

**RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT**
Riverside, California

**EASTVALE
MASTER DRAINAGE PLAN**

Revision No. 2
Approved April 2002

DAVID P. ZAPPE
General Manager-Chief Engineer

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(Revision No. 2)

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SECTION I

PURPOSE

The purpose of this report is to investigate and evaluate the drainage problems within the Eastvale drainage area. Presently this area is served by a report entitled "Eastvale Master Drainage Plan" prepared by the Riverside County Flood Control and Water Conservation District ("District") in May 1998. The report presented here is a reevaluation and expansion of the 1998 report and is meant to replace it. When implemented this revision will provide adequate flood protection to the community. This will also serve as a guide for the long term scheduling for construction of the proposed major drainage facilities. It will also act as a planning guide for the location and size of local drainage facilities to be constructed by developers and others within the area.

SECTION II

SCOPE

The drainage area covered by this plan is approximately 8.0 square miles in size. It covers unincorporated lands of the County of Riverside. The plan area is bounded roughly by Mission Boulevard and the County Line on the north, Santa Ana River on the south, Interstate 15 Freeway on the east, and Cucamonga Creek and the County Line on the west. The extent of the studies establishing this master plan includes:

1. Determination of the quantity and points of concentration of storm runoff in the area.
2. Preparation of a drainage facility map.
3. Determination of the location, size and capacity of the proposed drainage structures.
4. Investigation of alternatives as a basis for selecting the most effective plan.
5. Preparation of supporting cost estimates.

SECTION III

GENERAL DISCUSSION

The proposed drainage plan involves the construction of detention basins, underground storm drains and open channels. The drainage system will collect flows from local runoff and transport the flows to the Santa Ana River and Cucamonga Creek.

Even though most of the runoff will be generated within the plan boundary, there will still be significant amounts of runoff generated in San Bernardino County. The City of Ontario proposed a master plan for the area north of Eastvale titled Master Drainage Plan For The New Model Colony. The New Model Colony MDP proposed Project 2-13 (County Line Channel), a facility designed to intercept and convey

runoff from San Bernardino County to Cucamonga Creek. The Eastvale master drainage plan relies on the construction of this facility. The District has initiated design of this facility per cooperative cost sharing agreements with San Bernardino and Riverside Counties and the City of Ontario. Construction is expected to be completed in Spring 2004.

The Master Drainage Plan (MDP) presented herein provides an economical method of collecting and conveying storm runoff through the study area. When completed, the facilities will provide the area with improved drainage and a high level of flood protection.

It should be noted by the reader that this report 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 provides 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.

The alignment and location of the facilities proposed in this MDP are general; precise facility locations will be determined at the time of design. Similarly, the sizing information shown on the enclosed map is preliminary. A more detailed analysis performed at the design stage will determine final sizing.

SECTION IV

CRITERIA

All underground storm drains proposed in this plan are intended to collect local urban run off and, with few exceptions, are located either in existing or assumed future street rights of way. Runoff from a 10-year frequency storm is assumed to be conveyed in the streets until flow depths reach the top of the curb. Once it reaches the top of the curb, the plan proposes the initiation of an underground drain. The difference between the 100 year storm runoff and 10 year storm runoff will be conveyed within the street right of way until flow exceeds the right of way line, at which time a 100 year facility is initiated.

The alignments of all drains are based on existing and proposed development, street patterns, flow paths, the ability to drain problem areas, and economics.

SECTION V

HYDROLOGY

The hydrology for the plan was developed by two methods: the Modified Rational Method and HEC-1. The Modified Rational Method was used to determine the peak discharges generated from small watersheds (generally less than 300 to 500 acres in size). The HEC-1 Method was used for larger areas in generating the peak discharge rates for sizing major drainage facilities and for the routing of the proposed detention basins.

