AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

VOLUME I

FINAL FACILITIES PLAN REPORT

Prepared for

AMAFCA

ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

July 22, 1999

LEEDSHILL-HERKENHOFF, INC.
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Albuquerque, New Mexico
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LH Project No. 95043

RESOLUTION 1999-7
FURTHER MODIFICATIONS OF THE DRAINAGE MANAGEMENT PLAN WESTERN ALBUQUERQUE METROPOLITAN AREA AS IT PERTAINS TO THE AMOLE ARROYO BELOW WESTGATE DAM AND OTHER DRAINAGE BASINS DRAINING TO THE AMOLE-HUBBELL DETENTION SYSTEM

WHEREAS, the Drainage Management Plan Western Albuauerque Metropolitan Area Resolution 1975-8 adopted by AMAFCA, Sepetmber 25, 1975, called for the construction of the Westgate, Amole and Hubbell detention facilities and the Borrega, Sacate Blanco and Power Line diversion channels.

WHEREAS, in 1976 AMAFCA completed the construction of the Westgate Dam.

WHEREAS, in 1978 AMAFCA completed the construction of the Sacate Blanco Diversion, the Amole-Hubbell Channel, the Amole Detention Dam and Hubbell Lake Detention Dam.

WHEREAS, Resolution 1980-15 revised AMAFCA's Drainage Policy and provided additional criteria for development in the Amole watershed.

WHEREAS, in 1981 AMAFCA completed the construction of the Snow Vista Channel.

WHEREAS, in 1982 AMAFCA completed the construction of the Powerline Channel.

WHEREAS, in 1986 AMAFCA completed the Borrega Diversion Channel.

WHEREAS, since 1983 the City of Albuquerque, through the expenditure of CIP funds or as part of the SAD process, has completed the SAD 214, the North/South Coors and 98th and Central Ponds and the Amole del Norte Channel, Tierra Bayita Channel, Unser diversion and Unser Storm Drain.

WHEREAS, in April of 1994 the AMAFCA Board adopted Resolution 1994-4 modifying the Drainage Management Plan for Western Albuquerque by proposing the construction of two additional detention facilities on the Amole Arroyo north of I-40 that would divert all flows to a proposed I-40 diversion channel that would out fall to the Rio Grande.

WHEREAS, on July 28, 1994, the Board of Directors authorized the preparation of a Drainage Management Plan for the Amole Arroyo-Hubbell Lake system below the Westgate Dam.

WHEREAS, said Drainage Management Plan has been prepared, with input and assistance from community agencies, private landowners and the general public.

WHEREAS, the AMAFCA Board of Directors has previously authorized negotiations of a cost share agreement with private parties for improvements to the Borrega Diversion system and with the City of Albuquerque for the Tower-Sage Pond as part of improvements to the Amole del Norte Channel system.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY:

1. The improvements recommended by the Amole-Hubbell Drainage Management Plan, prepared by Leedshill-Herkenhoff, Inc., dated May 1999, are hereby adopted, subject to the following:

    a. Modifications to the adopted plan may be made as circumstances dictate, but shall be approved by the AMAFCA Board of Directors.

    b. Final decisions regarding arroyo treatments shall be made in accordance with existing and future planning documents, including but not limited to the Rio Bravo Sector Plan, the Facility Plan for Arroyos, the Bikeways Master Plan , the Trails Facility Plan and the U.S. Army Corps of Engineers Southwest Valley Plan.

    c. The Drainage Management Plan utilizes various criteria to establish general project priorities from a technical perspective, these do not necessarily reflect the priorities to be used by the Board of Directors for funding and construction. Specific projects, if any, will be funded and scheduled by AMAFCA Board action based on evaluation of public safety needs, cost sharing benefits, orderly development of flood control infrastructure, overall community needs and regional planning requirements.

    d. The Drainage Management Plan identifies drainage and flood control infrastructure necessary to provide protection to the community from storm water runoff, the adoption of this plan does not imply a commitment on the part of AMAFCA Board of Directors to build any or all of said facilities. Financing and scheduling of improvements are subject to the availability of public funds and to initiatives by the private sector.

    e. Every attempt will be made to construct facilities in accordance with the U.S. Army Corps of Engineers National Economic Plan for southwest valley drainage improvements so as to receive credit for local financial contribution.

2. The adoption of this Resolution modifies the Western Albuquerque Metropolitan Area Drainage Management Plan and any other previous Resolutions or actions by the

AMAFCA Board of Directors regarding the Amole and Hubbell drainage basins below the Westgate Dam.

PASSED, ADOPTED AND SIGNED THIS 22nd DAY OF July, 1999

Ronald D. Brown, Chairman

ATTEST:

Clifford E. Anderson, Secretary/Treasurer

AMOLE-HUBBELL
DRAINAGE MANAGEMENT PLAN

Prepared for

ALBUQUERQUE METROPOLITAN
ARROYO FLOOD
CONTROL AUTHORITY

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal as a Professional Engineer, licensed to practice in the State of New Mexico, is affixed below.

Clinton Dodge
Engineer of Record
License No. 6410

CLINTON DODGE
NEW MEXICO
6410
REGISTERED PROFESSIONAL ENGINEER

AMOLE - HUBBELL
DRAINAGE MANAGEMENT PLAN

AMAFCA

This is a planning document, only. Nothing herein constitutes any commitment by AMAFCA to construct any project, study any area, acquire any right of way or enter into any contract. This major drainage facility plan does not obligate AMAFCA in any way. Drainage facility alignments, corridors, locations, treatments and cost estimates are conceptual only, and may be altered or revised based upon future project analysis, changed circumstances or otherwise. Land uses included in this document were assumed for the basis for hydrologic modeling only.

July 22, 1999

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AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN
EXECUTIVE SUMMARY

The Executive Summary is intended to present the results of the Amole-Hubbell Drainage Management Plan (DMP) in a brief concise manner for reference purposes. A more detailed overview of the study is included in Section I, Introduction. Figures I-1 and I-2 graphically illustrate the study boundaries and the proposed DMP facilities.

The DMP proposes a combination of existing runoff constraints, existing facility upgrades and new facilities to accommodate existing and developed runoff in stable easy to maintain facilities.

- ✧ Existing Runoff Constraints - Snow Vista Basin, Atrisco Business Park. No new runoff constraints are proposed.
- ✧ Existing Conveyance Facility Upgrades - Powerline Diversion Channel, Amole Arroyo, Snow Vista Channel, Sacate Blanco Diversion Channel, Borrega Diversion, South Rio Bravo Arroyo Rundown.
- ✧ Existing Storage Facility Volume Upgrades - Amole Basin (Guac Basin), Spillway upgrades at Amole Basin and Hubbell Lake.
- ✧ New Conveyance Facilities - South Powerline Diversion, Tributary arroyos collection and conveyance.

Drainage improvements and facilities identified in this DMP include:
Note: These costs are drainage facility costs. Potential bridge or other crossing structure costs are identified in the detail management plan for each facility in Section III of this report.

Outside the Watershed - 4 facilities $16,160,000
(facilities identified in other DMPs)

Existing Condition Deficiencies - 6 facilities $2,986,000

Amole-Hubbell System Volume Increase - 4 projects $8,043,000
(initial volume increase needed now)

Amole Arroyo Stabilization - 7 projects $10,411,000
(needed now to control sediment and erosion)

Development Driven - 10 projects $11,604,000
(improvements to control avulsions, sediment, and erosion constructed before or concurrent with development)

This DMP address the drainage facilities and improvements required for existing and developed conditions. Conceptual drainage facility costs, potential bridge costs and necessary right-of-way are estimated for these facilities. This DMP does not attempt to identify or allocate funding sources for these facilities.

An abbreviated overview of the DMP facilities is contained in Table EX-1 with associated costs for these facilities included in Table EX-2. The facility identifier shown in these tables corresponds to the project identifier on the DMP Facilities Map, Figure I-2. Proposed DMP improvements are linked to the associated drainage basin. Drainage basins and their abbreviations used throughout the DMP are as follows: (Also see the Figures for each basin in Section III of this volume and Supplemental Mapping in Volume II.)

Basin	**Abbreviation**
Amole Arroyo	AA
Amole/Hubbell Detention	AH
Amole del Norte	ADN
Borrega	BR
Powerline	PL
Rio Bravo	RB
Sacate Blanco	SB
South Powerline	SP
Snow Vista	SV

Priorities have been assigned to the proposed system improvements to assist in implementation planning. These priorities are conceptual for use in preliminary planning and will require modification as the watershed continues to develop and as more detailed studies of the proposed improvements are conducted. The priorities are identified as:

High - Existing system deficiencies which would probably result in flood damage during the 100-year event.

Medium - Identified facilities with less flood damage potential.

Low - Future facilities not required until further development in watershed increases runoff rated and/or volumes.

Development Driven - Specific basin improvements required in conjunction with development. Depending on development pressures, the priority of these facilities will shift.

TABLE EX-1 - AMOLE-HUBBELL DMP FACILITIES OVERVIEW

0. RELATED PROJECTS/OTHER DMP FACILITIES

The following approved facilities are assumed to be constructed. Implementation of these facilities is critical to the Amole DMP.

East Amole Dam (north of I-40)
West Amole Dam (north of I-40)
I-40 Diversion Channel
Rio Bravo Boulevard and Channel.

1. CURRENT DEFICIENCIES - Upgrades to correct existing conditions deficiencies:

BR1 A 51 Acre-Ft Borrega Detention Basin is proposed to limit existing and developed condition flows at the Borrega Channel Inlet into Hubbell Lake.
High priority - overtopping of existing inlet at Hubbell Lake could lead to failure.

BR4 Borrega Inlet Freeboard Upgrade
High Priority - BR1 limits the flow to the bank full capacity.

AA1 Blake Rd profile regrading. Potential Amole Arroyo avulsion - maintenance type work. Completed 1998-1999.
High priority

AA2. Westgate Heights earthen channel regarding. Potential Amole Arroyo avulsion - maintenance type work. Completed 1998-1999.
High priority

AA3 Earthen channel bank improvements at the Amole Detention Basin entrance. Potential Amole Arroyo avulsion - maintenance type work. Completed 1998-1999.
High priority

SV1A Snow Vista Channel/Benavides Rd. Inlet - Existing condition runoff exceeds existing inlet/rundown capacity allowing flows to bypass Snow Vista Diversion Channel
High priority

SV1B Westgate Heights Benavides Rd. Storm Drain - Existing runoff exceeds street capacity. A storm drain to eliminate potential 100 year flooding is proposed. Medium priority, secondary facility.

PL2 Powerline channel Freeboard Upgrade
Medium Priority - Bank full capacity not exceeded.

2. AMOLE-HUBBELL SYSTEM STORAGE CAPACITY

Existing conditions runoff slightly exceeds present storage capacity in Amole and Hubbell Lake Dams.
Increase storage capacity for the developed conditions runoff volume from the Amole Watershed. Additional volume of 862 acre-ft. is required.
Construct the Guac detention basin, potentially in stages as development occurs, adjacent to the Amole Detention Basin on AMAFCA property. Combine with the Amole Basin. Investigate the development of the Salsa Basiin adjacent to the Amole Basin on the northeast corner to provide development flexibility. Investigate the potential for commercial gravel pit operations to offset a portion of the GUAC Basin excavation.

AH1 Stage 1 Revise emergency spillway configuration, connect Guac and Amole Basins, provide approximately 150 AF of storage.
Medium priority. Existing volume inadequate for existing conditions. Overflow at Hubbell Lake is at reduced flow rate with potential flooding limited primarily to City open space area.

AH2 Stage 2 Increase storage by approximately 300 AF.
Medium Priority. Concurrent with upstream development.

TABEL EX-2
AMOLE-HUBBELL DMP
PROPOSED MAJOR REGIONAL TRUNK FACILITIES
COST SUMMARY

PROJECT ID	FACILITY	CONST COST ($1000)	ROW (Acre)	ROW COST ($1000)	Crossing Structures ($1000)	TOTAL COST ($1000)	PRIORITY	COMMENTS
0. Planned Critical Trunk Facilities Outside Amole Arroyo Dmp Watershed								
	Westgate Dam Basin (North of I-40)					$2,930		Amole Westgate DMP*
	East Amole Dam & Channel	$2,620	29	$310		$4,210		Amole Westgate DMP*
	West Amole Dam	$3,400	141	$810		$7,420		I-40 DMP, in progress
	I-40 Diversion Channel	$6,390	38	$1,030		$1,600		Bernalillo County
	Rio Bravo Boulevard and Channel	$1,600						
SUBTOTAL						$16,160		
1. Current Issues (Existing Problem Areas)								
BR1	Borrega Detention Basin (51AF)	$767	15	$300		$1067	H	Limit existing flow at Borrega Inlet to 225
BR4	Borrega Inlet Freeboard	$87				$87	H	
AA1	Blake Road at Amole Arroyo					NA	H	Corrected by Maintenance Forces - 1998
AA2	Amole Arroyo at Westgate Hts.					NA	H	Corrected by Maintenance Forces - 1998
AA3	Amole at Detention Entrance					NA	H	Corrected by Maintenance Forces - 1998
SV1A	Benavides Inlet/Rundown	$152				$152	H	Potential "out of basin" flow
SV1B	Benavides Storm Drain	$1,600				$1,600	M	Existing street deficiency
PL2	Powerline Freeboard Upgrade	$80	NA			$80	M	
SUBTOTAL #1						$2986		
2. System Storage Capacity (Existing Amole and Hubbell Lake Dams Capacity)								
	Guac Detention Basin (862 AF, Total)					$1,453	M	Existing AMAFACa 40 Ac Parcel
AH1	Stage 1 Spillway Mod, 150 AF Basin					$2,214	M	
AH2	Stage 2 Increase storage by 300 AF					$3,131	L	
AH3	Stage 3 Increase storage to 867 AF					$1,245	M	Spillway Expansion
AH4	PMF Spillway Upgrade	$587	NA			$8,043		
SUBTOTAL #2								

* (Resolution 1994-4)

TABLE EX-2

PROJECT ID	FACILITY	CONST COST ($1000)	ROW (Acre)	ROW COST ($1000)	Crossing Structures ($1000)	TOTAL COST ($1000)	PRIORITY	COMMENTS
3.	**Amole Arroyo Stabilization**							
PL1	Powerline Detention Basins (58 AF)	$1,150				$1,150	H	Flow @ Amole 20 cfs
AA4	UpperLow Flow Channel	$1,521			$534	$2,055	H	Naturalistic Treatment
AA5	Mid Reach Composite Channel	$1,492			$1,837	$3,330	H	Low Flow w/ Overbank Flow
SV2	Snow Vista Runoff Constraints	NA					NA	1.29 cfs/ac
SV3	Snow Vista Channel Freeboard Upgrade	$104			$1,818	$1,922	H	
AA6	Lower Reach High Flow Channel	$845	NA		$909	$1,754	H	Naturalistic Treatment
AA7	Freeboard Upgrade at Rundown	$200				$200	L	
SUBTOTAL #3						$10,411		
4.	**South Powerline Channel/Detention**							
SP1	South Powerline Basin							
	In-Line Detention Basins (71 AF)	$1,170	31	$620	NA	$1,790	D	Sediment & Avulsion Cut Off
SUBTOTAL #4						$1,790		
5.	**South Rio Bravo Arroyo @ Hubbell Lake**							
RB1	Rio Bravo Basin							
	South Rio Bravo Arroyo Rundown	$1,200	3	$60	NA	$1,260	M	Existing Arroyo Rundown
SUBTOTAL #5						$1,260		
6.	**Development Driven**							
AD1	SAD 222 Tower-Sage Detention	$2,000				$2,000	H	Current Development
SB1	Sacate Blanco Diversion Channel	$463	NA		NA	$463	D	Upgrade Existing
SB2	S. Sacate Blanco Arroyo Conveyance	$785	NA		$1,003	$1,788	D	Future
SB3	Sacate Blanco Avulsion Conveyance	$628	NA		$591	$1,219	D	Future
BR2	N. & S. Borrega Arroyos Conveyance	$989	NA		$823	$1,812	D	Future
RB2	S. Rio Bravo Arroyo Conveyance	$518	NA		$162	$680	D	Future
BR3	Borrega Area "6B" Diversion SD	$345	1	$20		$365	D	Future
ADN	Amole Del Norte Basin						NA	City Management
SUBTOTAL #6						$8,327		

Legend:

H	Priority - High
M	Priority - Medium
L	Priority - Low
D	Priority - Development Driven

I. INTRODUCTION

A. SCOPE

This Drainage Management Plan (DMP) addresses the drainage issues in the Amole Arroyo Watershed located in the southwest quadrant of Albuquerque, New Mexico. The DMP was prepared for the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) with input from the City of Albuquerque, Bernalillo County, Middle Rio Grande Conservancy District (MRGCD), and the public.

The Watershed and drainage basins are illustrated on Figure I-1. The area west and north of Westgate Dam was investigated in 1994 in the Amole Westgate Dam DMP (RD #61)[1]. This DMP addresses all of the flows which reach the Amole and Hubbell Lake Detention Basins which are the storage facilities at the downstream end of the Amole Arroyo system. The specific limits of the study are:

- North - For existing conditions, flows from north of I-40 which contribute to the flows in the Amole Arroyo system. ***For developed conditions, the East and West Amole Dams north of I-40 and the I-40 channel are assumed to be constructed and essentially all of the flows from north of I-40 are diverted to the West Bluff Outfall.***

- East - The Amole Del Norte Diversion Channel forms the eastern drainage divide north of the Amole Detention Basin and the Hubbell Channel south of the basin. Both of these facilities are west of Coors Rd.

- South - The Borrega Arroyo drainage basin which drains into Hubbell Lake forms the south study boundary. The south boundary of the Borrega basin is in the vicinity of Gun Club Road.

- West - The existing Westgate Dam on the Amole Arroyo and the natural drainage boundary which is at the top of the Ceja Mesa escarpment form the western study limit. Contributions to the system from Westgate Dam are included in the study based on the Amole Westgate Dam Drainage Management Plan (RD# 61).

B. DRAINAGE MANAGEMENT PLAN FORMAT

This Drainage Management Plan (DMP) is presented in the following documents:

Volume I — Amole-Hubbell Drainage Management Plan Facilities Plan Report (This Report)

[1] Reference Documents are identified by RD# in the text. The full title of the document is contained in the Reference Document listing in Appendix I A of this Volume of the DMP.

Volume II - Supplemental Maps (24"x 36")

G-1	Cover Sheet, Index of Drawings and Watershed Map
Figures 1-9	ROW/Easement Mapping
E-1 - E-9	Existing Drainage Basin Mapping
E-10	Amole Arroyo HEC-RAS Section Locations
SH-1 - SH-5	Sediment Reconnaissance Mapping
D-1	Developed Conditions - Existing Facilities
I-2	Proposed DMP Facilities Mapping (Color)
R-1	Developed Conditions Runoff Categories Map (Color)
N-1 - N-9	DMP Facilities Mapping

Volume III - Hydrology Report

- Existing Conditions Hydrology
- Sediment Reconnaissance
- Developed Conditions/Existing Facilities Hydrology (DEVEX)
- Volume III Appendices
  - III-A AHYMO Read Me File
  - III-B Existing Conditions AHYMO Summary Files
  - III-C DEVEX AHYMO Summary Files
  - III-D AHYMO Input, Output and Summary Files Compact Disk
  - III-E AHYMO Input Files (Separate Cover)
    1. AHYMO Read Me File
    2. Existing Conditions Input Files
    3. DEVEX Input Files
    4. DMP Hydrology Input Files

Volume IV - Supporting Documents

- Literature Summary Report
- Public Meeting Minutes
- Westgate Dam Geotechnical Investigation
- MRGCD Amole Dam and Hubbell Lake Discharge Licenses
- Guac Basin Geotechnical Report
- Borrega Letter Report

C. HISTORY OF AMOLE FACILITIES

Historic major developments of record in the Amole Watershed date back to approximately 1945. Major events and facilities include:

Year	Event/Facility
1945	Abrupt change of direction of Amole Arroyo channel in the vicinity of the confluence with the present Snow Vista Diversion. This avulsion was apparently caused by roads/trails.
1975	Westgate Dam
1978	Amole Detention Dam
1978	Hubbell Lake Detention Dam
1978	Amole/Hubbell Diversion Channel
1978	Sacate Blanco Diversion Channel

1981 Snow Vista Diversion Channel
1982 Powerline Diversion Channel
1983 Borrega Diversion Channel
1983 SAD 214 Pond
1987 Amole Del Norte Diversion Channel
1991 N/S Coors Pond
1993 Tierra Bayita Channel and Unser Storm Drain
1996 98th & Central Detention Basin
1997 Unser Diversion north of Central Ave.

These locations and facilities are shown on Figure I-1. An historic listing of the major facilities is contained in Table I-1.

TABLE I-1 AMOLE ARROYO MAJOR FACILITIES

Facility	Date	Approximate Project Cost ($1000)	Maintained By	Design By	Contractor	Comments
MAJOR EXISTING FACILITIES						
Unser Diversion	1997	$1,600	City	Easterling	Triad	Constructed by AMAFCA, $800K private contribution ROW
98th & Central Pond	1996	$1,000	City	Greiner		No.46.2 AF± So.31.5 AF
Tierra Bayita Channel & Unser SD	1993	$1,550	City	Greiner		
N/S Coors Pond	1991	$1,000	City			64 AF, Constructed by NMSHTD
Amole del Norte Channel	1987	$4,100	City	Boyle		
SAD 214 Pond	1983		City	Scanlon		20 AF
Borrega Diversion	1983	$734	AMAFCA	CDM	Kirkland	
Powerline Channel	1982	$1,900	AMAFCA	Herkenhoff	Wylie	
Snow Vista Channel	1981	$3,840	AMAFCA	Herkenhoff	Wylie	$605 K - COA contribution
Sacate Blanco Diversion	1978		AMAFCA	Matotan	Kent Nowlin	
Amole Detention	1978	$4,701	AMAFCA	Matotan	Kent Nowlin	492 AF (Giannini Gravel Pit)
Hubbell Lake Detention	1978		AMAFCA	Matotan	Kent Nowlin	480 AF (Oxbow)
Amole/Hubbell Channel	1978		AMAFCA	Matotan	Kent Nowlin	
Westgate Dam	1975	$992	AMAFCA	Matotan	Kent Nowlin	425 AF
MAJOR "PLANNED/PROPOSED" FACILITIES						
Rio Bravo Extension Channel		$1,600	Bernalillo Cty	Gannett-Fleming/ Avid		
East Amole Dam & Outfall		$7,140				186 AF Amole Westgate DMP
West Amole Dam & Outfall						500 AF Amole Westgate DMP
I-40 Channel to 98th St.		$7,420				I-40 DMP
SAD 222 - Tower/Sage Detention & outfall		$2,000	City			

D. SYSTEM CHARACTERISTICS

The Amole watershed generally slopes from the northwest to the southeast. All of the runoff in the Amole watershed drains into the Amole and Hubbell Lake Detention Facilities. This includes several diversions which direct flow into the Amole system which historically drained into the valley area. The Amole and Hubbell Lake Facilities drain into the MRGCD Arenal Canal. The principal spillway in each basin is valved and these valves are normally closed to avoid flooding the Arenal Canal. The systems are designed to drain within 96 hours after opening of the valves. For purposes of the hydrologic analysis, these basins function as retention basins and the total storage capacity of these basins is a critical system parameter.

The Amole Watershed analysis consists of 10 different major drainage basins (See Figure I-1). These Basins are:

- Westgate Dam (WG)
- Amole Arroyo Basin (AA)
- Powerline Basin (PL)
- Snow Vista Basin (SV)
- South Powerline Basin (SP)
- Sacate Blanco Basin (SB)
- Rio Bravo Basin (RB)
- Borrega Basin (BR)
- Amole Del Norte Basin (ADN)
  - (Subbasins included in ADN are:
    - 98th & Central (98)
    - Unser Diversion/SAD 214 (UN)
    - Atrisco Business Park (AB)
    - Tierra Bayita (TB)
    - Tower/Sage (TS)
    - South Amole Del Norte (SA))
- Amole/Hubbell Lake Facility System

The Westgate, Amole and Hubbell Lake Detention Facilities must accommodate rainfall events in excess of the design storm without failure of the dam or basin embankment. The operation of this system is as follows:

- <u>Westgate Dam</u> - Overflows from the Westgate Dam flow down the Amole Arroyo and into the Amole/Hubbell Lake system.

- <u>Amole Emergency Spillway</u> - Overflows from the Amole Detention Facility enter the Hubbell Channel and are conveyed to Hubbell Lake. The Hubbell Channel functions as an element of the spillway and was designed to accommodate one half the Amole Detention facility PMP runoff rate without freeboard.

- Hubbell Lake - Overflows from Hubbell Lake overtop the emergency spillway and exit into the valley across Coors Rd. These flows include those from the Amole Detention Facility.

Numerous detention basins are incorporated in the Amole system. These detention basins reduce the peak runoff rate and thus decrease the size of downstream conveyance structures. These basins typically drain within 96 hours after the storm starts and the runoff volume from the entire watershed collects, and for purposes of this analysis, is stored in the Amole and Hubbell Lake Dams for the 100-year 24-hour return frequency design storm.

Two major factors determine facility size within the Amole-Hubbell DMP system - Peak Flow Rates and Total Runoff Volume:

1. Facilities Controlled by Peak Flow Rate - The peak flow rate determines the size of conveyance structures such as storm drains, channels, culverts, etc. The primary method of reducing or limiting peak flow rate is by detaining the runoff in detention basins. This reduces the peak flow and lengthens the time that the flow is occurring. These are typically designed to release the detained water within 96 hours in accordance with State Engineer Policy.

2. Facilities Controlled by Runoff Volume - The Amole and Hubbell Dams are assumed to retain the runoff during major storm events due to limited downstream capacity and the potential for downstream flooding. Therefore, the runoff which reaches these facilities must be retained (stored). The upstream detention facilities are designed to discharge at reduced rates which results in all of the runoff within the entire Amole Arroyo watershed being stored in the Amole and Hubbell Lake facilities, including the runoff volume from Westgate Dam, Unser Diversion Ponds, Tower/Sage Pond, N/S Coors Pond, etc.

E. ASSUMPTIONS

The hydrologic and hydraulic analyses and the proposed DMP facilities presented in this study were developed based on three major assumptions:

1. The proposed I-40 Diversion Channel and the two Amole Detention Dams north of I-40 are constructed as presented in the AMAFCA approved Amole Westgate Dam Drainage Management Plan (RD#61) and as included in the I-40 DMP (RD#53) (the I-40 DMP is in process at this time).

2. Existing Development Constraints which limit developed peak flow rates from Snow Vista Basin and Atrisco Business Park will remain in effect.

3. The principal spillway outlet valves on the Amole and Hubbell Lake Detention facilities are closed during the design storm event.

This assumption is based on the following:

- The principal spillway from the Amole Detention Facility and from the Hubbell Lake Detention facility drain to the MRGCD Arenal Canal. The Amole principal spillway is a 30" pipe discharging into the Arenal Canal and Hubbell Lake is a 36" pipe, also discharging to the Arenal Canal.

- During a major storm, the valley area, including the Arenal Canal, is assumed to be at capacity with local runoff and during the storm event, additional capacity in the Canal will not be available to release flows from the detention facilities.

This assumption is conservative for the analysis of the Amole and Hubbell Lake facilities.

Other major assumptions included in the DMP include:

- Rio Bravo Blvd. extension and channel are constructed (RD#22).

- Land uses to determine runoff characteristics for fully developed build out conditions are represented by approved planning documents such as Sector Plans, Comprehensive Plan, etc.

- The Amole Arroyo drainage improvements will conform to the Amole Arroyo Corridor Plan (RD#17) and adopted Sector Plans to the extent feasible.

- Cost Estimates were developed for the different projects and are included in Appendix 1-C. The costs are based on 1997-1998 dollars generally conforming to the City of Albuquerque Estimated Unit Prices Guide. Undeveloped and unsubdivided ROW was estimated to cost $20,000/acre. The exception to this was the ROW for the proposed Salsa Detention Basin, which was estimated at $34,000/acre.

- Priority Identification - Priorities have been assigned to the proposed system improvements to assist in implementation planning. These priorities are conceptual for use in preliminary planning and will require modification as the watershed continues to develop and as more detailed studies of the proposed improvements are conducted. The priorities are identified as:

  High - Existing system deficiencies which would probably result in flood damage during the 100-year event.

  Medium - Identified facilities with less flood damage potential.

  Low - Future facilities not required until further development in watershed increases runoff rate and/or volumes.

Development Driven - Specific basin improvements required in conjunction with development. Depending on development pressures, the priority of these facilities will shift.

- Programmed facilities include:
  - Rio Bravo Extension Channel
  - East Amole Dam and outfall
  - West Amole Dam and outfall
  - I-40 Channel
  - 98th and Central Detention and outfall
  - SAD 222 Tower/Sage Detention and outfall
  - SAD 222 Tower/Sage Storm Drains to Amole Del Norte
  - Sunrise Estates Detention and outfall
  - SAD 222 98th Street Storm Drain
  - Unser Extension Storm Drain
  - Atrisco Business Park runoff constraints.

F. HYDROLOGY

The Amole watershed was modeled using AHYMO.194 to predict runoff rates and volumes. Hydrologic models were developed for:

- Existing conditions (prepared June 1996).
- Developed land uses with existing and programmed facilities (DEVEX) (prepared December 1996, revised 1998).
- Alternatives which were considered.
- Developed conditions with DMP recommended facilities (DMP).

The design storm used in the DMP is the 100-yr return frequency, 24-hr event. Other storm events were analyzed for specific purposes but the design storm was determined to be the critical storm for the watershed. Detailed hydrologic and hydraulic computations are presented in Volume III for these conditions. The hydrologic and hydraulic results from the DMP analysis are summarized in this Volume.

Separate AHYMO models were used to predict runoff for each basin within the watershed and the output hydrographs imported into the Amole/Hubbell Lake model for the comprehensive system hydrology. See Section II of this Volume and Volume III for more detail.

G. SEDIMENT RECONNAISSANCE

The Amole Watershed is characterized by steep highly erodible slopes on the western boundary tending toward flatter slopes to the east. As a result, the sediment capacity of existing arroyos and channels typically decreases to the east and avulsion potential increases. A Sediment Reconnaissance was performed by Ayres Associates for this DMP. Numerous avulsion locations

were identified in the watershed. See Sediment Reconnaissance Report in Volume III and Sediment Reconnaissance Mapping in Volume II.

The Avulsion Control Plan for the Amole DMP is:

1. South Powerline Channel - Construct a combination diversion channel and series of sedimentation/detention basins along the existing Powerline easement which is essentially at the toe of the escarpment where the slopes flatten in the vicinity of the apex of the alluvial fans. The channel/basin facility extends from south of the Amole Arroyo to just south of Rio Bravo Boulevard. This facility will eliminate the upstream sediment sources and minimize the continued development of avulsion locations to the east of the Powerline easement. (See Section III E of this volume, Figure III-7, Sediment Reconnaissance Mapping in Volume II and Sediment Reconnaissance Report in Volume III.)

2. Interim Avulsion Controls - Developments within the Amole Watershed must consider upstream avulsion potentials. Either the upstream avulsion potential must be controlled as part of the development or the worst case avulsion potential used for design of drainage facilities within the development. See the Sediment Reconnaissance Mapping in Volume II for identified avulsion locations and the Sediment Reconnaissance Report in Volume III for more detail.

H. PROPOSED WATERSHED MANAGEMENT PLAN

The proposed Drainage Management Plan for each basin in the Amole Watershed is described in detail in Section III of this Volume. A summary of the proposed DMP facilities is shown schematically on Figure I-2. A short synopsis of the major elements of the DMP follows:

Westgate Dam Basin:

a. Implement the approved Amole Westgate Dam DMP (RD#61) recommendations.
b. Construct two detention dams north of I-40.
c. Construct I-40 Diversion channel conveying the flows to the West Bluff Outfall.
d. Amole Arroyo Conveyance improvements upstream from Westgate Dam.

Amole Arroyo Basin:

a. Limit the runoff in the Amole Arroyo through implementation of Powerline Detention to permit the flows to be conveyed in low flow channels. (Project PL1)
b. Construct a low flow naturalistic conveyance channel from Westgate Dam to Snow Vista confluence. Alignment to be finalized at time of development. (Project AA4)
c. Construct composite low flow/overbank flow naturalistic channel or other stable naturalistic channel for the Amole Arroyo between Snow Vista and Sacate Blanco. Alignment to be finalized at time of development. (Project AA5)
d. Construct a stable lined channel from Sacate Blanco to the existing entrance to the Amole Basin. (Project AA6)

e. Construct public amenities concurrently with Amole Arroyo improvements.

f. Maintain the existing rundown from the Amole Arroyo into the Amole Dam. Construct freeboard upgrade. (Project AA7)

Powerline Basin:

a. Develop in-line detention basins within the existing Powerline Channel ROW to restrict the flow entering the Amole Arroyo to approximately 20 cfs. (Project PL1)

b. Total in-line detention volume is estimated to be approximately 58 AF.

c. Provide freeboard upgrade to existing channel north of Central Ave. (Project PL2)

Snow Vista Basin:

a. Maintain the current 1.29 cfs/ac. runoff restriction in the Snow Vista Basin. This restriction has been implemented for development since 1994. A significant portion of this basin has been developed based on existing system capacity (RD #44).

b. Construct Benavides Inlet improvements to prevent street flows crossing the Snow Vista Channel. (Project SV1A)

c. Construct the Benavides Storm Drain. (Project SV1B)

d. Construct additional freeboard for the Snow Vista Channel riprap section from Amole Arroyo confluence north approximately 2,500 feet. (Project SV3)

South Powerline Channel Basin:

a. Construct a series of connected sedimentation/detention basins similar to existing Powerline Diversion along the Powerline ROW south of the Amole Arroyo into the northern portion of the Borrega Basin. Total detention volume is estimated to be 71 AF. This "In-line Basin" will eliminate the sediment source from the western escarpment area and minimize the avulsion potential east of the channel. (Project SP1)

b. The South Powerline Channel diverts the runoff west of the Powerline easement from the Sacate Blanco, Rio Bravo and northern portion of Borrega Basins to the Rio Bravo Channel.

c. Outfall for the South Powerline Channel is into the Rio Bravo Channel and does not increase the flow in the Rio Bravo Channel.

Sacate Blanco Basin:

a. Provide stable channel for Sacate Blanco Diversion to convey "clean" runoff from developed drainage area to the Amole Arroyo. The Sacate Blanco Diversion Channel could be replaced with a direct connection to the proposed Guac Basin depending on the sequence of development. (Project SB1)

b. South Sacate Blanco Arroyo is a major conveyance arroyo to be stabilized in conjunction with development. (Project SB2)

c. An existing channel which has developed along an existing trail as the result of an avulsion is a major conveyance to be stabilized in conjunction with development. (Project SB3)

Rio Bravo Basin:

a. Due to the detention provided by the South Powerline Channel, the flow in the Rio Bravo Channel parallel to Rio Bravo Boulevard will be less than the design flow. No revisions are proposed to the Rio Bravo Channel.

b. Construct a channel inlet structure for the South Rio Bravo Channel which collects flows south of Rio Bravo Boulevard and conveys flows to Hubbell Lake. This structure includes collection of the arroyo flows, conveyance down the escarpment, a separation structure at the crossing of the Gun Club Lateral and energy dissipation at the entrance to Hubbell Lake. (Project RB1)

c. South Rio Bravo Arroyo is a major conveyance arroyo to be stabilized in conjunction with development. (Project RB2)

Borrega Basin:

a. Construct an approximate 51 AF detention basin on the Borrega Arroyo for existing and future developed runoff. (Project BR1). The basin could be constructed in phases to match funding.

b. Limit the flow from the basin such that the total flow at the entrance to Hubbell Lake from the Borrega does not exceed the bank full capacity of the existing inlet structure (225 cfs). (An option of diverting runoff north to south Rio Bravo Arroyo or improving the inlet capacity will correct this deficiency as well.)

c. North and South Borrega Arroyos are major conveyance arroyos to be stabilized in conjunction with development. (Project BR2)

d. Divert drainage from south of Gun Club Rd (Area "6B") into the Borrega Detention Basin when development occurs via storm drain. (Project BR3)

e. Provide freeboard at Borrega Inlet. (Project BR4). This is required to provide freeboard at the 225 cfs flow rate.

Amole Del Norte Basin:

a. Implement proposed City of Albuquerque improvements upstream from the North/South Coors Pond and at inlets along the Amole Del Norte Channel to avoid overloading downstream facilities. Note: The Amole Del Norte Channel and upstream systems are maintained by the City. See ongoing City studies for detailed information on these systems.

b. Construct SAD 222 Tower/Sage detention basin and outfall storm drain in conjunction with the City.

Amole Detention/Hubbell Channel/Hubbell Lake Detention:

a. Construct the 862 AF Guac Basin to increase the total Amole/Hubbell Lake storage capacity from 983 AF to 1845 AF. Note: these volumes assume the principal spillway valves on the Amole Detention and Hubbell Detention Basins are closed during the 100-year 24-year design storm. (Projects AH1, AH2, AH3)

b. As part of the Guac Basin, enlarge the emergency spillway from the combined Guac-Amole Basin to the Hubbell Channel to accommodate the PMF flow of 45,000 cfs, lengthen the spillway from 400 ft to 960 ft. (Project AH1)

c. Increase the emergency spillway capacity at Hubbell Lake to accommodate 46,000 cfs, lengthen the spillway from 1,200 ft to 2,300 ft. (Project AH4)

d. Muli-use facilities at the Guac-Amole Basin. (Project AH5)

e. Consider alternate detention storage (1, 2 and 3) locations at northeast corner of Amole Basin (Project AH6) and at Hubbell Lake (Project AH5).

I. TECHNICAL TEAM

This DMP was prepared under the direction of the AMAFCA staff and the AMAFCA Board of Directors. Leedshill-Herkenhoff was retained by AMAFCA to perform the technical analysis. The following consultants provided technical input and guidance for the DMP.

Ayres and Associates - Sediment Reconnaissance
Marron and Associates - Environmental and Archeological
Southwest Land Research (now Sites Southwest) - Land use, public input
Vinyard and Associates - Geotechnical Evaluation of Westgate Dam.

A technical advisory team provided on-going review of the analysis and DMP development with representatives from:

AMAFCA
City of Albuquerque
- Public Works Department (Hydrology)
- Planning
- Parks and Recreation

Bernalillo County
- Public Works
- Planning

Middle Rio Grande Conservancy District

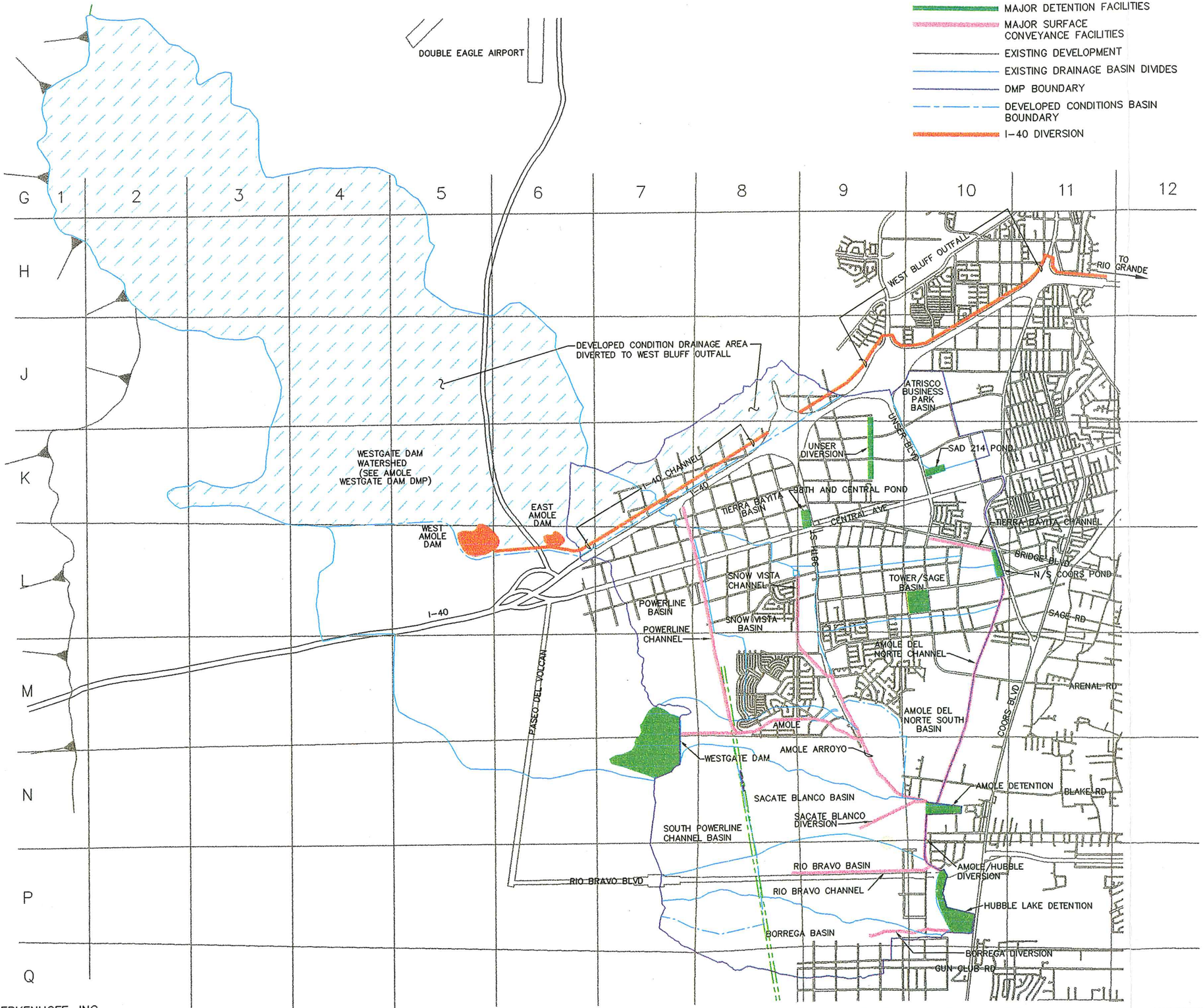
Agency representation at the Technical Team Meetings is illustrated on the following chart

J. PUBLIC INPUT

Public information and data gathering meetings were conducted on September 1996 and January 12, 1999. See minutes in Volume IV.

LEGEND

- MAJOR DETENTION FACILITIES
- MAJOR SURFACE CONVEYANCE FACILITIES
- EXISTING DEVELOPMENT
- EXISTING DRAINAGE BASIN DIVIDES
- DMP BOUNDARY
- DEVELOPED CONDITIONS BASIN BOUNDARY
- I-40 DIVERSION



APPROXIMATE BASIN AREAS

	EXISTING	DMP
WESTGATE DAM (CONTRIBUTING AREA)	18.7 SM	5.2
POWERLINE	1.7	1.2
SNOW VISTA	1.80	1.83
ATRISCO BUS. PARK	0.8	0.8
TIERRA BAYITA	3.1	2.7
TOWER/SAGE	0.2	0.2
AMOLE DEL NORTE SOUTH	2.8	2.5
AMOLE	1.1	1.3
SACATE BLANCO	1.5	0.8
RIO BRAVO	1.4	1.0
BORREGA	1.4	1.1
SOUTH POWERLINE	0	1.5
TOTAL	34.5	20.1

NOTES:

1 SEE LARGER SCALE MAPS FOR EACH BASIN IN SECTION III OF THIS VOLUME.

2 SEE VOLUME II, SUPPLEMENTAL MAPS FOR AERIAL MAPPING AND CONTOUR DATA.

N

SCALE 1" = 5000'±

AMOLE-HUBBELL D.M.P.

AMOLE-HUBBELL
DRAINAGE MANAGEMENT PLAN
BASIN MAP

FIGURE NO. I-1

LEEDSHILL-HERKENHOFF, INC.

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NOTES:

1. SEE SHEET 2 FOR PROJECT IDENTIFICATION LISTING
2. SEE LARGER SCALE BASIN MAPS IN SECTION III OF VOLUME I FOR DETAILS.
3. SEE AERIAL AND CONTOUR MAPS IN VOLUME II FOR DETAILS

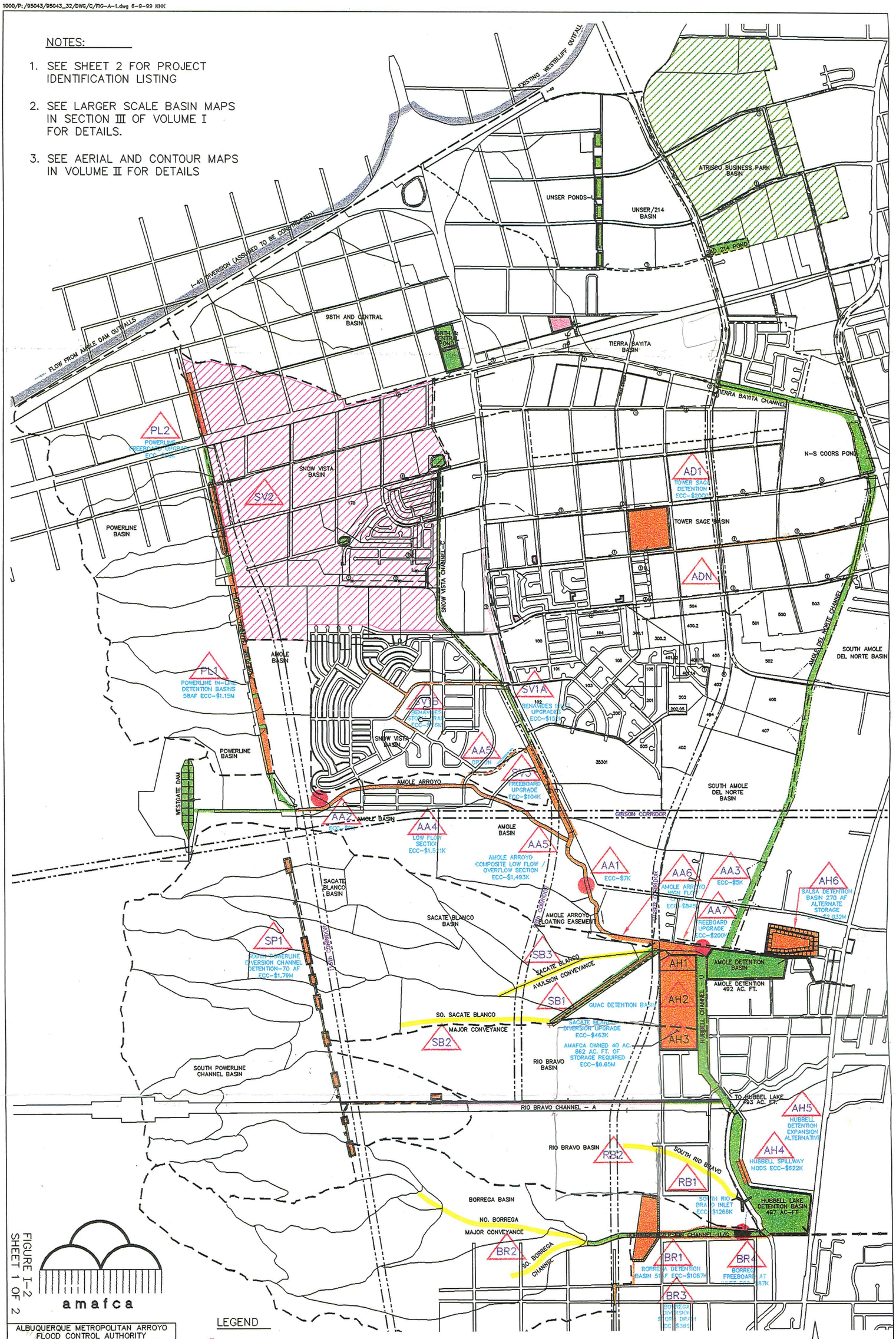

FIGURE I-2
SHEET 1 OF 2

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ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

AMOLE – HUBBELL DRAINAGE MANAGEMENT PLAN

PROPOSED DMP FACILITIES MAP

LEEDSHILL – HERKENHOFF, INC.
ENGINEERS ARCHITECTS
ALBUQUERQUE SANTA FE

LEGEND

- TODAY'S HOT SPOTS
- EXISTING DRAINAGE FACILITY
- PROPOSED DMP FACILITY
- MAJOR CONVEYANCE ARROYO
- PROGRAMMED FACILITY
- SNOW VISTA DEVELOPMENT CONSTRAINTS 1.3 cfs/AC
- ATRISCO BUSINESS PARK DEVELOPMENT CONSTRAINTS
- ECC ESTIMATED CONSTRUCTION COST (W/O BRIDGES)
- PL1 PROJECT IDENTIFICATION

TECHNICAL TEAM MEETING
ORGANIZATIONS IN ATTENDANCE

Organizations	1 2/27/96	2 3/26/96	3 4/23/96	4 5/21/96	5 6/25/96	6 8/8/96	7 10/16/96	8 10/30/96	9 1/21/97	10 12/1/98
AMAFCA	X	X	X	X	X	X	X	X	X	X
BC - PLANNING		X		X		X	X	X		
BC - PWD		X	X	X	X	X	X	X	X	X
COA - HYDROLOGY	X	X	X	X	X	X	X	X		X
COA - PLANNING		X	X	X	X	X				
COA - OPEN SPACE						X				
COA - TRANSPORTATION	X									
LH	X	X	X	X	X	X	X	X	X	X
MRGCD		X								
SWLR	X	X	X		X	X				

Abbreviations

AMAFCA - Albuquerque Metropolitan Arroyo Flood Control Authority
BC - Bernalillo County
COA - City of Albuquerque
LH - Leedshill-Herkenhoff, Inc.
MRGCD - Middle Rio Grande Conservancy District
SWLR - Southwest Land Research

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PROPOSED MAJOR REGIONAL TRUNK FACILITIES
PROJECT IDENTIFICATION LISTING

PROPOSED PRIORITY		
		CURRENT ISSUES/EXISTING CONDITIONS
H	AA1	Blake Road @ Amole Arroyo – Eliminate Possible Avulsion (Completed 1998)
H	AA2	Amole Arroyo @ Westgate Hts. – Channel Cleaning (Completed 1998)
H	AA3	Amole @ Detention Entrance – Channel Bank Upgrade (Completed 1998)
H	SV1A	Benavides Inlet Upgrade – Improve Collection from Benavides
M	SV1B	Benavides Storm Drain
H	BR1	Borrega Detention Basin (51AF) Limit flow @ Inlet
H	BR4	Borrega Freeboard @ Inlet
		AMOLE AND HUBBELL LAKE
M	AH1	Stage 1 Spillway Mod, 150 AF Basin – Provide Storage Volume for current conditions
M	AH2	Stage 2 Increase Storage by 300 AF – Future Expansion
L	AH3	Stage 3 Increase Storage to 862 AF – Future Expansion
M	AH4	Hubbell PMF Spillway Upgrade
	AH5	Hubbell Lake Expansion Alternate
	AH6	Salsa Detention Basin Alternate
		AMOLE ARROYO STABILIZATION
H	PL1	Powerline Detention Basins (58 AF) – Limit flow into Amole
H	AA4	Upper Reach Low Flow Channel – Construct Stable Channel
H	AA5	Mid Reach Composite Channel – Construct Stable Channel
H	SV2	Snow Vista Runoff Constraints – Existing
H	SV3	Snow Vista Channel Freeboard Upgrade – Provide adequate freeboard
H	AA6	Lower Reach High Flow Channel – Construct Stable Channel
L	AA7	Rundown Chute Freeboard Upgrade – Provide adequate freeboard
		SOUTH POWERLINE CHANNEL/DETENTION
L	SP1	South Powerline Basin
		In-Line Detention Basins (71 AF) – Diversion to control avulsions
		RIO BRAVO BASIN
M	RB1	South Rio Bravo Arroyo @ Hubbell Lake – Inlet structure
		DEVELOPMENT DRIVEN IMPROVEMENTS
	AD1	Tower-Sage Detention Basin and Outfall Storm Drain
	PL2	Powerline – Channel Freeboard Upgrade – Provide adequate freeboard
	SB1	Sacate Blanco Diversion Channel – Construct Stable Channel
	SB2	S. Sacate Blanco Arroyo – Stable Conveyance
	SB3	Sacate Blanco Avulsion Conveyance – Stable Conveyance
	BR2	N & S Borrega Arroyos Conveyance – Stable Conveyance
	RB2	S. Rio Bravo Arroyo Conveyance – Stable Conveyance
	BR3	Borrega Area "6B" Diversion SD – Diversion
	ADN	Amole Del Norte Basin – Ongoing City/Private Facilities

AMOLE–HUBBELL D.M.P.
FIGURE I–2
SHEET 2 OF 2

LEEDSHILL–HERKENHOFF, INC.

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II. SYSTEM HYDROLOGY

A. HYDROLOGY DATA

Hydrology for the Amole-Hubbell DMP was analyzed for the following conditions. The detailed reports are located in Volume III and the mapping is located in Volume II.

- Existing Conditions (Existing)
- Developed Conditions with Existing Facilities (DEVEX)
- Developed Conditions with Selected Alternatives
- Developed Conditions with Proposed DMP Facilities (DMP) - Summary in this report, detail in Volume III.

B. HYDROLOGIC SUMMARY - MAJOR FACILITIES

System deficiencies were identified from the existing conditions and developed conditions with existing facilities analyses. Alternative improvements were evaluated to correct these deficiencies and the apparent best alternative selected for the proposed DMP facility improvement. Table II-1 summarizes the hydrologic results at strategic locations within the watershed.

C. HYDROLOGIC (AHYMO) MODEL CONSTRUCTION

The Amole Arroyo hydrologic analysis was prepared using AHYMO_194 and the guidelines in the City of Albuquerque Development Process Manual (DPM). The hydrologic model consists of several separate independent models for the different drainage basins. See basin and subbasin mapping in Section III of this Volume and in Volume II. Volume III includes the detailed AHYMO analysis results.

