

**RIVERSIDE COUNTY FLOOD CONTROL AND  
WATER CONSERVATION DISTRICT  
RIVERSIDE, CALIFORNIA**

**MASTER DRAINAGE PLAN  
FOR  
THE WEST HEMET AREA**

**ZONE FOUR**

**JULY 1982**

**KENNETH L. EDWARDS  
CHIEF ENGINEER**

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## PURPOSE

The purpose of this report is to investigate and evaluate the drainage problems of the West Hemet area and to develop an economical drainage plan which considers protection of both existing development and potential future development.

The West Hemet area is a rapidly developing section of the City of Hemet and the adjoining County area. The watershed is roughly bounded by State Street on the east, the Hemet Channel on the south, the San Diego Aqueduct Channel on the west, and Menlo Avenue on the north.

The plan presented herein will provide adequate flood protection to the community when implemented and will serve as a guide for the long term construction scheduling of the primary drainage facilities. The plan will also act as a planning guide for the location and sizing of local drainage facilities to be constructed by developers and others within the area.

It should be noted by the reader that the cover of this report clearly states it is a master plan, and therefore should be read and used with this in mind. Simply stated, this plan is an overview; a study of the drainage problems that exist in a specific geographical area, and a conceptual solution to those problems. As stated elsewhere in this report, the selection of the facilities presented in this plan is based on engineering and economic considerations and is by no means the only solution.

In short, the alignment and location of the facilities proposed in this Master Drainage Plan are general; precise facility location will be dictated by conditions and other factors existing at the time of design. Similarly, the sizing information shown on the plates in this report, as well as on the enclosed map, is preliminary. A more detailed analysis performed at the design stage will determine final sizing.

## SCOPE

The drainage area covered by this plan is approximately 5.9 square miles in size. Aside from the Tres Cerritos hills in the northwestern section of the plan, the area consists of extremely flat valley terrain sloping gently to the west. The extent of the studies establishing this master plan include:

1. Determination of the quantity and points of concentration of storm runoff in the area.
2. Preparation of a drainage area map.
3. Determination of the location, size and capacity of the proposed drainage structures.
4. Investigation of alternate routes and methods as a basis for selecting the most economically and engineeringly sound plan.
5. Preparation of preliminary design plans and supporting cost estimates.

#### GENERAL DISCUSSION

This report provides a Master Drainage Plan for the West Hemet area. The plan consists of a retention basin, open channels and a network of underground storm drains. This proposed system will carry storm runoff through this rapidly developing area to an outlet at the Hemet Channel in the vicinity of the San Diego Aqueduct Channel.

At present, during periods of runoff, floodwaters, silt and other debris impact a wide area of prime agricultural land and the developing community, causing property damage and leaving roads and highways impassable. Subdivision activity within the plan area has increased dramatically within the last several years. As development continues to escalate, so will the drainage problems of the area, thus requiring a greater need for flood protection.

The Master Drainage Plan presented herein provides an economical method of collecting and conveying storm runoff through the study area. The proposed drainage structures will also provide an outlet for local drainage facilities built by developers and others as growth occurs in the area. When completed, the facilities will provide the area with improved drainage and protection from the once in 100 year flood.

#### CRITERIA

All underground storm drains proposed in this plan are intended to collect local urban runoff and, with few exceptions, are located either in existing or proposed street rights of way. Runoff from a 10 year frequency storm is allowed to accumulate in the streets until it reaches the top of the curb. At this point, the plan proposes the initiation of an underground drain which will intercept and convey the entire 10 year storm runoff to an outlet downstream. Flows exceeding the 10 year frequency storm will generally be carried within street rights of way and the combination of both the street and the underground storm drain provides 100 year protection.

Open channels are proposed when the discharge is large and the construction and right of way costs for a channel prove to be less than the cost of an underground storm drain. Where open channels are provided, they are designed to carry the runoff from a 100 year frequency storm.

The alignments of all drains and channels are based on hydraulic efficiency, the ability to drain tributary areas, and economics.

#### HYDROLOGY

Two methods of hydrology were used in this plan to determine design discharges. For smaller tributary areas up to 500 acres in size, the Modified Rational Hydrology Method was used. The Synthetic Unit Hydrograph Method was used for larger areas. The design discharges used in sizing all future appurtenant facilities in the study area should be determined by one of these two methods.

Methodology and supportive data for the rational and synthetic hydrology can be found in "The Riverside County Flood Control and Water Conservation District Hydrology Manual" dated April 1978.

Future land use assumptions used throughout the plan were based on "The Hemet-San Jacinto Area General Plan - 1990".

#### RECOMMENDED IMPROVEMENTS

The recommended improvements discussed briefly below are shown on the enclosed map found at the back of this report as well as on the preliminary plan and profile plates which follow this text. Supporting data for all proposed facilities is available at the Riverside County Flood Control and Water Conservation District office. Costs shown on the enclosed map include right of way and 30% for engineering, administration and contingencies (see Table I, Cost Summary, page 7 ). Preliminary size information as well as design flow rates are shown on the enclosed map as well as on the preliminary plan and profile plates.

Before any design is undertaken it should be noted that during preparation of preliminary plan and profile drawings, a detailed utility search was not completed. This means that, while major known facilities were dealt with, a more thorough search may discover utilities that will necessitate minor alignment or size changes, or utility relocation.

## OPEN CHANNELS

The open channels proposed in this plan consist of three types: (1) concrete lined, trapezoidal channels; (2) unlined, trapezoidal channels; and (3) concrete lined rectangular channels. Generally unlined, trapezoidal channels are the least costly of the three to construct but District policy restricts the use of these channels to cases where flow velocities are less than six feet per second. For this reason, the lower portion of Line A and Line E are the only locations where an unlined facility is feasible.

