay of Monterey, near Moss Landing... At 10 o'clock the river was said to be higher than at any time since the winter of 1862.

Flood conditions in areas which are now part of the City of Salinas were significant. In the Hilltown area, which is now within the corporate limits, conditions were described as follows:

> The situation at Hilltown is reported to be serious. At 8 o'clock last night the water which filled the road between Hilltown and the bridge, came up as far as Peterson's Hotel and Griffin's Tavern. This morning it surrounded both places and flooded them. The water is three feet deep on the ranch of Chapman Foster.

> The Buena Vista Road, on the westerly bank of the river, submerged in places. The same condition is reported at points south of Salinas, many of the ranches along the banks of the river are under water and it is not possible to get near the bridges.

The storms of January 1914 did significant damage throughout Monterey County. Bridges in King City, Soledad, Gonzales, Chualar, San Ardo, and Nacimiento were all washed out by raging floodwaters. Damage to these bridges was estimated to exceed $300,000 and damage to properties throughout the county came to over $1,000,000. Within the City of Salinas, conditions were also severe. The following account appeared in the January 26, 1914, issue of the Salinas Daily Index:

> Flood conditions prevailed today everywhere throughout the Salinas Valley. Bridges have been carried away, railroad trains tied up, telephone and telegraph service interrupted, and inestimable damage done as a result of the torrential rains of Saturday night and Sunday. Salinas has been isolated as far as communications south of Soledad and north to Castroville is concerned... All the buildings at Hilltown were flooded, and the water extended nearly a mile toward Salinas along the county road, reaching a point about 300 yards this side of the Chapman Foster place. Three years ago, when the river overflowed, the water just reached the Foster place.

In addition to the flood conditions in Salinas which resulted from Salinas River leaving its banks, other areas of the city were affected by flood conditions created by runoff and local drainage. As noted in the January 26, 1914, Salinas Daily Index:

> The flood conditions around Salinas are noticeable everywhere, especially in that section south of North Main Street and west of California, between town and the county hospital.
>
> This is a low-lying district drained by Carr's Ditch, which has proved inadequate to carry off the surplus water. The Gabilan Creek, on the west, has overflowed into this low-lying land and created a great lake that extends from North Main Street south as far as the eye can reach. The water comes almost to California on one side and the county hospital on the other. It is also backed up on the northeast until

> it reaches within a few feet of the houses forming the Japanese portion of the oriental quarter. Small lakes have also formed in other sections where the land is low and where the drainage is not good.

In December 1931, the Salinas area received near record precipitation. However, this rain was welcome in the area and did not cause flood conditions. The Salinas Index-Journal of January 2, 1932, noted: "The total precipitation for December was 7.55 inches. This comes near being a record.... Today dawned wet and chilly and at the noon hour the precipitation was slower but still in evidence. The Salinas River, which had given some fear last week, had dropped some." Other areas of the county, particularly the Carmel Valley, suffered much more from these December storms.

In February 1938, Salinas River again flooded. The headline in the Salinas Index-Journal of February 12 stated: "No, not the Mississippi -- just the Salinas River." Conditions within the city itself were not severe. However, flood conditions existed very close to the corporate limits:

> Water covered 1,000 acres around the river bridge of the Salinas-Monterey Highway two miles southwest of Salinas. At the bridge, the highway was under 5 feet of water. The Spreckles Road was closed on its northern end, where it joins the Monterey Highway. The Riverside Hotel, at the junction, was completely surrounded by water.

The winter of 1940-1941 produced flood conditions within the City of Salinas late in the season. As recorded in the March 4, 1941, issue of the Salinas Index-Journal:

> Salinas was shaking off the shackles of a storm Tuesday which left the community all but marooned Monday night when flood waters halted rail and automobile traffic in several directions...
>
> Lowland sections adjacent to Salinas, particularly in east Salinas, were inundated with water at a depth of 20 inches at some points. Boats were pressed into service to evacuate families in homes where the ground floors were flooded.
>
> The Toro Bridge on the Salinas-Monterey Highway will be closed for an indefinite period after it was undermined by raging flood waters of Toro Creek Monday night, as the State Highway maintenance crews found it necessary to allow water to subside in the street for repairs to be effected.

> East Market Street is now under water between Griffin and Madeira Streets. The north section of East Salinas is flooded to varying depths up to 20 inches and water at the south end of Griffin Street rose to the running boards of automobiles. Merced and Neil Streets were also impassable.

A dramatic storm hit the Salinas area in February 1945. However, due to the prevailing dry conditions, no appreciable damage resulted from this downpour. The following account appeared in the Salinas Californian on February 2, 1945:

> Heavy rains which drenched Salinas and Monterey County yesterday and last night brought a total of 1.69 inches of rainfall in a 36-hour period...
>
> The heavy rainfall was generally all over the county, including the southern section of the county, with a report from San Lucas of 3.82 inches for the entire storm. The downpour ended one of the driest spells on record for this time of year and was welcomed by farmers and cattlemen all through the state.
>
> Little damage was reported in this locality, all creeks were up but there were no floods.

The year 1952 was another of the significant flood years within the City of Salinas. The traditional areas of the city which were prone to flooding again experienced severe conditions. As noted in the Salinas Californian of January 16, 1952:

> The rampaging Salinas River, swelled by 6 days of heavy rain, today had left its banks, flooded Spreckles Junction and forced evacuation by boat of several families in that area and also in Salinas on East John Street. The Salinas-Monterey Highway was closed at Spreckles Junction bridge and probably will not be opened until tomorrow...
>
> Old-timers said the river was the highest it has been since the 1911 flood, and reports this morning from King City said that the stream in that area was rough and high. A crest of the river was expected today when water from yesterday's rain in the mountains reaches this area...

> Three families were moved from homes in East John and Madeira Streets yesterday afternoon and temporary housing was furnished by the County Housing Authority. Five adults and six children were removed and city work crews were working to clear the area of water.

The Carr Lake area within the City of Salinas also experienced flood conditions.

The City of Salinas was threatened with potential flood conditions in January 1956. However, conditions never reached a critical stage as described in the Salinas Californian of January 26, 1956:

> Rainfall in the Salinas Valley yesterday and this morning has raised the level of the Salinas River to an all-time high. The crest passed Spreckles about 10:30 a.m. and forced the closing of the Hilltown bridge early this afternoon.
>
> There was more water in the river now than was the case in the pre-Christmas storms (1955). However, the water is flowing faster this time, principally because most of the brush and leaves in the channel were washed away during the Christmas rains.

Conditions never did worsen, and the Hilltown bridge and other areas within the City of Salinas were spared damage.

The torrential rains of early April 1958 brought flood conditions to numerous counties in northern California. Monterey County was no exception. However, the City of Salinas fared better than other areas in the county, with only localized minor flood conditions. At Hilltown, the conditions exceeded those which were experienced in 1956. As noted in the Salinas Californian, On April 3, 1958:

> The first crest of the Arroyo Seco was expected to hit the Hilltown bridge in Salinas about 12 noon today, with a second higher crest due early tomorrow. This flood water is being supplemented by overflow from Nacimiento Dam as water started over the spillway this morning at 4:35 a.m., the first time in history.
>
> The County estimates the Dam is holding back enough water to cover 355,000 acres with one foot of water, which is 5,000 acre feet more than capacity.

Salinas River did subsequently overflow its banks at the Hilltown bridge, closing the road to traffic.

The Salinas Californian carried the following account of flood conditions of February 9, 1962:

> Heavy rains fell on Monterey County last night and this morning, leaving more than one inch of water throughout the Salinas Valley...
>
> In Salinas... there was some flooding along South Abbott Street, in front of the California Rodeo grounds, on North Main Street, along Nacional Street and Pacific Park, and at the end of Palma Drive in Serra Park.

Salinas River did not leave its banks, and the flooding described above was the result of localized drainage problems.

Flood conditions along the length of Salinas River caused extensive damage during the January storms of 1966. Most of this damage was to agricultural crops; over 32,000 acres were inundated at an estimated damage of $6,572,000. The City of Salinas experienced some flooding and damage, although the rural areas and agricultural production were the most affected. As noted in the Salinas Californian, on December 6, 1966:

> North Salinas and the Alisal areas were hardest hit by the flooding, but downtown Salinas also had its share. Water came to within an inch of the door at the Wells Fargo Bank at Valley Center.
>
> East Romie Lane at Main Street was flooded, as were most of the intersections in southwest Salinas. Sewer pumps handling water from the area were going full blast but were unable to keep up with the runoff.
>
> The underpass on Alisal Street was closed from 3:00 a.m. to 11:00 a.m. today when it filled with water and mud from the slopes around it. In North Salinas, streets were running full, gutter to gutter, and water was up to the doorsteps on many homes. North Main Street at Alvin, Laurel and Gardenia Drives was flooded at press time today. Water was more than a foot deep in Crescent Park and stalled cars were left in the main part of the street or wherever they were stalled.

> The intersection of Bardin and Williams Roads, John Street at Sanborn Road, and the Cherokee Drive subdivision were also flooded. A four-foot deep drainage ditch in the area was overflowing and storm sewers weren't large enough to carry off the rainwater.

The year 1969 was perhaps the most severe flood year in Monterey County. There were two distinct floods, one at the end of January and the second at the end of February; each of these resulted in Monterey County being declared a disaster area. In each flood, both Salinas and Carmel Rivers went on a rampage. Damage from the storms was extremely costly. As noted in the Monterey Peninsula Herald of January 27, 1969, "County officials said they were certain that the $6.5 million flood damage caused along the Salinas River in 1966, of which 4 million was in Monterey County alone, would be exceeded."

Conditions within the City of Salinas, however, were not serious. As described in the Salinas Californian of January 27, 1969, "The river lapped near Foster Road in the Salinas area at its peak early this morning, flooding the City's oxidation ponds at the sewage treatment plant... Salinas officials are anxiously eyeing a heavy accumulation of water on runways at the Municipal airport."