The AHYMO analysis construction is as follows:

1. Amole Arroyo Basin (AA)

The Amole Arroyo collects runoff from the drainage areas which flow directly into the arroyo and also from diverted flows from Powerline, Snow Vista, Sacate Blanco and in developed conditions, the Unser Extension Storm Drain. The Amole Arroyo AHYMO model imports the runoff from these diversions for a total combined flow. In all but the DMP model, the Amole Arroyo model is integral with the Amole and Hubbell Lake model.

TABLE II-1
HYDROLOGIC SUMMARY
MAJOR AMOLE ARROYO DMP FACILITIES

Existing Facility	Existing Design Capacity/ Bank Full Capacity	Existing Conditions (100-Yr Event)	Developed Conditions-Existing Facilities (100-Yr Event) (1)	Developed Conditions w/ DMP Facilities (100-yr Event)	DMP Design Capacity (Future)	Comments
Westgate Dam (Detention)	425 AF/425 AF	345 AF	421 AF (1) 1511 AF (2)	421 AF	425 AF	
Powerline Channel @ Amole	475 cfs/2000 cfs	502 cfs	941 cfs (3)	20 cfs	475 cfs	
Amole Arroyo @ Delgado CBC	720 cfs/720 cfs	652 cfs	1525 cfs	575 cfs	720 cfs	
Snow Vista Channel @ Amole	1200 cfs/2600 cfs	1814 cfs (3)	2083 cfs (3)	2083 cfs	2100 cfs	
Entrance Rundown to Amole Dam	4235 cfs/7480 cfs	3022 cfs (4)	6089 cfs	5293 cfs	5300 cfs	
South Powerline Detention	NA	NA	NA	65.1 AF	65.1 AF	New Facility
South Powerline Channel @ Rio Bravo	NA	NA	NA	446 cfs	450 cfs	New Facility
Sacate Blanco Diversion @ Amole	853 cfs/1660 cfs	901 cfs	2380 cfs	1183 cfs(5)	1190 cfs	
Rio Bravo Roadway Channel @ Hubbell	1105 cfs/2190 cfs	400 cfs	1004 cfs	658 cfs	1105 cfs	
South Rio Bravo Channel @ Hubbell Lake	NA	357 cfs	734 cfs	644 cfs(5)	700 cfs	
Borrega Detention Basin	NA	NA	NA	51 AF	51 AF	New Facility
Borrega Diversion @ inlet	225 cfs/225cfs	612 cfs (5)	1627 cfs (5)	225 cfs	225 cfs	
Amole Dam (Detention)	492 AF/492 AF	492 AF	492 AF	1352 AF	1352 AF	w/ Guac Basin
Hubbell Channel @ Amole Dam	10159 cfs/10159 cfs	122 cfs	2524 cfs	150 cfs	10159 cfs	
Hubbell Dam	493 AF/ 493 AF	519 AF	1301AF(1) 2600 AF (2)	493 AF	493 AF	

(1) Incorporates Amole Dams and Diversion of runoff north of I-40 (15 SM±).
(2) w/o Amole Dams and Diversion north of I-40.
(3) Contained within available freeboard.
(4) Minor Channel upgrades to convey flows.
(5) Significant Improvements required to convey flows.

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2. Westgate Dam Basin (WG)

The Westgate Dam AHYMO model developed for the Amole Westgate DMP (RD-61) for developed conditions with the East and West Amole Dams and outfall facility in place is utilized. (See Figure III-1). The output hydrograph is imported into the Amole Arroyo model. The AHYMO model from RD-61 contained several warning messages. Conveyance facilities were modified in the Westgate DMP and PMP models to provide adequate conveyance to ensure all runoff is accounted for. These revisions are not based on field or design data but are just pipe size or channel size increases to provide adequate conveyance.

3. Powerline Basin (PL)

The Powerline Basin AHYMO model for developed conditions utilizes existing drainage divides with the I-40 channel in place. (See Figure III-4). The output hydrograph at the Amole Arroyo is imported into the Amole Arroyo model.

4. Snow Vista Basin (SV)

The Snow Vista AHYMO model for developed conditions utilizes existing drainage divides, the I-40 Channel in place and a runoff constraint for undeveloped areas north of Sage Rd. and west of the channel of 1.29 cfs/acre. (See Figure III-5). The drainage area east of the Snow Vista Channel, west of 98th Street (Snow Vista Blvd.) and south of Tower Rd. is diverted by storm drain into the Snow Vista Channel south of Benavides Rd. as part of SAD 222 and the Tower/Sage Drainage Plan. This area is not included in the runoff restrictions in accordance with the City approved Tower/Sage Drainage Master Plan. The output hydrograph at the Amole Arroyo is imported into the Amole Arroyo model.

5. South Powerline Channel Basin (SP)

The South Powerline Channel Basin is developed only for the DMP model. The South Powerline Channel intercepts flows from the western portions of the Sacate Blanco, Rio Bravo and a portion of the Borrega Basin. The South Powerline Channel AHYMO model is incorporated in the Rio Bravo model since the outfall is into the Rio Bravo Channel.

6. Sacate Blanco Basin (SB)

The Sacate Blanco AHYMO model for developed conditions utilizes existing drainage divides. The current flow path of the South Sacate Blanco Arroyo, which has avulsed down an existing roadway, is incorporated in the model. The output hydrograph at the Amole Arroyo is imported into the Amole Arroyo model.

7. Rio Bravo Basin (RB)

The Rio Bravo AHYMO model is constructed using the divides developed for the Rio Bravo Drainage Study (RD-22). The Rio Bravo output hydrographs are imported into the Amole Detention/Hubbell Lake model.

8. Borrega Basin (BR)

The Borrega AHYMO model is constructed using existing drainage divides with the existing diversion channel in place (RD-35, RD-38). The basin south of Gun Club Road (Basin 6B) is diverted into the Borrega watershed for developed conditions to be consistent with the West Mesa Drainage Master Plan (RD-13, RD-14)

9. Amole Del Norte Basin

The areas which drain to the N/S Coors Pond and the Amole Del Norte Channel have been studied independently by the City and by private developers. The AHYMO models from these studies were combined into a comprehensive Amole Del Norte Channel model. The output hydrograph from the Amole Del Norte model is imported into the Amole Detention Basin model. The models were reviewed and discrepancies between the models corrected. Minor revisions were made to the models to provide consistent assumptions regarding sediment yield and to provide uniformity between all of the basins in the DMP. Minor conveyance revisions were made to eliminate AHYMO warning messages.

10. Amole Detention/Hubbell Lake Detention

The Amole Detention Dam and Hubbell Lake Detention Dam provide the storage facilities at the downstream end of the Amole Arroyo Watershed. These facilities are connected by the Amole/Hubbell Channel. The Hubbell Channel was designed as an integral part of the Amole Basin emergency spillway. Output hydrographs from the Amole Arroyo, Amole Del Norte Channel, Rio Bravo Channel, South Rio Bravo Arroyo and Borrega are imported into the Amole/Hubbell model.

11. Probable Maximum Flood

The PMF AHYMO model was developed assuming that the runoff was contained in the existing diversion and conveyance systems. Conveyance systems were modified in the model to eliminate AHYMO warning messages. The I-40 channel and I-40 Roadway Embankment was assumed to contain the PMF runoff north of I-40. Overflow from the East and West Amole Dams was not included. The Amole Dam and Hubbell Lake were assumed to be full at the start of the PMP rainfall but all other detention facilities were assumed to be empty. These assumptions should represent the reasonable PMF situation for the Amole Dam, Amole/Hubbell Channel and Hubbell Lake. Rainfall distributions include the PMP and one half PMP for existing conditions. For developed conditions, the NM Dam Safety

Design Criteria, 1997 Edition for a Class C dam is utilized. The PMP precipitation is used for the freeboard hydrograph and P100 + 0.26(PMP-P100) is used for the emergency spillway hydrograph.

D. RAINFALL EVENTS

Rainfall amounts for the various design storms were obtained from the City of Albuquerque Development Process Manual and the NOAA, Atlas II. Rainfall amounts used in the analysis are summarized in Table II-2.

TABLE II-2
PRECIPITATION DATA

Return Frequency	Storm Duration	Precipitation(in.)
100 year	24 hour	2.66
100 year	6 hour	2.20
PMP (freeboard)	6 hour	13.44
Spillway PMF	6 hour	5.12

E. TRUNCATED HYDROGRAPHS

The AHYMO models typically utilize a time step DT of 0.05 hours which, when combined with the 600 point limit in AHYMO, results in a total model hydrograph time of 30 hours. The 0.05 hour time step is considered important to obtaining correct peak flow rates. Experimentation with longer time steps resulted in lower (rounded) peak flow rates.

Due to the detention in the existing and proposed systems within the watershed, several of the facilities are still discharging at the end of the 30 hour model time. Consequently, the tail of the hydrograph is not included in the total runoff volume in the AHYMO model. For this DMP, these truncated volumes are tracked manually and added to the AHYMO reported volumes. The AHYMO "modified time" command which will force all of the volume into the hydrograph is utilized where appropriate. However, in the DMP model, the extended times to drain some of the detention facilities did not allow use of the "modified time" command. For clarity, all of the truncated volumes were tracked manually for the DMP analysis to ensure that both the peak runoff rate and the total runoff volume are accurate. Truncated and total volumes for the 100 year 24 hour DMP facilities analysis are:

TABLE II-3
RUNOFF VOLUME SUMMARY (DMP FACILITIES)

Facility	30 Hour Volume (AF)	Truncated Volume (AF)	Total Volume (AF)
Westgate Dam	171	278	449
Powerline	42.7	55.4	98.1
Snow Vista	183.4	0	183.4
Sacate Blanco	73.2	0	73.2
Rio Bravo	187.0	0	187.0
South Powerline	114.9	0	115
Borrega	94	0	94
Amole del Norte	601.2	3.2	604.4
Amole Detention	1191.8	336.6	1528.4
Hubbell Lake	287.8	176.2	464

F. SEDIMENT CONSIDERATIONS

Sediment bulking was incorporated into the estimation of flow rates and runoff volumes in the AHYMO models as follows:

Existing Conditions -

- Developed Areas - 6%
- Discharge from detention or desilting basins - 0%
- Undeveloped areas w/ slopes less than 20% - 15%
- Undeveloped areas w/ slopes greater than 20% - 54%
- Steep escarpment "bad lands" areas - 54%

Developed Conditions -

- Developed areas - 6%
- Discharge from detention or desilting basins - 0%
- Undeveloped (open space) areas - 15%
- Steep escarpment open space "bad lands" areas - 54%

These estimated bulking factors were based on the Sediment Reconnaissance performed for this project by Jim Schall and Bill Spitz of Ayres Associates which is included in Volume III.

Sediment bulking factors in models obtained from others which were incorporated into the Amole-Hubbell DMP were revised to conform to these assumptions.

G. LAND USES/RUNOFF CATEGORIES

Previously approved hydrologic reports and studies which reflect ultimate development conditions were used where appropriate. In these cases, developed conditions hydrographs were imported from upstream basins to work within the constraints of the AHYMO data base. For those basins whose boundaries are not encompassed by previous studies, an assumption was made about future development trends. The process for describing ultimate development conditions is summarized below.

1. Approved studies, plans, and pertinent documents were assimilated to establish probable future zoning/land uses. These included:

   a. West Route 66 Sector Plan
   b. Tower/Unser Sector Plan
   c. Rio Bravo Sector Plan
   d. Rio Bravo Corridor Sewer Study
   e. City/County Comprehensive Plan
   f. City/County Zoning Maps

   The Southwest Area Plan was being developed during this portion of the study and was not far enough along to be incorporated. The priority of use of the data from these studies and plans is as shown in this ranking.

2. Runoff categories were developed for different representative development densities. These categories were developed to determine how sensitive the runoff rate and volume is for different land uses for the Amole area. A typical 40 acre tract was modeled in AHYMO for each typical zoning/land use classification and the runoff computed. The zoning categories conform to typical Albuquerque City Zoning Code uses. These were then compared and the 25 different land uses originally identified were condensed into 12 runoff categories. Each runoff category has similar runoff rates and volumes, although the land use may be significantly different from a traffic, noise or other aspect. The runoff categories are summarized in Table II-4 and shown on Figure II-1.

TABLE II-4
RUNOFF CATEGORIES

Runoff Category	Zoning	Description	Estimated Development Density
0	E	Drainage Facilities	
0	EO	Other Easements	
1	A-2	Ag/Residential	0.5 dwelling units /acre (d.u./ac.)
1	A-1	Ag/Residential	1 d.u./ac.

Runoff Category	Zoning	Description	Estimated Development Density
1	PI	Public Infrastructure - General	
1	RO-1	Residential	1 d.u./ac.
3	RA-2	Residential	3 d.u./ac.
3	RA-1	Residential	2 d.u./ac.
5	R-1	Residential	5.5 d.u./ac.
7	MH	Residential	8 d.u./ac.
7	SU-1	Special Use	
7	R-LT	Residential	10 d.u./ac.
8	RD		
8	R-T	Residential	15 d.u./ac.
8	R-3	Residential	20 d.u./ac.
8	O-1	Office	
8	IP	Industrial	15% of net lot (lot-building-required parking = landscaping FAR 20%-50%
8	R-2	Residential	20 d.u./ac.
8	R-G	Residential	18 d.u./ac.
9	M-1	Manufacturing	15% of net lot (lot-buildings) = landscaping FAR 20%-50%
10	C-1, C-2, C-3	Commercial	25% of net lot FAR, 15% land-scaping
11	P	Parks	
12	PI	Public Infrastructure - Schools	

The Developed Conditions Runoff Categories Map in Volume II - Supplemental Maps is a graphical summary of the predicted ultimate development runoff categories. This map was utilized to estimate future hydrologic conditions in the Amole DMP Watershed. It should be noted that the hydrologic runoff category assumed for the escarpment area along the west side of the watershed was based on R-1 zoning for the terraced area. This also incorporated the assumptions that a strip of property east of the rim at an average width of 500 ft will ultimately be reserved for Open Space and that slopes steeper than 9% would remain undeveloped.

H. EXISTING FACILITY CAPACITIES

Existing facility capacities were taken from reference reports and plans to the extent possible

Design Capacity: The capacity of the channel or basin that was the basis of the design. Adequate freeboard conforming to the criteria at the time of the design is assumed to be included.

Bank Full Capacity: The bank full capacity for each of the arroyos or channels was estimated with Manning's "n" value used in general accordance with the City of Albuquerque DPM. Powerline Channel and Snow Vista Channel each had channel sections with either riprap or concrete and the top of bank was earth. In these cases the bank full capacity was calculated for the top of the concrete or riprap, not the top of earthen bank. In these cases, as well as others, the earthen embankment may provide adequate freeboard. Detailed investigation will be required to verify adequacy, stability and continuity of the earthen section.

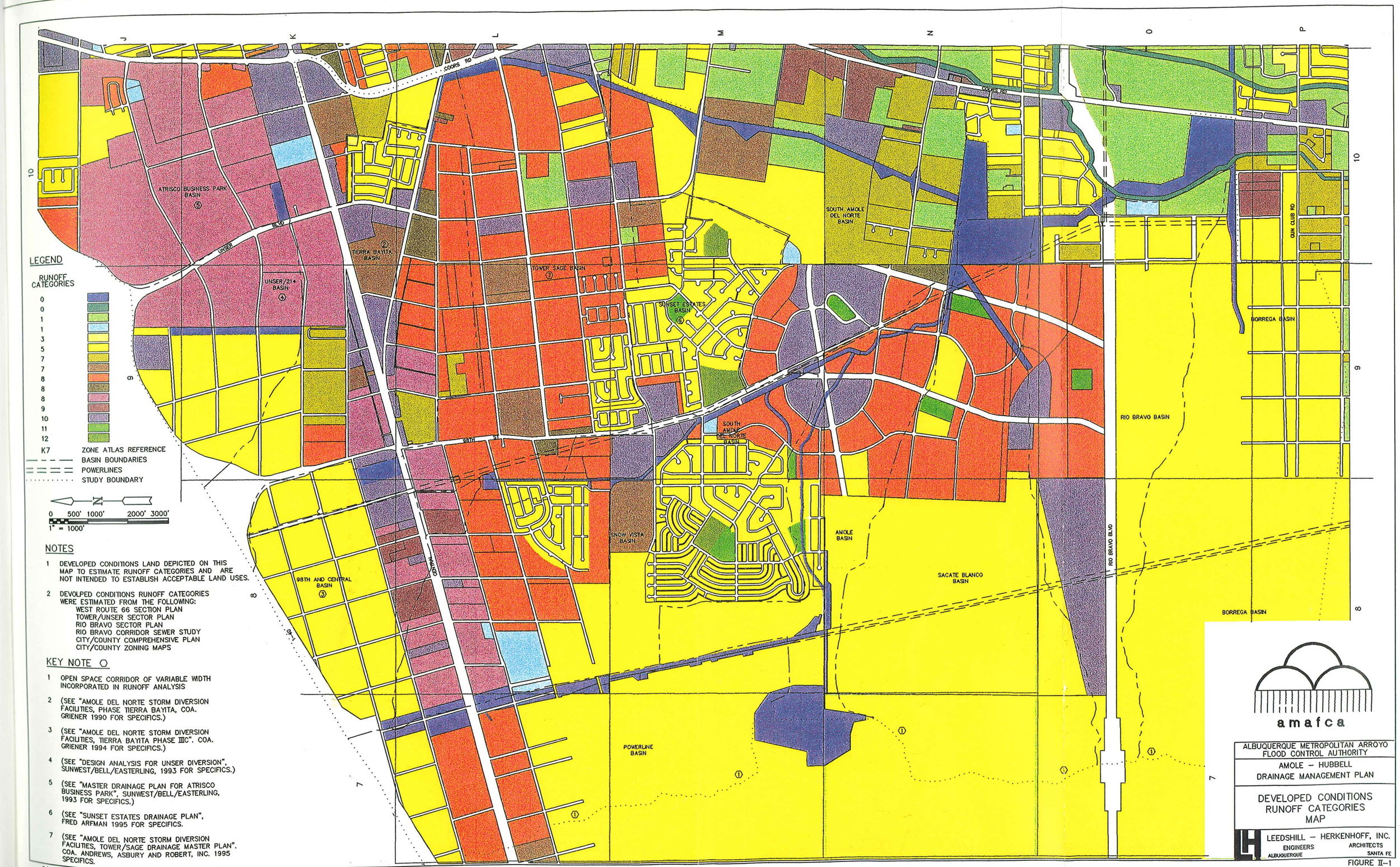

COORS RD
UNSER BLVD
98TH ST
TRAMWAY
GUN CLUB RD
RIO BRAVO BLVD
ATRISCO BUSINESS PARK BASIN
5
TIERRA BAYITA BASIN
2
UNSER/214 BASIN
4
TOWER SAGE BASIN
7
SUNSET ESTATES BASIN
6
SOUTH AMOLE DEL NORTE BASIN
SOUTH AMOLE DEL NORTE BASIN
RIO BRAVO BASIN
BORREGA BASIN
BORREGA BASIN
SNOW VISTA BASIN
AMOLE BASIN
SACATE BLANCO BASIN
98TH AND CENTRAL BASIN
3
POWERLINE BASIN
1
LEGEND
RUNOFF CATEGORIES
0
0
1
1
3
5
7
7
8
8
8
9
10
11
12
K7 ZONE ATLAS REFERENCE
BASIN BOUNDARIES
POWERLINES
STUDY BOUNDARY
N
0 500' 1000' 2000' 3000'
1" = 1000'
NOTES
1 DEVELOPED CONDITIONS LAND DEPICTED ON THIS MAP TO ESTIMATE RUNOFF CATEGORIES AND ARE NOT INTENDED TO ESTABLISH ACCEPTABLE LAND USES.
2 DEVOLPED CONDITIONS RUNOFF CATEGORIES WERE ESTIMATED FROM THE FOLLOWING:
WEST ROUTE 66 SECTION PLAN
TOWER/UNSER SECTOR PLAN
RIO BRAVO SECTOR PLAN
RIO BRAVO CORRIDOR SEWER STUDY
CITY/COUNTY COMPREHENSIVE PLAN
CITY/COUNTY ZONING MAPS
KEY NOTE O
1 OPEN SPACE CORRIDOR OF VARIABLE WIDTH INCORPORATED IN RUNOFF ANALYSIS
2 (SEE "AMOLE DEL NORTE STORM DIVERSION FACILITIES, PHASE TIERRA BAYITA, COA. GRIENER 1990 FOR SPECIFICS.)
3 (SEE "AMOLE DEL NORTE STORM DIVERSION FACILITIES, TIERRA BAYITA PHASE IIIC". COA. GRIENER 1994 FOR SPECIFICS.)
4 (SEE "DESIGN ANALYSIS FOR UNSER DIVERSION", SUNWEST/BELL/EASTERLING, 1993 FOR SPECIFICS.)
5 (SEE "MASTER DRAINAGE PLAN FOR ATRISCO BUSINESS PARK", SUNWEST/BELL/EASTERLING, 1993 FOR SPECIFICS.)
6 (SEE "SUNSET ESTATES DRAINAGE PLAN", FRED ARFMAN 1995 FOR SPECIFICS.
7 (SEE "AMOLE DEL NORTE STORM DIVERSION FACILITIES, TOWER/SAGE DRAINAGE MASTER PLAN". COA. ANDREWS, ASBURY AND ROBERT, INC. 1995 SPECIFICS.
amafca
ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
AMOLE – HUBBELL DRAINAGE MANAGEMENT PLAN
DEVELOPED CONDITIONS RUNOFF CATEGORIES MAP
LEEDSHILL – HERKENHOFF, INC.
ENGINEERS ALBUQUERQUE
ARCHITECTS SANTA FE
P:\85043\85043_32\ALLEN8\GIS\LHAZONE.dwg 3-16-99 KHK

FIGURE II-1

III. PROPOSED MANAGEMENT PLAN

A. INTRODUCTION

The proposed Drainage Management Plan for the Amole-Hubbell DMP Watershed (downstream from Westgate Dam) is presented for each basin in the watershed. The facilities addressed in this section are intended to accommodate the 100-year return frequency 24-hour storm. Dam safety issues and runoff from the PMF are presented in Section K. Tables and Figures illustrating the DMP facilities for each drainage basin are compiled at the end of each section. Additional larger scale mapping is contained in Volume II.

B. AMOLE ARROYO BASIN

1. EVALUATION

a. Situation

Location: The Amole Arroyo drainage basin is shown on Figure III-1. The Amole Arroyo within this study area extends from the existing Westgate Dam to the Amole Detention Basin. The arroyo is currently a natural earthen arroyo with short reaches of constructed earth channel. Runoff is diverted into the Amole Arroyo at three locations, Powerline Channel, Snow Vista Channel and Sacate Blanco Diversion Channel. The natural drainage area below Westgate Dam which drains into the Amole Arroyo is relatively small, approximately 1.23 square miles of the 10.12 square mile total tributary area.

Stability: The stability of the Amole Arroyo was investigated in the Sediment Reconnaissance portion of this study. The Sediment Reconnaissance report is located in Volume III. Aerial mapping with specific Amole Arroyo sediment concerns illustrated are included in Volume II.

The existing sandy soil arroyo is unstable. Erosion and deposition occurs with each rainfall event resulting in steep or vertical banks up to 10 ft. tall in the eroding areas and a shallow meandering alignment in areas of deposition. Runoff from Powerline and Snow Vista Channels are primarily "Clean" water runoff from diversions which have limited sediment carrying capacity. Continued development will increase the clean water runoff, creating more erosion and subsequent deposition and render the arroyo less stable. The instabilities create several different problems; in the erosion areas, the steep banks are a safety hazard, in the deposition areas, the shallow channel is a potential avulsion hazard and in both areas, the channel will migrate endangering existing and proposed developments.

Open Space Arroyo: The Amole Arroyo is designated as an "Open Space" Arroyo as listed in the Rank III, Amole Arroyo Corridor Plan (Corridor Plan) adopted by AMAFCA and the City of Albuquerque. Guidelines in the Corridor Plan establish an overall concept for the improvements to the arroyo. These guidelines encourage channel improvements to be compatible with the "Open Space" designation allowing recreational uses within the corridor and limiting improvements to those which have minimal impact. Drainage improvements established by this DMP control the drainage and channel parameters.

Rio Bravo Sector Plan: Near the eastern end of the Amole Arroyo, from the Snow Vista confluence to the Amole Detention Facility, the Rio Bravo Sector Plan, a Rank II development plan for future development, has been adopted by the City. It proposes a site layout that includes a large commercial/retail center, high and low density housing, parks and schools. In the developed conditions model, the proposed land uses from this sector plan are incorporated. Part of this plan is the extension of Unser Boulevard from Arenal Rd. to Rio Bravo Blvd. Extension. Portions of the drainage area that generates runoff to the Amole Del

Norte Channel will be diverted to the Amole Arroyo by a collection system in the Unser Boulevard Extension. This diversion is incorporated into the DMP. Drainage basins 35301, 35303 and 35305 are diverted into the Amole Arroyo in the Unser Blvd. Extension storm drain. The drainage area and general corridor location are shown on Figure III-1.

b. Problem Description

The Amole Arroyo upstream of the Snow Vista confluence has significant vertical channel banks that are unstable and present a danger to the public. These banks indicate the channel is in a degrading state due to "clean" water runoff from upstream Powerline Diversion and Westgate Heights and are unstable. The Amole Arroyo through Westgate Heights has a constructed or graded channel adjacent to existing development that conveys flows in what appears to be in a state of sediment equilibrium or slight aggradation. Above the Delgado crossing, aggradation is evident.

A potential avulsion of the Amole Arroyo has been identified at southwest corner of Westgate Heights. The development is slightly lower than the arroyo and a potential exists for the arroyo to overflow into the development during high flows. This situation is aggravated by local grading to prevent vehicular traffic in the bottom of the arroyo and vegetative growth. The channel was cleaned and capacity restored in the winter of 1998-1999.

Downstream of the Snow Vista confluence, the Amole Arroyo transitions from a well defined, deep rectangular channel to a wide shallow meandering channel. The meandering ends at the Sacate Blanco confluence. The meandering arroyo is susceptible to aggradation due to relatively flat slopes.

A potential avulsion exists where the extension of Blake Road crosses the Amole Arroyo. Proposed Interim temporary control measures include raising the road grade of Blake Road on each side of the arroyo to equal the adjacent bank height and still maintain a 25 mile per hour design speed. This local regrading was performed in the winter of 1998-1999. A permanent solution is still required.

In the earthen portion of the Amole Arroyo at the entrance into the Amole Detention Facility, a channel deficiency has been identified where a localized area has channel banks that are lower than the remaining channel. To mitigate this deficiency, the channel was cleaned and capacity restored in 1998-1999.

The geomorphology conducted by Ayres Associates as part of the Sediment Reconnaissance indicates that the soils in the Amole Arroyo are erosive and the present arroyo is unstable. (See Sediment Reconnaissance Report in Volume III).

c. Existing Facility Data

The existing Amole Arroyo is, for the most part, a natural, migrating arroyo with areas of aggradation and degradation. See Table III-1 for hydrologic data and approximate existing channel capacity.

The Amole Arroyo enters the Amole Detention Dam via a concrete transition channel and chute with an energy dissipator. The design flow rate was 4235 cfs (RD-14). The predicted flow with DMP facilities in place is 4111 cfs. Preliminary calculations indicate that from 0.5' to 1.4' of additional freeboard may be required on the entry channel and chute to satisfy current freeboard criteria. The predicted flows do not exceed the "bank full" capacity.

d. Existing Right-of-Way

AMAFCA has Right-of-Way (ROW) and drainage easements for the existing Amole Arroyo except through Westgate Heights which is City of Albuquerque ROW. From the Westgate Dam to the Powerline Channel confluence, AMAFCA has a 100 foot ROW. AMAFCA has an 80 foot wide "floating easement" from Westgate Heights to the Sacate Blanco confluence ROW. ROW has been dedicated from Del Rey Rd. to the Snow Vista Channel. However, the present arroyo alignment is south of this ROW.

The "floating easement" was based on the 100-year floodplain maps. The "floating easement" location does not conform to the present alignment of the Amole Arroyo in all locations due to continued erosion/sedimentation. The "floating easement" allows AMAFCA access to the arroyo for maintenance.

Sufficient ROW appears to be available for constructing a stable Amole Arroyo in the current alignment. Additional ROW may be required for public amenities such as trails, etc. For the purpose of evaluating alternatives, it is assumed that the existing ROW ownership is adequate.

ROW for the alignment proposed in the Rio Bravo Sector Plan is partially in place. ROW would be required west of Del Rey Rd. and for the alignment along the 98th Street corridor. It is assumed that this ROW would be provided by property owners during development if the Rio Bravo Sector Plan alignment is followed.

e. Developed Conditions Data

Results from the Developed Conditions Existing Facilities (DEVEX) analysis (see Chapter II of this Volume and Volume III) indicates the Amole Arroyo does not have the capacity and/or stability to safely convey the 100 year developed conditions design storm. The alternatives evaluated are intended to provide for a safe conveyance system for the design storm. Hydrologic results presented in the Developed Conditions Existing Facilities analysis were used to develop hydraulic alternative solutions. Developed conditions runoff values with existing facilities for various analysis points along the arroyo are presented in Table III-1.

f. Criteria

<u>The Amole Arroyo Corridor Plan</u> (Corridor Plan) designates the Amole Arroyo as an open space arroyo.

The criteria is to provide a drainage management plan which:

- Provides a stable conveyance system that has the capacity to convey the 100 year event and meets the City of Albuquerque's Design Process Manual requirements. A stable conveyance system in this situation is one which does not significantly degrade or aggrade for the range of flows expected.

- Conforms to the Corridor Plan and Sector Plans - visually natural ("not manmade"), allow for biking, hiking and equestrian trails.

g. Alternative Evaluation

The arroyo is currently an unstable arroyo which means it is aggradating, degradating, and meandering with each rainfall event. Therefore, a suitable method of stabilizing the arroyo will be required to provide for a safe public use facility.

The arroyo alignment from the Del Ray Road crossing to the Sacate Blanco confluence has not been established. There are two possible generic alignments. The first is to convey flows to the Snow Vista Channel alignment using the dedicated ROW north of the present alignment, then down adjacent to the existing powerlines and 98th St. Corridor to the Sacate Blanco confluence in the Rio Bravo Sector Plan proposed alignment. ROW for this alignment downstream from the Snow Vista confluence has not been dedicated. A portion of the Snow Vista Channel requires reconstruction for this configuration. The other is to use the existing natural alignment. In either case the channel treatment could be similar.

The Amole Arroyo Corridor Plan (Corridor Plan) identifies several alternative channel treatments for a long term drainage solution. Available channel treatment options identified in the Corridor Plan include "gabions (grade control structures), prudent line, rip rap, soil cement, and earth tone tinted concrete". Additional options investigated include combinations of detention and a low flow channel and composite channels (low flow with overbank high flow). These alternatives were evaluated for applicability in providing a long term stable drainage solution as well as satisfying the Corridor Plan requirements for the Amole Arroyo from Westgate Dam to the Sacate Blanco Diversion convergence. Combinations of these different methods of creating a stable channel could be used.

Below the Sacate Blanco Diversion convergence, the Amole Arroyo is channelized and changes character. Alternatives for the proposed improvements from the Sacate Blanco Diversion to the Amole Detention Facility are limited due to the high flow rates.

Nine potential alternates and combinations of treatments were identified for the Amole Arroyo. Four of these were discarded following the initial evaluation. These are discussed in subsection (3). Five alternates were explored in more detail in the following subsections (1) and (2).

(1) Five feasible and potentially prudent alternatives were explored in detail for the Amole Arroyo system meeting the criteria. These alternates are shown schematically in Figures Alternate 1 through Alternate 5. Generalized channel treatments used in these alternates are:

(a) Low Flow Channel Section: This channel section is a soil cement (or tinted concrete) channel designed similar to AMAFCA's San Antonio Channel. (See typical section on drawings.) This channel section includes the opportunity for meanders, vegetated sediment pools, varying cross sections and other measures to provide a "naturalistic" feel. The reduced flow rate, accomplished by upstream detention, allows a relatively small channel width providing adequate space for trails and other amenities.

(b) High Flow Composite Channel Section: This channel concept incorporates a stabilized soil cement or tinted concrete low flow section for recurring flows and a stabilized overbank flow area for larger events. (See typical section on Alternative drawings.) The recurring flow channel could be similar to the naturalistic treatment of the Low Flow section. Providing stability for the overbank flow includes:

- ✧ buried riprap along the channel edge for velocity transition,
- ✧ buried grade control structures to control local erosion,
- ✧ landscape grasses, forbs and shrubbery capable of resisting the shallow infrequent flows,
- ✧ trails and public amenities consistent with the shallow infrequent overbank flow, and
- ✧ freeboard conforming to FEMA levee requirements (3' minimum, 4' adjacent to structures which restrict flow).

(c) High Flow Stabilized Channel: This section is proposed only where flow depths and velocities are such that the composite channel is not feasible. The proposed section is a trapezoidal soil cement or tinted concrete channel over 6' deep. (See typical section on Alternative drawings. This section can be softened by use of exposed soil cement ledges, varying section, etc. This section is used below the confluence with Sacate Blanco for all alternatives.

(d) Amole/Snow Vista Pond: Two alternatives incorporate a detention pond at the Amole Arroyo and Snow Vista Channel confluence. Two pond configurations were evaluated: one, the pond location is on the Snow Vista Channel above the confluence with the Amole Arroyo. Runoff from the Snow Vista Channel could be discharged from the pond at a rate of 50 cfs. Runoff from the Amole Arroyo would be conveyed in the arroyo. This would result in a 131 AF detention pond on approximately 30 acres. The combined flow rate below the confluence is 450 cfs.

The second configuration is to locate the pond at the confluence such that the pond detains both the Snow Vista and Amole Arroyo flows. The end result is approximately 35 acres for the pond, a detention volume of 166 AF, and an overall reduction in the downstream low flow channel size. The flow exiting the pond is limited to a peak flow of 150 cfs. This option is included in the alternatives which include low flow channel section below the confluence. A pond at the Amole

Arroyo/Snow Vista confluence does not conform to the Rio Bravo Sector Plan (RD-58). The Sector Plan proposes a high density "urban center" for this vicinity which may not be consistent with a large detention pond/open space facility.

(2) The Alternates are:

(a) Alternate 1: Low Flow channel section from Westgate to Sacate Blanco confluence and a high flow stabilized channel to the Amole Basin. This requires 51 AF detention on Powerline and 166 AF detention at Snow Vista/Amole confluence.

(b) Alternate 2: Low Flow channel section from Westgate to confluence with Snow Vista, high flow composite section to Sacate Blanco and high flow stabilized channel to the Amole Basin. This requires 51 AF detention on Powerline and follows the Rio Bravo Sector Plan alignment.

(c) Alternate 3: High flow composite section from Powerline to Snow Vista and low flow section from Snow Vista and Sacate Blanco and high flow section to the Amole Basin. This requires 232 AF detention at Snow Vista.

(d) Alternate 4: High flow composite section from Westgate to Sacate Blanco and high flow section to the Amole Basin. No detention is required. The alignment follows Rio Bravo Sector Plan alignment.

(e) Alternate 5: Low flow section from Westgate to Snow Vista, High flow composite section Snow Vista to Sacate Blanco and high flow section to Amole Basin. This requires 51 AF detention on Powerline and follows AMAFCA "floating easement" alignment.

These alternates are summarized on Table III and shown schematically on the Alterative drawings (Figures Alternative 1 to Alternative 5).

(3) Several Channel Alternatives were investigated and discarded. These included:

(a) Grade Control Structures: Grade control structures are helpful in reducing the channel velocity and erosion potential. The Amole Arroyo is a relatively steep channel which would require grade control structures to be placed about every 200 feet or so, depending on the drop height. Grade control structures can be made of different materials such as rip rap, gabions, concrete, and soil cement. Of these building materials, riprap and gabions are recommended for limited use only due to their rodent habitat potential. After investigating the hydraulic advantages and disadvantages, and long term maintenance requirements, the grade control alternative was eliminated from further consideration for the following reasons:

TABLE III
SUMMARY OF ALTERNATES

	Powerline Detention	Westgate to Snow Vista	Snow Vista Detention	Snow Vista to Sacate Blanco	Sacate Blanco to Rundown	Conceptual Project Cost	Comments
Alt. 1	Yes 58 AF $1,230,000	Low Flow, Section $1,147,000	Yes 166 AF 35 Ac Row $2,656,000	Low Flow Section $427,000	High Flow Section $735,000	$6,195,000 Crossing Struct. $2,975,000 Total = $9,170,000	
Alt. 2	Yes 58 AF $1,230,000	Low Flow, Section $1,304,000	None	High Flow Composite Section $2,111,000	High Flow Section $845,000	$5,490,000 Crossing Struct. $4,131,000 Total = $9,621,000	Utilizes Arroyo ROW proposed in Rio Bravo Sector Plan
Alt. 3	None	High Flow Composite Section $2,262,000	Yes 232 AF 50 Ac ROW $3,734,000	Low Flow Section $427,000	High Flow Section $735,000	$7,158,000 Crossing Struct. $3,377,000 Total = $10,535,000	
Alt. 4	None	High Flow Composite $2,754,000	None	High Flow Composite $2,220,000	High Flow Section $845,000	$5,819,000 Crossing Struct. $4,533,000 Total = $10,352,000	Utilizes Arroyo ROW proposed in Rio Bravo Sector Plan
Alt. 5	Yes 58 AF $1,230,000	Low Flow Section $1,521,000	None	High Flow Composite $1,493,000	High Flow Section $845,000	$5,089,000 Crossing Struct. $5,098,000 Total = $10,187,000	Similar to Alt. 2 Utilizes existing AMAFCA "Floating Easement"

- ✧ The average arroyo bed slope is 2.3 percent. Therefore, to obtain a stable average bed slope of 0.6 percent, 3 ft. high grade control structures would be placed, on average, at approximately 175 foot intervals. This is costly, both for construction and maintenance.

- ✧ The Amole Arroyo has two basic channel cross sections. First, the upper end is deeply incised with no well defined low flow channel from the Delgado CBC crossing to below the convergence with the Snow Vista Channel. The balance of the system transitions to a wide and shallow cross section with a defined low flow channel. In both cases, grade control structures would span from bank to bank making it difficult and costly to construct pedestrian, bike and equestrian trails.

(b) Prudent/Erosion Setback Limits: Prudent line erosion limits could be used to establish development limits and provide an area for the Amole Arroyo to continue to migrate and evolve. The Sediment Reconnaissance report in Volume III, indicates the Amole Arroyo is not a suitable candidate for a prudent line/erosion setback due to the following:

- ✧ The Arroyo carries "clean water" runoff from the Westgate Dam, the Powerline Diversion, the Snow Vista Diversion and from existing and future development in the basin. The "clean water" will continue to erode where it enters the channel and in steeper channel sections and deposit where the channel grade flattens, continuing the current unstable situation, essentially forever.

- ✧ The prudent line could feasibly be used in the lower reach of the Amole Arroyo from the Snow Vista Channel to the Sacate Blanco Diversion convergence in the current situation in which deposition of material eroded from the upper reach is deposited. However, when the upper reach is stabilized and when development occurs, the lower reach will exhibit the same erosion instabilities as the upper reach.

This option is not considered feasible for the Amole Arroyo.

(c) Runoff Constraints: The runoff from the northern portion of the Snow Vista Basin is being developed with a 1.29 cfs/acre runoff due to the limited capacity of the existing Snow Vista Channel. However, the existing development south of Sage Road was originally developed with "free discharge" which results in high flows in the Snow Vista Channel

Imposing runoff constraints in the Amole Basin does not appreciably reduce the flow rate in the Arroyo. (See Figure III-1). Most of the flow is from Snow Vista Diversion, Powerline Channel and developed areas in Westgate Heights.

Therefore, runoff constraints were not considered feasible.

(4) Recommended Alternative

The Recommended baseline alternative is:

- ✧ 51 AF detention on Powerline and a low flow channel from Westgate Dam to Snow Vista confluence.
- ✧ Composite channel from Snow Vista to Sacate Blanco. Developed alignment could be in the existing AMAFCA "floating easement", in the RBSP alignment or other alignment. The routing is not critical for the conveyance and can be established at the time development occurs.
- ✧ High flow channel from Sacate Blanco to Amole Basin.

Alternative 2 and Alternative 5 illustrate the proposed alternative. This conveyance alternative provides the following advantages:

- ✧ Upper low flow channel and mid reach composite channel compatible with Corridor Plan.
- ✧ Consistent with RBSP land use (no detention at Snow Vista).
- ✧ Alignment within existing AMAFCA easement within RBSP alignment or other compatible alignment.

2. PROPOSED MANAGEMENT PLAN

The Baseline Alternative described above is the proposed Management Plan. This proposed management plan is schematically shown on Figure III-1 and the Alternative 2 and Alternative 5 Figure. The hydrologic results for the Amole Arroyo with the proposed plan in place are contained in Table III-2.

The proposed improvements are:

a. Limit Flows into the Amole Arroyo from Powerline Diversion

Powerline Detention: Construct an additional 58 acre feet of detention storage on the Powerline Channel with a Q_{100} discharge limit of 20 cfs at the Amole Arroyo confluence. See the Powerline Basin section for specifics.

Priority - High (required to implement DMP solution and to stabilize Amole Arroyo)

b. Channel Improvements

Upper Reach Low Flow Channel: Construct low flow channel with open space appurtenances from Westgate Dam to the Snow Vista confluence. This channel would be

designed to convey "clean" water discharges and use "naturalistic" construction in conformance with the Corridor Plan. Channel treatments to consider include meandering soil cement, concrete and riprap channel sections, silt traps, natural appearing drop structures, etc. A conceptual section of the low flow channel with recreational amenities is shown on Figure III-2 and on the Alternative drawings. If the low flow channel is assumed to be a trapezoidal section made of soil cement or concrete with 4:1 side slopes with the required freeboard, the approximate minimum bottom widths and channel depths to accommodate the predicted runoff are:

Westgate Dam to Powerline - 74 cfs - 5 ft. bottom (4' deep channel)
Powerline to Snow Vista - 575 to 693 cfs - 14 ft. bottom (4' deep channel)

Priority - High (required to implement DMP solution and stabilize Amole Arroyo)

Mid Reach Composite Channel: Construct composite channel from Snow Vista confluence to approximately Sacate Blanco. The proposed alignment is within the current AMAFCA "floating easement", or following the present alignment which is not within the floating easement, along the RBSP alignment or other alignment compatible with development. The composite channel consists of a low flow soil cement or tinted concrete "naturalistic" channel capable to conveying the 10-year runoff without overtopping. Less frequent higher flows would be conveyed in overbank areas as shallow low velocity flow. See conceptual section on Alternative Drawings 3 and 4 and on Figure III-2. The low flow portion is estimated to be approximately 4 feet deep with a 10 foot bottom width. The overbank flow area is approximately 70 feet wide with freeboard according to FEMA levee requirements. Freeboard is 3' with an additional 1' of freeboard required 100' before and after structures. Additional channel lining depth would also be required in curves, superelevations and conditions where back water conditions may be encountered.

Long term maintenance costs will be higher due to potential damage from storms greater than the 10-year frequency.

Priority - High

Lower Reach High Flow Channel: Construct a high flow soil cement or concrete channel from the Sacate Blanco confluence to the existing concrete channel transition at the inlet to Amole Dam. This trapezoidal channel is estimated to be 8 feet deep with a 30 foot bottom width. Naturalistic treatment could include exposed soil cement steps similar to the Callabacias Channel. This channel section is shown schematically on the Alternative drawings and on Figure III-2.

Priority - High.

Amole Rundown Upgrade: Construct additional freeboard for the existing rundown transition channel and chute. Provide additional freeboard using pinned curb or similar construction estimated to range from 0.5' to 1.4' high.

Priority - Low (concurrent with upstream development).

Crossing Structures: Numerous structures across the Amole Arroyo will require coordination, both for design and timing. These include major arterials such as Gibson, 98th and Unser as well as collector and local streets. Composite channels will require longer, and thus more costly, crossing structures.

The crossing structure design must be consistent with the hydraulic concept for the arroyo

Priority - Concurrent with development

Tributary Conveyances within the Amole Arroyo Basin must enter the proposed low flow channel via an underground conduit or by an open channel connection which is consistent with the open space design and AMAFCA approved. Improvement of these tributary conveyances should occur concurrently with development.

Priority - Low, (concurrent with Development)

c. Interim Conditions

Interim Urgent Improvements: Three improvements to the Amole Arroyo were identified in the existing conditions analysis (Volume III) which need to be constructed as soon as possible.

- Blake Road Crossing: The dirt road crossing of Blake Road of the Amole Arroyo is a potential avulsion hazard. Regrading of Blake Road to prevent the flow from diverting down Blake Rd. is proposed. AMAFCA is coordinating this work with Bernalillo County.

  Priority - Maintenance forces have corrected.

- Arroyo Channel Bank Height at Entrance to Detention Basin: The north bank of the earthen Amole Arroyo just upstream from the entrance to the Amole Detention Facility should be increased to safely convey the predicted existing conditions 100-year event and provide freeboard. Grading to accommodate local runoff must be incorporated.

  Priority - Maintenance forces have corrected.

✧ Arroyo Regrading at Westgate Heights: The existing earthen section at the southwestern corner of Westgate Heights has been graded to discourage vehicular traffic and trees and shrubs are growing in the channel. These conditions result in reduced arroyo capacity and the potential for avulsion. Regrading is proposed to provide adequate hydraulic capacity.

Priority - Maintenance forces have corrected.

d. Land Use Issues

Runoff Constrains: Due to the capacity of the proposed DMP solution, runoff constraints are not proposed in the Amole Arroyo Basin.

Priority - N/A

Open Space/Recreational Facilities: Concurrent with Amole Arroyo improvements, construct public open space and recreational amenities as generally conforming to the Corridor Plan including:

Pedestrian/Equestrian Trails
Landscaping
Foot bridges.

Priority - Concurrent with Arroyo Improvements.

Right-of-Way: Investigate floating easements owned by AMAFCA and confirm status or convert into ROW. Obtain fee interest at time of platting.

Priority - High

e. Crossing Structures

Crossing structures for the Amole Arroyo include the proposed 118th Street corridor across the low flow channel Upper Reach, the proposed Gibson Corridor and 98th Street corridor across the Mid-Reach Composite Channel and the proposed Unser Corridor crossing the high flow channel for the Lower Reach. The composite channel requires a longer span bridge and thus a higher cost crossing structure.

f. Budget

Budget Estimate: The estimated project cost of the proposed DMP (Alternative 5) facilities is:

Low Flow Channel Upper Reach - $ 1,521,000
Composite Channel - Mid Reach - $1,492,000
High Flow Channel - Lower Reach - $845,000

Channel Right-of-Way should be available within in the existing Amole Arroyo ROW and easements with minor exceptions or dedicated during platting process.
Powerline Detention - See Powerline Section
Rundown Upgrade - $ 200,000
Crossing Structures -

- Low Flow Channel Upper Reach - $534,000
- Composite Channel - Mid-Reach - $1,837,000
- High Flow Channel - Low Reach - $909,000

Timing: These facilities should be constructed prior to further significant development of the upstream watershed. This includes Powerline and Amole Basins which are essentially undeveloped and the Snow Vista Basin which is currently approximately 75 % developed.

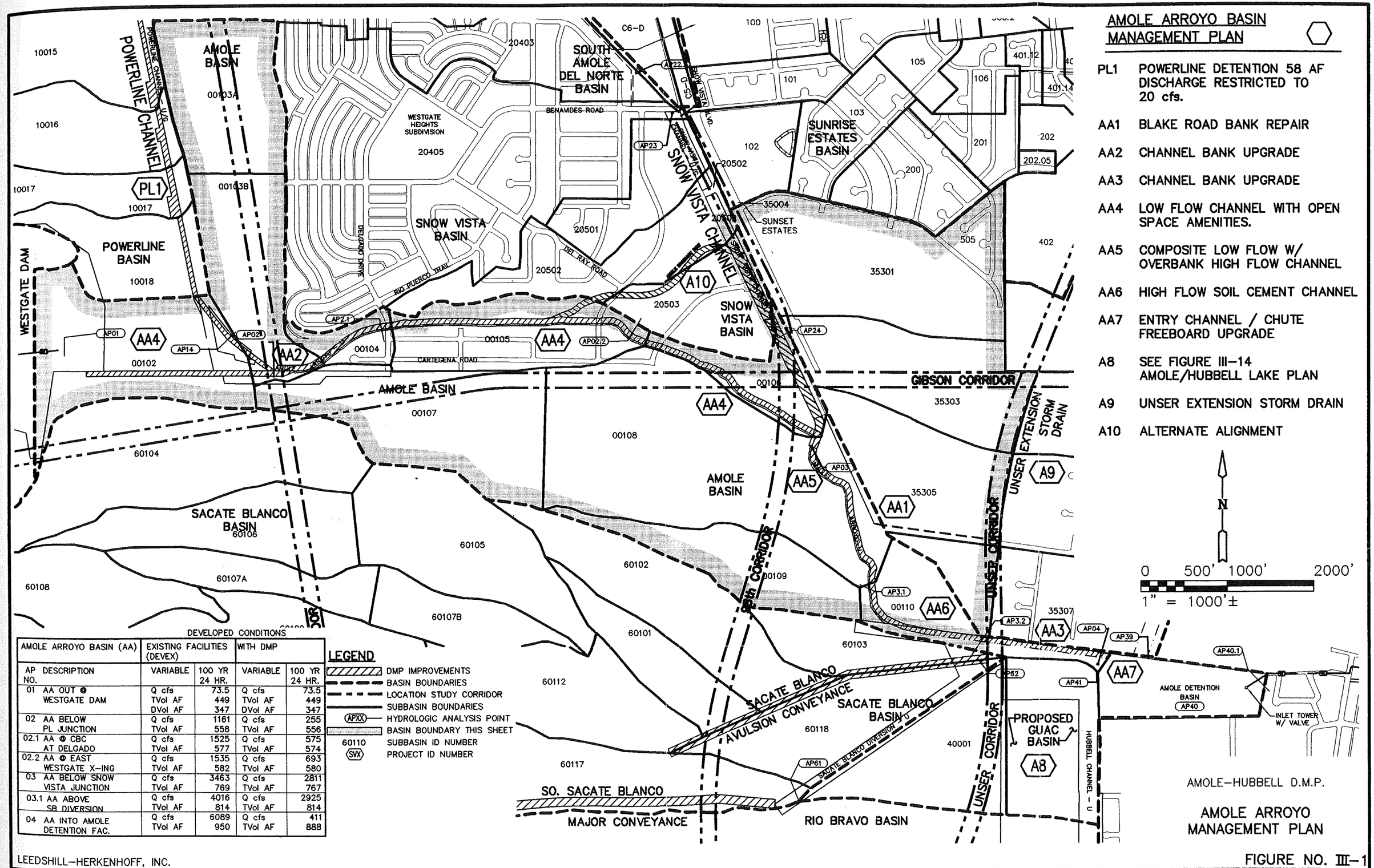
TABLE III -1
HYDROLOGIC SUMMARY
AMOLE ARROYO BASIN

AP NO.	MAP NO.	DESCRIPTION	VARIABLE	EXISTING FACILITIES			PROPOSED DMP FACILITIES	
				EXISTING	DEVEX	EXISTING CAPACITY	DMP	FUTURE CAPACITY
1	6	AMOLE ARROYO OUT @ WESTGATE	Q (cfs)	73.2	73.5	74	73.5	74
			Tvol (AF)	418	449		449	
			Runoff (in)	0.17	0.62		0.62	
			cfs/ac	0.01	0.02		0.02	
2	6	AMOLE ARROYO BELOW POWERLINE JUNCTION	Q (cfs)	562	1161	N/A	255	N/A
			Tvol (AF)	489	558		556	
			Runoff (in)	0.22	0.81		0.64	
			cfs/ac	0.04	0.28		0.06	
2.1	6	AMOLE ARROYO AT CBC AT DELGADO	Q (cfs)	652	1525	1026	575	1026
			Tvol (AF)	494	577	(bank full)	574	(bank full)
			Runoff (in)	0.22	0.84		0.67	
			cfs/ac	0.05	0.36		0.13	
2.2	6	AMOLE ARROYO AT EAST WESTGATE CROSSING	Q (cfs)	620	1535	N/A	693	N/A
			Tvol (AF)	497	582		580	
			Runoff (in)	0.22	0.84		0.68	
			cfs/ac	0.05	0.36		0.16	
3	7	AMOLE ARROYO AND SNOW VISTA CONFLUENCE	Q (cfs)	1990	3463	N/A	2825	N/A
			Tvol (AF)	603	769		767	
			Runoff (in)	0.29	1.06		0.94	
			cfs/ac	0.14	0.63		0.51	
3.1	7	AMOLE ARROYO ABOVE SACATE BLANCO CONFLUENCE	Q (cfs)	2237	4016	N/A	3526	N/A
			Tvol (AF)	639	814		814	
			Runoff (in)	0.29	1.11		0.98	
			cfs/ac	0.15	0.68		0.61	
4	7	AMOLE ARROYO INTO AMOLE DETENTION FACILITY	Q (cfs)	3022	6089	1500 cfs channel	5293	4650
			Tvol (AF)	657	950	4235 cfs chute	925	
			Runoff (in)	0.31	1.18	(bank full)	1.08	
			cfs/ac	0.19	0.89	3000 cfs channel	0.81	
						7480 cfs chute		

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.
Q - Peak discharge rate
Tvol - Total runoff volume (includes truncated volumes)
Dvol - Maximum detained volume
Runoff - inches of runoff

cfs/ac - peak discharge rate per acre of contributing area.
Existing - Existing land use and existing drainage facilities.
DEVEX - Fully developed land use and existing drainage facilities.
Capacity - Design capacity.
DMP - Proposed improvements in place, fully developed land use.



