FLOOD PROTECTION PLAN
FINAL REPORT

City of Donna
The Heart of the Valley

JOB NO. 67787
NOVEMBER, 1995

RUST LICHLITER/JAMESON
Environment & Infrastructure
Consulting Engineers, Scientists and Planners
2929 Briarpark Drive, Suite 600 Houston, Texas 77042-3203

CITY OF DONNA
FLOOD PROTECTION PLAN

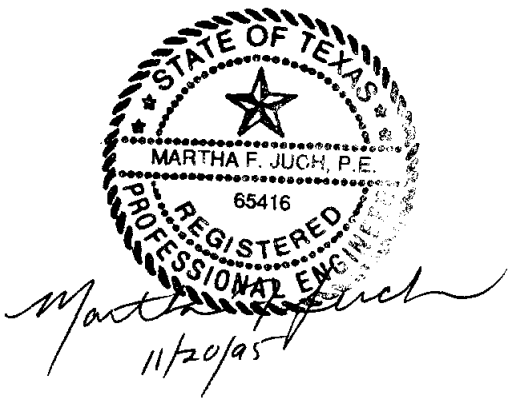
FINAL REPORT

Prepared By:

Rust Lichliter/Jameson
2929 Briarpark, Suite 600
Houston, Texas 77042
Phone: (713) 785-9800
Fax: (713) 953-5044

Project No.: 67787

November, 1995



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1.0 INTRODUCTION

1.1 Background

Localized flooding that hinders transportation and threatens residential and commercial structures has occurred frequently in the last ten years throughout the City of Donna and in Colonias within and near the City's extra-territorial jurisdiction (ETJ). The flooding has posed a potential health hazard by surcharging the sanitary sewer system in some areas and by interfering with pedestrian and vehicular traffic in critical areas near schools and residential communities. As the first step in reducing the flooding problem, the City of Donna, jointly with Hidalgo County, requested planning grant assistance from the Texas Water Development Board in September 1994. The grant assistance was targeted toward the development of a Flood Protection Plan (Plan) for the City and its ETJ. This Plan is the subject of this report and consists of the following elements:

- Identify the causes of flooding.
- Develop a plan for the orderly implementation of cost-effective solutions to the flooding problems.
- Eliminate flooding conditions, resulting flood damages, safety and access problems and health hazards.
- Develop a plan for the future anticipated growth in Donna and the surrounding area to insure properly controlled drainage.

1.2 Scope of Services

The City of Donna contracted with Rust Lichliter/Jameson (referred to in this report as the Engineer) in January of 1995 to perform a drainage study of the City and its ETJ and to develop a Flood Protection Plan for the area. The scope of engineering services summarized below was developed to identify the causes of flooding and recommend appropriate solutions to the flooding problems.

Task 1 Data Compilation

The Engineer met with staff at the City of Donna, Hidalgo County, the IBWC (Main Floodway system) and Donna Irrigation District No. 1 to identify areas of historical flooding and to compile sources of drainage information. Information on future drainage systems planned by the Texas Department of Transportation was also obtained. A map was developed to show the

existing watershed and drainage system as well as anticipated development for the next ten years.

Task 2 Flooding Analysis

The Engineer developed hydrologic and hydraulic models for the existing drainage system and developed hydraulic gradient profiles for the 5-, 10- and 100-year design frequencies for each primary drainage channel. Alternative methods of addressing the existing flooding areas and potential future problem areas were analyzed as to engineering feasibility, cost, benefits, and potential environmental impacts. The improvements recommended by the Engineer were prioritized into a 5-year and a 10-year capital improvement plan (CIP), and a 5-year implementation plan was proposed.

Task 3 Implementation Plan

The financial requirements associated with the recommended CIP were identified as were potential funding sources.

Task 4 Final Report and Deliverable

A draft report was prepared which describes the study results and the proposed solutions to the flooding problems. After receiving comments, a final report will be prepared and 25 copies will be submitted to the City.

1.3 Related TWDB Studies

No previous comprehensive flood protection studies have been done in the City of Donna or its ETJ.

Concurrent with the City of Donna study, two other cities near the planning area were identified by the Texas Water Development Board as participating in the Planning Grant program. The Cities of McAllen and Mission are developing Flood Protection Plans and were contacted in writing regarding the City of Donna study and requesting any pertinent information. However, neither city has the same watershed boundary with the City of Donna; therefore, no interaction in the planning activities that warranted further cooperation was identified.

2.0 DATA COMPILATION

2.1 Planning Area

The planning area is shown on Exhibit 1 and encompasses the City of Donna, its ETJ, and surrounding drainage areas. The boundaries of the planning area are generally the International Boundary and Water Commission (IBWC) Main Floodway levee on the south, Midway Road on the east, FM 1423 on the west and Eleven Mile Road on the north. Business Route 83 (BR 83) and the Missouri Pacific Railroad traverse the City from west to east and generally form the north-south drainage divide. Based on the United States Geological Survey's *Donna, Texas Quadrangle* 1:24000 7.5 minute series topographic map, ground elevations in the planning area range from approximately 95 feet mean sea level (msl) at FM 1423 and BR 83, to approximately 70 feet msl at the southern limit and 75 feet msl at the northern limit of the planning area.

2.2 Existing Drainage System

The City of Donna's storm drainage system, like all urban storm drainage systems, consists of two separate and distinct elements, the primary system and the secondary system. The primary drainage system includes the major ditches, drainage channels, streams or rivers in the studied watershed. The secondary system includes open and closed conduits intended to convey runoff from frequent, low intensity storms to the primary system while causing relatively minor public inconvenience. The secondary system is supplemented in urban areas by a street system that conveys sheet flow runoff when the conduits of the secondary system have insufficient capacity during large storm events or are inoperable due to temporary blockages. At many locations the streets may be too flat to convey the excess flow from heavy rainfall events and the result is extended periods of street ponding. When both drainage systems and the local street system are properly designed, a high level of flood protection will be provided, even during significant storm events. The existing primary and secondary drainage systems in the City of Donna and surrounding areas are described below.

A. Primary Drainage System

The primary drainage system serving the City and its ETJ is a series of agriculture ditches originally designed to drain agriculture fields and to slow the rate of runoff. The planning area includes five watersheds designated by the Hidalgo County (Donna) Irrigation District No. 1 (Irrigation District) as Laterals A, B, C, I and the Upper East Main Drain. Construction plans for Lateral A, profiles of Laterals B, C and Upper East Main Drain and a map showing the layouts of the irrigation ditches were obtained from the Irrigation District. These plans and maps were used to help determine the limits of the watersheds for modeling purposes. No plans or profiles of Lateral I were available. In addition, three

field reconnaissance trips were made by the Engineer to identify local runoff patterns, collect and measure field information on the primary drainage channels, and identify the sizes and locations of the secondary drainage system.

Laterals A, B and C service the southern portion of Donna draining runoff from northwest to southeast to the Main Floodway. Lateral I and the Upper East Main Drain service the northern portion of the City, draining rainfall runoff north to County District Drain. These channels and their approximate drainage boundaries within and adjacent to the City are shown on Exhibit 2.

Many road crossings occur on each channel, with most involving one or more pipe or box culverts in the channel. Elevated irrigation ditches also crisscross the watershed and alter the natural drainage pattern. One or more culverts have been placed in the primary drainage channels where these irrigation ditches cross. Since the ditches were originally designed to drain runoff from agricultural land and convey the flow slowly to the Main Floodway or County District Drain, most of the road or irrigation canal crossings are undersized for urban drainage and significantly restrict the flows in the primary channels.

B. Secondary Drainage System

Within the City of Donna, the secondary drainage system consists of valley gutters along most streets, limited storm sewer systems, and roadside ditches. Detailed data on the existing storm sewer system is unavailable, and no detailed field surveys were obtained for this study. Although written requests for the storm sewer construction drawings were made through the City to three local engineering firms, no plans were made available for use in this study. Proposed construction drawings for a storm sewer system along Business 83 were obtained from the Texas Department of Transportation.

The alignments and sizes of the system pipes used for the storm sewer analysis were approximated using inlet and manhole locations collected during the Engineer's field reconnaissance. Sizes of critical outfalls and roadside ditches were also determined using field measurements. The approximation of the existing City storm sewer system used for this study is shown on Exhibit 3.

2.3 Historical Flooding

The City of Donna experiences frequent flooding of neighborhoods and streets as shown in Exhibit 4. A summary of the number of homes, businesses and public facilities identified by the City as affected by area flooding is shown on Table 1. From the locations of the flooded areas, the existing storm sewer and outfall channel systems apparently do not function efficiently. The flooding has resulted in structural damage to homes and business, loss of vehicular and pedestrian access to schools, businesses and homes, and sewage

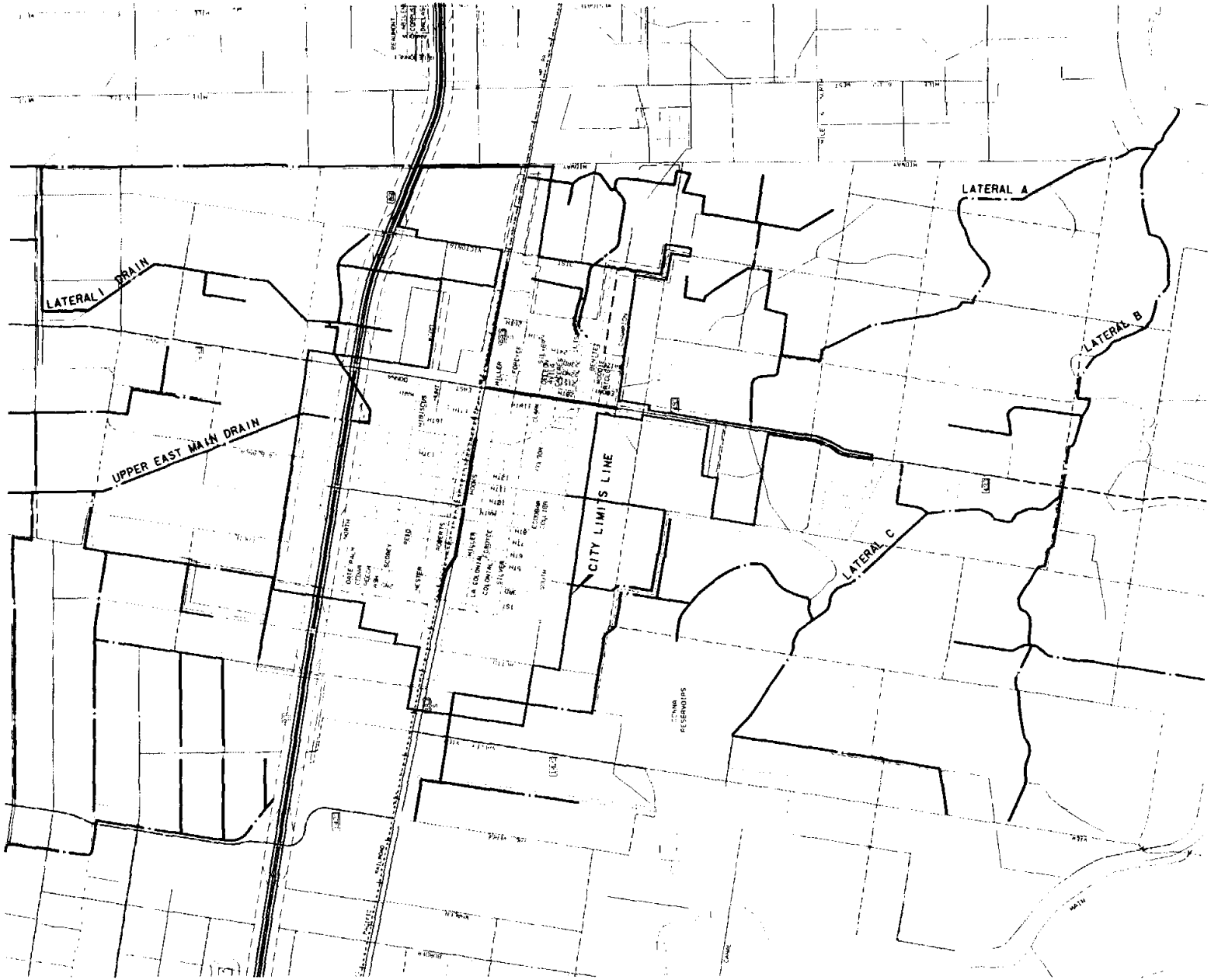
back up in wastewater collection systems due to the flooding of manholes in existing streets.

Besides the problem within the City, several Colonias in the City's ETJ have experienced flooding problems. These Colonias are also shown in Exhibit 4 and the affected homes are included in Table 2-1. Based on the estimated areas affected, approximately 445 homes, housing approximately 2000 residents, and several schools and public facilities are adversely affected by the flooding conditions.

TABLE 2-1
SUMMARY OF FLOODING AREAS

Area within City of Donna	Estimated Number of Homes Affected	Estimated Number of Businesses Affected	Estimated Number of Public Facilities Affected	Footnotes
(1) Roberts Avenue	12	1	0	
(2) North Main	20	3	2	(1)
(3) Scobey Avenue/School Area	10	0	0	
(4) U.S. 183 - S. 11th-13th	25	15	0	
(5) East Donna Boulevard	2	7	1	(2)
(6) South Avenue	14	2	3	(3)
(7) Silver Avenue/Fordyce/Mary	30	0	1	(4)
(8) Hooks Subdivision/East Donna	17	0	0	
Area Outside Donna				
(9) Colonia Nueva	200	0	0	
(10) Salinas Subdivision	25	0	0	
(11) Balli Estates	80	0	0	
(12) Valley View Estates	10	0	0	
Total	**445**	**28**	**7**	

Footnotes:
(1) La Sombra Apartments - Elderly Housing
Lenor Elementary School
(2) Todd Elementary School
(3) Donna Housing Authority, A.P. Solis Middle School
Ochoa Elementary School
(4) Stanike Elementary School



CITY OF DONNA
FLOOD PROTECTION PLAN

EXHIBIT 1

PLANNING AREA

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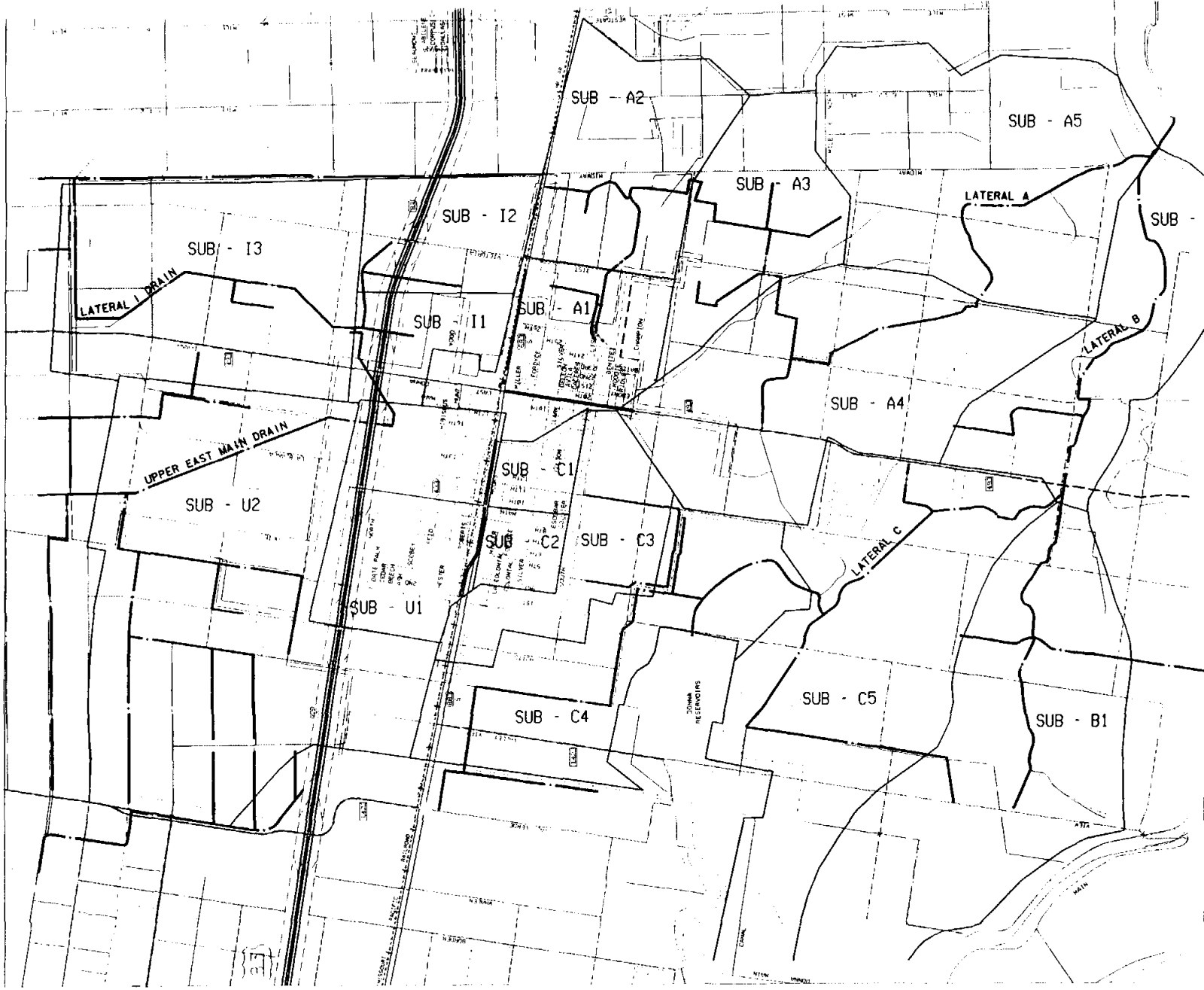

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SCALE: 1" = 3000'

LEGEND

EXISTING DITCH

DRAINAGE AREA BOUNDARIES

CITY OF DONNA
FLOOD PROTECTION PLAN

EXHIBIT 2

PRIMARY DRAINAGE SYSTEMS

LICHLITER/JAMESON

Engineering & Surveying
Consulting Engineers, Surveyors and Planners
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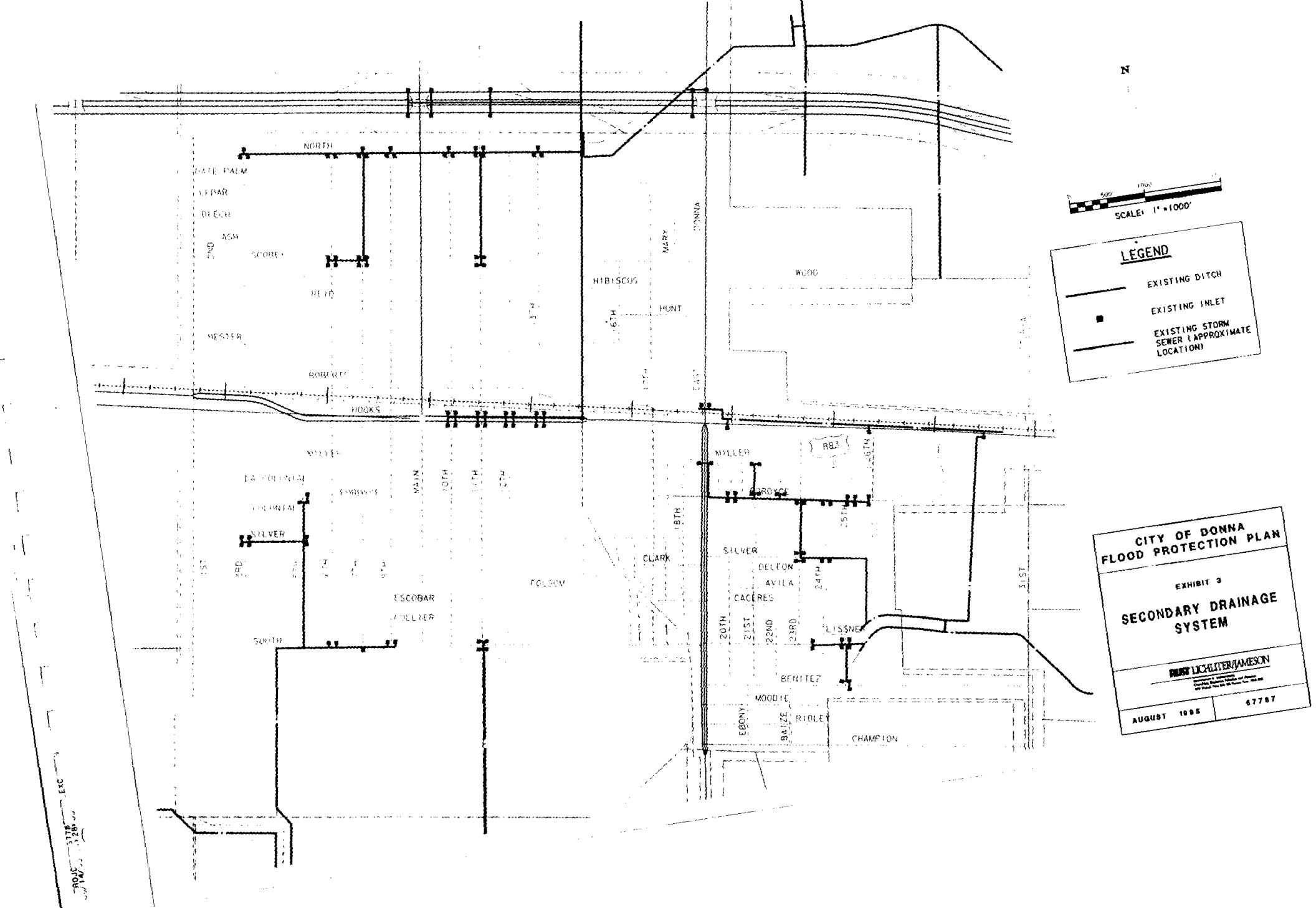
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LEGEND
EXISTING DITCH
EXISTING INLET
EXISTING STORM SEWER (APPROXIMATE LOCATION)
NORTH
GATE PALM
CEDAR
BEECH
ASH
2ND
SCORE
REID
WESTER
ROBERTS
HOOKS
HIBISCUS
MARY
DONNA
HUNT
WOOD
6TH
3RD
MAIN
10TH
14TH
17TH
EASY
MILLER
BROCE
SILVER
CLARK
ESCOBAR
FOLSOM
SOUTH
DELEON
AVILA
CACERES
LISSNER
BENITEZ
MOODIE
EBONY
BALIZE
RIDLEY
CHAMPION
20TH
21ST
22ND
23RD
24TH
31ST
CITY OF DONNA
FLOOD PROTECTION PLAN
EXHIBIT 3
SECONDARY DRAINAGE SYSTEM
LICHTER/JAMESON
AUGUST 1995
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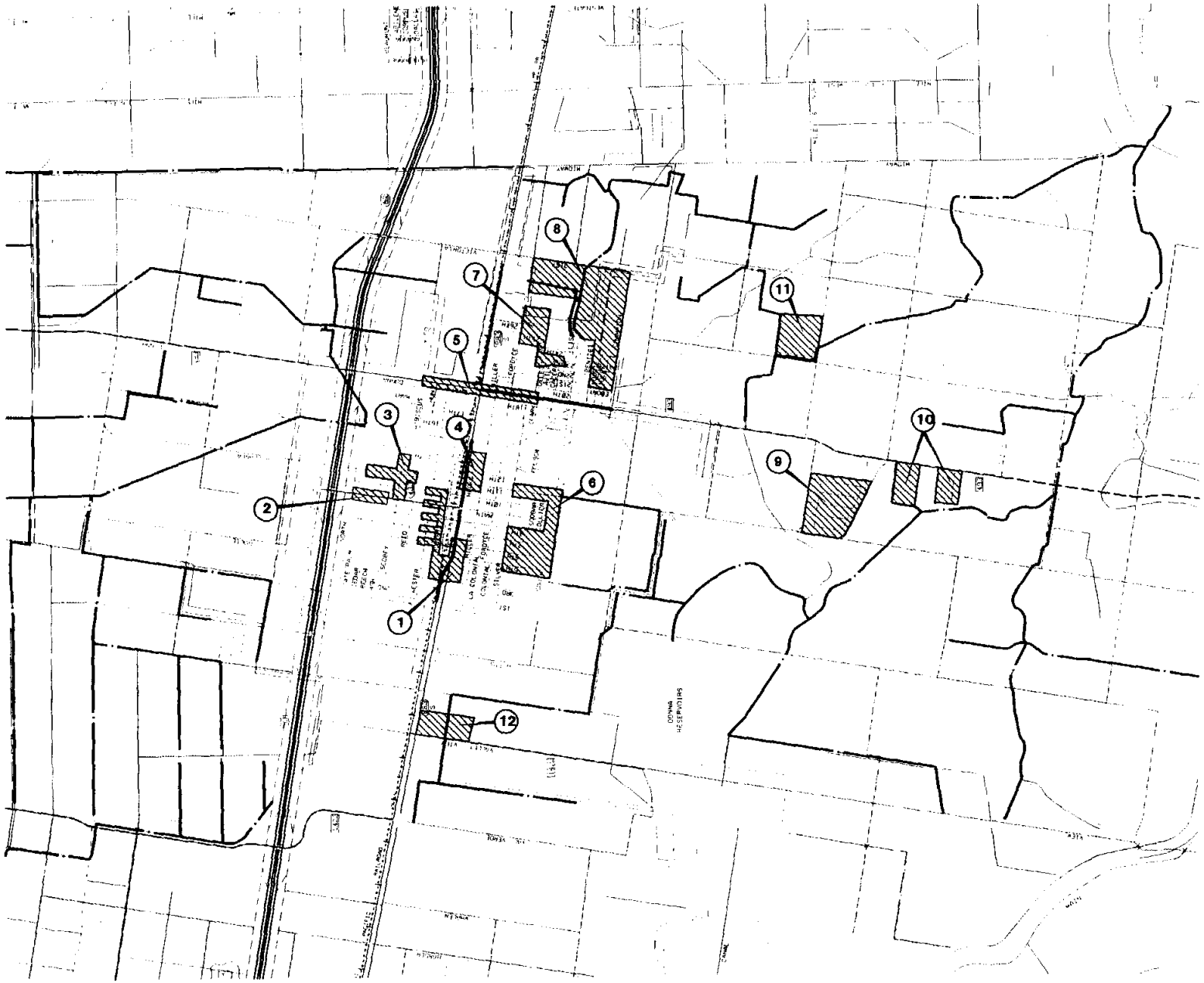
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SCALE: 1" = 3000'
LEGEND
EXISTING DITCH
HISTORICAL FLOODING AREA
REFERENCE TO TABLE I FLOODING AREAS
TABLE I
SUMMARY OF FLOODING AREAS
AREA WITHIN CITY OF DONNA
(1) ROBERTS AVENUE
(2) NORTH MAIN
(3) SCOBEY AVENUE/SCHOOL AREA
(4) U.S. 183-S. 11th-13th
(5) EAST DONNA BOULEVARD
(6) SOUTH AVENUE
(7) SILVER AVENUE/FORDYCE/MARY
(8) HOOKS SUBDIVISION/EAST DONNA
AREA OUTSIDE DONNA
(9) COLONIA NUEVA
(10) SALINAS SUBDIVISION
(11) BALLI ESTATES
(12) VALLEY VIEW ESTATES
CITY OF DONNA
FLOOD PROTECTION PLAN
EXHIBIT 4
LOCATION OF HISTORICAL FLOODING
LICHTER/JAMESON
AUGUST 1995
67787

3.0 FLOODING ANALYSIS

Early field visits to the City and its ETJ identified that the extensive flooding and access problems that occur are probably the result of the very limited extent of the storm sewer system, undersized storm sewers, nearly flat grade in many streets, inadequate capacity in portions of the outfall channels and poorly designed drainage structures associated with these channels. Once the problem areas had been identified and the available data on the existing systems had been compiled, a methodology was developed to quantify the extent of the problem and develop a flood protection plan to reduce the flooding problem.

3.1 Analysis of the Existing Drainage System

Computer models of the existing drainage systems were developed to analyze the flooding problems within the planning area. Two types of models were developed to quantify rainfall-runoff patterns in the regional area and to analyze the efficiency of the primary drainage system (i.e., drainage channels). These large-scale models were developed using the United States Army Corps of Engineers' HEC-1 hydrologic computer program and HEC-2 hydraulic computer program. These models are based on existing topographic, cross-section, profile and drainage area data from the City of Donna, Hidalgo County, the Irrigation District, and extensive field reconnaissance and are described below in Sections 3.1.A. and 3.1.B. A third type of model was used to evaluate the localized drainage patterns in the secondary drainage system (i.e., storm sewer system). This model was developed in-house by the Engineer and is described in Section 3.1.C. below.

A. HEC-1 Model

The HEC-1 program can simulate the precipitation-runoff process and compute flood hydrographs at desired locations in a watershed. The physical characteristics of the watershed are represented by an interconnected system of geographic and hydrologic components. The watershed boundaries are delineated, and the land area is divided into sub-watersheds based on the study objectives and hydrologic characteristics. After the rainfall-runoff process is simulated, runoff from the sub-watersheds is linked using channel routing. The basic hydrologic components of the model include land-surface runoff from each sub-watershed, channel and reservoir routing, and combining hydrographs at confluences.

No continuous long-term records of rainfall and resulting storm runoff were available in the study area. Therefore, rainfall values for the 5-, 10- and 100-year rainfalls were obtained from the National Weather Service's (NWS) Technical Paper No. 40 (TP-40) and Technical Memorandum NWS Hydro-35 ("Five- to 60-Minute Precipitation Frequency for the Eastern and Central United States) for use in the HEC-1 model. Table 3-1 shows the frequency and rainfall depth for a 24-hour duration according to previously mentioned documents.

TABLE 3-1
RAINFALL DEPTH FOR 24 HOUR DURATIONS FOR THE CITY OF DONNA

Frequency	Rainfall Depth (inches)
5- Year	6.0
10-Year	7.2
100-Year	11.0

The Soil Conservation Service (SCS) method was used for the HEC-1 hydrologic analysis. This method employs two parameters, the curve number (CN) and the lag. The CN for the various sub-basins was determined using the SCS Soil classification and the land use(s) within each sub-basin. The lag was calculated using the following formula:

$$Lag = \frac{l^{0.8}(S+1)^{0.7}}{1900Y^{0.5}}$$

where:
- S = (1000/CN)-10
- l = Hydraulic length in feet
- Y = Slope, in percent

The CN and lag values for each subarea (shown on Exhibit 2) are listed on Table 3-2.

TABLE 3-2
HYDROLOGIC PARAMETERS

Subarea	CN Value	Lag (hours)
A1	83.9	13.89
A1a	85.0	13.37
A1b	85.4	3.70
A1c	75.0	3.69
A2	76.1	7.33
A3	77.2	8.97
A4	78.3	8.45
A5	79.4	11.17
B1	86.0	14.87
B2	84.9	11.77
C1	85.0	1.59
C2	85.0	3.17
C3	75.0	8.80
C4	78.3	17.03
C5	85.5	18.68
U1	85.2	5.67
U2	76.7	14.43
I1	76.1	8.44
I2	76.1	6.25
I3	76.1	16.50

The SCS Dimensionless Unitgraph method in HEC-1 then determines how much of the rainfall actually becomes storm runoff. This method requires only the SCS lag, in hours, be entered to generate a unit hydrograph for the sub-basin.