One month later, Salinas River again flooded. Once more, the city was spared much damage. As noted in the Salinas Californian of February 26, 1969:

> The Salinas River, fast, deep and a mile wide, flowed at flood crest through the Salinas Valley this morning, cutting a swath of muddy destruction.
>
> Route 1 was closed at 10:30 a.m. at Twin Bridges near Nashville Road as the river's crest surged toward the ocean, overflowing the highway and drowning the artichoke field delta around Mulligan Hill.
>
> The City of Salinas, which underwent some anxious moments fretting about the possibility of urban flooding last night, remained high and dry as the crest passed. City and county officials had feared a breakthrough by the river in the old Alisal Slough near the Firestone Tire & Rubber Company plant south of town, and the possible intrusion of flood water into the City's industrial area. But it didn't come, although lake-like ponds of surface water now ring the entire Salinas area.

The month of February again brought flood conditions to the Salinas area as noted in the Salinas Californian of February 13, 1973:

> A fifth straight day of rain in the Salinas Valley created power failures, closed some Monterey County schools, and added to the mounting alarm of local farmers who face substantial revenue losses from the delay in planting spring crops...
>
> The principal flooding problem in Salinas has occurred on Williams Road near Alisal High School, according to Tom Wong, of the City Public Works Department. The water has been channeled down Williams Road from the foothills and nearby farmland, Wong said. But so far the flooding within the City hasn't been serious.

In 1978, flood conditions again occurred in the Salinas area. As noted in the Salinas Californian of February 13, 1978:

> Pounding weekend rains have left Salinas Valley farmers looking at an estimated $20,000,000 in flood damages today. Damage was concentrated along the banks of the Salinas River from San Ardo out to the sea.
>
> More than 20,000 of the Valley's 200,000 irrigated acres of farmland were covered with overflow waters from the Salinas River at some point Saturday or yesterday...
>
> The Salinas River has flooded over a number of south County roads, although those in the Salinas area have remained open except for Davis Crossing... Elm Avenue at the river had to be closed Friday when the water rose, and remains closed...
>
> The assessment of damages, exceeding those of even the Valley's 1969 flood, comes today from Flood Control Engineer Loren Bunte who said that the $20,000,000 estimate is based on his staff's assessment of damages as extensive but perhaps not quite as severe as those of 1969, placed at about $16,000,000. Allowing for inflation, that puts the new flood at about $20,000,000 he said.

Figures 2, 3, and 4 show historic flooding in Salinas.

Figure 2. Reclamation Ditch Flooding, Downstream of East Main Street, January 27, 1956

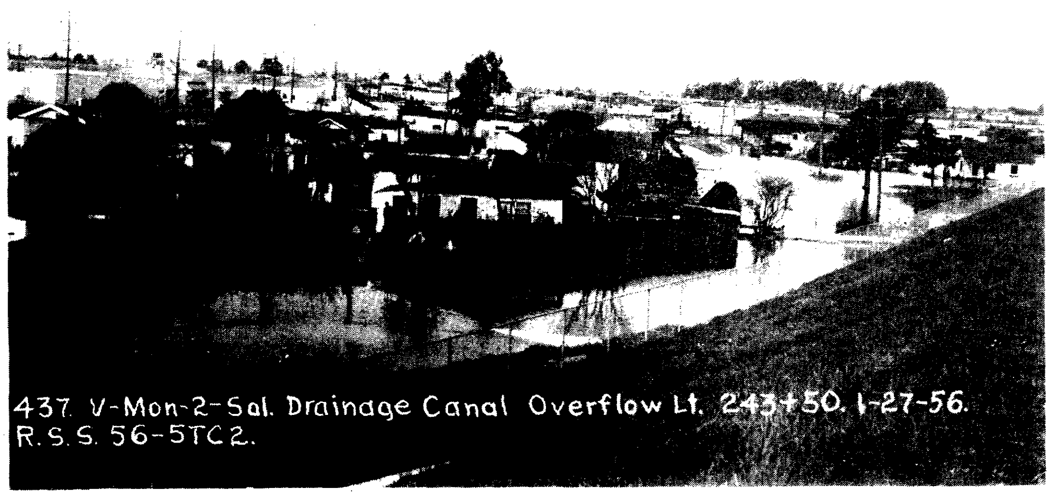

Figure 3. Reclamation Ditch Flooding, Upstream of Carr Lake Near U.S. Highway 101, January 27, 1956

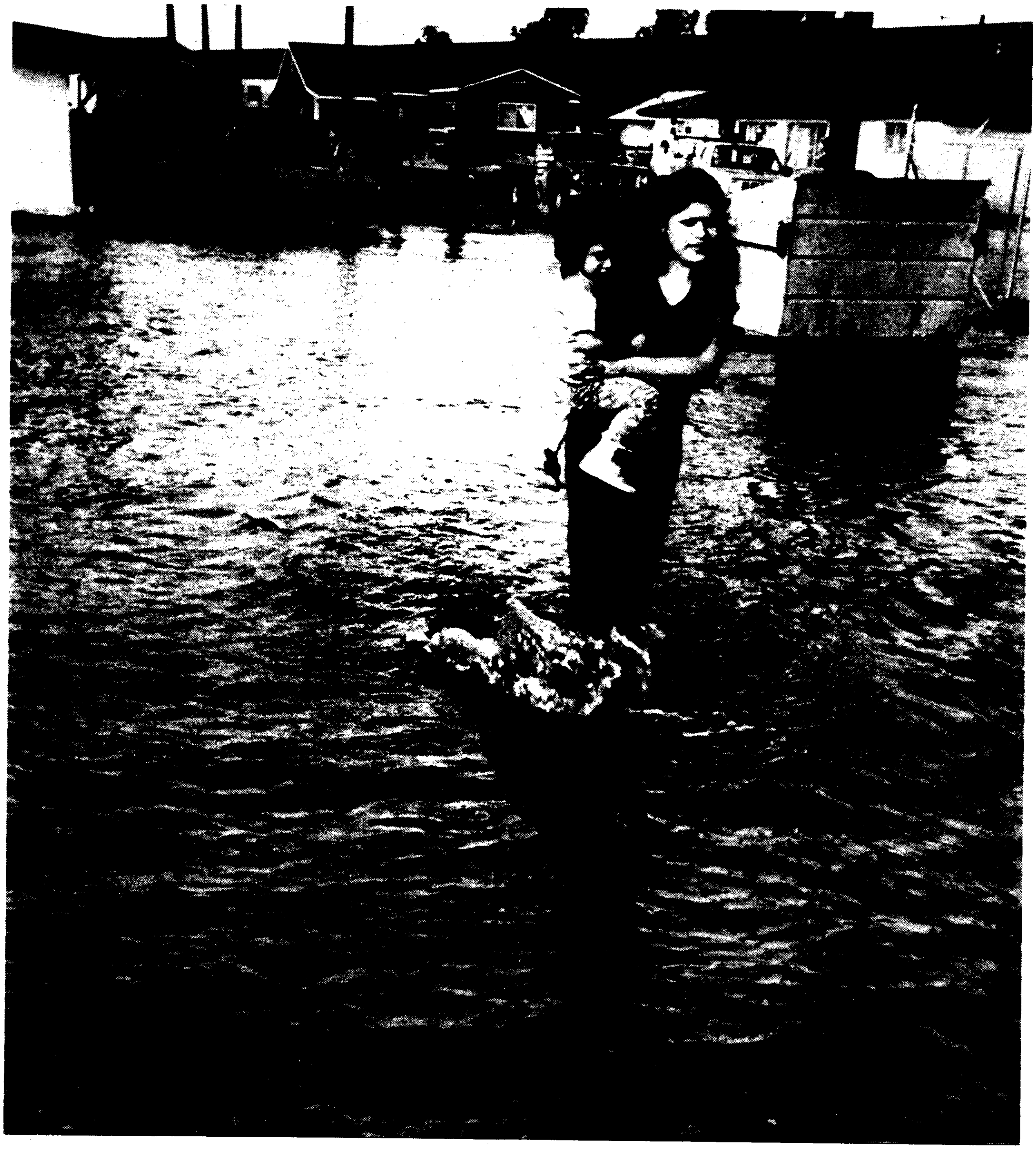

Figure 4. City of Salinas Flooding, 1973

2.4 Flood Protection Measures

Two flood protection projects have been completed in the City of Salinas: Reclamation Ditch, constructed by local interests to replace Alisal Slough, which meandered through the city; and channel improvements for Santa Rita Creek between U.S. Highway 101 and Russell Road, including concrete lining of the channel between U.S. Highway 101 and Santa Rita Street. The concrete lining on Santa Rita Creek has the effect of confining the 100- and 500-year flow along the channel between U.S. Highway 101 and Santa Rita Street.

Two existing dams provide some measure of flood protection to the City of Salinas. Salinas Dam, located on Salinas River near Santa Margarita in San Luis Obispo County, was completed in 1942 as a water-supply facility for Camp San Luis Obispo. The dam is approximately 2 miles upstream from Pilitas Creek and 7.5 miles northwest of the Town of Pozo, and intercepts runoff from a drainage area of 112 square miles. The reservoir, Lake Santa Margarita, is presently operated for water-conservation purposes only, and has an estimated average annual yield of 14,000 acre-feet.

The dam impounds a usable water-supply capacity of approximately 26,000 acre-feet to its spillway crest, and has a maximum capacity of 44,500 acre-feet to the dam crest. The only dependable storage for flood control is spillway surcharge. The effect of reservoir operation on the discharge hydrograph near the mouth of the river at Spreckles is negligible.