Methodology and supportive data for determining the design discharge can be found in the "Riverside County Flood Control and Water Conservation District Hydrology Manual" dated April 1978 and the

"U.S. Army Corps of Engineer's HEC-1 Flood Hydrograph Package User's Manual" dated September 1990. The design discharges used in sizing all future appurtenant facilities in the study area were determined by one of these two methods.

A map showing the complete drainage plan and location of existing and all proposed facilities is included in the rear of this report.

New hydrology was generated for this plan to reflect currently projected land use. The projected land use was based on the Jurupa Community Plan as amended through May 1995, certain specific plan developments, and overall development pattern assumed by the District.

SECTION VI

EXISTING FACILITIES

The District owns and maintains the interim Chandler Street Channel, several existing storm drains, a detention basin, and necessary rights of way for a proposed detention basin within the Eastvale area watershed. These facilities have been constructed by the District, developers and/or various agencies since the last revision in 1998. A brief description of these existing lines, which are an integral part of the master plan, is presented in this section. All existing District maintained facilities are shown on the MDP map in the rear of this report.

Line A-1 - This underground facility begins approximately 650 feet south of Schleisman Rd. on Archibald Ave. and travels southerly to discharge into Chandler Street Channel. It was constructed by developers of TR 28680 in 1999.

Line B Stage 1 - This facility Line B was constructed as a condition of TR 29104 under the 1998 Eastvale Master Plan. It is an 84" diameter pipe extending approximately 950 feet east on Schleisman Rd. at Harrison Ave. This facility was sized based on the 1998 Eastvale MDP and includes additional capacity for tributary offsite flows in the interim condition.

Line B-2 - This facility begins approximately 1200 feet south of Schleisman Rd. and 800 feet west of Harrison St. within Parcel Map 28681 and continues southerly for 3200 feet. It then turns east to Harrison St. then south to Chandler St. where it discharges into the Santa Ana River. This facility was constructed by developers of TR 28681 in 1999.

Lateral B-3 - Beginning at Citrus St., this 42" storm drain travels south on Harrison Ave. to confluence with Line B-2. The lateral partially alleviates a previous existing Harrison Ave. flooding problem. It was constructed in 1999 in conjunction with Line B-2.

Lateral C-2 - This 48" and 54" portion of Lateral C-2 was constructed as a condition of TR29208 under the 1998 Eastvale Master Plan. It begins at Cloverdale Rd. between Harrison and Sumner Avenues and travels south for about 1300 feet, then turns east and travels another 1300 feet to meet with Line C.

Line D Stages 1 and 2 - Line D Stage 2 begins 1300 feet east of Cleveland Ave. on 68th St. It travels west on 68th St. then heads south on Cleveland Ave., west on Schleisman Rd. for 2600 feet, then turns south

on Sumner Ave. to Orange Street. Stage 1 continues south on Sumner then heads west on Quail Run Rd., and south on Cobble Creek Drive before discharging into the Santa Ana River. Line D ranges in size from 60" to 96". Stage 1 was completed in 2000 by developers of TR 28644. Stage 2 is currently nearing completion of construction by developers of TR 28946.

Lateral D-B - This lateral extends approximately 600 feet along Citrus St. and drains into Line D. It was constructed by developers of TR 28644 in conjunction with Line D improvements in 2000.

Line D-3 - Stage 2 of Line D-3 was constructed as a condition of TR 28933-1 under the 1998 Eastvale Master Plan and was designed to convey tributary offsite flows. It runs about 1300 feet along 58th St. then turns south on Cleveland Ave. for another 970 feet.

Lateral D-6 - This drain was constructed by developers in conjunction with Line D Stage 1 and was not part of the Eastvale master plan. It does, however, provide equivalent flood control infrastructure to former Line B-1 of the 1998 Eastvale MDP. Lateral D-6 begins 1300 feet north of Schleisman Rd and travels south on Cobble Creek Dr. to join Line D at Quail Run Rd. It ranges in size from 54" to 72".