The time to peak of the unitgraph is computed as:

$$T_{peak} = \frac{\Delta t}{2} + T_{lag}$$

in which:

T_{peak}	=	the time to peak, in hours
Δt	=	the computation time interval (also duration of unit excess), in hours
T_{lag}	=	the watershed lag value, in hours

The peak flow rate of the unitgraph is computed by:

$$Q_{peak} = \frac{484\ AREA}{T_{peak}}$$

where:

Q_{peak}	=	the peak flow rate of the unitgraph in cfs per inch
$AREA$	=	the watershed area in square miles
T_{peak}	=	the calculated time to peak

Field reconnaissance showed Sub-basins A1-a, and A1-b drained to channel A through 18- and 30-inch outfall pipes, respectively. Channel C sub-basins C1 and C2 were also found to have restricted outfalls. These restrictions cause street ponding by limiting flow and creating storage areas upstream from the substandard outfall pipes. The HEC-1 model was adjusted to reflect this effective storage. The existing conditions HEC-1 model is included as Appendix A.

B. HEC-2 Model

The HEC-2 computer program has been developed for calculating water surface profiles for steady, gradually varied flow in natural or manmade channels. The program allows the effects of obstructions to flow, such as bridges, culverts, weirs, and buildings in the floodplain, to be modeled. Generally, the water surface profiles are calculated with the standard step method, which sequentially solves the one-dimensional energy equation between cross-sections. At some bridges, where more complex flow conditions exist, the program may use momentum and other hydraulic equations to determine changes in the water surface elevations.

HEC-2 has a variety of applications and many options for defining input and specifying output. This feature allows the Engineer to create models with several different channel or culvert improvement options.

The HEC-2 hydraulic models for the primary drainage channels in the planning area were developed using information from various sources. The topographic information for Lateral A was obtained from channel improvement plans provided by the Irrigation District. Profiles of Lateral B, Lateral C, and Upper East Main Drain were obtained from the Irrigation District and were augmented with field measured cross sections and elevations from the 1:24000 quad map. Dimensions and other required data for Lateral I were estimated from aerial photographs and the quad map since no profiles or plans for this ditch were available.

Timing of the peak flow was checked to establish the method for determining the starting water surface elevation in each channel. The peak flow in Lateral A, at the confluence with Lateral B, occurs approximately 12 hours before the peak in Lateral B. The peak flow in Lateral C, at its confluence with Lateral B, occurs approximately 11 hours after the peak in Lateral B. Since the early flow will be gone when the later flow arrives at the confluence, neither flow will affect the other. Therefore, the starting water surface elevation for each channel was calculated using the slope-area method. Similarly, the outfalls for both Lateral I and the Upper East Main Drain were estimated using the slope-area method. The existing conditions HEC-2 models are included as Appendix B.

C. Storm Sewer Analysis

A storm sewer conveys flow using the energy resulting from the difference in elevation of the upstream and downstream ends of the pipe. The Engineer developed an in-house program to simulate the pipe system. The analysis of the storm sewer system solves for the energy-loss in each pipe using Manning's formula for a pipe flowing full.

$$Energy\ Loss = Q^2\left(\frac{n}{1.486AR^{2/3}}\right)^2$$

where:

n	=	Manning's roughness coefficient
Q	=	the flow rate in cfs
A	=	cross-sectional area of the pipe in square feet
R	=	hydraulic radius

The analysis simulates one conduit at a time, working methodically through the system top to bottom as though it were a basic gravity system. During this process, any parameters that will be used in the surcharge calculations are noted. When the first run is completed, the system is recalculated starting at the outfall, working back up the system to calculate the surcharge on each overloaded pipe and carrying any excess head along until the top of the system is reached, or until the pipes are no longer surcharged. The existing storm sewer system for the City of Donna was approximated from field observations as discussed previously and then analyzed using the in-house program.

3.2 Results of Analyses

Using the HEC-1 model described in Section 3.1.A. above, flows in each of the five primary channels were developed for the 5-, 10- and 100-year design frequencies. These flows were then input into the HEC-2 models for each channel as described in Section 3.1.B. and the design water surfaces were generated and are shown graphically in the hydraulic gradient profiles shown in Exhibits 5a through 5e. These profiles were then analyzed with the available topographic maps to identify areas potentially subjected to riverine flooding from the primary channel system under design storm conditions. Exhibit 6 shows the areas that have the greatest potential for flooding during each of the 5-year, 10-year and 100-year design storm events. Limitations imposed by the lack of detailed construction drawings or topographic surveys affect the accuracy of this exhibit; however, the map shows the general locations and severity of potential channel flooding.

According to residents, questioned during field visits by the Engineer, Channels A, B, and C have historic flooding and Channels I and Upper East Main Drain do not have historic flooding. According to the hydraulic modeling, all of the channels have the potential for out-of-bank riverine flooding as follows: Channel A has three areas of potential flooding between the following cross sections: 8000 - 10,000; 15,000 - 17,000 and 22,000 - 27,000. Channel B has two areas of potential flooding between cross sections 9000 - 11,000 and 12,000 - 12,750. Channel C has two areas of potential flooding at the mouth, near the Colonias next to channel and upstream of 16,000. The Upper East Main Drain has the potential 100-year flooding along the entire length of the channel and higher frequency flooding along the downstream half the channel. Modeling shows that Channel I has the potential for limited out-of-bank flooding at all three studied frequencies; however, the lack of reported historical flooding indicates that the modeling may be overpredicting the flooding potential due to the estimated data used to simulate the channel and overbank characteristics.

The analysis of the secondary drainage system as described in Section 3.1.C. identified localized areas that may flood during more frequent smaller storms as well as the design storms due to an undersized or inadequate storm sewer and roadside ditch systems. The analysis was based on field assumptions of the existing system layout, pipe slopes and sizes and is therefore limited in its accuracy. However, using the analysis and historical

flooding information shown on Exhibit 4, several areas were identified as flood prone and were considered during development of the Flood Protection Plan described in Section 4.0.

Table 3-3 summarizes the areas identified as either having experienced historical flooding or having the potential for future flooding based on the analyses. The table also identifies the possible cause of flooding for each location and the potential design frequency of flooding, if applicable. As in the analysis of the primary drainage system, detailed topographic information of the area (including the street system) was not available, so assumptions were made in determining the causes of historical flooding.

TABLE 3-3
SUMMARY OF THE CAUSES OF POTENTIAL FLOODING

Area within City of Donna	Frequency of Potential Flooding	Cause of Potential Flooding
(1) Roberts Avenue	A	Inadequate Storm Sewers
(2) North Main	A	Inadequate Storm Sewers
(3) Scobey Avenue/School Area	A	Inadequate Storm Sewers
(4) U.S. 183 - S. 11th-13th	A	Inadequate Storm Sewers
(5) East Donna Boulevard	A	Inadequate Storm Sewers
(6) South Avenue	A	Inadequate Storm Sewers and Outfall to Channel
(7) Silver Avenue/Fordyce/Mary	A	Inadequate Storm Sewers and Outfall to Channel
(8) Hooks Subdivision/East Donna	A	Inadequate Storm Sewers and Outfall to Channel
Area Outside Donna		
(9) Colonia Nueva	B	Low Lying Sheet Flow Flooding
(10) Salinas Subdivision	B	Low Lying Sheet Flow and Riverine Flooding
(11) Balli Estates	A	Low Lying Sheet Flow and Riverine Flooding
(12) Valley View Estates	A	Restricted Outfall Channel with Constrictions
Primary Drainage Systems		
(13) Channel A: 8000-10,000	B	Small Pipe Crossing
(14) Channel A: 15,000-17,000	A	Low Lying Sheet Flow and Riverine Flooding
(15) Channel A: 22,000-27,000	A	Low Lying Area
(16) Channel B: 9000-11,000	A	Small Pipe Crossing
(17) Channel B: 12,000-12,750	A	Small Pipe Crossing and Confluence w/Channel C
(18) Channel C: at Mouth	A	Small Pipe Crossing on Channel B and Confluence w/Channel B
(19) Channel C at Colonias	B	Low Lying Sheet Flow and Riverine Flooding
(20) Channel C: 16,000-20,000	A	Small Pipe Crossing
(21) Channel UEMD	B	Small Pipe Crossing

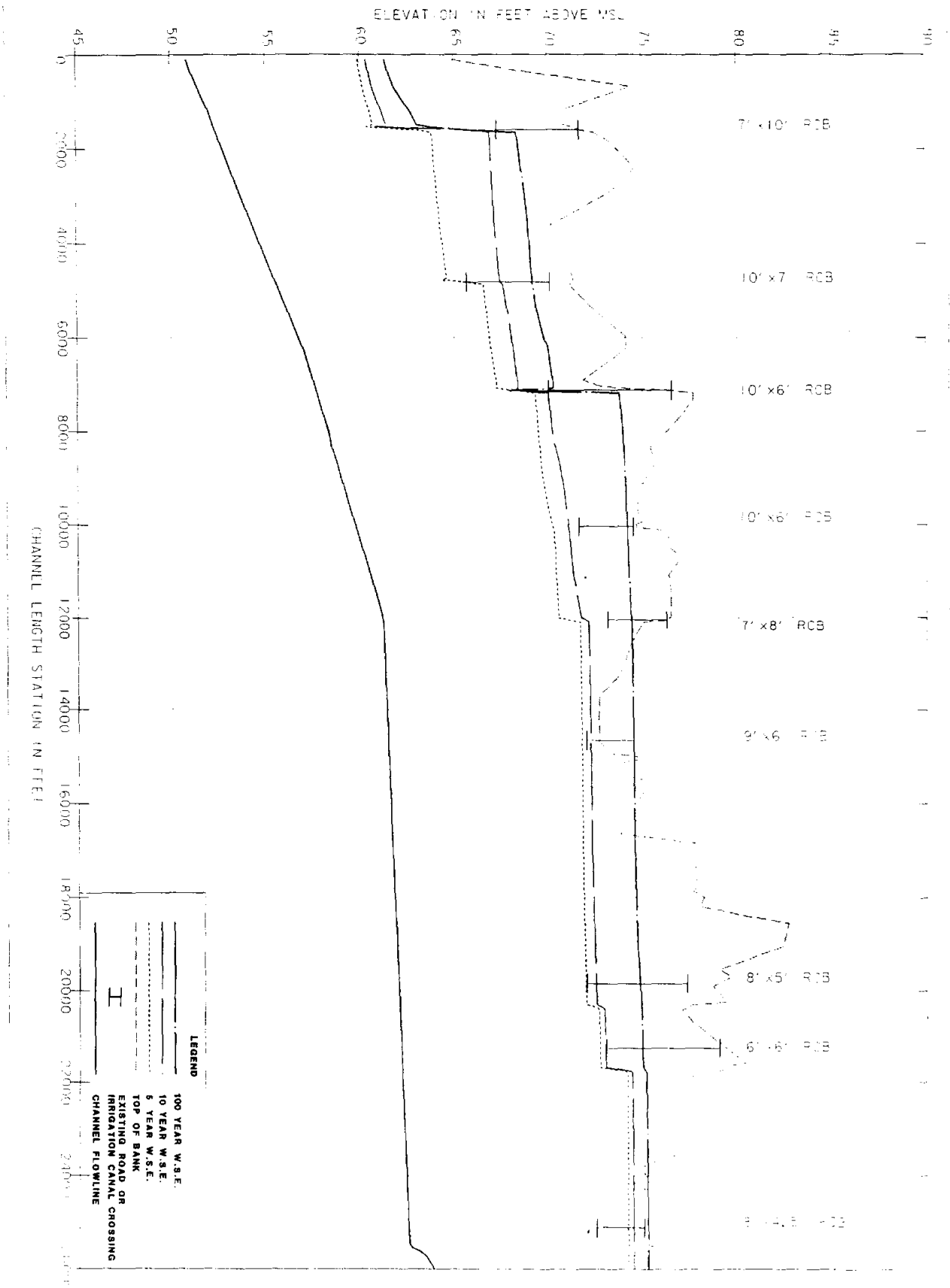
Note: (A)Frequency Less Than 5-years
(B)Frequency Between 5-years and 10-years
(C)Frequency Between 10-years and 100-years
(D)Frequency Greater Than 100-years

3.3 Extrapolation of Analysis to Future Development

In fulfillment of the TWDB planning grant requirements, a projection was developed which used current development trends and proposed future commercial plans to estimate new development that is likely to occur in the next ten years. The Engineer estimated the most probable locations and types of future development within the City and its ETJ as shown on Exhibit 7.

The projected development is limited to areas near current developed subdivisions or along the major roadways. This projection could change dramatically depending upon the construction of an international bridge and adjacent industrial complex or other development scenarios not considered as part of the scope of this study. A more detailed land planning study has been proposed by the City and can be used in the future to modify the projections used in this report.

The areas identified in Exhibit 7 were considered during development of the Flood Protection Plan described below. The improvements have been sized to accommodate limited future development in the areas indicated; however, land plans for these areas should be required to perform adequate analysis of the drainage system serving the targeted area in order to anticipate and prevent future flooding problems.



CITY OF DONNA FLOOD PROTECTION PLAN HALFF LICHLITER/JAMESON AUGUST 1995 67787	**EXHIBIT 5a - FLOOD PROFILES** **CHANNEL A**

EXHIBIT 5a - FLOOD PROFILES

CITY OF DONNA
FLOOD PROTECTION PLAN

SCHLUTER JAMESON

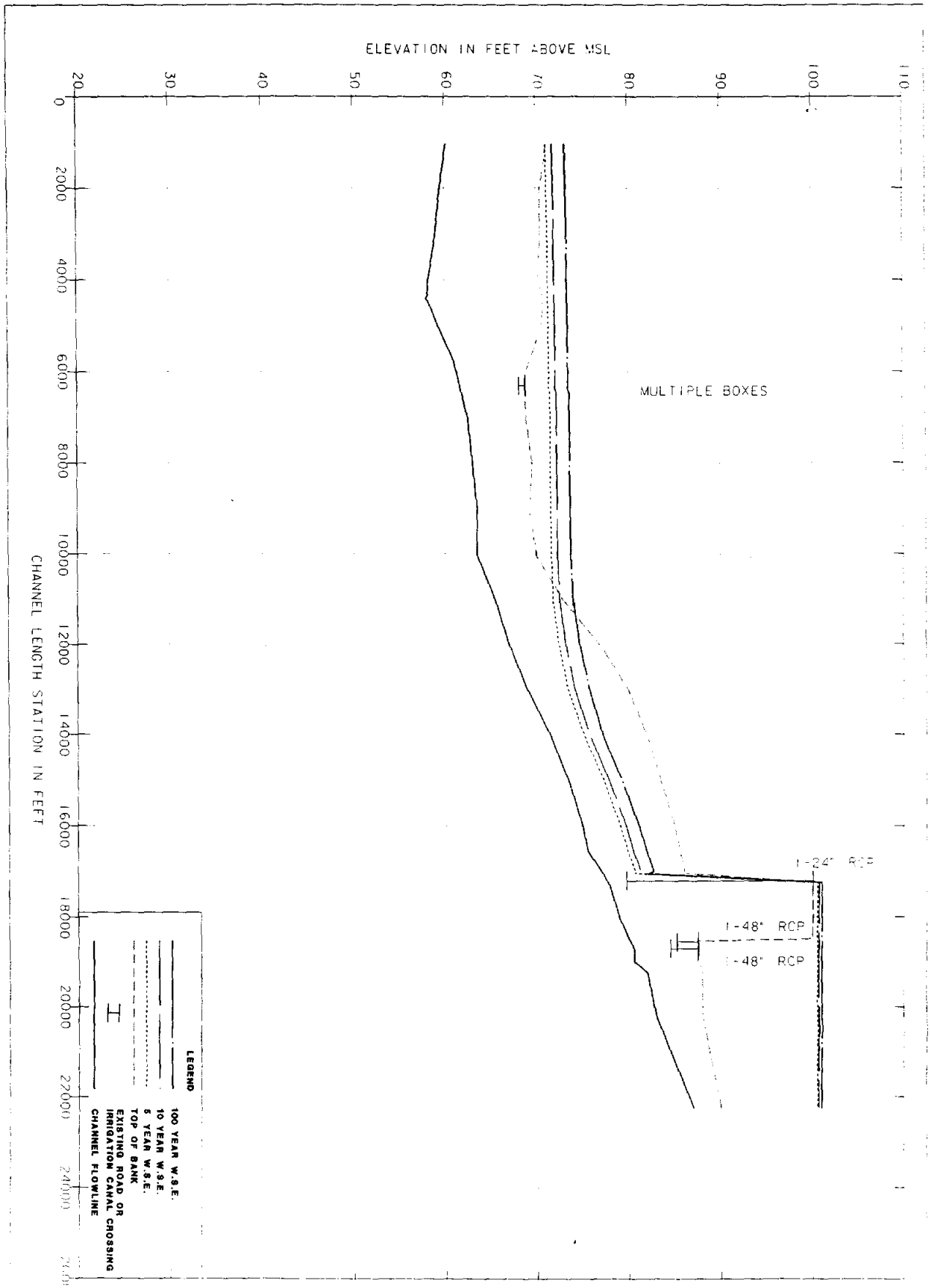
CITY OF DONNA
FLOOD PROTECTION PLAN

RUST LICHLITER/JAMESON

AUGUST 1995 67787

EXHIBIT 5b - FLOOD PROFILES

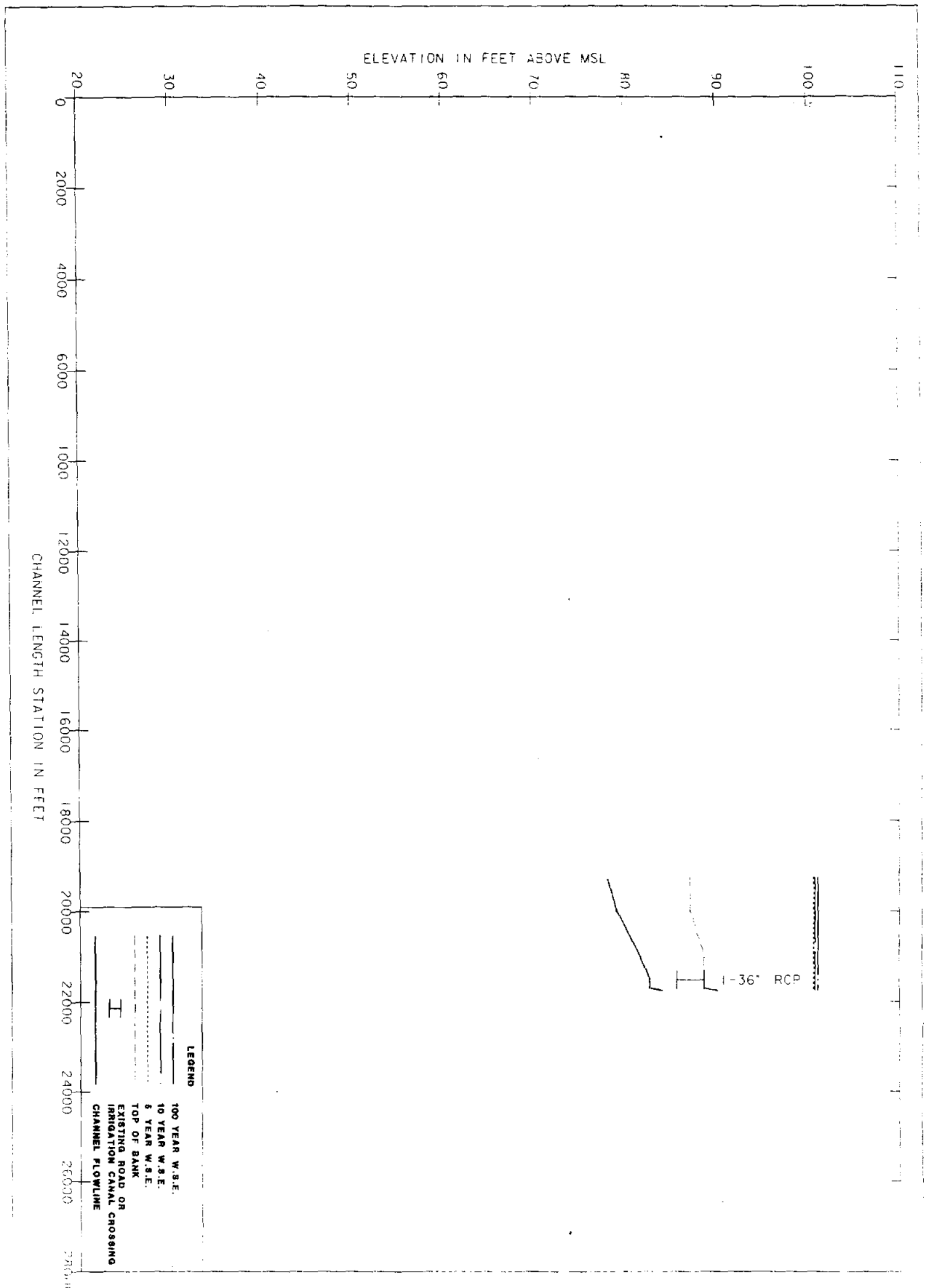
CHANNEL B



CITY OF DONNA
FLOOD PROTECTION PLAN
LICHLITER/JAMESON
AUGUST 1995 67787

EXHIBIT 5c - FLOOD PROFILES

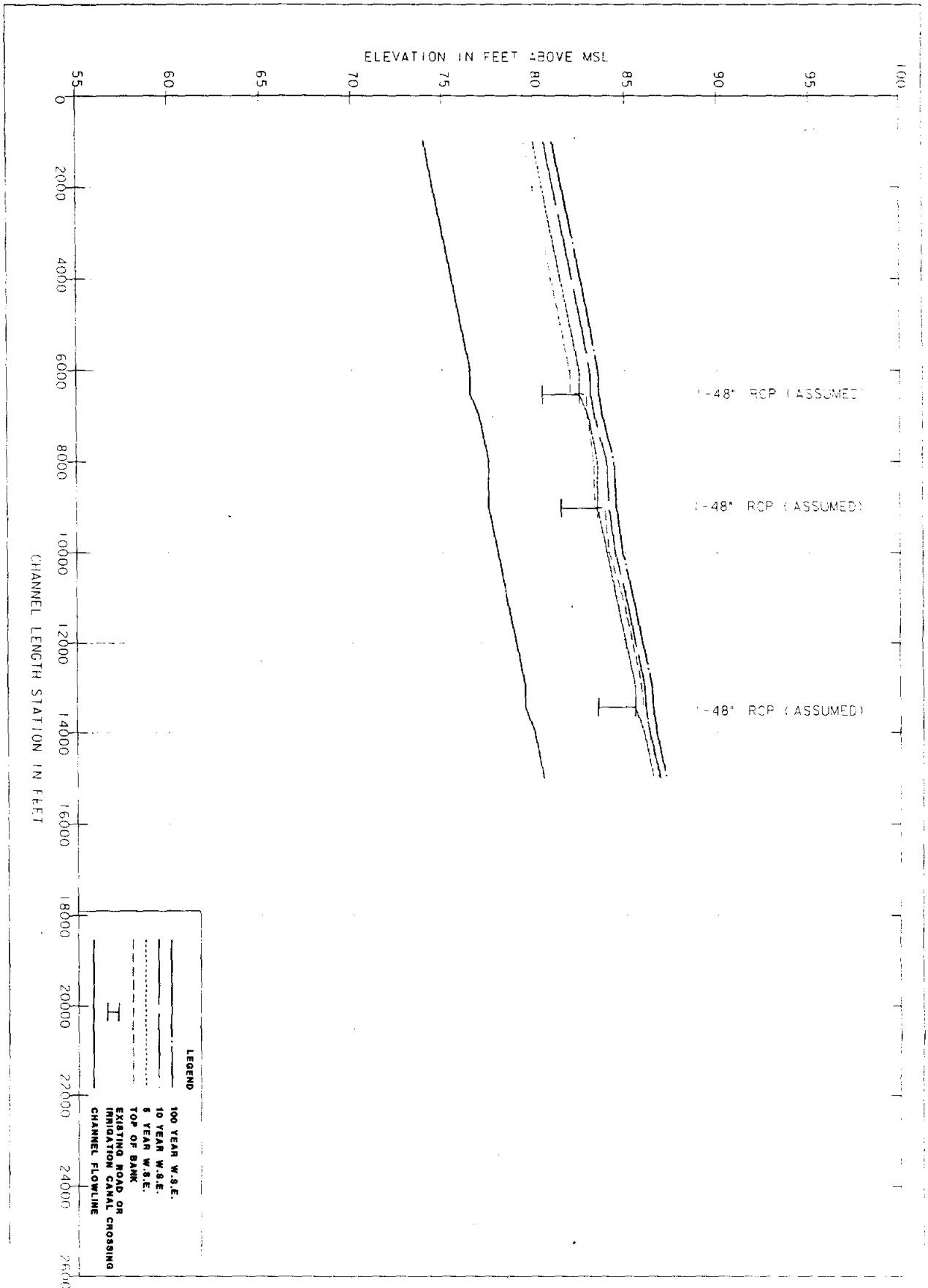
CHANNEL C



CITY OF DONNA
FLOOD PROTECTION PLAN
RUST LICHLITER/JAMESON

EXHIBIT 5c - FLOOD PROFILES

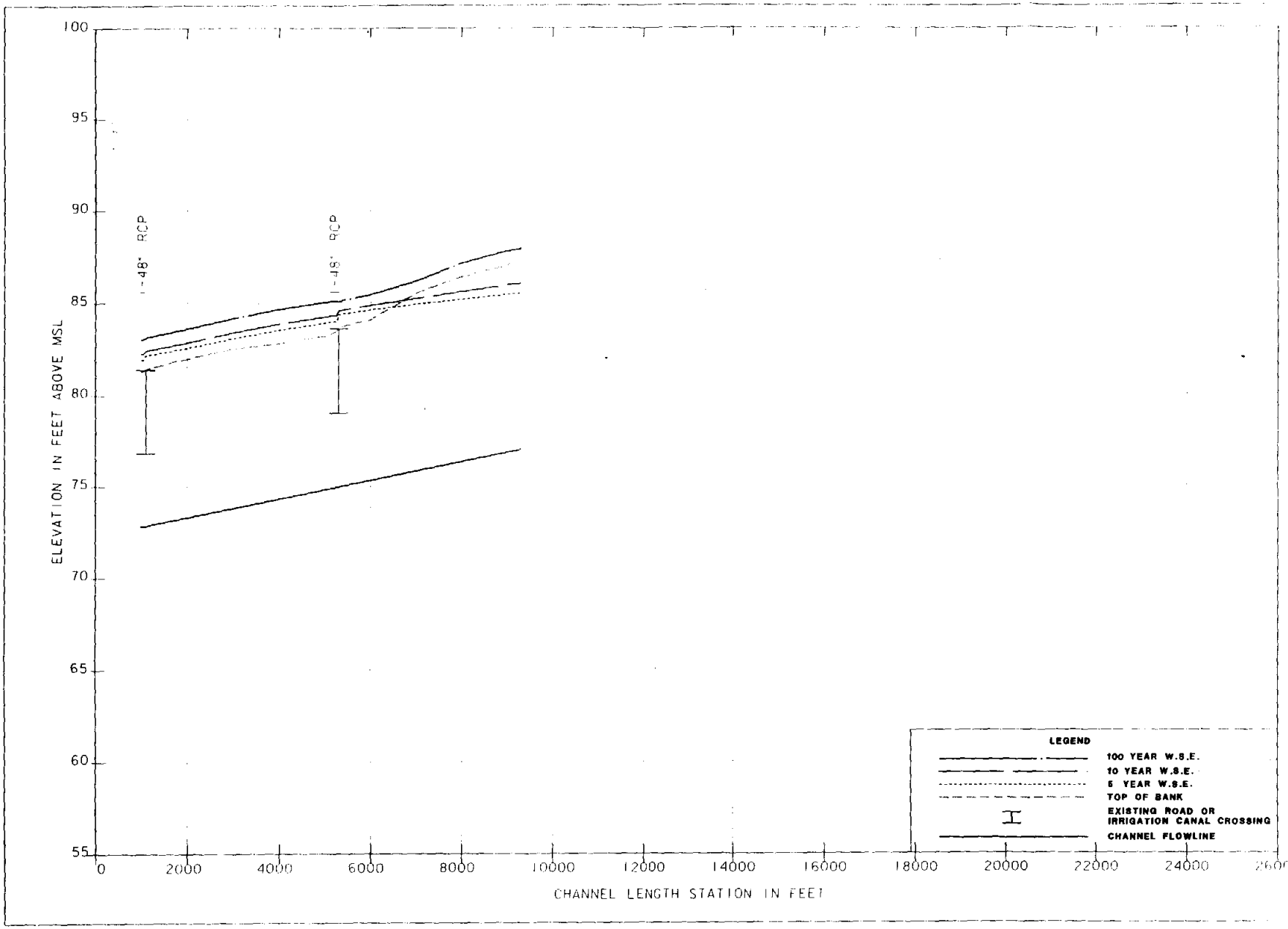
TRIBUTARY TO CHANNEL C



CITY OF DONNA
FLOOD PROTECTION PLAN
LICHLITER/JAMESON
AUGUST 1998 67787

EXHIBIT 5d - FLOOD PROFILES

CHANNEL I



CITY OF DONNA
FLOOD PROTECTION PLAN
RUST LICHLITER/JAMESON
AUGUST 1998 67787

EXHIBIT 5e - FLOOD PROFILES
UPPER EAST MAIN DRAIN

N

0 1000' 2000' 3000' 6000'

SCALE: 1" = 3000'

LEGEND

- EXISTING DITCH
- EXISTING INLET
- EXISTING STORM SEWER (APPROXIMATE LOCATION)
- POTENTIAL FLOOD AREA FROM 100-YEAR STORM
- POTENTIAL FLOOD AREA FROM 10-YEAR STORM
- POTENTIAL FLOOD AREA FROM 5-YEAR STORM

CITY OF DONNA FLOOD PROTECTION PLAN

EXHIBIT 6

POTENTIAL FLOODING AREAS ALONG PRIMARY DRAINAGE SYSTEM

RUST LICHLITER/JAMESON

AUGUST 1995 | 67767

CITY OF DONNA
FLOOD PROTECTION PLAN

EXHIBIT 7

PROJECTED DEVELOPMENT THROUGH 2005

LIEBT LICHTER/JAMESON

AUGUST 1995	67767

PROJECT 67767 EXHIBIT 7

4.0 RECOMMENDED FLOOD PROTECTION PLAN

Using the results of analysis discussed in Section 3.0 above, the Engineer developed a Flood Protection Plan that mitigates the 5-, 10- and 100-year design flood along the primary drainage channels in areas of existing or projected future development. The plan also eliminates or reduces the flooding within the City caused by the inadequate existing storm sewer system. Typically, severe storm events will still surcharge the storm sewer system and cause flow to pond or be conveyed in the street system; however, the improved storm sewer system will provide conveyance that will significantly decrease the time and depth of ponding and should decrease or eliminate inconvenience to vehicular or pedestrian traffic. Additional surveying of the local topography and the existing storm sewer/street system must be done before the preparation of construction drawings for any element of the proposed plan in order to supplement the limited data used in this study.