Nacimiento Dam is located approximately 15 miles northwest of Paso Robles in San Luis Obispo County and is situated on Nacimiento River, a major tributary of Salinas River. The dam was constructed in 1957 by Monterey County, and intercepts runoff from a drainage area of 319 square miles. The reservoir impounds 350,000 acre-feet of which 150,000 acre-feet is for flood control. Ten thousand acre-feet dead storage lies below the outlet works invert level. The 150,000 acre-foot flood-control storage is equivalent to 8.76 inches of runoff. Two hundred thousand acre-feet (including the 10,000 acre-feet of dead storage) are for water conservation and recreation. The water is stored during periods of relatively high runoff and released during the dry periods. Most of the released water percolates into the gravelly streambed and goes into underground storage in the Salinas Valley from which it is pumped primarily for irrigation. Storage greater than 200,000 acre-feet occurs in the reservoir only during and just after major storms. Following a flood, the reservoir is drawn down to the 200,000-acre-foot level to provide storage for subsequent floodflows. Nacimiento has spilled twice since being constructed: in April 1958 and February 1969. The larger spill, 3000 cubic feet per second (cfs), occurred on February 25, 1969, at the same time that 3770 cfs were being discharged through the outlet works, for a total discharge of 6770 cfs.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual occurrence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

Flood hydrographs and peak discharges for the 10-, 50-, 100-, and 500-year floods for streams in the City of Salinas studied by detailed procedures were based on rainfall-runoff computations and statistical analyses of stream-gage records. Flood hydrographs for streams were generated using the U.S. Soil Conservation Service rainfall-runoff procedure. This procedure uses the basin area, unit hydrograph, soil type, ground cover, antecedent moisture conditions, and a storm rainfall depth and time distribution to develop a runoff hydrograph (Reference 3).

To ensure the validity of the procedure assumptions for the region, the runoff hydrograph was reconstituted for the February 10 and 11, 1973, storm at the El Toro Creek stream gage. The basin above the gage was divided into smaller subbasins and unit hydrographs were derived using the S-hydrograph technique. The soil types were taken from the U.S. Soil Conservation Service soil survey for Monterey County (Reference 4). The rainfall depths and time distribution from the Monterey County Flood Control and Water Conservation District rain gage at Mount Toro were used. Due to the pervious nature of the soil in the basin, it was necessary to modify the basic U.S. Soil Conservation Service procedure by the incorporation of a minimum infiltration rate. Estimates of minimum infiltration rates for each soil type were based on data from the county soil survey (Reference 4). The modified procedure produced a reasonable reconstitution of the 1973 hydrograph.

Natividad and Santa Rita Creeks flows were derived from the U.S. Soil Conservation Service model. Discharges and storage capacities for Carr Lake were determined in a report prepared by Monterey County for the Monterey County Master Drainage Plan (Reference 5).

The Reclamation Ditch flows were derived from the U.S. Soil Conservation Service model and further modified by storage discharge curves for Heinz and Carr Lakes. Heinz Lake is a dry lake located southeast of Salinas along Reclamation Ditch. As these derived flows were within 10 percent of the flows of the Carr Lake study flows (References 3 and 5), the flows derived from the U.S. Soil Conservation Service Model were used. For Gabilan Creek, the U.S. Soil Conservation Service model was used on a weighted-average basis along with statistical analysis of the stream gage and regional regression equations.

Peak discharge-drainage area relationships for Gabilan Creek, Natividad Creek, Reclamation Ditch, and Santa Rita Creek are shown in Table 1.

Elevations for floods of the selected recurrence intervals on Carr Lake are shown in Table 2.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of these flooding sources.

Cross sections for the backwater analyses of the watercourses were obtained from aerial photographs flown in September 1978, at a negative scale of 1:12,000 in rural areas and 1:6,000 in urbanized areas (Reference 6). All bridges, dams, and culverts were field checked to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Roughness factors (Mannings "n") for hydraulic computations were assigned on the basis of field inspection of flood plain areas. Specific creeks and roughness factors are listed as follows:

	Mannings "n" Values	
Flooding Source	Channel	Overbank
Gabilan Creek	0.03 - 0.05	0.03 - 0.10
Natividad Creek	0.03 - 0.04	0.01 - 0.20
Reclamation Ditch	0.03 - 0.04	0.03 - 0.04
Santa Rita Creek	0.03 - 0.05	0.02 - 0.06

Table 1. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
Gabilan Creek					
At Hebert Road, Northeast of Salinas	36.7	600	1500	2000	3100
Natividad Creek					
At Laurel Drive	10.0	190	560	700	1330
Reclamation Ditch					
Downstream of Heinz Lake Southeast of Salinas	39.0	330	430	470	540
Downstream of Carr Lake	100.0	610	910	1050	1300
Santa Rita Creek					
At North Main Street	4.2	160	400	465	810

Table 2. Summary of Elevations

Flooding Source and Location	Elevation (Feet)			
	10-Year	50-Year	100-Year	500-Year
Carr Lake				
Northeast of U.S. Highway 101	40.0	42.6	43.8	46.1

water-surface elevations of floods of the selected recurrence intervals were computed through use of the HEC-2 step-backwater computer program (Reference 7). Starting water-surface elevations for Gabilan Creek and Natividad Creek were based on coincident water-surface elevations from Carr Lake determined from the Monterey County Master Drainage Plan report for Carr Lake and Reclamation Ditch (Reference 5). Starting water-surface elevations for Reclamation Ditch and Santa Rita Creek were determined using the slope-area method.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are, thus, considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Areas where runoff in excess of storm-drain capacity would collect and pond were evaluated as part of a sheet flow flooding investigation.

Sheet flow is shallow overland flooding generally less than 3 feet deep and unrelated to or not readily associated with channel flooding and flood profiles. The water-surface elevations of sheet flow flooding are essentially independent of those along adjacent stream channels and are affected principally by obstructions in the flooded area.

Downstream of East Alisal Street, Reclamation Ditch overflows the left overbank and becomes ponded along the U.S. Highway 101 embankment and along an area of high ground between Bridge Street and Sherwood Drive.

These areas of shallow flooding and ponding were determined using surveyed and photogrammetric elevations, field investigations by experienced engineers, and hand calculations based on normal depths.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were developed photogrammetrically, using aerial photographs at a scale of 1:12,000 and 1:6,000 (Reference 6).

The boundaries for the ponding along Reclamation Ditch west of Carr Lake and U.S. Highway 101 were developed photogrammetrically using the aerial photographs referenced previously.

The 500-year flood plain boundaries were modified in urbanized areas to include areas of inadequate drainage for local runoff.

Flood boundaries for the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 1). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year flood boundary has been shown. Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the Federal Insurance Administration limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal-conveyance reduction from each side of the flood plain. Floodways were designated for the following watercourses:

For Gabilan Creek, equal-conveyance reduction was used in floodway computations for the entire detailed study reach. However, at intermittent cross sections throughout the study reach, a velocity increase greater than 1 foot per second was the controlling restriction rather than a 1.0-foot rise in water surface.

For Natividad Creek, equal-conveyance reduction was used in floodway computations for the entire detailed study reach, except immediately upstream from East Laurel Drive, where overbank storage must be retained to prevent increase in flows.

For Reclamation Ditch, equal-conveyance reduction was used in floodway computations for the entire detailed study reach. Just downstream from Carr Lake, maintenance of water-surface elevation in Carr Lake was the controlling restriction. The entire surface area of Carr Lake is retained as floodway to preserve storage.

For Santa Rita Creek, equal-conveyance reduction was used in floodway computations for the entire detailed study reach.

The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 3).

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 5.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Gabilan Creek								
A	4,482	880	5,447	0.4	50.0	50.0	50.8	0.8
B	5,431	397	1,572	1.3	50.1	50.1	51.1	1.0
C	6,566	242	318	6.3	53.9	53.9	53.9	0.0
D	7,510	89	689	2.9	62.5	62.5	63.5	1.0
E	8,400	45	221	9.0	62.6	62.6	63.6	1.0
Natividad Creek								
A	3,844	1,266/305[2]	7,824	0.1	43.7	39.6[3]	39.6[3]	0.0
B	6,358	498/10[2]	2,461	0.3	44.5	44.5	44.5	0.0
C	7,424	840/745[2]	6,800	0.1	44.5	44.5	44.5	0.0
D	8,415	710/428[2]	4,060	0.2	44.5	44.5	44.5	0.0
E	9,419	29/14[2]	108	6.5	44.5	44.5	44.5	0.0

[1] Feet Above Confluence With Reclamation Ditch [2] Width/Width Within Corporate Limits
[3] Elevation Computed Without Consideration of Backwater Effect From Carr Lake

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

FLOODWAY DATA

GABILAN CREEK-NATIVIDAD CREEK

TABLE 3

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Reclamation Ditch								
A	38,305	45	260	4.0	38.2	38.2	38.2	0.0
B	40,510	45	278	3.8	39.7	39.7	39.7	0.0
C	43,094	458	1,486	1.7	41.1	41.1	41.1	0.0
D	45,749	216	635	1.7	43.0	43.0	43.0	0.0
E	47,588	4,250	21,018	0.1	43.8	43.8	43.8	0.0
F	52,228	550	587	0.8	43.8	43.8	43.8	0.0
G	54,379	49	379	1.2	48.3	48.3	48.8	0.5
H	56,144	30	337	1.4	49.6	49.6	49.9	0.3
I	58,740	64	516	0.9	49.6	49.6	49.9	0.3
J	61,443	76	498	0.9	55.4	55.4	55.7	0.3
K	63,616	111	838	0.6	55.6	55.6	55.9	0.3
L	66,676	132/35[2]	1,298	0.4	56.7	56.7	57.0	0.3
Santa Rita Creek								
A	30,795	20	61	7.6	72.7	72.7	72.8	0.1
B	32,660	29	94	4.9	81.0	81.0	81.0	0.0
C	34,410	36	94	4.9	87.0	87.0	87.0	0.0
D	36,440	38	109	4.3	100.2	100.2	100.2	0.0

[1] Feet Above Confluence With Tembladero Slough [2] Width/Width Within Corporate Limits