A concrete lined channel is used where flow velocities exceed six feet per second. The choice between a trapezoidal and rectangular section is usually based on total cost of facility, including right of way. Most often, the trapezoidal section proves more cost effective.

## UNDERGROUND STORM DRAINS

The underground drains proposed in the plan consist of, for the most part, precast reinforced concrete pipe (RCP). In some cases, where special circumstances dictate, a drain may be a reinforced concrete box (RCB), but this is usually a considerably more expensive alternative and avoided when possible.

With few exceptions, the underground drains in this plan are proposed within existing or assumed future street rights of way.

## RETENTION BASIN

The purpose of the retention basin proposed in this plan is, by the use of temporary storage, to reduce fairly high inflow rates to substantially lesser outflow rates. This peak reduction allows the use of smaller and thus less costly downstream facilities.

## ALTERNATE STUDIES

In developing this Master Drainage Plan a number of alternates were developed and studied for their feasibility, both hydraulically and economically.

The first major alternate studied was the elimination of the retention basin and the concomitant enlargement of Line A. The additional cost incurred from enlarging the facilities is not nearly offset by the elimination of the basin.

On the other end of the spectrum, the concept of more numerous, but smaller basins was explored. In the past several years, some developers in the West Hemet area have utilized small onsite retention basins as a method of helping to mitigate downstream flooding problems resulting from increased runoff due to development. This alternate examined the idea of perpetuating this practice and in addition, installing a storm drain system to provide an outlet for these basins. There were two major problems with this alternate; the first being the maintenance cost and responsibility for the many small basins, and the second, being a staging problem. The storm drain system would have to be completed before the basins would function properly. The basins being built currently by developers are, in most cases, outletted by building extensive lengths of bleeder drains or relying solely on percolation. This method of draining is not considered an acceptable master plan solution.

Open channels, by their existence, present problems that do not occur with underground facilities. For instance, the crossing of an open channel can only be accomplished at locations where bridges are provided; right of way acquisition is often difficult and costly; and the aesthetic benefit is debatable. For these reasons and others, consideration was given to using underground facilities instead of open channels in the northwestern portion of the plan. As in other alternates, cost played a big part in the rejection of this option. The substitution of underground facilities for the open channels would increase the overall cost of the plan by more than 50%.

The flood plain shown on the map in the back of this report is the result of the runoff generated in the West Hemet area only. A much more extensive flood plain currently exists, but a major portion of that is caused by Salt Creek flows. This master plan assumes full channelization of Salt Creek and is, therefore, not affected by its flows.

In developing this master plan, consideration was given to the full channelization of the 100 year flow in the reach from Florida Avenue to the Hemet Channel. It was found, however, that the cost of this full channelization, including right of way and a crossing at A.T. & S.F. railroad tracks, would be substantially more than the worth of the 160 acres that are otherwise subject to flooding.

For this reason full channelization was not considered a viable alternative. A low flow earth channel and the mapping of the flood plain provided a much more economical and feasible master plan solution.

In addition to those discussed above, a number of smaller alternates were studied and eventually disregarded as either being too costly or not providing adequate protection.

In short, the West Hemet Master Drainage Plan as presented herein is the coalescence of the best alternatives explored.

### CONCLUSIONS

Based on the studies and investigations made for this report, it is concluded that:

1. The West Hemet area has experienced serious flooding problems in the past. As this area converts from primarily agricultural uses to more urban uses, these damages are expected to increase. A more orderly growth pattern can safely occur with the construction of these proposed facilities.
2. A drainage system is required to safely convey storm runoff through the area with the least interruption to public services. The Master Drainage Plan presented in this report is such a system and is the most economical of the alternatives studied.
3. The proposed plan lends itself to stage construction as funds become available.
4. The total cost of the recommended improvements, including right of way, engineering, contingencies, and administration is estimated to be \$13,804,000.

### RECOMMENDATIONS

It is recommended that:

1. The Master Drainage Plan as set forth herein be adopted by the Hemet City Council as part of the overall master plan for the City and be approved by the Riverside County Flood Control and Water Conservation District's Board of Supervisors as part of the overall master plan for the County.
2. The Master Drainage Plan as set forth herein be used as a guide for all future developments in the study area and that such developments be required to conform to the plan insofar as possible.
3. The right of way required for the plan be protected from encroachment.

TABLE I

MASTER DRAINAGE PLAN

for the

WEST HEMET AREA

COST SUMMARY

FACILITY	CONSTRUCTION COST*	RIGHT OF WAY	MASTER PLAN COST
Line A	\$1,176,000	\$ 230,000	\$ 1,406,000
Line A-1	260,000	-0-	260,000
Line C	1,637,000	136,000	1,773,000
Line C-1	1,253,000	-0-	1,253,000
Line C-2	404,000	-0-	404,000
Line C-3	1,727,000	-0-	1,727,000
Line C-4	81,000	-0-	81,000
Line C-5	78,000	-0-	78,000
Line C-6	102,000	-0-	102,000
Line C-7	392,000	-0-	392,000
Line C-8	255,000	10,000	265,000
Line D	1,088,000	58,000	1,146,000
Line E	1,777,000	276,000	2,053,000
Line E-1	464,000	-0-	464,000
Devonshire Basin	1,800,000	600,000	2,400,000
TOTAL	\$12,494,000	\$1,310,000	\$13,804,000

\* Includes 30% for engineering, administration, and contingencies