The Flood Protection Plan is shown on Exhibit 8 and is composed of elements that add or replace thousands of linear feet of storm sewer pipe, add or expand the placement of inlet/lead systems, involve several thousand feet of open-cut roadway and driveway culverts, include nearly a thousand feet of bore-and-jack crossings, and proposes over three miles of channel clearing, clean-out and/or improvements. Table 4-1 lists the components of the Plan and shows cost estimates for construction activities involved with each component. The estimated cost for the recommended Flood Protection Plan for the City of Donna is $4,250,000 (does not include utility adjustments or other soft costs).

Channel improvements are recommended for many reaches of ditches in both the primary and secondary drainage systems. Most of the improvements are along roadside ditches or existing primary channels, with one new bypass ditch proposed southeast of the City. This new ditch is necessary to relieve flooding conditions along Lateral A which threaten the development in low-lying areas. Costs for right-of-way acquisition are included in Table 4-1. For existing channel improvements, only the cost for the additional easement is included in construction estimates.

Channel clearing shown on the plan consists of cleaning out debris and silt which has accumulated in the channel, clearing one bank of all vegetation except groundcover, and digging out the bottom with a backhoe. Many of the primary channels have sufficient storage capacity even with the heavy growth of vegetation; however, the flowline of the channel, culverts and storm sewer outfalls cannot be maintained without having at least one side cleared and accessible to maintenance crews and machinery.

The Engineer assumed bore-and-jack or tunneling construction techniques for the proposed irrigation ditch crossings along the primary channels so that the use of the irrigation ditches is not interrupted. For the wider irrigation ditch crossings with embankments, portions of the pipe culvert construction can be open-cut with the about 50

feet requiring tunneling directly under the conveyance portion of the ditch. All other culvert installations are assumed to be applicable to the less expensive open-cut construction techniques. The costs for installing driveway and street culverts given in Table 4-1 include pavement replacement.

TABLE 4-1
RECOMMENDED FLOOD PROTECTION PLAN
CONSTRUCTION COST ESTIMATE

ITEM	DESCRIPTION	UNIT	QTY	CONSTRUCTION COST UNIT COST	CONSTRUCTION COST TOTAL
1	18-Inch R.C.P. Storm Sewer w/M.H.	LF	5800	$30.00	$174,000
2	24-Inch R.C.P. Storm Sewer w/M.H.	LF	8200	$40.00	$328,000
3	30-Inch R.C.P. Storm Sewer w/M.H.	LF	4200	$50.00	$210,000
4	36-Inch R.C.P. Storm Sewer w/M.H.	LF	3500	$60.00	$210,000
5	48-Inch R.C.P. Storm Sewer w/M.H	LF	6000	$80.00	$480,000
6	60-Inch R.C.P. Storm Sewer w/M.H.	LF	2000	$100.00	$200,000
7	Inlet with 18-Inch R.C.P. Lead	EA	76	$1,800.00	$136,800
8	72-Inch Open Cut Culvert	LF	150	$90.00	$13,500
9	60-Inch Open Cut Culvert	LF	950	$80.00	$76,000
10	48-Inch Open Cut Culvert	LF	160	$70.00	$11,200
11	36-Inch Open Cut Culvert	LF	100	$60.00	$6,000
12	72-Inch Bore & Jack Crossing	LF	100	$250.00	$25,000
13	60-Inch Bore & Jack Crossing	LF	860	$200.00	$172,000
14	48-Inch Bore & Jack Crossing	LF	360	$150.00	$54,000
15	36-Inch Bore & Jack Crossing	LF	50	$100.00	$5,000
16	Channel Debris & Silt Clean out	LF	21000	$30.00	$630,000
17	Channel Cross-Section Improvement	LF	14200	$40.00	$568,000
18	New Channel	CY	25000	$3.00	$75,000
	Sub-Total Estimated Construction Costs				$3,374,500
	Right-of-Way Costs				$75,000
	Sub-Total Construction w/ROW Costs				$3,449,500
	Contingencies (10%)				$344,950
	Sub-Total				$3,794,450
	Engineering, Surveying, Const. Adm. (12%)				$455,334
	TOTAL				$4,249,784
	ROUND TO				$4,250,000

5.0 IMPLEMENTATION PLAN

5.1 Phasing

The Flood Protection Plan recommended in Section 3.0 was divided into three phases for implementation. The third phase is the Recommended Flood Protection Plan discussed in the previous section and shown on Exhibit 8. Phase 1 and Phase 2 are the 5-year and 10-year implementation plans. The meaning of "5-year" and "10-year" in this context refers to construction work over the next 5- or 10-year period and does not have the same meaning as in the earlier discussion of design storm frequency.

A. Phase 1

The Phase 1 Implementation Plan consists of the critical improvements that will be most cost effective in reducing flooding in the City of Donna. The Phase 1 improvements are presented on Exhibit 9 and have been structured so that they can be constructed within a 5-year time frame with financing as discussed below. The estimated costs of these improvements are $1,350,000 as summarized on Table 5-1. Some improvements are outside the City or its ETJ and are required to increase the conveyance of the primary drainage system serving the City. All elements of Phase 1 are compatible with the recommended Flood Protection Plan.

B. Phase 2

The Phase 2 Implementation Plan is the second tier of improvements recommended upon completion of Phase 1 when additional drainage funds become available. Using the financing assumption discussed below in Section 5.2, these improvements should be able to be fully constructed in 10-years. The Phase 1 and Phase 2 improvements are presented on Exhibit 10. The estimated costs of the Phase 2 improvements are an additional $1,450,000. The total project which includes Phase 1 and Phase 2 is summarized on Table 5-2. All elements of Phase 2 follow the Phase 1 improvements and are compatible with the remainder of the Flood Protection Plan.

C. Phase 3

The Phase 3 Implementation Plan is the third tier of improvements which completes the Flood Protection Plan. The additional estimated costs of the Phase 3 improvements are $1,450,000, bringing the total cost of the Plan to $4,250,000 as shown in Table 4-1.

TABLE 5-1
5-YEAR IMPLEMENTATION PLAN
CONSTRUCTION COST ESTIMATE

ITEM	DESCRIPTION	UNIT	QTY	CONSTRUCTION COST	
				UNIT COST	TOTAL
1	18-Inch R.C.P. Storm Sewer w/M.H.	LF	2400	$30.00	$72,000
2	24-Inch R.C.P. Storm Sewer w/M.H.	LF	3200	$40.00	$128,000
3	30-Inch R.C.P. Storm Sewer w/M.H.	LF	1500	$50.00	$75,000
4	36-Inch R.C.P. Storm Sewer w/M.H.	LF	1400	$60.00	$84,000
5	48-Inch R.C.P. Storm Sewer w/M.H	LF	900	$80.00	$72,000
6	60-Inch R.C.P. Storm Sewer w/M.H.	LF	2000	$100.00	$200,000
7	Inlet with 18-Inch R.C.P. Lead	EA	33	$1,800.00	$59,400
8	72-Inch Open Cut Culvert	LF	0	$90.00	$0
9	60-Inch Open Cut Culvert	LF	610	$80.00	$48,800
10	48-Inch Open Cut Culvert	LF	0	$70.00	$0
11	36-Inch Open Cut Culvert	LF	100	$60.00	$6,000
12	72-Inch Bore & Jack Crossing	LF	0	$250.00	$0
13	60-Inch Bore & Jack Crossing	LF	250	$200.00	$50,000
14	48-Inch Bore & Jack Crossing	LF	0	$150.00	$0
15	36-Inch Bore & Jack Crossing	LF	50	$100.00	$5,000
16	Channel Debris & Silt Cleanout	LF	5000	$30.00	$150,000
17	Channel Cross-Section Improvement	LF	3000	$40.00	$120,000
18	New Channel	CY	0	$3.00	$0
	Sub-Total Estimated Construction Costs				$1,070,200
	Right-of-Way Costs				$25,000
	Sub-Total Construction w/R.O.W. Costs				$1,095,200
	Contingencies (10%)				$109,520
	Sub-Total				$1,204,720
	Engineering, Surveying, Const. Adm. (12%)				$144,566
	TOTAL				$1,349,286
	ROUND TO				$1,350,000

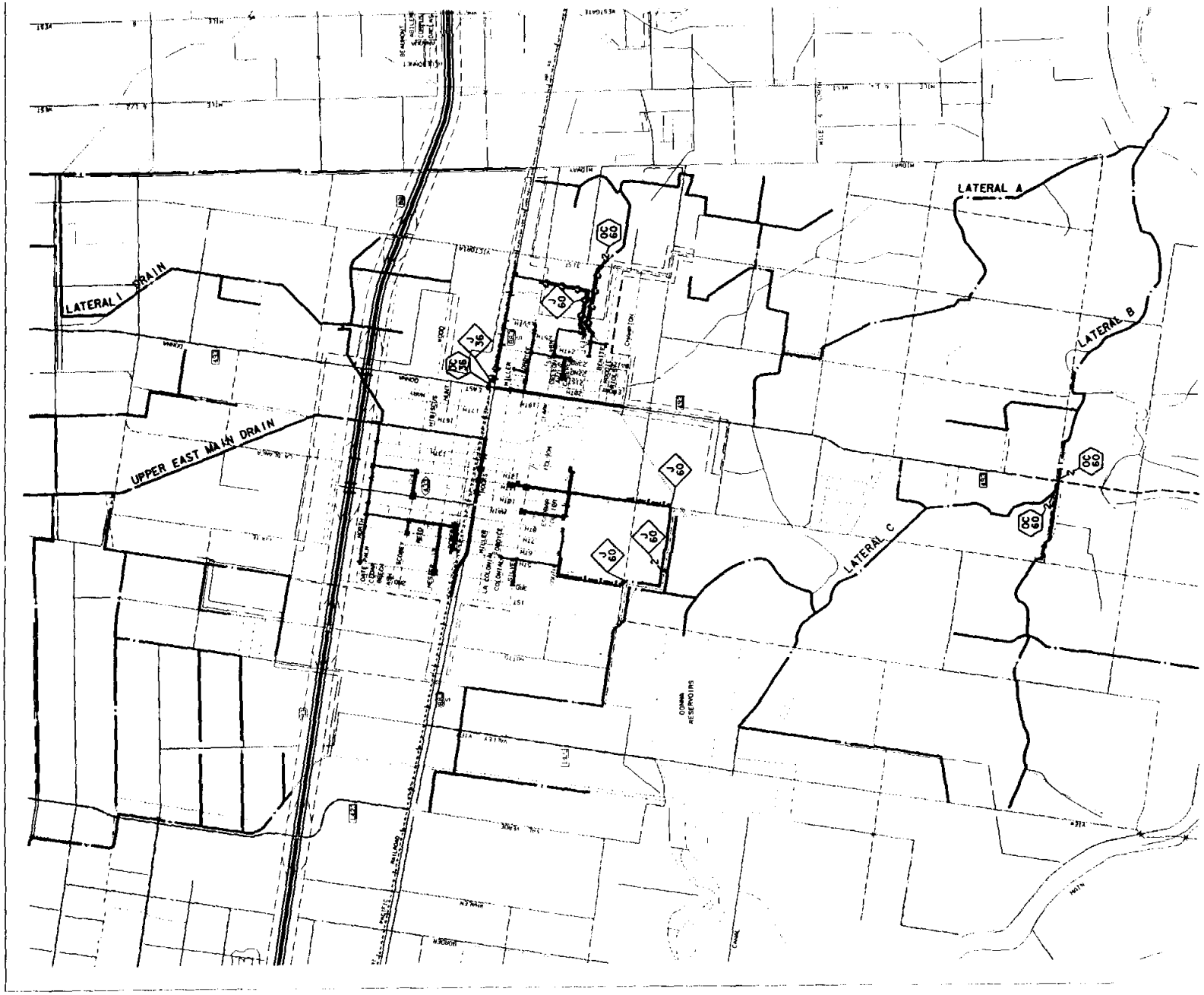
TABLE 5-2
10-YEAR IMPLEMENTATION PLAN
CONSTRUCTION COST ESTIMATE
(inclusive of the 5-Year Plan)

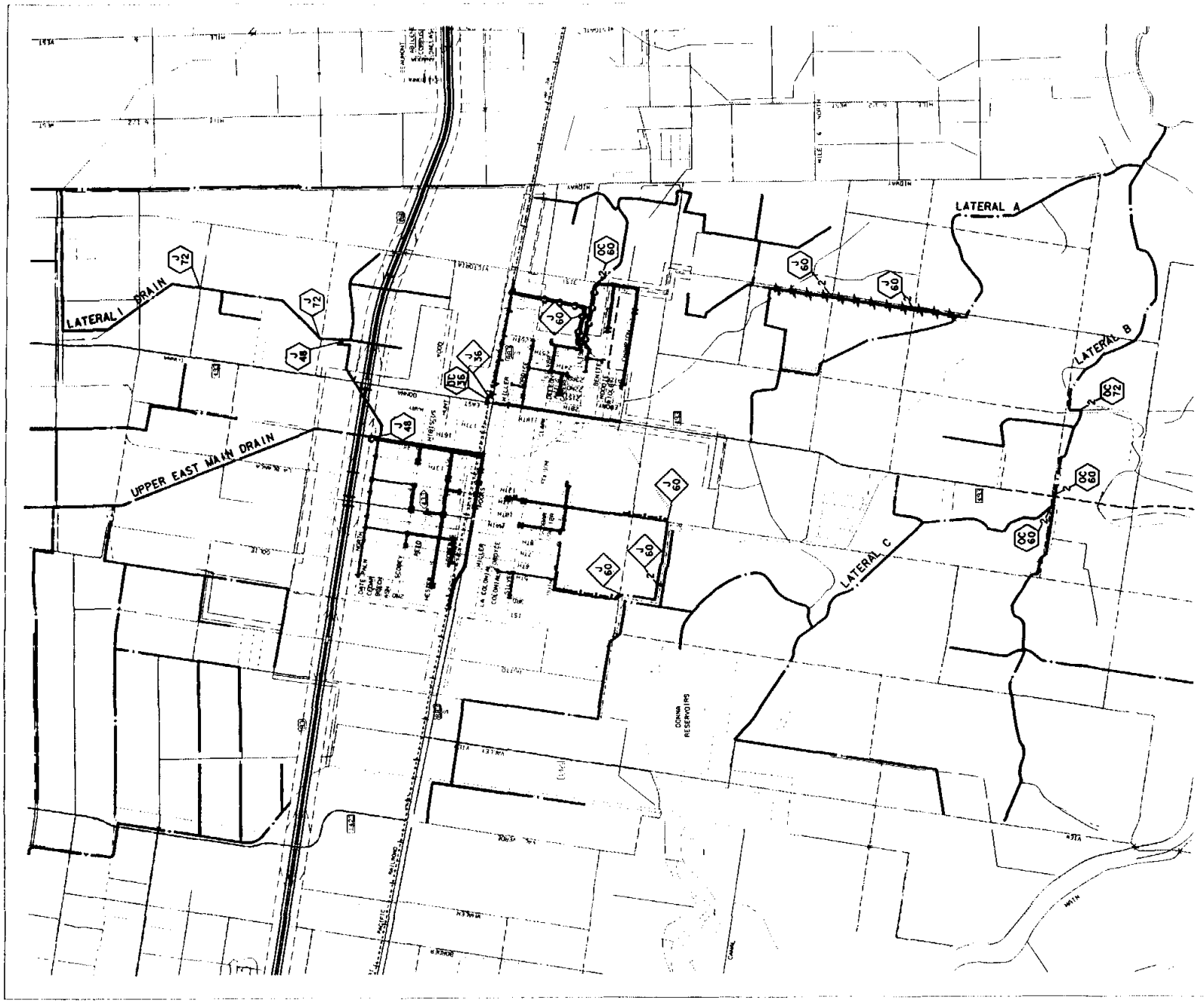
ITEM	DESCRIPTION	UNIT	QTY	CONSTRUCTION COST	
				UNIT COST	TOTAL
1	18-Inch R.C.P. Storm Sewer w/M.H.	LF	4000	$30.00	$120,000
2	24-Inch R.C.P. Storm Sewer w/M.H.	LF	8200	$40.00	$328,000
3	30-Inch R.C.P. Storm Sewer w/M.H.	LF	3000	$50.00	$150,000
4	36-Inch R.C.P. Storm Sewer w/M.H.	LF	3600	$60.00	$216,000
5	48-Inch R.C.P. Storm Sewer w/M.H	LF	6000	$80.00	$480,000
6	60-Inch R.C.P. Storm Sewer w/M.H.	LF	2000	$100.00	$200,000
7	Inlet with 18-Inch R.C.P. Lead	EA	64	$1,800.00	$115,200
8	72-Inch Open Cut Culvert	LF	150	$90.00	$13,500
9	60-Inch Open Cut Culvert	LF	610	$80.00	$48,800
10	48-Inch Open Cut Culvert	LF	50	$70.00	$3,500
11	36-Inch Open Cut Culvert	LF	100	$60.00	$6,000
12	72-Inch Bore & Jack Crossing	LF	100	$250.00	$25,000
13	60-Inch Bore & Jack Crossing	LF	400	$200.00	$80,000
14	48-Inch Bore & Jack Crossing	LF	150	$150.00	$22,500
15	36-Inch Bore & Jack Crossing	LF	50	$100.00	$5,000
16	Channel Debris & Silt Cleanout	LF	0	$30.00	$0
17	Channel Cross-Section Improvement	LF	9000	$40.00	$360,000
18	New Channel	CY	25000	$3.00	$75,000
	Sub-Total Estimated Construction Costs				$2,248,500
	Right-of-Way Costs				$25,000
	Sub-Total Construction w/R.O.W. Costs				$2,273,500
	Contingencies (10%)				$227,350
	Sub-Total				$2,500,850
	Engineering, Surveying, Const. Adm. (12%)				$300,102
	TOTAL				$2,800,952
	ROUND TO				$2,800,000

5.2 Financing

The total estimated cost of the Flood Protection Plan is $4,200,000. The majority of these costs will be borne by the City. The cost of some future facilities may be paid by developers in cases where portions of the plan are not constructed and drainage capacity is not available.

Commitments are in place for most of the funding for the 5-year plan. The City has $500,000 allocated to the project from certificates of obligation to be issued this year. In addition, Urban County Funds of $535,000 per year for the next four years will be provided. Hidalgo County will provide about $500,000 in "in kind" services to the plan. Their service will be in channel improvement, channel clearing and desnagging, and the construction of certain culverts. For the "in kind" work on urban culverts, the City would provide the materials and the County would perform the work with their equipment and personnel. It is anticipated that the remainder of the 10-year plan ($1,450,000) and the ultimate recommended Flood Protection Plan ($1,450,000) will be funded with future bond issues or any available State grants or loans.


LATERAL I DRAIN
UPPER EAST MAIN DRAIN
LATERAL A
LATERAL B
LATERAL C
DONNA RESERVOIRS
N
0 1000' 1000' 3000'
SCALE: 1" = 3000'
LEGEND
EXISTING
EXISTING DITC
EXISTING INLE
EXISTING STORM SEWER (APPROX LOCATION)
PROPOSED
STORM SEWER
INLET w/18' LT
OPEN CUT TWO 60" R.C.P.
BORE & JACK 60" R.C.P.
CHANNEL CLEAN
CHANNEL IMPROVEMENT
CITY OF DONNA
FLOOD PROTECTION PL
EXHIBIT 9
5-YEAR
IMPLEMENTATION PLAN
LICHLITER/JAMESON
AUGUST 1995
67787



CITY OF DONNA
FLOOD PROTECTION PLAN

EXHIBIT 10

10-YEAR IMPLEMENTATION PLAN

LICHTER/JAMESON

AUGUST 1995 | 67787

APPENDIX A

Existing Conditions HEC-1 Model

```
**************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*           MAY  1991                *
*         VERSION 4.0.1E             *
*    Lahey F77L-EM/32 version 5.01   *
*      Dodson & Associates, Inc.     *
* RUN DATE  08/08/95  TIME  07:55:44 *
*                                    *
**************************************
```

```
**************************************
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*     DAVIS, CALIFORNIA 95616        *
*         (916) 551-1748             *
*                                    *
**************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX  XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          *DIAGRAM
    1     ID        CITY OF DONNA FLOOD STUDY                    RUST JOB NO. 67787
    2     ID        DESIGN FREQUENCY MODEL  24 -HOUR      AREAS A, B AND C
    3     ID        FILENAME:  DONNA_S.HC1                       CSG        07/21/95
    4     IT      20 01JAN95    0000     500
    5     IO       5       0       0
    6     JP       3
          *
          *       Divide original Sub-A1 into three subareas
          *

    7     KK     A1a
    8     KO                                    21
    9     KM   SUBAREA A1 - NORTHWEST PORTION DRAINED BY EXISTING STORM SEWER SYSTEM
   10     BA     .61
   11     LS       0      85
   12     UD   13.37
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP-40
          * DURATION=          5MIN  15 MIN     1HR     2HR     3HR     6HR     12HR    24HR
   13     PH      20       0                    2.7     3.4     3.7     4.4     5.1     6.0
   14     KP       2
   15     PH      10       0                    3.2     4.0     4.3     5.1     6.2     7.2
   16     KP       3
   17     PH       1       0     .87     1.5    4.3     5.7     6.3     7.7     9.5    11.0
          *

   18     KK  A1a>A1
   19     KO                                    21
   20     KM   ROUTE SUB_A1a TO COMBINING POINT A1
   21     KM   18" PIPE OUTFALL - MODELED AS DETENTION RESERVOIR
   22     RS       1              -1
   23     SA       0      25      50     100     150     200     300     390
   24     SE      77      78      79      80      81      82      83    83.1
   25     SQ       0      17      20      21      23      25      26      30
          *

   26     KK     A1b
   27     KO                                    21
   28     KM   SUBAREA A1 - CENTRAL PORTION DRAINING TO 24" RCP
   29     BA     .27
   30     LS       0    85.4
   31     UD     3.7
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP-40
          * DURATION=          5MIN  15 MIN     1HR     2HR     3HR     6HR     12HR    24HR
   32     PH      20       0                    2.7     3.4     3.7     4.4     5.1     6.0
   33     KP       2
   34     PH      10       0                    3.2     4.0     4.3     5.1     6.2     7.2
   35     KP       3
   36     PH       1       0     .87     1.5    4.3     5.7     6.3     7.7     9.5    11.0
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  37      KK  A1b>A1
  38      KM   ROUTE SUB_A1b TO COMBINING POINT A1
  39      KO                                    21
  40      KM   MODELED AS DETENTION RESERVOIR
  41      RS       1              -1
  42      SA      10       25       50      100      150      173
  43      SE      79       80       81       82       83     83.1
  44      SQ       0       33       39       47       55       65
          *

  45      KK     A1c
  46      KO                                    21
  47      KM   SUBAREA A1 - SOUTH PORTION DRAINING TO 30" RCP
  48      BA     .13
  49      LS       0       75
  50      UD    3.69
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP-40
          * DURATION=          5MIN  15 MIN      1HR      2HR      3HR      6HR     12HR     24HR
  51      PH      20        0                    2.7      3.4      3.7      4.4      5.1      6.0
  52      KP       2
  53      PH      10        0                    3.2      4.0      4.3      5.1      6.2      7.2
  54      KP       3
  55      PH       1        0      .87     1.5     4.3      5.7      6.3      7.7      9.5     11.0
          *

  56      KK  A1c>A1
  57      KO                                    21
  58      KM   ROUTE SUB_A1c TO COMBINING POINT A1
  59      KM   MODELED AS DETENTION RESERVOIR
  60      RS       1              -1
  61      SV       0        3        5        7        9       10     1879
  62      SQ       0       10       20       30       40       50     2000
          *

  63      KK      A1
  64      KO                                    21
  65      KM  COMBINE THREE SUBAREAS AT A1
  66      HC       3
          *
          * BEGIN LATERAL "A"
          *

  67      KK   A1>A2
  68      KM   ROUTE SUB_A1 FROM COMBINING POINT A1 TO A2
  69      KM   HEC2 CROSS SECTIONS 30250 - 25060
  70      RS       5              -1
  71      SV       0     1.24     1.98     2.65     3.29     3.92  1084.74
  72      SQ       0       10       20       30       40       50     2000
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  73      KK  SUB_A2
  74      KM   SUBAREA A2
  75      BA    1.27
  76      LS       0    76.1
  77      UD    7.33
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN      1HR      2HR      3HR      6HR     12HR     24HR
  78      PH       20         0                  2.7      3.4      3.7      4.4      5.1      6.0
  79      KP        2
  80      PH       10         0                  3.2      4.0      4.3      5.1      6.2      7.2
  81      KP        3
  82      PH        1         0      .87      1.5      4.3      5.7      6.3      7.7      9.5     11.0

  83      KK       A2
  84      KM   COMBINE SUB_A2 HYDROGRAPH WITH ROUTED HYDROGRAPH
  85      HC        2

  86      KK   A2>A3
  87      KM   ROUTE TOTAL FLOW FROM COMBINING POINT A2 TO A3
  88      KM   HEC2 CROSS SECTIONS 25060-19370
  89      RS       11              -1
  90      SV        0         3         5         7         9        10     1879
  91      SQ        0        10        20        30        40        50     2000

  92      KK  SUB_A3
  93      KM   SUBAREA A3
  94      BA    1.06
  95      LS       0    77.2
  96      UD    8.97
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN      1HR      2HR      3HR      6HR     12HR     24HR
  97      PH       20         0                  2.7      3.4      3.7      4.4      5.1      6.0
  98      KP        2
  99      PH       10         0                  3.2      4.0      4.3      5.1      6.2      7.2
 100      KP        3
          *      1         0                   4.5      5.7      6.3      7.7      9.5     11.0
 101      PH        1         0      .87      1.5      4.3      5.7      6.3      7.7      9.5     11.0

 102      KK       A3
 103      KM   COMBINE SUB_A3 HYDROGRAPH WITH ROUTED HYDROGRAPH
 104      HC        2

 105      KK   A3>A4
 106      KM   ROUTE TOTAL FLOW FROM COMBINING POINT A3 TO A4
 107      KM   HEC2 CROSS SECTIONS 19370-9980
 108      RS       10
 109      SV        0         5         7        10        12        13     3130
 110      SQ        0        10        20        30        40        50     2000
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  111     KK  SUB_A4
  112     KM   SUBAREA A4
  113     BA    2.43
  114     LS       0    78.3
  115     UD    8.45
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN     1HR     2HR     3HR     6HR    12HR    24HR
  116     PH       20       0                  2.7     3.4     3.7     4.4     5.1     6.0
  117     KP        2
  118     PH       10       0                  3.2     4.0     4.3     5.1     6.2     7.2
  119     KP        3
          *       1       0                  4.5     5.7     6.3     7.7     9.5    11.0
  120     PH        1       0     .87    1.5   4.3     5.7     6.3     7.7     9.5    11.0

  121     KK      A4
  122     KM   COMBINE SUB_A4 HYDROGRAPH WITH ROUTED HYDROGRAPH
  123     HC        2

  124     KK   A4>A5
  125     KM   ROUTE TOTAL FLOW FROM COMBINING POINT A4 TO A5
  126     KM   HEC2 CROSS SECTIONS 9980-100
  127     RS        6
  128     SV        0       5       6       7       8       9    1224
  129     SQ        0      10      20      30      40      50    2000

  130     KK  SUB_A5
  131     KM   SUBAREA A5
  132     BA    2.54
  133     LS       0    79.4
  134     UD   11.17
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN     1HR     2HR     3HR     6HR    12HR    24HR
  135     PH       20       0                  2.7     3.4     3.7     4.4     5.1     6.0
  136     KP        2
  137     PH       10       0                  3.2     4.0     4.3     5.1     6.2     7.2
  138     KP        3
          *       1       0                  4.5     5.7     6.3     7.7     9.5    11.0
  139     PH        1       0     .87    1.5   4.3     5.7     6.3     7.7     9.5    11.0

  140     KK      A5
  141     KM   COMBINE SUB_A5 HYDROGRAPH WITH ROUTED HYDROGRAPH UPSTREAM OF MOUTH
  142     KM   FOR THE TOTAL "A" HYDROGRAPH
  143     KO                                    21
  144     HC        2
          *
          * BEGIN LATERAL "B"

  145     KK  SUB_B1
  146     KM   SUBAREA B1
  147     KO                                    21
  148     BA    2.95
  149     LS       0      86
  150     UD   14.87
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN     1HR     2HR     3HR     6HR    12HR    24HR
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  151     PH       20        0                    2.7     3.4     3.7     4.4     5.1     6.0
  152     KP        2
  153     PH       10        0                    3.2     4.0     4.3     5.1     6.2     7.2
  154     KP        3
          *       1        0                    4.5     5.7     6.3     7.7     9.5    11.0
  155     PH        1        0     .87     1.5    4.3     5.7     6.3     7.7     9.5    11.0
          *
          * BEGIN LATERAL "C"

  156     KK  SUB_C1
  157     KM   SUBAREA C1
  158     KO                                     21
  159     BA    0.24
  160     LS       0       85
  161     UD    1.59
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN     1HR     2HR     3HR     6HR    12HR    24HR
  162     PH       20        0                    2.7     3.4     3.7     4.4     5.1     6.0
  163     KP        2
  164     PH       10        0                    3.2     4.0     4.3     5.1     6.2     7.2
  165     KP        3
          *       1        0                    4.5     5.7     6.3     7.7     9.5    11.0
  166     PH        1        0     .87     1.5    4.3     5.7     6.3     7.7     9.5    11.0
          *
          *       Constricted with ___" pipe
          *

  167     KK   C1>C3
  168     KM   ROUTE SUB_C1 FROM COMBINING POINT C1 TO C3
  169     KM   HEC2 CROSS SECTIONS  17000-22000
  170     KO                                     21
  171     RS     100              -1
  172     SV       0        1        5     498    1348    1355    1650    1831    1912
  173     SQ       0        5       10      15      20      25    1000    2000    2500

  174     KK  SUB_C2
  175     KM   SUBAREA C2
  176     KO                                     21
  177     BA    0.24
  178     LS       0       85
  179     UD    3.17
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN     1HR     2HR     3HR     6HR    12HR    24HR
  180     PH       20        0                    2.7     3.4     3.7     4.4     5.1     6.0
  181     KP        2
  182     PH       10        0                    3.2     4.0     4.3     5.1     6.2     7.2
  183     KP        3
          *       1        0                    4.5     5.7     6.3     7.7     9.5    11.0
  184     PH        1        0     .87     1.5    4.3     5.7     6.3     7.7     9.5    11.0
          *
          *       Constricted w/ ___" pipe
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  185     KK   C2>C3
  186     KM   ROUTE TOTAL FLOW FROM COMBINING POINT C2 TO C3
  187     KM   HEC2 CROSS SECTIONS  22000-196700
  188     KO                                21
  189     RS      15             -1
  190     SV       0       1       6    1280    3721    3741    4608    5146    5385
  191     SQ       0      10      20      30      40      50    2000    4000    5000

  192     KK  SUB_C3
  193     KM   SUBAREA C3
  194     KO                                21
  195     BA    0.87
  196     LS       0      75
  197     UD     8.8
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN     1HR     2HR     3HR     6HR    12HR    24HR
  198     PH      20       0                   2.7     3.4     3.7     4.4     5.1     6.0
  199     KP       2
  200     PH      10       0                   3.2     4.0     4.3     5.1     6.2     7.2
  201     KP       3
          *       1       0                   4.5     5.7     6.3     7.7     9.5    11.0
  202     PH       1       0     .87     1.5     4.3     5.7     6.3     7.7     9.5    11.0

  203     KK      C3
  204     KM   COMBINE SUB_C3 HYDROGRAPH WITH ROUTED HYDROGRAPHS
  205     KO                                21
  206     HC       3

  207     KK   C3>C4
  208     KM   ROUTE TOTAL FLOW FROM COMBINING POINT C3 TO C4
  209     KM   HEC2 CROSS SECTIONS  10000-17000
  210     KO                                21
  211     RS       3             -1
  212     SV       0     4.3     5.1     5.8     6.7    7.25    1144    2709    3396
  213     SQ       0      10      20      30      40      50    2000    4000    5000

  214     KK  SUB_C4
  215     KM   SUBAREA C4
  216     BA    1.60
  217     LS       0    78.3
  218     UD   17.03
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN     1HR     2HR     3HR     6HR    12HR    24HR
  219     PH      20       0                   2.7     3.4     3.7     4.4     5.1     6.0
  220     KP       2
  221     PH      10       0                   3.2     4.0     4.3     5.1     6.2     7.2
  222     KP       3
          *       1       0                   4.5     5.7     6.3     7.7     9.5    11.0
  223     PH       1       0     .87     1.5     4.3     5.7     6.3     7.7     9.5    11.0
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  224     KK      C4
  225     KM   COMBINE SUB_C4 HYDROGRAPH WITH ROUTED HYDROGRAPH
  226     HC       2

  227     KK   C4>C5
  228     KM   ROUTE TOTAL FLOW FROM COMBINING POINT C4 TO C5
  229     KM   HEC2 CROSS SECTIONS  1000-10000
  230     RS      12              -1
  231     SV       0      32      52      76     110     139    4377    6561    7482
  232     SQ       0      20      40      60      80     100    4000    8000   10000

  233     KK  SUB_C5
  234     KM   SUBAREA C5
  235     BA    3.08
  236     LS       0    85.5
  237     UD   18.68
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN     1HR     2HR     3HR     6HR    12HR    24HR
  238     PH      20       0                    2.7     3.4     3.7     4.4     5.1     6.0
  239     KP       2
  240     PH      10       0                    3.2     4.0     4.3     5.1     6.2     7.2
  241     KP       3
          *      1       0                    4.5     5.7     6.3     7.7     9.5    11.0
  242     PH       1       0     .87     1.5    4.3     5.7     6.3     7.7     9.5    11.0

  243     KK      C5
  244     KM   COMBINE SUB_C5 HYDROGRAPH WITH ROUTED HYDROGRAPH FOR THE TOTAL
  245     KM   LATERAL "C" HYDROGRAPH
  246     KO                                   21
  247     HC       2
          *

  248     KK      B1
  249     KM   COMBINE LATERAL "C" WITH B1 HYDROGRAPH
  250     KO                                   21
  251     HC       2
          *

  252     KK   B1>B2
  253     KM   ROUTE COMBINED FLOW TO COMBINING POINT "B2"
  254     KM   HEC2 CROSS SECTIONS  100-12450
  255     RS      12              -1
  256     SV       0      11      13      14      16      18    1507    3395    4234
  257     SQ       0      10      20      30      40      50    2000    4000    5000
          *

  258     KK  SUB_B2
  259     KM   SUBAREA B2
  260     KO                                   21
  261     BA    1.59
  262     LS       0    84.9
  263     UD   11.77
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR , 25 YEAR AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN     1HR     2HR     3HR     6HR    12HR    24HR
```