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

FLOODWAY DATA

RECLAMATION DITCH-SANTA RITA CREEK

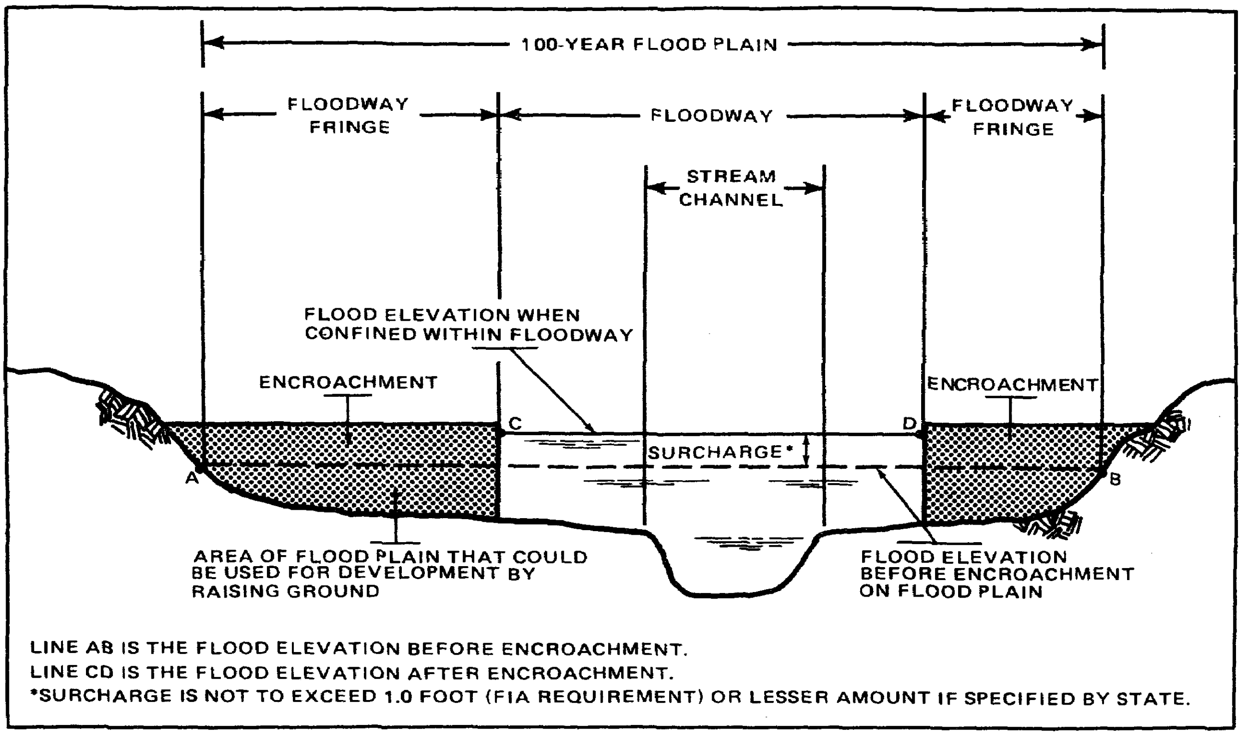

Figure 5. Floodway Schematic

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Insurance Administration has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source studied in detail affecting Salinas.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of Salinas are shown on the Flood Profiles (Exhibit 1) and summarized in Table 4.

5.2 Flood Hazard Factors

The FHF is the Federal Insurance Administration device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of Salinas was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone AH:	Special Flood Hazard Areas inundated by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feet; base flood elevations are shown, but no FHFs are determined.
Zones A2-A5, A7-A9, and A11:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
Gabilan Creek							
Reach 1	0003	-0.8	-0.1	0.5	010	A2	Varies - See Map
Reach 2	0003	-2.1	-0.5	0.8	020	A4	Varies - See Map
Natividad Creek							
Reach 1	0003	-4.6	-2.0	3.3	045	A9	Varies - See Map
Reach 2	0003	-2.1	-0.6	1.5	020	A4	Varies - See Map
Reclamation Ditch							
Reach 1	0002	-2.5	-0.6	1.0	025	A5	Varies - See Map
Reach 2	0002,0005	-3.7	-0.4	0.7	035	A7	Varies - See Map
Reach 3	0005	-5.6	-1.3	1.5	055	A11	Varies - See Map
Ponding	0002,0003	N/A	N/A	N/A	N/A	AH	45
Santa Rita Creek							
Reach 1	0001	-1.6	-0.3	1.1	015	A3	Varies - See Map
Carr Lake							
Reach 1	0002,0003	-3.8	-1.2	2.3	040	A8	44

[1] Flood Insurance Rate Map Panel [2] Weighted Average [3] Rounded to Nearest Foot

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

FLOOD INSURANCE ZONE DATA

GABILAN CREEK-NATIVIDAD CREEK
RECLAMATION DITCH-SANTA RITA CREEK-CARR LAKE

Zone C: Areas of minimal flooding.

The flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community are summarized in Table 4.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for Salinas is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Insurance Administration.

6.0 OTHER STUDIES

The Monterey County Master Drainage Plan for Carr Lake and Reclamation Ditch (Reference 5) included 100-year flows for Gabilan Creek, Natividad Creek, Reclamation Ditch, and Santa Rita Creek. The values in this Flood Insurance Study are between 485 and 600 cfs higher on Gabilan Creek and 105 cfs lower on Natividad Creek. The Monterey County Flood Control and Water Conservation District has accepted the Flood Insurance Study values for these streams. The Flood Insurance Study value for the Heinz Lake outflow was 410 cfs, while a value of 470 cfs was determined by the Monterey County Master Drainage Plan. Carr Lake outflow was found to be 970 cfs by the Flood Insurance Study and 1050 cfs by the Monterey County Master Drainage Plan. In both cases, the value given by the Monterey County Master Drainage Plan was adopted. The Monterey County Master Drainage Plan includes a stochastic analysis of the stream gage on Santa Rita Creek to obtain a 100-year flow of 510 cfs as opposed to the Flood Insurance Study value of 470 cfs. However, the stream gage does not fulfull the U.S. Water Resources Council Guideline criteria for stochastic analysis, and, therefore, the value determined for this Flood Insurance Study was used.

A Flood Hazard Boundary Map has been prepared for the City of Salinas (Reference 8). However, this study represents a more detailed analysis.

A Flood Insurance Study has been prepared for the unincorporated areas of Monterey County (Reference 9). Flooding information presented in these two studies are in general agreement.

This study is authoritative for the purposes of the National Flood Insurance Program; data presented herein either supersede or are compatible with all previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the Insurance and Mitigation Division, Federal Emergency Management Agency, 211 Main Street, Room 220, San Francisco, California 94105.

8.0 BIBLIOGRAPHY AND REFERENCES

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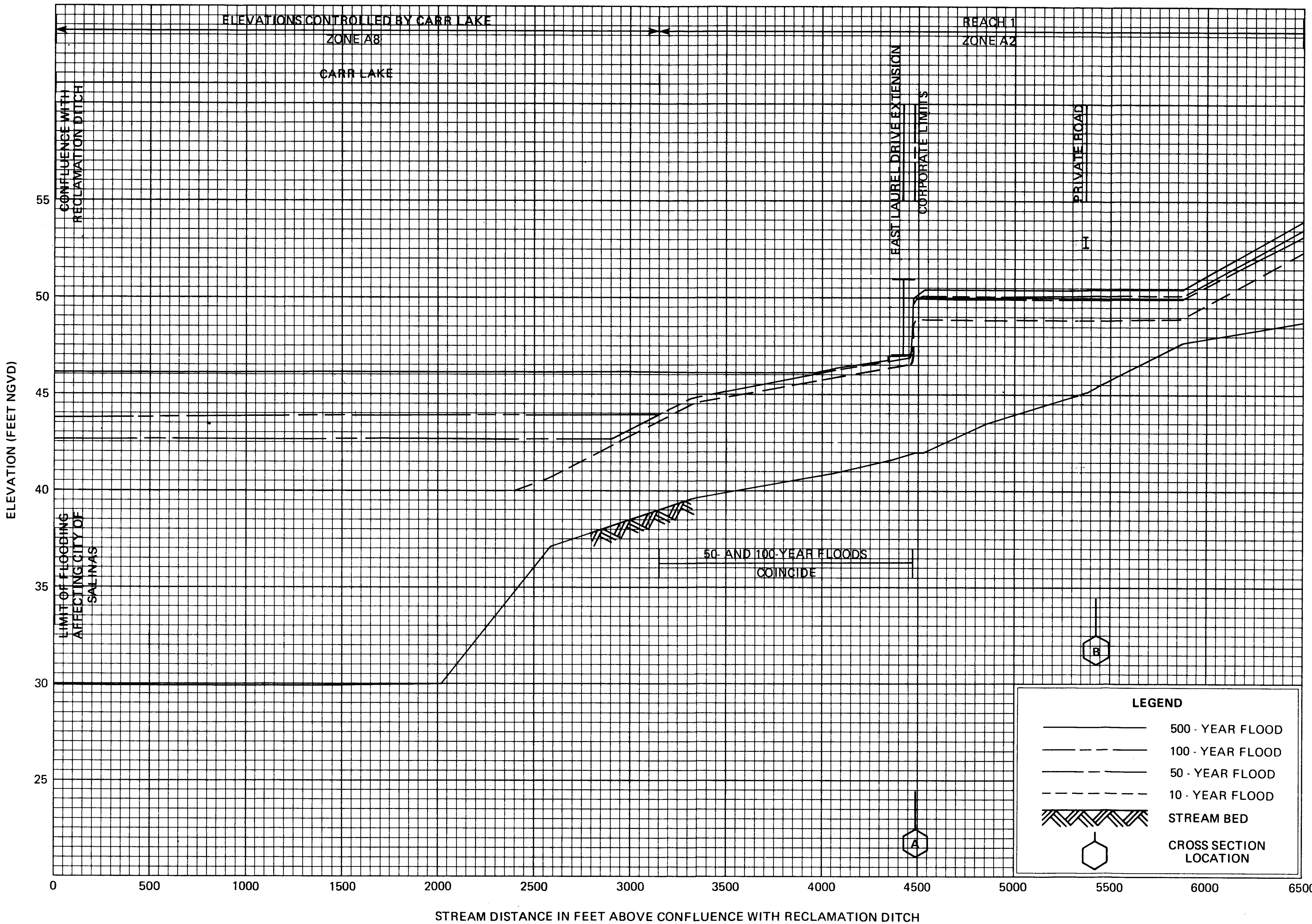