AMOLE ARROYO BASIN (AA)	EXISTING FACILITIES (DEVEX)		WITH DMP	
AP NO. DESCRIPTION	VARIABLE	100 YR 24 HR.	VARIABLE	100 YR 24 HR.
01 AA OUT @ WESTGATE DAM	Q cfs TVol AF DVol AF	73.5 449 347	Q cfs TVol AF DVol AF	73.5 449 347
02 AA BELOW PL JUNCTION	Q cfs TVol AF	1161 558	Q cfs TVol AF	255 556
02.1 AA @ CBC AT DELGADO	Q cfs TVol AF	1525 577	Q cfs TVol AF	575 574
02.2 AA @ EAST WESTGATE X-ING	Q cfs TVol AF	1535 582	Q cfs TVol AF	693 580
03 AA BELOW SNOW VISTA JUNCTION	Q cfs TVol AF	3463 769	Q cfs TVol AF	2811 767
03.1 AA ABOVE SB DIVERSION	Q cfs TVol AF	4016 814	Q cfs TVol AF	2925 814
04 AA INTO AMOLE DETENTION FAC.	Q cfs TVol AF	6089 950	Q cfs TVol AF	411 888

LEEDSHILL-HERKENHOFF, INC.

FIGURE NO. III-1

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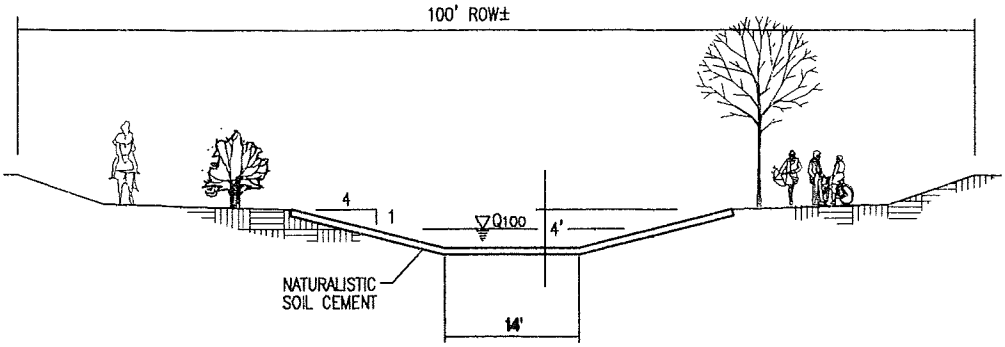
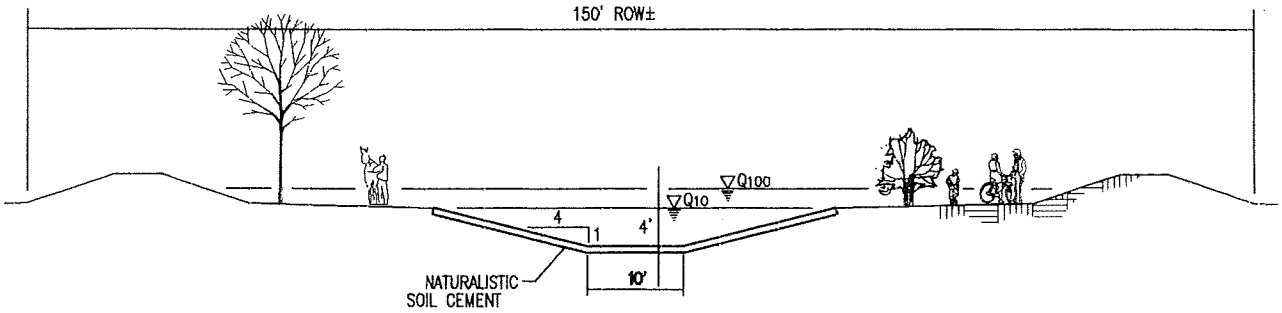


TYPICAL LOW FLOW SECTION AMOLE ARROYO

NOT TO SCALE



TYPICAL HIGH FLOW COMPOSITE SECTION AMOLE ARROYO

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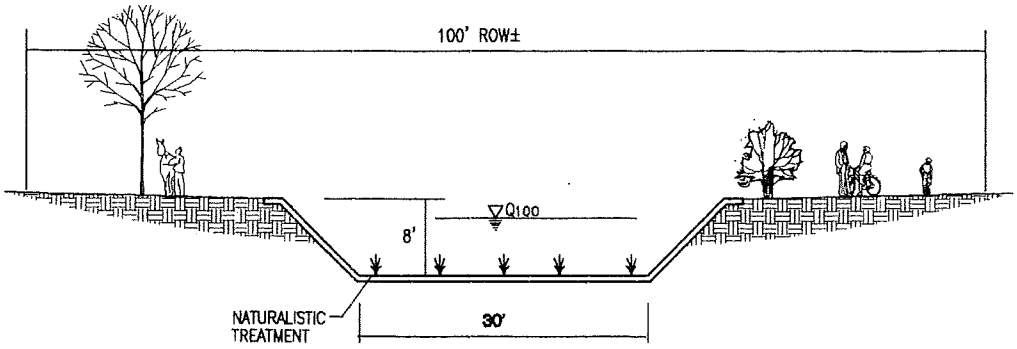

TYPICAL HIGH FLOW SECTION AMOLE ARROYO

NOT TO SCALE

AMOLE–HUBBELL D.M.P.

AMOLE ARROYO
CHANNEL SECTIONS

LEEDSHILL–HERKENHOFF, INC.

FIGURE NO. III–2

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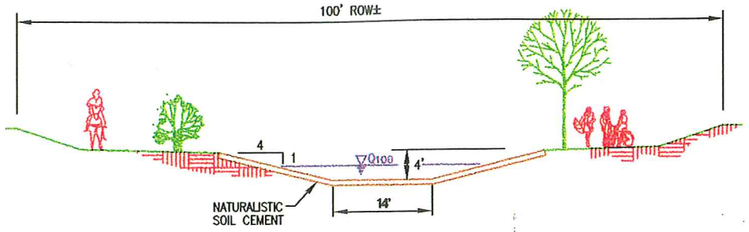
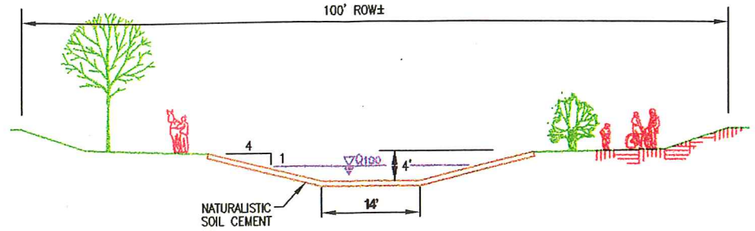
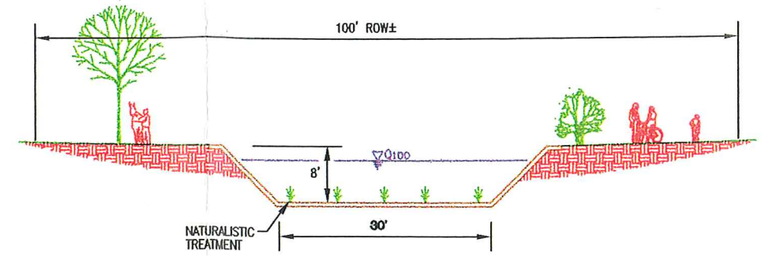


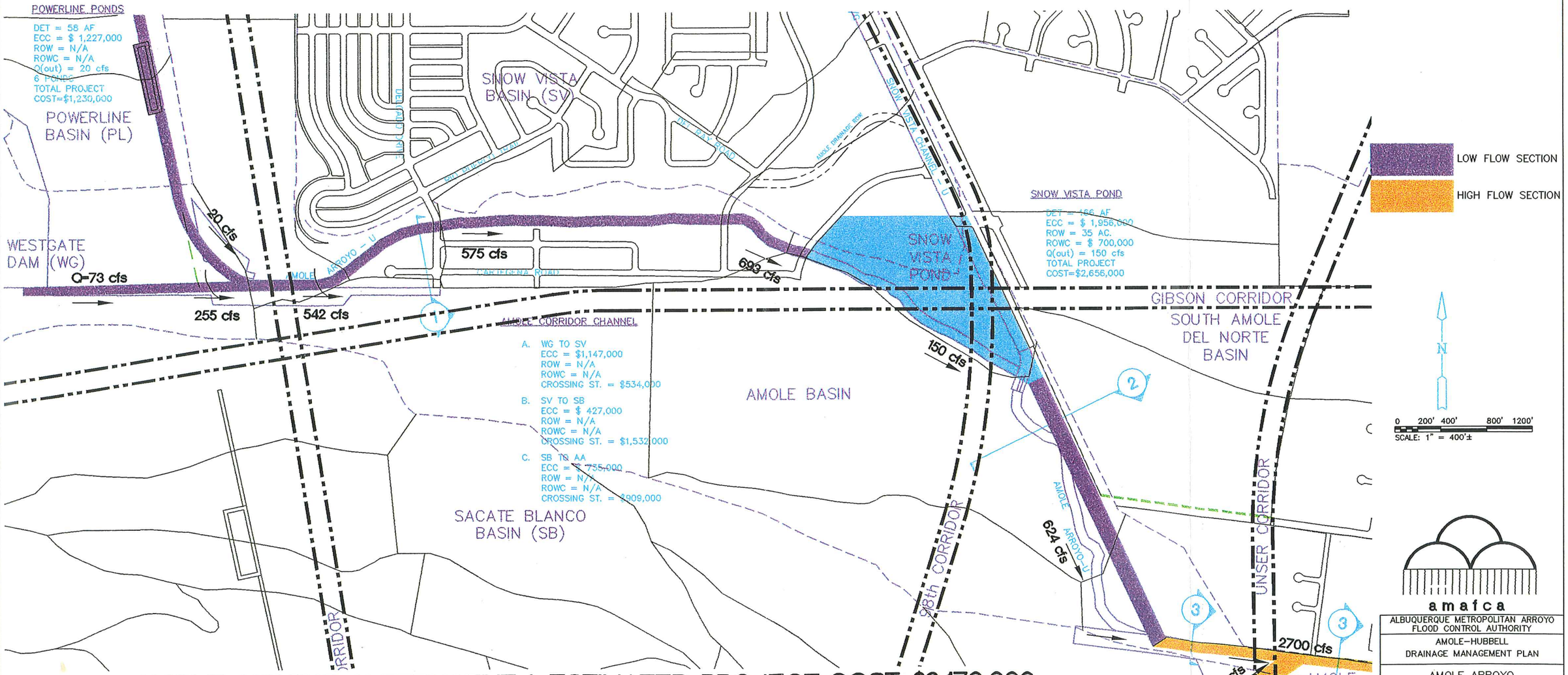
1 LOW FLOW SECTION - PL TO SV
AMOLE ARROYO
NOT TO SCALE



2 LOW FLOW SECTION - SV TO SB
AMOLE ARROYO
NOT TO SCALE



3 HIGH FLOW SECTION - LOWER AMOLE
AMOLE ARROYO
NOT TO SCALE



amafca
ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
AMOLE–HUBBELL DRAINAGE MANAGEMENT PLAN

AMOLE ARROYO ALTERNATIVE 1 (LOW/LOW)

LEEDSHILL – HERKENHOFF, INC. an ASCG Company
ENGINEERS ALBUQUERQUE
ARCHITECTS SANTA FE

AMOLE ARROYO ALTERNATIVE 1, ESTIMATED PROJECT COST=$9,170,000

POWERLINE POND/LOW FLOW CHANNEL SNOW VISTA POND/LOW FLOW CHANNEL

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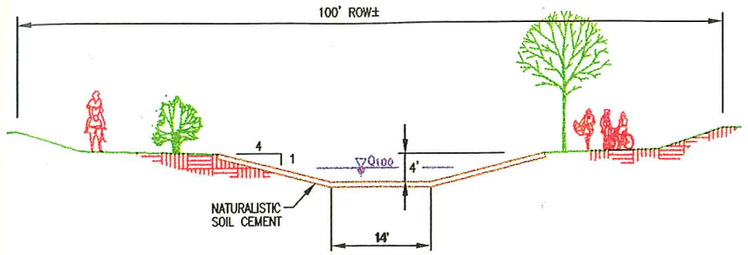
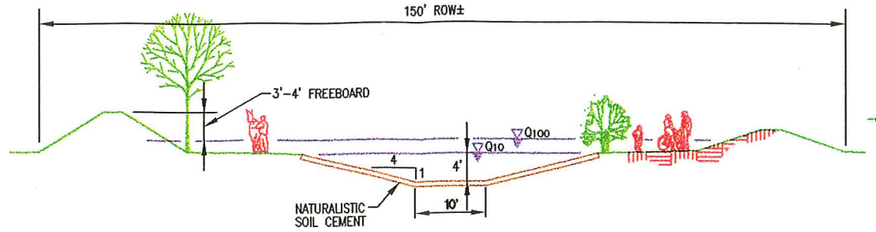


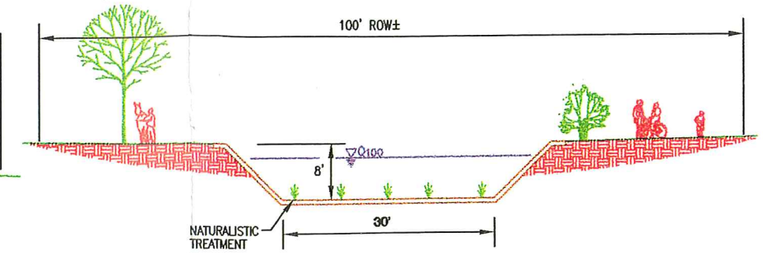
LOW FLOW SECTION - PL TO SV AMOLE ARROYO

1 NOT TO SCALE



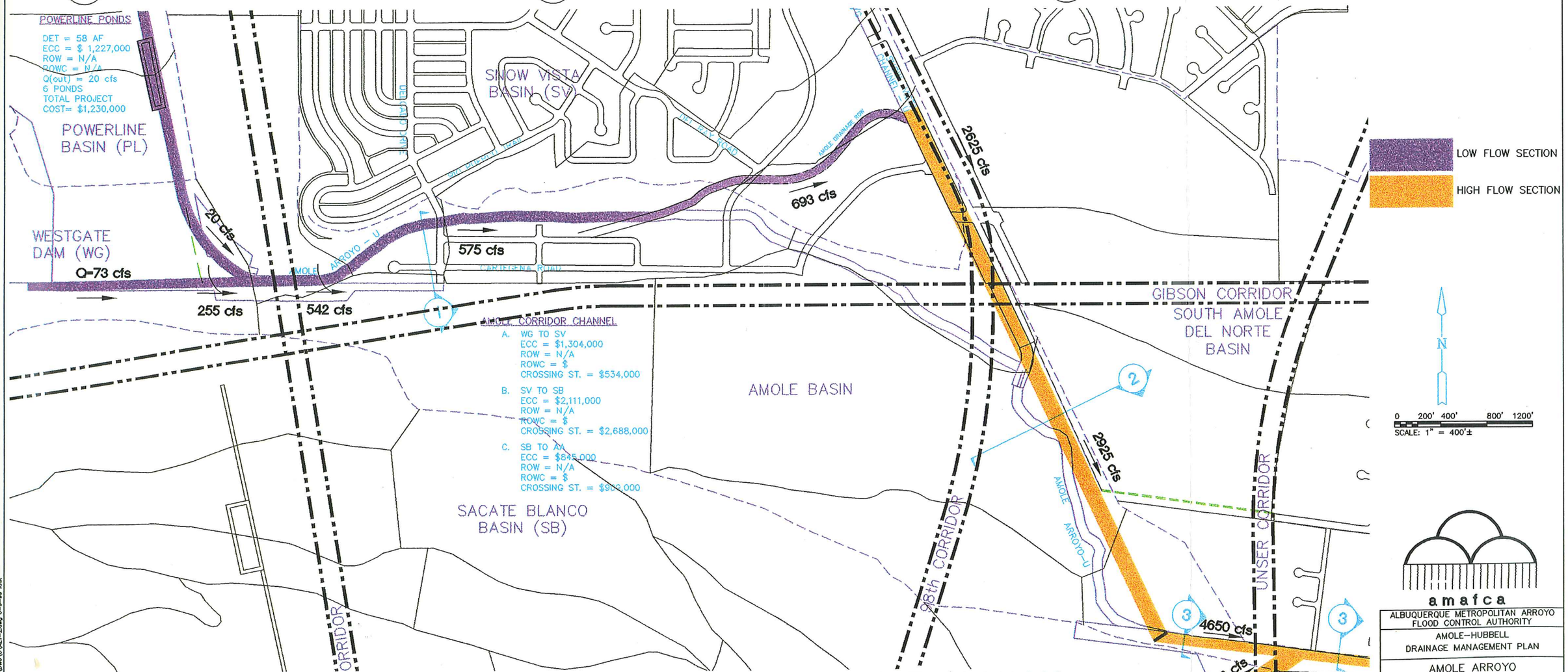
HIGH FLOW COMPOSITE SECTION-SV TO SB AMOLE ARROYO

2 NOT TO SCALE



HIGH FLOW SECTION - SB TO AMOLE DET. AMOLE ARROYO

3 NOT TO SCALE



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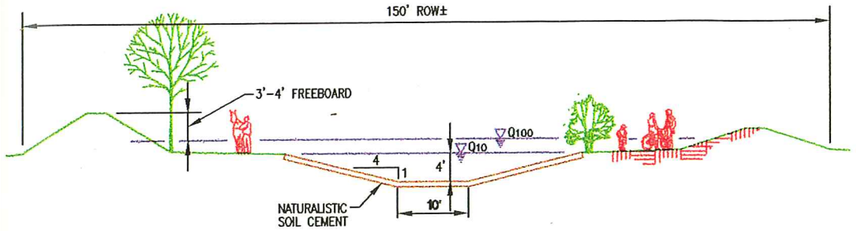
ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY
AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AMOLE ARROYO ALTERNATIVE 2 (LOW/HIGH)

LEEDSHILL - HERKENHOFF, INC. an ASCG Company
ENGINEERS ALBUQUERQUE
ARCHITECTS SANTA FE

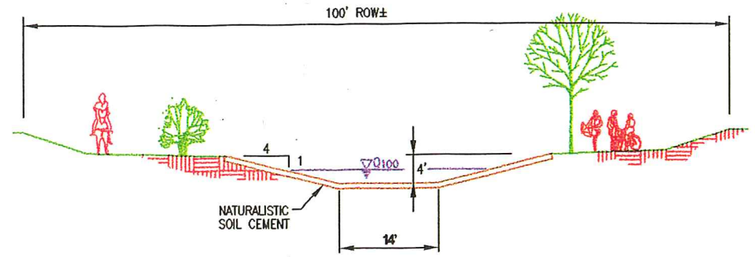
AMOLE ARROYO ALTERNATIVE 2, ESTIMATED PROJECT COST= $9,621,000

POWERLINE PONDS / LOW FLOW HIGH FLOW BELOW SNOW VISTA



1 HIGH FLOW COMPOSITE SECTION - PL TO SV AMOLE ARROYO

NOT TO SCALE



2 LOW FLOW SECTION - SV TO SB AMOLE ARROYO

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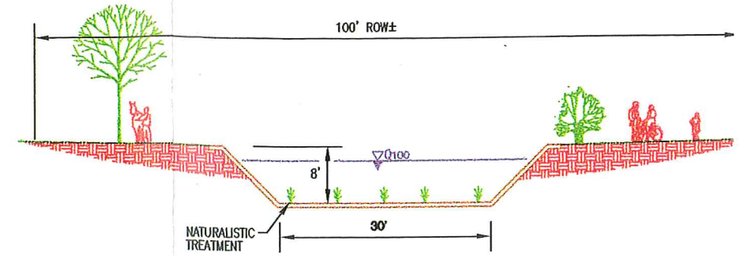

3 HIGH FLOW SECTION-SB TO AMOLE DET. AMOLE ARROYO

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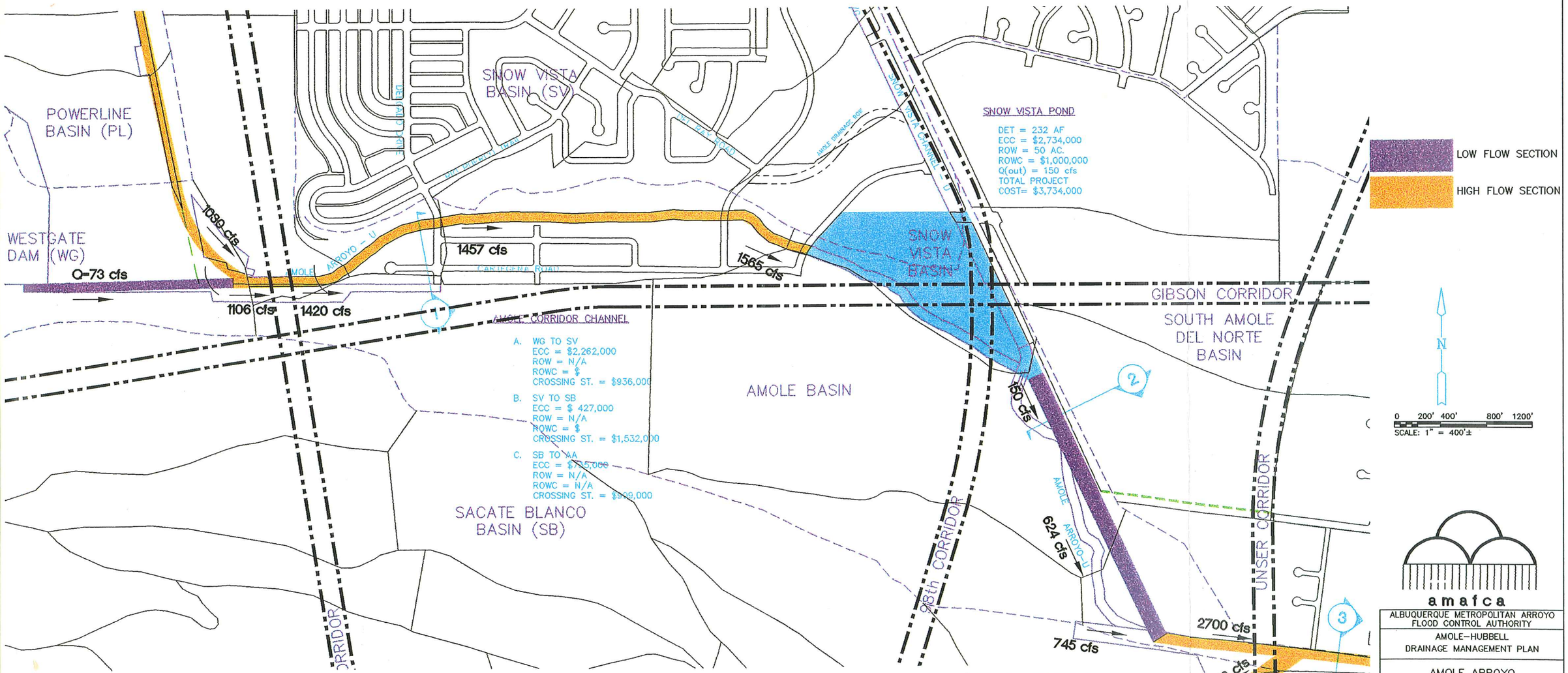

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ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

AMOLE–HUBBELL DRAINAGE MANAGEMENT PLAN

AMOLE ARROYO ALTERNATIVE 3 (HIGH/LOW)

LEEDSHILL – HERKENHOFF, INC. an ASCG Company
ENGINEERS ALBUQUERQUE
ARCHITECTS SANTA FE

AMOLE ARROYO ALTERNATIVE 3, ESTIMATED PROJECT COST= $10,535,000

HIGH FLOW BELOW POWERLINE SNOW VISTA POND/LOW FLOW CHANNEL

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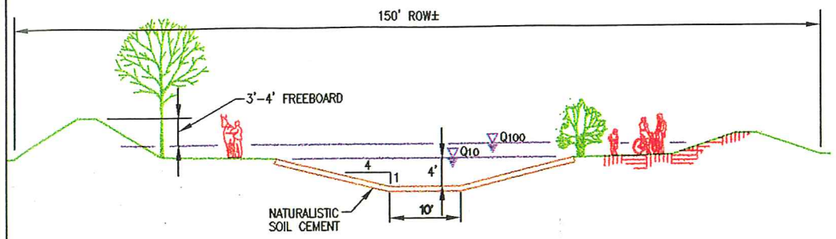

1 HIGH FLOW COMPOSITE SECTION-PL TO SV AMOLE ARROYO

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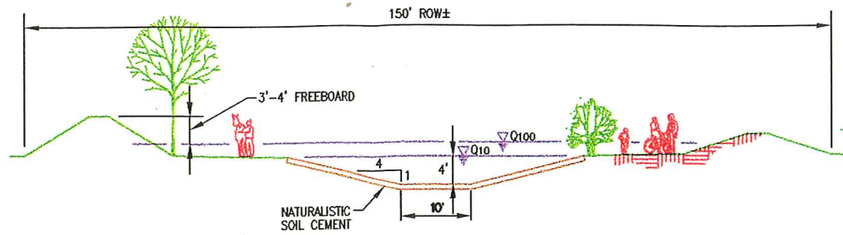

2 HIGH FLOW COMPOSITE SECTION-SV TO SB AMOLE ARROYO

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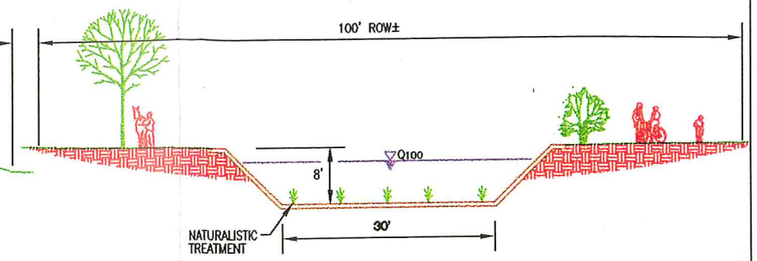

3 HIGH FLOW SECTION-SB TO AMOLE DET. AMOLE ARROYO

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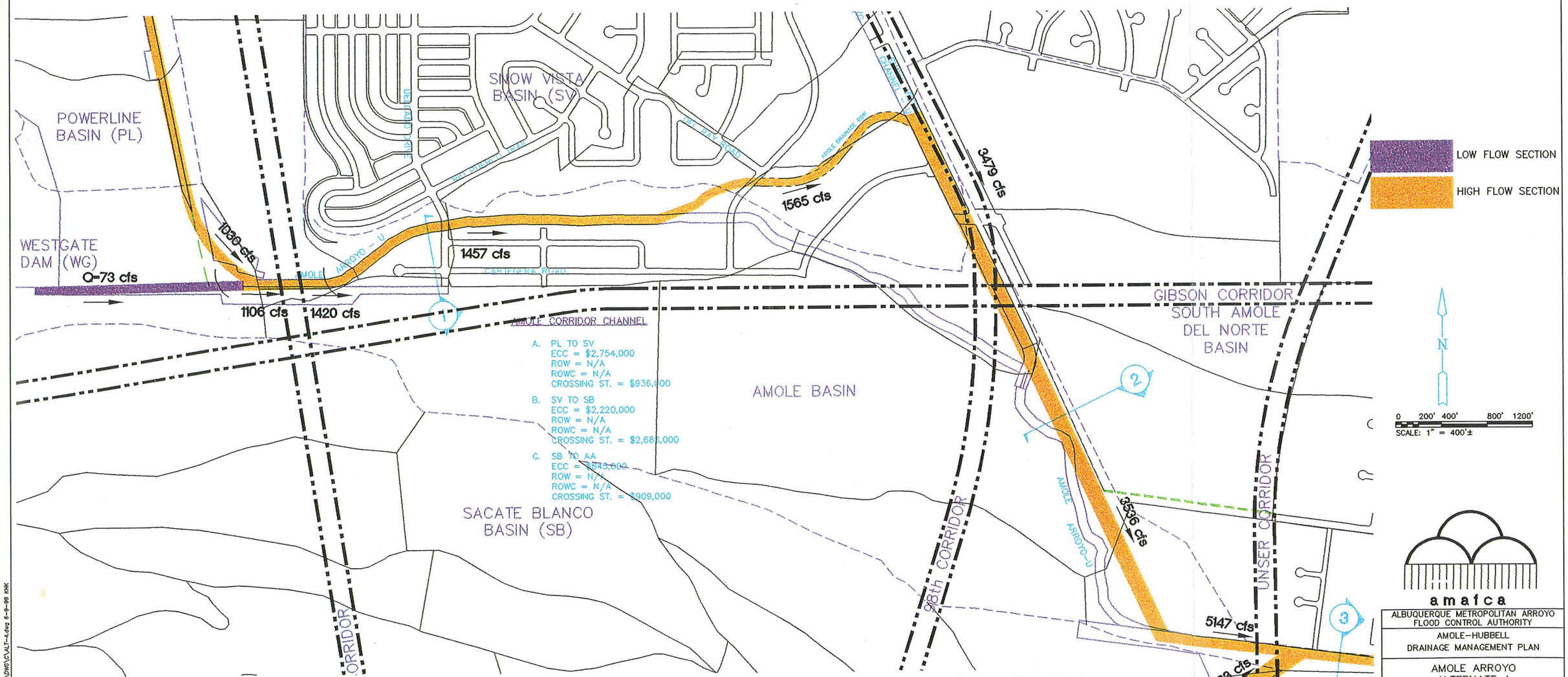

AMOLE CORRIDOR CHANNEL

A. PL TO SV
ECC = $2,754,000
ROW = N/A
ROWC = N/A
CROSSING ST. = $936,000

B. SV TO SB
ECC = $2,220,000
ROW = N/A
ROWC = N/A
CROSSING ST. = $2,683,000

C. SB TO AA
ECC = $3,845,000
ROW = N/A
ROWC = N/A
CROSSING ST. = $909,000

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ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

AMOLE–HUBBELL DRAINAGE MANAGEMENT PLAN

AMOLE ARROYO ALTERNATE 4 (HIGH/HIGH)

LEEDSHILL – HERKENHOFF, INC. on ASCG Company
ENGINEERS ALBUQUERQUE
ARCHITECTS SANTA FE

AMOLE ARROYO ALTERNATIVE 4, ESTIMATED PROJECT COST= $10,352,000

HIGH FLOW BELOW POWERLINE HIGH FLOW BELOW SNOW VISTA

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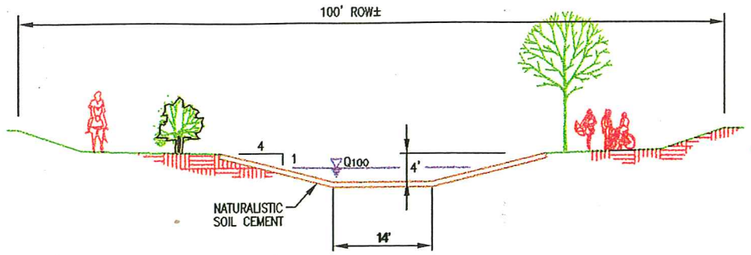
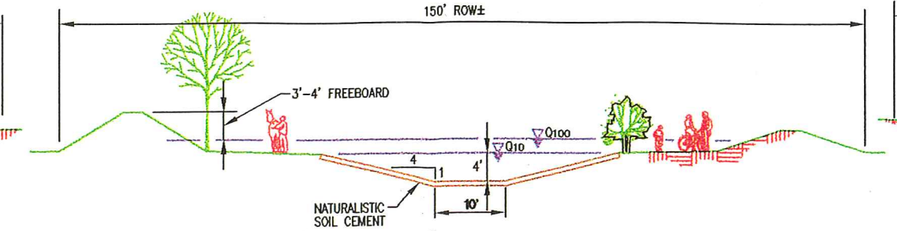


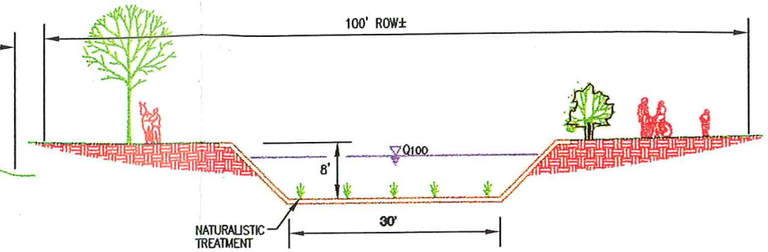
1 LOW FLOW SECTION - PL TO SV AMOLE ARROYO

NOT TO SCALE



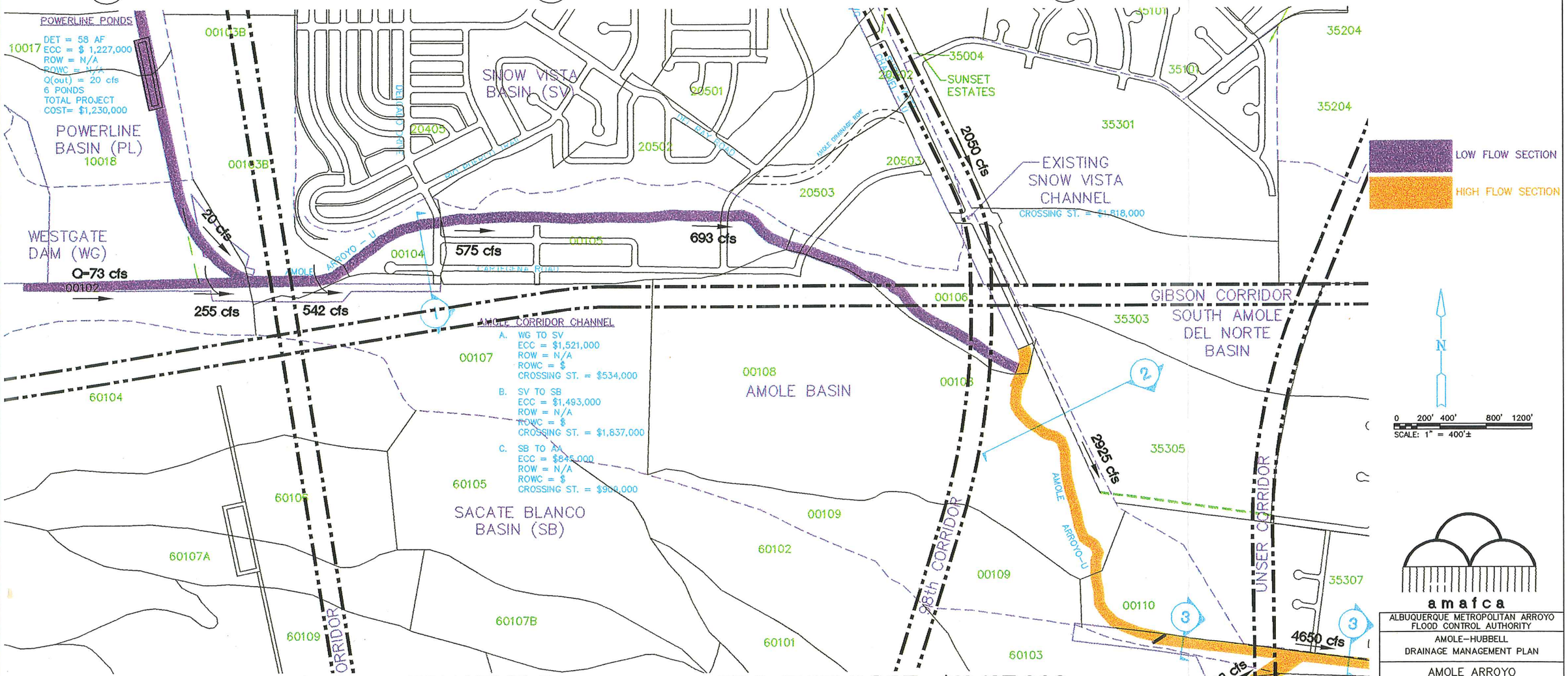
2 HIGH FLOW COMPOSITE SECTION-SV TO SB AMOLE ARROYO

NOT TO SCALE



3 HIGH FLOW SECTION - SB TO AMOLE DET. AMOLE ARROYO

NOT TO SCALE



AMOLE ARROYO ALTERNATIVE 5, ESTIMATED PROJECT COST= $10,187,000

POWERLINE PONDS / LOW FLOW-HIGH FLOW BELOW SNOW VISTA EXISTING EASEMENT

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ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AMOLE ARROYO ALTERNATIVE 5 (LOW/HIGH)

LEEDSHILL - HERKENHOFF, INC. an ASCG Company
ENGINEERS ALBUQUERQUE
ARCHITECTS SANTA FE

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C. POWERLINE BASIN

1. EVALUATION

a. Situation

Location: The Powerline Basin is the drainage area intercepted by the Powerline Diversion Channel and is located west of the Powerline Channel extending westerly to the drainage divide at the Ceja Mesa north of the Amole Arroyo. This basin is shown on Figure III-3.

Sediment: The existing Powerline Channel and sedimentation pond currently capture sediment laden flow from the Ceja Mesa escarpment area. Most of the sediment drops out in the existing sedimentation basin and channel and the flow is diverted into the Amole Arroyo. Developed conditions flows are expected to yield significantly less sediment than existing conditions, although some sediment is anticipated from the northern end of the basin and escarpment area. The existing sedimentation basin should be maintained in the system.

b. Problem Description

The Powerline Channel design is inadequate to convey the 100 year runoff from existing conditions or developed conditions, in accordance with the current COA DPM. The freeboard is inadequate to satisfy the requirements in the DPM, however overtopping is not expected.

c. Existing Facilities Data Summary

The existing conditions and developed conditions runoff are higher than the Powerline Channel design capacity. However, due to freeboard incorporated in the design, it is not anticipated that overtopping of the channel will occur during either event. Hydrologic and hydraulic summary data is presented in Table III-2. (See Existing Conditions Mapping in Volume II and detailed Existing Conditions Report in Volume III.)

d. Existing Right-of-Way

AMAFCA has a variety of easements and ROW for the Powerline Channel. It may be beneficial for AMAFCA to acquire, purchase, or trade property, to obtain full ROW for the existing and planned facilities for Powerline. (See ROW mapping, Volume II.)

e. Developed Conditions Data

Results from the Developed Conditions Existing Facilities (DEVEX) analysis (see Chapter II and Volume III) indicate that the Powerline Channel does not meet freeboard requirements. However, the water surface elevation does not exceed the top of bank. Hydrologic and hydraulic data is presented in Table III-2.

f. Criteria

Provide channel modifications and improvements which:

- Maintain a stable channel and detention system. A stable channel in this situation is one which has the capacity to convey the Developed Conditions flows and does not significantly degrade or aggrade for the range of flows expected.

- Provide channel improvements that meet current requirements for channel design.

- Limit the outflow from the Powerline Diversion into the Amole Arroyo to approximately 20 cfs. This is proposed to allow development of a "low flow" facility in the Amole Arroyo upper reach above the Snow Vista confluence and the proposed composite channel (low flow with stable overbank flow) between the Snow Vista and Sacate Blanco confluences to meet the proposed management plan for the Amole Arroyo.

g. Alternative Evaluation

The only feasible alternative identified for Powerline Basin to meet the Drainage Management Plan at the entrance to the Amole Arroyo is to detain the runoff in one or more basins. Applying runoff constraints to limit the flows to 20 cfs would equate to a 0.026 cfs per acre constraint applied over the basin. This appears to be impractical due to the steep nature of the area, the severity of the constraint, and considering that the existing Powerline Channel does not require runoff constraints.

Utilizing the existing ROW and modifying the existing channel to provide "in-line detention" seems to be much more practical and is being pursued as the preferred alternative. Two options considered for the in-line detention basins are: (1) to modify the existing channel within the current ROW which requires raising the berm along the east side for the channel; or, (2) to acquire additional ROW on the west side of the channel and widen the existing configuration. The option within the existing ROW is preferred due to less cost.

The Powerline Diversion Channel and proposed in-line detention basins are potential candidates for "landform" treatment. Landform treatment could include shaping the berms and existing channel to mimic other shapes with native landscape. These treatments require additional ROW. Possibly, some of the additional land needed could be shared use of the powerline easement. Due to the additional ROW needed, this option is considered a secondary feature which could be implemented at the time of development.

<u>AHYMO Analysis:</u> The Developed Conditions AHYMO model has been modified to represent the enlarged sedimentation basin with restricted outflow and the proposed in-line basins. Idealized *conceptual* basins have been inserted into the model to represent the proposed management plan. A more detailed AHYMO analysis will be required once specific detention pond parameters are established during design of these facilities. Due to the series of detention basins, some runoff is still traveling through the system after 96 hours.

2. PROPOSED MANAGEMENT PLAN

The proposed management plan is schematically shown on Figure III-3. The hydrologic results for the Powerline Basin with the proposed plan in place are contained in Table III-2.

a. Limit Flows into the Amole Arroyo - Project PL1

The proposed plan is to limit the outflow from the Powerline Diversion into the Amole Arroyo to approximately 20 cfs by providing additional detention along the Powerline Channel. The 20 cfs Powerline outflow was established as a practical minimum value to allow implementation of the Amole Arroyo low flow option between Westgate Dam and Snow Vista and the composite channel between Snow Vista and Sacate Blanco. The practical minimum was desired since local flows into the Amole Arroyo increase the peak flow rate to 542 cfs just downstream from the Powerline confluence.

These proposed improvements are:

- Sedimentation Basin Detention: Modify the existing sedimentation basin to increase the detained storage from 28 AF to 46 AF. This can be accomplished by increasing the side slopes from 4H:1V to 3H:1V and increasing the berm height on the east side by approximately 3 feet in localized areas. The east side of the basin is the Powerline ROW and increasing the berm height will need to be coordinated with Plains Electric. In conjunction with the increased storage, restrict the outflow from the existing SCS drop spillway by raising the top of the overflow weir elevation and reducing the size of the low flow discharge orifice. Flows in excess of the 100 year event would flow over the modified weir.

  Priority - High (required to implement proposed Amole-Hubbell DMP solution)

- In-Line Detention: Construct a series of "In-line" detention basins with a cumulative capacity of approximately 40 AF within the existing Powerline Channel ROW to provide additional detention storage for the runoff which enters the channel between the sedimentation basin and the Amole Arroyo. The channel in this reach is earthen with riprap grade control structures approximately every 500 ft. The proposed modification is to provide eight detention basins with approximately 5 AF of detention storage each using the existing grade control structures as part of the outfall erosion control between the basins. Selected detention berms (dams) could be widened to provide access across the Channel in conjunction with development. The in-line detention basin configuration is shown schematically on Figure III-4 and consists of:

  - Excavate the basin to revise the bottom slope from the existing 1.5% to 0.1%
  - Increase the side slope from 4H:1V to 3H:1V.

- ✧ Raise the east side berm at the south end of each basin approximately 3 feet, either by compacted fill or a gravity retaining wall. (This may require encroachment on the Powerline utility ROW.)

- ✧ Construct a detention berm across the channel with a pipe principal spillway and soil cement emergency spillway.

- ✧ During development, direct flow as required from the inflow arroyos from the west to avoid overloading any one basin.

Priority - High (required to implement proposed Amole-Hubbell DMP solution)

✦ Interim Ponding: For existing undeveloped conditions, it is estimated that approximately 58 AF of detention storage is required to reduce the flow into the Amole Arroyo to 20 cfs. The reason for the high estimate of required storage under existing conditions is due to the drainage area which will be diverted by the I-40 Diversion Channel for developed conditions. Interim ponding could possibly be accomplished with limiting the construction to modifying the sedimentation basin and constructing 2 or 3 in-line detention basins. A detailed analysis would be required if an interim solution is pursued.

Priority - Low

b. Channel Improvements - Project PL2

Channel improvements are proposed for channel sections which do not meet current design criteria.

Channel Freeboard: The concrete channel north of the Sedimentation Basin including the reach north of Central Ave. does not meet current criteria for freeboard for the existing or the developed flows. A freeboard deficiency of approximately 0.5 ft. is projected. Increase the concrete channel freeboard by constructing pinned curb, header curb or other freeboard materials along the top of the channel.

Priority - Medium - Existing system freeboard deficiency. Substantial bank full capacity available.

Tributary Arroyos: Tributary arroyos which are intercepted by the Powerline Channel are presently undeveloped "natural" arroyos. Entrance rundowns are in place for these arroyos which appear to be functioning satisfactorily. As this area develops, these arroyos will require stabilization as part of the development. Runoff and sediment from upstream areas will have to be accommodated in this stabilization. Combinations of street flow, storm drains and stabilized channels are anticipated, depending on the development layout. Improvement of these tributary arroyos should occur concurrently with development.

Priority - Low, Required as Development Occurs.

c. **Land Use Issues**

Runoff Constraints: Due to the steep basin slopes and the capacity of the in-line detention basins to accommodate the runoff from the basin and the long detention times in the in-line basins, constraining runoff from development in the Powerline Basin is not proposed.

Priority - N/A

Open Space: An open space corridor estimated at 500 feet wide along the top of the Ceja Mesa escarpment is included in the developed conditions hydrology. This corridor conforms to the suggested corridor in the Southwest Area Plan.

Priority - N/A

Steep Slope Development: In conformance with the Southwest Area Plan, slopes steeper than 9% are proposed to remain open space. Runoff from these areas will continue to produce sediment which must be accommodated in the conveyance between the steeper sections and Powerline Channel.

Priority - N/A

Open Space/Recreational Facilities: Construct or provide space for public use open space and recreational amenities in conjunction with the Powerline Improvements consisting of pedestrian and equestrian trails and landscaping.

Priority - N/A.

d. **Crossing Structures**

The Albuquerque Urban Area Long Range Major Street Plan (9/97) does not show any planned corridors crossing the Powerline Channel. However, local residential streets will cross as the area develops. Costs for possible residential crossing structures are not included.

e. **Budget**

Budget Estimate: The estimated project cost of the planned facilities is:

Sedimentation Basin Modifications - $ 350,000
In-Line Detention Basins - $100,000 each, $800,000 total.
Right-of-Way should be available within in the existing Powerline and adjacent Plains Electric ROW, with possibly minor exceptions.
Concrete Channel Freeboard - $80,000
Crossing Structures - N/A

Timing: These facilities should be constructed prior to the improvements to the Amole Arroyo. It is recommended that the flow restrictions from Powerline be in place to prevent damage to the low flow channel in the Amole Arroyo.

TABLE III-2
HYDROLOGIC SUMMARY
POWERLINE BASIN

AP NO.	MAP NO.	DESCRIPTION	VARIABLE	EXISTING FACILITIES			PROPOSED DMP FACILITIES	
				EXISTING	DEVEX	EXISTING CAPACITY	DMP	FUTURE CAPACITY
11A	4	POWERLINE CHANNEL	Q (cfs)		577	403	577	600
		ABOVE CENTRAL AVE. CROSSING	Tvol (AF)		25.2	2000 cfs	25.2	
			Runoff (in)		1.67	(bank full)	1.67	
			cfs/ac		3.2		3.2	
11B	4	POWERLINE CHANNEL	Q (cfs)	895	716	403	716	740
		BELOW CENTRAL AVE. CROSSING	Tvol (AF)	38.8	31.4	2000 cfs	31.4	
			Runoff (in)	0.94	1.67	(bank full)	1.67	
			cfs/ac	1.8	3.2		3.2	
12	4	POWERLINE CHANNEL	Q (cfs)	1052	890	603	890	910
		AT ENTRANCE INTO	Tvol (AF)	44.4	39.5	2000 cfs	39.5	
		SEDIMENTATION BASIN	Runoff (in)	0.9	1.71	(bank full)	1.71	
			cfs/ac	1.78	3.3		3.3	
13	4	POWERLINE CHANNEL	Q (cfs)	454	431	330	19	20
		AT EXIT FROM SEDIMENTATION	Tvol (AF)	52.6	58.7	1370 cfs	58.2	
		BASIN	Dvol (AF)	29.3	28.2	(bank full)	44.9	
			Runoff (in)	0.84	1.65		1.12	
			cfs/ac	0.62	1.01		0.05	
14	6	POWERLINE CHANNEL	Q (cfs)	502	941	475	20	475
		AT ENTRANCE TO	Tvol (AF)	67.6	99.8	2000 cfs	98.1	
		AMOLE ARROYO	Runoff (in)	0.74	1.55	(bank full)	0.67	
			cfs/ac	0.46	1.23		0.03	

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.
Q - Peak discharge rate
Tvol - Total runoff volume
Dvol - Maximum detained volume
Runoff - inches of runoff
cfs/ac - peak discharge rate per acre of contributing area.
Existing - Existing land use and existing drainage facilities.
DEVEX - Fully developed land use and existing drainage facilities.
Capacity - Design capacity.
DMP - Proposed improvements in place, fully developed land use.

POWERLINE BASIN MANAGEMENT PLAN

PROJECT PL1

P1 INCREASE POWERLINE SEDIMENTATION DETENTION BASIN FROM 28 AF TO 46 AF

P2 IN-LINE DETENTION BASINS~ 4 TO 8 AF EACH, 58 AF TOTAL SEE FIGURE III-4

P3 FLOW INTO AMOLE ARROYO~ 20 cfs

PROJECT PL2

P4 CHANNEL FREEBOARD UPGRADE.

POWERLINE BASIN (PL)		EXISTING FACILITIES (DEVEX)		WITH DMP	
AP NO.	DESCRIPTION	VARIABLE	100 YR 24 HR.	VARIABLE	100 YR 24 HR.
11A	PL CHANNEL ABOVE CENTRAL	Q cfs	577	Q cfs	577
		TVol AF	25.2	TVol AF	25.2
11B	PL CHANNEL BELOW CENTRAL	Q cfs	716	Q cfs	716
		TVol AF	31.4	TVol AF	31.4
12	PL CHANNEL INTO SED. BASIN	Q cfs	890	Q cfs	890
		TVol AF	39.5	TVol AF	39.5
13	PL CHANNEL FROM SED. BASIN	Q cfs	431	Q cfs	19
		TVol AF	58.7	TVol AF	58.2
		DVol AF	28.2	DVol AF	44.9
14	PL CHANNEL @ AMOLE ARROYO	Q cfs	941	Q cfs	20
		TVol AF	99.8	TVol AF	98.1

LEGEND

- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- LOCATION STUDY CORRIDOR
- SUBBASIN BOUNDARIES
- (APXX) HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 60110 SUBBASIN ID NUMBER
- (SVX) PROJECT ID NUMBER

0 500' 1000' 2000'

1" = 1000'±

AMOLE-HUBBELL D.M.P.

POWERLINE BASIN MANAGEMENT PLAN

FIGURE NO. III-3

LEEDSHILL-HERKENHOFF, INC.

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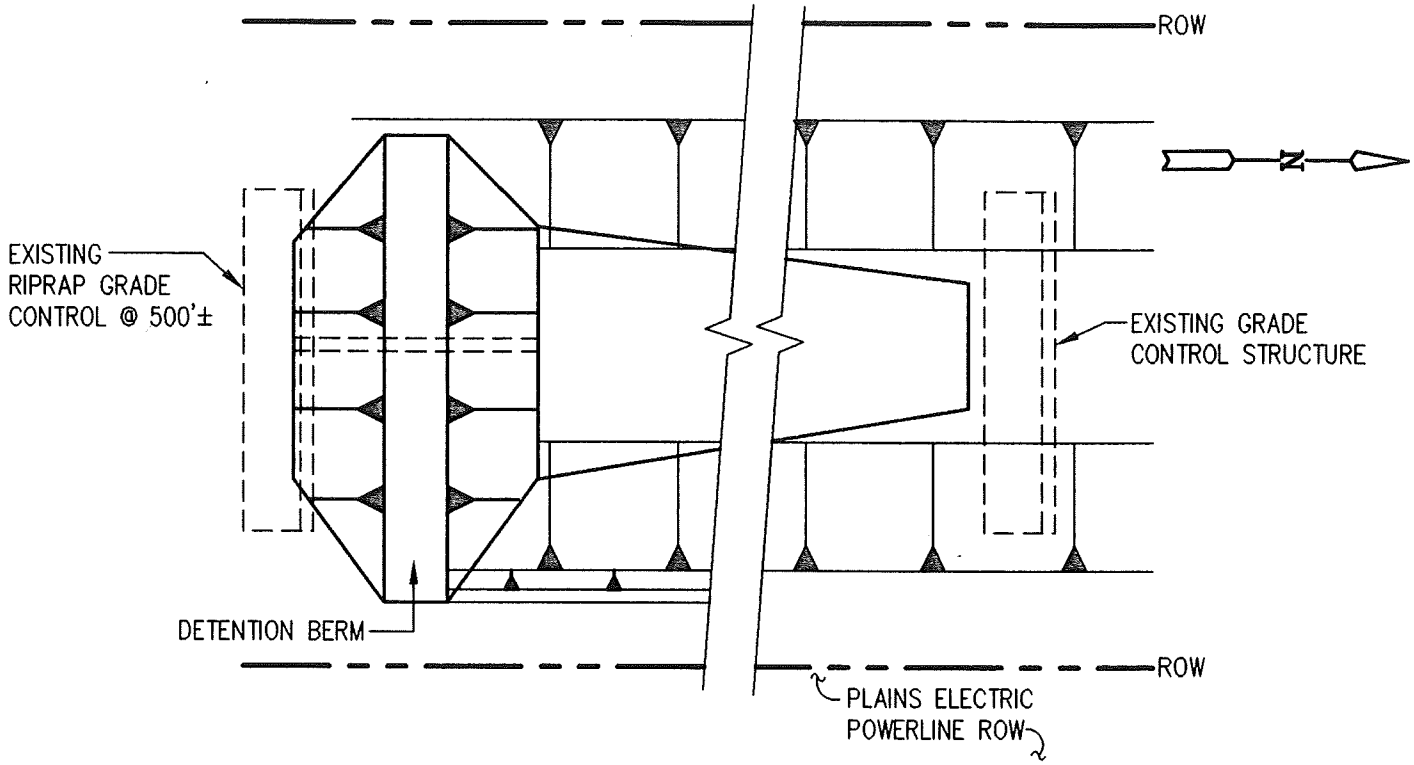
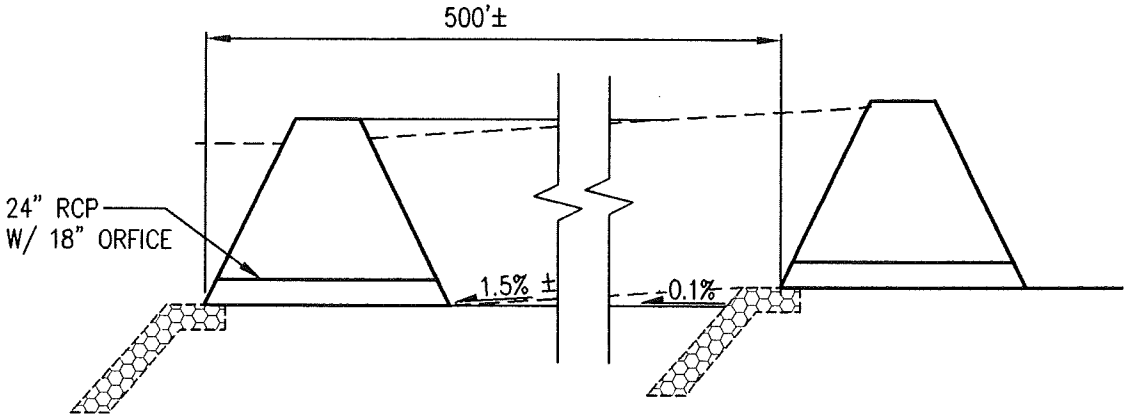


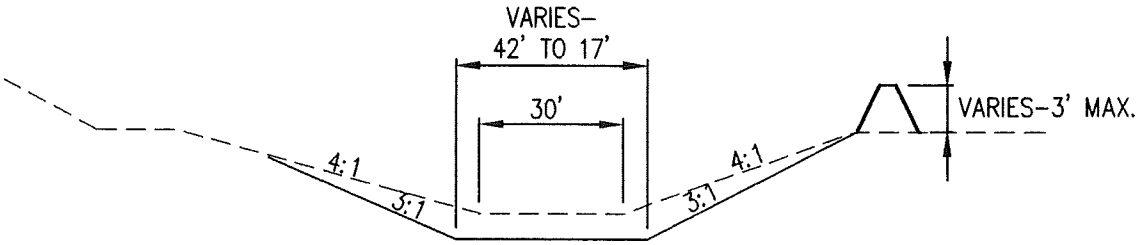
TYPICAL PLAN

SCALE: NO SCALE



TYPICAL PROFILE

SCALE: NO SCALE



TYPICAL SECTION

SCALE: NO SCALE

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POWERLINE
"IN–LINE"
DETENTION BASINS

LEEDSHILL–HERKENHOFF, INC.