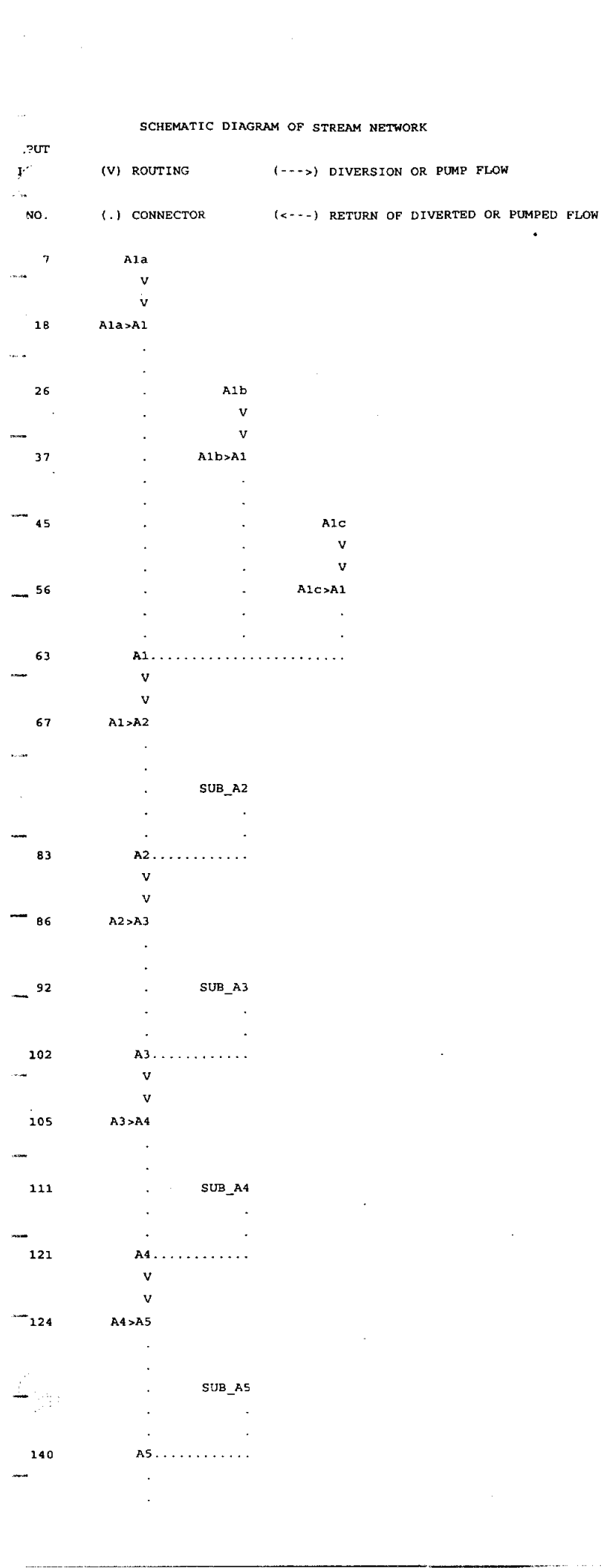
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  264     PH      20       0                    2.7     3.4     3.7     4.4     5.1     6.0
  265     KP       2
  266     PH      10       0                    3.2     4.0     4.3     5.1     6.2     7.2
  267     KP       3
          *       1        0                   4.5     5.7     6.3     7.7     9.5    11.0
  268     PH       1       0     .87    1.5     4.3     5.7     6.3     7.7     9.5    11.0
          *

  269     KK      B2
  270     KM   COMBINE LATERALS "B" AND "C" FLOWS AT THE MOUTH
  271     KO                                    21
  272     HC       2
          *

  273     KK   MOUTH
  274     KM   COMBINE LATERAL'S "A", "B", AND "C" FLOWS AT THE MOUTH
  275     KO                                    21
  276     HC       2
  277     ZZ
```

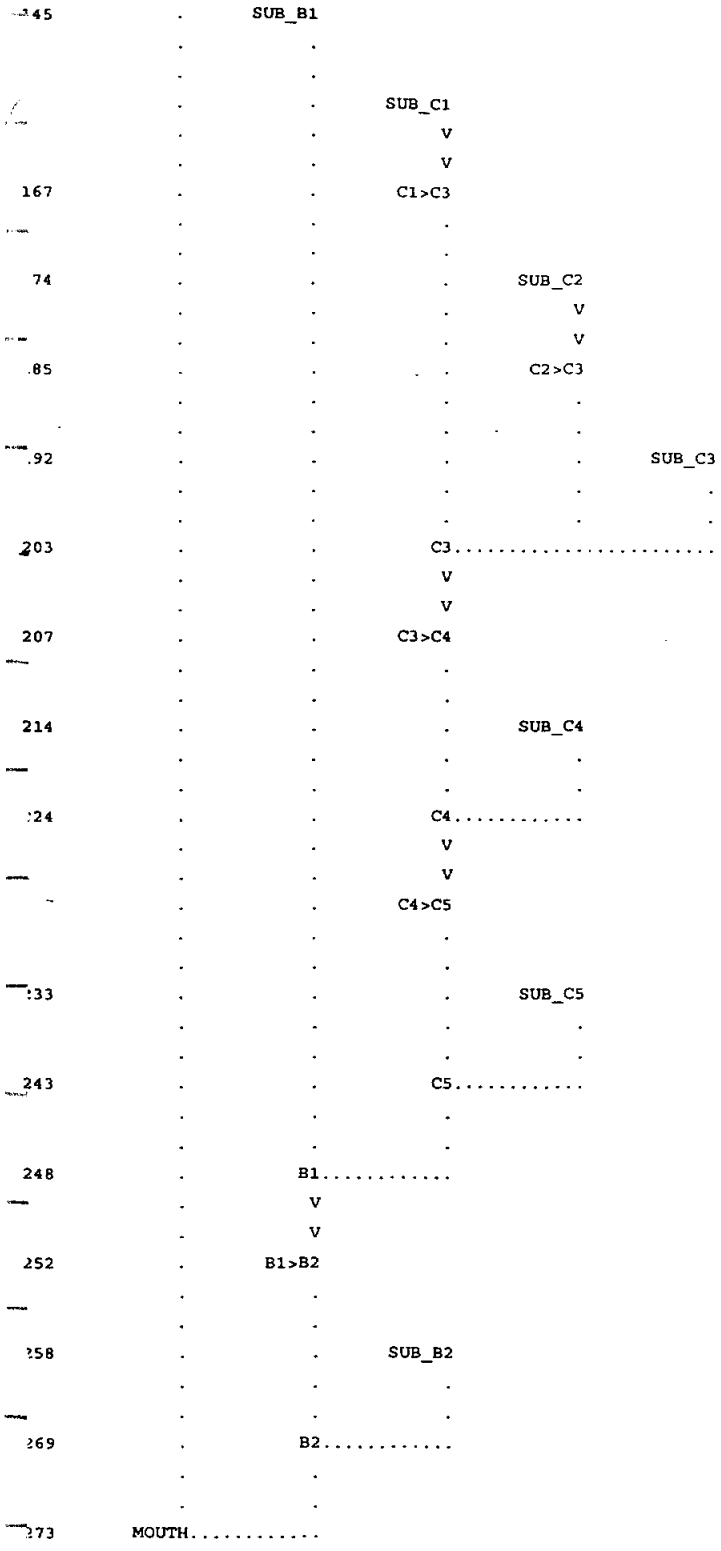
SCHEMATIC DIAGRAM OF STREAM NETWORK

.?UT

I (V) ROUTING (---->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW





(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**********************************************
*                                            *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)        *
*             MAY   1991                     *
*          VERSION 4.0.1E                    *
*     Lahey F77L-EM/32 version 5.01          *
*       Dodson & Associates, Inc.            *
*  RUN DATE  08/08/95  TIME  07:55:44        *
*  ****************************************  *
```

```
**********************************************
*                                            *
*    U.S. ARMY CORPS OF ENGINEERS            *
*    HYDROLOGIC ENGINEERING CENTER           *
*          609 SECOND STREET                 *
*        DAVIS, CALIFORNIA 95616             *
*           (916) 551-1748                   *
*                                            *
**********************************************
```

CITY OF DONNA FLOOD STUDY RUST JOB NO. 67787
DESIGN FREQUENCY MODEL 24 -HOUR AREAS A, B AND C
FILENAME: DONNA_S.HC1 CSG 07/21/95

5 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	20	MINUTES IN COMPUTATION INTERVAL
IDATE	1JAN95	STARTING DATE
ITIME	0000	STARTING TIME
NQ	500	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	7JAN95	ENDING DATE
NDTIME	2220	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL 0.33 HOURS
TOTAL TIME BASE 166.33 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION

NPLAN	3	NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF RUNOFF
1.00

*** ***

```
**************
*            *
*       A1a  *
*            *
**************
```

8 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL

```
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                    IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                     IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT       0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
  8 KK    *    A1a>A1  *
          *            *
          **************

  9 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           5  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                    IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                     IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT       0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
  6 KK    *       A1b  *
          *            *
          **************

 27 KO          OUTPUT CONTROL VARIABLES
                    IPRNT           5  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
                    IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                     IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                    ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                    ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                   TIMINT       0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 37 KK    *    A1b>A1  *
          *            *
          **************
```

39 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	500	LAST ORDINATE PUNCHED OR SAVED
TIMINT	0.333	TIME INTERVAL IN HOURS

*** ***

```
**************
*            *
45 KK  *      A1c  *
*            *
**************
```

46 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	500	LAST ORDINATE PUNCHED OR SAVED
TIMINT	0.333	TIME INTERVAL IN HOURS

*** ***

```
**************
*            *
56 KK  *   A1c>A1  *
*            *
**************
```

57 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE
IPNCH	0	PUNCH COMPUTED HYDROGRAPH
IOUT	21	SAVE HYDROGRAPH ON THIS UNIT
ISAV1	1	FIRST ORDINATE PUNCHED OR SAVED
ISAV2	500	LAST ORDINATE PUNCHED OR SAVED
TIMINT	0.333	TIME INTERVAL IN HOURS

*** ***

```
**************
*            *
63 KK  *      A1  *
*            *
```

```
          **************

  4 KO            OUTPUT CONTROL VARIABLES
                        IPRNT            5  PRINT CONTROL
                        IPLOT            0  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE
                        IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                         IOUT           21  SAVE HYDROGRAPH ON THIS UNIT
                        ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                        ISAV2          500  LAST ORDINATE PUNCHED OR SAVED
                       TIMINT        0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
  0 KK    *         A5 *
          *            *
          **************

143 KO            OUTPUT CONTROL VARIABLES
                        IPRNT            5  PRINT CONTROL
                        IPLOT            0  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE
                        IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                         IOUT           21  SAVE HYDROGRAPH ON THIS UNIT
                        ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                        ISAV2          500  LAST ORDINATE PUNCHED OR SAVED
                       TIMINT        0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
145 KK    *    SUB_B1  *
          *            *
          **************

147 KO            OUTPUT CONTROL VARIABLES
                        IPRNT            5  PRINT CONTROL
                        IPLOT            0  PLOT CONTROL
                        QSCAL           0.  HYDROGRAPH PLOT SCALE
                        IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                         IOUT           21  SAVE HYDROGRAPH ON THIS UNIT
                        ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                        ISAV2          500  LAST ORDINATE PUNCHED OR SAVED
                       TIMINT        0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
```

```
156 KK      *    SUB_C1  *
            *            *
            **************

            OUTPUT CONTROL VARIABLES
                  IPRNT            5  PRINT CONTROL
                  IPLOT            0  PLOT CONTROL
                  QSCAL           0.  HYDROGRAPH PLOT SCALE
                  IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                   IOUT           21  SAVE HYDROGRAPH ON THIS UNIT
                  ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                  ISAV2          500  LAST ORDINATE PUNCHED OR SAVED
                 TIMINT        0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
167 KK      *     C1>C3  *
            *            *
            **************

  0 KO      OUTPUT CONTROL VARIABLES
                  IPRNT            5  PRINT CONTROL
                  IPLOT            0  PLOT CONTROL
                  QSCAL           0.  HYDROGRAPH PLOT SCALE
                  IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                   IOUT           21  SAVE HYDROGRAPH ON THIS UNIT
                  ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                  ISAV2          500  LAST ORDINATE PUNCHED OR SAVED
                 TIMINT        0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  4 KK      *    SUB_C2  *
            *            *
            **************

  6 KO      OUTPUT CONTROL VARIABLES
                  IPRNT            5  PRINT CONTROL
                  IPLOT            0  PLOT CONTROL
                  QSCAL           0.  HYDROGRAPH PLOT SCALE
                  IPNCH            0  PUNCH COMPUTED HYDROGRAPH
                   IOUT           21  SAVE HYDROGRAPH ON THIS UNIT
                  ISAV1            1  FIRST ORDINATE PUNCHED OR SAVED
                  ISAV2          500  LAST ORDINATE PUNCHED OR SAVED
                 TIMINT        0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
          **************
          *            *
  5 KK    *     C2>C3  *
          *            *
          **************

 108 KO           OUTPUT CONTROL VARIABLES
                       IPRNT           5  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                       IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                        IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                       ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                       ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                      TIMINT       0.333  TIME INTERVAL IN HOURS

 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
  2 KK    *    SUB_C3  *
          *            *
          **************

 194 KO           OUTPUT CONTROL VARIABLES
                       IPRNT           5  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                       IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                        IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                       ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                       ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                      TIMINT       0.333  TIME INTERVAL IN HOURS

 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 203 KK   *        C3  *
          *            *
          **************

 205 KO           OUTPUT CONTROL VARIABLES
                       IPRNT           5  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE
                       IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                        IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                       ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                       ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                      TIMINT       0.333  TIME INTERVAL IN HOURS

 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
          **************
          *            *
          *     C3>C4  *
          *            *
          **************

 10 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 43 KK    *        C5  *
          *            *
          **************

          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
 48 KK    *        B1  *
          *            *
          **************

 50 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE
                      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                      ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                     TIMINT       0.333  TIME INTERVAL IN HOURS
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
258 KK    *    SUB_B2  *
          *            *
          **************

260 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       0.333  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
269 KK    *         B2  *
          *            *
          **************

271 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       0.333  TIME INTERVAL IN HOURS

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
273 KK    *     MOUTH  *
          *            *
          **************

275 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
                     IPNCH           0  PUNCH COMPUTED HYDROGRAPH
                      IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
                     ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
                     ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
                    TIMINT       0.333  TIME INTERVAL IN HOURS
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO FLOWS
OPERATION	STATION	AREA	PLAN		RATIO 1
					1.00
HYDROGRAPH AT	A1a	0.61	1	FLOW	81.
				TIME	26.67
			2	FLOW	107.
				TIME	26.67
			3	FLOW	181.
				TIME	26.67
ROUTED TO	A1a>A1	0.61	1	FLOW	20.
				TIME	42.33
			2	FLOW	21.
				TIME	44.33
			3	FLOW	23.
				TIME	48.00
			** PEAK STAGES IN FEET **		
			1	STAGE	79.45
				TIME	42.67
			2	STAGE	79.95
				TIME	44.67
			3	STAGE	80.85
				TIME	48.00
HYDROGRAPH AT	A1b	0.27	1	FLOW	102.
				TIME	16.00
			2	FLOW	131.
				TIME	16.00
			3	FLOW	214.
				TIME	16.00
ROUTED TO	A1b>A1	0.27	1	FLOW	35.
				TIME	20.67
			2	FLOW	37.
				TIME	22.00
			3	FLOW	42.
				TIME	23.33
			** PEAK STAGES IN FEET **		
			1	STAGE	80.34
				TIME	21.00
			2	STAGE	80.70
				TIME	22.00
			3	STAGE	81.42
				TIME	23.33
HYDROGRAPH AT	A1c	0.13	1	FLOW	36.
				TIME	16.33
			2	FLOW	50.
				TIME	16.00
			3	FLOW	89.
				TIME	16.00
ROUTED TO	A1c>A1	0.13	1	FLOW	26.
				TIME	18.33

			2	FLOW	36.
				TIME	18.33
			3	FLOW	56.
				TIME	18.67
COMBINED AT	A1	1.01	1	FLOW	75.
				TIME	20.00
			2	FLOW	89.
				TIME	19.00
			3	FLOW	115.
				TIME	20.00
JTED TO	A1>A2	1.01	1	FLOW	68.
				TIME	27.33
			2	FLOW	78.
				TIME	26.67
			3	FLOW	106.
				TIME	26.67
ROGRAPH AT	SUB_A2	1.27	1	FLOW	214.
				TIME	20.33
			2	FLOW	294.
				TIME	20.33
			3	FLOW	531.
				TIME	20.00
COMBINED AT	A2	2.28	1	FLOW	267.
				TIME	20.33
			2	FLOW	351.
				TIME	20.67
			3	FLOW	600.
				TIME	20.33
TED TO	A2>A3	2.28	1	FLOW	221.
				TIME	33.00
			2	FLOW	290.
				TIME	33.00
			3	FLOW	491.
				TIME	32.67
HYDROGRAPH AT	SUB_A3	1.06	1	FLOW	157.
				TIME	22.00
			2	FLOW	215.
				TIME	22.00
			3	FLOW	386.
				TIME	22.00
2 COMBINED AT	A3	3.34	1	FLOW	279.
				TIME	31.00
			2	FLOW	368.
				TIME	31.00
			3	FLOW	630.
				TIME	30.67
ROUTED TO	A3>A4	3.34	1	FLOW	237.
				TIME	49.00
			2	FLOW	311.
				TIME	49.00
			3	FLOW	529.
				TIME	48.67
HYDROGRAPH AT	SUB_A4	2.43	1	FLOW	390.
				TIME	21.33
			2	FLOW	530.

				TIME	21.33
			3	FLOW	942.
				TIME	21.33
INED AT	A4	5.77	1	FLOW	440.
				TIME	21.33
			2	FLOW	580.
				TIME	21.33
			3	FLOW	992.
				TIME	21.33
ROUTED TO	A4>A5	5.77	1	FLOW	377.
				TIME	29.67
			2	FLOW	498.
				TIME	29.33
			3	FLOW	852.
				TIME	29.33
HYDROGRAPH AT	SUB_A5	2.54	1	FLOW	335.
				TIME	24.67
			2	FLOW	455.
				TIME	24.33
			3	FLOW	803.
				TIME	24.33
2 COMBINED AT	A5	8.31	1	FLOW	662.
				TIME	27.67
			2	FLOW	886.
				TIME	27.67
			3	FLOW	1537.
				TIME	27.33
HYDROGRAPH AT	SUB_B1	2.95	1	FLOW	366.
				TIME	28.33
			2	FLOW	480.
				TIME	28.33
			3	FLOW	807.
				TIME	28.00
HYDROGRAPH AT	SUB_C1	0.24	1	FLOW	163.
				TIME	14.00
			2	FLOW	209.
				TIME	14.00
			3	FLOW	331.
				TIME	13.67
ROUTED TO	C1>C3	0.24	1	FLOW	10.
				TIME	23.00
			2	FLOW	10.
				TIME	21.67
			3	FLOW	10.
				TIME	20.00
HYDROGRAPH AT	SUB_C2	0.24	1	FLOW	101.
				TIME	15.33
			2	FLOW	130.
				TIME	15.33
			3	FLOW	211.
				TIME	15.33
ROUTED TO	C2>C3	0.24	1	FLOW	20.
				TIME	25.67
			2	FLOW	20.
				TIME	25.33

			3	FLOW	20.
				TIME	23.67
HYDROGRAPH AT	SUB_C3	0.87	1	FLOW	122.
				TIME	22.00
			2	FLOW	170.
				TIME	22.00
			3	FLOW	310.
				TIME	21.67
3 COMBINED AT	C3	1.35	1	FLOW	152.
				TIME	22.00
			2	FLOW	200.
				TIME	22.00
			3	FLOW	340.
				TIME	21.67
ROUTED TO	C3>C4	1.35	1	FLOW	126.
				TIME	29.33
			2	FLOW	164.
				TIME	29.00
			3	FLOW	276.
				TIME	28.67
DROGRAPH AT	SUB_C4	1.60	1	FLOW	144.
				TIME	31.00
			2	FLOW	196.
				TIME	30.67
			3	FLOW	349.
				TIME	30.67
BINED AT	C4	2.95	1	FLOW	268.
				TIME	30.00
			2	FLOW	357.
				TIME	29.67
			3	FLOW	621.
				TIME	29.33
TED TO	C4>C5	2.95	1	FLOW	245.
				TIME	43.67
			2	FLOW	325.
				TIME	43.33
			3	FLOW	563.
				TIME	43.00
ROGRAPH AT	SUB_C5	3.08	1	FLOW	309.
				TIME	32.33
			2	FLOW	406.
				TIME	32.33
			3	FLOW	686.
				TIME	32.00
COMBINED AT	C5	6.03	1	FLOW	466.
				TIME	39.00
			2	FLOW	618.
				TIME	38.67
			3	FLOW	1057.
				TIME	38.67
BINED AT	B1	8.98	1	FLOW	706.
				TIME	31.33
			2	FLOW	939.
				TIME	33.67
			3	FLOW	1617.

				TIME	33.00
JTED TO	B1>B2	8.98	1	FLOW	693.
				TIME	42.00
			2	FLOW	920.
				TIME	42.33
			3	FLOW	1576.
				TIME	42.33
)ROGRAPH AT	SUB_B2	1.59	1	FLOW	234.
				TIME	25.00
			2	FLOW	309.
				TIME	25.00
			3	FLOW	522.
				TIME	24.67
COMBINED AT	B2	10.57	1	FLOW	741.
				TIME	40.00
			2	FLOW	978.
				TIME	40.33
			3	FLOW	1672.
				TIME	40.67
COMBINED AT	MOUTH	18.88	1	FLOW	1142.
				TIME	30.67
			2	FLOW	1515.
				TIME	30.33
			3	FLOW	2599.
				TIME	30.00

*** ..ORMAL END OF HEC-1 ***

FLOOD HYDROGRAPH PACKAGE (HEC-1)
MAY 1991
VERSION 4.0.1E
Lahey F77L-EM/32 version 5.01
Dodson & Associates, Inc.
RUN DATE 08/08/95 TIME 07:55:24

U.S. ARMY CORPS OF ENGINEERS
HYDROLOGIC ENGINEERING CENTER
609 SECOND STREET
DAVIS, CALIFORNIA 95616
(916) 551-1748

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

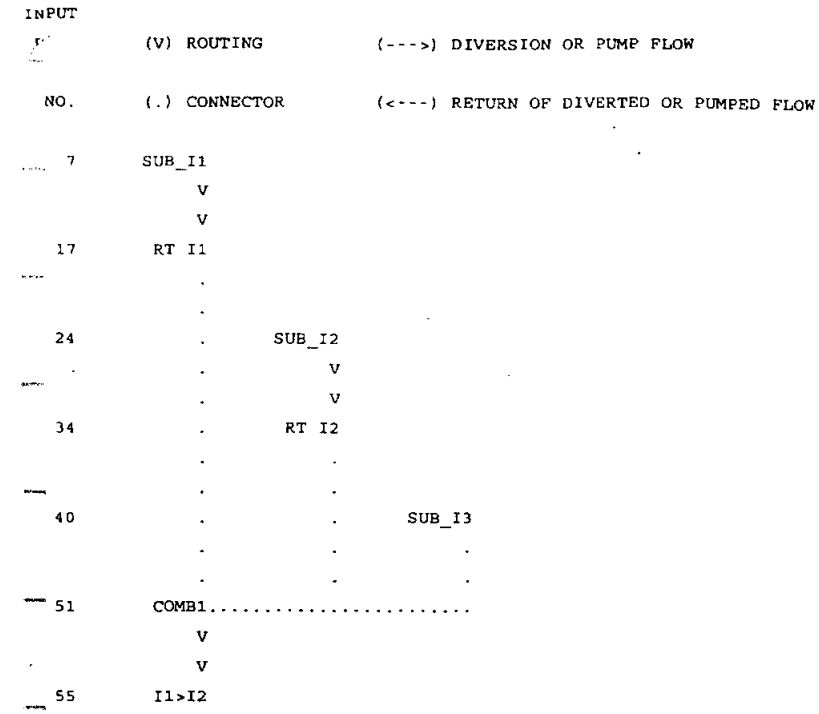
THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          *DIAGRAM
    1     ID        CITY OF DONNA FLOOD STUDY                    RUST JOB NO. 67787
    2     ID        DESIGN FREQUENCY MODEL  24 -HOUR          AREA I
    3     ID        FILENAME:  DONNA_I.HC1                          CWW        07/26/95
    4     IT      20 01JAN95    0000     500
    5     IO       5       0       0
    6     JP       3

    7     KK  SUB_I1
    8     KM   SUBAREA I1
    9     BA    0.46
   10     LS       0    76.1
   11     UD    8.44
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR   AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN      1HR      2HR      3HR      6HR     12HR     24HR
   12     PH      20       0                    2.7      3.4      3.7      4.4      5.1      6.0
   13     KP       2
   14     PH      10       0                    3.2      4.0      4.3      5.1      6.2      7.2
   15     KP       3
   16     PH       1       0     .87     1.5     4.3      5.7      6.3      7.7      9.5     11.0
          *

   17     KK   RT I1
   18     KM   ROUTE FLOWS THROUGH 18" RESTRICTOR PIPE
   19     KM   HEC2 CROSS SECTIONS
   20     RS       1              -1
   21     SV       0       3       8     300
   22     SE    80.5    83.5    86.5    87.0
   23     SQ       0      18      24      25
          *

   24     KK  SUB_I2
   25     KM   SUBAREA I2
   26     BA    0.67
   27     LS       0    76.1
   28     UD    6.25
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR   AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN      1HR      2HR      3HR      6HR     12HR     24HR
   29     PH      20       0                    2.7      3.4      3.7      4.4      5.1      6.0
   30     KP       2
   31     PH      10       0                    3.2      4.0      4.3      5.1      6.2      7.2
   32     KP       3
   33     PH       1       0     .87     1.5     4.3      5.7      6.3      7.7      9.5     11.0
          *

   34     KK   RT I2
   35     KM   ROUTE FLOWS THROUGH 24" RESTRICTOR PIPE UNDER EXPRESSWAY
   36     RS       1              -1
   37     SV       0       1       3     300
   38     SE      81    83.5      86    86.5
   39     SQ       0      20      29      30
          *
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  40      KK  SUB_I3
  41      KM   SUBAREA I3
  42      KO                                    21
  43      BA    2.18
  44      LS       0    76.1
  45      UD    16.5
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR   AND 100 YEAR EVENTS FROM TP40
          * DURATION=          5MIN   15MIN      1HR      2HR      3HR      6HR     12HR     24HR
  46      PH       20        0                  2.7      3.4      3.7      4.4      5.1      6.0
  47      KP        2
  48      PH       10        0                  3.2      4.0      4.3      5.1      6.2      7.2
  49      KP        3
  50      PH        1        0     .87     1.5     4.3      5.7      6.3      7.7      9.5     11.0

  51      KK   COMB1
  52      KM   COMBINE I1 AND I2 ROUTED FLOWS AND I3 HYDROGRAPH
  53      KO                                    21
  54      HC        3
          *

  55      KK   I1>I2
  56      KM   ROUTE FLOWS THROUGH CHANNEL I (FROM EXPRESSWAY TO MOUTH)
  57      RS       11              -1
  58      SV        0        5       15       34       65     1071     3263
  59      SQ        0       10       50      100      200      500     2000
          *
  60      ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK



**) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*            MAY  1991               *
*          VERSION 4.0.1E            *
*     Lahey F77L-EM/32 version 5.01  *
*       Dodson & Associates, Inc.    *
* RUN DATE  08/08/95  TIME  07:55:24 *
**************************************
```

```
**************************************
*                                    *
*   U.S. ARMY CORPS OF ENGINEERS     *
*   HYDROLOGIC ENGINEERING CENTER    *
*        609 SECOND STREET           *
*      DAVIS, CALIFORNIA 95616       *
*          (916) 551-1748            *
*                                    *
**************************************
```