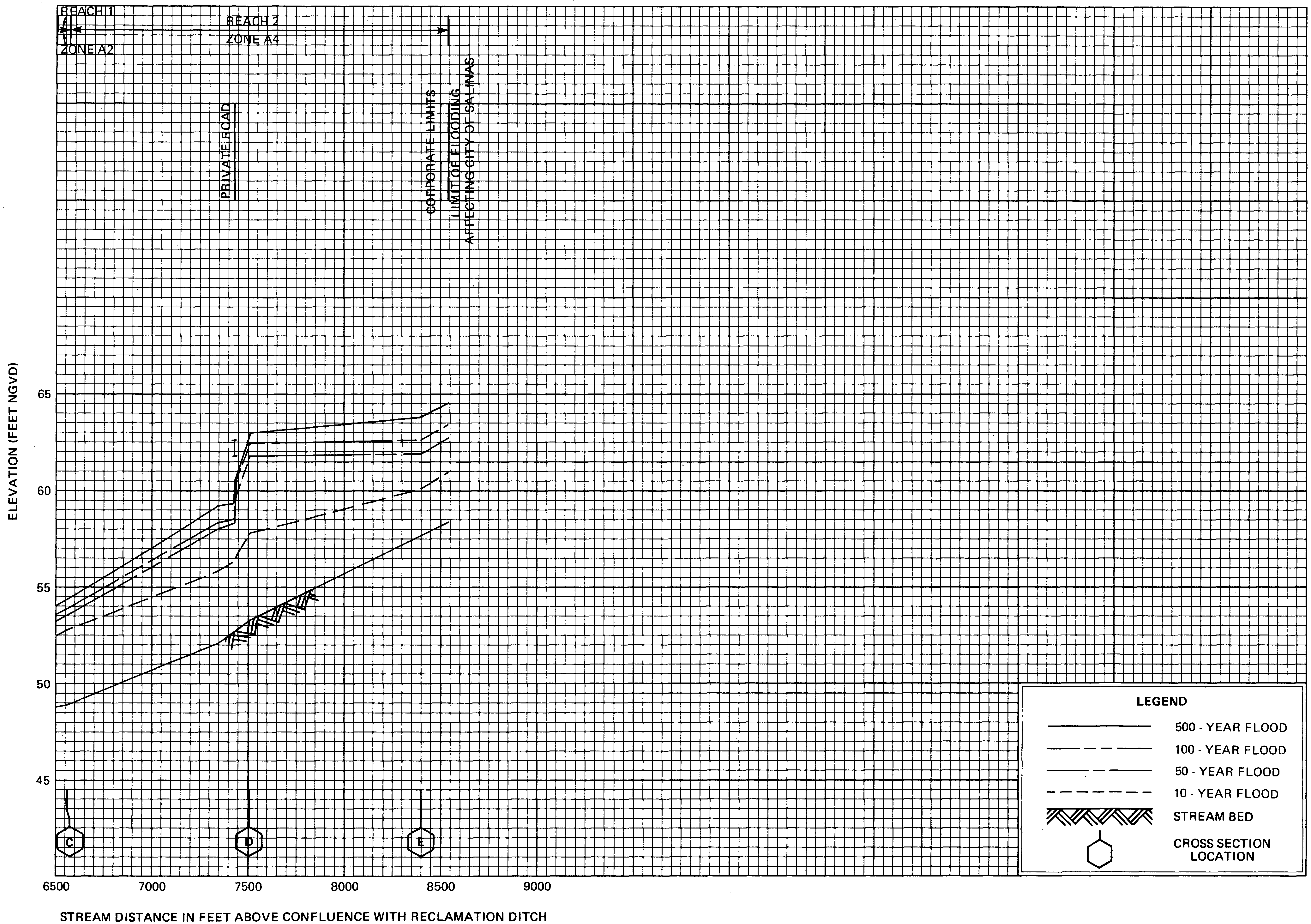
FLOOD PROFILES

GABILAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

01P



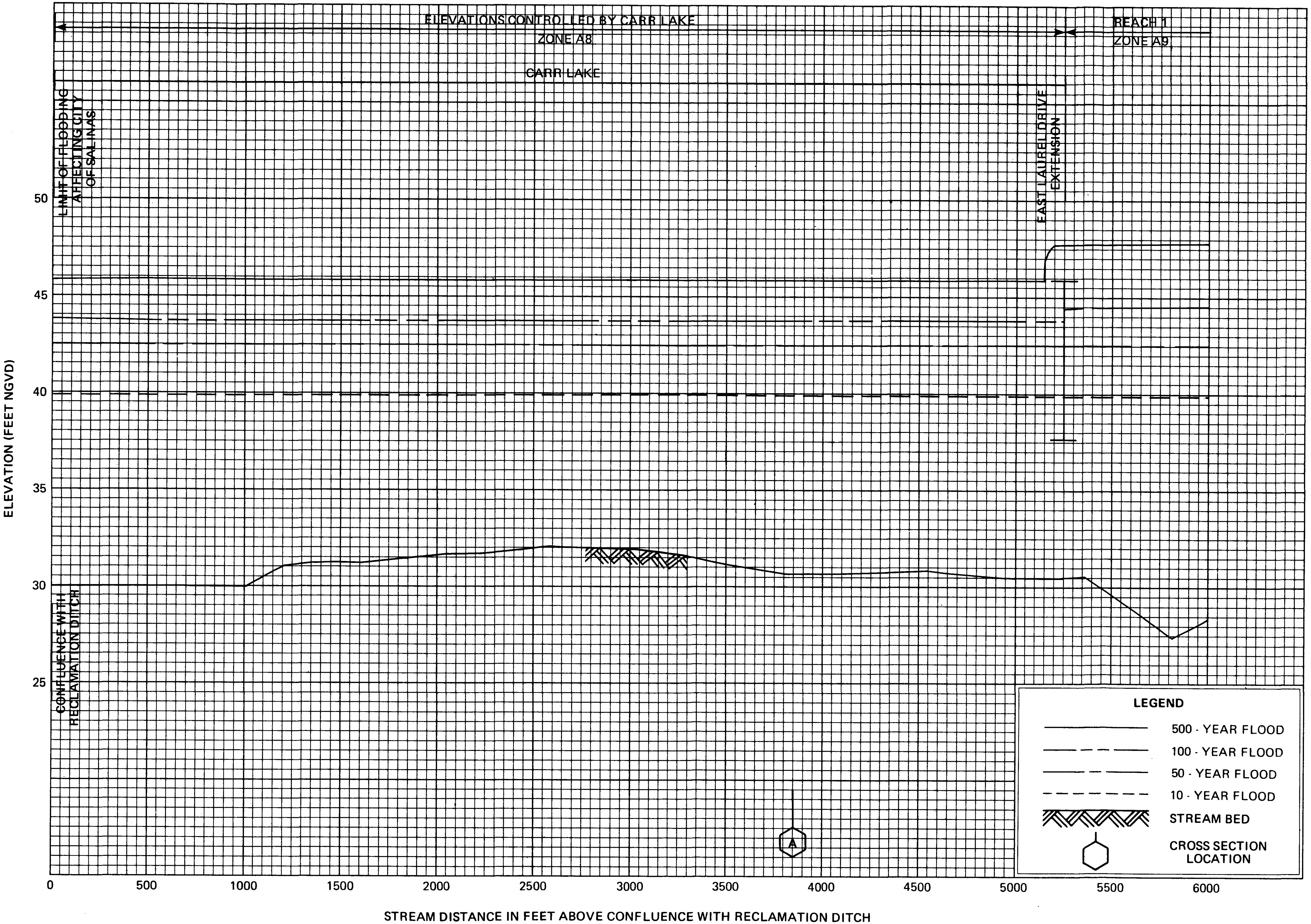
FLOOD PROFILES

GABILAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

02P



FLOOD PROFILES

NATIVIDAD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

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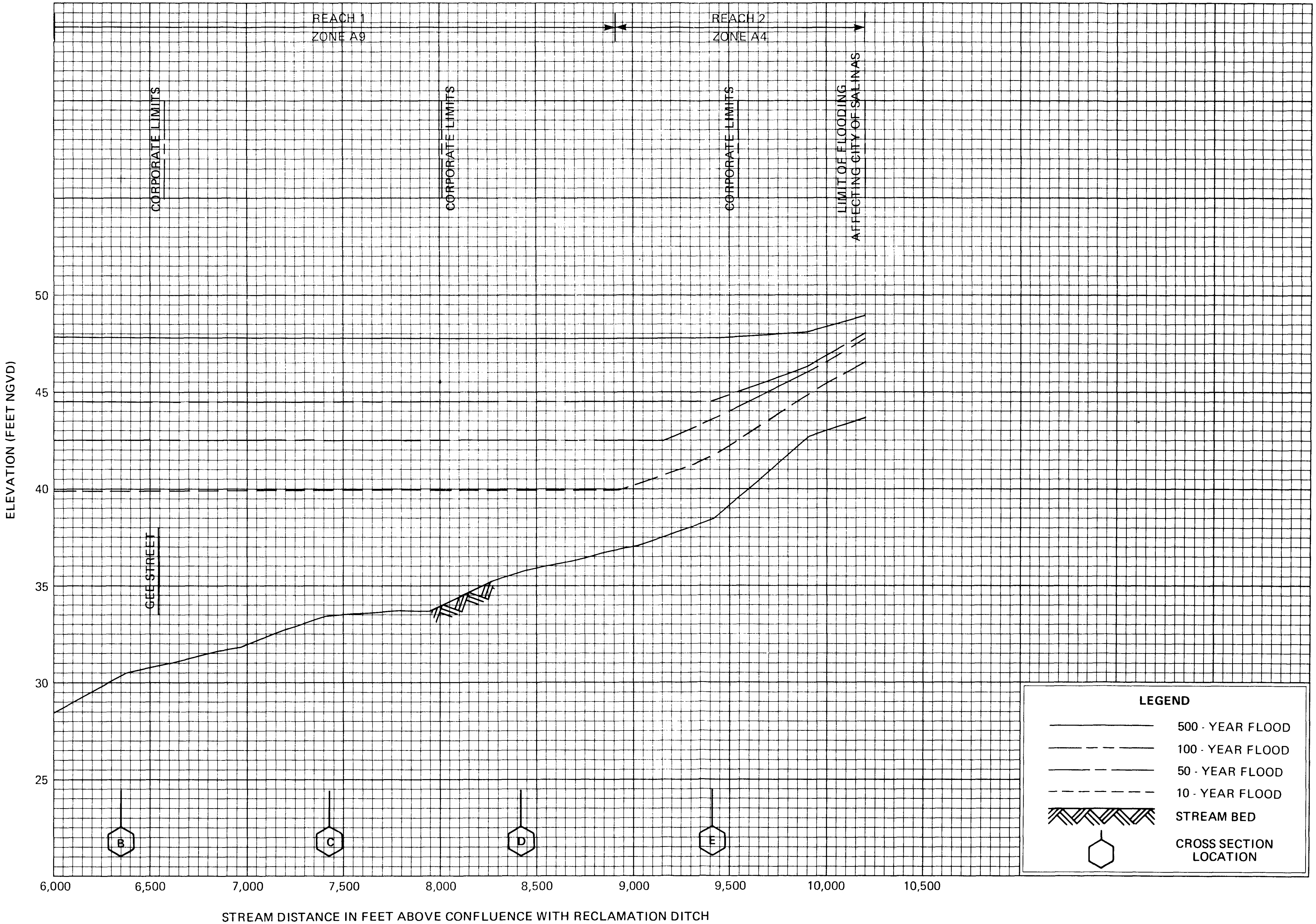

FLOOD PROFILES

NATIVIDAD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

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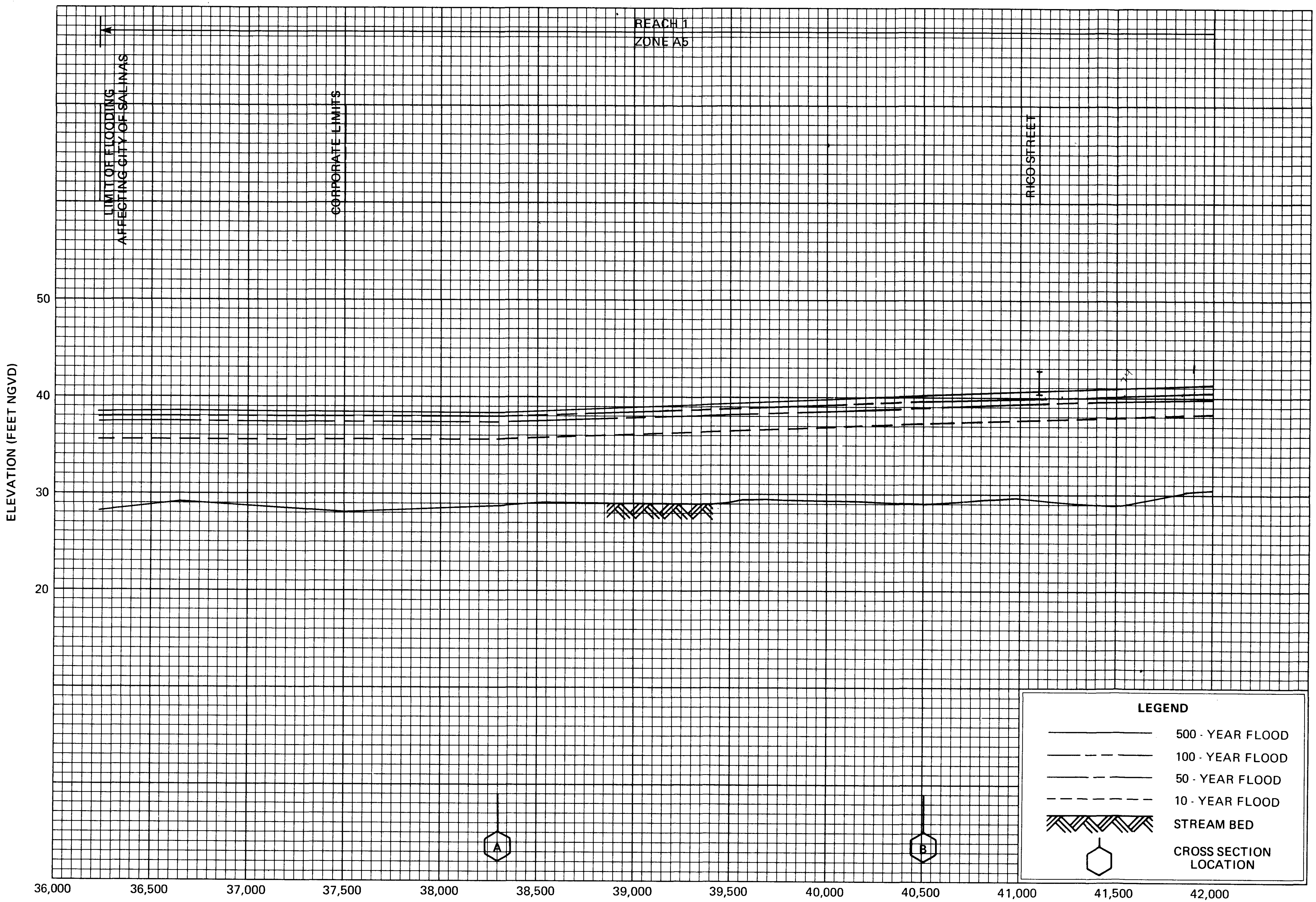


STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH TEMBLADERO SLOUGH

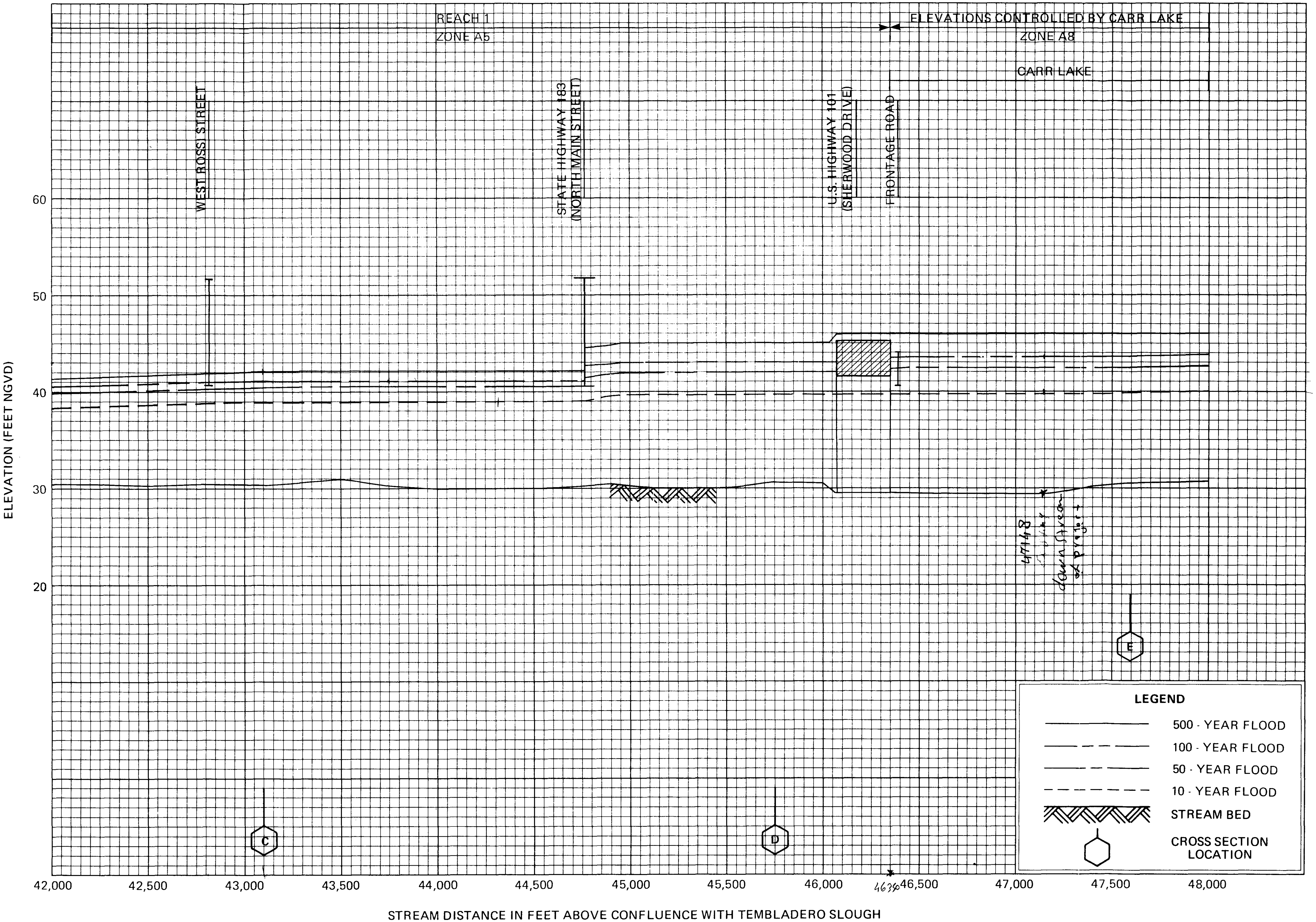
FLOOD PROFILES

RECLAMATION DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

05P

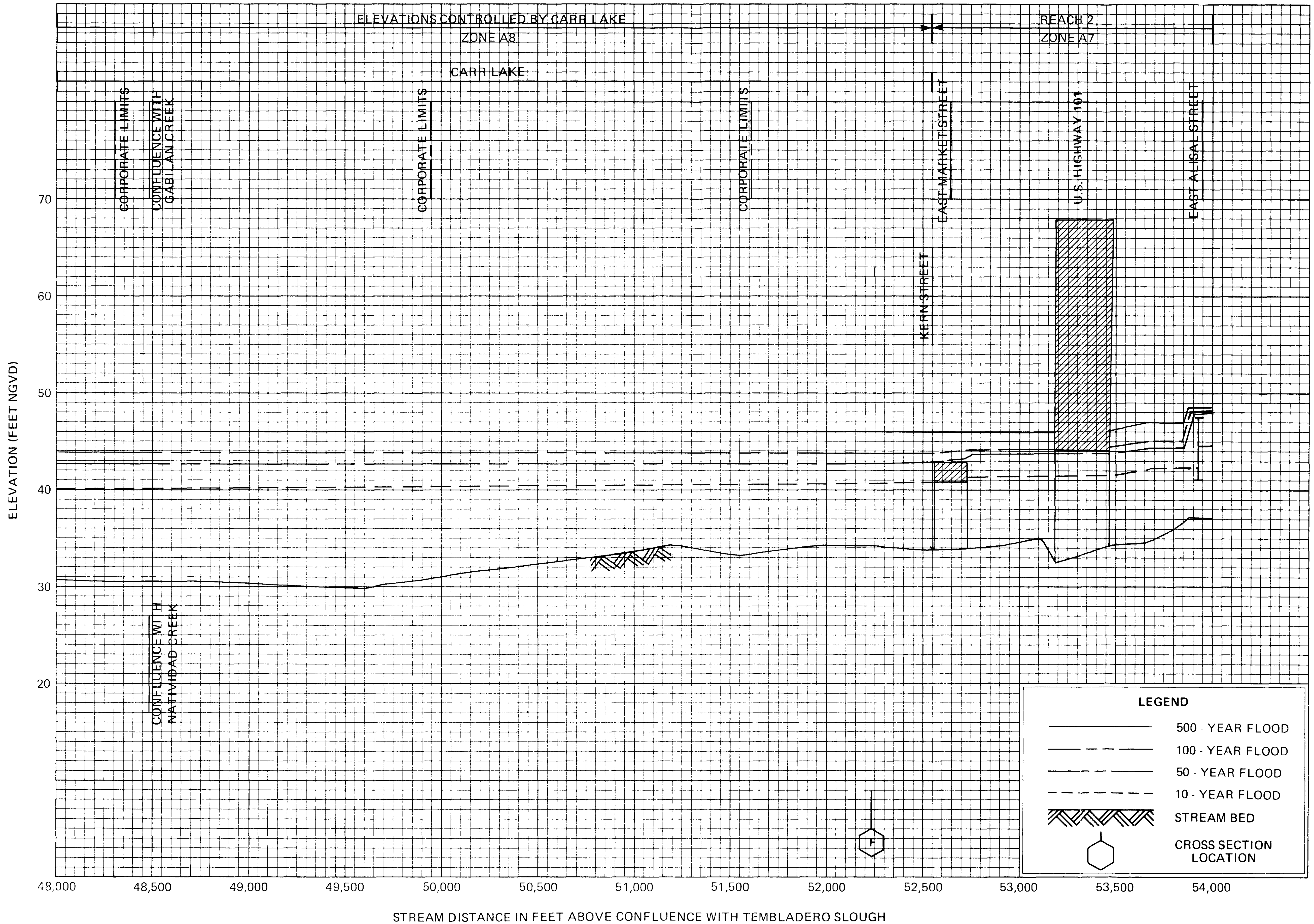


FLOOD PROFILES

RECLAMATION DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)