FIGURE NO. III–4

1 P:\95043\95043_32\DWG\C\TYP–SEC.dwg\11–05–98 MDJ

D. SNOW VISTA BASIN

1. EVALUATION

a. Situation

Location: The Snow Vista Basin is the drainage area which drains into the Snow Vista Diversion Channel. This area is located east of the Powerline Channel, north of the Amole Arroyo and west of the Snow Vista Channel. This basin is shown on Figure III-5.

Development: A large percentage of this basin is developed. Westgate Heights, Sunrise Terrace and other developments are already constructed.

b. Problem Description

The Snow Vista Basin has a significant amount of existing development. The channel that drains this area is concrete lined for approximately the first 60 percent of its length, and the remaining channel is earthen with riprap drop structures. The lower portion of the channel just upstream from the confluence with Amole Arroyo is riprap lined. Under existing conditions, runoff constraints have been imposed by the City on tributary areas upstream of the Sage bridge over the Snow Vista Channel. The runoff constraint of 1.29 cfs/ac is based on the existing channel capacity (See RD 44). In developed conditions, the flow in portion of the Snow Vista Channel below Sage Rd. exceeds the minimum freeboard requirements.

Downstream of the Sage crossing, the existing Westgate Heights neighborhood generates a large portion of the basin's runoff. Channel capacity in this area is exceeded and will require remedial work to increase channel freeboard. Runoff from Westgate Heights along Benavides Road exceeds the capacity of the inlets and rundown into the Snow Vista Channel. Additionally, Westgate Heights does not have a conveyance system to convey runoff from the 100 year event to the Snow Vista Channel. Therefore, localized flooding could occur.

c. Existing Facility Data

The existing development, including Westgate Heights and other existing developments currently free discharge. New developments in the Snow Vista Basin are constrained to 1.29 cfs per acre to avoid exceeding the capacity of the existing Snow Vista Channel.

The Snow Vista Diversion channel was constructed in 1986 to divert the runoff from Westgate Heights and developments north of Westgate Heights into the Amole Arroyo. This system consists of a sedimentation basin at the head of a concrete lined channel which transitions to an earthen channel with riprap grade control structures below Benavides Road. Existing conditions runoff in this channel encroaches on the freeboard.

d. Existing Right-of-Way

AMAFCA owns ROW or has drainage easements for the existing AMAFCA facilities within the Snow Vista Basin. (See ROW maps in Volume II.)

e. Developed Conditions Data

As a result of this DMP, areas of hydraulic deficiencies have been identified. The Snow Vista Channel does not have adequate freeboard to meet the design requirements of the City DPM below Sage Road. Additionally, the street capacity of Benavides Road will be exceeded during the design event.

f. Criteria

Provide modifications and improvements which:

- Identify and resolve capacity deficiencies on the existing channel and collection systems leading to the channel.
- Provide a solution commensurate with the option presented in the Amole Arroyo Basin section.

g. Alternative Evaluation

Peak Flow Reduction: One alternative identified for the Snow Vista Basin to reduce the peak flow at the entrance to the Amole Arroyo is to detain the runoff in one or more basins. Applying runoff constraints to limit the flows is not feasible due to the large percentage of the basin which is currently developed. Utilizing the existing ROW and modifying the existing channel to provide "in-line" detention is not a feasible alternate for Snow Vista due to the volume required to be stored and the limited ROW. Providing a regional detention basin located in the vicinity of the Snow Vista Channel confluence with the Amole Arroyo is one practical alternative to reduce flow rates. Therefore, included in the alternatives for the Amole Arroyo is a 166 ac-ft detention pond (See Amole Arroyo Basin for alternative specifics).

Rio Bravo Sector Plan: The Rio Bravo Sector Plan identifies the area at the confluence of the Snow Vista Channel and Amole Arroyo as an urban center. This plan also shows a realigned Amole Arroyo through this area and ROW for a portion of this realignment has been dedicated as part of a bulk land transfer. The land use categories used in the Developed Conditions AHYMO analysis conform to this Sector Plan. The proposed management plan for Snow Vista conforms to the alignment shown in the Sector Plan.

AHYMO Analysis: The Developed Conditions AHYMO model was not modified as a result of the alternatives analysis. Runoff constraints were applied to undeveloped areas in the entire Snow Vista Basin west of the Snow Vista Channel at a rate of 1.29 cfs/ac for developed conditions.

Runoff Constraints: The basin area which drains into Snow Vista above Sage Road is being developed with a runoff constraint of 1.29 cfs/ac (see RD 44). This constraint is based on the channel capacity above Sage Road. The undeveloped drainage areas along Sage Road west of the channel (301.61, 301.62, 301.63, 301.64, 301.65 and 301.05) are also assumed to be constrained to 1.29 cfs/ac for developed conditions. This is based on available capacity of the Snow Vista Channel at Sage Rd. The ponds constructed to retain public water will be owned and maintained by the City of Albuquerque.

The drainage area east of the Snow Vista Channel between the Channel and 98th Street south of Tower Rd. (Basins 301.71, 301.72, 301.73 and 301.74 Figure III-5) enters the Snow Vista Channel below the Benavides crossing. Runoff from this area is unrestrained as presented in the Tower/Sage Drainage Study (RD-25) which has been approved by the City. A storm drain along 98th Street is included in the Tower/Sage SAD 222 and this area free discharges to the Snow Vista Channel.

Developed conditions runoff is 2083 cfs at the Amole Arroyo confluence compared to the existing channel design capacity of approximately 1200 cfs and estimated bank full capacity of 2600 cfs.

2. PROPOSED MANAGEMENT PLAN

The proposed management plan is schematically shown on Figure III-5. The hydrologic results for the Snow Vista Basin with the proposed plan in place are contained in Table III-3.

The proposed management plan is:

a. Channel Improvements

Existing Channel Freeboard - Project SV3: Provide freeboard for segments along the concrete channel which do not meet current criteria. Pinned curb wall extensions or similar minimal improvements are envisioned.

Provide freeboard meeting current criteria by increasing the height of the riprap banks and/or improve hydraulic capacity of the riprap channel section below the energy dissipator south of Benavides Road. Increasing the east bank height, upgrading channel stability and providing new channel rundowns with increased west bank heights should be designed and constructed.

Priority - High - Existing capacity exceeded.

Benavides Rd./Snow Vista Inlet - Project SVIA: Provide additional inlet in Benavides and piping to convey the runoff to the Snow Vista Channel beyond the jump structure. Additional freeboard (0.5') is required for a short section of the side channel, this is envisioned as Pinned curb wall extensions or similar minimal improvements.

Benavides Storm Drain - Project SV1B: The runoff from a significant area of Westgate Heights which is currently developed collects and flows down Benavides Road and adjacent roadways. The predicted 100 year flow in Benavides Road is approximately 800 cfs and the estimated street capacity to meet COA DPM criteria is approximately 70 cfs. Construct a storm drain in Benavides Road and some tributary roads to bring these streets in compliance with the City drainage criteria. The system consists of approximately 4,700 ft of storm drain pipe ranging from 24" to 72" diameter and associated inlets, manholes, etc. (see Figure III-6).

Priority - Medium

b. Land Use Issues - Project SV2

Runoff Constraint: Continue to restrict all new development in the Snow Vista Basin north of Sage Road west of the Snow Vista Channel to the existing runoff constraint of 1.29 cfs/ac. This will avoid overloading the existing Snow Vista Channel above Benavides and reduce the freeboard requirements and minimize the impacts of additional runoff resulting from future development.

Priority - On-Going

Snow Vista/Amole Confluence: Realignment of the Amole Arroyo as proposed in the Rio Bravo Sector Plan or as development in the area occurs may require reconstruction of the lower portion of Snow Vista. The final alignment for the Amole Arroyo and the impact on the Snow Vista Channel will be established when development occurs in this area.

c. Crossing Structures

Crossing Structures for this area of the Amole-Hubbell DMP have been added only for Amole Arroyo Alternatives. The 98th and Gibson Corridor crossings of the Snow Vista Channel are assumed to be located upstream of the confluence with the Amole Arroyo. For all other alternatives it was assumed that the corridors would cross after that confluence and are included in the Amole Arroyo Alternative Costs.

d. Budget

Budget Estimate: The estimated project budget for the proposed facilities is:

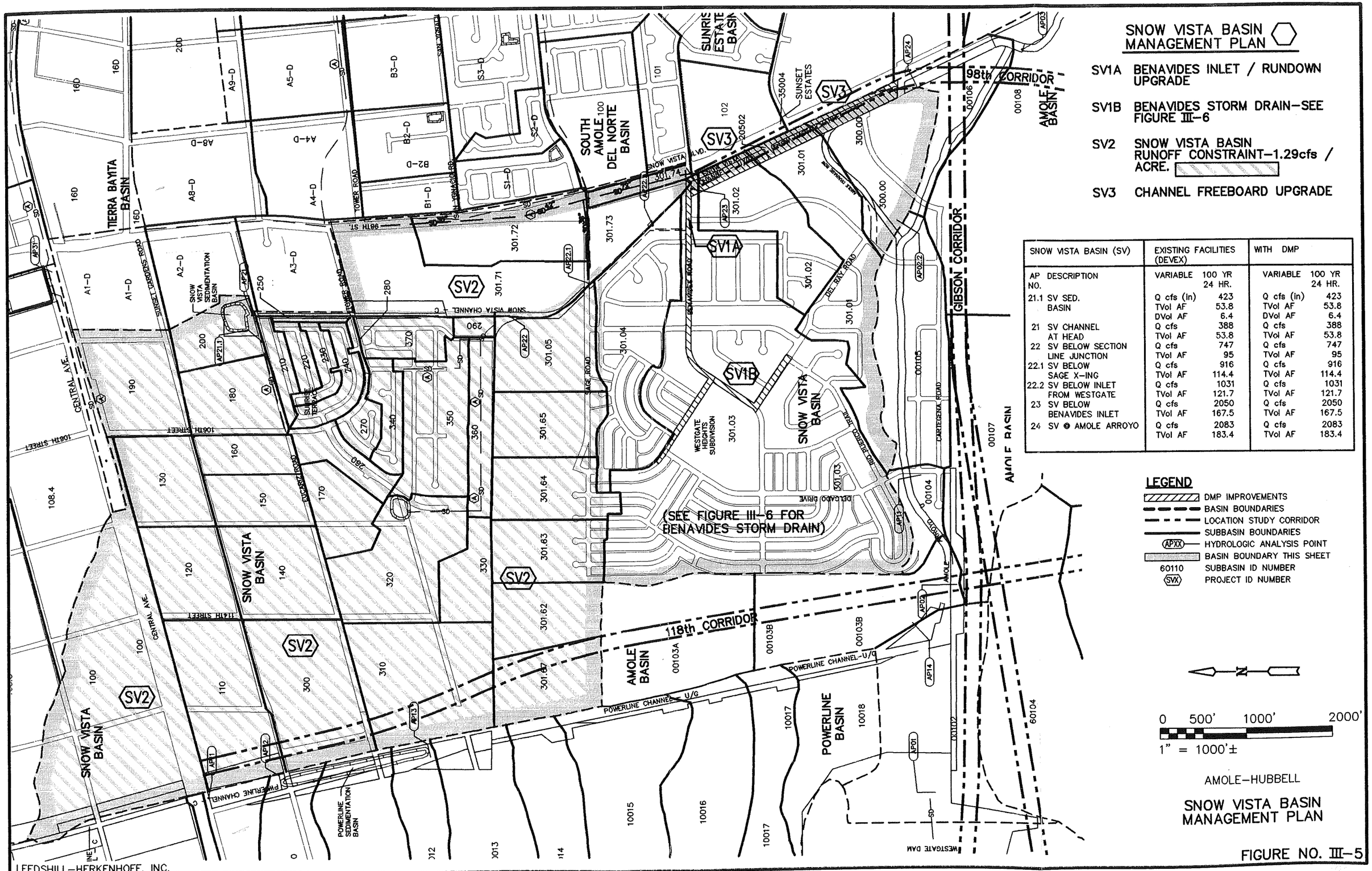
- Benavides Inlet Upgrades - $152,000
- Benavides Storm Drain - $1,600,000
- Snow Vista Channel Freeboard improvements - $104,000
- Crossing Structures
  - Snow Vista Channel Freeboard Upgrade (Amole Alternative 5 only) - $1,818,000

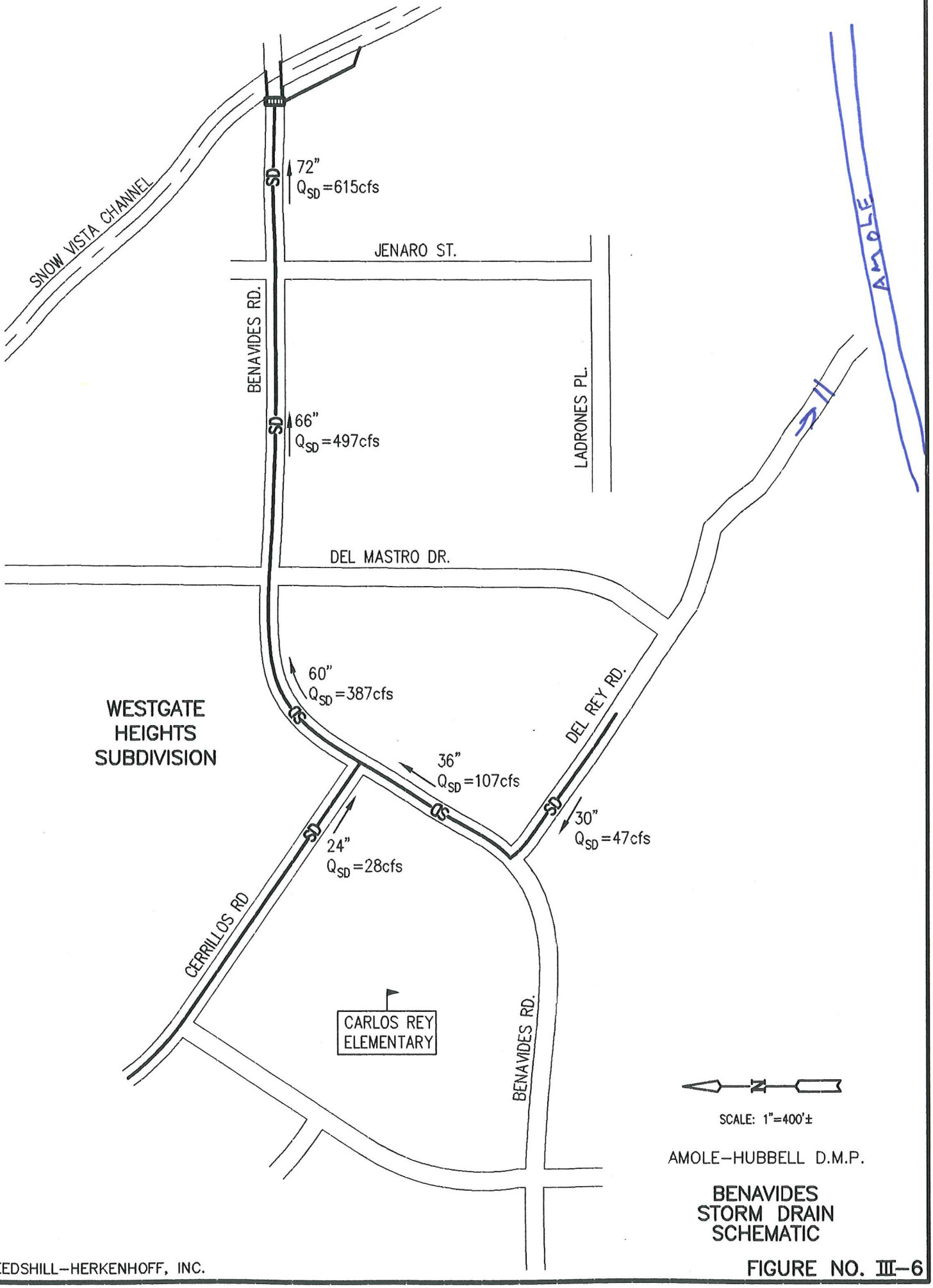
TABLE III-3
HYDROLOGIC SUMMARY
SNOW VISTA BASIN

AP NO.	MAP NO.	DESCRIPTION	VARIABLE	EXISTING FACILITIES			PROPOSED DMP FACILITIES	
				EXISTING	DEVEX	EXISTING CAPACITY	DMP	FUTURE CAPACITY
21.1	4	SNOW VISTA SEDIMENTATION BASIN	Q (cfs)	233	423	484	423	484
			Tvol (AF)	17.1	53.8		53.8	
			Dvol (AF)	4.0	6.4		6.4	
			Runoff (in)	0.76	2.07		2.07	
			cfs/ac	0.62	1.36		1.36	
21	4	SNOW VISTA CHANNEL AT HEAD	Q (cfs)	167	388	290	388	375
			Tvol (AF)	17.1	53.8	2530	53.18 *	
			Runoff (in)	0.76	2.07	(bank full)	2.07	
			cfs/ac	0.62	1.25		1.25	
22	4	SNOW VISTA BELOW SECTION LINE JUNCTION	Q (cfs)	407	747	810	747	810
			Tvol (AF)	41.5	95	4595	95 *	
			Runoff (in)	0.86	1.97	(bank full)	1.97	
			cfs/ac	0.70	1.29		1.29	
22.1	4	SNOW VISTA BELOW SAGE CROSSING	Q (cfs)	642	916	850	916	930
			Tvol (AF)	49.3	114.4	3850	114.4 *	
			Runoff (in)	0.83	1.93	(bank full)	1.93	
			cfs/ac	0.90	1.29		1.29	
22.2	4	SNOW VISTA BELOW INLET FROM WESTGATE	Q (cfs)	812	1031	990	1031	1050
			Tvol (AF)	57	121.7	3700	121.7 *	
			Runoff (in)	0.90	1.92	(bank full)	1.92	
			cfs/ac	1.07	1.36		1.36	
23	4	SNOW VISTA BELOW BENAVIDES INLET	Q (cfs)	1864	2050	1200	2050	2100
			Tvol (AF)	99	167.5	5230	167.5	
			Runoff (in)		1.88	(bank full)	1.88	
			cfs/ac		1.92		1.92	
24	7	SNOW VISTA AT ENTRANCE TO AMOLE ARROYO	Q (cfs)	1814	2083	1200	2083	2100
			Tvol (AF)	105.7	183.4	2600	183.4	
			Runoff (in)	1.10	1.87	(bank full)	1.87	
			cfs/ac	1.57	1.77		1.77	

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.
Q - Peak discharge rate
Tvol - Total runoff volume
Dvol - Maximum detained volume
Runoff - inches of runoff
cfs/ac - peak discharge rate per acre of contributing area.
Existing - Existing land use and existing drainage facilities.
DEVEX - Fully developed land use and existing drainage facilities.
Capacity - Design capacity.
DMP - Proposed improvements in place, fully developed land use.
* Existing channel has excess capacity without additional freeboard. No improvements are necessary.


SNOW VISTA BASIN MANAGEMENT PLAN
SV1A BENAVIDES INLET / RUNDOWN UPGRADE
SV1B BENAVIDES STORM DRAIN–SEE FIGURE III–6
SV2 SNOW VISTA BASIN RUNOFF CONSTRAINT–1.29cfs / ACRE.
SV3 CHANNEL FREEBOARD UPGRADE
SNOW VISTA BASIN (SV) | EXISTING FACILITIES (DEVEX) | WITH DMP
AP NO. | DESCRIPTION | VARIABLE | 100 YR 24 HR. | VARIABLE | 100 YR 24 HR.
21.1 SV SED. BASIN | Q cfs (in) 423 | TVol AF 53.8 | DVol AF 6.4 | Q cfs (in) 423 | TVol AF 53.8 | DVol AF 6.4
21 SV CHANNEL AT HEAD | Q cfs 388 | TVol AF 53.8 | Q cfs 388 | TVol AF 53.8
22 SV BELOW SECTION LINE JUNCTION | Q cfs 747 | TVol AF 95 | Q cfs 747 | TVol AF 95
22.1 SV BELOW SAGE X–ING | Q cfs 916 | TVol AF 114.4 | Q cfs 916 | TVol AF 114.4
22.2 SV BELOW INLET FROM WESTGATE | Q cfs 1031 | TVol AF 121.7 | Q cfs 1031 | TVol AF 121.7
23 SV BELOW BENAVIDES INLET | Q cfs 2050 | TVol AF 167.5 | Q cfs 2050 | TVol AF 167.5
24 SV @ AMOLE ARROYO | Q cfs 2083 | TVol AF 183.4 | Q cfs 2083 | TVol AF 183.4
LEGEND
DMP IMPROVEMENTS
BASIN BOUNDARIES
LOCATION STUDY CORRIDOR
SUBBASIN BOUNDARIES
APXX HYDROLOGIC ANALYSIS POINT
BASIN BOUNDARY THIS SHEET
60110 SUBBASIN ID NUMBER
SVX PROJECT ID NUMBER
0 500' 1000' 2000'
1" = 1000'±
AMOLE–HUBBELL
SNOW VISTA BASIN MANAGEMENT PLAN
FIGURE NO. III–5
LEEDSHILL–HERKENHOFF, INC.
1 P:\95043\95043_32\DWG\C\SV–BASIN.dwg 6–9–99 KHK
SV1A
SV1B
SV2
SV3
TIERRA BAYITA BASIN
SOUTH AMOLE DEL NORTE BASIN
SUNRISE ESTATE BASIN
SNOW VISTA BASIN
AMOLE BASIN
POWERLINE BASIN
98th CORRIDOR
118th CORRIDOR
GIBSON CORRIDOR
SNOW VISTA CHANNEL
POWERLINE CHANNEL–U/G
POWERLINE SEDIMENTATION BASIN
SNOW VISTA SEDIMENTATION BASIN
WESTGATE HEIGHTS SUBDIVISION
(SEE FIGURE III–6 FOR BENAVIDES STORM DRAIN)
WESTGATE DAM
CENTRAL AVE.
106TH STREET
114TH STREET
98TH ST
TOWER ROAD
SUNSET GARDENS ROAD
EUCALYPTUS ROAD
SAGE ROAD
BENAVIDES ROAD
DEL RAY ROAD
DELCADO DRIVE
CARTEGENA ROAD
SUNSET ESTATES
SUNRISE TERRACE



AMOLE–HUBBELL D.M.P.

BENAVIDES
STORM DRAIN
SCHEMATIC

LEEDSHILL–HERKENHOFF, INC.

FIGURE NO. III–6

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E. SOUTH POWERLINE CHANNEL BASIN

1. EVALUATION

a. Situation

Location: South Powerline Channel is a proposed DMP solution facility that will divert flows from the Sacate Blanco Basin, Rio Bravo Basin, and Borrega Basin, to the Rio Bravo Channel and ultimately Hubbell Lake. The drainage area from these basins begins at the top of the Ceja Mesa from the southern Amole Arroyo basin boundary, then south to sub-basin 50103 of the Borrega Basin. These basins drain west to east where the east boundary of the South Powerline Basin is the existing PNM and Plains Electric powerline easements. The South Powerline Channel outfall is the Rio Bravo Channel. The South Powerline Channel drainage area is shown on Figure III-7. (Also see aerial mapping with contours in Volume II.)

Stability: The South Powerline Channel drainage area characteristics are similar to the existing Powerline Channel Basin with a steep slope escarpment area. The escarpment is an erosive area that generates large volumes of sediment. Sediment is transported downstream resulting in incised arroyos. The transported sediment deposits in areas along the drainage ways creating alluvial fans and the development of avulsion points. With the high degree of sediment transport and alluvial fan and avulsion development, the conveyance systems are unstable.

PNM and Plains Electric Powerline Easements: Similar to the existing Powerline Diversion Channel, the PNM and Plains Electric powerlines extend to the south across the DMP watershed (see Figure III-7). PNM and Plains Electric have a 100-foot wide easement each and they are parallel to each other for a total easement width of 200 feet.

Rio Bravo Channel: Bernalillo County is extending Rio Bravo Boulevard from Coors to Paseo del Vulcan. A trapezoidal channel along the north side is planned as part of that roadway extension. The channel will be lined to sustain supercritical flows.

b. Problem Description

The drainage area between the powerlines and the Ceja Mesa is steep and consists of highly erodible soils. As a result, multiple avulsion points and unstable arroyos make up the conveyance system for runoff from the mesa. Each arroyo and avulsion point would have to be dealt with on a case by case basis to develop a stable conveyance system to various outfall points along the Amole Hubbell detention and channel system. The resulting product in the future could be a series of concrete lined channels, naturalistic channels, grade control structures, etc. These facilities would be expensive and may require significant maintenance.

c. Existing Facility Data

Other than natural arroyos, no constructed drainage facilities exist within the South Powerline Channel drainage area. However, there are the PNM and Plains Electric powerlines and easements.

d. Existing Right-of-Way

As a result of a bulk land transfer, AMAFCA was dedicated a series of easements for the existing arroyos (see ROW mapping in Volume II). Where feasible, the proposed sediment ponds will be placed in these easements, however, additional easements or ROW will be required.

e. Developed Conditions Data

The Southwest Area Plan proposes a 500-foot wide easement along the Ceja Mesa escarpment. Additionally, slopes greater than 9 percent are proposed to remain undeveloped. Therefore, sediment from the escarpment areas will continue to be generated in fully developed conditions from these open space areas. Currently, the South Powerline drainage area is undeveloped. When the area is fully developed, and according to current regulations, the runoff in the arroyos will be increased. The additional runoff will include "clean water", thereby causing an increase in sediment generated and conveyed downstream.

Several minor avulsions exist in arroyos downstream of the powerline where the arroyo bed slope reduces to the point that the arroyo can no longer carry the suspended sediment load. When the sediment drops out of suspension; meanders, avulsions, alluvial fans and braided streams are created. A major avulsion exists where the Rio Bravo and Borrega basin boundaries meet just west of the powerline (see Volume II, Sediment Reconnaissance, sheets SR-6 and SR-8). This avulsion is listed as an "active avulsion" in that the flow could be conveyed into either basin during any given rainfall event.

Rio Bravo Boulevard is designed to extend from Coors Boulevard to Paseo del Vulcan. This project is being lead by Bernalillo County Public Works Department. A channel along the north side of the extension is incorporated. The channel is steep and concrete lined. The intent of this DMP is to use the channel as the outfall for the South Powerline Channel. The flow rate entering the channel from the diversion is less than the Rio Bravo Channel design flow rate at that location.

The Rio Bravo drainage system was modeled in the Final Drainage Report for the Rio Bravo West Extension, in July 1993 (RD-22).

f. Criteria

The criteria is to provide a drainage management plan which:

- Provides a stable conveyance system that has the capacity to convey the 100 year event and meets the City of Albuquerque Design Process Manual requirements. A stable conveyance system in this situation is one which captures the runoff and sediment from the escarpment, removes the majority of sediment, and conveys the remaining flow to the Rio Bravo Channel. The stable system will control the Rio Bravo/Borrega basin major avulsion and greatly reduce the runoff and sediment to other potential avulsions east of the powerlines.

g. Alternative Evaluation

Essentially, there are two global alternatives to reducing sediment loadings generated by the escarpment, and controlling the avulsions and conveyance systems.

Individual Conveyance Systems: The first alternative is to provide improvements in each conveyance system such as channel lining, grade control structures, sedimentation ponds, and/or prudent limits. Due to the number of conveyance systems required, this alternative would be costly and maintenance intensive. Each conveyance system would follow existing arroyo alignments from the escarpment to their respective outfalls along the Amole/Hubbell system. This type of system is not considered prudent and has not been investigated further.

Diversion and Detention Facility: The second alternative is to capture the sediment and runoff and have a single conveyance system to convey the flow to the Amole/Hubbell system. As a result, the existing powerline easements have been chosen as the point of collection and the Rio Bravo channel as the point of discharge. The Rio Bravo channel is a facility that will have the capacity to convey the flow from the South Powerline Diversion to the Amole/Hubbell system. The total diversion system has been labeled the South Powerline Channel. This regional DMP facility consists of eight interconnected ponds with an additional pond located at the Rio Bravo Channel head. Results from this alternatives analysis are incorporated into the DMP solution and are presented in Table III-4.

Landform Design Issues: The South Powerline channel is a candidate for Landform Treatment similar to that discussed in the Powerline Basin section.

AHYMO Analysis: The Rio Bravo drainage system was modeled in the Final Drainage Report for the Rio Bravo West Extension, in July 1993 (RD-22). The Rio Bravo DMP AHYMO model has been modified to represent the South Powerline Basin with the in-line basins. Idealized conceptual basins have been inserted into the model to represent the proposed management plan. A more detailed AHYMO analysis will be required once specific detention pond and conveyance system parameters are established during design of these facilities.

2. PROPOSED MANAGEMENT PLAN

The proposed management plan is schematically shown on Figure III-7. The hydrologic and hydraulic results for the South Powerline Diversion Channel are contained in Table III-4.

The proposed improvements are:

a. South Powerline Channel/Detention Project SP-1

Sedimentation/Detention Basins: To capture the sediment generated from the escarpment, detention/sedimentation ponds with diversion berms are placed at existing arroyos along the powerline ROW. These locations cut off the sediment source from downstream alluvial fans and avulsions. The ponds are connected in series by conveyance systems. Detention/ sedimentation ponds will attenuate the peak runoff thereby reducing the size of conveyance systems required. This DMP facility has nine (9) ponds in the hydrologic model to achieve the required detention. Ponds one through six are located north of Rio Bravo and ponds seven and eight are located south of Rio Bravo. Pond nine is to detain the local runoff from subbasin B-3 east. A total of 71 AF of detention volume is required based on the analysis of this DMP. Sediment volume is inherent in the bulked volumes from the AHYMO analysis for fully developed conditions. A detailed hydrologic, hydraulic, sediment and runoff volume analysis will be required for design.

Priority - Low, (required by development)

South Powerline Channel Conveyance System: Each pond will be connected to the next by a conveyance system. Conveyance systems range from pipe to an open channel with a diversion berm. From pond one, a 24" pipe is modeled to convey the flow to pond two. Then, open channels are used between ponds two through six. The major avulsion located along the Rio Bravo/Borrega basin boundary is the location for ponds seven and eight. These two ponds will be used in capturing the flows at the avulsion. Since the two ponds are down gradient from the pond six outfall, flows from ponds seven and eight are collected and conveyed to a junction point with the pond six outfall. The combined flows are then piped to the Rio Bravo channel head for conveyance to the Amole/Hubbell system. Pond nine is modeled for the 80 acre local drainage area (Area B-3 East) at the Rio Bravo channel head. Pond nine is a local pond and to be constructed when needed by development.

Priority - Low, (required by development)

b. Land Use Issues

Runoff Constraints: Due to the capacity of the proposed South Powerline system to accommodate the runoff from the basin, constraining runoff from the South Powerline Basin is not proposed.

Priority - N/A

Southwest Area Plan: The Southwest Area Plan proposes an open space easement approximately 500-foot wide along the escarpment. Also, the Southwest Area Plan proposes a restriction on development of areas with slopes greater than 9 percent. These restrictions are intended to preserve the escarpment area and to reduce the impacts of development in the escarpment area. These restrictions are included in the DMP analysis.

Priority - N/A

PNM and Plains Electric Easements: The intent of this DMP is to construct a diversion channel with sediment and detention basins along the existing powerline easement. Coordination with PNM and Plains Electric to use part of the existing easement and additional ROW or easement are required. This location for the diversion works well, due to the existing powerline easement which forms a development boundary.

Priority - N/A

c. Crossing Structures

Local residential crossing structures are not considered in the cost estimate. Rio Bravo (Sen. Dennis Chavez Blvd.) and 118th Street Corridors cross the proposed South Powerline Channel, but were assumed to cross over pipe outfall structures and not open channels, so crossing structures are not considered in the cost estimate.

d. Budget

Budget Estimate: The estimated project cost of the planned drainage facilities are:

Detention/Sedimentation ponds - $ 950,000
Conveyance Systems - $ 220,000
Right-of-Way - $ 620,000 (Assumes purchase required.)
Crossing Structures - N/A

Timing: These facilities are not required today since the drainage area below the diversion is currently undeveloped. These facilities will become necessary as development, either to the west or to the east of the powerline, occurs.

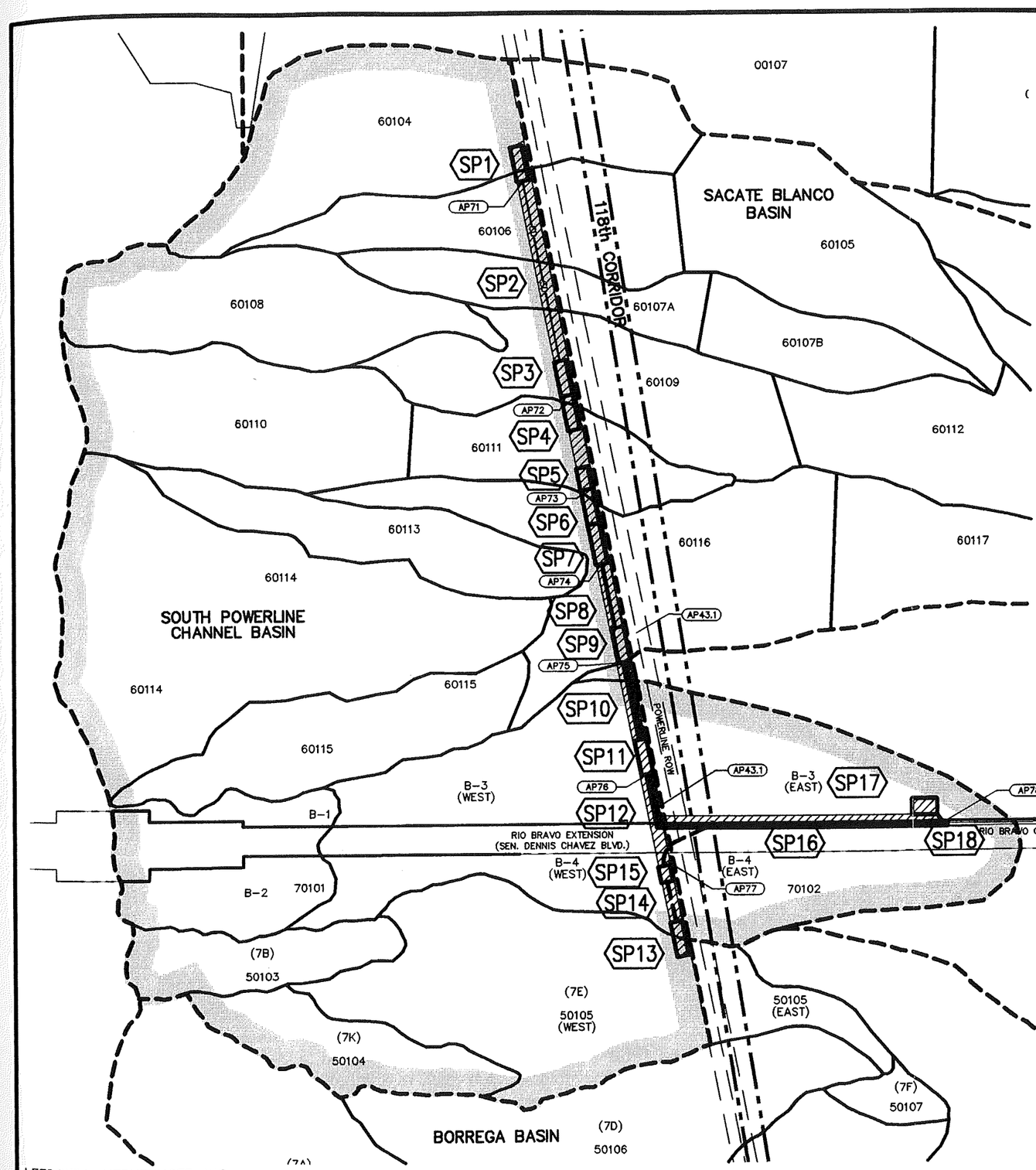
Right-of-Way: AMAFCA may consider acquiring Right-of-Way for these planned facilities in the near future if economically feasible. The Right-of-Way would be used to supplement agreements that can be reached with proposed development or with PNM and Plains Electric for the use of their existing easement.

TABLE III-4
HYDROLOGIC SUMMARY
SOUTH POWERLINE CHANNEL BASIN

AP NO	MAP NO	DESCRIPTION	VARIABLE	EXISTING FACILITIES			PROPOSED DMP FACILITIES	
				EXISTING	DEVEX	EXISTING CAPACITY	DMP	FUTURE CAPACITY
71	2	POND 1 OUTFALL	Q (cfs)	N/A	N/A	N/A	21.20	21.2
			Tvol (AF)				8.90	8.9
			Dvol (AF)				5.90	5.9
			Runoff (in)				1.42	
			cfs/ac				0.28	
72	3	POND 2 OUTFALL	Q (cfs)	N/A	N/A	N/A	118.80	118.8
			Tvol (AF)				25.70	25.7
			Dvol (AF)				8.60	8.6
			Runoff (in)				1.46	
			cfs/ac				0.56	
73	3	POND 3 OUTFALL	Q (cfs)	N/A	N/A	N/A	167.00	167.1
			Tvol (AF)				37.10	37.1
			Dvol (AF)				6.00	6.0
			Runoff (in)				1.47	
			cfs/ac				0.55	
74	3	POND 4 OUTFALL	Q (cfs)	N/A	N/A	N/A	174.70	174.7
			Tvol (AF)				45.20	45.2
			Dvol (AF)				6.30	6.3
			Runoff (in)				1.49	
			cfs/ac				0.48	
75	3	POND 5 OUTFALL	Q (cfs)	N/A	N/A	N/A	356.40	356.4
			Tvol (AF)				69.30	69.3
			Dvol (AF)				9.70	9.7
			Runoff (in)				1.47	
			cfs/ac				0.63	
76	3	POND 6 OUTFALL	Q (cfs)	N/A	N/A	N/A	351.00	351.0
			Tvol (AF)				78.40	78.4
			Dvol (AF)				9.60	9.6
			Runoff (in)				1.45	
			cfs/ac				0.54	
77	5	PONDS 7&8 OUTFALL	Q (cfs)	N/A	N/A	N/A	56.40	56.4
			Tvol (AF)				27.40	27.4
			Dvol (AF)				19.10	19.0
			Runoff (in)				1.43	
			cfs/ac				0.25	
78	5	SOUTH POWERLINE CHANNEL OUTFALL INTO RIO BRAVO CHANNEL	Q (cfs)	N/A	N/A	N/A	446.20	446.2
			Tvol (AF)				114.90	114.9
			Runoff (in)				1.44	
			cfs/ac				0.47	

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.
Q - Peak discharge rate
Tvol - Total runoff volume
Dvol - Maximum detained volume
Runoff - inches of runoff
cfs/ac - peak discharge rate per acre of contributing area.
Existing - Existing land use and existing drainage facilities.
DEVEX - Fully developed land use and existing drainage facilities.
Capacity - Design capacity.
DMP - Proposed improvements in place, fully developed land use.



SOUTH POWERLINE BASIN (SP)		EXISTING FACILITIES (DEVEX)		WITH DMP	
AP NO.	DESCRIPTION	VARIABLE	100 YR 24 HR.	VARIABLE	100 YR 24 HR.
71	POND 1 OUTFALL	Q cfs	N/A	Q cfs	21.2
		TVol AF	N/A	TVol AF	8.9
		DVol AF	N/A	DVol AF	5.9
72	POND 2 OUTFALL	Q cfs	N/A	Q cfs	118.8
		TVol AF	N/A	TVol AF	25.7
		DVol AF	N/A	DVol AF	8.6
73	POND 3 OUTFALL	Q cfs	N/A	Q cfs	167
		TVol AF	N/A	TVol AF	37.1
		DVol AF	N/A	DVol AF	6
74	POND 4 OUTFALL	Q cfs	N/A	Q cfs	174.7
		TVol AF	N/A	TVol AF	45.2
		DVol AF	N/A	DVol AF	6.3
75	POND 5 OUTFALL	Q cfs	N/A	Q cfs	356.4
		TVol AF	N/A	TVol AF	69.3
		DVol AF	N/A	DVol AF	9.7
76	POND 6 OUTFALL	Q cfs	N/A	Q cfs	351
		TVol AF	N/A	TVol AF	78.4
		DVol AF	N/A	DVol AF	9.6
77	PONDS 7 & 8 OUTFALL	Q cfs	N/A	Q cfs	56.4
		TVol AF	N/A	TVol AF	27.4
		DVol AF	N/A	DVol AF	19.10
78	SOUTH POWERLINE CHANNEL OUTFALL INTO RIO BRAVO CHANNEL	Q cfs	N/A	Q cfs	446.2
		TVol AF	N/A	TVol AF	114.9
		DVol AF	N/A	DVol AF	1.44

LEGEND

- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- LOCATION STUDY CORRIDOR
- SUBBASIN BOUNDARIES
- (APXX) HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 60110 SUBBASIN ID NUMBER
- (SVX) PROJECT ID NUMBER

SOUTH POWERLINE BASIN MANAGEMENT PLAN

PROJECT SP1

SPI	POND 1–6 AF
SP2	24" STORM DRAIN.
SP3	POND 2–8.6 AF
SP4	EARTHEN 5' CHANNEL W/ GRADE CONTROL STRUCTURE.
SP5	POND 3–6 AF
SP6	EARTHEN 5' CHANNEL W/ GRADE CONTROL STRUCTURE.
SP7	POND 4–6.3 AF
SP8	EARTHEN 5' CHANNEL W/ GRADE CONTROL STRUCTURE.
SP9	POND 5–9.7 AF
SP10	EARTHEN 5' CHANNEL W/ GRADE CONTROL STRUCTURE.
SP11	POND 6–9.6 AF
SP12	66" STORM DRAIN
SP13	POND 7–10 AF
SP14	36" STORM DRAIN
SP15	POND 8–9.1 AF
SP16	60" STORM DRAIN
SP17	POND 9–5 AF
SP18	SOUTH POWERLINE DISCHARGE INTO RIO BRAVO CHANNEL

N

0 500' 1000' 2000'

1" = 1000'±

AMOLE–HUBBELL D.M.P.

SOUTH POWERLINE BASIN MANAGEMENT PLAN

LEEDSHILL–HERKENHOFF, INC.

FIGURE NO. III–7

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F. SACATE BLANCO BASIN

1. EVALUATION

a. Situation

Location: The Sacate Blanco Basin is the area south of the Amole Arroyo Basin and north of the Rio Bravo Basin. This area drains to the Sacate Blanco Arroyo and the Sacate Blanco Diversion Channel. The Sacate Blanco Basin is shown on Figure III-8. (Also see aerial mapping with contours in Volume II.)

Stability: The arroyos in the Sacate Blanco Basin, east of the powerlines, are deeply incised which indicates the arroyos are in a degrading state. Furthermore, sediment deposits at the Amole Arroyo confluence indicates aggradation at this location. Based on field observations, the sediment deposits have reduced the hydraulic capacity of the existing Sacate Blanco Diversion.

Avulsions: There are two avulsions located just upstream of the Sacate Blanco Diversion (east of the powerlines) that were caused by dirt roads that traverse the area (see Volume II, Sediment Reconnaissance, Mapping SR-6). The runoff captured by the road has incised the road in such a manner to create a channel. The flow carried by the avulsion historically would be conveyed to the head of the Sacate Blanco Diversion. Similar potential avulsions caused by roads exist within the upper portion of the basin.

Rio Bravo Sector Plan: Near the eastern end of the Sacate Blanco Basin (the Rio Bravo Sector Plan), a Rank II development plan for future development, has been adopted. It includes a site layout that provides for a large commercial/retail center, high and low density housing, parks and schools for the southwest side of the city. In the developed conditions hydrology model, the proposed land uses from this sector plan are incorporated. The Unser Blvd. Extension from Arenal to Rio Bravo Boulevard Extension included in this plan crosses the Amole Arroyo in the vicinity of the intersection with the existing Sacate Blanco Diversion.

Improvements: As development occurs in the Sacate Blanco Basin, the tributary arroyos and drainage divides will be established to conform to the development pattern. Minor modifications to alignments and detail are anticipated.

b. Problem Description

The Sacate Blanco Basin is currently undeveloped. All of the flow generated from the Sacate Blanco Basin reaches the Amole Arroyo either from the Sacate Blanco Diversion or the avulsion caused by an unimproved roadway. The Sacate Blanco Diversion Channel will require upgrading and stabilizing to convey the runoff from future "clean water" development.

The escarpment area west of the powerlines is very active in sediment generation; creating meandering, braided flows and avulsions. As development increases, these problems will become more prevalent. Avulsion control and sediment reduction from this basin will be required as part of the DMP solution.

c. Existing Facility Data

The Sacate Blanco Basin is currently undeveloped. Under existing conditions, the Sacate Blanco Diversion Channel has the capacity to convey the design storm. (See Table III-5.) The Sacate Blanco Diversion Channel was designed with a capacity of 853 cfs. The developed conditions existing facility (DEVEX) 100-year 24-hour runoff ranges from 1,070 cfs at the head to 2,380 cfs at the Amole Arroyo confluence. Bank full capacity of the diversion is approximately 1660 cfs.

d. Existing Right-of-Way

The Sacate Blanco Diversion Channel has a 150 ft ROW. Most of the other arroyos within this basin have 100 foot to 200 foot wide drainage easements dedicated to AMAFCA. These easements were dedicated as the result of a bulk land transfer. The easements are shown in the Right-of-Way Mapping in Volume II.

e. Developed Conditions Data

Results from the Developed Conditions Existing Facilities (DEVEX) analysis (see Table III-5 and Volume III) indicates the existing Sacate Blanco Diversion Channel does not have the capacity to safely convey the 100-year developed condition design storm runoff. The alternatives evaluated will provide for a safe conveyance system for the design storm. Hydrologic results presented in the Developed Conditions Existing Facilities analysis are used to develop hydraulic alternative solutions. Developed conditions runoff values with existing facilities (DEVEX) for various analysis points along the arroyo are presented in Table III-5.

f. Criteria

Provide modifications and improvements which:

- Reduce the developed conditions flow rate to within the capacity of the existing Sacate Blanco Diversion Channel and/or improve the channel capacity.
- Provide control for avulsions.
- Reduce the sediment load in the proposed Guac and existing Amole Detention Facilities.

g. Alternative Evaluation

South Powerline Diversion: A regional diversion facility parallel to the existing powerline easement is proposed which impacts the Sacate Blanco, Rio Bravo and Borrega Basins. This facility is proposed to collect, detain and convey the runoff from the areas west of the powerline easement. The diversion will eliminate many of the potential avulsion locations east of the powerline since the source of the sediment will be eliminated. The alternative to this diversion is to accommodate the sediment from the escarpment "bad lands" area and the resultant avulsions within each basin resulting in more complicated and costly improvements. See the South Powerline Basin for further information.

The following two alternatives have been developed to address the capacity issue of the diversion channel. Both alternatives assume the active avulsion above the diversion channel will be maintained in approximately its current path as a result of development. Conveyance from the avulsion point to the Amole Arroyo can be achieved by storm drains, streets or other systems. *Both alternates assume the South Powerline Diversion Channel is in place.*

Sacate Blanco Outfall into the Guac Detention Facility: There is an existing arroyo that conveys flow to the Sacate Blanco Diversion Channel head, that could be used to bypass the diversion channel and convey flows to the planned Guac Detention Facility. With the incorporation of rundowns and channel improvements along the old arroyo, the need for the diversion channel is eliminated. However, the cost to construct a rundown into the Guac Basin and 2,300 feet of channel improvements, would be significant.

Sacate Blanco Outfall into the Amole Arroyo: Under existing conditions, the outfall for the Sacate Blanco Diversion Channel is the Amole Arroyo. This system is undersized for existing conditions runoff and would be grossly undersized for developed conditions without the South Powerline Diversion. Impacts to the Sacate Blanco Diversion and the Amole Arroyo are reduced when the proposed South Powerline Diversion is constructed. With the South Powerline Diversion in place, the developed condition runoff in the Sacate Blanco Diversion reduces from 1070 cfs to 309 cfs at the head and from 2,380 cfs to 1,183 cfs at the Amole Arroyo confluence. The developed runoff will be "clean" water and erosive in the existing unlined channel. A channel upgrade consisting of soil cement or similar non-erosive lining is recommended. The impact on the Amole Arroyo below the confluence of including the flows from the Sacate Blanco Diversion is minimal (See Amole Arroyo Section). With only minor channel upgrade required within the existing AMAFCA ROW to mitigate channel inadequacy, this alternative has been chosen as the proposed DMP solution.

AHYMO Analysis: The Developed Conditions AHYMO model was modified to represent the proposed South Powerline Channel. Sub-basins in the Sacate Blanco that are tributary to the South Powerline Channel have been removed from the Sacate Blanco model and added to the South Powerline Channel AHYMO model. Developed conditions drainage divides within the Basin are assumed to be the same as Existing Conditions. Minor realignment of divides, conveyance paths, etc. will accompany development.

2. PROPOSED MANAGEMENT PLAN

The proposed Drainage Management Plan is schematically shown on Figure III-8. The hydrologic results for the Sacate Blanco Basin with the proposed plan in place are contained in Table III-5.

a. Sacate Blanco Diversion Channel Project SB1

Stabilize the channel to convey the "clean" water runoff to the convergence with the Amole Arroyo. See proposed channel section on Figure III-8.

Priority - Low - Development driven.

b. South Sacate Blanco Arroyo Project SB2

Conveys the runoff generated in the Sacate Blanco Basin to the diversion channel. This arroyo, shown on Figure III-8, is one main conveyance system of the basin. Since this arroyo is required to convey flows to the diversion, a flow path for the runoff must be maintained. This arroyo could be lined, placed in a storm drain, or otherwise stabilized, depending on future development. No recommendations are made about channel improvements as a result of this DMP. This DMP identifies the need for maintaining the existing facility as part of the Sacate Blanco Basin backbone conveyance system.

c. Sacate Blanco Avulsion Conveyance Project SB3

The existing drainage divide just upstream from the Diversion Channel is the result of an avulsion down an unimproved road. The DMP hydrology assumes this drainage divide remains. This conveyance is shown on Figure III-8. This conveyance could be street flow, storm drain or channel flow or a combination depending on future development. This DMP identifies the need for maintaining the existing facility as part of the Sacate Blanco Basin backbone conveyance system.

d. Avulsion Control

The South Powerline Diversion will cut off the sediment sources west of the powerline and allow local control of avulsions east of the powerline as development occurs. (See Sediment Reconnaissance Mapping in Volume II and Sediment Reconnaissance Report in Volume III for discussion of detailed avulsion potential.)

The avulsion plan:

- ✧ Construct the South Powerline Diversion prior to significant development within the Sacate Blanco, Rio Bravo or northern Borrega Basins.

- ✧ Design conveyance facilities through developed properties to accommodate the worst case combination of uncontrolled upstream avulsions.

- ✧ Control potential avulsions within the development in a stable manner to eliminate the avulsion potential.

e. Land Use Issues

Runoff Constraints: Due to the diversion by the South Powerline Channel facility and the proposed improvements to the Sacate Blanco Diversion to accommodate "clean water" runoff from the west, constraining runoff within the Sacate Blanco Basin is not proposed.