Lateral D-6.4 - This lateral extends approximately 600 feet along Schleisman Ave. and drains into Line D-6. It was constructed by developers of TR 28644 in conjunction with Line D improvements in 2000.

Line E Stage 1 - This underground facility begins as a 12'x7' RCB on 65th St. and travels south through TR 29093. At 68th St it becomes a 96" RCP and continues southerly on Well Spring St and through TR 28784 as a 13'x6' RCB. At the southeastern corner of the tract the box opens to a concrete trapezoidal channel where it discharges into the Santa Ana River. This facility intercepts flow from the tributary area south of Bellegrave Ave. between Hamner Ave. and I-15 freeway. It is currently under construction.

Line E-2 Stages 1 and 2 - This facility begins at Riverside Dr. and continues southerly, outletting into Line E basin, halfway between Riverside Ave. and Bellegrave Ave.. This line has a tributary area that is bounded by Hamner Ave. to the west, Mission Boulevard to the north and I-15 to the east. Line E-2 ranges in size from 54" to 90" and was completed in 2000 under PP15023.

Line E Detention Basin - This 15 acre basin was completed in 2000. It has a storage capacity of 80 acre-feet and reduces the peak 100-year inflow of 6950 cfs down to 115 cfs. The basin is located approximately 5500 feet north of Bellegrave Ave. by I-15.

Chandler Street Channel - This 10'x6' earthen trapezoidal channel was constructed in 1972 and serves as an outlet for Line A-1. The crossings at Hall and Selby Avenues require further improvement in order to obtain 100-yr flood protection.

CalTrans Facilities- To protect the Pomona 60 Freeway from being overtopped by floodwaters that may pond to the north side of the freeway, Caltrans built several culverts passing under the freeway. There is a triple cell, 4 feet wide by 2 feet high reinforced concrete box, a 24-inch diameter corrugated metal pipe and a 30-inch diameter reinforced concrete pipe draining an area of approximately 145 acres. These culverts discharge onto the area north of Riverside Drive between Hamner Avenue and I-15 Freeway.

Cucamonga Creek - This concrete trapezoidal channel, $b = 78'$, $d = 18'$, $ss = 2$, $Q = 45,000$ cfs, was constructed in 1984 by the U. S. Army Corps of Engineers. The channel is owned and maintained by the

San Bernardino County Flood Control District and will serve as an outlet for Eastvale MDP Lines A, B, F-1, and F-3.

RECOMMENDED IMPROVEMENTS

Line A - This underground facility begins 650 feet north of Cloverdale Rd. on Harrison Ave., runs south on Harrison Ave. for 2600 feet, then east for 5200 feet in Cherry St. before discharging into Cucamonga Creek.

Lateral A-2 - This underground facility begins approximately 1300 feet east of Archibald Ave. on Cloverdale Rd., runs west on Cloverdale Rd. before turning south on Archibald Ave. and travels 2640 feet to confluence with Line A.

Line B - This underground facility begins approximately 1300 feet north of Schleisman Rd. on Harrison Ave., runs south on Harrison Ave. then turns west on Schleisman Rd. for 5300 feet before discharging into Cucamonga Creek. A 950 foot portion of Line B extending westward from the intersection of Schleisman Rd. and Harrison Ave. was constructed in 1998.

Line C - Line C begins approximately 2000 feet north of Cloverdale Rd. between Sumner Ave. and Cleveland Ave. on an assumed future street. This underground facility travels west on Cloverdale Rd. then turns south on Sumner Ave. for 2600 feet and continues east on Cherry St. for 1300 feet before turning south to Cleveland Ave. detention basin. Tributary area for Line C is south of the county line between Sumner Ave. and Cleveland Ave.

Lateral C-2 - Beginning at approximately 1300 feet south of County Line Channel and 900 feet west of Sumner, this underground storm drain will run south for 2600 feet then east to its junction with Line C. This lateral will convey southwesterly flows to Line C. Approximately 2600 feet of the downstream portion of storm drain exists.