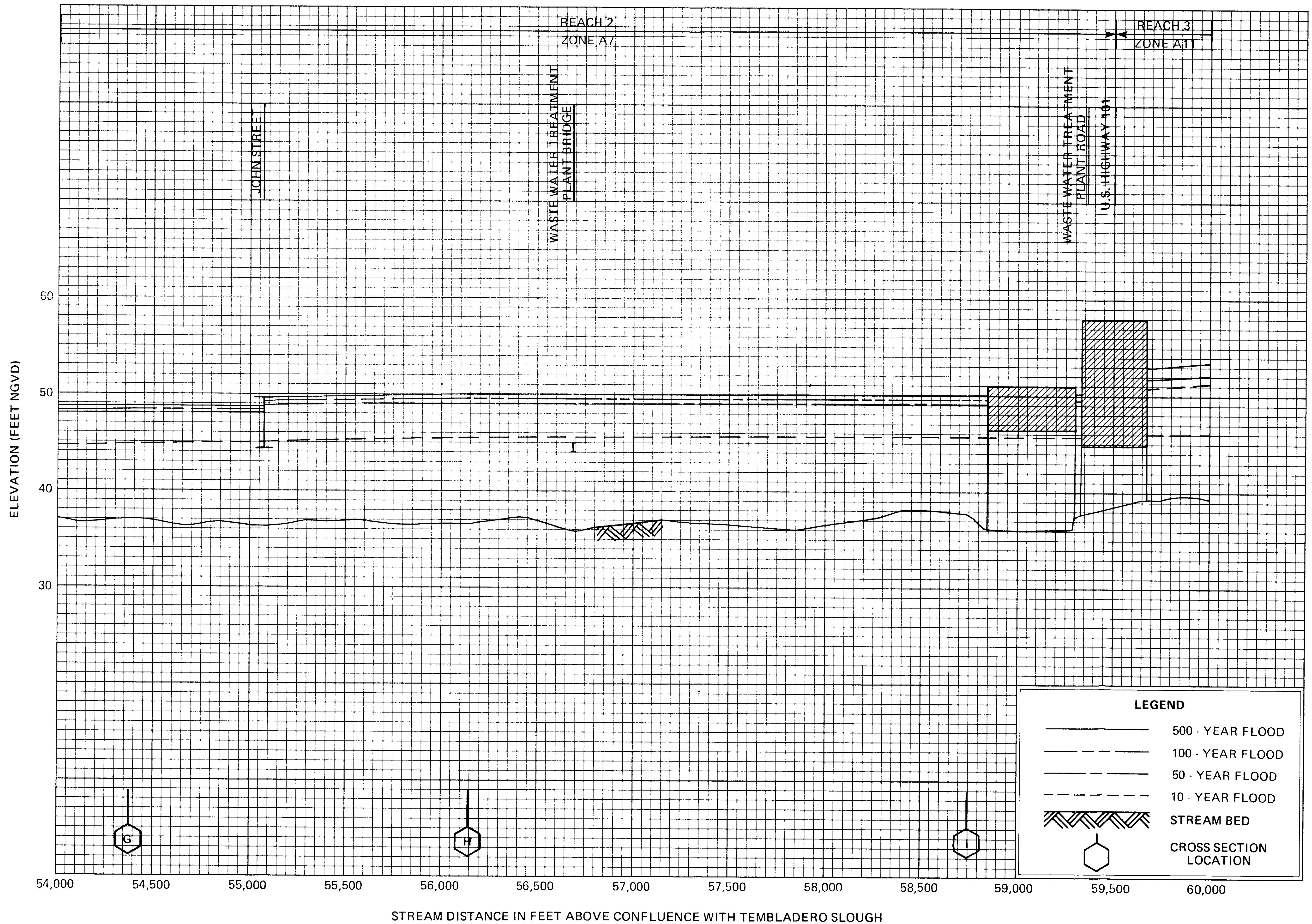
FLOOD PROFILES

RECLAMATION DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

07P



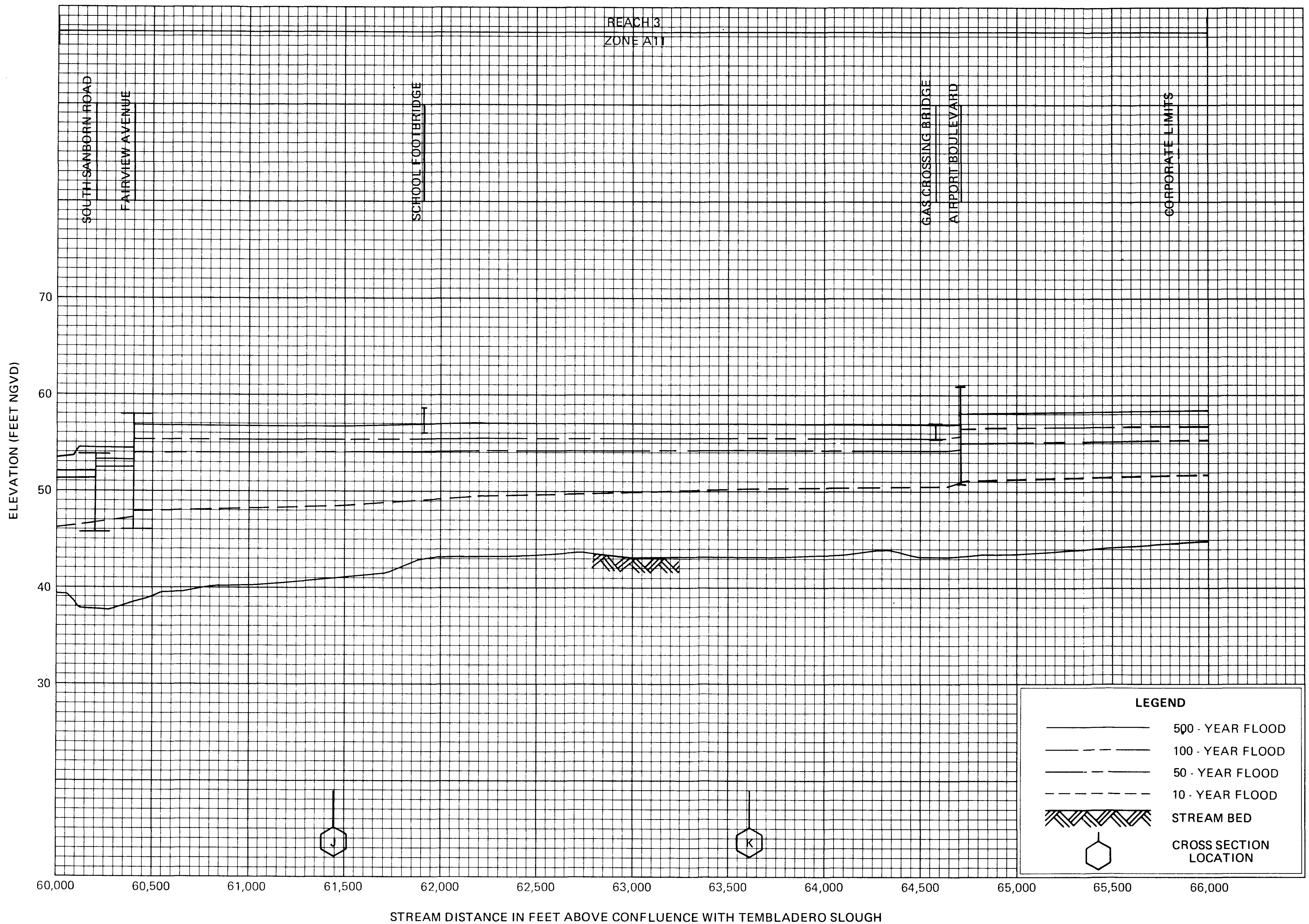
FLOOD PROFILES

RECLAMATION DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF SALINAS, CA
(MONTEREY CO.)

08P



FLOOD PROFILES

RECLAMATION DITCH