Priority - N/A

f. Crossing Structures

The Albuquerque Urban Area Long Range Major Street Plan (9/99) shows corridors for 98th and 118th Streets and Unser Blvd. in the Sacate Blanco Basin. (See Figure III-8.) The Unser crossing was assumed to be located downstream of the confluence of the Sacate Blanco Diversion and the Amole Arroyo. The estimated cost for that crossing structure is included in the Amole Arroyo estimate (AA-6). The 98th Street crosses both the Sacate Blanco Avulsion Conveyance (SB2). 118th Street crosses the South Sacate Blanco Arroyo Conveyance near the west end.

g. Budget

Budget Estimate: The estimated project budget for the proposed facilities is:

Sacate Blanco Diversion Channel Improvements - $460,000
South Sacate Blanco Arroyo Conveyance - $785,000
Sacate Blanco Avulsion Conveyance - $628,000
Crossing Structures -
- Sacate Blanco Diversion Channel Improvements - no crossing
- South Sacate Blanco Arroyo Conveyance - $1,003,200
- Sacate Blanco Avulsion Conveyance - $591,360

Timing: Conveyance improvements along the Sacate Blanco Diversion are required when development occurs.

TABLE III-5
HYDROLOGIC SUMMARY
SACATE BLANCO BASIN

AP NO.	MAP NO.	DESCRIPTION	VARIABLE	EXISTING FACILITIES			PROPOSED DMP FACILITIES	
				EXISTING	DEVEX	EXISTING CAPACITY	DMP	FUTURE CAPACITY
61	7	SACATE BLANCO DIVERSION AT HEAD	Q (cfs)	492	1070	853	369	853
			Tvol (AF)	16.9	50.1	(1660 cfs	19	
			Runoff (in)	0.53	1.58	bank full)	1.86	
			cfs/ac	1.29	2.81		3.03	
62	7	SACATE BLANCO BASIN AT ENTRANCE TO AMOLE ARROYO	Q (cfs)	901	2380	853	1183	1190
			Tvol (AF)	43.4	131	(1660 cfs	73.2	
			Runoff (in)	0.53	1.61	bank full)	1.83	
			cfs/ac	0.92	2.43		2.47	

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.
Q - Peak discharge rate
Tvol - Total runoff volume
Dvol - Maximum detained volume
Runoff - inches of runoff
cfs/ac - peak discharge rate per acre of contributing area.
Existing - Existing land use and existing drainage facilities.
DEVEX - Fully developed land use and existing drainage facilities.
Capacity - Design capacity.
DMP - Proposed improvements in place, fully developed land use.

SACATE BLANCO BASIN (SB)		EXISTING FACILITIES (DEVEX)		WITH DMP	
AP NO.	DESCRIPTION	VARIABLE	100 YR 24 HR.	VARIABLE	100 YR 24 HR.
61	SB DIVERSION @ HEAD	Q cfs	1070	Q cfs	369
		TVol AF	50.1	TVol AF	19.0
62	SB @ AMOLE ARROYO	Q cfs	2380	Q cfs	1183
		TVol AF	131	TVol AF	73.2

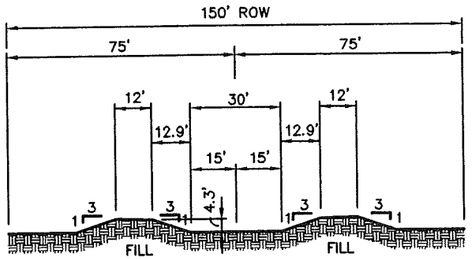
SACATE BLANCO BASIN MANAGEMENT PLAN

SB1 DIVERSION CHANNEL UPGRADE

SB2 SOUTH SACATE BLANCO ARROYO CONVEYANCE

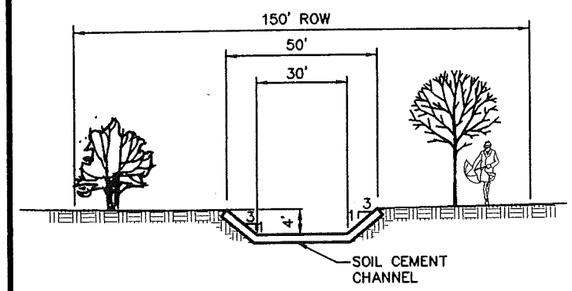
SB3 AVULSION CONVEYANCE

SB4 OPTIONAL DIRECT ENTRY TO GUAC BASIN



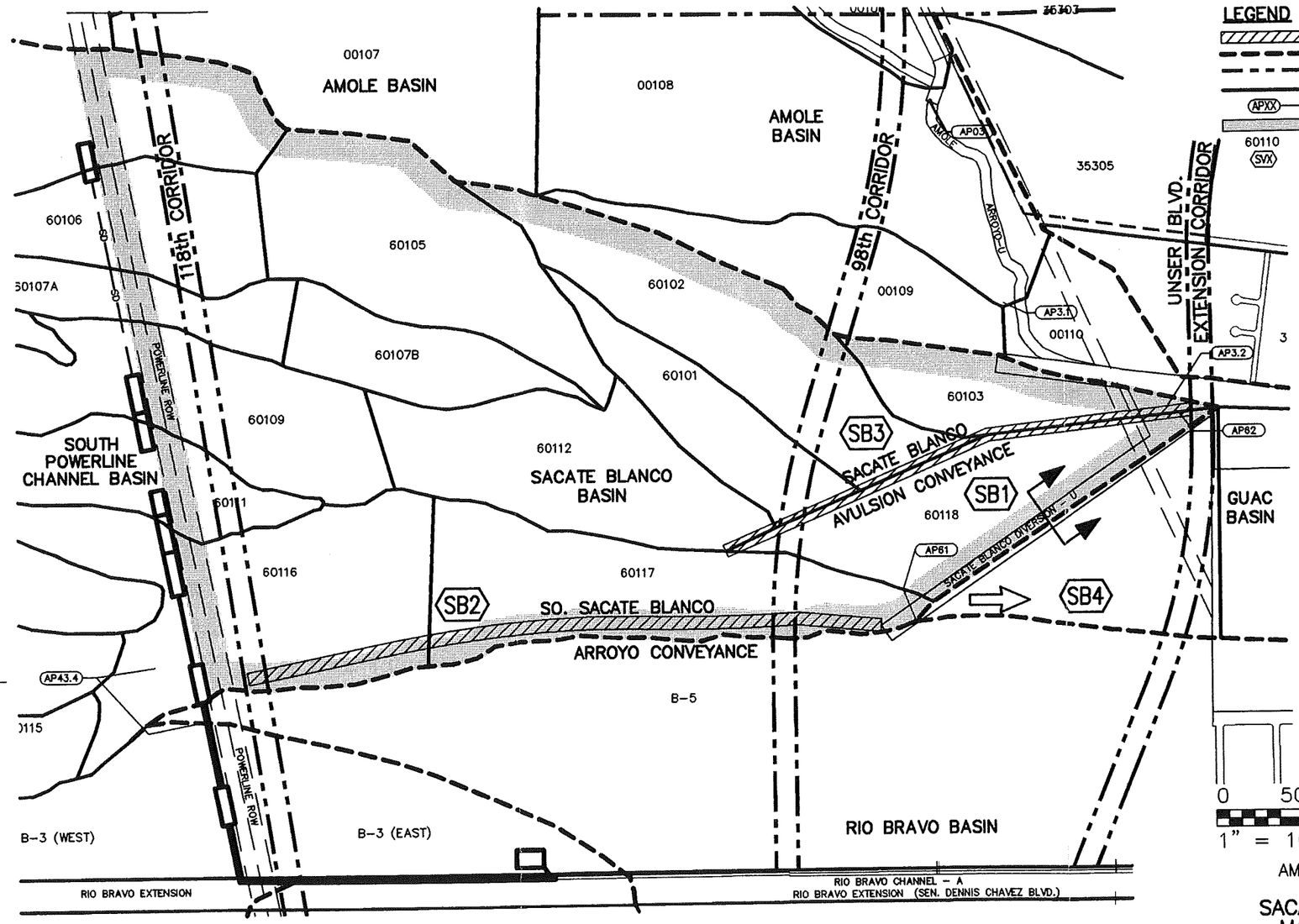
EXISTING SACATE BLANCO DIVERSION CHANNEL SECTION

SCALE: NO SCALE



PROPOSED SACATE BLANCO DIVERSION CHANNEL SECTION

SCALE: NO SCALE



LEGEND

- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- LOCATION STUDY CORRIDOR
- SUBBASIN BOUNDARIES
- (APXX) HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 60110 SUBBASIN ID NUMBER
- (SVX) PROJECT ID NUMBER

AMOLE-HUBBELL D.M.P.

SACATE BLANCO BASIN MANAGEMENT PLAN

FIGURE NO. III-8

LEEDSHILL-HERKENHOFF, INC.

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G. RIO BRAVO BASIN

1. EVALUATION

a. Situation

Location: The Rio Bravo Basin is the drainage area which drains into the planned Rio Bravo Channel and the area south of Rio Bravo Boulevard which drains into the "South Rio Bravo" Arroyo. This area is located along Rio Bravo Boulevard, east of the escarpment, north of the Borrega Arroyo Basin and south of the Sacate Blanco Basin. This basin is shown on Figure III-9 and in aerial mapping with contours in Volume II .

Development: This basin is essentially undeveloped. Rio Bravo Boulevard construction is anticipated to spur development activity in this basin.

Rio Bravo Channel: The design of Rio Bravo Boulevard includes a concrete lined channel along the north side to collect road runoff as well as intercepted flows in the Rio Bravo Basin (Drainage Report RD-22). This channel enters the Hubbell Channel at the crossing of Rio Bravo Blvd. A hydraulic model study was conducted to ensure this inlet would function properly. Modifications to the Hubbell Channel to control wave action were identified from this model to be constructed as part of Rio Bravo Blvd.

South Rio Bravo Arroyo: The drainage area south of Rio Bravo Boulevard currently enters the Hubbell Lake Detention Basin in a natural arroyo condition. The runoff is conveyed in a sheet flow pattern until it reaches the edge of the mesa. Here the runoff is concentrated in a steep head cut that conveys the flow to a culvert under the MRGCD Gun Club Lateral. The crossing of the MRGCD Gun Club Lateral is undersized and is an on-going maintenance problem and is a safety concern due to the potential for overtopping and plugging of the lateral.

b. Problem Description

The Rio Bravo Basin is currently undeveloped with the roadway extension of Rio Bravo Boulevard from Coors Boulevard to Paseo del Vulcan. With the roadway extension, the basin is divided almost equally into two halves. The northern half (subbasin B-5) drains to an improved channel planned to convey the runoff to the Hubbell Lake Diversion Channel. The southern half follows the natural drainage path.

In the lower portion of the southern half, a well defined arroyo becomes an alluvial fan (See Figure III-9). Sparse development exists below the fan which experiences braided and sheet flows. The runoff enters Hubbell Lake through a head cut in the mesa above Hubbell Lake. There are no easements or Right-of-Way for the arroyo alluvial fan or head cut. The head cut and Gun Club Lateral crossing are causing damage and creating an unsafe situation due to the possible plugging of the lateral.

c. Existing Facility Data

There are no existing drainage facilities owned or maintained by AMAFCA within the Rio Bravo Basin. See Table III-6 for hydrologic data.

d. Existing Right-of-Way

There is no existing AMAFCA owned Right-of-Way in the Rio Bravo Basin. See Volume II for Right-of-Way mapping. However, Right-of-Way has been obtained by Bernalillo County for the Rio Bravo Extension and MRGCD has right-of-way for the Gun Club Lateral.

e. Developed Conditions Data

Results from the Developed Conditions Existing Facilities analysis (see Table III-6 and Volume III) indicates the proposed Rio Bravo Channel has the capacity to safely convey the 100 year design storm. The alternatives evaluated herein will provide for a safe conveyance system for the southern half of Rio Bravo Basin. Hydrologic results presented in the Developed Conditions Existing Facilities analysis are used to develop hydraulic alternative solutions. Developed conditions runoff values with existing facilities and with proposed DMP facilities in place for various analysis points along the arroyo are presented in Table III-6.

f. Criteria

Provide modifications and improvements which:

- Collect the flows from the "South Powerline Diversion" Channel (See South Powerline Channel Basin) and convey to the Rio Bravo Channel without exceeding the design capacity.

- Provide "South Rio Bravo Arroyo" stable collection, channel and entrance into Hubbell Lake Detention

g. Alternative Evaluation

A regional diversion facility parallel to the existing powerline easement is proposed which impacts the Sacate Blanco, Rio Bravo and Borrega Basins. This facility is proposed to collect and detain the runoff from the areas west of the powerline easement. The runoff collected from the South Powerline Diversion Channel will enter into the Rio Bravo Channel and be conveyed to Hubbell Lake. The peak flow rate in the Rio Bravo Channel with the diversion in place is less than the Rio Bravo Channel capacity. Many of the potential avulsion locations east of the powerline will be eliminated by the South Powerline Channel since the source of the sediment will be cut off. The alternative to this diversion is to accommodate the sediment from the escarpment "bad lands" area and the resultant avulsions within each basin, resulting in more complicated and costly improvements. *The following alternative assumes the South Powerline Channel is in place.*

South Rio Bravo Arroyo: The critical location for this arroyo is where the flow from the mesa is conveyed over the lower bench, across the MRGCD Gun Club Lateral and into the Hubbell Lake Detention. The vertical drop from the top of the mesa to Hubbell Lake is approximately 45 feet. This area has head cut back into the mesa, the culvert at the Gun Club Lateral is undersized and flows in the arroyo endanger the Lateral. A stable rundown from the mesa into Hubbell Lake crossing the lateral appears to be the most practical alternative, as shown in Figures III-10 and III-11. This facility is incorporated into the DMP solution. Design and construction of this crossing structure must be coordinated with MRGCD and allow maintenance access for Gun Club lateral. Combining the South Rio Bravo Arroyo with overflow from the Borrega Inlet has been considered. See the Borrega Basin section for further discussions.

AHYMO Analysis: The Developed Conditions AHYMO model was modified to represent the proposed "South Powerline Diversion" with detention facilities and outflows restricted to the capacity of the Rio Bravo Channel. Idealized conceptual basins were inserted into the model to represent the proposed management plan. A more detailed AHYMO analysis will be required once specific detention basin parameters are established during design of these facilities.

2. PROPOSED MANAGEMENT PLAN

The proposed management plan is schematically shown on Figure III-9. The hydrologic results for the Rio Bravo Basin with the proposed plan in place are contained in Table III-6.

a. South Rio Bravo Entrance into Hubbell Lake - Project RB1

Without a facility to safely convey the design storm from the South Rio Bravo Arroyo to Hubbell Lake, uncontrolled erosion, failure of the MRGCD Gun Club lateral, and possible flooding may occur in this area. To accommodate the runoff, facilities and improvements will be required. These facilities include a conveyance system through the existing developments, a rundown through the mesa escarpment, and a crossing structure over the MRGCD Gun Club Lateral. The conveyance system could be an open channel or a storm drain. Since no ROW exists, AMAFCA or other public agency may consider the purchase of ROW for an alignment that best suits this need. The conveyance system will require a diked inlet to capture the sheet flow runoff from the alluvial fan located upstream. The point of discharge from the conveyance system would be the mesa head cut. With improvements, the head cut could be transformed into a stable channel that conveys the flow in a non-erosive manner to the crossing structure. The crossing structure, designed to provide access for the existing maintenance road, would allow safe and controlled discharge into Hubbell Lake. (See Figures III-10 and III-11.)

Priority - Medium (Although this improvement does not directly impact the AMAFCA Hubbell Lake facility, the medium priority is assigned due to the continued erosion and the danger to the MRGCD Gun Club Lateral.)

b. Rio Bravo Channel

Construction of the Rio Bravo Channel is programmed to be constructed concurrently with the Rio Bravo Boulevard Extension. Therefore, this facility is included in the DMP solution.

Priority - N/A

c. South Rio Bravo Arroyo - Project RB2

Tributary conveyances within the Rio Bravo Basin should occur concurrently with development.

Priority - Low, (required by Development)

d. Avulsion Control

The South Powerline Diversion will cut off the sediment sources west of the powerline and allow local control of avulsions east of the powerline as development occurs. (See Sediment Reconnaissance Mapping in Volume II and Sediment Reconnaissance Report in Volume III for discussion of detailed avulsion potential.)

The avulsion plan:

- ✧ Construct the South Powerline Diversion prior to significant development within the Sacate Blanco, Rio Bravo or northern Borrega Basins.
- ✧ Design conveyance facilities through developed properties to accommodate the worst case combination of uncontrolled upstream avulsions.
- ✧ Control potential Avulsions within the development in a stable manner to eliminate the avulsion potential.

e. Land Use Issues

Runoff Constraints: Due to the proposed capacity of the South Powerline Detention Facility to accommodate the runoff from the west, the long detention times in the detention basins and the capacity of the Rio Bravo Channel, constraining runoff from the Rio Bravo Basin is not proposed.

Priority - N/A

f. Crossing Structures

The Rio Bravo Arroyo is a programmed facility for Bernalillo County. At some time in the future 118th Street, 98th Street and Unser Boulevard may cross this facility. Because the Arroyo is small (5' bottom width), it was estimated that 6' x 6' concrete box culverts would be used for crossing structures. This estimate is included in Project RB2, South Rio Bravo Arroyo Conveyance.

g. Budget

Estimated Budget: The estimated project budget for the proposed facilities is:

South Rio Bravo Arroyo Rundown - $ 1.2 Million
South Rio Bravo Arroyo ROW - $ 60,000
South Rio Bravo Arroyo Conveyance - $518,000
Crossing Structures - South Rio Bravo Arroyo Conveyance - $161,840

Timing: The South Rio Bravo outfall is required to safely convey the design storm from the mesa, across the Gun Club Lateral and into Hubbell Lake. ROW will be required for this facility. Construction of this facility is required under existing conditions to protect the MRGCD Gun Club Lateral since the culvert under the lateral does not have the capacity to convey the design storm.

TABLE III-6
HYDROLOGIC SUMMARY
RIO BRAVO BASIN

AP NO.	MAP NO.	DESCRIPTION	VARIABLE	EXISTING FACILITIES			PROPOSED DMP FACILITIES	
				EXISTING	DEVEX	EXISTING CAPACITY	DMP	FUTURE CAPACITY
43	9	RIO BRAVO ROADWAY	Q (cfs)	400	1004	1105	658	1105
		CHANNEL AT HUBBELL CHANNEL	Tvol (AF)	21.1	43.5	2190 cfs	142	
			Runoff (in)	0.66	1.36	(bank full) *	1.44	
			cfs/ac	1.05	2.62		0.56	
44	9	SOUTH RIO BRAVO ARROYO	Q (cfs)	357	734	NA	644	700
		AT HUBBLE LAKE	Tvol (AF)	22.8	48.8		45	
			Runoff (in)	0.51	1.19		1.28	
			cfs/ac	0.66	1.49		1.53	

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.
Q - Peak discharge rate
Tvol - Total runoff volume
Dvol - Maximum detained volume
Runoff - inches of runoff
* Taken from RD-22

cfs/ac - peak discharge rate per acre of contributing area.
Existing - Existing land use and existing drainage facilities.
DEVEX - Fully developed land use and existing drainage facilities.
Capacity - Design capacity.
DMP - Proposed improvements in place, fully developed land use.

RIO BRAVO BASIN (RB)		EXISTING FACILITIES (DEVEX)		WITH DMP	
AP NO.	DESCRIPTION	VARIABLE	100 YR 24 HR.	VARIABLE	100 YR 24 HR.
43	RB CHANNEL @ HUBBELL CH.	Q cfs	1004	Q cfs	658
		TVol AF	43.5	TVol AF	141.6
76	SO. POWERLINE DIVERSION FROM POND 6	Q cfs	–	Q cfs	351
		TVol AF	–	TVol AF	78.4
		DVol AF	–	DVol AF	9.6
77	SO. POWERLINE DIVERSION FROM POND 8	Q cfs	–	Q cfs	56.4
		TVol AF	–	TVol AF	27.4
		DVol AF	–	DVol AF	19.0
44	SOUTH RB ARROYO @ HUBBELL LAKE	Q cfs	734	Q cfs	644
		TVol AF	48.8	TVol AF	45

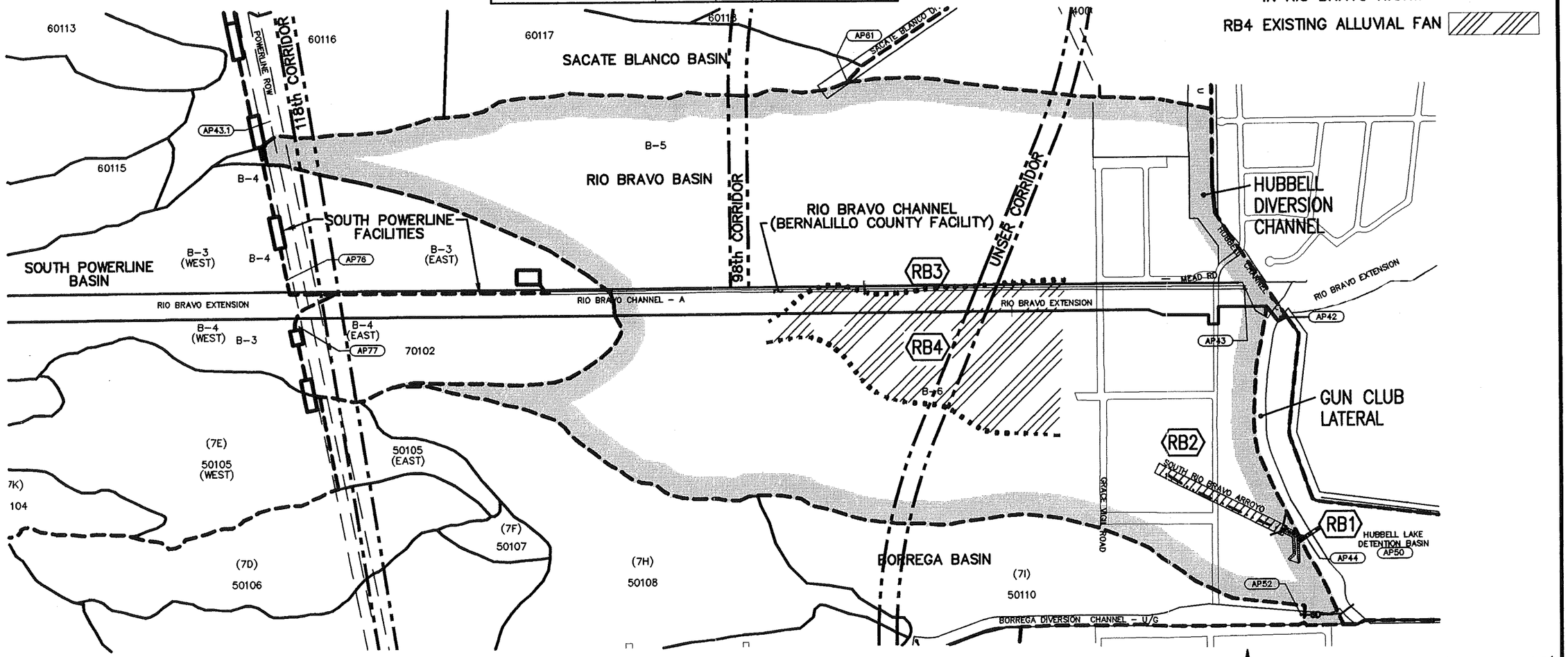
RIO BRAVO BASIN
MANAGEMENT PLAN

RB1 SOUTH RIO BRAVO ARROYO 'Y' STRUCTURE INLET. SEE FIGURES III–10 & III–11

RB2 SOUTH RIO BRAVO ARROYO CONVEYANCE

RB3 CONCRETE LINED CHANNEL IN RIO BRAVO R.O.W.

RB4 EXISTING ALLUVIAL FAN



LEGEND

- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- LOCATION STUDY CORRIDOR
- SUBBASIN BOUNDARIES
- (APXX) — HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 60110 — SUBBASIN ID NUMBER
- (SVX) — PROJECT ID NUMBER

AMOLE–HUBBELL D.M.P.

RIO BRAVO BASIN
MANAGEMENT PLAN

FIGURE NO. III–9

LEEDSHILL–HERKENHOFF, INC.

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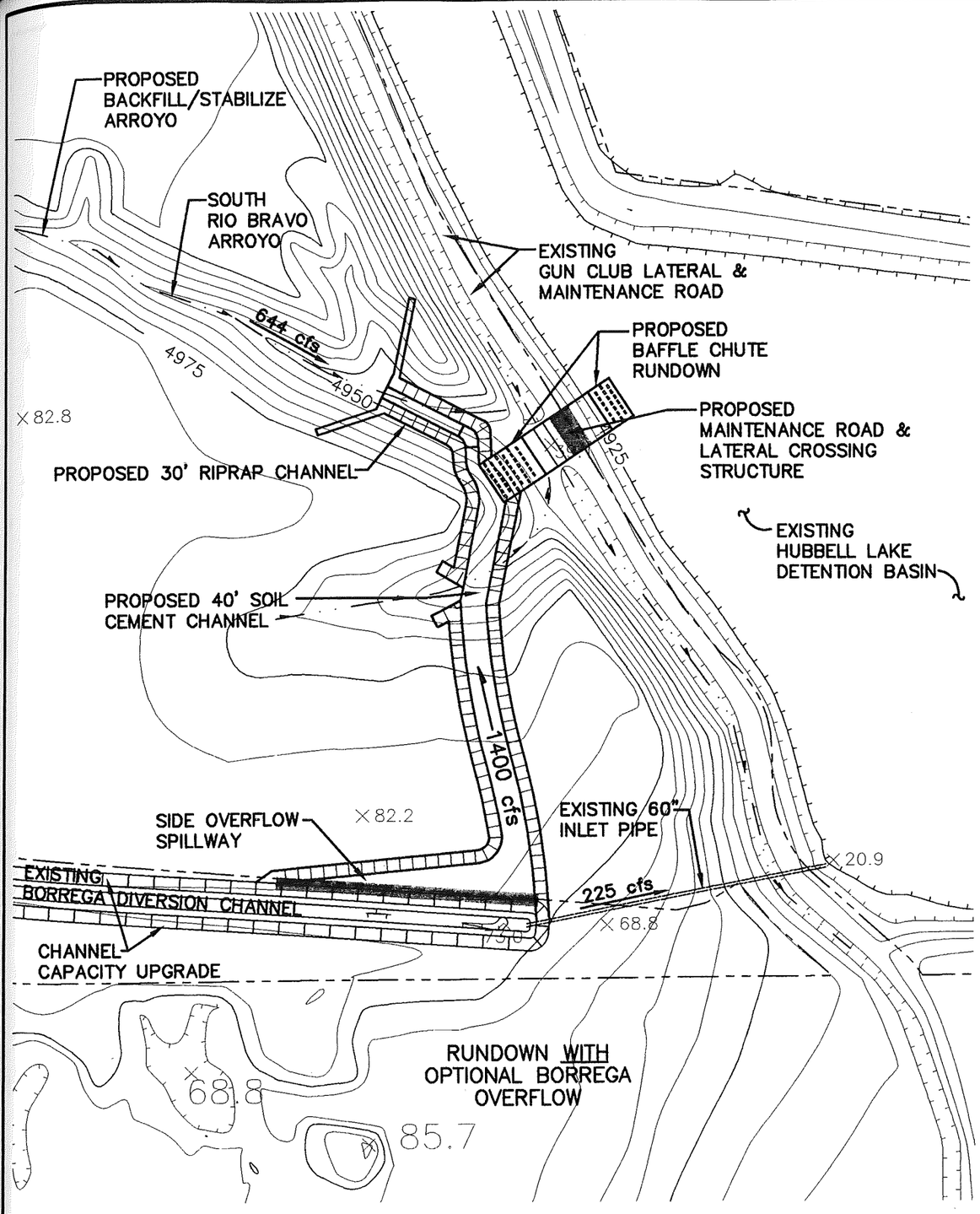

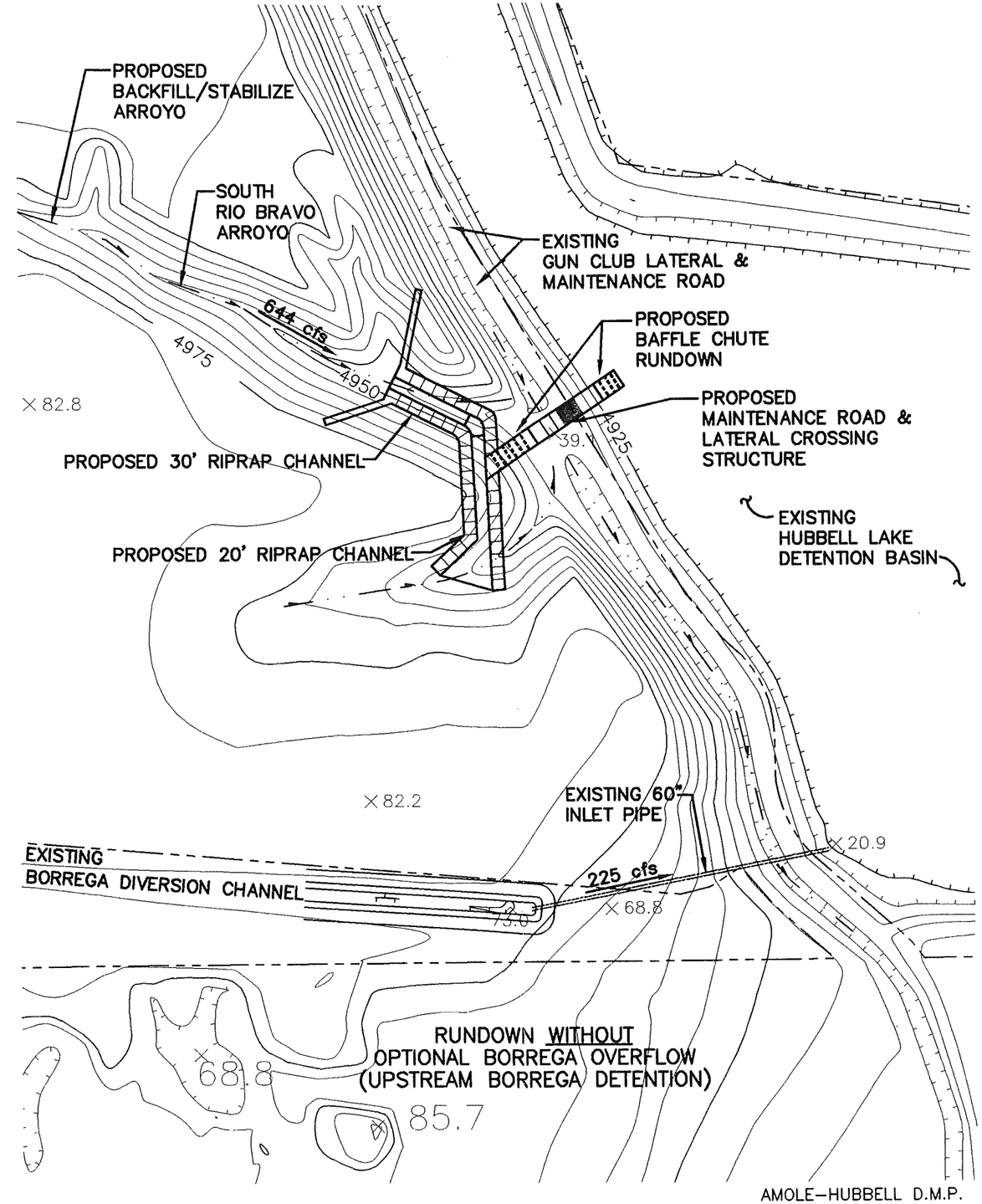

N

0 100' 200' 400'

1" = 200'±

AMOLE–HUBBELL D.M.P.

SOUTH RIO BRAVO ARROYO RUNDOWN 'Y' STRUCTURE SCHEMATIC

LEEDSHILL–HERKENHOFF, INC.

FIGURE NO. III–10

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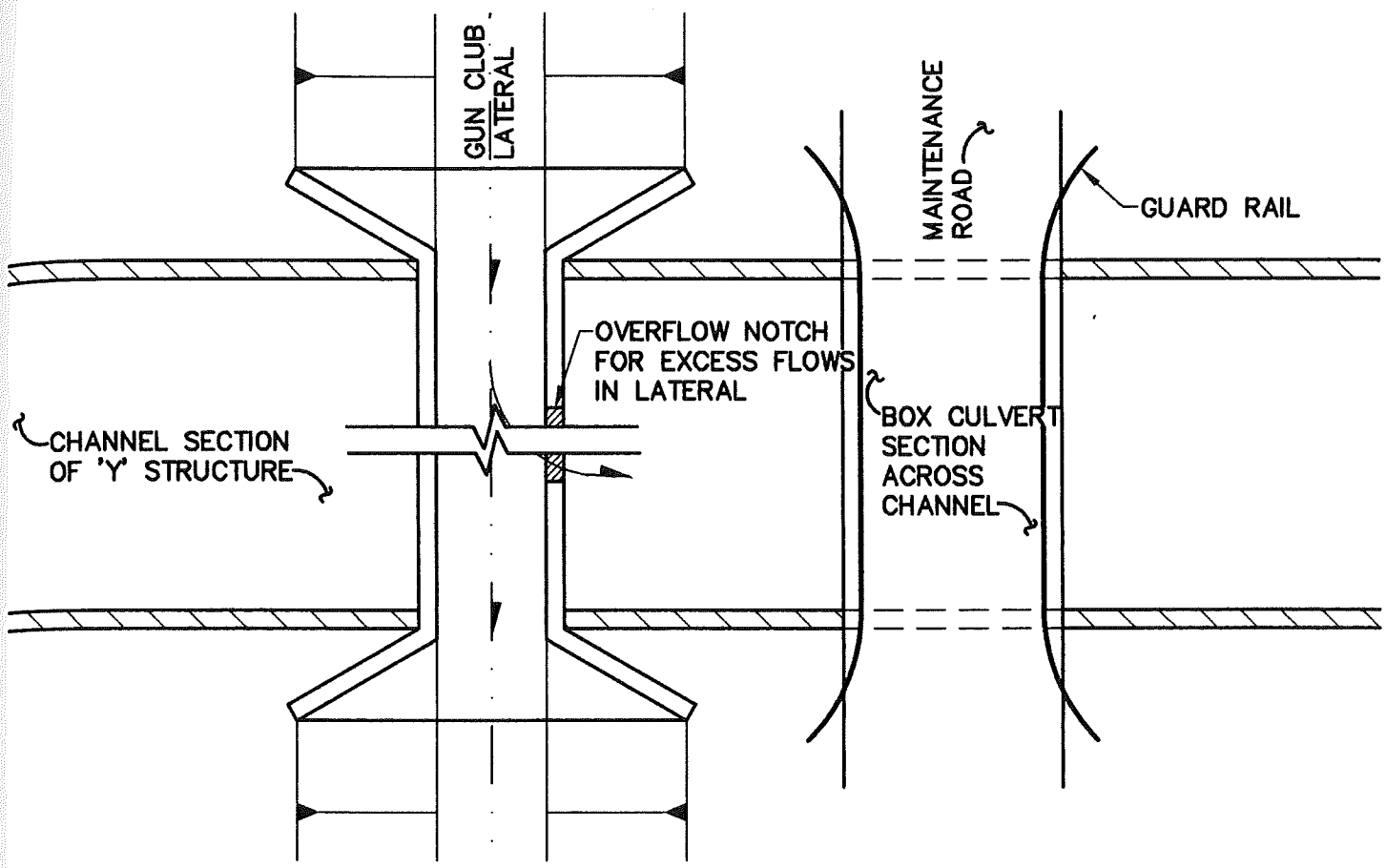
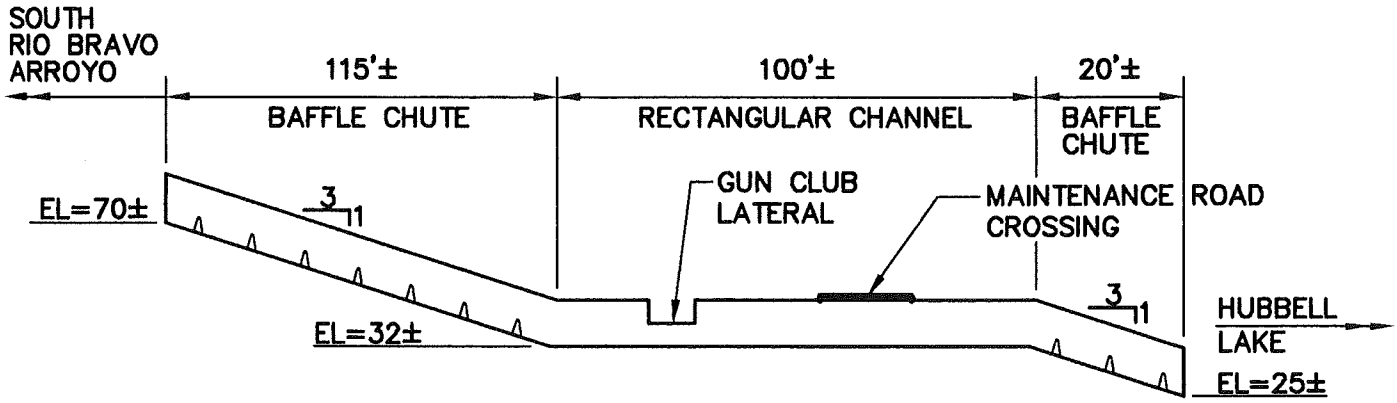


DETAIL: GUN CLUB LATERAL CROSSING

SCALE: 1"=20'



'Y' STRUCTURE BAFFLE CHUTE CONCEPT PROFILE

SCALE: NO SCALE

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SOUTH RIO BRAVO ARROYO
RUNDOWN 'Y' STRUCTURE
BAFFLE CHUTE
CONCEPT PROFILE / DETAIL

LEEDSHILL–HERKENHOFF, INC.

FIGURE NO. III–11

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H. BORREGA ARROYO BASIN

1. EVALUATION

a. Situation

Location: The Borrega Basin is a drainage area which drains into Hubbell Lake. This area is located south of the Rio Bravo Basin, east of the escarpment, and forms the southern boundary of the Drainage Management Plan watershed. This basin is shown on Figure III-12. (See aerial mapping and contours in Volume II.)

Development: This basin is essentially undeveloped.

Borrega Diversion Channel: The existing Borrega Diversion Channel is an earthen channel with riprap grade control structures that conveys runoff generated within the Borrega Basin to Hubbell Lake. The channel is adequately sized for existing conditions but does not have the capacity to convey unrestrained developed conditions runoff.

Borrega Inlet: At the downstream end of the Borrega Channel, is an inlet structure that conveys the channel flows to Hubbell Lake. Several independent analyses have been performed with the conclusion that the inlet is undersized for existing conditions. (RD-40, RD-47, RD-35).

As part of the technical investigation for the DMP, previous studies and proposed alternatives were summarized in a letter report (RD-76) which is included in Volume IV.

b. Problem Description

The Borrega Basin is currently undeveloped including arroyo systems, alluvial fans, and avulsions. Sediment is generated from the steep escarpment slope on the west, and transported downstream to the milder slope areas where some of the suspended sediment deposits forming alluvial fans and avulsion locations.

The Borrega Diversion Channel collects runoff from the arroyo systems and conveys the runoff to the Borrega Inlet and then into Hubbell Lake. Grade control structures have been constructed in the channel to minimize erosion with a design capacity of 640 cfs. Under fully developed conditions without upstream diversions or detention, the channel does not have the capacity to convey the predicted 1643 cfs. The Borrega Inlet is a headwall with a 60-inch RCP that has a bank full capacity of 225 cfs. It does not have the capacity to convey the existing 640 cfs or developed 1643 cfs. Both the Borrega Channel and Inlet are AMAFCA facilities.

Under developed conditions, sub-basin 50201 is proposed to be diverted into the Borrega Basin as development occurs. Currently, the flows generated by this sub-basin flow outside of the DMP boundary. Diverting this area into the Borrega Basin will reduce the downstream hydrologic impacts

from this area. Drainage facilities will be required to convey the flows from sub-basin 50201 to the Borrega Basin. This diversion was initially proposed in the Western Albuquerque Metropolitan Area Drainage Management Plan, identified as Area 6-B (RD-13, RD-14, RD-39).

An avulsion exists at the basin boundary between the Borrega and Rio Bravo Basins, west of the Powerline. Flows generated from sub-basins 50103, 50104, and 50105 could flow into either the Borrega or the Rio Bravo Basins. Improvements at the avulsion will be required to control this runoff.

c. Existing Facility Data

The Borrega Diversion Channel is an earthen channel with grade control drop structures. The facility was designed and constructed in the mid 1980's. The Borrega Diversion Channel diverts the flows from the North and South Borrega Arroyos into Hubbell Lake. (See Figure III-12 and Aerial Photos in Volume II). The need for this diversion was identified to remove downstream areas from the 100-year floodplain (RD-38). A LOMR was filed by AMAFCA in 1991 to remove the downstream area from the FEMA floodplain maps as a result of constructing the Borrega Diversion Channel. Current floodplain mapping is schematically shown on the Existing Conditions Mapping in Volume II.

The channel has a design capacity of 640 cfs and is adequate to convey the predicted existing conditions runoff. The point of discharge from the channel is the Borrega Inlet which conveys the flows to Hubbell Lake.

The Borrega Inlet has a hydraulic capacity of 225 cfs and is inadequate to convey the predicted existing conditions runoff. Additionally the velocities in the 60" RCP exceed the erosive velocity for the pipe which will eventually damage the pipe.

d. Existing Right-of-Way

AMAFCA has sufficient Right-of-Way (ROW) for the existing channel and inlet. See ROW mapping in Volume II.

e. Developed Conditions Data

Results from the Developed Conditions Existing Facilities (DEVEX) analysis (see Volume III) indicates the Borrega Channel and Inlet do not have the capacity to safely convey the 100-year design storm. Hydrologic results presented in the Developed Conditions Existing Facilities analysis are used to develop hydraulic alternative solutions. Developed conditions runoff values with existing facilities for various analysis points along the arroyo system are presented in Table III-7.

The Southwest Area Plan, developed by Bernalillo County and the City of Albuquerque, proposes a 500-foot wide easement along the Ceja Mesa escarpment. Additionally, slopes greater than 9 percent are proposed to remain undeveloped. Therefore, sediment from the escarpment areas will

continue to be generated in fully developed conditions, although at a lesser rate than today. Currently, the Borrega Basin is undeveloped. When the area is fully developed, the additional runoff will be "clean water" with the potential for erosion of earthen channels.

f. Criteria

Provide modifications and improvements which:

- Reduce the peak runoff to a manageable rate such that existing facilities can be utilized as much as possible and/or modify existing facilities.
- Provide a hydraulic solution for the inlet structure such that it will safely convey the design storm from the Borrega Basin to Hubbell Lake.
- Divert the runoff from Sub-basin 50201 (Area 6B) into the Borrega Channel.

g. Alternative Evaluation

The South Powerline Diversion Channel is assumed to be in place for all the Borrega alternatives. This regional diversion facility parallels the existing Powerline easement and impacts the Sacate Blanco, Rio Bravo and Borrega Basins. The proposed facility will collect and detain the runoff from sub-basins 50103, 50104, and 50105. (See Figure III-12 and DMP mapping in Volume II.) This will eliminate the existing major avulsion located west of the Powerline. The alternative to this diversion is to accommodate the sediment from the escarpment "bad lands" area and the resultant avulsions within the sub-basins resulting in more complicated and costly improvements.

The "Area 6B" storm drain diverts flows from the small sub-basin south of Gun Club Road into the Borrega Basin in all alternates.

Numerous potential alternatives have been identified and investigated in this DMP and the previous studies. These include reconstructing the inlet with 6 additional 60" pipes, replacing the pipes with a box culvert or chute. Reconstruction of the inlet appears to be the most expensive option and was not considered further.

Free Discharge: This alternative represents the fully developed condition, free discharge runoff from the Borrega Basin. The maximum flow rate in the channel is 1,627 cfs. In this alternative extensive channel improvements as well as inlet improvements will be required. This alternative is not recommended due to anticipated high cost.

Borrega Detention Pond With 640 cfs Outfall: To reduce the impacts of developed conditions runoff on the existing channel, the placement of a detention pond near the Borrega Diversion Channel head was investigated. The resulting pond would need to be approximately 26 AF in order to limit the discharge to 640 cfs, the existing channel's design flow rate. This does not include the runoff from sub-basin 50111 which generates 109 cfs during the design storm. The resulting flow at the Borrega

Inlet to Hubbell Lake is 665 cfs compared to existing capacity of 225 cfs. In this alternative, local detention ponds and minor channel improvements such as increasing bank height, may be required. This alternative will require major improvements to the inlet. These improvements would include the construction of a side spillway and/or reconstruction of the existing inlet and pipe system. As a result, this alternative is not recommended.

Side Spillway and "Y" Inlet Structure: This structure consists of a side overflow spillway on the north side to divert the flow in excess of the 225 cfs capacity out of the Borrega Channel. This flow would enter a stabilized channel and be conveyed into Hubbell Lake through a drop structure located where the South Rio Bravo Arroyo presently crosses the Gun Club Lateral. This alternate combines the overflow from the Borrega Channel and the flows from South Rio Bravo. The concept for the "Y" structure crossing the Gun Club lateral and providing the energy dissipation to convey the flow from the top of the mesa is shown on Figure III-10 in the Rio Bravo Section.

This alternative is feasible but is estimated to cost approximately $1,027,000 in addition to the South Rio Bravo Arroyo rundown estimated cost of $1,200,000.

Borrega Detention Pond With 225 cfs Outfall: In this alternative, the controlling factor is the Capacity of the existing Borrega Inlet. The capacity of the inlet is approximately 225 cfs, as determined by a study performed by the UNM Civil Engineering Department (RD-40, RD-47). This Alternative incorporates a detention pond to reduce the peak flow from the basin to a flow rate which can be conveyed through the existing inlet. The pond would require approximately 51 AF of storage to reduce the discharge at the inlet to 225 cfs. The Area 6B storm drain is included in the detained runoff. The maximum flow rate from the detention pond is 171 cfs, well below the existing channel capacity. This option appears to cost essentially the same as the side spillway and "Y" inlet structure and does not require financing of the South Rio Bravo Arroyo Rundown concurrently. If the proposed development in this area proceeds, cost sharing and/or ROW dedication could make this alternate less expensive. Therefore, the detention basin is recommended as the DMP solution.

AHYMO Analysis: The Developed Conditions AHYMO model was modified to investigate the proposed alternatives. Idealized conceptual detention basins were inserted into the models to represent the proposed management plan. A detailed AHYMO analysis will be required once specific detention basin, channel and outfall parameters are established during design of the DMP solution.

2. PROPOSED MANAGEMENT PLAN

The proposed management plan is schematically shown on Figure III-12. The hydrologic results for the Borrega Basin with the proposed plan in place are contained in Table III-7.

a. Borrega Detention Pond Limiting Flow to 225 cfs at Inlet - Project BR1

Construct a 51 AF detention basin to capture existing runoff with capacity for developed runoff and limit flow at the Borrega Inlet to 225 cfs. Limit discharge into the Borrega

Channel to 171 cfs at the pond principal spillway. Sub-basin 50111 will discharge into the channel below the spillway but the total peak flow in the channel is predicted to be 225 cfs, the Borrega Inlet's existing capacity. Runoff generated from sub-basin 50201 is planned to be diverted into the Borrega system. To accommodate this additional runoff, the pond should be located along the existing channel such that the flow from sub-basin 50201 (Area 6B Storm Drain) will enter the pond. This will alleviate the need for an additional pond in sub-basin 50201. With the implementation of this alternative, the improvements to the channel are limited to a freeboard upgrade at the inlet (Project BR4). The detention basin could be constructed in phases to accommodate existing runoff initially.

Priority - Project BR1 - High, Capacity exceeded under existing conditions.

b. South Powerline Diversion Detention/Channel - Project SP1

The major part of the proposed plan is to detain and divert runoff from sub-basins 50103, 50104 and 50105 which are west of the powerline easement in the existing Borrega Basin into the proposed Rio Bravo Channel. This facility will eliminate the existing avulsion point shown on Figure III-12.

c. North and South Borrega Arroyo Conveyance - Project BR2

Stable conveyance of the major Borrega Arroyos in conjunction with development is required.

Priority - Low - concurrent with development.

d. "Area 6B" Storm Drain - Project BR3

Construct a storm drain system to collect runoff in sub-basin 50201 and divert it into the detention basin. This facility is shown schematically on Figure III-12.

Priority - Medium - alleviates flows into developed property.

e. Freeboard at Inlet Project BR4

The 225 cfs inlet capacity is bank full at the inlet, without freeboard. Bank height improvements at the inlet and along the lower portion of the channel to provide minimum freeboard for the headwater required to convey the 225 cfs into the 60" pipe.

Priority - High - required for existing conditions deficiency.

f. Land Use Issues

Runoff Constraints: Constraining runoff from this basin to avoid exceeding the existing facility capacity is not practical. The runoff area with South Powerline in place and without the "Area 6B" storm drain diversion is approximately 400 acres. To limit runoff to 225 cfs requires a constraint of 0.56 cfs/ac. This is below the existing runoff rate of approximately 0.69 cfs/ac. Due to the capacity of the proposed and existing facilities within the Borrega Basin and incorporation of the proposed DMP solution, constraining runoff from the Borrega Basin is not proposed.

Priority - N/A

Southwest Area Plan: Upon adoption, the Southwest Area Plan proposes an easement approximately 500-foot wide along the escarpment. The Southwest Area Plan also proposes a restriction on development of areas with slopes greater than 9 percent. These restrictions are intended to preserve the escarpment area and to reduce the impacts of development in the escarpment area. Both of these land use restrictions are incorporated in the hydrologic model.

Priority - Low, (required by development)

Open Space/Recreational Facilities: Construct or provide space for public use open space and recreational amenities in conjunction with the Borrega Detention Pond.

Priority - N/A.

g. Crossing Structures

Long range major street plan for the Albuquerque Urban Area shows Unser Boulevard crossing the Borrega Arroyo. It was assumed that the crossing would be located between the confluence of the North and South Arroyos and the proposed detention basin.

h. Budget

Estimated Budget: The estimated project budget for the proposed facilities is:

Borrega Detention Pond Construction - $ 767,000
Borrega Detention Pond ROW - $300,000 (15 Ac)
Inlet Freeboard Upgrade - $87,000
Area "6B" Storm Drain - $365,000
North and South Borrega Arroyos Conveyance - $989,000
Crossing Structures - Borrega Arroyo - $823,420

Timing: *The Borrega Detention Pond and inlet freeboard upgrade are required to minimize the impacts of possible damage at the Borrega Inlet and resultant downstream flooding from existing conditions runoff. This facility should be constructed as soon as feasible.*

The Area "6B" storm drain timing is not critical and can be deferred until upstream development occurs.

Right-of-Way: The proposed Borrega Detention Pond will require approximately 15 acres of ROW.

TABLE III-7
HYDROLOGIC SUMMARY
BORREGA ARROYO BASIN

AP NO.	MAP NO.	DESCRIPTION	VARIABLE	EXISTING FACILITIES			PROPOSED DMP FACILITIES	
				EXISTING	DEVEX	EXISTING CAPACITY	DMP	FUTURE CAPACITY
51	9	BORREGA DETENTION FACILITY	Qout (cfs)	619	1558	640	171	640
			Tvol (AF)	33.1	94.5		89.6	
			Dvol(AF)	0	0		51	51.2
			Runoff (in)	0.55	1.56		1.59	
			cfs/ac	0.85	2.14		0.86	
51.1	9	N. BORREGA ARROYO	Q (cfs)	513	1275	NA	1005	1005
			Tvol (AF)	27.9	78.2		60.6	
			Runoff (in)	0.55	1.55		1.57	
			cfs/ac	0.85	2.11		2.17	
51.2	9	S. BORREGA ARROYO	Q (cfs)	112	320	NA	320	320
			Tvol (AF)	5.25	16.3		16.3	
			Runoff (in)	0.51	1.60		1.60	
			cfs/ac	0.92	2.61		2.61	
51.3	9	AREA 6B STORM DRAIN	Q (cfs)	NA	NA	NA	230	230
			Tvol (AF)				12.50	
			Runoff (in)				1.60	
			cfs/ac				2.44	
52	9	BORREGA INLET TO HUBBELL LAKE	Q (cfs)	612	1627	225	225	225
			Tvol (AF)	41.1	116	(bank full)	94	(with
			Runoff (in)	0.55	1.56		1.59	freeboard)
			cfs/ac	0.69	1.83		0.86	

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.
Q - Peak discharge rate
Tvol - Total runoff volume
Dvol - Maximum detained volume
Runoff - inches of runoff
cfs/ac - peak discharge rate per acre of contributing area.
Existing - Existing land use and existing drainage facilities.
DEVEX - Fully developed land use and existing drainage facilities.
Capacity - Design capacity.
DMP - Proposed improvements in place, fully developed land use.
Qout - Outflow peak discharge rate.