Lateral D-1 - This underground storm drain begins approximately 1300 feet east of Cleveland and runs west to its junction with Line D. Lateral D-1 will help alleviate the Schleisman Rd. flooding problem.

Line D-2 - Beginning approximately 700 feet east of Sumner Ave. and 1400 feet north of Schleisman Rd., this underground storm drain travels east to discharge into the proposed basin by Cleveland Ave.. The lateral will collect and convey local flows to the basin.

Line D-3 - Line D-3 begins approximately 700 feet north of 58th St on Grangersford Rd. It travels west on 58th St for 1300 feet, then south on Cleveland Ave. for about 5300 feet to the proposed Cleveland Basin. Line D-3 has tributary area that is south of the county line between Cleveland and Hamner Avenues.

Lateral D-4 - This underground facility begins approximately 1300 feet east of Cleveland Ave. on Cherry St. and travels westerly to confluence with Line D-3.

Lateral D-5 - This underground facility begins approximately 700 feet north of Cloverdale Rd. between Cleveland and Hamner Avenues. It travels south then turns west on Cloverdale Rd. and travels 1600 feet

to its junction with Line D-3. The lateral will help alleviate the Cloverdale Rd. flooding problem.

Lateral D-7- This lateral begins at Cleveland Ave and travels west on Orange St. for 1300 feet, turns south for about 700 feet, then travels west on Walnut St. for 1300 feet to meet with existing Line D.

Line E - The upstream reach of this underground facility begins approximately 1600 feet east of Hamner Ave. and 2000 feet south of Bellegrave Ave. Line E travels west to Hamner Ave., then south to Cherry St. where it turns east for approximately 1000 feet. It then turns south to meet the storm drain currently under construction at 65th Street. The existing line continues south through Tracts 29093 and 28784 to discharge into the Santa Ana River. The line will intercept flow from the tributary area south of Bellegrave Ave. between Hamner Ave. and I-15 Freeway.

Line E-1 - Beginning as an outlet drain for the Line E basin, this underground facility travels south for approximately 1400 feet before turning west for 500 feet. Here the facility continues south to Bellegrave Ave. then west to County Line Channel. In addition to the maximum 100-year outflow, Line E-1 is sized to convey flows from tributary area south of the basin between Hamner Ave. and I-15.

Line E-3 - Beginning approximately 1200 feet west of Hamner Ave., this underground facility travels east on Walnut Ave. then south on Hamner Ave. for approximately 1200 feet. It then daylights in the Santa Ana flood plain. This line is provided for Hamner Ave. to collect and convey local runoff to Santa Ana River.

Line F-1 - Line F-1 begins approximately 1300 feet south of Schleisman Rd and 1300 feet west of Archibald Ave. and travels south for about 1300 feet on an assumed future street, then turns west to discharge into Cucamonga Creek.

Line F-3 - Line F-3 begins approximately 1300 feet west of Archibald Ave. and 1100 feet south of the County Line and travels west in a future street to discharge into Cucamonga Creek.

Cleveland Ave. Detention Basin - This 16 acre basin has 150 acre-feet of storage capacity. It reduces the peak 100-year inflow of 1553 cfs down to 106 cfs. The basin is located approximately 1400 feet north of Schleisman Rd. by Cleveland Rd. and is currently proposed to be constructed through CFD financing by Jurupa Community Services District.

Chandler Channel Crossings - The existing triple 36" diameter corrugated metal pipe culverts at Hall Ave. and Selby Ave. do not have enough capacity to convey the 100-year flow. The proposed 12' wide by 5' high and 60' long reinforced concrete box culverts for Hall Ave. and Selby Ave. are sized to convey the 100-year storm runoff.