CITY OF DONNA FLOOD STUDY RUST JOB NO. 67787
DESIGN FREQUENCY MODEL 24 -HOUR AREA I
FILENAME: DONNA_I.HC1 CWW 07/26/95

5 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	20	MINUTES IN COMPUTATION INTERVAL
IDATE	1JAN95	STARTING DATE
ITIME	0000	STARTING TIME
NQ	500	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	7JAN95	ENDING DATE
NDTIME	2220	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL 0.33 HOURS
TOTAL TIME BASE 166.33 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION

NPLAN	3	NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF RUNOFF
1.00

*** ***

```
**************
*            *
K     *  SUB_I3  *
*            *
**************
```

12 KO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL

```
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE
                  IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                   IOUT         21  SAVE HYDROGRAPH ON THIS UNIT
                  ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                  ISAV2        500  LAST ORDINATE PUNCHED OR SAVED
                 TIMINT      0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  1 KK      *    COMB1   *
            *            *
            **************

  3 KO           OUTPUT CONTROL VARIABLES
                  IPRNT          5  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE
                  IPNCH          0  PUNCH COMPUTED HYDROGRAPH
                   IOUT         21  SAVE HYDROGRAPH ON THIS UNIT
                  ISAV1          1  FIRST ORDINATE PUNCHED OR SAVED
                  ISAV2        500  LAST ORDINATE PUNCHED OR SAVED
                 TIMINT      0.333  TIME INTERVAL IN HOURS
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES

TIME TO PEAK IN HOURS

ERATION	STATION	AREA	PLAN		RATIOS APPLIED TO FLOWS RATIO 1 1.00
HYDROGRAPH AT	SUB_I1	0.46	1	FLOW	69.
				TIME	21.67
			2	FLOW	96.
				TIME	21.67
			3	FLOW	173.
				TIME	21.33
ROUTED TO	RT I1	0.46	1	FLOW	24.
				TIME	30.33
			2	FLOW	24.
				TIME	32.33
			3	FLOW	24.
				TIME	35.33
			** PEAK STAGES IN FEET **		
			1	STAGE	86.55
				TIME	31.33
			2	STAGE	86.59
				TIME	33.00
			3	STAGE	86.73
				TIME	36.00
DROGRAPH AT	SUB_I2	0.67	1	FLOW	129.
				TIME	19.00
			2	FLOW	176.
				TIME	19.00
			3	FLOW	317.
				TIME	19.00
ROUTED TO	RT I2	0.67	1	FLOW	29.
				TIME	28.67
			2	FLOW	29.
				TIME	30.00
			3	FLOW	30.
				TIME	32.33
			** PEAK STAGES IN FEET **		
			1	STAGE	86.11
				TIME	29.67
			2	STAGE	86.17
				TIME	30.67
			3	STAGE	86.37
				TIME	33.00
DROGRAPH AT	SUB_I3	2.18	1	FLOW	188.
				TIME	30.33
			2	FLOW	260.
				TIME	30.33
			3	FLOW	471.
				TIME	30.00
COMBINED AT	COMB1	3.31	1	FLOW	242.
				TIME	30.33

			2	FLOW	313.
				TIME	30.33
			3	FLOW	525.
				TIME	30.00
RO TED TO	I1>I2	3.31	1	FLOW	201.
				TIME	47.67
			2	FLOW	227.
				TIME	58.00
			3	FLOW	353.
				TIME	67.00

*** NORMAL END OF HEC-1 ***

```
*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            MAY  1991                  *
*         VERSION 4.0.1E                *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  08/08/95  TIME  07:56:09   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX  XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

          *DIAGRAM
    1     ID        CITY OF DONNA FLOOD STUDY                    RUST JOB NO. 67787
    2     ID        DESIGN FREQUENCY MODEL  24 -HOUR      AREA UEMD
    3     ID        FILENAME:  DONNA_UM.HC1                      CWW        07/26/95
    4     IT      20 01JAN95    0000     500
    5     IO       5       0       0
    6     JP       3

    7     KK  SUB_U1
    8     KM   SUBAREA U1
    9     BA    1.25
   10     LS       0    85.2
   11     UD    5.67
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR AND 100 YEAR EVENTS FROM TP 40
          * DURATION:          5MIN   15MIN     1HR     2HR     3HR     6HR     12HR    24HR
   12     PH      20       0                   2.7     3.4     3.7     4.4     5.1     6.0
   13     KP       2
   14     PH      10       0                   3.2     4.0     4.3     5.1     6.2     7.2
   15     KP       3
   16     PH       1       0     .87     1.5   4.3     5.7     6.3     7.7     9.5     11.0
          *

   17     KK  SUB_U2
   18     KM   SUBAREA U2
   19     KO                                   21
   20     BA    3.91
   21     LS       0    76.7
   22     UD   14.43
          * RAINFALL DATA FOR THE 5 YEAR, 10 YEAR AND 100 YEAR EVENTS FROM TP 40
          * DURATION:          5MIN   15MIN     1HR     2HR     3HR     6HR     12HR    24HR
   23     PH      20       0                   2.7     3.4     3.7     4.4     5.1     6.0
   24     KP       2
   25     PH      10       0                   3.2     4.0     4.3     5.1     6.2     7.2
   26     KP       3
   27     PH       1       0     .87     1.5   4.3     5.7     6.3     7.7     9.5     11.0
          *

   28     KK      U1
   29     KO                                   21
   30     HC       2
          *

   31     KK   U1>U2
   32     KM   ROUTE SUB_U1 AND SUB_U2 FROM U1 TO U2
   33     RS       7              -1
   34     SV       0       3       4       6       7       9    1626
   35     SQ       0      10      20      30      40      50    2000
          *
          *
   36     ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

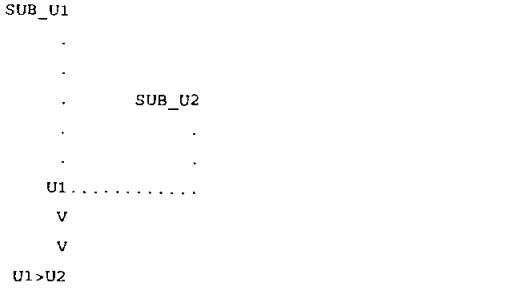
PUT

LT

NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
**************************************
*                                    *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1) *
*            MAY  1991               *
*         VERSION 4.0.1E             *
*    Lahey F77L-EM/32 version 5.01   *
*      Dodson & Associates, Inc.     *
* RUN DATE  08/08/95  TIME  07:56:09 *
**************************************
```

```
**************************************
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616      *
*         (916) 551-1748             *
*                                    *
**************************************
```

CITY OF DONNA FLOOD STUDY RUST JOB NO. 67787
DESIGN FREQUENCY MODEL 24 -HOUR AREA UEMD
FILENAME: DONNA_UM.HC1 CWW 07/26/95

```
 5 IO          OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                  NMIN         20  MINUTES IN COMPUTATION INTERVAL
                 IDATE      1JAN95  STARTING DATE
                 ITIME        0000  STARTING TIME
                    NQ         500  NUMBER OF HYDROGRAPH ORDINATES
                NDDATE      7JAN95  ENDING DATE
                NDTIME        2220  ENDING TIME
                 ICENT          19  CENTURY MARK

              COMPUTATION INTERVAL     0.33 HOURS
                  TOTAL TIME BASE  166.33 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                   NPLAN          3  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                RATIOS OF RUNOFF
               1.00
```

*** ***

```
          **************
          *            *
   K      *   SUB_U2   *
          *            *
          **************

   KO          OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
```

```
      IPLOT           0  PLOT CONTROL
      QSCAL          0.  HYDROGRAPH PLOT SCALE
      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
      ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
     TIMINT       0.333  TIME INTERVAL IN HOURS


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
  8 KK      *       U1   *
            *            *
            **************

  9 KO          OUTPUT CONTROL VARIABLES
      IPRNT           5  PRINT CONTROL
      IPLOT           0  PLOT CONTROL
      QSCAL          0.  HYDROGRAPH PLOT SCALE
      IPNCH           0  PUNCH COMPUTED HYDROGRAPH
       IOUT          21  SAVE HYDROGRAPH ON THIS UNIT
      ISAV1           1  FIRST ORDINATE PUNCHED OR SAVED
      ISAV2         500  LAST ORDINATE PUNCHED OR SAVED
     TIMINT       0.333  TIME INTERVAL IN HOURS
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO FLOWS
OPERATION	STATION	AREA	PLAN		RATIO 1
					1.00
HYDROGRAPH AT	SUB_U1	1.25	1	FLOW	336.
				TIME	18.33
			2	FLOW	435.
				TIME	18.33
			3	FLOW	724.
				TIME	18.00
HYDROGRAPH AT	SUB_U2	3.91	1	FLOW	384.
				TIME	28.00
			2	FLOW	529.
				TIME	28.00
			3	FLOW	955.
				TIME	28.00
2 COMBINED AT	U1	5.16	1	FLOW	484.
				TIME	20.33
			2	FLOW	654.
				TIME	24.67
			3	FLOW	1165.
				TIME	24.67
ROUTED TO	U1>U2	5.16	1	FLOW	456.
				TIME	34.33
			2	FLOW	619.
				TIME	34.33
			3	FLOW	1100.
				TIME	34.33

*** NORMAL END OF HEC-1 ***

APPENDIX B

Existing Conditions HEC-2 Model

```
*******************************************
  HEC-2 WATER SURFACE PROFILES             *
                                           *
*   sion   4.6.2;  May 1991                *
                                           *
  RUN DATE    08AUG95     TIME   08:08:43  *
*******************************************
```


```
*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*           (916) 756-1104              *
*****************************************
```


```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX  XXXXX               XXXXXXX
```

THIS RUN EXECUTED 08AUG95 08:08:43

```
************************************
 3C-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
************************************

 ********************************************************************************
 CITY OF DONNA                                                                  *
 CHANNEL "A"                                                                    *
 EXISTING CONDITIONS                                                            *
 FILENAME: CHA_100.IH2                                                          *
 MODEL STARTS UPSTREAM OF THE LEVEE PUMP STRUCTURE AND PROCEEDS UPSTREAM TO     *
 S. VICTORIA RD. NORTH OF STILES ROAD. PLAN & PROFILE DRAWINGS FOR DRAINAGE     *
 IMPROVEMENTS BY MELDEN & HUNT, INC. AND SIGLER, WINSTON, GREENWOOD &           *
 ASSOCIATES, INC. DATED 1990 WERE USED TO CREATE CROSS SECTIONS FOR THIS        *
 MODEL. SOME MODIFICATIONS WERE MADE AFTER FIELD VERIFICATION OF THESE          *
 PLANS. THE TOPOGRAPHIC MAP PROVIDED BY THE CITY WAS USED TO CREATE SOME        *
 OF THE CROSS SECTIONS IN THIS MODEL.                                           *
                                                                                *
                                                                                *
                                                                                *
                                                                                *
                                                                                *
                                                                                *
 ********************************************************************************
T1       RUST JOB NO:  67787     CITY OF DONNA DRAINAGE STUDY
T2       5-YEAR  24 HOUR FLOWS   EXISTING MODEL
T3       FILENAME: CHA_100.IH2                              CSG        07/31/95

   ICHECK     INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                           .0008                                  68.59

   NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1                  -1

J3 VARIABLE CODES FOR SUMMARY PRINTOUT

      38          1         43         55         26         56         60         4         66         63

   LPRNT     NUMSEC                  ********REQUESTED SECTION NUMBERS********

     -10       -10

   IHLEQ     ICOPY     SUBDIV    STRTDS    RMILE

       1

         FLOWS FROM DONNA_S1.OH1
```

	5-YR	10-YR	100-YR							
QT	3	662	886	1537						
NC	0.9	0.9	0.04	.1	.3					
	100	8	9915	10085						
	75.0	8415	64.8	9915	64.8	9965	55.87	9995	55.87	10005
GR	64.8	10035	64.8	10085	75.0	11585				
	350	8	9910	10090	150	375	250			
GR	75.0	8410	68.5	9910	68.5	9960	56.07	9995	56.07	10005
	68.5	10040	68.5	10090	75.0	11590				
X1	680	8	9910	10090	360	300	330			
	75.0	8410	74.3	9910	74.3	9960	56.43	9995	56.43	10005
	74.3	10040	74.3	10090	75.0	11590				
	1180	8	9915	10085	560	430	500			
GR	75.0	8415	70.6	9915	70.6	9965	56.97	9995	56.97	10005
GR	70.6	10035	70.6	10085	75.0	11585				
X1	1490	10	9915	10085	220	470	310			
GR	75.0	8415	75.0	9600	70.7	9915	70.7	9965	57.24	9995
	57.24	10005	70.7	10035	70.7	10085	75.0	10700	75.0	11585

SPECIAL CULVERT BRIDGE NUM 1 *
CULVERT SIZE: 7' X 10' *

NC				0.3	0.5					
	1540	10	9915	10085	50	50	50			
X3	10			9995	67	10005	67			
GR	75.0	8415	75.0	9715	71.2	9915	71.2	9965	57.29	9995
	57.29	10005	71.2	10035	71.2	10085	75.0	10800	75.0	11585
	1.013	0.5	3.0	170	10	7	60	8.2	57.35	57.29
X1	1600	10	9915	10085	60	60	60			
X2			2	0	71.7					
	10			9995	71.7	10005	71.7			
	75	8415	75	9715	71.7	9915	71.7	9965	57.35	9995
GR	57.35	10005	71.7	10035	71.7	10085	75	10800	75	11585

	1650	10	9915	10085	50	50	50		
GR	75	8415	75	9715	72.3	9915	72.3	9965	57.40	9995
GR	57.4	10005	72.3	10035	72.3	10085	75	10800	75	11585
NC	0.9	0.9	0.04	.1	.3					
	1850	10	9910	10090	250	150	200		
	75	8410	75	9710	73.2	9910	73.2	9960	57.57	9995
GR	57.57	10005	73.2	10040	73.2	10090	75	10800	75	11590
X1	2400	10	9910	10090	570	520	550		
GR	76	8410	75	9810	74.5	9910	74.5	9960	58.10	9995
	58.10	10005	74.5	10040	74.5	10090	75	10800	76	11590
X1	2900	10	9910	10090	530	460	500		
	76	8410	75	9500	73.2	9910	73.2	9960	58.57	9995
	58.57	10005	73.2	10040	73.2	10090	75	10700	75.5	11590
	3600	9	9915	10085	700	700	700		
GR	75	8415	75	9000	70.0	9915	70.0	9965	59.27	9995
GR	59.27	10005	70.0	10035	70.0	10085	75	11585		
X1	4720	10	9922	10078	1120	1120	1120		
GR	75	8422	75	8700	71.2	9922	71.2	9972	60.39	9995
	60.39	10005	71.2	10028	71.2	10078	75	10400	75	11578

SPECIAL BRIDGE BRIDGE NUM 2 *
ULVERT SIZE: 10' X 7' *

NC				0.3	0.5				
	4770	10	9922	10078	20	110	50		
X3	10			9995	69	10005	69		
	75	8422	75	8600	71.2	9922	71.2	9972	60.32	9995
	60.32	10005	71.2	10028	71.2	10078	75	10500	75	11578
S	1.013	0.5	3.0	156	7	10	45	8.2	60.33	60.32
X1	4810	10	9922	10078	45	45	45		
X2			2	0	71.2				
X	10			9995	71.2	10005	71.2		
GR	75	8422	75	8700	71.2	9922	71.2	9972	60.33	9995
GR	60.33	10005	71.2	10028	71.2	10078	75	10500	77	11578

	4860	10	9922	10078	40	60	50			
GR	75	8422	75	8600	71.0	9922	71.0	9972	60.56	9995
GR	60.56	10005	71.0	10028	71.0	10078	75	10500	75	11578
NC	0.9	0.9	0.04	0.1	0.3					
	5360	10	9922	10078	500	500	500			
	75	8422	75	8700	72.2	9922	72.2	9972	61.07	9995
GR	61.07	10005	72.2	10028	72.2	10078	75	10500	75	11578
X1	5960	10	9917	10083	600	600	600			
GR	80	8200	75	8900	74.0	9917	74	9967	61.67	9995
	61.67	10005	74.0	10033	74.0	10083	75	10300	75	11583
X1	6220	10	9917	10083	220	300	260			
	77	8417	75	8900	74.0	9917	74	9967	61.95	9995
GR	61.95	10005	74.0	10033	74.0	10083	75	10400	75	11583
	6900	10	9915	10085	1000	300	680			
GR	80	9200	75	9800	71.7	9915	71.7	9965	62.47	9995
GR	62.47	10005	71.7	10035	71.7	10085	75	10300	75	11585
X1	7020	10	9915	10085	110	120	120			
	80	9600	75	9900	72.5	9915	72.5	9965	62.59	9995
	62.59	10005	72.5	10035	72.5	10085	75	10400	75	11585

SPECIAL CULVERT BRIDGE NUM 3 *
CULVERT SIZE: 10' X 6' *

NC				0.3	0.5					
	7070	10	9915	10085	50	50	50			
X3	10			9995	67	10005	67			
	80	9600	75	9900	73.7	9915	73.7	9965	64.05	9995
	64.05	10005	73.7	10035	73.7	10085	75	10300	75	11585
	1.013	0.5	3.0	170	6	10	50	8.2	64	64
X1	7120	8	9915	10085	50	50	50			
			2	0	73.7					
	10			9995	76.5	10005	76.5			
GR	80	9500	76.5	9915	76.5	9965	63.92	9995	63.92	10005
GR	76.5	10035	76.5	10085	76.5	11585				

	7170	9	9915	10085	120	5	50			
GR	80	8415	80	9600	77.5	9915	77.5	9965	62.66	9995
GR	62.66	10005	77.5	10035	77.5	10085	77.5	11585		
NC	.9	.9	.04	.1	.3					
	7320	9	9915	10085	155	145	150			
	80	8415	80	9700	77.5	9915	77.5	9965	62.76	9995
GR	62.76	10005	77.5	10035	77.5	10085	77.5	11585		
X1	8000	9	9917	10083	660	700	680			
GR	80	8417	80	9600	76.1	9917	76.1	9967	63.31	9995
C	63.31	10005	76.1	10033	76.1	10083	76.1	11585		
X1	8330	9	9917	10083	450	240	330			
C	80	8417	80	9600	75.2	9917	75.2	9967	63.46	9995
G	63.46	10005	75.2	10033	75.2	10083	75.2	11585		
X	8680	9	9917	10083	100	510	350			
GR	80	8417	80	9700	75.5	9917	75.5	9967	63.74	9995
GR	63.74	10005	75.5	10033	75.5	10083	75.5	11585		
X1	9280	10	9917	10083	600	600	600			
G	80	8417	80	9700	74.5	9917	74.5	9967	64.16	9995
C	64.16	10005	74.5	10033	74.5	10083	75	10200	75	11587
X	9780	10	9922	10078	500	500	500			
C	80	8417	80	9700	74.6	9922	74.6	9972	64.51	9995
GR	64.51	10005	74.6	10028	74.6	10078	75	10300	75	11578

	5-YR	10-YR	100-YR							
QT	3	440	580	992						
X	9930	10	9922	10078	150	150	150			
G	80	8422	80	9500	74.8	9922	74.8	9972	64.61	9995
GR	64.61	10005	74.8	10028	74.8	10078	75	10200	75	11578

PECIAL CULVERT BRIDGE NUM 4 *

ULVERT SIZE: 10' X 6' *

N	.9	.9	.04	0.3	0.5

	9980	10	9922	10078	50	50	50			
	10			9995	72	10005	72			
GR	80	8422	80	9500	74.5	9922	74.5	9972	65.57	9995
GR	65.57	10005	74.5	10028	74.5	10078	75	10400	75	11578
SC	1.013	0.5	3.0	156	6	10	60	8.2	65.94	65.57
	10040	10	9922	10078	60	60	60			
			2	0	74.5					
X3	10			9995	74.5	10005	74.5			
GR	80	8422	80	9500	74.5	9922	74.5	9972	65.94	9995
	65.94	10005	74.5	10028	74.5	10078	75	10400	75	11578
	10120	10	9922	10078	5	240	80			
	80	8422	80	9500	75.9	9922	75.9	9972	64.83	9995
GR	64.83	10005	75.9	10028	75.9	10078	80	10500	80	11578
	.9	.9	.04	.1	.3					
	10270	10	9920	10080	150	150	150			
	80	8420	80	9500	76.2	9920	76.2	9970	64.93	9995
GR	64.93	10005	76.2	10030	76.2	10080	80	10500	80	11580
	10410	10	9910	10090	350	50	140			
GR	80	8410	80	9500	76.1	9910	76.1	9960	64.99	9995
GR	64.9	10005	76.1	10040	76.1	10090	80	10500	80	11590
X1	10510	10	9917	10083	250	50	100			
	80	8417	80	9700	76.3	9917	76.3	9967	65.04	9995
	65.04	10005	76.3	10033	76.3	10083	80	10300	80	11583
	10570	10	9915	10085	10	170	60			
	80	8415	80	9700	76.5	9915	76.5	9965	65.11	9995
GR	65.11	10005	76.5	10035	76.5	10085	80	10300	80	11585
X1	10680	10	9917	10083	50	220	110			
GR	80	8417	80	9700	76.8	9917	76.8	9967	65.21	9995
	65.21	10005	76.8	10033	76.8	10083	80	10300	80	11583
X1	11060	10	9920	10080	340	440	380			
	80	8420	80	9800	76.2	9920	76.2	9970	65.49	9995
GR	65.49	10005	76.2	10030	76.2	10080	80	10200	80	11580

	11940	10	9920	10080	880	880	880			
GR	83	9200	80	9500	76.3	9920	76.3	9970	66.11	9995
GR	66.11	10005	76.3	10030	76.3	10080	80	11400	80	11580

SPECIAL CULVERT BRIDGE NUM 5 *
CULVERT SIZE: 7' X 8' *

				0.3	0.5					
	11990	10	9922	10078	50	50	50			
	10			9995	74	10005	74			
GR	83	9100	80	9200	76.2	9922	76.2	9972	66.12	9995
GR	66.12	10005	76.2	10028	76.2	10078	80	11500	85	12100
SC	1.013	0.5	3.0	156	7	8	60	8.2	66.13	66.12
	12050	9	9922	10078	60	60	60			
			2	0	76.2					
X3	10			9996	76.2	10004	76.2			
	80	8422	80	9200	76.2	9922	76.2	9972	66.13	9995
	66.13	10005	76.2	10028	76.2	10078	80	11600		
	12100	10	9925	10075	50	50	50			
	80	8425	80	9200	74.8	9925	74.8	9975	66.14	9992
GR	66.14	10008	74.8	10025	74.8	10075	80	11600	85	11800
NC	.9	.9	.04	.1	.3					
	12660	10	9925	10075	560	560	560			
	80	8100	75	9200	74.1	9925	74.1	9975	66.20	9992
GR	66.2	10008	74.1	10025	74.1	10075	75	10600	80	12200
	12860	10	9925	10075	600	600	600			
GR	85	8100	80	9100	73.6	9925	73.6	9975	66.26	9992
	66.26	10008	73.6	10025	73.6	10075	75	10900	80	11575
X1	13280	10	9925	10075	500	380	420			
	85	8425	80	9200	75	9600	72.5	9925	72.5	9975
	66.3	9992	66.3	10008	72.5	10025	72.5	10075	80	11575

30 IN. IRRIGATION PIPE CROSSING W/ TOP ELEV. OF 72.51 AT 14000 *
NOT MODELED *

	14280	10	9925	10075	1000	1000	1000			
GR	85	8500	80	9100	72.5	9925	72.5	9975	66.40	9992
GR	66.4	10008	72.5	10025	72.5	10075	80	10900	85	11500
X1	14530	10	9925	10075	230	290	250			
GR	85	8500	80	9100	73.2	9925	73.2	9975	66.43	9992
	66.43	10008	73.2	10025	73.2	10075	80	10900	85	11500

SPECIAL BRIDGE BRIDGE NUM 6 *

CULVERT SIZE: 9' X 6' *

NC				0.3	0.5					
		5-YR	10-YR	100-YR						
QT	3	353	465	796						
X1	14580	10	9925	10075	70	40	50			
	10			9995	73	10005	73			
	85	8500	80	9100	74.5	9925	74.5	9975	65.97	9992
GR	65.97	10008	74.5	10025	74.5	10075	80	10900	85	11500
SC	1.013	0.5	3.0	156	6	9	70	8.2	65.97	65.97
	14650	10	9922	10078	70	70	70			
			2	0	74.5					
X3	10			9995	74.5	10005	74.5			
GR	85	8500	80	9100	74.5	9922	74.5	9972	65.97	9992
	65.97	10008	74.5	10028	74.5	10078	80	10900	85	11500

CROSS SECTIONS 14580 & 14650 *

	14710	8	9925	10075	230	10	60			
GR	73.8	8425	73.8	9925	73.8	9975	66.44	9992	66.44	10008
GR	73.8	10025	73.8	10075	73.8	11575				
NC				.1	.3					
	14960	8	9925	10075	270	270	270			
GR	73.8	8425	73.8	9925	73.8	9975	66.47	9992	66.47	10008
GR	73.8	10025	73.8	10075	73.8	11575				
X1	15080	8	9925	10075	5	400	120			
GR	75.1	8425	75.1	9925	75.1	9975	66.49	9992	66.49	10008
	75.1	10025	75.1	10075	75.1	11575				

	16210	8	9925	10075	1130	1130	1130			
GR	73.6	8425	73.6	9925	73.6	9975	66.58	9992	66.58	10008
GR	73.6	10025	73.6	10075	73.6	11575				
X1	16410	8	9917	10083	60	450	200			
GR	77.6	8417	77.6	9917	77.6	9967	66.61	9992	66.61	10008
	77.6	10033	77.6	10083	77.6	11583				
	16710	8	9917	10083	300	300	300			
	77.5	8417	77.5	9917	77.5	9967	66.64	9992	66.64	10008
GR	77.5	10033	77.5	10083	77.5	11583				
	17370	8	9917	10083	660	660	660			
GR	77.6	8417	77.6	9917	77.6	9967	66.71	9992	66.71	10008
	77.6	10033	77.6	10083	77.6	11583				
X1	17530	8	9915	10085	10	170	60			
	77.4	8415	77.4	9915	77.4	9965	66.72	9992	66.72	10008
	77.4	10035	77.4	10085	77.4	11585				
	17660	9	9917	10083	220	50	130			
	80	8417	80	9500	78.0	9917	78.0	9967	66.73	9992
GR	66.73	10008	78.0	10033	78.0	10083	78	11583		
X1	17860	9	9917	10083	200	200	200			
GR	80	8417	80	9500	77.8	9917	77.8	9967	66.75	9992
	66.75	10008	77.8	10033	77.8	10083	77.8	11583		
	18060	8	9915	10085	200	200	200			
	80.2	8415	80.2	9915	80.2	9965	66.77	9992	66.77	10008
GR	80.2	10035	80.2	10085	80.2	11585				
	18220	8	9905	10095	10	400	160			
GR	82.5	8405	82.5	9905	82.5	9955	66.8	9992	66.8	10008
GR	82.5	10045	82.5	10095	85	11595				
X1	18720	10	9905	10095	500	500	500			
	85	8405	85	9000	82.2	9905	82.2	9955	66.85	9992
	66.85	10008	82.2	10045	82.2	10095	85	11000	85	11595

	19220	10	9917	10083	500	500	500			
GR	85	8417	85	9000	78.8	9917	78.8	9967	66.90	9992
GR	66.90	10008	78.8	10033	78.8	10083	80	10500	84	11583

5-YR 10-YR 100-YR

QT	3	279	368	630						
	19370	8	9917	10083	300	50	150			
	82	8417	79.5	9917	79.5	9967	66.91	9992	66.91	10008
GR	79.5	10033	79.5	10083	85	11583				

X1	19570	8	9917	10083	350	120	200			
GR	78.5	8417	78.5	9917	78.5	9967	66.93	9992	66.93	10008
	78.5	10033	78.5	10083	80	11583				

X1	19720	8	9917	10083	350	350	350			
	79.2	8417	79.2	9917	79.2	9967	66.97	9992	66.97	10008
GR	79.2	10033	79.2	10083	80	11583				

SPECIAL BRIDGE BRIDGE NUM 7 *
CULVERT SIZE: 8' X 5' (BUT FILLED WITH 2' OF MUD) *
SEDIMENT MODELED ON X3 CARDS THROUGH CULVERT

				0.3	0.5					
	19780	10	9925	10075	10	170	50			
	10	68.98		9995	73	10005	73			
GR	85	8425	80	9000	77.3	9925	77.3	9975	66.98	9995
GR	66.98	10005	77.3	10025	77.3	10075	80	10300	82	11575

SC	1.013	0.5	3.0	156	5	8	60	8.2	66.99	66.98

	19840	10	9922	10078	60	60	60			
			2	0	77.3					
X3	10	68.99		9995	77.3	10005	77.3			
	85	8422	80	9000	77.3	9922	77.3	9972	66.99	9995
	66.99	10005	77.3	10028	77.3	10078	80	10300	82	11578

	19890	10	9920	10080	50	50	50			
	85	8420	80	9000	76.8	9920	76.8	9970	66.99	9992
GR	66.99	10008	76.8	10030	76.8	10080	80	10500	82	11580