BORREGA BASIN MANAGEMENT PLAN

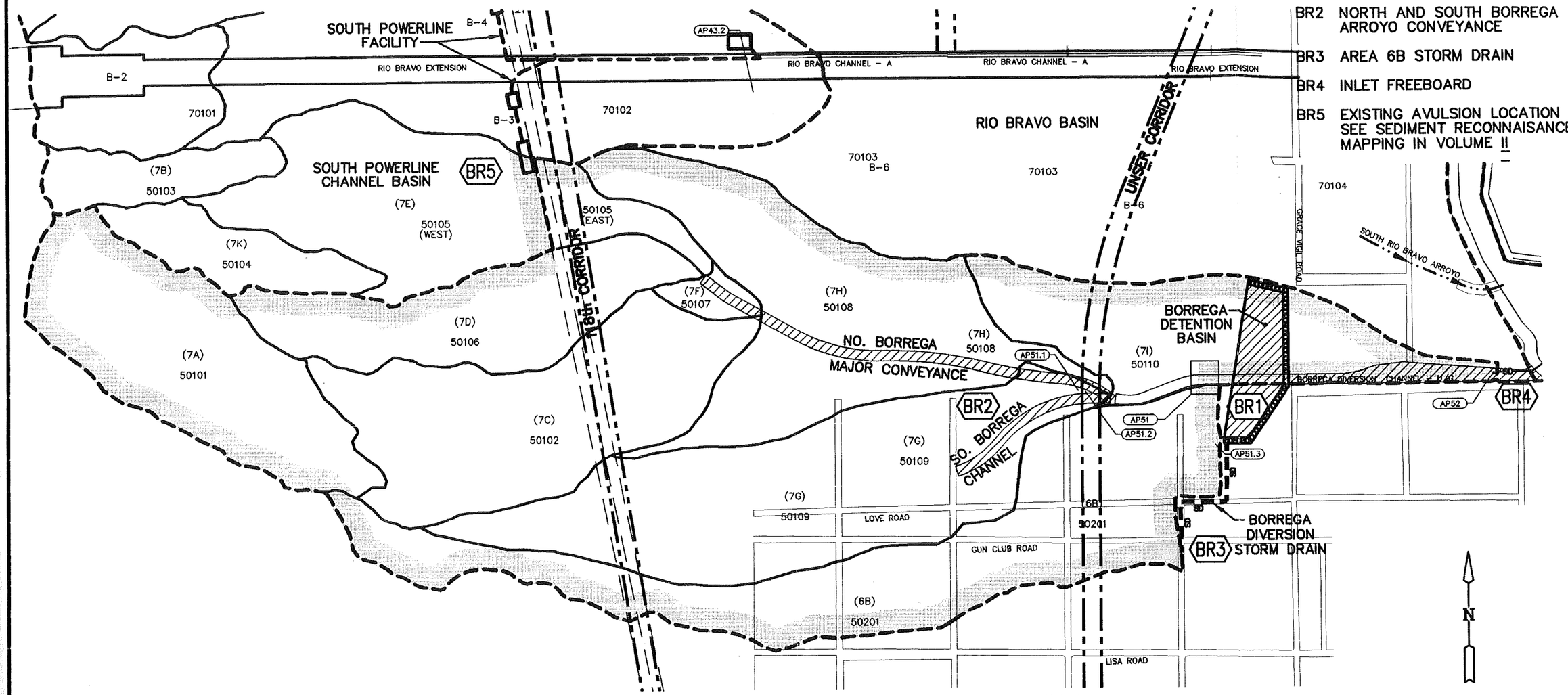
BR1 BORREGA DETENTION FACILITY 51 AF LIMIT FLOW TO 225cfs AT BORREGA INLET INTO HUBBELL LAKE.

BR2 NORTH AND SOUTH BORREGA ARROYO CONVEYANCE

BR3 AREA 6B STORM DRAIN

BR4 INLET FREEBOARD

BR5 EXISTING AVULSION LOCATION SEE SEDIMENT RECONNAISANCE MAPPING IN VOLUME II



BORREGA ARROYO BASIN (BR)	EXISTING FACILITIES (DEVEX)		WITH DMP	
AP NO.	DESCRIPTION	VARIABLE	100 YR 24 HR.	VARIABLE	100 YR 24 HR.
51	BORREGA DETENTION FACILITY	Q cfs	1558	Q cfs	171
		TVol AF	94.5	TVol AF	89.6
		DVol AF	–	DVol AF	51
51.1	NORTH BORREGA ARROYO	Q cfs	1275	Q cfs	1005
		TVol AF	78.2	TVol AF	60.6
51.2	SOUTH BORREGA ARROYO	Q cfs	320	Q cfs	320
		TVol AF	16.3	TVol AF	16.3
51.3	AREA 6B STORM DRAIN	Q cfs	NA	Q cfs	230
		TVol AF	–	TVol AF	12.5
52	BORREGA DIVERSION @ INLET	Q cfs	1627	Q cfs	225
		TVol AF	116	TVol AF	94

LEGEND

- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- LOCATION STUDY CORRIDOR
- SUBBASIN BOUNDARIES
- (APXX) HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 60110 SUBBASIN ID NUMBER
- (SVX) PROJECT ID NUMBER

0 500' 1000' 2000'

1" = 1000'±

AMOLE–HUBBELL D.M.P.

BORREGA BASIN MANAGEMENT PLAN

FIGURE NO. III–12

LEEDSHILL–HERKENHOFF, INC.

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I. AMOLE DEL NORTE BASIN

1. EVALUATION

a. Situation

Location: The Amole del Norte basin is a large watershed south of I-40 and east of the Snow Vista Diversion Channel, which is collected in the Amole del Norte Diversion Channel. This watershed is approximately 6.5 square miles of the 16.1 square mile Amole watershed below Westgate Dam. This basin includes several subbasins which have been analyzed by others as part of on-going development in this area. These Subbasins and the analysis reports are as follows:

- ✧ 98th & Central Basin - Drainage between I-40 and Central Ave. West of 98th St. which is detained in a basin at the intersection of 98th St. and Central Ave. (Prepared by Griener for COA, RD #34).

- ✧ Tierra Bayita Basin - drainage which flows to the Tierra Bayita Channel along Bridge St. and into the N-S Coors Pond. (Prepared by Griener for COA, RDs # 6,32,33,34).

- ✧ Unser/214 Basin - The drainage area north of Tierra Bayita and west of Unser Blvd which is collected in the Unser Pond system. (Prepared by Easterling for Sunwest Bank, COA, AMAFCA, RD #29 and by Scanlon for COA, RD #23, included in SAD 214).

- ✧ Atrisco Business Park Basin - The drainage area east of Unser Blvd. and north of Bridge St. which drains to the N-S Coors Pond. (Prepared by Easterling for Sunwest Bank, COA, AMAFCA, RD #28).

- ✧ Tower/Sage Basin - The drainage area north of Sage Road and east of the Snow Vista Channel which drains into the proposed Tower Pond and to the Amole del Norte Channel. (Prepared by Andrews, Asbury and Robert for COA, RD #25, included in SAD 222).

- ✧ Sunrise Estates Basin - The drainage area south of Sage Road incorporating the Sunrise Estates Subdivision. (Prepared by Isaacson & Arfman, RD #59).

- ✧ South Amole del Norte Basin - The drainage area east of the Snow Vista Channel and Amole Arroyo and south and east of Sunrise Estates.

The Amole del Norte watershed and subbasins are shown on Figure III-13. See existing and developed conditions mapping in Volume II for more detail. The AHYMO model for the Amole del Norte Basin was constructed from the AHYMO models developed for each of these subbasins.

Modifications to the models included revising ID numbers, exporting hydrographs, revising sediment bulking and boundaries to construct a homogeneous AHYMO analysis. A revised rating curve was developed for the N-S Coors Pond based on COA provided survey data. (See detailed hydrologic data in Volume III).

The main trunk facilities are already in place in this basin. This area was included because all of the runoff from the Amole del Norte Diversion Channel drains to the Amole and Hubbell Lake Detention Basins impacting storage volumes and spillway requirements.

b. DRAINAGE MANAGEMENT PLAN

The facilities within the Amole del Norte watershed are controlled and maintained by the City of Albuquerque. The City is considering several independent studies, evaluations and design solutions for improvements within this watershed, many in conjunction with Special Assessment Districts and with proposed developments and COA studies.

It is intended that these independent design solutions will address the potential deficiencies with existing facilities identified in Volume III, Developed Conditions - Existing Facilities (DEVEX). Due to the evolving nature of these City and private development plans, studies and proposals, a detailed management plan for the Amole del Norte watershed has not been included in this DMP.

The Tower/Sage 60 AF Detention Pond and outfall storm drain is a programmed facility proposed as part of COA SAD 222. AMAFCA has been requested to participate in construction funding for this regional facility. The Tower/Sage Pond has been identified as Project AD1 in this report.

Conveyance Facilities: Conveyance (flow rate) issues for these existing facilities is deferred to the City. *The detention basins and ponds in the Amole del Norte watershed are required to mitigate the future conditions peak runoff rates which minimizes overloading of existing channels, storm drains and streets.*

Existing, proposed and potential future detention basins/ponds in the Amole del Norte watershed include:

98th & Central
Unser Diversion
214 Basin
Atrisco business Park
N/S Coors Pond
Sunrise Estates
Tower/Sage (Programmed)
90th & Central (Potential Future)
South Amole del Norte (Potential Future)

These and similar detention facilities are necessary to avoid exceeding the capacity of the existing Amole del Norte Channel as well as other existing streets, storm drains and channels.

Runoff Volume Storage: *The detention facilities which presently exist and are proposed for the areas draining to the Amole del Norte Diversion Channel do not reduce the Amole Dam and Hubbell Lake Dam volume requirements.*

The detention facilities controlling runoff rates to the Amole del Norte Channel are designed to detain a portion of the runoff and release it at a reduced rate. All of these facilities are essentially drained within 30 hours after the start of the storm. Drainage out of the Amole and Hubbell Lake facilities may not have started by the time these upstream basins have evacuated.

AHYMO Analysis: The hydrograph from the Developed Conditions - Existing Facilities (DEVEX) AHYMO analysis is incorporated in the total runoff entering the Amole Detention Basin to determine impacts to the Amole/Hubbell Dam system. Revised conveyance and detention facilities in the Amole del Norte watershed as a result of on-going improvements may alter the timing of the runoff entering the Amole Basin, but these differences are not anticipated to effect the total storage volume requirements for the Amole and Hubbell Lake Facilities.

The DEVEX AHYMO analysis indicated 13.7 AF of flow over the emergency spillway at the N/S Coors pond for fully developed conditions with existing facilities.

The DMP AHYMO which is summarized in this volume does not include any spillage out of the system. The DMP run routes all of the inflow hydrograph through N/S Coors to the Amole Dam so all of the volume is accounted for. The inflow hydrograph into the pond is the same as the DEVEX runs.

For the DMP analysis, in order to capture all of the volume, the pond is modeled as essentially having raised sides which raises the peak Q in the Amole del Norte Channel. This is conservative for the timing of this flow reaching the Amole Dam which was the intent. However, this overestimates the channel Q if the long term solution of N/S is to widen the pond or install detention upstream.

The truncated volume of 3.2 AF on Table II-3 is the sum of the truncations from all the ponding in the Amole del Norte watershed including 1.6 AF at N/S Coors.

TABLE III-8
HYDROLOGIC SUMMARY
AMOLE DEL NORTE BASIN

AP NO.	MAP NO.	DESCRIPTION	VARIABLE	EXISTING FACILITIES			DMP	DEVEX 96
				EXISTING	DEVEX	EXISTING CAPACITY		
36.1	5	N-S COORS POND OUTFALL	Qin (cfs)	1728	3097	NA	3167	---
			Qout (cfs)	733	960	1199	1442	960
			Tvol (AF)	167	365		379	
			Dvol (AF)	43.0	¥ 76.6		‡ 68.3	
			Runoff (in)	0.74	1.99		1.99	
			cfs/ac	0.30	0.44		0.63	
36	5	AMOLE DEL NORTE CHANNEL AT HEAD (below Tower Rd.)	Q (cfs)	739	1199	1220	1623	1199
			Tvol (AF)	169	389	2940 cfs	403	
			Runoff (in)	0.74	1.97	(bank full)	1.97	
			cfs/ac	0.30	0.51		0.66	
36.2	5	AMOLE DEL NORTE CHANNEL BELOW SAN YGNACIO	Q (cfs)	754	1418	1360	1802	1418
			Tvol (AF)	174	470	2940 cfs	483	
			Runoff (in)	74.00	1.91	(bank full)	1.92	
			cfs/ac	0.29	0.48		0.6	
37	5	AMOLE DEL NORTE BELOW SAGE RD.	Q (cfs)	754	1649	1360	1982	1649
			Tvol (AF)	174.0	491	2847 cfs	505	
			Runoff (in)	0.74	1.90	(bank full)	1.91	
			cfs/ac	0.29	0.53		0.62	
38	5	AMOLE DEL NORTE BELOW ARENAL RD.	Q (cfs)	1032	1924	1600	1993	2146
			Tvol (AF)	226	540	2847 cfs	508	
			Runoff (in)	0.73	1.83	(bank full)	1.90	
			cfs/ac	0.30	0.54		0.62	
38.1	5	OVERLAND FLOWS OUT OF SUNRISE ESTATE AREA (not total Sunrise Estate flow)	Q (cfs)	726	190	987	190	
			Tvol (AF)	29	36.4		36.4	
			Runoff (in)	0.94	1.24		1.24	
			cfs/ac	1.97	0.54		0.54	
39	7	AMOLE DEL NORTE AT ENTRANCE TO AMOLE DETENTION FACILITY	Q (cfs)	1634	2184	1665	2347	3071
			Tvol (AF)	252	588	2990 cfs	601	
			Runoff (in)	0.75	1.80	(bank full)	1.81	
			cfs/ac	0.41	0.56		0.59	incls 35301,
					w/Unser SD		w/Unser SD	35303, 35305

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.
Q - Peak discharge rate
Tvol - Total runoff volume
Dvol - Maximum detained volume
Runoff - inches of runoff
Qout - Outflow
Qin - Inflow

cfs/ac - peak discharge rate per acre of contributing area.
Existing - Existing land use and existing drainage facilities.
DEVEX - Fully developed land use and existing drainage facilities.
Capacity - Design capacity.
DMP - Proposed improvements in place, fully developed land use.
¥ 13.7 AF overtopping.
‡ No overtopping at N/S Coors
DEVEX 96 Originally reported DEVEX analysis without updated Sunrise Estates Model.

AMOLE DEL NORTE BASIN (ADN) DMP FACILITIES			
AP NO.	DESCRIPTION	VARIABLE	100 YR 24 HR.
36.1	N–S COORS POND OUTFALL	Q cfs (in)	1442
		TVol AF	379
		DVol AF	68.3
	N–S COORS POND OVERTOPPING	Q cfs	0
		TVol AF	0
36	ADN CHANNEL @ HEAD	Q cfs	1623
		TVol AF	403
36.2	ADN BELOW SAN YGNACIO	Q cfs	1802
		TVol AF	483
37	ADN BELOW SAGE ROAD	Q cfs	1982
		TVol AF	505
38	ADN BELOW ARENAL ROAD	Q cfs	1993
		TVol AF	508
38.1	OVERLAND FLOW SUNRISE EST. AREA	Q cfs	190
		TVol AF	36.4
39	ADN @ ENTR. TO AMOLE DET. BASIN	Q cfs	2347
		TVol AF	601

IDENTIFIED MANAGEMENT PLAN FACILITIES
AD1 SAD 222 TOWER–SAGE DETENTION BASIN AND OUTFALL

LEGEND

- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- PLATTED EASEMENT/ROW
- SUBBASIN BOUNDARIES
- (APXX) HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 6011D SUBBASIN ID NUMBER
- (SVX) PROJECT ID NUMBER

N

0 750' 1500' 3000'
1" = 1500'±

AMOLE–HUBBELL D.M.P.

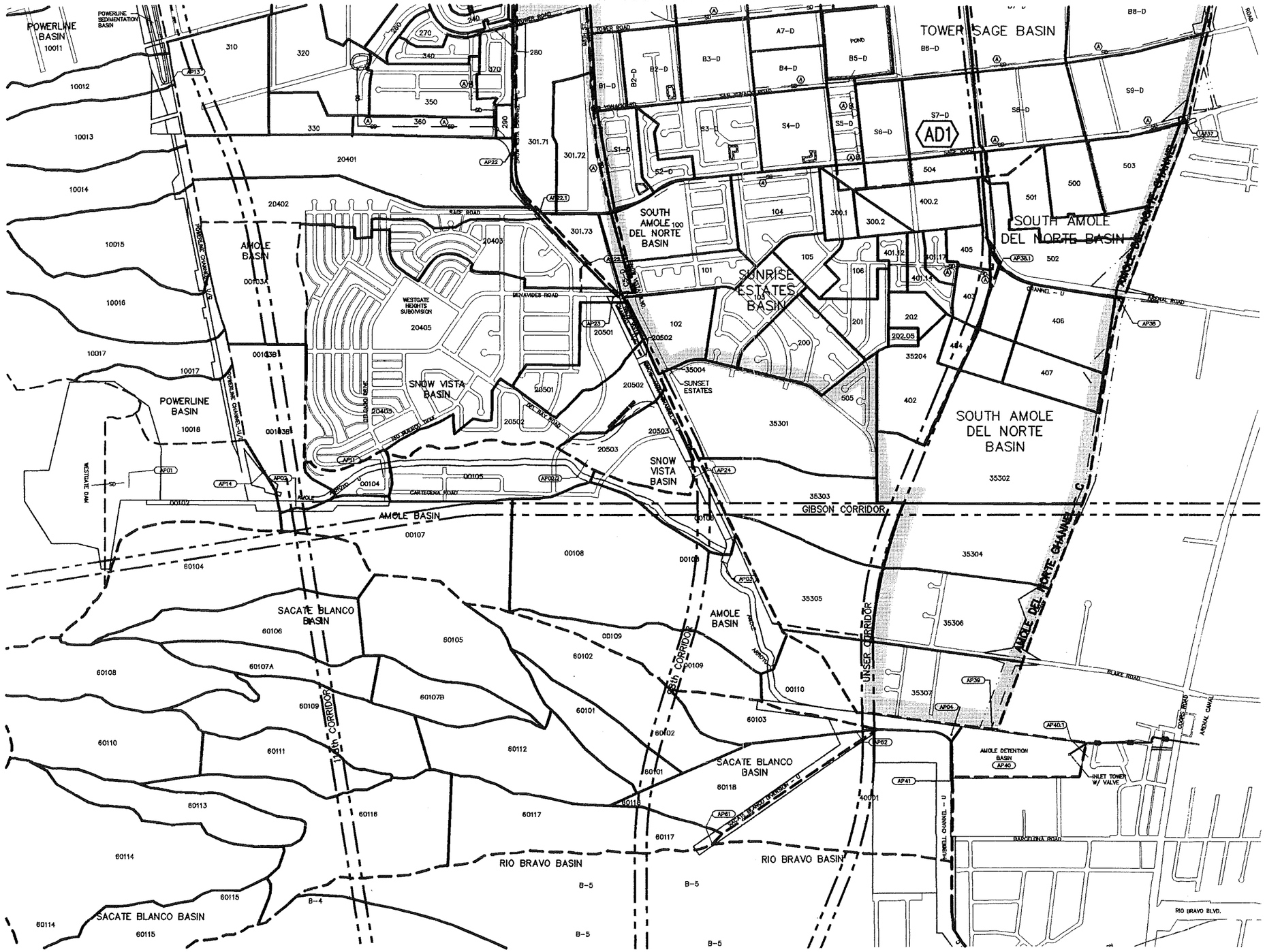
AMOLE DEL NORTE BASIN MANAGEMENT PLAN

SEE FIGURE NO. III–13b FOR CONTINUATION

LEEDSHILL–HERKENHOFF, INC.

FIGURE NO. III–13a

1 P:\95043\95043_32\DWG\C\DN–BASIN.dwg 6–10–99 KHK



AMOLE DEL NORTE BASIN (ADN) DMP FACILITIES			
AP NO.	DESCRIPTION	VARIABLE	100 YR 24 HR.
36.1	N-S COORS POND	Q cfs (in)	1442
	OUTFALL	TVol AF	379
		DVol AF	68.3
	N-S COORS POND	Q cfs	0
	OVERTOPPING	TVol AF	0
36	ADN CHANNEL	Q cfs	1623
	@ HEAD	TVol AF	403
36.2	ADN BELOW	Q cfs	1802
	SAN YGNACIO	TVol AF	483
37	ADN BELOW	Q cfs	1982
	SAGE ROAD	TVol AF	505
38	ADN BELOW	Q cfs	1993
	ARENAL ROAD	TVol AF	508
38.1	OVERLAND FLOW	Q cfs	190
	SUNRISE EST. AREA	TVol AF	36.4
39	ADN @ ENTR. TO	Q cfs	2347
	AMOLE DET. BASIN	TVol AF	601

IDENTIFIED MANAGEMENT PLAN FACILITIES
AD1 SAD 222 TOWER-SAGE DETENTION BASIN AND OUTFALL

LEGEND

- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- PLATTED EASEMENT/ROW
- SUBBASIN BOUNDARIES
- (APXX) HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 60110 SUBBASIN ID NUMBER
- (SVX) PROJECT ID NUMBER

N

0 750' 1500' 3000'
1" = 1500'±

AMOLE-HUBBELL D.M.P.

AMOLE DEL NORTE BASIN MANAGEMENT PLAN

LEEDSHILL-HERKENHOFF, INC.

FIGURE NO. III-13b

1 P:\95043\95043_32\DWG\C\DN-BASIN.dwg 6-10-99 KHK

J. AMOLE DETENTION FACILITY, HUBBELL CHANNEL, AND HUBBELL LAKE SYSTEM

1. EVALUATION

a. Situation

Location: The Amole Detention Dam, Hubbell Channel, and Hubbell Lake Dam form the watershed's southeast boundary. These facilities are shown on Figure III-14.

Operations: Runoff enters the Amole Detention Facility primarily from runoff collected in the Amole Arroyo and Amole del Norte Diversion Channel where up to 490 AF can be detained (See Aerial Mapping in Volume II). This volume is estimated to be approximately the 20-year return frequency event. The principal outfall is a gated 30 inch drain that requires MRGCD approval to operate since the point of discharge for the drain is the Arenal Canal, an MRGCD facility. Inflow volume in excess of 490 AF is conveyed in the Hubbell Channel to Hubbell Lake. The excess flow spills over a side spillway and into the channel. The Hubbell Channel is concrete lined along the side spillway. Below the spillway, the channel transitions to an earthen channel where flows are conveyed to Hubbell Lake. Hubbell Lake is an oxbow from the Rio Grande converted into a 493 AF detention facility. The principal spillway for Hubbell Lake is a 36 inch gated drain that is operated in the same manner as the Amole Detention Facility. (See Mapping in Volume II)

The outfalls for these two facilities are gated pipe drains that remain in the closed position. The principal spillway discharge to the MRGCD Arenal Canal is by permit which includes the operational constraints. The operational logic assumes that during large storm events, the valley stormwater systems will be full and the stored water in the Amole and Hubbell dams will not be released until the valley stormwater subsides. When AMAFCA wishes to release the detained runoff, AMAFCA obtains concurrence from MRGCD to open the valve and discharge into the MRGCD facility. This operational system causes the detention facilities to be treated like a "retention" facility. Therefore, there has to be enough storage to contain the runoff from the entire Amole watershed. This will remain the operational system unless an alternate outfall from the Amole Dam or Hubbell Lake is designed and constructed.

b. Problem Description

The Amole and Hubbell Lake detention facility system does not provide adequate storage volume for existing conditions. Approximately 26 AF out of a total of 1009 AF spills out of Hubbell Lake. The flow is the tailend of the hydrograph and is the drain down from upstream detention and is estimated to be less than 100 cfs. Under fully developed conditions, the existing storage volume from these two facilities is inadequate to contain the predicted volume from the design storm with a deficiency of approximately 862 AF.

The analysis in this section addresses the capability of the system for the 100-year 24-hour event. Emergency spillway adequacy and dam safety issues are addressed in the following section.

c. Existing Facility Data

The Amole/Hubbell system does not have sufficient volume to detain the existing conditions runoff. However, the predicted deficiency is very small compared to the overall system function. Essentially, these facilities perform adequately for existing conditions. Also, these facilities are inadequate for developed conditions.

The Hubbell Channel is an extension of the Amole Dam emergency spillway connecting the Amole and Hubbell Lake facilities and was designed to accommodate the runoff from the ½ PMP event. The channel design capacity ranges from 10,159 to 11,765 cfs which greatly exceeds the 100-year developed conditions peak flow rates of approximately 2500 cfs. For the 100-year event, the Hubbell Channel is adequate.

Flows enter the Amole and Hubbell Lake Dam via rundowns or energy dissipating chutes. These facilities are included in the basin associated with the channel including the following:

Amole Arroyo
Amole del Norte Channel
Rio Bravo Channel
South Rio Bravo Arroyo
Borrega Diversion Channel

d. Existing Right-of-Way

AMAFCA owns sufficient ROW for the existing facilities. In addition, AMAFCA owns approximately 40 acres of unimproved land adjacent to the Amole Detention Facility and Hubbell Channel. The land is currently unused by AMAFCA. See Figure III- 14 for site location.

e. Developed Conditions Data

Results from the Developed Conditions Existing Facilities analysis (see Volume III) indicates that, without improvements, the total volume flowing into the Amole/Hubbell system exceeds the volume capacity and flow will leave the system across the emergency spillway. The added volume required to prevent the system from spilling is 862 AF. Developed conditions runoff values for various analysis points along the system are presented in Table III - 9.

f. Criteria

The criteria is to provide a drainage management plan which:

- Provides adequate storage volume for runoff from the watershed under fully developed conditions. The system improvements must meet the design criteria set forth by the City

of Albuquerque Design Process Manual and meet the State Engineer's criteria for dam safety.

g. Alternative Evaluation

There are basically two alternatives available for the Amole/Hubbell system. The increased runoff from developed conditions can either be conveyed to a point of discharge or stored. In either case, new facilities will be required. *In all of the alternatives, the West I-40 channel is assumed to be constructed and operationl along with the two Amole Detention Dams north of I-40.*

1. Outfall To the Rio Grande: An alternative to improve the Amole Detention Facility principal spillway has been evaluated. The existing 30 inch pipe would be replaced by a 60 inch pipe from the Amole Basin that would flow by gravity to the Rio Grande. This is feasible only from the Amole Basin since the elevation of the basin bottom and the principal spillway is higher than the Rio Grande. Near the river, a small pump station would be required to lift the residual and low flows to the point of discharge. This system is estimated to cost $8 million excluding ROW costs. A combination of smaller pipe outfall from the Amole Dam and increased storage could potentially reduce the overall system cost. Since a significant portion of the outfall cost is pavement and utility removal and replacement, the cost savings from a smaller outfall pipe may not be large enough to offset savings in smaller detention facilities.

   The outfall pipe invert across the valley floor will be below the Rio Grande elevation. Utilization of this outfall pipe to drain valley areas may not be feasible.

2. Westgate Dam Storage: One way to prevent all of the runoff from being stored in the Amole and Hubbell Lake Dams is to convert the Westgate Dam from a short term detention dam to a valved long term detention facility. The valve would be maintained in the closed position and the stored water released only when downstream facilities, including Amole, Hubbell Lake and the MRGCD Arenal Canal had adequate capacity.

   Geotechnical data for the existing dam could not be located and an independent geotechnical investigation was performed as part of this DMP by Vinyard and Associates. (See report in Volume IV.) This investigation included borings to verify materials and seepage analyses. This analysis indicated that a decrease in the transmissivity of the dam is required to prevent seepage due to the longer detention times. Substantial improvements to the upstream face of the dam including a cutoff trench at the upstream toe of the dam would be required.

   Even with longer detention (retention) in Westgate Dam, additional storage at the Amole/ Hubbell Lake system is required for developed condition runoff volume.

   Based on these results, this alternative was not evaluated further.

3. Hubbell Lake Expansion: The storage volume at Hubbell Lake can be increased by expanding the basin to the north which is presently undeveloped. Approximately 100 acres is available. Potentially all of this would be required to store the necessary 862 AF of additional volume.

This concept is to construction a berm similar to the present Hubbell Lake dam—approximately 10' to 12' high, to enclose this area on the east and north. The existing berm on the north side of Hubbell Lake would be removed. A low level berm could be left enclosing the existing Hubbell Lake to facilitate wetlands habitat in the old oxbow area. The emergency spillway would be removed and reconstructed on the east side of the basin.

The construction cost for this alternative ($1,502,000) is significantly less than the other viable alternative, the Guac Basin. However, the purchase of the approximately 100 acres of property is the key to implementing this alternative. A joint use facility would be feasible due to the low height of the dam and the large flat interior.

Due to the nature of this construction, phasing is not advantageous for this alternative.

4. The Guac- Basin: The existing 40 acres owned by AMAFCA can be used to supply the additional 862 AF of detention volume required. The new facility would be incorporated into the existing Amole system to form the Guac-Amole Detention Facility. The connection of these two basins is proposed to be as open as practical to facilitate multiple uses of the basin. In Figures III-15, III-16, and III-17, this concept is illustrated. The Guac-Amole Detention Facility is the "Baseline" proposal to provide adequate storage for the developed conditions runoff volume from the Amole Arroyo watershed.

Several secondary alternatives were identified for the Guac Basin as variations on the Baseline Alternative.

a. Value of Existing Materials: Construction of the Guac basin involves removing approximately 1.7 million CY of existing soil to create a large "hole". The existing Amole Basin was constructed in an old aggregate pit (the Giannini Gravel Pit). It may be possible to offset some of the excavation cost by recovering aggregate from the Guac Basin location. AMAFCA has obtained a preliminary geotechnical investigation to evaluate the potential commercial use of materials at this site. This report is contained in Volume IV (RD-83) and estimates that the site has the following quantities of material:

901,000	CY of relatively clean sands
1,877,000	CY of silty sand (borrow)
976,000	CY of sands and gravels

Land owner royalties that might be expected from this site range from $0.50 per ton to $1.50 per ton. The sand and gravel portion has a potential value of approximately

$1.5 million to $2.5 million. The ten to twenty foot overburden may have a negative impact on the commercial value of the site.

b. Salsa Basin: A vacant approximately 20 acre parcel located at the northeast corner of the Amole Basin was evaluated as part of the expanded Guac-Amole facility. The natural ground at the east side approximately matches the bottom elevation of the Amole Dam. The concept is to remove the Amole embankment on the north side and extend the embankment around this parcel. Approximately 270 AF of storage is obtained which could reduce the depth of the Guac Basin.

c. Enhanced Recreational Multiple Uses: The proposed 862 AF Guac basin located on the AMAFCA 40 acre site requires 3 horizontal to 1 side slopes approximately 30 feet deep to provide adequate volume. The Guac-Amole Basin (combined Amole and Guac Basin) floor area is approximately 45 acres, large enough for numerous playing fields, a park or other multiple uses. However, with the 30 ft deep sides, this space may not be visually pleasing.

One concept is to expand the site by an adequate amount to incorporate a regional park, golf course or other recreational facility. As much as 100 acres of additional land would be required for a golf course. This would allow a shallower Guac Basin and incorporation of the facility into the overall basin geometry. Two features will have to be addressed in the planning and design of a combined recreational facility/golf course/detention facility:

Unser Boulevard Extension: The proposed extension of Unser Boulevard (shown on Figure III-14) effectively cuts off access from the Guac Basin to the vacant land to the west.

Upslope of the Natural Grade to the West and to the Northwest: The natural grade slopes between 2% and 4% to the west. To utilize the existing Hubbell Channel system, the runoff must be stored below elevation 4996.75, the emergency spillway elevation. Raising the spillway elevation would require raising the top of the dam elevation (presently 5003) which is not considered feasible. (See Sections on Figures III-16 and III-17.)

A series of detention basins scattered along the Amole west of the Unser Extension incorporating a golf course is a feasible alternative to the proposed naturalistic composite channel (See Section B). However. these basins would not decrease the storage required in the Guac-Amole basin unless each basin was designed and operated as a "retention" facility. This would require valved principal spillways as well as emergency spillways.

Based on these constraints, it is proposed to pursue multi-use and recreational amenities in the Guac-Amole Basin and the Amole Arroyo corridor as a secondary consideration.

d. Staged Construction: The 862 AF storage volume proposed for the Guac Basin accommodates full build out of the upstream watershed. For existing conditions, only approximately 26AF additional storage is needed. Staged construction would be accomplished as follows:

Stage I - Construct the northern portion of the Guac Basin with approximately 150 AF storage, the connection between Guac and Amole Basins and make the modifications to the emergency spillway into the Hubbell Channel.

Stages II and III: Excavate the Guac Basin in stages. If borrow was required for other AMAFCA projects or the existing material had commercial value, the Guac Basin could be expanded gradually over a series of years at minimal cost. Also, if the Salsa Basin is incorporated into this storage, it could be one of these stages.

2. PROPOSED MANAGEMENT PLAN

The proposed management plan is schematically shown on Figure III-14. The hydrologic results for the Amole/Hubbell Lake system with the proposed plan in place are contained in Table III-8. These are based on the Guac or Guac and Salsa alternative.

The baseline proposed improvements are:

a. Guac-Amole Detention Facility Projects AH-1, AH-2 and AH-3: Construct an 862 AF multi-use facility in stages to provide the additional storage volume required under fully developed conditions (See Figures III-16, 17 and 18). The new detention facility would be located on the existing 40 acres owned by AMAFCA, adjacent to the Amole Detention Facility. The combined basins will form the Guac-Amole Detention Facility with a total storage volume of 1,352 AF. The Guac-Amole basin will function as a single facility. The existing emergency spillway would be shortened on the east side to provide space for a 100 ft wide connection corridor. The emergency spillway would be increased to approximately 600 ft total length by construction approximately 300 ft of weir length from the Guac Basin on the west side of the existing Hubbell Channel stilling basin.

Priority - Stage 1 - Medium, Hubbell Lake spills under existing conditions but the flow rates are low and the overflow is onto City open space areas. The risk of flood damage or loss of life is relatively low.

Stage 2 and 3 - Required as upstream areas develop

b. **Land Use Issues**

Open Space/Recreational Facilities: Construct public land use open space and recreational amenities in the Guac- Basin. The amenities in the Guac- Basin should be designed in basic conformance with the Amole Arroyo Corridor Plan (see Amole Arroyo Basin).

Priority - Medium (required by development)

c. **Crossing Structures**

Rio Bravo Boulevard is the only major street crossing and this has been constructed as part of the Rio Bravo Boulevard construction.

d. **Budget**

Budget Estimate: The estimated baseline project cost for this planned facility is:

Guac- Detention Facility - $ 5.7 Million

Stage 1 -	$1,453,000	(150 AF)
Stage 2 -	$2,214,000	(300 AF)
Stage 3 -	$3,131,000	(412 AF)

Public Use Amenities - $ 0.8 Million
Right-of-Way - None Required
Crossing Structures - NA

Timing: Stage 1 should be constructed prior to significant further development of the upstream watershed.

Right-of-Way: No additional ROW is required for construction of the baseline Guac-Amole Detention Facility.

d. **Hubbell Lake Expansion Alternative**: Implementation of the Hubbell Lake expansion alternative, shown on Figure III-14 as project AH5 involves acquisition of approximately 100 acres of currently undeveloped property north and east of the existing Hubbell Lake and relocation of existing dam embankment and reconstruction of the emergency spillway. This site has recently been purchased by the City as open space property.

This site may be well suited for a multi-use facility due to low 10'-12' embankment, access from Coors Road, the wetland habitat in the existing Hubbell Lake and the broad expanse of open fields which would form the bottom of the basin.

Budget Estimate:

Hubbell Dam Construction - $1,502,000
Public Use Amenities - $0.8 Million
Right of Way - $2,000,000 (100 acres)

Timing: The existing storage volume in Amole and Hubbell Lake are exceeded. Therefore increased storage should be constructed prior to further development in the upstream watershed.

To implement this alternative, the purchase of the property must be accomplished prior to development. Obtaining the property is critical for successfully implementing this alternative.

e. **Guac - Amole - Salsa Alternative**. This alternative would reduce the volume of the Guac Basin by approximately 270 AF which would be included in the Salsa Basin at the northeast corner of the Amole Basin. This would allow a shallower Guac Basin, more amenable to multiple use.

Budget Estimate:

Guac Detention Stage 1	$1,453,000 (same as baseline)	
Salsa Basin	$ 986,000	(270 AF)
Guac Detention Stage 2	$2,857,000	(442 AF)
Public Use Amenities	$0.4 million	
Right of Way (20 Ac @ $34,000)	$646,000	

Timing:

Stage 1 should be constructed prior to significant further upstream development.

The ROW for the Salsa Basin should be acquired as soon as possible.

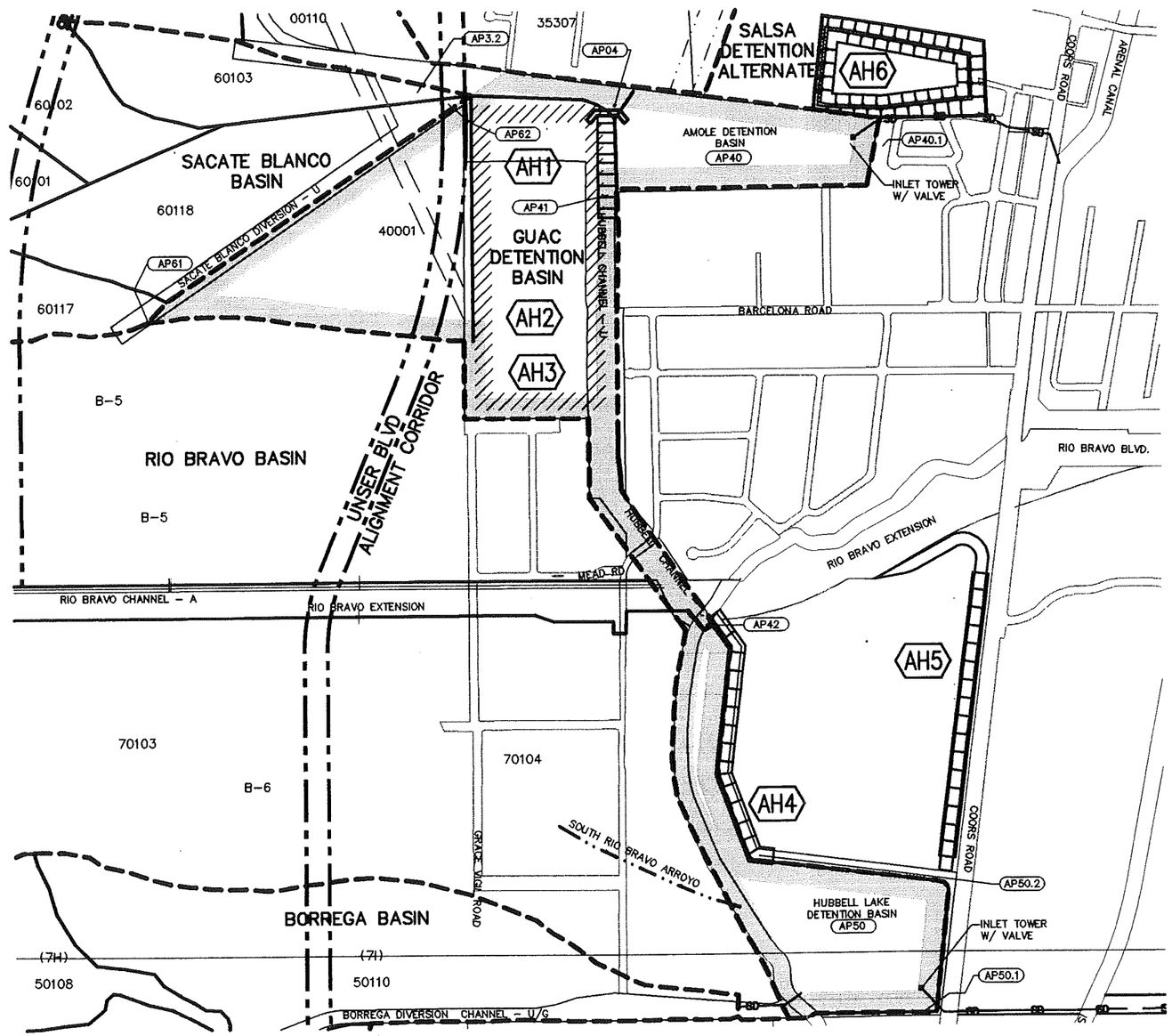
Right-of-Way: The ROW for the Salsa Basin will have to be acquired.

TABLE III-9
HYDROLOGIC SUMMARY
AMOLE DETENTION BASIN, HUBBELL CHANNEL AND HUBBELL LAKE DETENTION

AP NO.	MAP NO.	DESCRIPTION	VARIABLE	EXISTING FACILITIES			PROPOSED DMP FACILITIES	
				EXISTING	DEVEX	EXISTING CAPACITY	DMP (BASELINE)	FUTURE CAPACITY
40	7	AMOLE DETENTION BASIN	Q (cfs)	4667	8331	4235	6483	6500
			Tvol (AF)	924	1578		1528	
			Dvol (AF)	494	490	492	1352	1352
			Runoff (in)	0.40	1.43		1.36	
			cfs/ac	0.24	0.76		0.62	
40.1	7	PRINCIPAL SPILLWAY OUT OF AMOLE DETENTION BASIN	Q (cfs)	0	0	64	0	64
			Tvol (AF)	0	0		0	
			Runoff (in)	0	0		0	
			cfs/ac	0	0		0	
41	7	HUBBELL CHANNEL AT AMOLE DETENTION BASIN	Q (cfs)	122	2524	10159	<150	10159
			Tvol (AF)	434	1093	(1) 10159	176	
			Runoff (in)	0.10	0.89	Bank full	0.01	
			cfs/ac	0.01	0.23		0	
42	9	HUBBELL CHANNEL AT ENTRANCE TO HUBBLE LAKE	Q (cfs)	457	2540	11765	795	11765
			Tvol (AF)	455.0	1138	(1) 28250	325	
			Runoff (in)	0.11	0.91	Bank full	0.15	
			cfs/ac	0.02	0.22		0.07	
50	9	HUBBELL LAKE DETENTION BASIN	Q (cfs)	1325	3089		1433	
			Tvol (AF)	519	1301		464	
			Dvol (AF)	493.0	493.0	493	464	493
			Runoff (in)	0.00	0.96		0.27	
			cfs/ac	0.00	0.24		0.14	

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.
Q - Peak discharge rate
Tvol - Total runoff volume (includes truncated volumes)
Dvol - Maximum detained volume
Runoff - inches of runoff
cfs/ac - peak discharge rate per acre of contributing area.
Existing - Existing land use and existing drainage facilities.
DEVEX - Fully developed land use and existing drainage facilities.
Capacity - Design capacity.
DMP - Proposed improvements in place, fully developed land use.
(1) From Hubbell Lake Detention System "As-built" Plans, dated Feb.15, 1979 and from RD-39.



AMOLE DETENTION / HUBBELL LAKE DETENTION MANAGEMENT PLAN

AH1 GUAC BASIN STAGE I CONSTRUCT GUAC–AMOLE CONNECTION, REVISE EMERGENCY SPILLWAY, PROVIDE 150 AF STORAGE (SEE FIGURE III–15)

AH2 ENLARGE GUAC BASIN BY 300 AF

AH3 ENLARGE GUAC BASIN TO 862 AF

AH4 EXTEND HUBBELL LAKE EMERGENCY SPILLWAY FROM 1250' TO 3338'

AH5 HUBBELL LAKE EXPANSION ALTERNATIVE – RELOCATE EXISTING NORTH AND EAST BERM. CONSTRUCT 3338 FOOT EMERGENCY SPILLWAY.

AH6 SALSA BASIN ALTERNATE 270 AF STORAGE

LEGEND

- DMP IMPROVEMENTS
- BASIN BOUNDARIES
- PLATTED EASEMENT/ROW
- SUBBASIN BOUNDARIES
- (APXX) HYDROLOGIC ANALYSIS POINT
- BASIN BOUNDARY THIS SHEET
- 60110 SUBBASIN ID NUMBER
- (SVX) PROJECT ID NUMBER

AMOLE DETENTION BASIN, HUBBELL CHANNEL AND HUBBELL LAKE DETENTION		EXISTING FACILITIES (DEVEX)		WITH DMP	
AP NO.	DESCRIPTION	VARIABLE	100 YR 24 HR.	VARIABLE	100 YR 24 HR.
40	AMOLE DETENTION BASIN	Q cfs (in)	8145	Q cfs (in)	6488
		TVol AF	1569	TVol AF	1528
		DVol AF	490	DVol AF	1352
40.1	PRINCIPAL SPILLWAY AMOLE BASIN	Q cfs	0	Q cfs	0
		TVol AF	0	TVol AF	0
41	HUBBELL CH. @ AMOLE DET. (EMER. SPWY.)	Q cfs	2462	Q cfs	< 150
		TVol AF	1086	TVol AF	176
42	HUBBELL CH. @ ENTR. TO HUBBELL LAKE	Q cfs	2483	Q cfs	795
		TVol AF	1136	TVol AF	325
50	HUBBELL LAKE DETENTION BASIN	Q cfs (in)	3089	Q cfs (in)	1433
		TVol AF	1293	TVol AF	464
		DVol AF	493	DVol AF	464
50.1	HUBBELL LAKE PRINCIPAL SPILLWAY	Q cfs	0	Q cfs	0
		TVol AF	0	TVol AF	0
50.2	HUBBELL LAKE EMERGENCY SP.	Q cfs	471	Q cfs	0
		TVol AF	806	TVol AF	0

N

0 500' 1000' 2000'

1" = 1000'±

AMOLE–HUBBELL D.M.P.

AMOLE DETENTION / HUBBELL LAKE DETENTION MANAGEMENT PLAN

FIGURE NO. III–14

LEEDSHILL–HERKENHOFF, INC.

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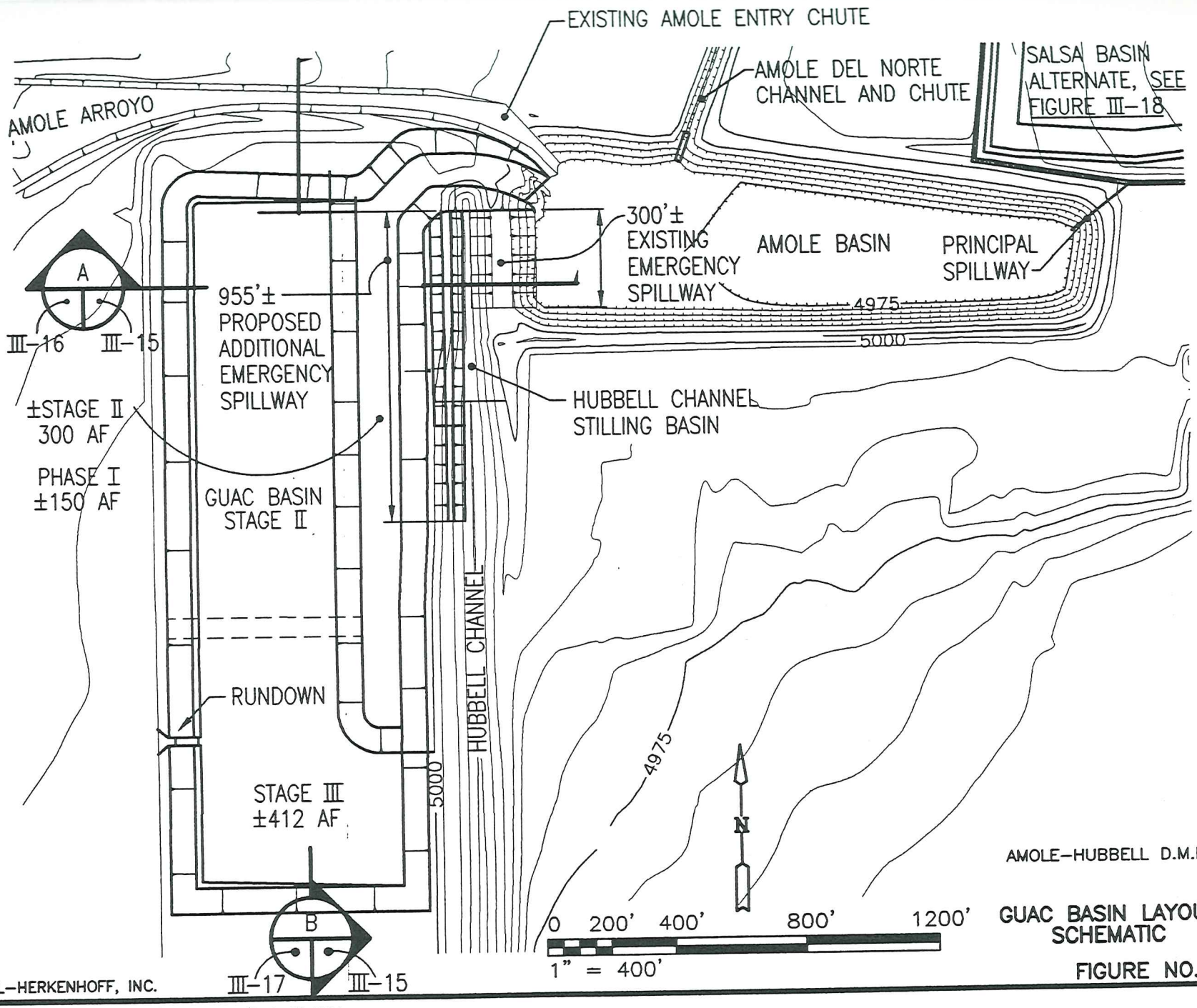
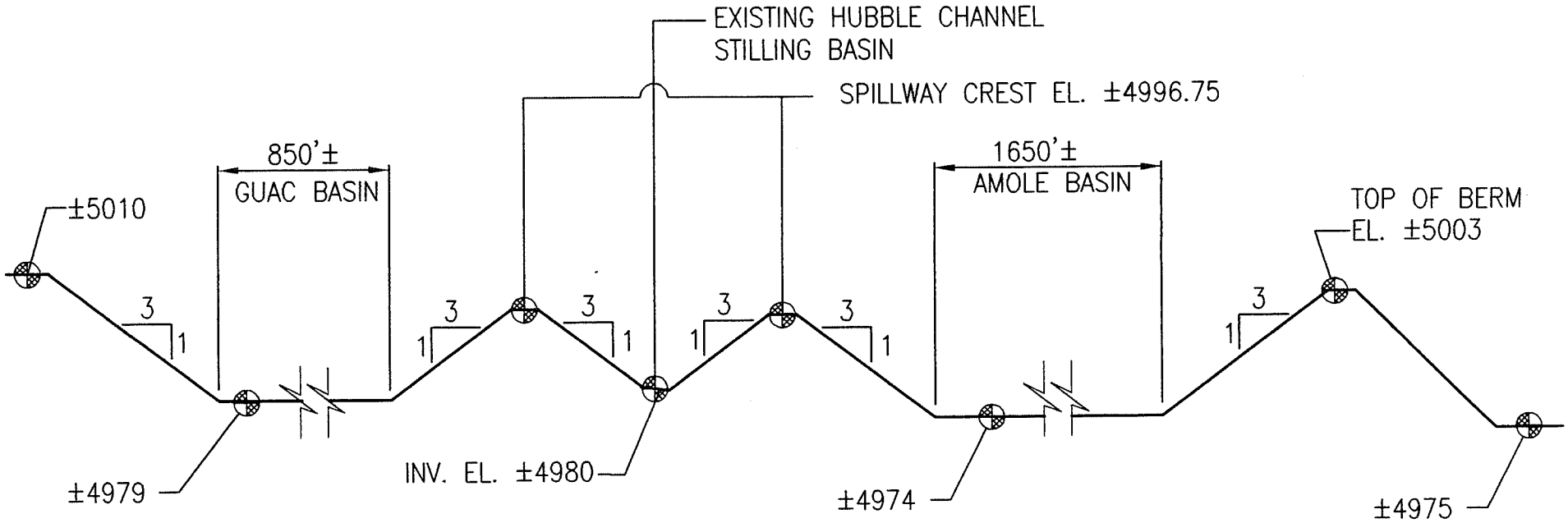
APPENDIX I-A

REFERENCE DOCUMENT LISTING



1 P:\95043\95043_32\DWG\C\GUAC1.dwg/8-6-99 MDJ



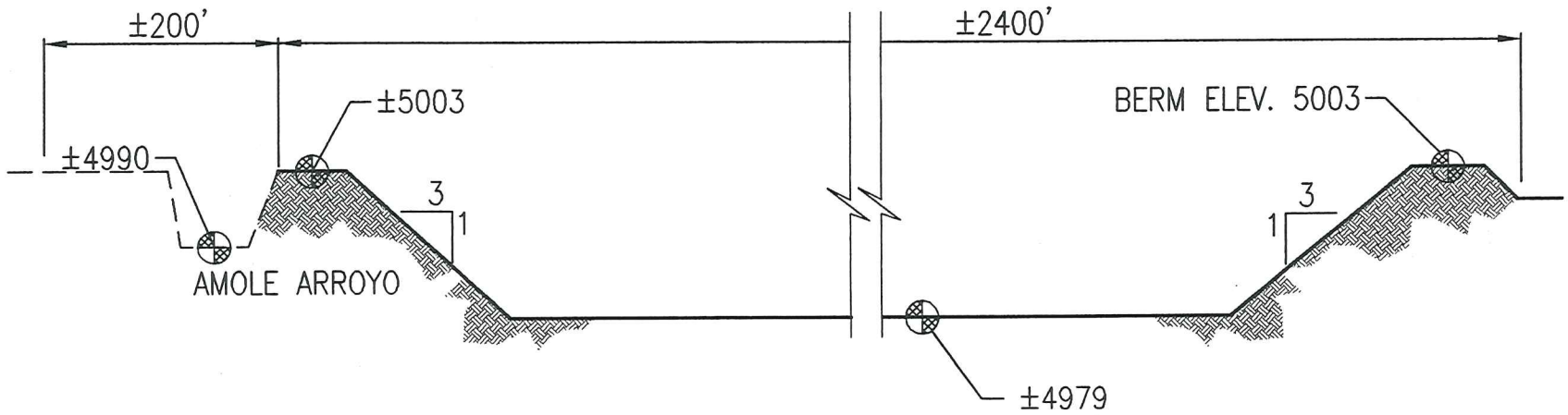
AMOLE–HUBBELL D.M.P.

NOT TO SCALE

GUAC BASIN
EAST–WEST SECTION A

FIGURE NO. III–16

LEEDSHILL–HERKENHOFF, INC.