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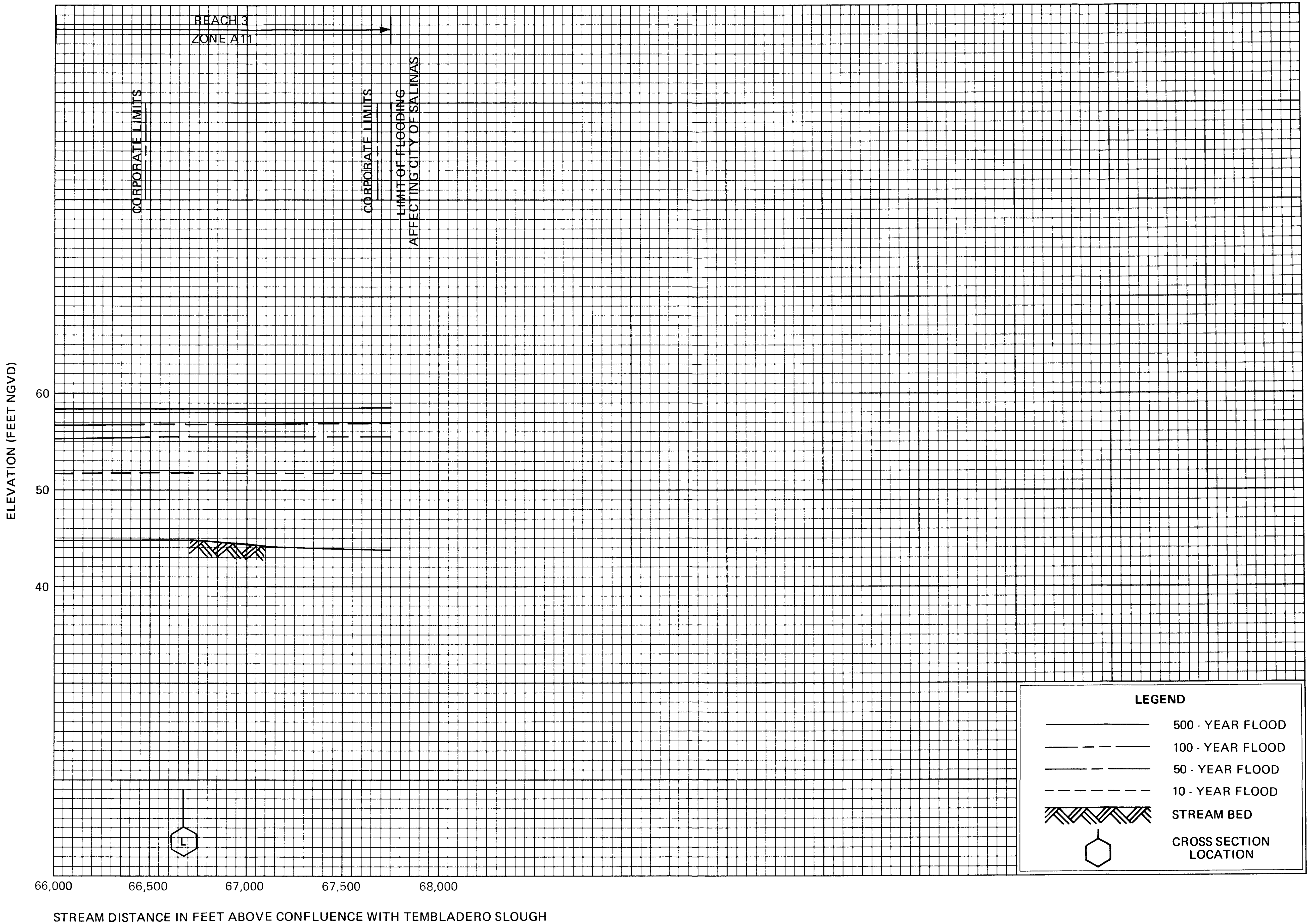
09P



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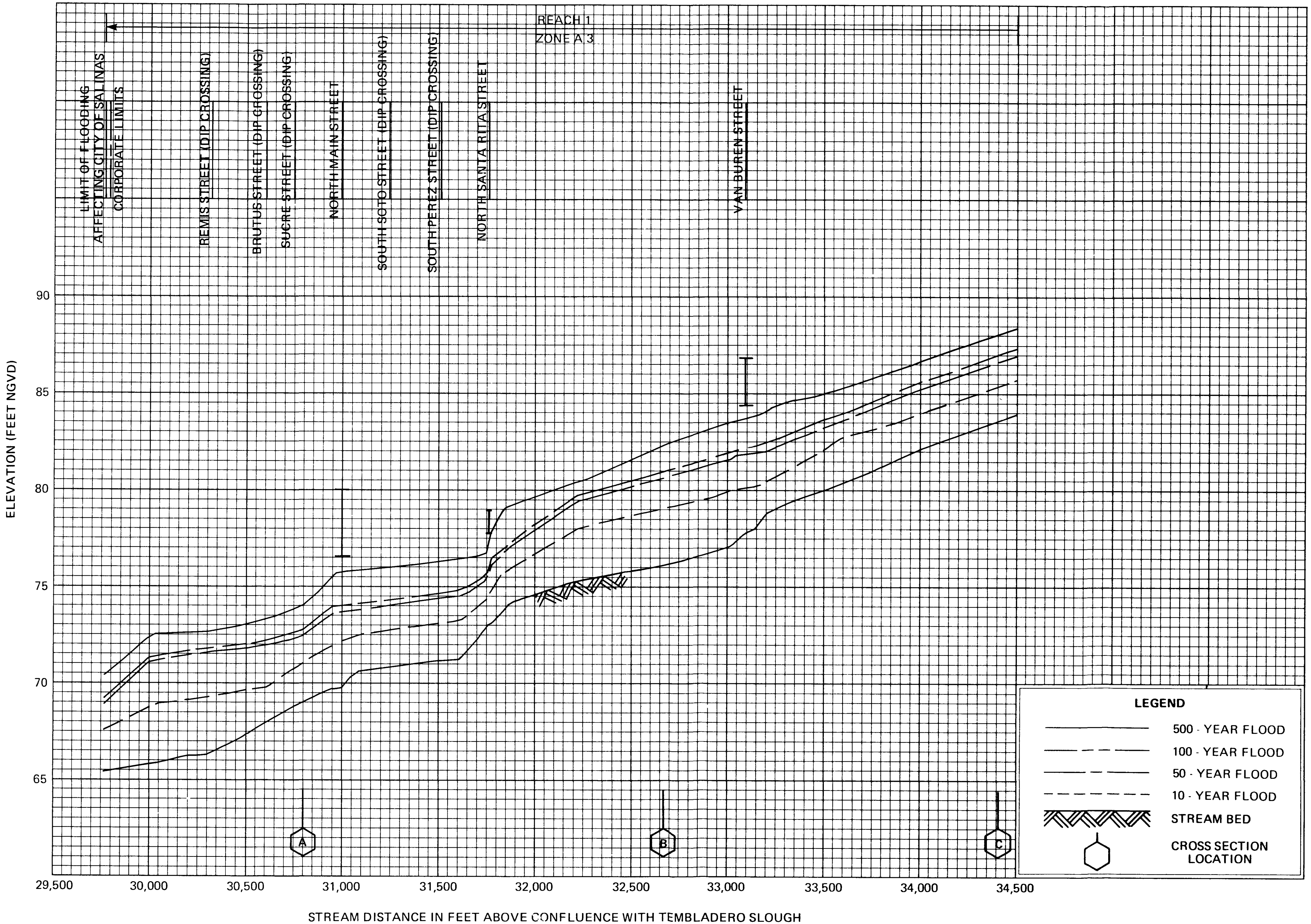

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FLOOD PROFILES

SANTA RITA CREEK

FLOOD PROFILES

SANTA RITA CREEK

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