				.1	.3					
X1	20210	10	9920	10080	320	320	320			
	85	8420	80	9000	77.5	9920	77.5	9970	67.02	9992
	67.02	10008	77.5	10030	77.5	10080	80	10900	81	11580
	21060	8	9915	10085	850	850	850			
	85	8000	80.2	9915	80.2	9965	67.11	9992	67.11	10008
GR	80.2	10035	80.2	10085	80.2	11585				
	SPECIAL BRIDGE		BRIDGE NUM 8				*			
	CULVERT SIZE: 6' x 6'						*			
				0.3	0.5					
X1	21180	8	9925	10075	280	50	100			
	10			9995	73	10005	73			
GR	79.0	8425	79.0	9925	79.0	9975	67.11	9995	67.11	10005
GR	79.0	10025	79.0	10075	79.0	11575				
SC	1.013	0.5	3.0	156	6	6	80	8.2	67.12	67.11
	21260	8	9922	10078	80	80	80			
			2	0	79.0					
X3	10			9995	79.0	10005	79.0			
GR	79.0	8422	79.0	9922	79.0	9972	67.12	9995	67.12	10005
	79.0	10028	79.0	10078	79.0	11578				
	CROSS SECTIONS		21180 & 21260				*			
	21300	8	9927	10073	90	10	40			
GR	77.4	8427	77.4	9927	77.4	9977	67.12	9992	67.12	10008
GR	77.4	10023	77.4	10073	77.4	11573				
NC				.1	.3					
	21450	8	9920	10080	150	150	150			
GR	77.4	8420	77.4	9920	77.4	9950	67.13	9992	67.13	10008
GR	77.4	10030	77.4	10080	80	11580				
X1	22810	9	9917	10083	1360	1360	1360			
GR	80	8417	77.1	9917	77.1	9967	67.27	9992	67.27	10008
	77.1	10033	77.1	10083	80	10600	83	11583		

	22960	9	9917	10083	50	250	150			
GR	77.2	8417	77.2	9917	77.2	9967	67.29	9992	67.29	10008
GR	77.2	10033	77.2	10083	80	10500	82	11583		
X1	23320	10	9925	10075	230	450	360			
GR	78	8425	75	9800	74.6	9925	74.6	9975	67.33	9992
	67.33	10008	74.6	10025	74.6	10075	75	10200	79	11575
	23520	9	9922	10078	300	110	200			
	80	8422	75.0	9922	75.0	9972	67.35	9992	67.35	10008
GR	75.0	10028	75.0	10078	80	10900	81	11578		
	23680	9	9925	10075	300	60	160			
GR	78	8425	74.2	9925	74.2	9975	67.36	9992	67.36	10008
GR	74.2	10025	74.2	10075	80	10700	82	11575		
X1	24080	9	9925	10075	400	400	400			
	76.5	8425	76.5	9925	76.5	9975	67.40	9992	67.40	10008
	76.5	10025	76.5	10075	80	10700	82	11575		
	24380	8	9925	10075	20	400	300			
	75.8	8425	75.8	9925	75.8	9975	67.43	9992	67.43	10008
GR	75.8	10025	75.8	10075	80	11575				
X1	24680	8	9927	10073	300	300	300			
GR	76.0	8427	76.0	9927	76.0	9977	67.46	9992	67.46	10008
	76.0	10023	76.0	10073	80	11573				
X1	24830	8	9927	10073	280	50	150			
	80	8427	76.0	9927	76.0	9977	67.48	9992	67.48	10008
GR	76.0	10023	76.0	10073	80	11573				
	24960	8	9927	10073	300	30	130			
GR	75.6	8427	75.6	9927	75.6	9977	67.49	9992	67.49	10008
GR	75.6	10023	75.6	10073	80	11573				

SPECIAL BRIDGE BRIDGE NUM 9 *

CULVERT SIZE: 8' X 4.5' (BUT FILLED WITH 1.5' OF MUD) *

				0.3	0.5					
		5-YR	10-YR	100-YR						
	3		267	351	600					
	25060		8	9925	10075	100	100	100		
X3	10				9995	74.5	10005	74.5		
CR	75.0		8425	75.0	9925	75.0	9975	67.65	9995	67.65	10005
	75.0		10025	75.0	10075	80	11575			
	1.013		0.5	3.0	156	4.5	8	60	8.2	68.00	67.65
X1	25120		8	9922	10078	60	60	60		
X2				2	0	75.0				
	10				9995	75.0	10005	75.0		
	75.0		8422	75.0	9922	75.0	9972	68.00	9995	68.00	10005
GR	75.0		10028	75.0	10078	80	11578			
X1	25220		8	9930	10070	200	20	100		
GR	75.0		8430	75.0	9930	75.0	9980	68.38	9995	68.38	10005
	75.0		10020	75.0	10070	75.0	11570			
NC					.1	.3				
	25550		9	9930	10070	30	350	230		
GR	75.0		8430	75.0	9930	75.0	9980	68.75	9995	68.75	10005
	75.0		10020	75.0	10070	80	10900	81	11570		
X1	26560		8	9920	10080	1010	1010	1010		
	79.2		8420	79.2	9920	79.2	9950	69.78	9995	69.78	10005
	79.2		10030	79.2	10080	79.2	11580			

SPECIAL BRIDGE BRIDGE NUM 10 *
CULVERT SIZE: 8' X 4' *

				0.3	0.5					
X1	26670		8	9925	10075	110	110	110		
X3	10				9995	74.5	10005	74.5		
	82.0		8425	82.0	9925	82.0	9975	68.6	9995	68.6	10005
	82.0		10025	82.0	10075	82.0	11575			
	1.013		0.5	3.0	156	4	8	55	8.2	68.6	68.6

	26725	8	9922	10078	55	55	55			
			2	0	82.0					
X3	10			9995	82.0	10005	82.0			
GR	82.0	8422	82.0	9922	82.0	9972	68.6	9995	68.6	10005
	82.0	10028	82.0	10078	82.0	11578				

CROSS SECTIONS 26670 & 26725 *

	26780	8	9920	10080	55	55	55			
GR	82.0	8420	82.0	9920	82.0	9950	70.12	9995	70.12	10005
GR	82.0	10030	82.0	10080	82.0	11580				
NC				.1	.3					
	27180	8	9920	10080	400	400	400			
	83.0	8420	83.0	9920	83.0	9950	70.52	9995	70.52	10005
GR	83.0	10030	83.0	10080	83.0	11580				
X1	27310	8	9922	10078	270	30	130			
GR	83.2	8422	83.2	9922	83.2	9972	70.62	9995	70.62	10005
	83.2	10028	83.2	10078	83.2	11578				
X1	27520	8	9920	10080	320	80	210			
	83.2	8420	83.2	9920	83.2	9950	70.77	9995	70.77	10005
G.	83.2	10030	83.2	10080	83.2	11580				
	27720	8	9920	10080	300	50	200			
GR	83.4	8420	83.4	9920	83.4	9950	70.92	9995	70.92	10005
GR	83.4	10030	83.4	10080	83.4	11580				

	5-YR	10-YR	100-YR
	3	127	157	228

	28140	8	9922	10078	395	465	420			
GR	83.5	8422	83.5	9922	83.5	9972	71.37	9995	71.37	10005
GR	83.5	10028	83.5	10078	83.5	11578				
X1	28460	8	9920	10080	220	420	320			
GR	83.4	8420	83.4	9920	83.4	9950	71.72	9995	71.72	10005
	83.4	10030	83.4	10080	83.4	11580				
	28960	8	9922	10078	500	500	500			
	83.5	8422	83.5	9922	83.5	9972	72.22	9995	72.22	10005
GR	83.5	10028	83.5	10078	83.5	11578				

	29500	8	9925	10075	460	680	540			
GR	84.0	8425	84.0	9925	84.0	9975	72.77	9995	72.77	10005
GR	84.0	10025	84.0	10075	84.0	11575				

		5-YR	10-YR	100-YR						
QT	3	75	89	115						
	30250	8	9925	10075	700	800	750			
GR	83.6	8425	83.6	9925	83.6	9975	73.52	9995	73.52	10005
GR	83.6	10025	83.6	10075	83.6	11575				

ILEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

T RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
T 10-YEAR 24 HOUR FLOWS EXISTING MODEL
T3 FILENAME: CHA_100.IH2 CSG 07/31/95

J	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10	3			.0008				69.24	

J	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	-2		-1							

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF
P FILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR
D AILS.

RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
100-YEAR 24 HOUR FLOWS EXISTING MODEL
T3 FILENAME: CHA_100.IH2 CSG 07/31/95

ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
-10	4			.0008				70.87	

NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
15		-1							

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF
OFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR
TAILS.

THIS RUN EXECUTED 08AUG95 08:08:49

****
EC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE-- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

FILENAME: CHA_100.IH2

MARY PRINTOUT

	SECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
	100.000	64.91	662.00	.01	1.76	.01	100.00	203.57	.00	75.00
	100.000	65.34	886.00	.02	1.98	.02	99.91	327.37	.00	75.00
	100.000	66.35	1537.00	.04	2.45	.04	99.10	625.54	.00	75.00
*	350.000	65.03	662.00	.00	2.10	.00	100.00	60.44	250.00	75.00
	350.000	65.47	886.00	.00	2.59	.00	100.00	62.91	250.00	75.00
	350.000	66.48	1537.00	.00	3.75	.00	100.00	68.65	250.00	75.00
	680.000	65.16	662.00	.00	2.80	.00	100.00	44.22	580.00	75.00
	680.000	65.66	886.00	.00	3.42	.00	100.00	46.15	580.00	75.00
	680.000	66.81	1537.00	.00	4.88	.00	100.00	50.67	580.00	75.00
	1180.000	65.51	662.00	.00	2.69	.00	100.00	47.58	1080.00	75.00
	1180.000	66.13	886.00	.00	3.20	.00	100.00	50.34	1080.00	75.00
	1180.000	67.64	1537.00	.00	4.30	.00	100.00	56.96	1080.00	75.00
	1490.000	65.71	662.00	.00	2.70	.00	100.00	47.80	1390.00	75.00
	1490.000	66.40	886.00	.00	3.18	.00	100.00	50.82	1390.00	75.00
	1490.000	68.04	1537.00	.00	4.18	.00	100.00	58.14	1390.00	75.00
	1540.000	65.38	662.00	.00	8.18	.00	100.00	10.00	1440.00	75.00
	1540.000	65.83	886.00	.00	10.37	.00	100.00	10.00	1440.00	75.00
*	1540.000	68.77	1537.00	.00	11.20	.00	100.00	35.33	1440.00	75.00
	1600.000	68.10	662.00	.00	6.16	.00	100.00	10.00	1500.00	75.00
	1600.000	71.10	886.00	.00	6.45	.00	100.00	10.00	1500.00	75.00
	1600.000	70.74	1537.00	.00	11.48	.00	100.00	10.00	1500.00	75.00
	1650.000	68.82	662.00	.00	1.76	.00	100.00	55.98	1550.00	75.00
*	1650.000	71.90	886.00	.00	1.56	.00	100.00	68.38	1550.00	75.00
*	1650.000	73.36	1537.00	.02	1.97	.02	99.73	529.54	1550.00	75.00

	ECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
	1850.000	68.86	662.00	.00	1.66	.00	100.00	60.57	1750.00	75.00
	1850.000	71.92	886.00	.00	1.46	.00	100.00	74.29	1750.00	75.00
	1850.000	73.44	1537.00	.01	2.06	.01	99.99	303.68	1750.00	75.00
	2400.000	68.97	662.00	.00	1.84	.00	100.00	56.38	2300.00	76.00
	2400.000	71.99	886.00	.00	1.61	.00	100.00	69.27	2300.00	76.00
*	2400.000	73.61	1537.00	.00	2.30	.00	100.00	76.19	2300.00	76.00
	2900.000	69.08	662.00	.00	1.79	.00	100.00	60.27	2800.00	75.50
	2900.000	72.05	886.00	.00	1.56	.00	100.00	74.47	2800.00	75.50
	2900.000	73.80	1537.00	.02	2.01	.02	99.90	516.31	2800.00	75.50
	3600.000	69.25	662.00	.00	1.75	.00	100.00	65.77	3500.00	75.00
	3600.000	72.16	886.00	.02	1.09	.02	97.67	1209.42	3500.00	75.00
*	3600.000	73.96	1537.00	.03	1.30	.03	93.44	2082.60	3500.00	75.00
*	4720.000	69.62	662.00	.00	2.42	.00	100.00	49.26	4620.00	75.00
*	4720.000	72.41	886.00	.02	1.61	.02	99.23	648.70	4620.00	75.00
*	4720.000	74.15	1537.00	.04	1.80	.04	95.95	1355.73	4620.00	75.00
*	4770.000	69.37	662.00	.00	7.20	.00	100.00	17.76	4670.00	75.00
*	4770.000	72.43	886.00	.05	2.48	.05	98.06	719.47	4670.00	75.00
*	4770.000	74.16	1537.00	.06	2.29	.06	92.59	1516.39	4670.00	75.00
	[illegible]810.000	70.74	662.00	.00	6.36	.00	100.00	10.00	4715.00	77.00
	0.000	72.46	886.00	.06	2.83	.06	97.51	699.76	4715.00	77.00
	[illegible]810.000	74.15	1537.00	.07	2.49	.07	91.94	1431.46	4715.00	77.00
*	4860.000	71.55	662.00	.01	1.54	.01	99.85	393.86	4765.00	75.00
*	4860.000	72.60	886.00	.02	1.47	.02	98.53	851.94	4765.00	75.00
*	4860.000	74.22	1537.00	.03	1.72	.03	94.89	1561.90	4765.00	75.00
	5360.000	71.70	662.00	.00	1.95	.00	100.00	53.93	5265.00	75.00
*	5360.000	72.81	886.00	.02	1.91	.02	99.76	514.54	5265.00	75.00
	5360.000	74.38	1537.00	.04	2.10	.04	96.66	1434.81	5265.00	75.00
	5960.000	71.86	662.00	.00	1.96	.00	100.00	56.30	5865.00	75.00
*	5960.000	73.05	886.00	.00	2.17	.00	100.00	61.67	5865.00	75.00
*	5960.000	74.76	1537.00	.03	2.57	.03	99.40	1101.57	5865.00	75.00
	6220.000	71.94	662.00	.00	2.00	.00	100.00	56.40	6125.00	75.00
	6220.000	73.13	886.00	.00	2.20	.00	100.00	61.94	6125.00	75.00
	6220.000	74.99	1537.00	.03	2.44	.03	98.78	1484.79	6125.00	75.00
	6900.000	72.21	662.00	.01	1.45	.01	99.97	221.28	6805.00	75.00
	6900.000	73.36	886.00	.02	1.36	.02	99.66	335.92	6805.00	75.00
*	6900.000	75.24	1537.00	.03	1.56	.02	98.47	1814.06	6805.00	75.00
	7020.000	72.24	662.00	.00	1.75	.00	100.00	68.47	6925.00	75.00
	7020.000	73.39	886.00	.02	1.62	.02	99.89	287.63	6925.00	75.00
	7020.000	75.26	1537.00	.03	1.75	.03	98.64	1700.74	6925.00	75.00

SECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
7070.000	72.23	662.00	.00	3.24	.00	100.00	56.82	6975.00	75.00
7070.000	73.37	886.00	.00	3.22	.00	100.00	67.06	6975.00	75.00
7070.000	75.26	1537.00	.05	2.69	.03	98.75	1701.39	6975.00	75.00
7120.000	73.36	662.00	.00	7.00	.00	100.00	10.00	7025.00	76.50
7120.000	73.23	886.00	.00	9.51	.00	100.00	10.00	7025.00	76.50
7120.000	72.91	1537.00	.00	17.10	.00	100.00	10.00	7025.00	76.50
7170.000	74.31	662.00	.00	1.69	.00	100.00	57.12	7075.00	77.50
7170.000	75.00	886.00	.00	2.05	.00	100.00	59.90	7075.00	77.50
7170.000	78.78	1537.00	.02	1.81	.03	95.56	1831.29	7075.00	77.50
7320.000	74.34	662.00	.00	1.70	.00	100.00	57.14	7225.00	77.50
7320.000	75.04	886.00	.00	2.06	.00	100.00	59.98	7225.00	77.50
7320.000	78.83	1537.00	.02	1.80	.03	95.36	1784.50	7225.00	77.50
8000.000	74.47	662.00	.00	1.72	.00	100.00	58.84	7905.00	76.10
8000.000	75.21	886.00	.00	2.07	.00	100.00	62.09	7905.00	76.10
8000.000	78.98	1537.00	.03	1.41	.04	88.19	1902.22	7905.00	76.10
8330.000	74.54	662.00	.00	1.64	.00	100.00	62.82	8235.00	75.20
8330.000	75.36	886.00	.01	1.87	.01	99.66	1678.62	8235.00	75.20
8330.000	79.03	1537.00	.02	1.21	.04	84.93	1920.64	8235.00	75.20
8680.000	74.60	662.00	.00	1.70	.00	100.00	61.70	8585.00	75.50
30.000	75.60	886.00	.01	1.91	.01	99.85	1672.59	8585.00	75.50
680.000	79.06	1537.00	.02	1.27	.04	85.77	1839.81	8585.00	75.50
9280.000	74.80	662.00	.01	1.49	.01	99.98	249.25	9185.00	75.00
9280.000	75.85	886.00	.02	1.39	.02	96.43	1723.12	9185.00	75.00
9280.000	79.12	1537.00	.02	1.12	.04	84.87	1852.23	9185.00	75.00
9780.000	75.05	662.00	.01	1.64	.01	99.80	1674.64	9685.00	75.00
9780.000	75.99	886.00	.02	1.53	.03	94.69	1713.02	9685.00	75.00
9780.000	79.15	1537.00	.03	1.22	.04	82.79	1843.47	9685.00	75.00
9930.000	75.13	440.00	.01	1.13	.01	99.63	1682.76	9835.00	75.00
9930.000	76.04	580.00	.02	1.03	.02	94.13	1755.84	9835.00	75.00
9930.000	79.17	992.00	.02	.80	.03	81.76	2010.33	9835.00	75.00
9980.000	75.16	440.00	.03	1.73	.02	98.21	1706.32	9885.00	75.00
9980.000	76.05	580.00	.03	1.33	.04	89.13	1775.06	9885.00	75.00
9980.000	79.18	992.00	.02	.87	.03	76.58	2014.91	9885.00	75.00
10040.000	75.20	440.00	.04	2.17	.04	96.37	1710.08	9945.00	75.00
10040.000	76.05	580.00	.04	1.52	.05	85.89	1774.77	9945.00	75.00
10040.000	79.18	992.00	.03	.90	.04	74.03	2015.89	9945.00	75.00
10120.000	75.28	440.00	.00	1.33	.00	100.00	53.42	10025.00	80.00
10120.000	76.10	580.00	.01	1.46	.01	99.99	197.96	10025.00	80.00
10120.000	79.18	992.00	.02	1.10	.02	97.53	832.96	10025.00	80.00

SECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
10270.000	75.30	440.00	.00	1.29	.00	100.00	56.01	10175.00	80.00
10270.000	76.13	580.00	.00	1.49	.00	100.00	59.69	10175.00	80.00
10270.000	79.20	992.00	.02	1.11	.02	97.87	822.55	10175.00	80.00
10410.000	75.32	440.00	.00	1.00	.00	100.00	75.12	10315.00	80.00
10410.000	76.17	580.00	.00	1.12	.00	100.00	196.53	10315.00	80.00
10410.000	79.22	992.00	.02	.92	.02	98.25	835.09	10315.00	80.00
10510.000	75.33	440.00	.00	1.20	.00	100.00	61.21	10415.00	80.00
10510.000	76.18	580.00	.00	1.38	.00	100.00	65.45	10415.00	80.00
10510.000	79.22	992.00	.02	1.07	.02	98.98	509.20	10415.00	80.00
10570.000	75.34	440.00	.00	1.17	.00	100.00	63.86	10475.00	80.00
10570.000	76.19	580.00	.00	1.33	.00	100.00	68.40	10475.00	80.00
10570.000	79.23	992.00	.02	1.07	.02	99.11	504.84	10475.00	80.00
10680.000	75.34	440.00	.00	1.26	.00	100.00	58.99	10585.00	80.00
10680.000	76.20	580.00	.00	1.44	.00	100.00	63.13	10585.00	80.00
10680.000	79.23	992.00	.02	1.16	.02	99.18	496.44	10585.00	80.00
11060.000	75.39	440.00	.00	1.34	.00	100.00	56.20	10965.00	80.00
11060.000	76.32	580.00	.01	1.47	.01	100.00	167.58	10965.00	80.00
11060.000	79.28	992.00	.02	1.14	.02	99.33	354.16	10965.00	80.00
11940.000	75.52	440.00	.00	1.42	.00	100.00	56.13	11845.00	80.00
11940.000	76.71	580.00	.01	1.37	.01	99.92	350.95	11845.00	80.00
11940.000	79.37	992.00	.02	1.11	.02	95.08	1604.98	11845.00	80.00
11990.000	75.46	440.00	.00	3.80	.00	100.00	40.60	11895.00	85.00
11990.000	76.73	580.00	.04	2.47	.04	99.50	454.03	11895.00	85.00
11990.000	79.37	992.00	.03	1.38	.03	90.10	1945.90	11895.00	85.00
12050.000	76.03	440.00	.00	5.56	.00	100.00	8.00	11955.00	80.00
12050.000	76.93	580.00	.06	2.92	.06	98.29	590.19	11955.00	80.00
12050.000	79.37	992.00	.04	1.51	.04	87.61	2026.30	11955.00	80.00
12100.000	76.65	440.00	.01	.76	.01	97.72	950.31	12005.00	80.00
12100.000	77.10	580.00	.02	.89	.02	96.67	1143.22	12005.00	80.00
12100.000	79.40	992.00	.02	.92	.02	90.43	2135.70	12005.00	80.00
12660.000	76.68	440.00	.02	.60	.01	88.21	2306.83	12565.00	80.00
12660.000	77.13	580.00	.02	.70	.02	85.93	2551.28	12565.00	80.00
12660.000	79.42	992.00	.02	.72	.02	76.54	3788.80	12565.00	80.00
12860.000	76.70	440.00	.01	.56	.02	90.62	1606.65	13165.00	80.00
12860.000	77.16	580.00	.01	.66	.02	89.11	1727.36	13165.00	80.00
12860.000	79.44	992.00	.02	.74	.02	83.00	2329.32	13165.00	80.00
13280.000	76.71	440.00	.01	.48	.01	92.12	1455.94	13585.00	80.00
13280.000	77.17	580.00	.02	.58	.01	91.05	1584.61	13585.00	80.00
13280.000	79.45	992.00	.02	.69	.02	86.14	2221.56	13585.00	80.00

ECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
14280.000	76.73	440.00	.01	.50	.01	94.74	1082.14	14585.00	85.00
14280.000	77.20	580.00	.01	.60	.01	93.97	1184.54	14585.00	85.00
14280.000	79.47	992.00	.02	.72	.02	90.27	1684.42	14585.00	85.00
14530.000	76.74	440.00	.01	.56	.01	95.69	1007.95	14835.00	85.00
14530.000	77.20	580.00	.02	.67	.02	94.87	1121.06	14835.00	85.00
14530.000	79.48	992.00	.02	.77	.02	90.84	1673.09	14835.00	85.00
* 14580.000	76.74	353.00	.02	.75	.02	96.15	821.22	14885.00	85.00
* 14580.000	77.20	465.00	.02	.84	.02	95.04	961.15	14885.00	85.00
* 14580.000	79.48	796.00	.02	.82	.02	89.64	1643.53	14885.00	85.00
14650.000	76.74	353.00	.02	.78	.02	95.70	827.14	14955.00	85.00
14650.000	77.20	465.00	.02	.87	.02	94.58	965.56	14955.00	85.00
14650.000	79.48	796.00	.02	.82	.02	89.24	1647.41	14955.00	85.00
* 14710.000	76.75	353.00	.01	.36	.01	69.75	3150.00	15015.00	73.80
* 14710.000	77.22	465.00	.01	.42	.01	67.98	3150.00	15015.00	73.80
* 14710.000	79.49	796.00	.02	.46	.02	62.82	3150.00	15015.00	73.80
14960.000	76.75	353.00	.01	.36	.01	69.65	3150.00	15285.00	73.80
14960.000	77.22	465.00	.01	.42	.01	67.89	3150.00	15285.00	73.80
14960.000	79.49	796.00	.02	.46	.02	62.77	3150.00	15285.00	73.80
* [illegible]080.000	76.75	353.00	.01	.53	.01	79.78	3150.00	15405.00	75.10
* 0.000	77.22	465.00	.02	.59	.02	76.20	3150.00	15405.00	75.10
[illegible]080.000	79.50	796.00	.02	.56	.02	66.79	3150.00	15405.00	75.10
* 16210.000	76.77	353.00	.01	.34	.01	68.27	3150.00	16535.00	73.60
* 16210.000	77.25	465.00	.01	.40	.01	66.70	3150.00	16535.00	73.60
* 16210.000	79.51	796.00	.02	.44	.02	62.13	3150.00	16535.00	73.60
* 16410.000	76.77	353.00	.00	.89	.00	100.00	62.27	16735.00	77.60
* 16410.000	77.25	465.00	.00	1.09	.00	100.00	64.43	16735.00	77.60
* 16410.000	79.52	796.00	.02	.87	.02	84.19	3166.00	16735.00	77.60
16710.000	76.79	353.00	.00	.88	.00	100.00	62.70	17035.00	77.50
16710.000	77.27	465.00	.00	1.08	.00	100.00	64.89	17035.00	77.50
16710.000	79.54	796.00	.02	.85	.02	83.29	3166.00	17035.00	77.50
17370.000	76.82	353.00	.00	.89	.00	100.00	62.44	17695.00	77.60
17370.000	77.32	465.00	.00	1.09	.00	100.00	64.70	17695.00	77.60
17370.000	79.58	796.00	.02	.86	.02	83.61	3166.00	17695.00	77.60
17530.000	76.83	353.00	.00	.84	.00	100.00	67.11	17755.00	77.40
17530.000	77.32	465.00	.00	1.02	.00	100.00	69.61	17755.00	77.40
17530.000	79.59	796.00	.02	.79	.02	82.75	3170.00	17755.00	77.40
17660.000	76.83	353.00	.00	.91	.00	100.00	60.83	17885.00	78.00
17660.000	77.33	465.00	.00	1.11	.00	100.00	63.04	17885.00	78.00
17660.000	79.59	796.00	.01	1.01	.02	92.47	1999.08	17885.00	78.00

SECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
17860.000	76.85	353.00	.00	.90	.00	100.00	61.68	18085.00	77.80
17860.000	77.35	465.00	.00	1.10	.00	100.00	63.95	18085.00	77.80
17860.000	79.62	796.00	.01	.96	.02	91.35	2009.22	18085.00	77.80
18060.000	76.86	353.00	.00	.96	.00	100.00	56.56	18285.00	80.20
18060.000	77.36	465.00	.00	1.18	.00	100.00	58.59	18285.00	80.20
18060.000	79.62	796.00	.00	1.48	.00	100.00	67.70	18285.00	80.20
18220.000	76.87	353.00	.00	.88	.00	100.00	63.45	18445.00	82.50
18220.000	77.38	465.00	.00	1.07	.00	100.00	65.86	18445.00	82.50
18220.000	79.64	796.00	.00	1.34	.00	100.00	76.53	18445.00	82.50
18720.000	76.89	353.00	.00	.87	.00	100.00	64.43	18945.00	85.00
18720.000	77.42	465.00	.00	1.06	.00	100.00	66.95	18945.00	85.00
18720.000	79.69	796.00	.00	1.32	.00	100.00	77.93	18945.00	85.00
19220.000	76.92	353.00	.00	.95	.00	100.00	58.10	19445.00	84.00
19220.000	77.45	465.00	.00	1.15	.00	100.00	60.34	19445.00	84.00
* 19220.000	79.76	796.00	.01	1.23	.01	99.61	641.47	19445.00	84.00
19370.000	76.93	279.00	.00	.78	.00	100.00	55.79	19595.00	82.00
19370.000	77.47	368.00	.00	.94	.00	100.00	57.92	19595.00	82.00
19370.000	79.79	630.00	.01	1.12	.01	99.97	412.66	19595.00	82.00
570.000	76.94	279.00	.00	.74	.00	100.00	59.28	19795.00	78.50
0.000	77.48	368.00	.00	.90	.00	100.00	61.62	19795.00	78.50
* 19570.000	79.82	630.00	.02	.84	.01	92.79	2999.21	19795.00	78.50
19720.000	76.95	279.00	.00	.77	.00	100.00	56.82	20145.00	79.20
19720.000	77.50	368.00	.00	.93	.00	100.00	59.06	20145.00	79.20
19720.000	79.86	630.00	.01	1.00	.01	97.11	2911.88	20145.00	79.20
* 19780.000	76.95	279.00	.00	1.65	.00	100.00	47.43	20195.00	82.00
* 19780.000	77.52	368.00	.01	1.69	.01	99.96	240.77	20195.00	82.00
19780.000	79.86	630.00	.02	1.05	.02	94.78	1243.04	20195.00	82.00
* 19840.000	77.51	279.00	.03	2.39	.03	99.89	247.16	20255.00	82.00
* 19840.000	77.82	368.00	.04	2.22	.04	99.35	377.27	20255.00	82.00
19840.000	79.86	630.00	.03	1.21	.03	92.94	1240.41	20255.00	82.00
* 19890.000	77.63	279.00	.01	.55	.01	99.67	506.43	20305.00	82.00
* 19890.000	77.92	368.00	.01	.66	.01	99.37	628.17	20305.00	82.00
* 19890.000	79.88	630.00	.01	.70	.01	95.71	1447.81	20305.00	82.00
20210.000	77.65	279.00	.00	.66	.00	99.99	261.34	20625.00	81.00
20210.000	77.94	368.00	.01	.78	.01	99.88	467.94	20625.00	81.00
20210.000	79.89	630.00	.01	.77	.01	95.66	1826.67	20625.00	81.00
* 21060.000	77.69	279.00	.00	.70	.00	100.00	59.63	21475.00	80.20
* 21060.000	78.00	368.00	.00	.88	.00	100.00	60.96	21475.00	80.20
21060.000	79.94	630.00	.00	1.16	.00	100.00	68.90	21475.00	80.20

SECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
21180.000	77.68	279.00	.00	1.56	.00	100.00	41.26	21575.00	79.00
21180.000	77.99	368.00	.00	1.91	.00	100.00	43.34	21575.00	79.00
21180.000	79.95	630.00	.03	1.40	.03	84.61	3150.00	21575.00	79.00
21260.000	79.03	279.00	.01	2.23	.01	99.47	3156.00	21655.00	79.00
21260.000	79.33	368.00	.04	1.91	.04	88.51	3156.00	21655.00	79.00
21260.000	80.09	630.00	.05	1.57	.05	72.04	3156.00	21655.00	79.00
21300.000	79.13	279.00	.01	.39	.01	80.55	3146.00	21695.00	77.40
21300.000	79.40	368.00	.01	.47	.01	78.43	3146.00	21695.00	77.40
21300.000	80.12	630.00	.02	.65	.02	73.98	3146.00	21695.00	77.40
21450.000	79.14	279.00	.01	.33	.00	91.46	2661.67	21845.00	77.40
21450.000	79.40	368.00	.01	.41	.01	90.01	2814.07	21845.00	77.40
21450.000	80.13	630.00	.02	.58	.01	86.17	3160.00	21845.00	77.40
22810.000	79.15	279.00	.01	.36	.01	96.77	1596.05	23205.00	80.00
22810.000	79.42	368.00	.01	.45	.01	95.96	1784.64	23205.00	80.00
22810.000	80.16	630.00	.01	.64	.01	93.33	2238.69	23205.00	80.00
22960.000	79.15	279.00	.01	.34	.01	89.96	1956.94	23355.00	77.20
22960.000	79.43	368.00	.01	.42	.01	88.77	1997.32	23355.00	77.20
22960.000	80.17	630.00	.02	.60	.01	85.92	2174.18	23355.00	77.20
[illegible]320.000	79.16	279.00	.01	.25	.01	82.25	3150.00	23715.00	78.00
0.000	79.43	368.00	.01	.31	.01	80.88	3150.00	23715.00	78.00
[illegible]320.000	80.18	630.00	.01	.45	.01	77.64	3150.00	23715.00	78.00
23520.000	79.16	279.00	.01	.28	.01	91.14	2087.32	23915.00	80.00
23520.000	79.43	368.00	.01	.34	.01	90.34	2214.30	23915.00	80.00
23520.000	80.18	630.00	.01	.51	.01	87.95	2601.34	23915.00	80.00
23680.000	79.16	279.00	.01	.25	.01	86.09	2184.34	24075.00	78.00
23680.000	79.43	368.00	.01	.31	.01	85.18	2213.80	24075.00	78.00
23680.000	80.18	630.00	.01	.47	.01	82.91	2354.62	24075.00	78.00
24080.000	79.16	279.00	.01	.33	.01	83.64	2125.11	24475.00	76.50
24080.000	79.44	368.00	.01	.41	.01	82.56	2174.13	24475.00	76.50
24080.000	80.19	630.00	.02	.59	.01	79.93	2357.20	24475.00	76.50
24380.000	79.16	279.00	.01	.28	.01	78.55	2851.09	24775.00	75.80
24380.000	79.44	368.00	.01	.35	.01	77.49	2949.45	24775.00	75.80
24380.000	80.20	630.00	.02	.50	.01	74.79	3150.00	24775.00	75.80
24680.000	79.17	279.00	.01	.30	.01	78.53	2833.46	25075.00	76.00
24680.000	79.44	368.00	.01	.37	.01	77.38	2937.26	25075.00	76.00
24680.000	80.20	630.00	.02	.53	.01	74.46	3146.00	25075.00	76.00
24830.000	79.17	279.00	.01	.35	.01	90.13	2521.40	25225.00	80.00
24830.000	79.44	368.00	.01	.43	.01	88.88	2729.24	25225.00	80.00
24830.000	80.20	630.00	.01	.61	.01	85.11	3146.00	25225.00	80.00

SECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
24960.000	79.17	279.00	.01	.28	.01	76.77	2862.56	25355.00	75.60
24960.000	79.45	368.00	.01	.34	.01	75.77	2957.20	25355.00	75.60
24960.000	80.21	630.00	.02	.50	.01	73.19	3146.00	25355.00	75.60
25060.000	79.17	267.00	.01	.25	.01	67.47	2900.99	25455.00	80.00
25060.000	79.45	351.00	.01	.31	.01	66.90	2984.47	25455.00	80.00
25060.000	80.21	600.00	.02	.45	.01	65.33	3150.00	25455.00	80.00
25120.000	79.17	267.00	.01	.25	.01	67.50	2908.22	25515.00	80.00
25120.000	79.45	351.00	.01	.31	.01	66.98	2992.06	25515.00	80.00
25120.000	80.22	600.00	.02	.44	.01	65.51	3156.00	25515.00	80.00
25220.000	79.17	267.00	.01	.22	.01	61.14	3140.00	25615.00	75.00
25220.000	79.45	351.00	.01	.27	.01	60.59	3140.00	25615.00	75.00
25220.000	80.22	600.00	.02	.40	.02	59.34	3140.00	25615.00	75.00
25550.000	79.17	267.00	.01	.26	.01	72.92	2333.09	25845.00	75.00
25550.000	79.45	351.00	.01	.33	.01	72.31	2379.56	25845.00	75.00
25550.000	80.22	600.00	.02	.48	.01	70.76	2618.68	25845.00	75.00
26560.000	79.19	267.00	.00	.63	.00	100.00	79.89	26855.00	79.20
26560.000	79.50	351.00	.01	.73	.01	98.16	3160.00	26855.00	79.20
* 26560.000	80.28	600.00	.02	.91	.02	90.40	3160.00	26855.00	79.20
70.000	79.19	267.00	.00	1.62	.00	100.00	35.03	26965.00	82.00
0.000	79.50	351.00	.00	2.00	.00	100.00	36.70	26965.00	82.00
* 26670.000	80.25	600.00	.00	2.93	.00	100.00	40.68	26965.00	82.00
26725.000	80.93	267.00	.00	2.16	.00	100.00	10.00	27020.00	82.00
* 26725.000	82.06	351.00	.02	2.42	.02	98.96	3156.00	27020.00	82.00
26725.000	82.68	600.00	.06	2.01	.06	80.39	3156.00	27020.00	82.00
26780.000	81.02	267.00	.00	.58	.00	100.00	74.25	27075.00	82.00
* 26780.000	82.18	351.00	.00	.62	.00	99.43	3160.00	27075.00	82.00
26780.000	82.74	600.00	.01	.88	.01	95.30	3160.00	27075.00	82.00
27180.000	81.03	267.00	.00	.64	.00	100.00	68.97	27475.00	83.00
27180.000	82.19	351.00	.00	.70	.00	100.00	75.41	27475.00	83.00
27180.000	82.77	600.00	.00	1.10	.00	100.00	78.70	27475.00	83.00
27310.000	81.04	267.00	.00	.88	.00	100.00	48.09	27605.00	83.20
27310.000	82.19	351.00	.00	.97	.00	100.00	52.33	27605.00	83.20
27310.000	82.77	600.00	.00	1.53	.00	100.00	54.46	27605.00	83.20
27520.000	81.05	267.00	.00	.67	.00	100.00	67.86	27815.00	83.20
27520.000	82.21	351.00	.00	.73	.00	100.00	74.37	27815.00	83.20
27520.000	82.81	600.00	.00	1.14	.00	100.00	77.75	27815.00	83.20
27720.000	81.06	267.00	.00	.69	.00	100.00	66.86	28015.00	83.40
27720.000	82.21	351.00	.00	.75	.00	100.00	73.36	28015.00	83.40
27720.000	82.82	600.00	.00	1.16	.00	100.00	76.79	28015.00	83.40

	XSNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
*	28140.000	81.07	127.00	.00	.46	.00	100.00	46.79	28435.00	83.50
*	28140.000	82.23	157.00	.00	.47	.00	100.00	51.18	28435.00	83.50
*	28140.000	82.86	228.00	.00	.62	.00	100.00	53.57	28435.00	83.50
	28460.000	81.08	127.00	.00	.36	.00	100.00	66.08	28755.00	83.40
	28460.000	82.23	157.00	.00	.36	.00	100.00	73.03	28755.00	83.40
	28460.000	82.87	228.00	.00	.47	.00	100.00	76.85	28755.00	83.40
*	28960.000	81.08	127.00	.00	.51	.00	100.00	46.14	29255.00	83.50
*	28960.000	82.24	157.00	.00	.51	.00	100.00	50.86	29255.00	83.50
*	28960.000	82.87	228.00	.00	.67	.00	100.00	53.45	29255.00	83.50
	29500.000	81.10	127.00	.00	.61	.00	100.00	39.64	29795.00	84.00
	29500.000	82.25	157.00	.00	.62	.00	100.00	43.76	29795.00	84.00
	29500.000	82.89	228.00	.00	.80	.00	100.00	46.04	29795.00	84.00
	30250.000	81.12	75.00	.00	.39	.00	100.00	40.15	30545.00	83.60
	30250.000	82.27	89.00	.00	.37	.00	100.00	44.72	30545.00	83.60
	30250.000	82.92	115.00	.00	.43	.00	100.00	47.32	30545.00	83.60

```
*****************************************
*  HEC-2 WATER SURFACE PROFILES         *
*                                       *
*     sion   4.6.2;  May 1991           *
*                                       *
*  RUN DATE    08AUG95    TIME   08:09:18 *
*****************************************
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*************************************
*  U.S. ARMY CORPS OF ENGINEERS     *
*  HYDROLOGIC ENGINEERING CENTER    *
*  609 SECOND STREET, SUITE D       *
*  DAVIS, CALIFORNIA 95616-4687     *
*          (916) 756-1104           *
*************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX  XXXXX               XXXXXXX
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THIS RUN EXECUTED 08AUG95 08:09:18

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**********************************
 EC-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
**********************************


  ********************************************************************************
 *CITY OF DONNA                                                                   *
  CHANNEL "B"                                                                     *
  EXISTING CONDITIONS                                                             *
  FILENAME:  CHB_100.IH2                                                          *
 *ODEL STARTS UPSTREAM OF THE LEVEE PUMP STRUCTURE AND PROCEEDS UPSTREAM TO       *
  TO THE CONFLUENCE OF CHANNEL "B" AND CHANNEL "C".  THE MODEL THEN PROCEEDS      *
  UP CHANNEL "B".                                                                 *
                                                                                  *
                                                                                  *
  ********************************************************************************
  ASSUMED BW=15 & SS=2:1 D/S OF BRIDGE # 2, ASSUMED BW=10 & SS=2:1 U/S OF #2      *
 *********************************************************************************
                                                                                  *
                                                                                  *
  ********************************************************************************
       RUST JOB NO:  67787     CITY OF DONNA DRAINAGE STUDY
       5-YEAR  24 HOUR FLOWS   EXISTING MODEL  CHANNEL "B"
T3     FILENAME:  CHB_100.IH2                              CSG        04/17/95

       FLOWS FROM DONNA_S1.HC1


   ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

    -10        2                          .0004                                   60

   NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1                  -1


J3 VARIABLE CODES FOR SUMMARY PRINTOUT

    38         1         43        55        26        56        60        4         66        63

J5 LPRNT    NUMSEC                    ********REQUESTED SECTION NUMBERS********

   -10       -10

J6 IHLEQ     ICOPY     SUBDIV    STRTDS    RMILE

     1


          5-YR   10-YR  100-YR
```

CONFLUENCE W/CHANNEL "A"

5-YR 10-YR 100-YR

SPECIAL CULVERT BRIDGE NUM 1
CULVERT SIZE: 1-60" & 1-48" MODELED AS 2-54" CMP

PECIAL CULVERT BRIDGE NUM 2
ULVERT SIZE: 1-60" CMP

5-YR 10-YR 100-YR

M 493
PECIAL CULVERT BRIDGE NUM 3
ULVERT SIZE: 1-60" CMP

ONFLUENCE OF CHANNEL "B" AND "C"

5-YR 10-YR 100-YR

SPECIAL CULVERT BRIDGE NUM 4
CULVERT SIZE: 1-48" CMP

PECIAL CULVERT BRIDGE NUM 5
CULVERT SIZE: 1-2'x3' RCB

LAST CROSS SECTION OF CHANNEL "B"

LEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF OFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

T1 RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
1 10-YEAR 24 HOUR FLOWS EXISTING MODEL CHANNEL "B"
1 FILENAME: CHB_100.IH2 CSG 04/03/95

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10	3			.0004				62	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2		-1							

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

T RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
T 100-YEAR 24 HOUR FLOWS EXISTING MODEL CHANNEL "B"
T FILENAME: CHB_100.IH2 CSG 04/03/95

J	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10	4			.0004				66	

J	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15		-1							

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

THIS RUN EXECUTED 08AUG95 08:09:21

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE-- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

FILENAME: CHB_100.IH2

SUMMARY PRINTOUT

	SECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
	100.000	68.53	1142.00	.03	1.80	.03	96.32	1781.88	.00	70.00
	100.000	69.16	1515.00	.04	2.00	.04	93.66	2366.14	.00	70.00
	100.000	70.57	2599.00	.06	2.41	.06	86.09	3156.00	.00	70.00
	1000.000	68.89	1142.00	.03	1.80	.03	96.09	1965.06	900.00	75.00
	1000.000	69.52	1515.00	.04	1.99	.04	93.12	2639.39	900.00	75.00
	1000.000	70.93	2599.00	.06	2.36	.05	84.44	3677.95	900.00	75.00
	1500.000	69.03	741.00	.02	1.12	.02	95.46	2113.89	1400.00	75.00
	1500.000	69.66	978.00	.02	1.24	.02	92.36	2794.23	1400.00	75.00
	1500.000	71.08	1672.00	.04	1.47	.03	83.49	3763.33	1400.00	75.00
	2000.000	69.12	741.00	.02	1.30	.02	97.84	1830.85	1900.00	75.00
	2000.000	69.75	978.00	.02	1.41	.02	94.74	2779.43	1900.00	75.00
	2000.000	71.16	1672.00	.04	1.60	.04	84.64	3810.11	1900.00	75.00
	3000.000	69.39	741.00	.01	1.45	.01	99.81	852.03	2900.00	75.00
	3000.000	70.01	978.00	.02	1.58	.02	98.29	1917.12	2900.00	75.00
	3000.000	71.39	1672.00	.03	1.82	.04	90.98	2787.95	2900.00	75.00
*	4000.000	69.52	741.00	.02	.86	.02	93.56	1755.63	3900.00	75.00
*	4000.000	70.15	978.00	.02	.99	.02	91.68	2058.77	3900.00	75.00
*	4000.000	71.55	1672.00	.03	1.31	.03	87.05	2695.83	3900.00	75.00
	5000.000	69.59	741.00	.02	.95	.02	96.99	1126.82	4900.00	75.00
	5000.000	70.23	978.00	.02	1.09	.02	95.65	1365.57	4900.00	75.00
	5000.000	71.65	1672.00	.03	1.43	.03	92.41	1900.13	4900.00	75.00
	5650.000	69.64	741.00	.02	.94	.02	97.48	954.11	5550.00	75.00
	5650.000	70.28	978.00	.02	1.09	.02	96.36	1148.86	5550.00	75.00
	5650.000	71.73	1672.00	.03	1.44	.03	93.65	1585.03	5550.00	75.00

	SECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
	5700.000	69.64	741.00	.03	1.52	.03	97.24	831.47	5600.00	74.00
*	5700.000	70.28	978.00	.04	1.63	.04	95.64	1066.39	5600.00	74.00
	5700.000	71.73	1672.00	.05	1.91	.05	91.88	1592.78	5600.00	74.00
	5780.000	69.63	741.00	.03	1.83	.03	97.81	810.06	5680.00	74.00
	5780.000	70.27	978.00	.03	1.90	.03	96.72	1035.93	5680.00	74.00
	5780.000	71.71	1672.00	.04	2.17	.04	94.20	1547.67	5680.00	74.00
*	5830.000	69.69	741.00	.02	1.08	.02	98.51	942.54	5730.00	74.00
	5830.000	70.32	978.00	.02	1.23	.02	97.27	1236.70	5730.00	74.00
	5830.000	71.76	1672.00	.03	1.56	.03	93.80	1906.09	5730.00	74.00
	6000.000	69.71	741.00	.02	1.07	.02	98.34	1017.45	5900.00	75.00
	6000.000	70.34	978.00	.02	1.21	.02	96.99	1335.69	5900.00	75.00
	6000.000	71.79	1672.00	.03	1.54	.03	93.27	2055.24	5900.00	75.00
	7000.000	69.82	741.00	.02	.97	.02	95.11	1463.78	6900.00	75.00
	7000.000	70.46	978.00	.02	1.11	.02	93.28	1762.80	6900.00	75.00
	7000.000	71.93	1672.00	.03	1.42	.03	89.00	2443.50	6900.00	75.00
	8000.000	69.94	741.00	.00	1.85	.00	100.00	59.72	7900.00	75.00
*	8000.000	70.75	978.00	.02	1.85	.02	99.36	1001.44	7900.00	75.00
*	8000.000	72.17	1672.00	.04	2.09	.04	94.17	2536.05	7900.00	75.00
	8950.000	70.25	741.00	.02	1.54	.02	97.38	1460.95	8850.00	75.00
	0.000	71.12	978.00	.03	1.52	.03	93.04	2340.79	8850.00	75.00
	8950.000	72.49	1672.00	.04	1.75	.04	84.58	3410.38	8850.00	75.00
*	9000.000	70.28	741.00	.05	2.36	.05	94.10	1480.80	8900.00	75.00
*	9000.000	71.13	978.00	.05	2.04	.05	87.52	2350.53	8900.00	75.00
*	9000.000	72.51	1672.00	.06	2.09	.05	77.29	3418.42	8900.00	75.00
	9080.000	70.26	741.00	.04	2.61	.04	94.09	2039.29	8980.00	74.00
*	9080.000	71.12	978.00	.04	2.20	.04	87.90	3289.26	8980.00	74.00
*	9080.000	72.50	1672.00	.04	2.21	.04	77.86	4911.21	8980.00	74.00
	9130.000	70.37	741.00	.03	1.66	.03	95.52	1857.93	9030.00	74.00
	9130.000	71.18	978.00	.03	1.62	.03	89.99	2859.38	9030.00	74.00
	9130.000	72.54	1672.00	.04	1.80	.05	79.30	4551.14	9030.00	74.00
*	10000.000	70.64	741.00	.03	1.26	.03	90.93	2206.38	9900.00	75.00
	10000.000	71.39	978.00	.03	1.32	.03	86.36	2725.92	9900.00	75.00
	10000.000	72.74	1672.00	.04	1.59	.05	78.91	3453.50	9900.00	75.00
	11000.000	70.89	741.00	.03	1.46	.03	94.16	2077.54	10900.00	75.00
	11000.000	71.60	978.00	.03	1.50	.03	89.08	2499.32	10900.00	75.00
	11000.000	72.94	1672.00	.04	1.75	.05	81.13	3152.12	10900.00	75.00
*	12000.000	71.08	741.00	.02	1.07	.02	88.85	2308.85	11900.00	75.00
*	12000.000	71.78	978.00	.03	1.17	.03	84.92	2536.78	11900.00	75.00
	12000.000	73.13	1672.00	.04	1.47	.04	78.95	2978.01	11900.00	75.00

SECNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
12250.000	71.11	741.00	.02	1.06	.02	88.67	2318.66	12150.00	75.00
12250.000	71.81	978.00	.03	1.16	.03	84.73	2549.33	12150.00	75.00
12250.000	73.16	1672.00	.04	1.45	.04	78.79	2991.30	12150.00	75.00
12300.000	71.12	706.00	.03	1.04	.03	84.46	2363.62	12200.00	75.00
12300.000	71.81	939.00	.03	1.13	.03	80.61	2583.33	12200.00	75.00
12300.000	73.17	1617.00	.04	1.41	.05	74.96	3010.97	12200.00	75.00
12400.000	71.11	706.00	.02	1.27	.02	89.81	2316.59	12300.00	75.00
12400.000	71.81	939.00	.02	1.37	.03	86.82	2544.13	12300.00	75.00
12400.000	73.16	1617.00	.03	1.70	.04	82.42	2986.37	12300.00	75.00
12450.000	71.14	366.00	.01	.39	.01	63.49	3317.30	12350.00	68.00
12450.000	71.84	480.00	.02	.42	.02	61.33	3357.25	12350.00	68.00
12450.000	73.20	807.00	.02	.53	.02	58.50	3435.35	12350.00	68.00
13000.000	71.17	366.00	.02	.77	.02	79.50	3818.10	12900.00	75.00
13000.000	71.86	480.00	.02	.72	.02	71.55	4222.42	12900.00	75.00
13000.000	73.22	807.00	.02	.75	.03	62.29	5013.37	12900.00	75.00
14000.000	71.49	366.00	.02	1.28	.02	90.15	3505.20	13900.00	75.00
14000.000	72.04	480.00	.03	1.14	.03	79.34	3919.53	13900.00	75.00
14000.000	73.31	807.00	.03	1.03	.03	65.33	4875.19	13900.00	75.00
14150.000	71.57	366.00	.02	1.20	.02	88.32	3560.64	14050.00	75.00
14150.000	72.09	480.00	.03	1.11	.03	78.74	3938.31	14050.00	75.00
14150.000	73.33	807.00	.03	1.02	.03	65.27	4864.12	14050.00	75.00
14200.000	71.53	366.00	.00	3.81	.00	100.00	30.76	14100.00	75.00
14200.000	72.01	480.00	.00	4.27	.00	100.00	37.26	14100.00	75.00
14200.000	73.32	807.00	.07	3.10	.07	85.44	3743.21	14100.00	75.00
14270.000	73.57	366.00	.03	1.73	.03	84.65	3846.99	14170.00	75.00
14270.000	73.77	480.00	.03	1.86	.03	80.84	4091.89	14170.00	75.00
14270.000	74.24	807.00	.04	2.16	.04	74.56	4664.12	14170.00	75.00
14320.000	73.62	366.00	.01	1.15	.01	99.20	3333.66	14220.00	75.00
14320.000	73.82	480.00	.02	1.34	.02	96.53	3633.73	14220.00	75.00
14320.000	74.29	807.00	.03	1.72	.03	88.80	4336.35	14220.00	75.00
15000.000	73.83	366.00	.02	1.00	.02	89.37	3645.20	14900.00	78.00
15000.000	74.07	480.00	.02	1.14	.02	85.18	3831.48	14900.00	78.00
15000.000	74.60	807.00	.04	1.43	.04	77.42	4254.14	14900.00	78.00
15150.000	73.86	366.00	.02	.69	.02	75.93	4105.87	15050.00	78.00
15150.000	74.10	480.00	.02	.81	.02	73.20	4268.81	15050.00	78.00
15150.000	74.65	807.00	.03	1.08	.03	68.05	4652.14	15050.00	78.00
15200.000	73.87	366.00	.02	.61	.02	60.10	4356.83	15100.00	80.00
15200.000	74.11	480.00	.03	.72	.03	58.44	4514.45	15100.00	80.00
15200.000	74.66	807.00	.03	.96	.04	55.44	4871.59	15100.00	80.00

:CNO	CWSEL	Q	VLOB	VCH	VROB	QCHP	TOPWID	CUMDS	TELMX
* 15270.000	73.87	366.00	.01	.88	.01	79.83	4360.91	15170.00	80.00
* 15270.000	74.11	480.00	.01	1.04	.01	78.93	4516.06	15170.00	80.00
* 15270.000	74.66	807.00	.02	1.42	.02	77.23	4866.54	15170.00	80.00
* 15320.000	73.88	366.00	.02	.58	.02	67.75	4356.31	15220.00	78.00
* 15320.000	74.12	480.00	.02	.68	.02	65.66	4517.06	15220.00	78.00
* 15320.000	74.68	807.00	.03	.93	.03	61.87	4875.83	15220.00	78.00
* 16000.000	73.96	366.00	.02	.91	.02	81.00	3613.07	15900.00	78.00
* 16000.000	74.22	480.00	.03	1.03	.03	77.18	3738.98	15900.00	78.00
* 16000.000	74.80	807.00	.04	1.29	.04	70.67	4025.15	15900.00	78.00
* 17000.000	74.31	366.00	.02	1.26	.02	89.91	3222.17	16900.00	80.00
* 17000.000	74.58	480.00	.03	1.36	.03	84.69	3264.39	16900.00	80.00
17000.000	75.18	807.00	.05	1.60	.05	76.01	3361.72	16900.00	80.00
* 18000.000	74.62	366.00	.03	.91	.03	75.95	3291.59	17900.00	80.00
* 18000.000	74.90	480.00	.03	1.01	.03	72.56	3329.80	17900.00	80.00
* 18000.000	75.53	807.00	.04	1.26	.04	67.12	3417.42	17900.00	80.00

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*****************************************
  HEC-2 WATER SURFACE PROFILES            *
                                          *
*  sion   4.6.2;  May 1991                *
                                          *
  RUN DATE    08AUG95    TIME   08:09:37  *
*****************************************
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*           (916) 756-1104              *
*****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X         XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
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THIS RUN EXECUTED 08AUG95 08:09:37

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**********************************
 3C-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
**********************************


  ********************************************************************************
 CITY OF DONNA                                                                  *
  CHANNEL "C"                                                                   *
  EXISTING CONDITIONS                                                           *
  FILENAME:  CHC_100.IH2                                                        *
 THE MODEL STARTS AT THE CONFLUENCE OF CHANNEL "B" AND CHANNEL "C" AND          *
  PROCEEDS UP CHANNEL "C".                                                      *
  ********************************************
 *******       ASSUMED BW=10 AND S:S=2:1
  ****************************************

  ********************************************************************************
       RUST JOB NO:  67787     CITY OF DONNA DRAINAGE STUDY
       5 -YEAR 24 HOUR FLOWS   EXISTING MODEL  CHANNEL "C"
T3     FILENAME:  CHC_100.IH2                              CSG        04/17/95

   ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

    -10        2                             0                                  71.16

   NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1                  -1


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    38         1         43        23        24        56        60        4         66        63