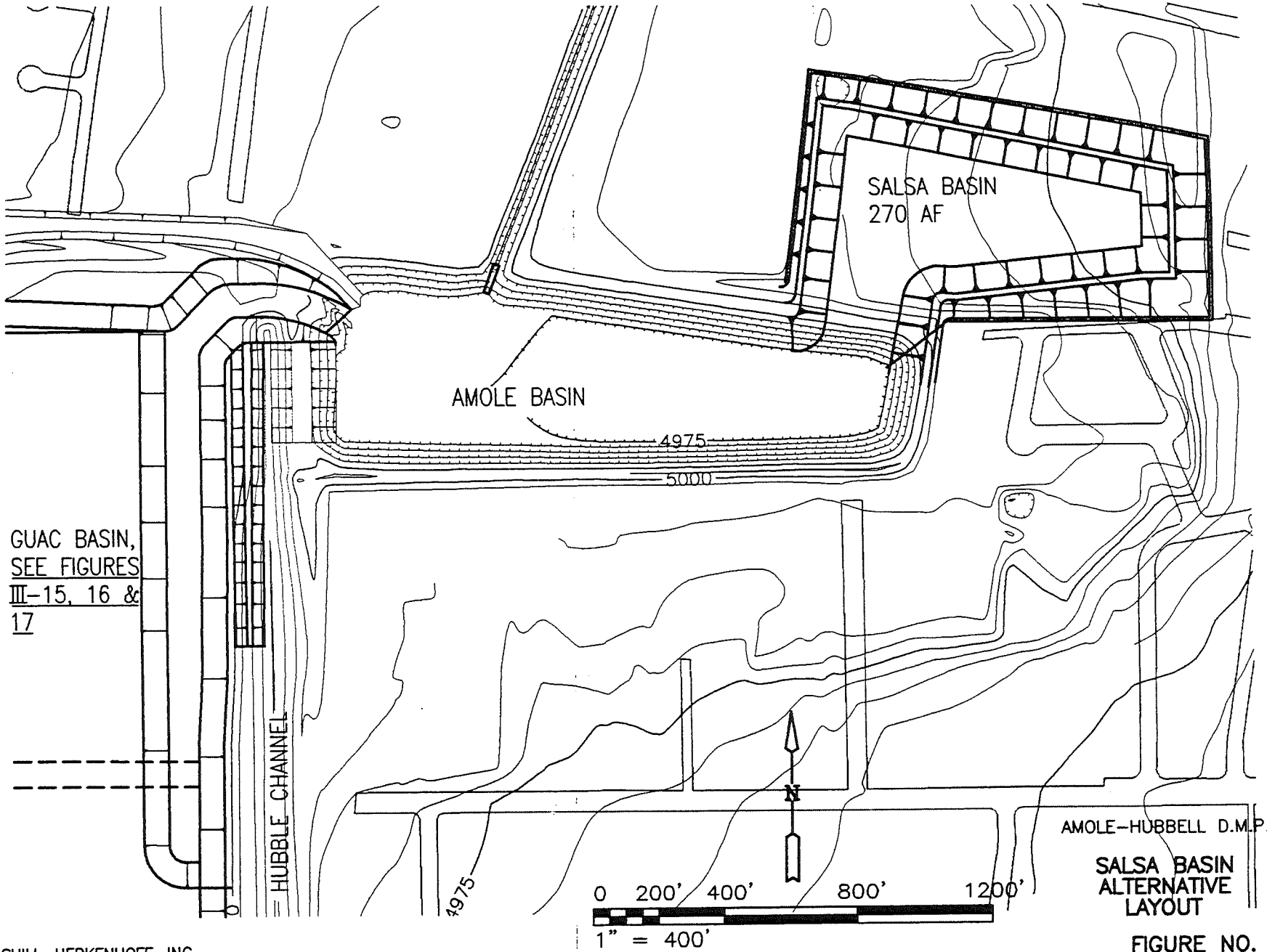
AMOLE–HUBBELL D.M.P.

NOT TO SCALE

GUAC BASIN
NORTH–SOUTH SECTION B

LEEDSHILL–HERKENHOFF, INC.

FIGURE NO. III–17



LEEDSHILL-HERKENHOFF, INC.

FIGURE NO. III-18

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K. AMOLE AND HUBBELL LAKE EMERGENCY SPILLWAYS

1. EVALUATION

a. Situation

The Amole and Hubbell Lake facilities were constructed in accordance with State Engineer criteria in effect at the time of construction. The Amole Basin emergency spillway is into the Hubbell Channel which conveys the flows to Hubbell Lake. The Hubbell Lake emergency spillway spills onto natural ground west of Coors Road returning the flow essentially to the historic path.

b. Problem Description

The emergency spillway sizes are not adequate to accommodate the full PMP event for existing conditions (see Volume III). For developed conditions runoff, the spillways are not adequate to convey the Freeboard hydrograph without overtopping the dam.

c. Existing Facility Data

The existing emergency spillways and Hubbell Channel are in good condition. The existing capacities of these facilities, based on the State Engineer Filing Maps are:

Amole Emergency Spillway - 420' broad crested weir, 10,159 cfs,
Spillway Crest El. = 4996.75', Top of Embankment El. = 5003.0'
Hubbell Channel Design Capacity - 10,159 cfs
Hubbell Lake Emergency Spillway - 1250' broad crested weir, 19,854 cfs
Spillway Crest El. = 4932.0', Top of Embankment El. = 4935.5'

Dam Hazard Classification - Both of these facilities appear to be classified as Class (c) Dams defined as "Dams located where failure may cause loss of life, serious damage to homes, industrial and commercial buildings, important public utilities, main highways, or railroads" as defined in SCS TR 60.

d. Existing Right-of-Way

These facilities are located on AMAFCA owned property.

e. AHYMO Analysis

The AHYMO models for the developed land use conditions with DMP facilities in place were modified to analyze the Spillway and Freeboard precipitation events. In these analyses, it was assumed that the runoff followed historic paths and where diverted, that the runoff followed the diversion path. In other words, potential spillage out of a diversion channel which might leave the Amole Watershed was not included except at the N-S Coors Pond. Flows in excess of the capacity of the N-S Coors Pond which leave the facility were allowed to exit the Amole Arroyo system.

These are conservative assumptions which should result in the maximum amount of runoff entering the Amole and Hubbell Lake facilities.

The system was analyzed with the Amole and Hubbell Dams full at the beginning of the storm. The other detention facilities were analyzed as empty at the beginning of the storm. This is an approximation of a 100-year event proceeding the PMF event. A detailed evaluation of these assumptions and resultant PMF hydrographs will be required for final design.

The results of the Spillway and Freeboard hydrology for developed conditions with DMP facilities in place is presented in Table III-10.

f. Criteria

The Amole Detention Dam and the Hubbell Lake Detention Dam spillways were evaluated in this DMP for compliance with current New Mexico State Engineer Dam Safety Criteria. The State Engineer New Mexico Dam Safety Criteria, 1997 Edition (RD-71) and Earth Dams and Reservoirs SCS TR 60 (RD-73) were utilized to establish the criteria.

Two emergency spillway events are defined, the Emergency Spillway Hydrograph and the Freeboard Hydrograph. The Emergency Spillway Hydrograph must be passed through the spillway in a stable manner, without erosion. The dam must contain the Freeboard Hydrograph without overtopping. The precipitation amounts for Class (c) dams are the PMP for the Freeboard Hydrograph and P100 + 0.26(PMP-P100) for the Spillway Hydrograph. For the Amole and Hubbell Lake dams, the 6-hour precipitation amounts were determined to be 5.12" for the Emergency Spillway Hydrograph and 13.44" for the Freeboard Hydrograph.

g. Evaluation

The proposed spillway improvements are based on providing adequate spillway weir length to pass the Freeboard hydrograph without overtopping the existing dam embankment. An optimization analysis comparing the cost of embankment with the additional spillway was not conducted. Raising the existing embankments was not considered due to increased visual impacts and potential geotechnical concerns with increased embankment height on the existing facility. Increasing the embankment height is a viable alternative to be considered during design.

2. PROPOSED MANAGEMENT PLAN

To satisfy the New Mexico Dam Safety Criteria, it is proposed to increase the capacity of the existing emergency spillways.

a. Guac-Amole Emergency Spillway Project AH1. The peak flow over the emergency spillway of 60,799 cfs is required to prevent overtopping of the dam. A total overflow weir length of approximately 1,255 ft will pass the Freeboard Hydrograph without overtopping the existing dam. No increase in the dam height is required. It is proposed to incorporate additional

spillway weir length in the modifications required to the Hubbell Channel as part of the Guac Basin. (See Figure III-15).

At the spillway hydrograph or freeboard hydrograph flow rate, the capacity of the Hubbell Channel will be exceeded. This is also true for most of the other channels within the watershed. Overtopping or failure of the Hubbell Channel should not endanger the Amole Detention Dam. This element of the facility will require additional evaluation during design.

b. Hubbell Lake Emergency Spillway Project AH4. An increase of the weir length from 1250 ft to 3338 ft is required to pass the Freeboard Hydrograph peak flow rate of 67,765 cfs without overtopping the existing dam embankment. The additional broad crested weir length could be located on the northern portion of the Hubbell Lake embankment (See Figure III-14).

c. **Budget**

Estimated Budget

Hubbell Lake Spillway Expansion - $1,245,700
Amole Spillway Expansion - included in Guac Basin costs.

Timing

The Guac-Amole spillway modifications should be accomplished during Stage I of Guac Basin which should be constructed as soon as practical. The existing spillway is inadequate to pass the PMP event.

The Hubbell Lake spillway modifications should be accomplished as soon as practical. The existing spillway is inadequate to pass the full PMP runoff based on this analysis. A more refined PMP hydrology model would more accurately reflect the anticipated spillway flow and should be developed as part of the design.

TABLE III-10
HYDROLOGIC SUMMARY
AMOLE AND HUBBELL EMERGENCY SPILLWAYS

AP NO.	MAP NO	DESCRIPTION	VARIABLE	EXISTING FACILITIES		PROPOSED DMP FACILITIES		
				PMP EXISTING	CAPACTIY	SPILLWAY HYDROGRAPH	FREEBOARD HYDROGRAPH	FUTURE CAPACITY
40	7	AMOLE DETENTION BASIN	Q (cfs)(In)	24,615	10,159 cfs	31,083 cfs	65,708 cfs	
41	7	AMOLE DETENTION BASIN EMERGENCY SPILLWAY	Q (cfs) WS Elev. (ft)	22,696 5003.12	10,159 cfs	28,745 cfs 4999.49	60,799 cfs 5003.00	60,800 cfs
42	9	HUBBELL CHANNEL AT ENTRANCE TO HUBBLE LAKE	Q (cfs)	24,835	11,765 cfs	29,209 cfs	62,910 cfs	11,765 cfs
50	9	HUBBELL LAKE DETENTION BASIN EMERGENCY SPILLWAY	Q (cfs) WS Elev. (ft)	30,073 4936.28	26,000 cfs	30,983 cfs 4933.58	67,765 cfs 4935.5	67,800 cfs

Notes/Legend

AP - Analysis Point - See Figures this report, maps in Volume II and detail hydrology in Volume III.

Q - Peak discharge rate

WS Elev - Maximum Water Surface Elevation

Existing - Existing land use and existing drainage facilities.

Capacity - Design capacity.

DMP - Proposed improvements in place, fully developed land use.

PMP - Probable Maximum Precipitation.

APPENDIX I-A
REFERENCE DOCUMENTS LIST

3/15/99

RD NUMBER	AMOLE REFERENCE DOCUMENTS (Client,Title,Author)	DATE
RD-1	AMAFCA. Final Design Report. Westgate Diversion Channels. Powerline Channel-Phase II & III. Gordon Herkenhoff & Assoc.	March 1982
RD-2	AMAFCA. Design Report. Westgate Diversion Channels. Snow Vista Channel-Phase I. For Review Only. Gordon Herkenhoff & Assoc.	March 1981
RD-3	AMAFCA. Design Concepts Memorandum. Westgate Diversion Channels. Snow Vista Channel-Phase II. Powerline Channel-Ph.II&III. Gordon Herkenhoff & Assoc.	August 1981
RD-4	AMAFCA. Interim Design Report. Westgate Diversion Channels. Gordon Herkenhoff & Assoc.	December 1980
RD-5	AMAFCA. Preliminary Design Analyses. Westgate Diversion Channel.Gordon Herkenhoff & Assoc.	April 1980
RD-6	City of Albq. Preliminary Design Report for Amole Del Norte Storm Diversion Facilities. Tierra Bayita Drainage Facilities. Greiner.	October 1990
RD-7	Bernalillo County. Environmental Assessment for NM500, Rio Bravo Blvd.,Coors Blvd-West. Gannett Fleming West.	December 1992
RD-8	Bernalillo County. Addendum to the Environmental Impact Statement for Rio Bravo West Extension/Paseo del Volcan. Coors Boulevard to Interstate 40. Bernalillo County, New Mexico. Gannett Fleming West.	January 1991
RD-9	City of Albuquerque. Municipal Development Dept. Existing Conditions Report for Amole Watershed Drainage Management Plan. Holmes & Narver.	Revised December 1985

RD NUMBER	AMOLE REFERENCE DOCUMENTS (Client,Title,Author)	DATE
RD-10	City of Albuquerque. Municipal Development Dept. Improved Conditions Report for Amole Watershed Drainage Management Plan. Holmes & Narver.	February 1986 Revised April 1986
RD-11	AMAFCA. Western Albuquerque Metropolitan Area Drainage Management Plan. Interim Report. William Matotan & Assoc.	June 1974
RD-12	AMAFCA. Drainage Management Plan Western Albuquerque Metropolitan Area-Supplement. Planning Report William Matotan & Assoc.	August 1975
RD-13	AMAFCA. Drainage Management Plan Western Albuquerque Metropolitan Area-Volume I. Planning Report William Matotan & Assoc.	June 1975
RD-14	AMAFCA. Drainage Management Plan Western Albuquerque Metropolitan Area-Volume II. William Matotan & Assoc.	1975
RD-15	City of Albq. Municipal Development Dept. Design Analysis Report for the Amole del Norte Storm Diversion Facility,Phases I & II from the Amole Detention Basin to Bridge Blvd. Boyle Engineering.	October 1985
RD-16	AMAFCA. Hubbell Lake Diversion. UNM Dept.of Civil Engineering. Richard Heggen..	May 1993
RD-17	Amole Arroyo Corridor Plan. City of Albuquerque Planning Dept.	April 1992
RD-18	Southwest Area Plan. Volume I- Existing Conditions. City Planning.	1985
RD-19	Southwest Area Plan. Volume II- Goals & Issues. City Planning.	1985
RD-20	Southwest Area Plan. Volume III- Alternatives. City Planning.	1985
RD-21	Southwest Area Plan. Volume IV- The Plan. City Planning.	1985

RD NUMBER	AMOLE REFERENCE DOCUMENTS (Client,Title,Author)	DATE
RD-22	County of Bernalillo. Public Works Dept. Final Drainage Report for Rio Bravo West Extension. Avid Engineering.	July 1993
RD-23	City of Albuquerque. Drainage Plan for the Design of SAD - 214. Unser Boulevard. Scanlon & Assoc.	February 1983
RD-24	City of Albuquerque. Investigation Phase Report for the Re-evaluation Study of the Amole Del Norte Storm Diversion Facility. Boyle Engineering Corp.	July 1984
RD-25	City of Albuquerque. Amole Del Norte Storm Drainage Facilities. Tower/Sage Drainage Master Plan. Andrews,Asbury & Robert, Inc. Consulting Engineers.	April 1995
RD-26	Westland Development Company. Atrisco Business Park Master Drainage Plan. Fred Denney & Associates.	June 1980 Revised October 1980
RD-27	City of Albuquerque. West Bluff Drainage Plan. Andrews,Asbury & Robert,Inc.	
RD-28	Sunwest Bank Special Assets Dept. Master Drainage Plan for Atrisco Business Park. Easterling & Associates.	Revised October 1993
RD-29	Sunwest Bank Special Assets Dept. & The Bell Group. Draft Design Analysis Report for the AMAFCA Unser Diversion. Easterling & Associates.	September 1993
RD-30	AMAFCA. Phase III Design Guidelines. Snow Vista Channel. Westgate Diversion Channels. For Review Only. Gordon Herkenhoff & Assoc.	July 1982
RD-31	Bohannan-Huston, Inc./AMAFCA Borrega Diversion Sediment Issues Floodplain Study for AMAFCA. Resource Consultants, Inc.	June 1992

RD NUMBER	AMOLE REFERENCE DOCUMENTS (Client,Title,Author)	DATE
RD-32	City of Albuquerque. Public Works Dept. Preliminary Analysis Report for Amole del Norte Storm Diversion Facilities. Tierra Bayita Drainage Facilities. Greiner, Inc.	August 1990
RD-33	City of Albuquerque. Public Works Dept. Calculations for Amole Del Norte Storm Diversion Facilities, Phase IIIA & B. Griener, Inc.	January 1993
RD-34	City of Albuquerque. Public Works Dept. Design Report for Amole Del Norte Storm Diversion Facilities. Tierra Bayita Drainage Facilities. Phase IIIC. Greiner, Inc.	June 1994
RD-35	AMAFCA. Borrega Channel DRAFT Hydrology and Sediment Issues. Bohannan-Huston, Inc.	June 1992
RD-36	West Mesa Drainage Plan. Atrisco Business Park Area. Richard Heggen.	December 1979
RD-37	Tom Neilson. Drainage Report for Sunset West Unit 2. Leedshill-Herkenhoff, Inc.	April 1994
RD-38	AMAFCA. Memorandum Report for Borrega Arroyo Diversion to Hubbell Lake Detention Area. CDM.	December 1983
RD-39	AMAFCA. Western Metropolitan Drainage System. Hubbell Lake Detention System. William Matotan & Assoc.	January 1978
RD-40	UNM Hydraulic Structures course paper for Dr. Richard Heggen. Critical Field Review. Borrega Arroyo Diversion Channel Pipe Culvert to Hubbell Lake Detention Area. Michael Bone.	December 1993
RD-41	City of Albuquerque. Northwest Mesa Drainage Management Plan - Future Conditions & Proposed Improvements. Scanlon & Assoc.	March 1994

RD NUMBER	AMOLE REFERENCE DOCUMENTS (Client,Title,Author)	DATE
RD-42	AMAFCA. Report of Development Potential. Hubbell Lake Diversion & Detention Facilities. For Stanley Zurix, Attorney. Boyle Engineering Corp.	June 1978
RD-43	AMAFCA. Phase I Report - Preliminary Investigation of the Alternates. Southwest Valley Drainage Management Plan. Andrews, Asbury & Robert, Inc.	April 1991
RD-44	Curb, Inc. & Santa Fe Properties Development Co. Master Drainage Plan for Sunrise Terrace Unit I. City of Albuquerque. Easterling & Associates.	October 1994
RD-45	City of Albuquerque. Design-Development Report for the Re-evaluation Study of the Amole Del Norte Storm Diversion Facility. Boyle Engineering Corp.	February 1985
RD-46	Pajarito Arroyo Corridor Plan Citizens Advisory Group. Pajarito Arroyo Corridor Plan. City of Albuquerque. Susan McKee, Planner.	May 1989
RD-47	AMAFCA. Borrega Pipe Inlet. Richard Heggen, UNM.	April 1992
RD-48	Albuquerque West Side Strategic Plan. City of Albuquerque Planning Dept. Draft	October 1995
RD-49	AMAFCA. Western Albuquerque Drainage Bibliography & Recommendations for Drainage Planning. Leverton-Easterling.	October 1983
RD-50	AMAFCA Borrega Channel/Arroyo. Bohannan Huston, Inc. AHYMO Files. Existing & Developed 24 hour, with & without sediment. 1 3.5" disk	Nov 91 - May 92
RD-51	Amole Del Norte AHYMO files. Amole.doc,Amole.dat,Abioo.dat, Pertaining to RD-33,34 1 - 3.5" disk	March 1996
RD-52	ABP Master Drainage Plan.AHYMO Files, 10-93 Vers. Pertaining to RD-28 1 - 3.5" disk	October 1993

RD NUMBER	AMOLE REFERENCE DOCUMENTS (Client,Title,Author)	DATE
RD-53	AMAFCA. West I-40 Diversion Drainage Management Plan Literature Review. Bohannan-Huston Inc.	October 1995
RD-54	American Southwest Homes. Master Drainage Plan. Sunrise Terrace Units III,IV,&V. Conceptual Master Drainage Plan. Ryals Engineering & Construction Services.	March 1994 Revised June 1994
RD-55	Historic Aerial Photographs from UNM Earth Data Analysis Center,277-3622. 1935(3), 1947(7), 1951(6), 1959(9), 1967(4), 1975(2), 1981(2)	1935-1981
RD-56	West Route 66 Sector Development Plan. City of Albuquerque, Planning Dept.	January 1988
RD-57	Tower/Unser Sector Development Plan. City of Albuquerque, Planning Dept.	September 1989
RD-58	Rio Bravo Sector Development Plan. Plate Two:Land Use & Transportation. Community Sciences Corporation. One sheet.	
RD-59	1 - 3.5 disk. Sunrise Estates. "AHYMO files & exhibits of Westgate area." Isaacson & Arfman.	December 1995
RD-60	ABQ West Bulk Land Drainage Study. DRB#95-440.Zone Atlas Page N-8, T9N, R2E, Section 5, Gordon & Associates. (Includes 2 sheets: Lands of Rio Bravo Partners Parcels 2-A, 2-B, 2-C, 2-D Jan.1996 and 1 sheet Sketch Plat Sept.1995)	February 1996
RD-61	AMAFCA. Amole Arroyo-Westgate Dam Drainage Management Plan - Final. Debra Vaughan-Cleff.	June 1994
RD-62	FHA, NMSHD, City, County. Drainage Management Study North/South Coors Connection. Denney-Gross & Assoc.	June 1983

RD NUMBER	AMOLE REFERENCE DOCUMENTS (Client,Title,Author)	DATE
RD-63	North/South Coors Connection Retention Pond (Between Bridge Blvd. & Tower Rd. SW) City of Albuquerque. Municipal Dev. Dept. Denney-Tibljas-McLean.	1986
RD-64	Amole Arroyo Watershed Sediment Hazards Invest.Rpt. & List of Plates & Figures. Ayres Associates. Fort Collins, CO.3.5" diskette.	May 1996
RD-65	AHYMO: Tower/Sage Master Drainage Plan by Andrews, Asbury & Robert.3.5" diskette.	1994
RD-66	NA	
RD-67	NA	
RD-68	NA	
RD-69	NA	
RD-70	Summary of New Mexico State Engineer Office Procedure on Design Criteria & Safety of Dams. Report.	
RD-71	New Mexico Dam Safety Design Criteria (Draft) Thomas C. Turney, State Engineer	1997 Edition
RD-72	AMAFCA, North Albuquerque Acres Arroyo Avulsion Problems for La Cueva, El Camino and North Camino Arroyo Drainage Management Plan. Resource Technology, Inc.	March 1997
RD-73	Earth Dams and Reservoirs U.S. Department of Agriculture, Soil Conservation Service, Engineering Division. TR-60	Oct 1985
RD-74	AMAFCA, Calabacillas Arroyo Channel Stabilization, Environmental Planning Commission report. Wilson and Company.	August 1998

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RD-75	AMAFCA, San Antonio Arroyo, Environmental Planning Commission report . Bohannan-Huston, Inc.	August 1998
RD-76	AMAFCA Letter Report - Borrega Arroyo Options Comments, Leedshill-Herkenhoff letter #264-95043.52-96.	March 1996
RD-77	Colorado State University, Fort Collins, CO, Evolution of Large Arroyos, The Rio Puerco of New Mexico, Unpublished MS Thesis, 106p. Elliott, J.G.	1979
RD-78	New Mexico Bureau of Mines and Mineral Resources, Surficial Geology of Northwest New Mexico, Geologic Map 43, 1:500,000, Hunt, C.B.	1978
RD-79	New Mexico Bureau of Mines and Mineral Resources, Geology of Albuquerque Basin, New Mexico, Memoir 33, 59 p., Kelley, V.C.	1977
RD-80	AMAFCA, Sediment and Erosion Design Guide, Resource Consultants & Engineers, Inc. (RCE)	1994
RD-81	A Wiley-Interscience Publication, John Wiley & Sons, New York, The Fluvial System, Schumm, S.A.	1977
RD-82	Water Resources Publications, Littleton, CO, Incised Channels: Morphology, Dynamics and Control, Schumm, S.A., Harvey, M.D., and Watson, C.C.	1984
RD-83	AMAFCA, Materials Investigation 40-Acre Site Near Amole Dam, Albuquerque, New Mexico. (Guac Basin geotech report) Kleinfelder.	1999
RD-84	Long Range Major Street Plan, Albuquerque Urban Area, Middle Rio Grande Council of Governments	1997
RD-85	44 CFR Ch.1, Section 65.10, "Mapping of Areas Protected by Levee Systems" Federal Emergency Management Agency (10-1-97) Edition) 51 FR 30316.	1986 Revised 1997

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APPENDIX I-B

GLOSSARY AND ABBREVIATIONS

LIST OF ABBREVIATIONS, ACRONYMS & DEFINITIONS

AMAFCA	Albuquerque Metropolitan Arroyo Flood Control Authority
CBC	Concrete Box Culvert
CID	Construction Industries Division
COA	City of Albuquerque
COE	Corps of Engineers
DEVEX	Developed Conditions w/ Existing Facilities
DMP	Drainage Master Plan
DPM	Design Process Manual
FAR	
FEMA	Federal Emergency Management Agency
HEC-RAS	Hydrologic Engineering Center - River Analysis System
LH	Leedshill-Herkenhoff, Inc.
LOMR	Letter of Map Revision
MRGCD	Middle Rio Grande Conservancy District
NM	New Mexico
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation
PNM	Public Service Company of New Mexico
SAD	Special Assessment District
RCP	Reinforced Concrete Pipe
RD	Reference Document
ROW	Right-of-Way
USGS	United States Geological Survey

Avulsion - a channel or arroyo shifting to a new path, AMAFCA, 1994, Sediment and Erosion Design Guide, p. 4-15.

Alluvial Fans - a deposit whose surface forms a segment of a cone that radiates down slope from the point where the stream leaves the source area, W.B. Bull, 1977, The Alluvial Fan Environment, v. 1, p. 222.

Aggradation- deposition of sediment on the channel bed, AMAFCA, 1994, Sediment and Erosion Design Guide, p. 3-43.

Degradation- removal of sediment from the channel bed, AMAFCA, 1994, Sediment and Erosion Design Guide, p. 3-43.

"Clean" Water Runoff - runoff from developed areas without a significant sediment load. (Sediment poor or sediment starved).

APPENDIX I-C

PROJECT CONCEPTUAL COST ESTIMATES

BR1	- Borrega Detention Basin (51 AF)
BR4	- Borrega Channel Freeboard Upgrade
AA1	- Blake Road @ Amole Arroyo
AA2	- Amole Arroyo @ Westgate Heights
AA3	- Amole @ Detention Entrance
SV1A	- Benavides Inlet Upgrades
SV1B	- Benavides Storm Drain
AH1	- Amole Detention/Hubbell Lake Guac Detention Basin
AH2	- Amole Detention/Hubbell Lake Guac Detention Basin
AH3	- Amole Detention/Hubbell Lake Guac Detention Basin
AH4	- Hubbell Lake PMF Protection
AH5	- Hubbell Lake Expansion
AH6	- Amole/Salsa Detention Basin
PL1	- Powerline Basin, In-line Detention Basins
AA4	- Amole Arroyo Alt #5-A
AA5	- Amole Arroyo Alt #5-B
SV3	- Snow Vista - Channel Freeboard Upgrade
AA6	- Amole Arroyo Alt #5-C
AA7	- Amole Arroyo - Channel & Freeboard Upgrade @ Rundown
SP1	- South Powerline Channel/Detention
RB1	- South Rio Bravo Channel and Rundown
BR-ALT	- "Y" Alternate for Borrega Diversion Channel
PL2	- Powerline - Channel Freeboard Upgrade
SB1	- Sacate Blanco Diversion Channel (3000')
SB2	- South Sacate Blanco Arroyo Conveyance
SB3	- Sacate Blanco Avulsion Conveyance
BR2	- North & South Borrega Arroyos Conveyance
RB2	- South Rio Bravo Arroyo Conveyance
BR3	- Borrega Basin Area "6B" Diversion Stormdrain

PROJECT #BR1

Borrega Detention Basin (51 AF)

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$11,335.09	$11,340.00
2	Mobilization and Demobilization	LS	1	$24,641.50	$24,640.00
3	Earthwork	CY	37,000	$5.00	$185,000
4	Clearing and Grubbing	AC	15	$600.00	$9,000
5	Reseeding	AC	15	$1,500.00	$22,500
6	Spill Way Piping, 60" RCP	LF	88	$106.00	$9,330
7	Concrete Inlet/Outlet Structures, Tower/Dissipater	CY	50	$400.00	$20,000
8	Emergency Spillway/Drop Structure, Soil Cement	CY	3,400	$55.00	$187,000
9	Rip Rap below Dam	CY	1,000	$60.00	$60,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-9)				$528,800
	CONSTRUCTION CONTINGENCIES @ 25%				$132,200
	ENGINEERING, TESTING, TAXES @20%				$105,800
	TOTAL ESTIMATED CONSTRUCTION COSTS				$766,800
	RIGHT OF WAY ACQUISITION	AC	15	$20,000.00	$300,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,067,000**

PROJECT #BR4:

Borrega - Channel Freeboard Upgrade

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Mobilization and Demobilization	LS	1	$6,500.00	$6,500
2	Freeboard Upgrade	CY	5,350	$10.00	$53,500
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-2)				$60,000
	CONSTRUCTION CONTINGENCIES @ 25%				$15,000
	ENGINEERING, TESTING, TAXES @20%				$12,000
	TOTAL ESTIMATED PROJECT COSTS				**$87,000**

PROJECT #AA1:

Blake Road @ Amole Arroyo

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$800.00	$800
2	Mobilization and Demobilization	LS	1	$1,600.00	$1,600
3	Earthwork	CY	532	$5.00	$2,660
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-3)				$5,100
	CONSTRUCTION CONTINGENCIES @ 25%				$1,300
	ENGINEERING, TESTING, TAXES @20%				$1,000
	TOTAL ESTIMATED PROJECT COSTS				**$7,000**

PROJECT #AA2:

Amole Arroyo @ Westgate Heights

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Mobilization and Demobilization	LS	1	$800.00	$800
2	Earthwork	CY	500	$5.00	$2,500
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-2)				$3,300
	CONSTRUCTION CONTINGENCIES @ 25%				$800
	ENGINEERING, TESTING, TAXES @20%				$700
	TOTAL ESTIMATED PROJECT COSTS				**$5,000**

PROJECT #AA3:

Amole @ Detention Entrance

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying (2.3% +/-)	LS	1	$500.00	$500
2	Mobilization and Demobilization (10% +/-)	LS	1	$1,060.00	$1,060
3	Earthwork	CY	400	$5.00	$2,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-3)				$3,600
	CONSTRUCTION CONTINGENCIES @ 25%				$900
	ENGINEERING, TESTING, TAXES @20%				$700
	TOTAL ESTIMATED PROJECT COSTS				**$5,000**

PROJECT #SV1A:

Benavides Inlet Upgrades

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$2,240.20	$2,240
2	Mobilization and Demobilization	LS	1	$4,870.00	$4,870
3	Storm Drain, 76"	LF	350	$205.00	$71,750
4	Storm Drain, 24"	LF	50	$47.00	$2,350
5	Cattle Guard Inlet	EA	1	$7,000.00	$7,000
6	Inlet Piping	LF	20	$15.00	$300
7	Manholes	EA	1	$5,000.00	$5,000
8	AC Pavement, Remove and Replace	SY	200	$20.00	$4,000
9	Concrete Remove & Replace	SF	250	$8.00	$2,000
10	Speed Hump	EA	1	$2,000.00	$2,000
11	Freeboard Upgrade	LF	100	$30.00	$3,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-12)				$104,500
	CONSTRUCTION CONTINGENCIES @ 25%				$26,100
	ENGINEERING, TESTING, TAXES @20%				$20,900
	TOTAL ESTIMATED PROJECT COSTS				**$152,000**

PROJECT #SV1B:

Benavides Storm Drain

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$24,032.70	$24,030
2	Mobilization and Demobilization	LS	1	$52,245.00	$52,250
3	Storm Drain, 72"	LF	600	$192.00	$115,200
4	Storm Drain, 66"	LF	1,100	$182.00	$200,200
5	Storm Drain, 60"	LF	700	$142.00	$99,400
6	Storm Drain, 36"	LF	600	$67.00	$40,200
7	Storm Drain, 30"	LF	700	$57.00	$39,900
8	Storm Drain, 24"	LF	1,000	$47.00	$47,000
9	Inlets, 9 CFS capacity	EA	70	$3,000.00	$210,000
10	Inlet Piping	LS	1	$63,000.00	$63,000
11	Manholes	EA	10	$3,000.00	$30,000
12	AC Pavement, Remove and Replace	SY	10,000	$20.00	$200,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-12)				$1,121,200
	CONSTRUCTION CONTINGENCIES @ 25%				$280,300
	ENGINEERING, TESTING, TAXES @20%				$224,200
	TOTAL ESTIMATED PROJECT COSTS				**$1,626,000**

PROJECT #AH1:

Amole Detention/Hubbell Lake Guac Detention Basin

Stage I (Emergency Spillway, Guac-Amole Connection, 150 AF Storage)

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$19,407.40	$19,410
2	Mobilization and Demobilization	LS	1	$42,190.00	$42,190
3	Earthwork/Excavation	CY	244,000	$2.00	$488,000
4	PCC Rundown	CY	200	$400.00	$80,000
5	Fencing	LF	1,500	$12.00	$18,000
6	Concrete Removal at Hubbell Channel	CY	2,000	$20.00	$40,000
7	Slope Paving	CY	1,452	$150.00	$217,800
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-7)				$905,400
	CONSTRUCTION CONTINGENCIES @ 25%				$226,400
	ENGINEERING, TESTING, TAXES @20%				$181,100
	TOTAL ESTIMATED CONSTRUCTION COSTS				$1,313,000
	Multi Use Facilities/Amenities	LS	1	$140,000.00	$140,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,453,000**

PROJECT #AH2:

Amole Detention/Hubbell Lake Guac Detention Basin

Stage II (Additional 300 AF Storage) 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$28,589.00	$28,590
2	Mobilization and Demobilization	LS	1	$62,150.00	$62,150
3	Earthwork/Excavation	CY	700,000	$1.75	$1,225,000
4	Fencing	LF	1,500	$12.00	$18,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-4)				$1,333,700
	CONSTRUCTION CONTINGENCIES @ 25%				$333,400
	ENGINEERING, TESTING, TAXES @20%				$266,700
	TOTAL ESTIMATED CONSTRUCTION COSTS				$1,934,000
	Multi Use Facilities/Amenities	LS	1	$280,000.00	$280,000
	TOTAL ESTIMATED PROJECT COSTS				**$2,214,000**

PROJECT #AH3:

Amole Detention/Hubbell Lake Guac Detention Basin

Stage III (Total 862 AF Storage)

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$40,664.00	$40,660
2	Mobilization and Demobilization	LS	1	$88,400.00	$88,400
3	Earthwork/Excavation	CY	1,000,000	$1.75	$1,750,000
4	Fencing	LF	1,500	$12.00	$18,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-4)				$1,897,100
	CONSTRUCTION CONTINGENCIES @ 25%				$474,300
	ENGINEERING, TESTING, TAXES @20%				$379,400
	TOTAL ESTIMATED CONSTRUCTION COSTS				$2,751,000
	Multi Use Facilities/Amenities	LS	1	$380,000.00	$380,000
	TOTAL ESTIMATED PROJECT COSTS				**$3,131,000**

PROJECT #AH4:

Hubbell Lake PMF Protection

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$40,000.00	$40,000
2	Mobilization and Demobilization	LS	1	$20,000.00	$20,000
3	Earthwork	CY	11,200	$20.00	$224,000
4	Spillway	CY	5,400	$106.50	$575,100
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-4)				$859,100
	CONSTRUCTION CONTINGENCIES @ 25%				$214,800
	ENGINEERING, TESTING, TAXES @20%				$171,800
	TOTAL ESTIMATED PROJECT COSTS				**$1,245,700**

PROJECT #AH5:
Hubbell Lake Expansion

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$22,195.00	$22,200
2	Mobilization and Demobilization	LS	1	$48,250.00	$48,250
3	Soil Cement	CY	15,000	$35.00	$525,000
4	Earthwork	CY	170,000	$2.00	$340,000
5	Landscaping	LS	1	$100,000.00	$100,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-5)				$1,035,500
	CONSTRUCTION CONTINGENCIES @ 25%				$258,900
	ENGINEERING, TESTING, TAXES @20%				$207,100
	TOTAL ESTIMATED CONSTRUCTION COSTS				$1,502,000
	Multi Use Facilities/Amenities	LS	1	$800,000.00	$800,000
	RIGHT OF WAY ACQUISITION	AC	100	$20,000.00	$2,000,000
	TOTAL ESTIMATED PROJECT COSTS				**$4,302,000**

PROJECT #AH6: SYSTEM STORAGE CAPACITY

Amole/Salsa Detention Basin

Total 270 AF Storage

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$14,570.50	$14,570
2	Mobilization and Demobilization	LS	1	$31,675.00	$31,680
3	Earthwork/Excavation	CY	338,000	$1.75	$591,500
4	Fencing	LF	3,500	$12.00	$42,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-4)				$679,800
	CONSTRUCTION CONTINGENCIES @ 25%				$170,000
	ENGINEERING, TESTING, TAXES @20%				$136,000
	TOTAL ESTIMATED CONSTRUCTION COSTS				$986,000
	Multi Use Facilities/Amenities	LS	1	$400,000.00	$400,000
	RIGHT OF WAY ACQUISITION	AC	19	$34,000.00	$646,000
	TOTAL ESTIMATED PROJECT COSTS				**$2,032,000**

PROJECT #PL1:

Powerline Basin, In-line Detention Basins (58 AF)

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$16,997.00	$17,000
2	Mobilization and Demobilization	LS	1	$36,950.00	$36,950
3	8 Detention Basins				
	A. Concrete Wall (8ea X 500 LF/ea)	LF	4,000	$90.00	$360,000
	B. Soil Cement (8ea X 150 CY/ea)	CY	1,200	$40.00	$48,000
	C. Berm Dams with Drain Piping	EA	8	$8,000.00	$64,000
4	Sedimentation Basin Modification				
	A. Earthwork	CY	29,000	$3.00	$87,000
	B. Concrete Gravity Wall	LF	1,500	$90.00	$135,000
	C. Outlet Structure Modifications	LS	1	$45,000.00	$45,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-4)				$793,000
	CONSTRUCTION CONTINGENCIES @ 25%				$198,300
	ENGINEERING, TESTING, TAXES @20%				$158,600
	TOTAL ESTIMATED PROJECT COSTS				**$1,150,000**

PROJECT #AA4:

Amole Arroyo Alt #5-A

Amole Corridor Channel

Low Flow Section WG to SV (7000')

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$22,479.05	$22,480
2	Mobilization and Demobilization	LS	1	$48,867.50	$48,870
3	Soil Cement	CY	15,010	$35.00	$525,350
4	Earthwork	CY	70,500	$2.00	$141,000
5	Seeding	AC	10	$1,500.00	$15,000
6	Landscaping/Sod	AC	1	$100,000.00	$100,000
7	Stuctural PCC (CBC)	CY	170	$400.00	$68,000
8	Roadway AC R/R	SY	2,200	$20.00	$44,000
9	Maintenance Road	SY	15,000	$4.00	$60,000
10	Fence	LF	20,000	$1.20	$24,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-10)				$1,048,700.00
	CONSTRUCTION CONTINGENCIES @ 25%				$262,200
	ENGINEERING, TESTING, TAXES @20%				$209,700
	ESTIMATED DRAINAGE SUBTOTAL				**$1,521,000**
	118th Street Corridor Crossing	LS	1	$534,000.00	$534,000
	TOTAL ESTIMATED PROJECT COSTS				**$2,055,000**

PROJECT #AA5:

Amole Arroyo Alt #5-B

Amole Corridor Channel

Mid Reach High Flow Composite Section SV to SB (4100') Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$22,063.90	$22,060
2	Mobilization and Demobilization	LS	1	$47,965.00	$47,970
3	Soil Cement	CY	7,500	$35.00	$262,500
4	Earthwork	CY	81,000	$2.00	$162,000
5	Riprap	CY	1,460	$50.00	$73,000
6	Filter Gravel	CY	700	$30.00	$21,000
7	Landscape	AC	4	$100,000.00	$400,000
8	Maintenance Road	SY	7,500	$4.00	$30,000
9	Fence	LF	9,000	$1.20	$10,800
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-9)				$1,029,000
	CONSTRUCTION CONTINGENCIES @ 25%				$257,300
	ENGINEERING, TESTING, TAXES @20%				$205,800
	ESTIMATED DRAINAGE SUBTOTAL				**$1,492,000**
	98th & Gibson Corridor Crossings	LS	1	$1,837,000.00	$1,837,000
	TOTAL ESTIMATED PROJECT COSTS				**$3,329,000**

PROJECT #SV3:

Snow Vista - Channel Freeboard Upgrade

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Mobilization and Demobilization	LS	1	$3,000.00	$3,000
2	Freeboard Upgrade Rip Rap Section	CY	600	$100.00	$60,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-2)				$63,000
	CONSTRUCTION CONTINGENCIES @ 25%				$15,800
	ENGINEERING, TESTING, TAXES @20%				$12,600
	ESTIMATED DRAINAGE SUBTOTAL				**$104,000**
***	Gibson & 98th Bridge Crossings	EA	2	$909,000.00	$1,818,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,922,000**

*** Use additional Bridge costs for Amole Alternate 5 ONLY

PROJECT #AA6:

Amole Arroyo Alt #5-C

Amole Corridor Channel

Lower Reach High Flow Section SB to AA (1300')

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$12,486.24	$12,490
2	Mobilization and Demobilization	LS	1	$27,144.00	$27,140
3	Channel Lining	SF	84,800	$5.70	$483,360
4	Excavation	CY	10,000	$4.00	$40,000
5	Seeding	AC	1	$1,500.00	$1,200
6	Maintenance Road	SY	2,200	$4.00	$8,800
7	Freeboard for AAD Entrance/Pinned Curb	LF	800	$8.00	$6,400
8	Fence	LF	2,600	$1.20	$3,120
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-8)				$582,500
	CONSTRUCTION CONTINGENCIES @ 25%				$145,600
	ENGINEERING, TESTING, TAXES @20%				$116,500
	ESTIMATED DRAINAGE SUBTOTAL				**$845,000**
	Unser Corridor Crossing	LS	1	$909,000.00	$909,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,754,000**

PROJECT #AA7:

Amole Arroyo - Channel & Freeboard Upgrade @ Rundown

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Mobilization and Demobilization	LS	1	$6,500.00	$6,500
2	Rehabilitation of Channel & Misc.	LS	1	$90,000.00	$90,000
3	Pinned Curb or Header Curb	LF	1,000	$40.00	$40,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-3)				$136,500
	CONSTRUCTION CONTINGENCIES @ 25%				$34,100
	ENGINEERING, TESTING, TAXES @20%				$27,300
	TOTAL ESTIMATED PROJECT COSTS				**$198,000**

PROJECT #SP1: SOUTH POWERLINE CHANNEL/DETENTION

Detention Ponds and Storm Drain (71 AF)

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Mobilization and Demobilization	LS	1	$37,775.00	$37,780
2	Surveying	LS	1	$17,376.50	$17,380
3	Earthwork	CY	35,000	$5.00	$175,000
4	Spill Way	EA	8	$20,000.00	$160,000
5	24" Diameter Outfall Structure	EA	1	$14,500.00	$14,500
6	36" Diameter Outfall Structure	EA	4	$20,000.00	$80,000
7	42" Diameter Outfall Structure	EA	1	$21,000.00	$21,000
8	66" Diameter Outfall Structure	EA	1	$60,000.00	$60,000
9	60" Concrete Storm Drain Pipe, CIP	LF	2,000	$110.00	$220,000
10	Inlets	EA	6	$2,500.00	$15,000
11	Manholes	EA	5	$2,000.00	$10,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-11)				$810,700
	CONSTRUCTION CONTINGENCIES @ 25%				$202,700
	ENGINEERING, TESTING, TAXES @20%				$162,100
	TOTAL ESTIMATED CONSTRUCTION COSTS				$1,176,000
	RIGHT OF WAY ACQUISITION	AC	31	$20,000.00	$620,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,796,000**

PROJECT #RB1:

Rio Bravo Basin and South Rio Bravo Arroyo

Channel and Rundown to Hubbell Lake

Preliminary Construction Cost Estimate

Last Revision: 11-Jun-99

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Mobilization and Demobilization	LS	1	$ 38,742.50	$38,740
2	Surveying	LS	1	$ 17,821.55	$17,820
3	Clearing & Grubbing	AC	3	$ 600.00	$1,800
4	Structural Excavation	CY	450	$ 25.00	$11,250
5	12" Class A Riprap cip	CY	1,440	$ 70.00	$100,800
6	Concrete Drop Structure	CY	450	$ 500.00	$225,000
7	6" Gravel Filter	CY	720	$ 50.00	$36,000
8	Earth Works (total)	CY	16,000	$ 25.00	$400,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-8)				$831,400
	CONSTRUCTION CONTINGENCIES @ 25%				$207,900
	ENGINEERING, TESTING, TAXES @20%				$166,300
	TOTAL ESTIMATED CONSTRUCTION COSTS				$1,205,600
	RIGHT OF WAY ACQUISITION	AC	3	20,000	60,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,266,000**

PROJECT #BR-ALT:

"Y" Alternate for Borrega Diversion Channel

Channel and Rundown to Hubbell Lake (Additional to So. Rio Bravo Arroyo Rundown)

Preliminary Construction Cost Estimate

Last Revision: 11-Jun-99

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Mobilization and Demobilization	LS	1	$ 32,196.55	$32,200
2	Surveying	LS	1	$ 69,992.50	$69,990
3	Clearing & Grubbing	AC	6	$ 600.00	$3,600
4	12" Class A Riprap cip	CY	13,750	$ 60.00	$825,000
5	Concrete Spillway/Drop Structure	CY	600	$ 400.00	$240,000
6	6" Gravel Filter	CY	6,875	$ 30.00	$206,250
7	Earth Works (total)	CY	25,000	$ 5.00	$125,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-7)				$1,502,000
	CONSTRUCTION CONTINGENCIES @ 25%				$375,500
	TOTAL ESTIMATED CONSTRUCTION COSTS				$1,877,500
	ENGINEERING, TESTING, TAXES @20%				$375,500
					2,253,000
	RIGHT OF WAY ACQUISITION	AC	2	20,000	40,000
	TOTAL ESTIMATED PROJECT COSTS				**$2,293,000**

PROJECT #PL2:

Powerline - Channel Freeboard Upgrade

11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Demobilization	LS	1	$2,632.50	$2,630
2	Pinned Curb or Header Curb	LF	6,500	$8.10	$52,650
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-2)				$55,300
	CONSTRUCTION CONTINGENCIES @ 25%				$13,800
	ENGINEERING, TESTING, TAXES @20%				$11,100
	TOTAL ESTIMATED PROJECT COSTS				**$80,000**

PROJECT #SB1:
Sacate Blanco Diversion Channel (3000')

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$6,837.90	$6,840
2	Mobilization and Demobilization	LS	1	$14,865.00	$14,870
3	Soil Cement	CY	6,000	$35.00	$210,000
4	Earthwork	CY	10,000	$5.00	$50,000
5	Seeding	AC	7	$1,500.00	$10,500
6	Maintenance Road	SY	6,700	$4.00	$26,800
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-6)				$319,010.00
	CONSTRUCTION CONTINGENCIES @ 25%				$79,800
	ENGINEERING, TESTING, TAXES @20%				$63,800
	TOTAL ESTIMATED PROJECT COSTS				**$463,000**

PROJECT #SB2:

South Sacate Blanco Arroyo Conveyance

Preliminary Construction Cost Estimate

Last Revision: 11-Jun-99

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Conveyance Improvement	LF	5,000	$ 157.00	$785,000
	SUBTOTAL CONSTRUCTION COSTS (ITEM 1)				$785,000
	CONSTRUCTION CONTINGENCIES @ 25%			(INCLUDED)	
	ENGINEERING, TESTING, TAXES @20%			(INCLUDED)	
	ESTIMATED DRAINAGE SUBTOTAL				**$785,000**
	118th & 98th Corridor Crossings	LS	1	$1,003,200.00	$1,003,200
	TOTAL ESTIMATED PROJECT COSTS				**$1,788,000**

PROJECT #SB3:

Sacate Blanco Avulsion Conveyance

Preliminary Construction Cost Estimate

Last Revision: 11-Jun-99

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Conveyance Improvement	LF	4,000	$ 157.00	$628,000
	SUBTOTAL CONSTRUCTION COSTS (ITEM 1)				$628,000
	CONSTRUCTION CONTINGENCIES @ 25%			(INCLUDED)	
	ENGINEERING, TESTING, TAXES @20%			(INCLUDED)	
	ESTIMATED DRAINAGE SUBTOTAL				**$628,000**
	98th Street Corridor Crossing	LS	1	$591,360.00	$591,360
	TOTAL ESTIMATED PROJECT COSTS				**$1,219,000**

PROJECT #BR2:

North & South Borrega Arroyos Conveyance

Preliminary Construction Cost Estimate

Last Revision: 11-Jun-99

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Conveyance Improvement	LF	6,300	$ 157.00	$989,100
	SUBTOTAL CONSTRUCTION COSTS (ITEM 1)				$989,100
	CONSTRUCTION CONTINGENCIES @ 25%			(INCLUDED)	
	ENGINEERING, TESTING, TAXES @20%			(INCLUDED)	
	ESTIMATED DRAINAGE SUBTOTAL				**$989,000**
	Unser Corridor Crossing	LS	1	$823,424.00	$823,420
	TOTAL ESTIMATED PROJECT COSTS				**$1,812,000**

PROJECT #RB2:

South Rio Bravo Arroyo Conveyance

Preliminary Construction Cost Estimate

Last Revision: 11-Jun-99

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Conveyance Improvement	LF	3,300	$ 157.00	$518,100
	SUBTOTAL CONSTRUCTION COSTS (ITEM 1)				$518,100
	CONSTRUCTION CONTINGENCIES @ 25%			(INCLUDED)	
	ENGINEERING, TESTING, TAXES @20%			(INCLUDED)	
	ESTIMATED DRAINAGE SUBTOTAL				**$518,000**
	118th, 98th & Unser Corridor Crossings	LF	340	$476.00	$161,840
	TOTAL ESTIMATED PROJECT COSTS				**$680,000**

PROJECT #BR3:

Borrega Basin Area "6B" Diversion Stormdrain

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Mobilization and Demobilization	LS	1	$12,000.00	$12,000
2	Surveying	LS	1	$2,400.00	$2,400
3	Earthwork	CY	100	$5.00	$500
4	54" Concrete Stormdrain Pipe, CIP	LF	1,800	$110.00	$198,000
5	Inlets	EA	6	$2,500.00	$15,000
6	Manholes	EA	5	$2,000.00	$10,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-6)				$237,900
	CONSTRUCTION CONTINGENCIES @ 25%				$59,500
	ENGINEERING, TESTING, TAXES @20%				$47,600
	TOTAL ESTIMATED CONSTRUCTION COSTS				$345,000
	RIGHT OF WAY ACQUISITION	AC	1	$20,000.00	$20,000
	TOTAL ESTIMATED PROJECT COSTS				**$365,000**

APPENDIX I-D

ALTERNATE CONCEPTUAL COST ESTIMATES

ALT 1-A	Low Flow Section WG to SV
ALT 1-B	Low Flow Section SV to SB
ALT 1-C	High Flow Section SB to AA
ALT 2-A	Low Flow Section WG to SV
ALT 2-B	High Flow Composite Section SV to SB
ALT 2-C	High Flow Section SB to AA
ALT 3-A	High Flow Composite Section WG to SV
ALT 3-B	Low Flow Section SV to SB
ALT 3-C	High Flow Section SB to AA
ALT 4-A	High Flow Composite Section WG to SV
ALT 4-B	High Flow Composite Section SV to SB
ALT 4-C	High Flow Section SB to AA

Amole Arroyo Alt #1-A

Amole Corridor Channel

Low Flow Section WG to SV (7300')

Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$16,960.20	$16,960
2	Mobilization and Demobilization	LS	1	$36,870.00	$36,870
3	Soil Cement	CY	10,500	$35.00	$367,500
4	Earthwork	CY	50,000	$2.00	$100,000
5	Seeding	AC	9	$1,500.00	$13,500
6	Landscaping/Sod	AC	1	$100,000.00	$100,000
7	Stuctural PCC (CBC)	CY	140	$400.00	$56,000
8	Roadway AC R/R	SY	1,800	$20.00	$36,000
9	Maintenance Road	SY	11,000	$4.00	$44,000
10	Fence	LF	17,000	$1.20	$20,400
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-10)				$791,230.00
	CONSTRUCTION CONTINGENCIES @ 25%				$197,800
	ENGINEERING, TESTING, TAXES @20%				$158,200
	ESTIMATED DRAINAGE SUBTOTAL				**$1,147,000**
	118th Street Corridor Crossing	LS	1	$534,000.00	$534,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,681,000**

Amole Arroyo Alt #1-B

Amole Corridor Channel

Low Flow Section SV to SB (2800')

Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$6,306.14	$6,310
2	Mobilization and Demobilization	LS	1	$13,709.00	$13,710
3	Soil Cement	CY	5,500	$35.00	$192,500
4	Earthwork	CY	25,000	$2.00	$50,000
5	Seeding	AC	4	$1,500.00	$6,000
6	Maintenance Road	SY	4,500	$4.00	$18,000
7	Fence	LF	6,400	$1.20	$7,680
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-7)				$294,200.00
	CONSTRUCTION CONTINGENCIES @ 25%				$73,600
	ENGINEERING, TESTING, TAXES @20%				$58,800
	ESTIMATED DRAINAGE SUBTOTAL				**$427,000**
	98th & Gibson Corridor Crossings	LS	1	$1,532,000.00	$1,532,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,959,000**