County Line Channel - This facility originally proposed by the City of Ontario as the outlet for the City's New Model Colony MDP, will begin at Hamner Ave. and travel westerly along the county line to discharge into Cucamonga Creek. In addition to the 100-year flow from Line E-1, this RCB and rectangular channel will intercept runoff from San Bernardino County and convey these flows to Cucamonga Creek.

SECTION VIII

ALTERNATIVE STUDIES

Several alternatives were developed and studied during the generation of this revision to the Eastvale Master Drainage Plan. These alternatives considered different alignment schemes for the major storm drains; different sizing of the proposed detention basins; storm drains without basins and various hydraulic considerations. As the study progressed, alternates considered for the main facilities proposed in this plan were presented to the District management and staff. General concurrence with the plan selected was obtained based on cost differentials, accessibility to collector drains, and ease of construction.

SECTION IX

ESTIMATED COST

The Revision to the Eastvale Master Drainage Plan presented herein is an accumulation of the preferred features of all the alternatives studied. This revision to the plan presents an economical drainage facility system while also effecting the least impact on the existing character of development within the study area.

The majority of the facilities are proposed as underground and aligned within existing or proposed street right of way. Property acquisitions will be required for any proposed detention basin or storm drain constructed on private land.

All facility costs were developed from current construction cost data researched by the District.

All prices tabulated herein were adjusted to reflect present 2002 cost levels and are shown in Table 1 "COST SUMMARY." These costs include necessary rights of way and 31% for engineering, administration, and contingencies.

SECTION X

CONCLUSIONS

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

1. The Eastvale area has experienced serious flooding problems in the past. As the area continues to industrialize and urbanize, 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 Eastvale area to Santa Ana River and Cucamonga Creek. This Revision to the Eastvale Master Drainage Plan presented in this report is the most feasible of the alternatives studied.

3. The revision to the Eastvale Master Drainage Plan indicated herein will lend itself to a staged construction program as funds are available.
4. The total cost of the recommended improvements, including right of way, engineering, contingencies, and administration is estimated to be \$47,855,000.

SECTION XI

RECOMMENDATIONS

It is recommended that:

1. The revision to the Eastvale Master Drainage Plan, as set forth herein, be adopted by the Riverside County Flood Control and Water Conservation District's Board of Supervisors.
2. The revision to the Eastvale Master Drainage Plan, as set forth herein, shall replace the Master Drainage Plan adopted in May 1998.
3. The revision to the Eastvale Master Drainage Plan, as set forth herein, shall 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.

TABLE I
EASTVALE MASTER DRAINAGE PLAN
COST SUMMARY

<u>FACILITY</u>	<u>CONSTRUCTION*</u>	<u>RIGHT OF WAY</u>	<u>TOTAL COST</u>
Line A	\$ 3,128,000		\$3,128,000
A-1	436,000		436,000
Lateral A-2	860,000		860,000
Line B	2,128,000		2,128,000
B-2	1,635,000		1,635,000
Lateral B-3	214,000		214,000
Line C	2,433,000		2,433,000
Lateral C-2	128,000		128,000
Line D	3,647,000		3,647,000
Lateral D-1	252,000		252,000
Line D-2	229,000		229,000
D-3	2,335,000		2,335,000
Lateral D-4	310,000		310,000
D-5	385,000		385,000
D-6	236,000		236,000
D-7	679,000		679,000
Line E	5,344,000		5,344,000
E-1	2,305,000		2,305,000
E-2	2,067,000		2,067,000
E-3	362,500	43,500	406,000
Line F-1	845,000		845,000
F-3	264,000		264,000
County Line Channel	11,000,000	2,100,000	13,100,000
Cleveland Ave. Basin	970,000	1,488,000	2,458,000
Line E Basin	912,000	1,256,000	2,168,000
Chandler Ch. Crossings	112,000		112,000
TOTAL	\$42,867,500	\$4,987,500	\$47,855,000

* Includes 31% for Engineering, Administration and Contingencies.