J5  LPRNT    NUMSEC                    ********REQUESTED SECTION NUMBERS********

    -10       -10

J6  IHLEQ     ICOPY     SUBDIV    STRTDS    RMILE

     1


  CONFLUENCE OF CHANNEL "B" AND "C"
           5-YR   10-YR  100-YR


           5-YR   10-YR  100-YR
```

5-YR 10-YR 100-YR

****

11TH STREET
ULVERT SIZE: MULTIPLE BOXES WITH A 36" UNDERNEATH
ODEL WITH NORMAL BRIDGE ROUTINE

****

DOWNSTREAM NORMAL BRIDGE SECTION (2)

UPSTREAM NORMAL BRIDGE SECTION (3)

LAST CROSS SECTION OF CHANNEL "C"

ANNEL C-2: NO PROFILES EXIST FOR THIS CHANNEL THEREFORE MODELED
WITH PICTURES AND FIELD NOTES.

5-YR 10-YR 100-YR

5-YR 10-YR 100-YR

SPECIAL CULVERT CHANNEL C-2
CULVERT SIZE: 1-24" RCP
ROSSING UNDER ELEVATED IRRIGATION DITCH

CONFLUENCE OF THE CHANNEL "C2a" AND "C-2b"
PROCEED UP CHANNEL "C2a" WHICH IS ON THE EAST CHANNEL IN THE "U".
LEVATED IRRIGATION DITCH TO THE SOUTH

ROUTED FLOWS FROM SUB_C1

ELEVATED IRRIGATION DITCH TO THE SOUTH

LEVATED IRRIGATION DITCH TO THE SOUTH

PECIAL CULVERT CHANNEL C-2a
ULVERT SIZE: 1-48" RCP CULVERT FLOWLINE 1' HIGHER THAN CHANNEL FLOWLINE

BOTTOM WIDTH = 6 FEET

PECIAL CULVERT CHANNEL C-2a
BOTTOM WIDTH = 6 FEET
ULVERT SIZE: 1-48" RCP

BOTTOM WIDTH = 6 FEET

OTTOM WIDTH = 6 FEET

BOTTOM WIDTH = 6 FEET

OTTOM WIDITH = 4 FEET

CONFLUENCE OF THE CHANNEL "C2a" AND "C-2b"
ROCEED UP CHANNEL "C2b" WHICH IS ON THE WEST CHANNEL IN THE "U".

ELEVATED IRRIGATION DITCH TO THE SOUTH

ATED IRRIGATION DITCH TO THE WEST
M WIDTH = 6 FEET

LEVATED IRRIGATION DITCH TO THE WEST
OTTOM WIDTH = 6 FEET

ELEVATED IRRIGATION DITCH TO THE WEST
OTTOM WIDTH = 6 FEET

BOTTOM WIDTH = 6 FEET

PECIAL CULVERT CHANNEL C-2b
OTTOM WIDTH = 6 FEET
CULVERT SIZE: 1-36" RCP

OTTOM WIDTH = 6 FEET

BOTTOM WIDTH = 6 FEET

I EQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF P..FILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

T RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
T 10 -YEAR24 HOUR FLOWS EXISTING MODEL CHANNEL "C"
T FILENAME: CHC_100.IH2 CSG 04/03/95

ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
-10	3			0				71.86	

NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
.2		-1							

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF
P FILE TYPE, WHICH CAN VARY FROM REACH.TO REACH. SEE DOCUMENTATION FOR
D AILS.

T RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
100-YEAR 24 HOUR FLOWS EXISTING MODEL CHANNEL "C"
FILENAME: CHC_100.IH2 CSG 04/03/95

ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
-10	4			0				73.24	

NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
15		-1							

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF
F FILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR
D AILS.

THIS RUN EXECUTED 08AUG95 08:09:40

****
EC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

FILENAME: CHC_100.IH2

SUMMARY PRINTOUT

SECNO	CWSEL	Q	XLBEL	RBEL	VROB	QCHP	TOPWID	CUMDS	TELMX
1000.000	71.16	466.00	71.20	71.20	.00	100.00	63.84	.00	75.00
1000.000	71.86	618.00	71.20	71.20	.01	94.80	3683.32	.00	75.00
1000.000	73.24	1057.00	71.20	71.20	.02	81.40	4769.16	.00	75.00
2000.000	71.24	466.00	70.50	70.50	.01	94.22	3469.98	1000.00	75.00
* 2000.000	71.96	618.00	70.50	70.50	.02	87.17	3776.57	1000.00	75.00
2000.000	73.32	1057.00	70.50	70.50	.02	77.26	4349.13	1000.00	75.00
3000.000	71.30	411.00	70.50	70.50	.01	93.91	3540.73	2000.00	75.00
3000.000	72.01	546.00	70.50	70.50	.01	87.45	3868.18	2000.00	75.00
3000.000	73.37	938.00	70.50	70.50	.02	77.77	4500.09	2000.00	75.00
4000.000	71.34	411.00	70.20	70.20	.01	91.52	3521.62	3000.00	75.00
4000.000	72.05	546.00	70.20	70.20	.01	85.84	3744.06	3000.00	75.00
4000.000	73.41	938.00	70.20	70.20	.02	77.66	4166.00	3000.00	75.00
4250.000	71.35	411.00	70.70	70.70	.01	96.22	3243.95	3250.00	75.00
4250.000	72.05	546.00	70.70	70.70	.01	90.66	3324.45	3250.00	75.00
4250.000	73.42	938.00	70.70	70.70	.02	82.09	3479.61	3250.00	75.00
4300.000	71.35	411.00	70.80	70.80	.01	96.00	3230.81	3300.00	75.00
4300.000	72.05	546.00	70.80	70.80	.02	89.18	3314.26	3300.00	75.00
4300.000	73.42	938.00	70.80	70.80	.02	79.42	3475.09	3300.00	75.00
4370.000	71.35	411.00	70.80	70.80	.01	96.05	3227.76	3370.00	75.00
4370.000	72.06	546.00	70.80	70.80	.02	89.33	3311.81	3370.00	75.00
4370.000	73.42	938.00	70.80	70.80	.02	79.63	3473.92	3370.00	75.00
4420.000	71.36	411.00	70.80	70.80	.01	95.77	3226.40	3420.00	75.00
4420.000	72.06	546.00	70.80	70.80	.02	88.81	3310.31	3420.00	75.00
4420.000	73.42	938.00	70.80	70.80	.02	78.96	3472.34	3420.00	75.00

	ECNO	CWSEL	Q	XLBEL	RBEL	VROB	QCHP	TOPWID	CUMDS	TELMX
	5000.000	71.40	411.00	70.60	70.60	.01	93.69	3344.98	4000.00	75.00
	5000.000	72.10	546.00	70.60	70.60	.01	87.35	3501.53	4000.00	75.00
	5000.000	73.46	938.00	70.60	70.60	.02	78.22	3806.86	4000.00	75.00
*	6000.000	71.43	411.00	68.80	68.80	.01	70.31	3526.13	5000.00	75.00
*	6000.000	72.13	546.00	68.80	68.80	.02	67.08	3626.01	5000.00	75.00
	6000.000	73.49	938.00	68.80	68.80	.02	62.79	3822.58	5000.00	75.00
	6250.000	71.44	411.00	68.80	68.80	.02	66.36	3527.51	5250.00	75.00
	6250.000	72.14	546.00	68.80	68.80	.02	62.18	3627.25	5250.00	75.00
	6250.000	73.50	938.00	68.80	68.80	.03	56.59	3822.67	5250.00	75.00
*	6260.000	71.43	337.00	68.80	68.13	.04	63.46	1383.22	5260.00	75.00
*	6260.000	72.13	449.00	68.80	68.13	.05	56.23	1484.21	5260.00	75.00
*	6260.000	73.49	775.00	68.80	68.13	.07	45.88	1681.10	5260.00	75.00
	6300.000	71.45	337.00	68.80	68.80	.05	53.05	1398.37	5300.00	75.00
	6300.000	72.14	449.00	68.80	68.80	.06	45.94	1499.52	5300.00	75.00
	6300.000	73.51	775.00	68.80	68.80	.08	36.46	1699.07	5300.00	75.00
	6370.000	71.44	337.00	68.80	68.80	.06	40.08	1400.25	5370.00	75.00
	6370.000	72.14	449.00	68.80	68.80	.06	39.42	1499.51	5370.00	75.00
	6370.000	73.49	775.00	68.80	68.80	.07	38.18	1696.22	5370.00	75.00
*	6380.000	71.49	337.00	68.80	68.80	.02	78.80	1389.81	5380.00	75.00
*	0.000	72.17	449.00	68.80	68.80	.03	73.50	1489.38	5380.00	75.00
*	80.000	73.52	775.00	68.80	68.80	.04	64.79	1685.67	5380.00	75.00
*	6420.000	71.54	337.00	68.80	68.80	.01	67.34	3408.96	5420.00	75.00
*	6420.000	72.24	449.00	68.80	68.80	.01	64.52	3476.63	5420.00	75.00
*	6420.000	73.63	775.00	68.80	68.80	.02	60.81	3611.28	5420.00	75.00
	7000.000	71.55	337.00	68.90	68.90	.01	68.48	3402.63	6000.00	75.00
	7000.000	72.25	449.00	68.90	68.90	.01	65.51	3470.42	6000.00	75.00
	7000.000	73.64	775.00	68.90	68.90	.02	61.64	3604.37	6000.00	75.00
	8000.000	71.57	337.00	69.50	69.50	.01	72.19	3329.89	7000.00	75.00
	8000.000	72.27	449.00	69.50	69.50	.02	68.18	3392.10	7000.00	75.00
	8000.000	73.66	775.00	69.50	69.50	.02	63.25	3516.37	7000.00	75.00
	9000.000	71.60	337.00	69.20	69.20	.01	67.75	3193.19	8000.00	75.00
	9000.000	72.29	449.00	69.20	69.20	.02	64.73	3208.04	8000.00	75.00
	9000.000	73.69	775.00	69.20	69.20	.02	61.02	3237.85	8000.00	75.00
*	10000.000	71.63	268.00	70.00	70.00	.02	69.68	3453.39	9000.00	75.00
*	10000.000	72.32	357.00	70.00	70.00	.02	64.69	3587.97	9000.00	75.00
	10000.000	73.71	621.00	70.00	70.00	.02	59.00	3859.88	9000.00	75.00
*	11000.000	71.84	268.00	73.00	73.00	.00	100.00	35.36	10000.00	80.00
*	11000.000	72.54	357.00	73.00	73.00	.00	100.00	38.15	10000.00	80.00
*	11000.000	74.00	621.00	73.00	73.00	.04	80.50	3549.44	10000.00	80.00

SECNO	CWSEL	Q	XLBEL	RBEL	VROB	QCHP	TOPWID	CUMDS	TELMX
12000.000	72.44	268.00	77.00	77.00	.00	100.00	31.75	11000.00	80.00
12000.000	73.19	357.00	77.00	77.00	.00	100.00	34.72	11000.00	80.00
12000.000	74.70	621.00	77.00	77.00	.00	100.00	40.78	11000.00	80.00
13000.000	73.44	212.00	80.00	80.00	.00	100.00	27.71	12000.00	80.00
13000.000	74.17	281.00	80.00	80.00	.00	100.00	30.64	12000.00	80.00
13000.000	75.76	484.00	80.00	80.00	.00	100.00	37.03	12000.00	80.00
14000.000	75.19	212.00	82.00	82.00	.00	100.00	24.78	13000.00	82.00
14000.000	75.82	281.00	82.00	82.00	.00	100.00	27.28	13000.00	82.00
14000.000	77.28	484.00	82.00	82.00	.00	100.00	33.09	13000.00	82.00
15000.000	77.39	212.00	83.50	83.50	.00	100.00	25.58	14000.00	83.50
15000.000	77.97	281.00	83.50	83.50	.00	100.00	27.91	14000.00	83.50
15000.000	79.33	484.00	83.50	83.50	.00	100.00	33.30	14000.00	83.50
16000.000	79.15	212.00	85.00	85.00	.00	100.00	26.58	15000.00	85.00
16000.000	79.75	281.00	85.00	85.00	.00	100.00	29.00	15000.00	85.00
16000.000	81.15	484.00	85.00	85.00	.00	100.00	34.61	15000.00	85.00
16500.000	79.86	212.00	85.50	85.50	.00	100.00	27.43	15500.00	85.50
16500.000	80.48	281.00	85.50	85.50	.00	100.00	29.92	15500.00	85.50
16500.000	81.91	484.00	85.50	85.50	.00	100.00	35.64	15500.00	85.50
16950.000	80.66	212.00	86.00	86.00	.00	100.00	24.63	15950.00	86.00
16950.000	81.26	281.00	86.00	86.00	.00	100.00	27.05	15950.00	86.00
16950.000	82.66	484.00	86.00	86.00	.00	100.00	32.65	15950.00	86.00
17000.000	80.63	212.00	86.20	86.20	.00	100.00	10.00	16000.00	86.20
17000.000	81.13	281.00	86.20	86.20	.00	100.00	10.00	16000.00	86.20
17000.000	82.14	484.00	86.20	86.20	.00	100.00	10.00	16000.00	86.20
17200.000	100.54	212.00	100.00	100.00	.01	93.37	3146.00	16200.00	86.70
17200.000	100.67	281.00	100.00	100.00	.01	91.55	3146.00	16200.00	86.70
17200.000	101.00	484.00	100.00	100.00	.02	87.64	3146.00	16200.00	86.70
17250.000	100.55	152.00	100.00	86.90	.00	71.48	1673.00	16250.00	86.90
17250.000	100.68	200.00	100.00	86.90	.00	71.44	1673.00	16250.00	86.90
17250.000	101.02	340.00	100.00	86.90	.00	71.35	1673.00	16250.00	86.90
18000.000	100.55	152.00	100.00	87.00	.00	70.35	1671.00	17000.00	87.00
18000.000	100.68	200.00	100.00	87.00	.00	70.32	1671.00	17000.00	87.00
18000.000	101.02	340.00	100.00	87.00	.00	70.24	1671.00	17000.00	87.00
18450.000	100.55	152.00	100.00	87.50	.00	69.92	1670.00	17450.00	87.50
18450.000	100.68	200.00	100.00	87.50	.00	69.89	1670.00	17450.00	87.50
18450.000	101.02	340.00	100.00	87.50	.01	69.81	1670.00	17450.00	87.50
18500.000	100.55	75.00	87.50	87.50	.00	52.14	3140.00	17500.00	87.50
18500.000	100.68	90.00	87.50	87.50	.00	52.12	3140.00	17500.00	87.50
18500.000	101.02	126.00	87.50	87.50	.00	52.08	3140.00	17500.00	87.50

	ECNO	CWSEL	Q	XLBEL	RBEL	VROB	QCHP	TOPWID	CUMDS	TELMX
*	18550.000	100.55	75.00	87.50	87.50	.00	76.45	3140.00	17550.00	87.50
*	18550.000	100.69	90.00	87.50	87.50	.00	76.44	3140.00	17550.00	87.50
*	18550.000	101.02	126.00	87.50	87.50	.00	76.42	3140.00	17550.00	87.50
*	18650.000	100.55	75.00	87.50	87.50	.00	50.41	3134.00	17650.00	87.50
*	18650.000	100.69	90.00	87.50	87.50	.00	50.40	3134.00	17650.00	87.50
*	18650.000	101.02	126.00	87.50	87.50	.00	50.37	3134.00	17650.00	87.50
*	18700.000	100.55	75.00	87.50	87.50	.00	75.18	3134.00	17700.00	87.50
*	18700.000	100.69	90.00	87.50	87.50	.00	75.18	3134.00	17700.00	87.50
*	18700.000	101.03	126.00	87.50	87.50	.00	75.16	3134.00	17700.00	87.50
*	18750.000	100.55	75.00	87.50	87.50	.00	53.03	3134.00	17950.00	87.50
*	18750.000	100.69	90.00	87.50	87.50	.00	53.00	3134.00	17950.00	87.50
*	18750.000	101.03	126.00	87.50	87.50	.00	52.93	3134.00	17950.00	87.50
	19000.000	100.55	29.00	88.00	88.00	.00	51.82	3130.00	18200.00	88.00
	19000.000	100.69	32.00	88.00	88.00	.00	51.79	3130.00	18200.00	88.00
	19000.000	101.03	38.00	88.00	88.00	.00	51.73	3130.00	18200.00	88.00
	20000.000	100.55	29.00	88.00	88.00	.00	50.47	3126.00	19200.00	88.00
	20000.000	100.69	32.00	88.00	88.00	.00	50.45	3126.00	19200.00	88.00
	20000.000	101.03	38.00	88.00	88.00	.00	50.40	3126.00	19200.00	88.00
	22000.000	100.55	29.00	90.00	90.00	.00	47.44	3116.00	21200.00	90.00
	0.000	100.69	32.00	90.00	90.00	.00	47.43	3116.00	21200.00	90.00
	00.000	101.03	38.00	90.00	90.00	.00	47.41	3116.00	21200.00	90.00
	17250.000	100.55	152.00	86.90	86.90	.00	56.86	3146.00	21250.00	86.90
	-17250.000	100.68	200.00	86.90	86.90	.00	56.82	3146.00	21250.00	86.90
	-17250.000	101.02	340.00	86.90	86.90	.00	56.71	3146.00	21250.00	86.90
	73000.000	100.55	152.00	100.00	87.00	.00	71.51	1673.00	21300.00	87.00
	173000.000	100.68	200.00	100.00	87.00	.00	71.47	1673.00	21300.00	87.00
	173000.000	101.02	340.00	100.00	87.00	.00	71.39	1673.00	21300.00	87.00
	80000.000	100.55	152.00	100.00	87.00	.00	69.26	1669.00	22000.00	87.00
	180000.000	100.68	200.00	100.00	87.00	.00	69.24	1669.00	22000.00	87.00
	80000.000	101.02	340.00	100.00	87.00	.00	69.17	1669.00	22000.00	87.00
	190000.000	100.55	31.00	100.00	88.50	.00	68.52	1667.00	23000.00	88.50
	190000.000	100.68	33.00	100.00	88.50	.00	68.49	1667.00	23000.00	88.50
	90000.000	101.02	37.00	100.00	88.50	.00	68.42	1667.00	23000.00	88.50
	195000.000	100.55	31.00	100.00	88.50	.00	67.27	1665.00	23500.00	88.50
	195000.000	100.68	33.00	100.00	88.50	.00	67.25	1665.00	23500.00	88.50
	95000.000	101.02	37.00	100.00	88.50	.00	67.19	1665.00	23500.00	88.50
	195050.000	100.55	31.00	88.50	88.50	.00	49.25	3130.00	23550.00	88.50
	95050.000	100.68	33.00	88.50	88.50	.00	49.24	3130.00	23550.00	88.50
	95050.000	101.02	37.00	88.50	88.50	.00	49.21	3130.00	23550.00	88.50

XCNO	CWSEL	Q	XLBEL	RBEL	VROB	QCHP	TOPWID	CUMDS	TELMX
* 195150.000	100.55	31.00	88.50	88.50	.00	74.71	3130.00	23650.00	88.50
* 195150.000	100.69	33.00	88.50	88.50	.00	74.70	3130.00	23650.00	88.50
* 95150.000	101.02	37.00	88.50	88.50	.00	74.69	3130.00	23650.00	88.50
* 195200.000	100.55	31.00	88.50	88.50	.00	51.92	3130.00	23700.00	88.50
* 195200.000	100.69	33.00	88.50	88.50	.00	51.89	3130.00	23700.00	88.50
* 95200.000	101.02	37.00	88.50	88.50	.00	51.82	3130.00	23700.00	88.50
196700.000	100.55	31.00	90.00	90.00	.00	52.28	3130.00	23750.00	90.00
96700.000	100.69	33.00	90.00	90.00	.00	52.24	3130.00	23750.00	90.00
96700.000	101.02	37.00	90.00	90.00	.00	52.16	3130.00	23750.00	90.00

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*******************************************
  HEC-2 WATER SURFACE PROFILES             *
                                           *
*     sion   4.6.2;  May 1991              *
                                           *
  RUN DATE    08AUG95    TIME   08:09:52   *
*******************************************
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*           (916) 756-1104              *
*****************************************
```


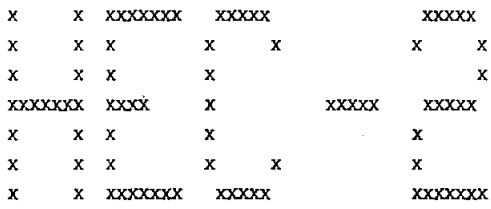

THIS RUN EXECUTED 08AUG95 08:09:52

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**********************************
 HEC-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
**********************************


  ********************************************************************************
  CITY OF DONNA                                                                 *
  CHANNEL I                                                                     *
  EXISTING CONDITIONS                                                           *
  FILENAME:  CHI_100.IH2                                                        *
  MODEL STARTS APPROXIMATELY 15000 FEET DOWNSTREAM OF HIGHWAY 83 AND PROCEEDING*
  UPSTREAM TO JUST  DOWNSTREAM OF EXPRESSWAY (HWY 83)                           *
                                                                                *
                                                                                *
  ********************************************************************************
T1      RUST JOB NO:  67787     CITY OF DONNA DRAINAGE STUDY
T2      5-YEAR FREQUENCY
        FILENAME:  CHI_100.IH2                              CWW         07/26/95

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
      10          2                         0.0005                                  60

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
      1                  -1


    VARIABLE CODES FOR SUMMARY PRINTOUT

     38          1         43         23         24         26         42         14         60         63

    LPRNT     NUMSEC                    ********REQUESTED SECTION NUMBERS********

    -10        -10

    IHLEQ     ICOPY     SUBDIV    STRTDS    RMILE

     1




  SPECIAL CULVERT                                                               *
  CULVERT SIZE: 48" Culvert      (ASSUMED)                                      *
```

SPECIAL CULVERT *
CULVERT SIZE: 48" Culvert (ASSUMED) *

SPECIAL CULVERT *
CULVERT SIZE: 48" Culvert (ASSUMED) *

LEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF
OFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR
DETAILS.

RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
10-YEAR FREQUENCY
FILENAME: CHI_100.IH2 CWW 07/26/95

ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
-10	3			.0005				60	

NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
.2		-1							

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF
OFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR
TAILS.

RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
100-YEAR FREQUENCY
FILENAME: CHI_100.IH2 CWW 07/26/95

ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
-10	4			.0005				60	

NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
15		-1							

LEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

THIS RUN EXECUTED 08AUG95 08:09:54

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991

****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

FILENAME: CHI_100.IH2

SUMMARY PRINTOUT

	SECNO	CWSEL	Q	XLBEL	RBEL	VCH	ELMIN	QCH	QCHP	TELMX
	1000.000	79.50	240.00	80.00	80.00	1.90	74.00	240.00	100.00	80.00
	1000.000	80.61	310.00	80.00	80.00	1.15	74.00	261.59	84.38	80.00
	1000.000	81.08	520.00	80.00	80.00	1.36	74.00	394.81	75.92	80.00
	2000.000	80.00	240.00	80.50	80.50	1.90	74.50	240.00	100.00	80.50
	2000.000	81.11	310.00	80.50	80.50	1.15	74.50	261.47	84.35	80.50
	2000.000	81.58	520.00	80.50	80.50	1.36	74.50	394.73	75.91	80.50
	3000.000	80.50	240.00	81.00	81.00	1.90	75.00	240.00	100.00	81.00
	3000.000	81.61	310.00	81.00	81.00	1.15	75.00	261.49	84.35	81.00
	3000.000	82.08	520.00	81.00	81.00	1.36	75.00	394.72	75.91	81.00
	4000.000	81.00	240.00	81.50	81.50	1.90	75.50	240.00	100.00	81.50
	4000.000	82.11	310.00	81.50	81.50	1.15	75.50	261.57	84.38	81.50
	4000.000	82.58	520.00	81.50	81.50	1.36	75.50	394.76	75.92	81.50
	5000.000	81.50	240.00	82.00	82.00	1.90	76.00	240.00	100.00	82.00
	5000.000	82.61	310.00	82.00	82.00	1.15	76.00	261.46	84.34	82.00
	5000.000	83.08	520.00	82.00	82.00	1.36	76.00	394.73	75.91	82.00
	6000.000	81.97	220.00	82.50	82.50	1.75	76.50	220.00	100.00	82.50
	6000.000	83.08	280.00	82.50	82.50	1.06	76.50	237.71	84.90	82.50
	6000.000	83.53	450.00	82.50	82.50	1.21	76.50	344.51	76.56	82.50
*	6500.000	82.01	220.00	82.50	82.50	1.73	76.50	220.00	100.00	82.50
*	6500.000	83.12	280.00	82.50	82.50	1.16	76.50	263.81	94.22	82.50
*	6500.000	83.58	450.00	82.50	82.50	1.41	76.50	407.97	90.66	82.50
	6530.000	82.87	220.00	82.50	82.50	1.09	76.50	212.65	96.66	82.50
	6530.000	83.13	280.00	82.50	82.50	1.14	76.50	263.33	94.05	82.50
	6530.000	83.58	450.00	82.50	82.50	1.40	76.50	407.70	90.60	82.50

ECNO	CWSEL	Q	XLBEL	RBEL	VCH	ELMIN	QCH	QCHP	TELMX
* 7000.000	82.94	220.00	83.00	83.00	1.55	77.00	220.00	100.00	83.00
* 7000.000	83.34	280.00	83.00	83.00	1.35	77.00	256.10	91.46	83.00
* 7000.000	83.77	450.00	83.00	83.00	1.47	77.00	364.89	81.09	83.00
8000.000	83.27	220.00	83.50	83.50	1.62	77.50	220.00	100.00	83.50
8000.000	84.01	280.00	83.50	83.50	1.14	77.50	242.89	86.75	83.50
8000.000	84.40	450.00	83.50	83.50	1.33	77.50	354.32	78.74	83.50
* 9000.000	83.33	220.00	83.50	83.50	1.59	77.50	220.00	100.00	83.50
* 9000.000	84.10	280.00	83.50	83.50	1.17	77.50	264.17	94.35	83.50
* 9000.000	84.51	450.00	83.50	83.50	1.46	77.50	410.06	91.12	83.50
9030.000	83.86	220.00	83.50	83.50	1.09	77.50	212.75	96.70	83.50
9030.000	84.11	280.00	83.50	83.50	1.15	77.50	263.71	94.18	83.50
9030.000	84.52	450.00	83.50	83.50	1.45	77.50	409.65	91.03	83.50
* 10000.000	84.11	220.00	84.00	84.00	1.36	78.00	216.01	98.19	84.00
* .0000.000	84.44	280.00	84.00	84.00	1.21	78.00	247.36	88.34	84.00
* .0000.000	84.85	450.00	84.00	84.00	1.38	78.00	357.79	79.51	84.00
* 11000.000	84.84	220.00	84.50	84.50	1.05	78.50	200.85	91.30	84.50
.1000.000	85.02	280.00	84.50	84.50	1.14	78.50	242.85	86.73	84.50
11000.000	85.41	450.00	84.50	84.50	1.32	78.50	353.27	78.50	84.50
12000.000	85.36	220.00	85.00	85.00	1.05	79.00	200.38	91.08	85.00
).000	85.53	280.00	85.00	85.00	1.11	79.00	241.31	86.18	85.00
12000.000	85.93	450.00	85.00	85.00	1.30	79.00	351.73	78.16	85.00
.3000.000	85.86	220.00	85.50	85.50	1.03	79.50	199.48	90.67	85.50
.3000.000	86.03	280.00	85.50	85.50	1.11	79.50	241.19	86.14	85.50
13000.000	86.43	450.00	85.50	85.50	1.30	79.50	351.24	78.05	85.50
* .3400.000	85.90	220.00	85.50	85.50	1.07	79.50	212.13	96.42	85.50
* 13400.000	86.07	280.00	85.50	85.50	1.20	79.50	265.15	94.70	85.50
* 13400.000	86.47	450.00	85.50	85.50	1.49	79.50	411.14	91.36	85.50
.3440.000	86.08	220.00	85.50	85.50	.93	79.50	207.90	94.50	85.50
13440.000	86.08	280.00	85.50	85.50	1.19	79.50	264.77	94.56	85.50
13440.000	86.49	450.00	85.50	85.50	1.47	79.50	410.57	91.24	85.50
* 14000.000	86.25	200.00	86.00	86.00	1.06	80.00	188.18	94.09	86.00
* 14000.000	86.29	230.00	86.00	86.00	1.17	80.00	213.79	92.95	86.00
* 14000.000	86.67	350.00	86.00	86.00	1.24	80.00	290.54	83.01	86.00
15000.000	86.79	200.00	86.50	86.50	1.01	80.50	185.40	92.70	86.50
15000.000	86.88	230.00	86.50	86.50	1.06	80.50	207.40	90.17	86.50
15000.000	87.20	350.00	86.50	86.50	1.21	80.50	288.34	82.38	86.50

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*******************************************
  HEC-2 WATER SURFACE PROFILES             *
                                           *
    sion   4.6.2;  May 1991                *
                                           *
  RUN DATE    08AUG95    TIME   08:10:08   *
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*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*          (916) 756-1104               *
*****************************************
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X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                   X
X     X  X        X     X             X
X     X  XXXXXXX  XXXXX               XXXXXXX
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THIS RUN EXECUTED 08AUG95 08:10:08

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**********************************
HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
**********************************

  ***************************************************************************
 CITY OF DONNA                                                              *
  UPPER EAST MAIN DRAIN CHANNEL                                             *
  EXISTING CONDITIONS                                                       *
  FILENAME: UEMD_100.IH2                                                    *
 MODEL STARTS APPROXIMATELY  9300 FEET DOWNSTREAM OF HIGHWAY 83 AND PROCEEDING*
  UPSTREAM TO JUST DOWN STREAM OF EXPRESSWAY (HWY 83)                       *
                                                                            *
                                                                            *
  ***************************************************************************
       RUST JOB NO:  67787     CITY OF DONNA DRAINAGE STUDY
T2     5-YEAR  24 HOUR FLOWS   EXISTING MODEL
       FILENAME: UEMD_100.IH2                              CWW       07/28/95

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

    -10         2                         0.0005                                    60

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

     1                  -1

 VARIABLE CODES FOR SUMMARY PRINTOUT

    38          1         43          23          24          26          42          14          60          63

   LPRNT    NUMSEC                    ********REQUESTED SECTION NUMBERS********

   -10       -10

   IHLEQ     ICOPY     SUBDIV    STRTDS     RMILE

     1


 SPECIAL CULVERT                                                            *
  CULVERT SIZE:   48"RCP                                                    *
```

SPECIAL CULVERT
CULVERT SIZE: 1-48" RCP

EQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF
PFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR
DETAILS.

T RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
T 10-YEAR 24 HOUR FLOWS EXISTING MODEL
T FILENAME: UEMD_100.IH2 CWW 07/28/95

J	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	-10	3			0.0005				60	

J	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2		-1							

IHLEQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

T RUST JOB NO: 67787 CITY OF DONNA DRAINAGE STUDY
100-YEAR24 HOUR FLOWS EXISTING MODEL
FILENAME: UEMD_100.IH2 CWW 07/28/95

ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
-10	4			0.0005				60	

NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
15		-1							

1 EQ = 1. THEREFORE FRICTION LOSS (HL) IS CALCULATED AS A FUNCTION OF PROFILE TYPE, WHICH CAN VARY FROM REACH TO REACH. SEE DOCUMENTATION FOR DETAILS.

THIS RUN EXECUTED 08AUG95 08:10:09

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EC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

FILENAME: UEMD_100.IH2

MARY PRINTOUT

	SECNO	CWSEL	Q	XLBEL	RBEL	VCH	ELMIN	QCH	QCHP	TELMX
	1000.000	81.95	460.00	81.30	81.30	1.35	72.84	406.78	88.43	81.30
	1000.000	82.27	620.00	81.30	81.30	1.48	72.84	515.55	83.15	81.30
	1000.000	83.04	1100.00	81.30	81.30	1.79	72.84	819.27	74.48	81.30
*	1050.000	81.95	460.00	81.35	81.35	1.49	72.85	442.98	96.30	81.35
*	1050.000	82.26	620.00	81.35	81.35	1.71	72.85	583.94	94.18	81.35
*	1050.000	83.04	1100.00	81.35	81.35	2.20	72.85	993.04	90.28	81.35
	1100.000	82.16	460.00	81.40	81.40	1.36	72.86	438.15	95.25	81.40
	1100.000	82.41	620.00	81.40	81.40	1.62	72.86	580.75	93.67	81.40
	1100.000	83.13	1100.00	81.40	81.40	2.15	72.86	991.77	90.16	81.40
*	1150.000	82.17	460.00	81.45	81.45	1.27	72.89	402.03	87.40	81.45
*	1150.000	82.44	620.00	81.45	81.45	1.45	72.89	515.42	83.13	81.45
*	1150.000	83.18	1100.00	81.45	81.45	1.79	72.89	823.79	74.89	81.45
	2000.000	82.57	460.00	82.00	82.00	1.38	73.31	415.87	90.41	82.00
	2000.000	82.86	620.00	82.00	82.00	1.54	73.31	529.16	85.35	82.00
	2000.000	83.63	1100.00	82.00	82.00	1.85	73.31	838.51	76.23	82.00
	3000.000	83.09	460.00	82.50	82.50	1.36	73.81	413.94	89.99	82.50
	3000.000	83.40	620.00	82.50	82.50	1.50	73.81	525.50	84.76	82.50
	3000.000	84.17	1100.00	82.50	82.50	1.82	73.81	834.71	75.88	82.50
	4000.000	83.54	460.00	82.80	82.80	1.26	74.31	399.18	86.78	82.80
	4000.000	83.87	620.00	82.80	82.80	1.39	74.31	507.29	81.82	82.80
	4000.000	84.65	1100.00	82.80	82.80	1.71	74.31	810.86	73.71	82.80
	5000.000	83.92	400.00	83.20	83.20	1.13	74.81	348.10	87.02	83.20
	5000.000	84.24	520.00	83.20	83.20	1.20	74.81	426.25	81.97	83.20
	5000.000	85.02	890.00	83.20	83.20	1.41	74.81	655.52	73.65	83.20

	ECNO	CWSEL	Q	XLBEL	RBEL	VCH	ELMIN	QCH	QCHP	TELMX
	5200.000	83.99	400.00	83.40	83.40	1.21	74.91	358.06	89.52	83.40
	5200.000	84.30	520.00	83.40	83.40	1.28	74.91	436.97	84.03	83.40
	5200.000	85.09	890.00	83.40	83.40	1.48	74.91	667.29	74.98	83.40
*	5250.000	83.99	400.00	83.50	83.50	1.36	74.94	388.20	97.05	83.50
*	5250.000	84.30	520.00	83.50	83.50	1.49	74.94	493.41	94.89	83.50
*	5250.000	85.08	890.00	83.50	83.50	1.84	74.94	808.05	90.79	83.50
	5300.000	84.37	400.00	83.60	83.60	1.15	74.96	380.72	95.18	83.60
	5300.000	84.58	520.00	83.60	83.60	1.36	74.96	488.59	93.96	83.60
	5300.000	85.08	890.00	83.60	83.60	1.89	74.96	813.16	91.37	83.60
*	5350.000	84.38	400.00	83.70	83.70	1.12	74.99	353.99	88.50	83.70
*	5350.000	84.60	520.00	83.70	83.70	1.27	74.99	441.88	84.98	83.70
*	5350.000	85.11	890.00	83.70	83.70	1.65	74.99	696.86	78.30	83.70
	6000.000	84.62	400.00	84.10	84.10	1.22	75.31	365.88	91.47	84.10
	6000.000	84.86	520.00	84.10	84.10	1.36	75.31	453.73	87.26	84.10
	6000.000	85.44	890.00	84.10	84.10	1.70	75.31	706.55	79.39	84.10
	7000.000	84.92	400.00	85.50	85.50	1.67	75.81	400.00	100.00	85.50
	7000.000	85.23	520.00	85.50	85.50	2.06	75.81	520.00	100.00	85.50
*	7000.000	86.17	890.00	85.50	85.50	2.21	75.81	805.65	90.52	85.50
	8000.000	85.17	400.00	86.40	86.40	1.75	76.31	400.00	100.00	86.40
	8000.000	85.59	520.00	86.40	86.40	2.11	76.31	520.00	100.00	86.40
	8000.000	87.14	890.00	86.40	86.40	2.03	76.31	802.21	90.14	86.40
	9000.000	85.43	340.00	87.00	87.00	1.56	76.81	340.00	100.00	87.00
	9000.000	85.94	440.00	87.00	87.00	1.83	76.81	440.00	100.00	87.00
	9000.000	87.80	720.00	87.00	87.00	1.59	76.81	645.52	89.66	87.00
	9300.000	85.50	340.00	88.00	88.00	1.58	76.96	340.00	100.00	88.00
	9300.000	86.03	440.00	88.00	88.00	1.85	76.96	440.00	100.00	88.00
	9300.000	87.89	720.00	88.00	88.00	2.21	76.96	720.00	100.00	88.00