Amole Arroyo Alt #1-C

Amole Corridor Channel

High Flow Section SB to AA (1300')

Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$10,870.26	$10,870
2	Mobilization and Demobilization	LS	1	$23,631.00	$23,630
3	Channel Lining	SF	75,000	$5.70	$427,500
4	Excavation	CY	8,000	$4.00	$32,000
5	Seeding	AC	1	$1,500.00	$1,200
6	Maintenance Road	SY	2,200	$4.00	$8,800
7	Fence	LF	2,600	$1.20	$3,120
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-7)				$507,120.00
	CONSTRUCTION CONTINGENCIES @ 25%				$126,800
	ENGINEERING, TESTING, TAXES @20%				$101,400
	ESTIMATED DRAINAGE SUBTOTAL				**$735,000**
	Unser Corridor Crossing	LS	1	$909,000.00	$909,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,644,000**

Amole Arroyo Alt #2-A

Amole Corridor Channel

Low Flow Section WG to SV (8300') Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$19,271.70	$19,270
2	Mobilization and Demobilization	LS	1	$41,895.00	$41,900
3	Soil Cement	CY	12,800	$35.00	$448,000
4	Earthwork	CY	60,000	$2.00	$120,000
5	Seeding	AC	9	$1,500.00	$13,500
6	Landscaping/Sod	AC	1	$100,000.00	$100,000
7	Stuctural PCC (CBC)	CY	140	$400.00	$56,000
8	Roadway AC R/R	SY	1,800	$20.00	$36,000
9	Maintenance Road	SY	11,000	$4.00	$44,000
10	Fence	LF	17,000	$1.20	$20,400
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-10)				$899,070.00
	CONSTRUCTION CONTINGENCIES @ 25%				$224,800
	ENGINEERING, TESTING, TAXES @20%				$179,800
	ESTIMATED DRAINAGE SUBTOTAL				**$1,304,000**
	118th Street Corridor Crossing	LS	1	$534,000.00	$534,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,838,000**

Amole Arroyo Alt #2-B

Amole Corridor Channel

Mid Reach High Flow Composite Section SV to SB (6200') Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$31,208.24	$31,210
2	Mobilization and Demobilization	LS	1	$67,844.00	$67,840
3	Soil Cement	CY	10,000	$35.00	$350,000
4	Earthwork	CY	114,000	$2.00	$228,000
5	Riprap	CY	1,880	$50.00	$94,000
6	Filter Gravel	CY	1,000	$30.00	$30,000
7	Landscape	AC	6	$100,000.00	$600,000
8	Maintenance Road	SY	10,000	$4.00	$40,000
9	Fence	LF	12,400	$1.20	$14,880
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-9)				$1,455,930.00
	CONSTRUCTION CONTINGENCIES @ 25%				$364,000
	ENGINEERING, TESTING, TAXES @20%				$291,200
	ESTIMATED DRAINAGE SUBTOTAL				**$2,111,000**
	98th & Gibson Corridor Crossings	LS	1	$2,688,000.00	$2,688,000
	TOTAL ESTIMATED PROJECT COSTS				**$4,799,000**

Amole Arroyo Alt #2-C

Amole Corridor Channel

Lower Reach High Flow Section SB to AA (1300')

Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$12,486.24	$12,490
2	Mobilization and Demobilization	LS	1	$27,144.00	$27,140
3	Channel Lining	SF	84,800	$5.70	$483,360
4	Excavation	CY	10,000	$4.00	$40,000
5	Seeding	AC	1	$1,500.00	$1,200
6	Maintenance Road	SY	2,200	$4.00	$8,800
7	Freeboard for AAD Entrance/Pinned Curb	LF	800	$8.00	$6,400
8	Fence	LF	2,600	$1.20	$3,120
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-8)				$583,000
	CONSTRUCTION CONTINGENCIES @ 25%				$145,800
	ENGINEERING, TESTING, TAXES @20%				$116,600
	ESTIMATED DRAINAGE SUBTOTAL				**$845,000**
	Unser Corridor Crossing	LS	1	$909,000	$909,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,754,000**

Amole Arroyo Alt #3-A

Amole Corridor Channel

High Flow Composite Section WG to SV (5000')

Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$33,429.35	$33,429
2	Mobilization and Demobilization	LS	1	$72,672.50	$72,673
3	Soil Cement	CY	10,530	$35.00	$368,550
4	Earthwork	CY	101,000	$2.00	$202,000
5	Seeding	AC	1	$1,500.00	$1,500
6	Landscaping/Sod	AC	6	$100,000.00	$600,000
7	Stuctural PCC (CBC)	CY	140	$400.00	$56,000
8	Roadway AC R/R	SY	1,800	$20.00	$36,000
9	Maintenance Road	SY	11,000	$4.00	$44,000
10	Fence	LF	17,000	$1.20	$20,400
11	Riprap	CY	1,900	$50.00	$95,000
12	Filter Gravel	CY	1,000	$30.00	$30,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-12)				$1,560,000
	CONSTRUCTION CONTINGENCIES @ 25%				$390,000
	ENGINEERING, TESTING, TAXES @20%				$312,000
	ESTIMATED DRAINAGE SUBTOTAL				**$2,262,000**
	118th Street Corridor Crossing	LS	1	$936,000.00	$936,000
	TOTAL ESTIMATED PROJECT COSTS				**$3,198,000**

Amole Arroyo Alt #3-B

Amole Corridor Channel

Low Flow Section SV to SB (2800') Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$6,306.14	$6,310
2	Mobilization and Demobilization	LS	1	$13,709.00	$13,710
3	Soil Cement	CY	5,500	$35.00	$192,500
4	Earthwork	CY	25,000	$2.00	$50,000
5	Seeding	AC	4	$1,500.00	$6,000
6	Maintenance Road	SY	4,500	$4.00	$18,000
7	Fence	LF	6,400	$1.20	$7,680
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-7)				$294,200
	CONSTRUCTION CONTINGENCIES @ 25%				$73,600
	ENGINEERING, TESTING, TAXES @20%				$58,800
	ESTIMATED DRAINAGE SUBTOTAL				**$427,000**
	98th & Gibson Corridor Crossings	LS	1	$1,532,000	$1,532,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,959,000**

Amole Arroyo Alt #3-C

Amole Corridor Channel

High Flow Section SB to AA (1300')

Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$10,870.26	$10,870
2	Mobilization and Demobilization	LS	1	$23,631.00	$23,630
3	Channel Lining	SF	75,000	$5.70	$427,500
4	Excavation	CY	8,000	$4.00	$32,000
5	Seeding	AC	1	$1,500.00	$1,200
6	Maintenance Road	SY	2,200	$4.00	$8,800
7	Fence	LF	2,600	$1.20	$3,120
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-7)				$507,000
	CONSTRUCTION CONTINGENCIES @ 25%				$126,800
	ENGINEERING, TESTING, TAXES @20%				$101,400
	ESTIMATED DRAINAGE SUBTOTAL				**$735,000**
	Unser Corridor Crossing	LS	1	$909,000	$909,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,644,000**

Amole Arroyo Alt #4-A

Amole Corridor Channel

High Flow Composite Section WG to SV (6000') Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$40,719.20	$40,720
2	Mobilization and Demobilization	LS	1	$88,520.00	$88,520
3	Soil Cement	CY	12,500	$35.00	$437,500
4	Earthwork	CY	125,000	$2.00	$250,000
5	Seeding	AC	1	$1,500.00	$1,500
6	Landscaping/Sod	AC	8	$100,000.00	$800,000
7	Stuctural PCC (CBC)	CY	140	$400.00	$56,000
8	Roadway AC R/R	SY	1,800	$20.00	$36,000
9	Maintenance Road	SY	11,000	$4.00	$44,000
10	Fence	LF	17,000	$1.20	$20,400
11	Riprap	CY	1,900	$50.00	$95,000
12	Filter Gravel	CY	1,000	$30.00	$30,000
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-12)				$1,899,640.00
	CONSTRUCTION CONTINGENCIES @ 25%				$474,900
	ENGINEERING, TESTING, TAXES @20%				$379,900
	ESTIMATED DRAINAGE SUBTOTAL				**$2,754,000**
	118th Street Corridor Crossing	LS	1	$936,000.00	$936,000
	TOTAL ESTIMATED PROJECT COSTS				**$3,690,000**

Amole Arroyo Alt #4-B

Amole Corridor Channel

High Flow Composite Section SV to SB (6200') Last Revision: 11-Jun-99

Concept Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$32,818.24	$32,820
2	Mobilization and Demobilization	LS	1	$71,344.00	$71,340
3	Soil Cement	CY	12,000	$35.00	$420,000
4	Earthwork	CY	114,000	$2.00	$228,000
5	Riprap	CY	1,880	$50.00	$94,000
6	Filter Gravel	CY	1,000	$30.00	$30,000
7	Landscape	AC	6	$100,000.00	$600,000
8	Maintenance Road	SY	10,000	$4.00	$40,000
9	Fence	LF	12,400	$1.20	$14,880
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-9)				$1,531,040.00
	CONSTRUCTION CONTINGENCIES @ 25%				$382,800
	ENGINEERING, TESTING, TAXES @20%				$306,200
	ESTIMATED DRAINAGE SUBTOTAL				**$2,220,000**
	98th & Gibson Corridor Crossings	LS	1	$2,688,000.00	$2,688,000
	TOTAL ESTIMATED PROJECT COSTS				**$4,908,000**

Amole Arroyo Alt #4-C

Amole Corridor Channel

High Flow Section SB to AA (1300')

Last Revision: 11-Jun-99

Preliminary Construction Cost Estimate

Item No.	Description	Units	Quantity	Unit Cost	Total
1	Surveying	LS	1	$12,496.36	$12,500
2	Mobilization and Demobilization	LS	1	$27,166.00	$27,170
3	Channel Lining	SF	86,000	$5.70	$490,200
4	Excavation	CY	10,000	$4.00	$40,000
5	Seeding	AC	1	$1,500.00	$1,200
6	Maintenance Road	SY	2,200	$4.00	$8,800
7	Fence	LF	2,600	$1.20	$3,120
	SUBTOTAL CONSTRUCTION COSTS (ITEMS 1-7)				$583,000
	CONSTRUCTION CONTINGENCIES @ 25%				$145,800
	ENGINEERING, TESTING, TAXES @20%				$116,600
	ESTIMATED DRAINAGE SUBTOTAL				**$845,000**
	Unser Corridor Crossing	LS	1	$909,000.00	$909,000
	TOTAL ESTIMATED PROJECT COSTS				**$1,754,000**

APPENDIX I-E

AHYMO READ ME FILE

READ.ME FILE
FOR
THE AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

This file accompanies the digital AHYMO files for the Amole-Hubbell Management Plan. File extensions must be associated with the program the user expects to use to view files, before files can be opened.

AHYMO version AHYMO194 (Jan 1994) utilized for this DMP.

Drainage basins and their abbreviations used throughout the Amole-Hubbell Drainage Management Plan are as follows:

Basin	**Abbreviation**
98th & Central	98
Amole Arroyo	AA
Atrisco Business Park	AB
Amole/Hubbell Detention	AH
Amole del Norte	ADN or AN
Borrega	BR
Powerline	PL
Rio Bravo	RB
Sacate Blanco	SB
South Powerline	SP or SPL
Snow Vista	SV
Sunrise Estates	DN
Tierra Bayita	TB
Tower/Sage	TS
Unser	UN
Westgate	WG

Included on the disk are the AHYMO analysis files for existing conditions runs, developed conditions with existing facilities (DEVEX), and developed conditions with DMP recommended facilities (DMP). The convention for naming the AHYMO files is as follows:

1. The first two letters/numbers are the drainage basin abbreviation.

2. The next three letters/numbers are the return frequency of the run.

3. The next letter is either "E" or "D" for Existing or Developed.

4. The next number is the version.

5. The next letter is either "A" or "B" for 6 hour or 24 hour, respectively.

6. The file extensions are the associated AHYMO extensions; *.DAT for the input file, *.OUT for the output file, *.PUN for the punch hyd file and *.SUM for the summary table file.

EXAMPLE: SV100E1B.DAT is the Snow Vista Basin 100 Year - 24 hour storm first trial input file for existing conditions.
SV100D1B.DAT is the Snow Vista Basin 100 Year - 24 hour storm first trial input file for developed conditions, with existing facilities.

The exceptions to the above are the DMP and PMP files. For these files "_DMP#.*" replaces the "100D1B.*" sequence for the AHYMO files used in the design of the Drainage Management Plan. These files are Developed Conditions with the recommended facilities in place. (i.e. the extended spillways for the Amole and Hubbell Dams, etc.). For the Probable Maximum Precipitation (PMP) files the notation "_PMPF.*" or "_ PMPS.*" replaces the "100D1B.*" sequence for the AHYMO files used in the design of the PMP Freeboard and PMP Spillway models, respectively.

EXAMPLES: SV_DMP.DAT is the Snow Vista Basin DMP input file.
SV_PMPF.DAT is the Snow Vista Basin PMP Freeboard input file.
SV_PMPS.DAT is the Snow Vista Basin PMP Spillway input file.

The South Powerline Basin is included in the Rio Bravo AHYMO Model for DEVEX and DMP.

COMPACT DISK

Included with Volume III of the Amole-Hubbell Drainage Management Plan is a compact disk. The disk contains the AHYMO Files listed below: *Note: .PUN listed files not available (do not work)*

PMP Freeboard/Amole Hubbell Basins

Amole Arroyo Basins ..... AA_PMPF.DAT,*.OUT, and *.SUM
Borrega Basins ..... BR_PMPF.DAT, *.OUT, *.PUN and *.SUM
Powerline Basins ..... PL_PMPF.DAT, *.OUT, *.PUN and *.SUM
Rio Bravo Basins ..... RB_PMPF.DAT, *.OUT, *.PUN and *.SUM
Sacate Blanco Basins ..... SB_PMPF.DAT, *.OUT, *.PUN and *.SUM
Snow Vista Basins ..... SV_PMPF.DAT, *.OUT, *.PUN and *.SUM
Westgate Basins ..... WG_PMPF.DAT, *.OUT, *.PUN and *.SUM

PMP Freeboard/Amole del Norte Basins

98th and Central Basins ..... 98_PMPF.DAT, *.OUT, *.PUN and *.SUM
Atrisco Business Park Basins ..... AB_PMPF.DAT, *.OUT, *.PUN and *.SUM
Amole del Norte Basins ..... AN_PMPF.DAT, *.OUT, *.PUN and *.SUM
Sunrise Estates Basins ..... DN_PMPF.DAT, *.OUT, *.PUN and *.SUM
Tierra Bayita Basins ..... TB_PMPF.DAT, *.OUT, *.PUN and *.SUM
Tower/Sage Basins ..... TS_PMPF.DAT, *.OUT, *.PUN and *.SUM
Unser Basins ..... UN_PMPF.DAT, *.OUT, *.PUN and *.SUM

PMP Spillway/Amole Hubbell Basins

Amole Arroyo Basins ..... AA_PMPS.DAT,*.OUT, and *.SUM
Borrega Basins ..... BR_PMPS.DAT, *.OUT, *.PUN and *.SUM
Powerline Basins ..... PL_PMPS.DAT, *.OUT, *.PUN and *.SUM
Rio Bravo Basins ..... RB_PMPS.DAT, *.OUT, *.PUN and *.SUM
Sacate Blanco Basins ..... SB_PMPS.DAT, *.OUT, *.PUN and *.SUM
Snow Vista Basins ..... SV_PMPS.DAT, *.OUT, *.PUN and *.SUM
Westgate Basins ..... WG_PMPS.DAT, *.OUT, *.PUN and *.SUM

PMP Spillway/Amole del Norte Basins

98th and Central Basins ..... 98_PMPS.DAT, *.OUT, *.PUN and *.SUM
Atrisco Business Park Basins ..... AB_PMPS.DAT, *.OUT, *.PUN and *.SUM
Amole del Norte Basins ..... AN_PMPS.DAT, *.OUT, *.PUN and *.SUM
Sunrise Estates Basins ..... DN_PMPS.DAT, *.OUT, *.PUN and *.SUM
Tierra Bayita Basins ..... TB_PMPS.DAT, *.OUT, *.PUN and *.SUM
Tower/Sage Basins ..... TS_PMPS.DAT, *.OUT, *.PUN and *.SUM
Unser Basins ..... UN_PMPS.DAT, *.OUT, *.PUN and *.SUM

DMP/Amole Hubbell Basins

Amole Arroyo Basins ..... AA_DMP2.DAT,*.OUT, and *.SUM
Borrega Basins ..... BR_DMP1.DAT, *.OUT, *.PUN and *.SUM
Powerline Basins ..... PL_DMP1.DAT, *.OUT, *.PUN and *.SUM
Rio Bravo Basins ..... RB_DMP.DAT, *.OUT, *.PUN and *.SUM
Sacate Blanco Basins ..... SB_DMP.DAT, *.OUT, *.PUN and *.SUM
Snow Vista Basins ..... SV_DMP.DAT, *.OUT, *.PUN and *.SUM
Westgate Basins ..... WG_DMP.DAT, *.OUT, *.PUN and *.SUM

DMP/Amole del Norte Basins

98th and Central Basins ..... 98_DMP.DAT, *.OUT, *.PUN and *.SUM
Atrisco Business Park Basins ..... AB_DMP.DAT, *.OUT, *.PUN and *.SUM
Amole del Norte Basins ..... AN_DMP.DAT, *.OUT, *.PUN and *.SUM
Sunrise Estates Basins ..... DN_DMP.DAT, *.OUT, *.PUN and *.SUM
Tierra Bayita Basins ..... TB_DMP.DAT, *.OUT, *.PUN and *.SUM
Tower/Sage Basins ..... TS_DMP.DAT, *.OUT, *.PUN and *.SUM
Unser Basins ..... UN_DMP.DAT, *.OUT, *.PUN and *.SUM

DEVEX/Amole Hubbell Basins

Amole Arroyo Basins ..... AA100D1B.DAT, *.OUT, and *.SUM
Borrega Basins ..... BR100D1B.DAT, *.OUT, *.PUN and *.SUM
Powerline Basins ..... PL100D1B.DAT, *.OUT, *.PUN and *.SUM
Rio Bravo Basins ..... RB100D1B.DAT, *.OUT, *.PUN and *.SUM
Sacate Blanco Basins ..... SB100D1B.DAT, *.OUT, *.PUN and *.SUM
Snow Vista Basins ..... SV100D1B.DAT, *.OUT, *.PUN and *.SUM
Westgate Basins ..... WG100D1B.DAT, *.OUT, *.PUN and *.SUM

DEVEX/Amole del Norte Basins

98th and Central Basins ..... 98100D1B.DAT, *.OUT, *.PUN and *.SUM
Atrisco Business Park Basins ..... AB100D1B.DAT, *.OUT, *.PUN and *.SUM
Amole del Norte Basins ..... AN100D1B.DAT, *.OUT, *.PUN and *.SUM

Sunrise Estates Basins ..... DN100D1B.DAT, *.OUT, *.PUN and *.SUM
Tierra Bayita Basins ..... TB100D1B.DAT, *.OUT, *.PUN and *.SUM
Tower/Sage Basins ..... TS100D1B.DAT, *.OUT, *.PUN and *.SUM
Unser Basins ..... UN100D1B.DAT, *.OUT, *.PUN and *.SUM

EX/Amole Hubbell Basins

Amole Arroyo Basins ..... AA100E1B.DAT, *.OUT, and *.SUM
Borrega Basins ..... BR100E1B.DAT, *.OUT, *.PUN and *.SUM
Powerline Basins ..... PL100E1B.DAT, *.OUT, *.PUN and *.SUM
Rio Bravo Basins ..... RB100E1B.DAT, *.OUT, *.PUN and *.SUM
Sacate Blanco Basins ..... SB100E1B.DAT, *.OUT, *.PUN and *.SUM
Snow Vista Basins ..... SV100E1B.DAT, *.OUT, *.PUN and *.SUM
Westgate Basins ..... WGEXIST.DAT, *.OUT, *.PUN and *.SUM

EX/Amole del Norte Basins

98th and Central Basins ..... 98100E1B.DAT, *.OUT, *.PUN and *.SUM
Atrisco Business Park Basins ..... AB100E1B.DAT, *.OUT, *.PUN and *.SUM
Amole del Norte Basins ..... AN100E1B.DAT, *.OUT, *.PUN and *.SUM
Sunrise Estates Basins ..... DN100E1B.DAT, *.OUT, *.PUN and *.SUM
Tierra Bayita Basins ..... TB100E1B.DAT, *.OUT, *.PUN and *.SUM
Unser Basins ..... UN100E1B.DAT, *.OUT, *.PUN and *.SUM

G:\DATA\PROJECTS\AMAFCA\AMOLE\READ.ME

APPENDIX I-F

AHYMO DMP HYDDROLOGY

SUMMARY FILES

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE

```
START                                                                                    TIME= .00
*S        WESTGATE DAM
*S
*S
*S 100-YR, 24-HR STORM WITH SEDIMENT
*S FILE NAME: WG_DMP.DAT
*S BY: RICHARD STOCKTON   PEER REVIEWED BY: DEBORAH DIXON
*S LAST REVISION: 06-9-99  KAREN JACOBSEN * * * * * * * * * * * * * * * * *
*S LH * MODIFIED THE FOLLOWING COMPUTE RATING CURVES TO HAVE A GENERAL    *
*S LH * CHANNEL SECTION INSTEAD OF PIPE.  THIS WAS DONE TO ELIMINATE      *
*S LH * WARNING AND EXCEED ERROR MESSAGES FOR THE FOLLOWING HYDROGRAPHS   *
*S LH * 310.2,311.2,148.1,508.2,506.1,505.1,300.2,302.4,302.5,504.99,     *
*S LH * 123.3,147.1,111.2,402.2,316.1, AND 504.98                         *
*S ANALYSIS ASSUMPTIONS:
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.
*S
*S 2. THE PUNCH HYD COMMAND WAS ADDED TO THE END OF THIS FILE SO THE OUTFALL
*S    HYDROGRAPH COULD BE USED IN THE AMOLE ARROYO DEVELOPED CONDITIONS MODEL
*SAA_DMP.DAT, WHICH WILL BE USED IN THE ANALYSIS OF THE AMOLE & HUBBELL SYST
*S
*S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL  TYPE= 2                                                                        RAIN24=2.660
COMPUTE NM HYD        418.00   -     1       1.49581      1872.81     125.528      1.57350    1.700    1.956 PER IMP=48.00
COMPUTE NM HYD        417.00   -     2        .13909       150.05      11.672      1.57350    1.800    1.686 PER IMP=48.00
```

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	417.10	1& 2	3	1.63490	2012.23	137.200	1.57350	1.700	1.923	
ROUTE RESERVOIR	417.01	3	4	1.63490	2012.23	137.200	1.57350	1.700	1.923	
ROUTE	417.20	4	5	1.63490	1496.86	137.200	1.57350	1.850	1.431	
COMPUTE NM HYD	419.00	-	1	.19715	250.88	16.545	1.57350	1.700	1.988	PER IMP=48.00
COMPUTE NM HYD	420.00	-	2	.18889	228.37	15.852	1.57350	1.700	1.889	PER IMP=48.00
ADD HYD	419.10	1& 2	3	.38604	479.25	32.396	1.57349	1.700	1.940	
ADD HYD	420.10	3& 5	4	2.02094	1890.08	169.597	1.57350	1.850	1.461	
ROUTE	420.20	4	5	2.02094	824.67	169.447	1.57211	2.250	.638	
COMPUTE NM HYD	416.00	-	1	.86541	957.80	72.625	1.57350	1.750	1.729	PER IMP=48.00
ROUTE	416.10	1	2	.86541	440.70	72.472	1.57019	2.150	.796	
ADD HYD	416.20	2& 5	3	2.88635	1260.58	241.919	1.57153	2.200	.682	
COMPUTE NM HYD	415.00	-	1	.15228	269.08	12.779	1.57350	1.550	2.761	PER IMP=48.00
ROUTE RESERVOIR	415.01	1	2	.15228	269.08	12.779	1.57350	1.550	2.761	
COMPUTE NM HYD	414.00	-	1	.11235	142.83	9.428	1.57350	1.700	1.986	PER IMP=48.00
ADD HYD	414.10	2& 1	4	.26463	377.00	22.208	1.57349	1.600	2.226	
ROUTE RESERVOIR	414.01	4	2	.26463	377.00	22.208	1.57349	1.600	2.226	
ROUTE	414.30	2	1	.26463	168.23	22.182	1.57165	1.900	.993	
COMPUTE NM HYD	411.00	-	2	.29891	426.42	25.084	1.57350	1.650	2.229	PER IMP=48.00
ADD HYD	411.10	1& 2	4	.56354	545.66	47.266	1.57263	1.650	1.513	
ROUTE	411.20	4	1	.56354	523.52	47.263	1.57251	1.750	1.452	
COMPUTE NM HYD	412.00	-	2	1.18559	1330.28	99.495	1.57350	1.750	1.753	PER IMP=48.00
ADD HYD	412.10	1& 2	4	1.74913	1853.80	146.757	1.57318	1.750	1.656	
ADD HYD	412.20	4& 3	1	4.63548	2479.44	388.676	1.57215	1.900	.836	
ROUTE	412.30	1	5	4.63548	1399.24	388.421	1.57112	2.450	.472	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	424.00	-	1	.33534	463.50	28.142	1.57350	1.650	2.160	PER IMP=48.00
ROUTE RESERVOIR	424.01	1	2	.33534	463.50	28.142	1.57350	1.650	2.160	
COMPUTE NM HYD	421.00	-	1	.33184	443.53	27.848	1.57350	1.650	2.088	PER IMP=48.00
ADD HYD	421.10	1& 2	3	.66718	907.02	55.990	1.57350	1.650	2.124	
ROUTE	421.20	3	1	.66718	745.81	55.989	1.57349	1.750	1.747	
COMPUTE NM HYD	422.00	-	2	.14367	177.15	12.057	1.57350	1.700	1.927	PER IMP=48.00
ADD HYD	422.10	1& 2	3	.81085	920.12	68.046	1.57349	1.700	1.773	
ROUTE	422.20	3	1	.81085	535.65	68.015	1.57276	1.900	1.032	
COMPUTE NM HYD	423.00	-	2	.05985	56.31	5.023	1.57350	1.900	1.470	PER IMP=48.00
ADD HYD	423.10	1& 2	3	.87070	591.96	73.037	1.57281	1.900	1.062	
ROUTE	423.20	3	1	.87070	284.70	72.607	1.56355	2.500	.511	
COMPUTE NM HYD	413.00	-	2	1.00011	1191.16	83.929	1.57350	1.700	1.861	PER IMP=48.00
ADD HYD	413.10	1& 2	3	1.87081	1236.88	156.536	1.56887	1.750	1.033	
ROUTE	413.20	3	1	1.87081	959.97	156.346	1.56696	1.950	.802	
COMPUTE NM HYD	410.00	-	2	1.38956	1697.81	116.612	1.57350	1.700	1.909	PER IMP=48.00
ADD HYD	410.10	1& 2	3	3.26037	2444.42	272.958	1.56975	1.800	1.171	
ADD HYD	410.20	3& 5	4	7.89585	3027.44	661.378	1.57055	1.850	.599	
ROUTE RESERVOIR	410.01	4	1	7.89585	3027.44	661.378	1.57055	1.850	.599	
ROUTE	410.30	1	2	7.89585	2618.92	660.903	1.56942	2.250	.518	
COMPUTE NM HYD	409.00	-	1	.46618	669.79	39.122	1.57350	1.650	2.245	PER IMP=48.00
ROUTE	409.10	1	3	.46618	181.47	38.806	1.56078	2.050	.608	
COMPUTE NM HYD	408.00	-	1	1.38633	1674.02	116.341	1.57350	1.700	1.887	PER IMP=48.00
ADD HYD	408.10	1& 3	4	1.85251	1799.38	155.146	1.57030	1.750	1.518	
ADD HYD	408.20	4& 2	2	9.74836	3590.09	816.049	1.56959	1.950	.575	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE RESERVOIR	410.01	2	5	9.74836	243.83	532.611	1.02442	7.900	.039	AC-FT=553.553
ROUTE	408.30	5	1	9.74836	243.81	528.625	1.01676	8.150	.039	
COMPUTE NM HYD	403.00	-	2	.48341	648.72	42.989	1.66741	1.700	2.097	PER IMP=53.70
ADD HYD	403.10	1& 2	3	10.23177	686.76	571.614	1.04750	1.700	.105	
ROUTE	408.30	3	19	10.23177	597.36	568.539	1.04186	1.800	.091	
COMPUTE NM HYD	406.00	-	1	.05788	93.75	6.453	2.09027	1.700	2.531	PER IMP=78.40
DIVIDE HYD	406.10	1	2	.05698	84.00	6.352	2.09026	1.600	2.304	
	406.20	AND	3	.00090	9.75	.101	2.09027	1.700	16.895	
ROUTE	406.30	3	1	.00090	1.86	.101	2.09886	1.750	3.224	
COMPUTE NM HYD	407.00	-	2	.06012	106.50	5.045	1.57350	1.550	2.768	PER IMP=48.00
ROUTE RESERVOIR	407.01	2	3	.06012	106.50	5.045	1.57350	1.550	2.768	
ROUTE	407.10	3	2	.06012	30.32	5.036	1.57052	1.850	.788	
COMPUTE NM HYD	404.00	-	3	.22811	345.30	26.223	2.15542	1.700	2.365	PER IMP=83.00
ADD HYD	404.10	1& 2	4	.06102	31.81	5.137	1.57832	1.850	.814	
ADD HYD	404.20	3& 4	7	.28913	375.63	31.359	2.03362	1.750	2.030	
DIVIDE HYD	404.10	7	2	.14025	46.00	15.211	2.03362	1.400	.512	
	404.20	AND	3	.14889	329.63	16.148	2.03362	1.750	3.459	
DIVIDE HYD	404.20	2	1	.07012	23.00	7.606	2.03362	1.400	.512	
	404.30	AND	4	.07012	23.00	7.606	2.03362	1.400	.512	
ROUTE	404.40	1	2	.07012	23.64	7.606	2.03361	1.450	.527	
ROUTE	404.40	4	1	.07012	23.64	7.606	2.03361	1.450	.527	
ADD HYD	404.50	1& 2	7	.14025	47.29	15.211	2.03361	1.450	.527	
ROUTE	404.60	3	1	.14889	272.69	16.148	2.03367	1.850	2.862	
COMPUTE NM HYD	405.00	-	2	.28007	395.97	27.954	1.87144	1.700	2.209	PER IMP=66.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	405.10	2	3	.28007	187.73	27.904	1.86811	2.000	1.047	
ADD HYD	405.20	3& 1	3	.42896	449.28	44.052	1.92557	1.900	1.637	
COMPUTE NM HYD	402.00	-	2	.21249	346.29	24.221	2.13725	1.700	2.546	PER IMP=81.70
ADD HYD	402.10	2& 3	4	.64145	709.72	68.273	1.99569	1.800	1.729	
ROUTE	402.20	4	2	.64145	708.02	68.271	1.99563	1.850	1.725	
COMPUTE NM HYD	401.00	-	3	.14474	244.79	16.995	2.20159	1.650	2.643	PER IMP=86.00
ADD HYD	401.20	2& 3	5	.78619	908.02	85.266	2.03354	1.800	1.805	
COMPUTE NM HYD	303.00	-	1	.00790	5.00	.597	1.41615	2.200	.989	PER IMP=29.50
ADD HYD	303.10	1& 7	2	.14815	51.09	15.808	2.00068	2.150	.539	
DIVIDE HYD	303.20	2	1	.14461	46.00	15.431	2.00068	1.450	.497	
	303.30	AND	6	.00353	5.09	.377	2.00068	2.150	2.248	
DIVIDE HYD	303.40	1	2	.07231	23.00	7.715	2.00068	1.450	.497	
	303.40	AND	3	.07231	23.00	7.715	2.00068	1.450	.497	
ROUTE	303.50	2	1	.07231	23.57	7.715	2.00067	1.450	.509	
ROUTE	303.60	3	2	.07231	23.57	7.715	2.00067	1.450	.509	
ADD HYD	303.70	1& 2	3	.14461	47.14	15.430	2.00067	1.450	.509	
COMPUTE NM HYD	302.00	-	1	.01116	9.21	.770	1.29424	1.900	1.289	PER IMP=21.00
ADD HYD	302.10	1& 3	2	.15577	55.40	16.201	1.95006	1.950	.556	
DIVIDE HYD	302.20	2	1	.15000	46.00	15.601	1.95006	1.450	.479	
	302.30	AND	8	.00577	9.40	.600	1.95006	1.950	2.546	
DIVIDE HYD	302.40	1	2	.07500	23.00	7.800	1.95006	1.450	.479	
	302.40	AND	3	.07500	23.00	7.800	1.95006	1.450	.479	
ROUTE	302.40	2	4	.07500	23.66	7.800	1.95005	1.450	.493	
ROUTE	302.50	3	1	.07500	23.66	7.800	1.95005	1.450	.493	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	302.60	4& 1	3	.15000	47.32	15.601	1.95005	1.450	.493	
COMPUTE NM HYD	301.00	-	1	.00593	7.36	.491	1.55240	1.700	1.940	PER IMP=39.00
ROUTE	301.20	1	2	.00593	7.35	.491	1.55241	1.750	1.936	
ADD HYD	301.30	2& 3	7	.15593	53.70	16.092	1.93492	1.750	.538	
COMPUTE NM HYD	300.00	-	2	.00603	12.22	.420	1.30715	1.500	3.167	PER IMP=21.90
ADD HYD	300.10	8& 2	1	.01180	14.28	1.020	1.62145	1.550	1.891	
ROUTE	300.20	1	2	.01180	13.45	1.020	1.62152	1.550	1.782	
COMPUTE NM HYD	304.00	-	1	.00347	7.56	.285	1.53949	1.500	3.405	PER IMP=38.10
ROUTE	304.20	1	3	.00347	7.47	.285	1.53964	1.500	3.363	
ADD HYD	304.30	2& 3	8	.01527	20.31	1.305	1.60281	1.550	2.078	
COMPUTE NM HYD	305.00	-	9	.00402	8.06	.322	1.50077	1.500	3.132	PER IMP=35.40
ROUTE RESERVOIR	401.01	5	1	.78619	824.73	85.266	2.03354	1.950	1.639	AC-FT=10.619
ROUTE	401.80	1	2	.78619	826.56	85.265	2.03352	1.950	1.643	
COMPUTE NM HYD	307.00	-	4	.01650	20.25	1.295	1.47208	1.700	1.917	PER IMP=33.40
ADD HYD	307.10	6& 4	1	.02003	22.45	1.673	1.56531	1.750	1.750	
ROUTE	307.20	1	3	.02003	21.71	1.673	1.56534	1.750	1.693	
ADD HYD	307.30	3& 2	1	.80622	844.93	86.938	2.02189	1.950	1.638	
COMPUTE NM HYD	315.00	-	2	.00836	15.50	.464	1.04040	1.500	2.896	PER IMP=3.30
ROUTE RESERVOIR	315.01	2	3	.00836	15.50	.464	1.04040	1.500	2.896	
ROUTE	315.10	3	2	.00836	13.74	.464	1.04048	1.550	2.569	
ADD HYD	315.20	1& 2	3	.81458	848.60	87.402	2.01182	1.950	1.628	
COMPUTE NM HYD	312.00	-	1	.03437	68.16	2.278	1.24262	1.500	3.098	PER IMP=17.40
DIVIDE HYD	312.10	1	2	.01719	34.08	1.139	1.24261	1.500	3.098	
	312.20	AND	4	.01719	34.08	1.139	1.24261	1.500	3.098	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	312.30	2	5	.01719	32.97	1.139	1.24264	1.550	2.998	
ADD HYD	312.40	3& 5	1	.83177	856.56	88.541	1.99593	1.950	1.609	
COMPUTE NM HYD	314.00	-	3	.01914	35.92	1.100	1.07768	1.500	2.932	PER IMP=5.90
ADD HYD	314.10	1& 3	2	.85091	862.42	89.641	1.97527	1.950	1.584	
ROUTE RESERVOIR	401.02	2	1	.85091	549.32	89.639	1.97523	2.300	1.009	AC-FT=16.110
ROUTE	314.90	1	2	.85091	549.05	89.638	1.97521	2.300	1.008	
COMPUTE NM HYD	306.00	-	1	.01532	16.22	1.068	1.30715	1.750	1.655	PER IMP=21.90
ROUTE	306.10	1	3	.01532	16.23	1.068	1.30715	1.750	1.655	
ROUTE	306.20	3	1	.01532	14.66	1.068	1.30715	1.850	1.496	
COMPUTE NM HYD	310.00	-	3	.00981	19.71	.670	1.28134	1.500	3.139	PER IMP=20.10
ADD HYD	310.10	3& 1	5	.02513	21.91	1.738	1.29703	1.500	1.362	
ROUTE	310.20	5	1	.02513	22.01	1.738	1.29706	1.550	1.369	
ADD HYD	310.30	1& 2	3	.87604	557.01	91.377	1.95575	2.300	.993	
ROUTE	310.40	4	5	.01719	33.91	1.139	1.24264	1.500	3.084	
ADD HYD	310.50	5& 3	1	.89322	558.63	92.515	1.94203	2.300	.977	
COMPUTE NM HYD	313.00	-	2	.00787	15.84	.540	1.28564	1.500	3.144	PER IMP=20.40
ADD HYD	313.10	1& 2	3	.90109	559.29	93.055	1.93630	2.300	.970	
ROUTE RESERVOIR	401.03	3	1	.90109	511.95	93.055	1.93630	2.800	.888	AC-FT=7.992
COMPUTE NM HYD	309.00	-	3	.00803	7.00	.579	1.35161	1.900	1.361	PER IMP=25.00
COMPUTE NM HYD	308.00	-	4	.00915	10.41	.785	1.60833	1.800	1.778	PER IMP=42.90
ADD HYD	308.10	3& 4	2	.01718	17.06	1.364	1.48825	1.850	1.552	
ADD HYD	308.20	1& 2	10	.91827	514.30	94.419	1.92792	2.750	.875	
COMPUTE NM HYD	311.00	-	11	.00602	6.75	.529	1.64705	1.800	1.753	PER IMP=45.60
ROUTE	301.10	7	1	.15593	40.50	16.029	1.92732	2.900	.406	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	304.10	8	2	.01527	8.34	1.305	1.60272	2.100	.854	
ROUTE	305.10	9	3	.00402	2.66	.322	1.50086	1.750	1.033	
ADD HYD	301.20	1& 2	4	.17120	44.97	17.334	1.89837	2.850	.410	
ADD HYD	301.30	3& 4	1	.17522	45.93	17.655	1.88925	2.850	.410	
COMPUTE NM HYD	145.00	-	2	.12312	191.40	13.093	1.99392	1.700	2.429	PER IMP=71.60
ADD HYD	145.10	1& 2	3	.29834	214.15	30.748	1.93244	1.700	1.122	
ROUTE	145.20	3	1	.29834	211.18	30.742	1.93206	1.750	1.106	
COMPUTE NM HYD	143.00	-	2	.09431	128.30	7.914	1.57350	1.650	2.126	PER IMP=48.00
COMPUTE NM HYD	144.00	-	3	.02602	51.69	2.354	1.69638	1.550	3.104	PER IMP=50.40
ADD HYD	143.10	1& 2	4	.39265	336.11	38.656	1.84593	1.700	1.338	
ADD HYD	143.20	3& 4	1	.41867	366.90	41.011	1.83664	1.700	1.369	
ROUTE	143.30	1	2	.41867	360.22	41.004	1.83636	1.750	1.344	
COMPUTE NM HYD	141.00	-	1	.03868	76.80	3.246	1.57350	1.500	3.103	PER IMP=48.00
ADD HYD	141.10	1& 2	3	.45735	397.39	44.250	1.81413	1.700	1.358	
COMPUTE NM HYD	140.00	-	1	.09638	129.96	8.088	1.57350	1.650	2.107	PER IMP=48.00
ADD HYD	140.10	1& 3	2	.55373	524.68	52.339	1.77225	1.700	1.481	
ROUTE	140.20	2	1	.55373	443.11	52.317	1.77151	1.800	1.250	
COMPUTE NM HYD	139.00	-	2	.02145	45.00	1.800	1.57350	1.500	3.278	PER IMP=48.00
ADD HYD	139.10	1& 2	3	.57518	457.36	54.117	1.76412	1.800	1.242	
ROUTE	139.20	3	1	.57518	430.61	54.106	1.76378	1.900	1.170	
COMPUTE NM HYD	138.00	-	2	.16332	270.67	13.706	1.57350	1.550	2.590	PER IMP=48.00
ADD HYD	138.10	2& 1	3	.73850	544.08	67.812	1.72169	1.850	1.151	
ROUTE	138.20	3	1	.73850	502.83	67.796	1.72128	1.950	1.064	
COMPUTE NM HYD	129.00	-	2	.39080	606.30	32.796	1.57350	1.600	2.424	PER IMP=48.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	129.10	1& 2	3	1.12930	846.86	100.592	1.67014	1.650	1.172	
COMPUTE NM HYD	136.00	-	1	.08130	117.65	6.823	1.57350	1.600	2.261	PER IMP=48.00
COMPUTE NM HYD	135.00	-	2	.05923	92.74	4.971	1.57350	1.600	2.447	PER IMP=48.00
ADD HYD	135.10	1& 2	4	.14053	210.39	11.793	1.57349	1.600	2.339	
ROUTE RESERVOIR	135.01	4	1	.14053	210.39	11.793	1.57349	1.600	2.339	
ROUTE	135.20	1	2	.14053	94.30	11.790	1.57303	1.900	1.049	
COMPUTE NM HYD	130.00	-	1	.20469	265.09	17.178	1.57350	1.700	2.024	PER IMP=48.00
ADD HYD	130.10	1& 2	4	.34522	342.64	28.967	1.57331	1.700	1.551	
ROUTE	130.20	4	2	.34522	281.96	28.966	1.57324	1.850	1.276	
COMPUTE NM HYD	125.00	-	1	.03679	66.14	3.087	1.57350	1.550	2.809	PER IMP=48.00
ADD HYD	125.10	1& 2	4	.38201	307.04	32.054	1.57327	1.850	1.256	
ADD HYD	125.20	3& 4	1	1.51131	1117.90	132.645	1.64565	1.800	1.156	
COMPUTE NM HYD	124.00	-	2	.04092	60.54	3.434	1.57350	1.600	2.311	PER IMP=48.00
ADD HYD	124.10	2& 1	3	1.55223	1162.43	136.079	1.64375	1.750	1.170	
ROUTE	124.20	3	1	1.55223	1161.78	136.075	1.64370	1.800	1.169	
COMPUTE NM HYD	123.00	-	2	.02504	52.64	2.101	1.57350	1.500	3.285	PER IMP=48.00
COMPUTE NM HYD	122.00	-	3	.13622	197.25	11.432	1.57350	1.600	2.263	PER IMP=48.00
ADD HYD	123.10	1& 2	4	1.57727	1179.05	138.176	1.64259	1.750	1.168	
ADD HYD	123.20	3& 4	1	1.71349	1343.78	149.608	1.63709	1.700	1.225	
ROUTE	123.30	1	2	1.71349	1345.11	149.605	1.63707	1.700	1.227	
COMPUTE NM HYD	121.00	-	1	.02100	41.74	1.629	1.45481	1.500	3.106	PER IMP=42.30
ADD HYD	121.10	1& 2	3	1.73449	1363.71	151.235	1.63486	1.700	1.228	
ROUTE	121.20	3	1	1.73449	1363.91	151.233	1.63485	1.750	1.229	
COMPUTE NM HYD	120.00	-	2	.01176	22.89	.839	1.33817	1.500	3.042	PER IMP=32.20

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	119.00	-	3	.03895	74.01	3.323	1.59952	1.500	2.969	PER IMP=49.40
ADD HYD	119.10	2& 3	4	.05071	96.91	4.162	1.53890	1.500	2.986	
ROUTE	119.20	4	2	.05071	72.57	4.162	1.53891	1.600	2.236	
COMPUTE NM HYD	115.00	-	3	.03760	65.43	2.085	1.03956	1.500	2.719	PER IMP=12.60
ROUTE	115.10	3	4	.03760	65.38	2.085	1.03958	1.500	2.717	
COMPUTE NM HYD	112.00	-	3	.04603	79.27	2.501	1.01863	1.500	2.691	PER IMP=11.50
ADD HYD	112.10	1& 2	5	1.78520	1425.43	155.395	1.63212	1.700	1.248	
ADD HYD	112.20	3& 5	2	1.83123	1460.34	157.896	1.61670	1.700	1.246	
ADD HYD	112.30	4& 2	1	1.86883	1489.34	159.981	1.60509	1.700	1.245	
ROUTE	311.40	11	2	.00602	5.19	.529	1.64703	2.000	1.347	
COMPUTE NM HYD	149.00	-	3	.03482	89.77	4.068	2.19075	1.500	4.028	PER IMP=85.10
ADD HYD	311.10	2& 3	4	.04084	89.96	4.597	2.11057	1.500	3.442	
DIVIDE HYD	311.20	4	2	.01389	30.59	1.563	2.11057	1.500	3.442	
	311.30	AND	3	.02695	59.38	3.034	2.11057	1.500	3.442	
DIVIDE HYD	311.20	3	4	.01348	29.69	1.517	2.11056	1.500	3.442	
	311.20	AND	5	.01348	29.69	1.517	2.11056	1.500	3.442	
ROUTE	311.20	2	3	.01389	30.49	1.563	2.11057	1.500	3.431	
ROUTE	311.20	4	2	.01348	29.57	1.517	2.11057	1.500	3.428	
ROUTE	311.20	5	4	.01348	29.57	1.517	2.11057	1.500	3.428	
ADD HYD	311.30	2& 3	5	.02736	60.06	3.080	2.11051	1.500	3.430	
ADD HYD	311.40	5& 4	2	.04084	89.63	4.597	2.11051	1.500	3.429	
ROUTE	311.30	2	3	.04084	55.86	4.597	2.11056	1.600	2.137	
COMPUTE NM HYD	148.00	-	2	.01588	33.39	1.333	1.57350	1.500	3.286	PER IMP=48.00
ROUTE	148.10	2	4	.01588	33.26	1.333	1.57353	1.500	3.273	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	148.20	4	2	.01588	13.56	1.332	1.57314	1.700	1.334	
COMPUTE NM HYD	147.00	-	4	.00565	11.89	.474	1.57350	1.500	3.288	PER IMP=48.00
ROUTE	147.10	4	5	.00565	11.82	.474	1.57359	1.500	3.270	
ROUTE	147.20	5	4	.00565	5.00	.474	1.57350	1.700	1.384	
COMPUTE NM HYD	146.00	-	5	.05976	99.09	5.512	1.72957	1.600	2.591	PER IMP=56.00
ADD HYD	146.10	2& 3	6	.05672	68.45	5.929	1.96009	1.600	1.886	
ADD HYD	146.20	4& 6	2	.06237	73.23	6.403	1.92504	1.650	1.835	
ADD HYD	146.30	5& 2	3	.12213	172.21	11.916	1.82939	1.600	2.203	
COMPUTE NM HYD	154.00	-	2	.01947	52.79	2.465	2.37421	1.500	4.236	PER IMP=96.70
ROUTE	154.10	2	4	.01947	31.58	2.465	2.37423	1.600	2.535	
COMPUTE NM HYD	153.00	-	2	.00646	15.14	.781	2.26606	1.550	3.661	PER IMP=90.00
ROUTE	153.10	2	5	.00646	6.90	.781	2.26612	1.750	1.670	
COMPUTE NM HYD	152.00	-	2	.07224	103.82	6.278	1.62956	1.650	2.245	PER IMP=54.70
ADD HYD	152.10	2& 4	6	.09171	134.58	8.744	1.78764	1.600	2.293	
ADD HYD	152.20	5& 6	2	.09817	140.81	9.524	1.81912	1.650	2.241	
ROUTE	152.30	2	5	.09817	142.44	9.524	1.81913	1.650	2.267	
ADD HYD	152.40	3& 5	2	.22030	310.39	21.440	1.82481	1.650	2.201	
ROUTE	152.30	10	3	.91827	513.70	94.414	1.92782	2.850	.874	
COMPUTE NM HYD	150.00	-	4	.03482	84.93	3.626	1.95249	1.500	3.811	PER IMP=67.20
ROUTE	150.10	4	5	.03482	61.05	3.626	1.95250	1.600	2.740	
COMPUTE NM HYD	142.00	-	4	.12769	269.42	12.048	1.76912	1.500	3.297	PER IMP=58.80
ADD HYD	142.20	3& 4	6	1.04596	518.50	106.462	1.90844	2.800	.775	
ADD HYD	142.30	5& 6	3	1.08078	520.53	110.088	1.90986	2.750	.753	
ROUTE RESERVOIR	142.01	3	4	1.08078	520.53	110.088	1.90986	2.750	.753	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	142.40	4	3	1.08078	520.17	110.084	1.90980	2.800	.752	
COMPUTE NM HYD	137.00	-	4	.08668	157.25	7.274	1.57350	1.550	2.835	PER IMP=48.00
ADD HYD	137.10	3& 4	5	1.16746	524.08	117.358	1.88483	2.750	.701	
COMPUTE NM HYD	134.00	-	4	.04029	82.28	3.381	1.57350	1.500	3.191	PER IMP=48.00
ADD HYD	134.10	4& 2	6	.26059	371.08	24.821	1.78596	1.600	2.225	
ADD HYD	134.20	6& 5	2	1.42805	864.76	142.180	1.86679	1.600	.946	
ROUTE	134.30	2	3	1.42805	872.47	142.178	1.86676	1.600	.955	
COMPUTE NM HYD	132.00	-	2	.02692	56.60	2.259	1.57350	1.500	3.285	PER IMP=48.00
COMPUTE NM HYD	133.00	-	4	.03939	81.85	3.306	1.57350	1.500	3.247	PER IMP=48.00
ADD HYD	133.10	2& 3	5	1.45497	912.28	144.437	1.86134	1.600	.980	
ADD HYD	133.20	4& 5	2	1.49436	971.25	147.742	1.85375	1.600	1.016	
ROUTE	133.30	2	3	1.49436	955.07	147.739	1.85371	1.600	.999	
COMPUTE NM HYD	151.00	-	2	.02907	62.38	2.579	1.66330	1.500	3.353	PER IMP=55.00
ROUTE	151.10	2	4	.02907	49.30	2.579	1.66332	1.550	2.650	
COMPUTE NM HYD	131.00	-	2	.05707	105.16	3.993	1.31185	1.500	2.879	PER IMP=30.80
ADD HYD	131.10	2& 3	5	1.55143	1036.27	151.732	1.83378	1.600	1.044	
ADD HYD	131.20	4& 5	2	1.58050	1084.70	154.311	1.83064	1.600	1.072	
ROUTE	131.30	2	3	1.58050	1050.10	154.307	1.83060	1.650	1.038	
COMPUTE NM HYD	127.00	-	2	.04370	85.46	3.168	1.35916	1.500	3.056	PER IMP=33.90
ADD HYD	127.10	2& 3	4	1.62420	1097.73	157.475	1.81791	1.650	1.056	
ROUTE	127.20	4	2	1.62420	1092.46	157.473	1.81789	1.650	1.051	
COMPUTE NM HYD	128.00	-	3	.07690	159.88	6.483	1.58068	1.500	3.248	PER IMP=48.00
ROUTE	128.10	3	4	.07690	158.11	6.483	1.58068	1.550	3.212	
COMPUTE NM HYD	126.00	-	3	.07448	133.69	5.662	1.42541	1.550	2.805	PER IMP=37.70

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	126.10	3& 4	5	.15138	291.80	12.145	1.50428	1.550	3.012	
ROUTE	126.20	5	3	.15138	290.61	12.145	1.50429	1.550	3.000	
ADD HYD	126.30	2& 3	4	1.77558	1317.24	169.618	1.79115	1.650	1.159	
COMPUTE NM HYD	118.00	-	2	.06353	112.29	3.674	1.08419	1.500	2.762	PER IMP=15.80
ADD HYD	118.10	2& 4	3	1.83911	1380.78	173.291	1.76673	1.650	1.173	
ROUTE	118.20	3	2	1.83911	1385.51	173.289	1.76671	1.650	1.177	
COMPUTE NM HYD	116.00	-	3	.01678	27.77	.823	.92000	1.500	2.586	PER IMP= 5.00
COMPUTE NM HYD	117.00	-	4	.01804	30.10	.904	.93979	1.500	2.607	PER IMP= 6.30
COMPUTE NM HYD	114.00	-	5	.01552	28.49	.978	1.18201	1.500	2.868	PER IMP=22.20
ADD HYD	114.10	2& 3	6	1.85589	1401.40	174.112	1.75905	1.650	1.180	
ADD HYD	114.20	4& 6	2	1.87393	1418.59	175.017	1.75116	1.650	1.183	
ADD HYD	114.30	5& 2	3	1.88945	1434.62	175.995	1.74649	1.650	1.186	
ROUTE	114.40	3	2	1.88945	1433.63	175.993	1.74647	1.650	1.186	
COMPUTE NM HYD	113.00	-	5	.01992	33.85	1.047	.98515	1.500	2.655	PER IMP= 9.30
ADD HYD	113.10	5& 2	4	1.90937	1452.91	177.039	1.73852	1.650	1.189	
ADD HYD	112.10	1& 4	3	3.77820	2924.54	337.020	1.67252	1.700	1.209	
ROUTE	112.20	3	1	3.77820	2952.18	337.014	1.67249	1.700	1.221	
COMPUTE NM HYD	111.00	-	2	.00906	15.00	.445	.92000	1.500	2.587	PER IMP= 5.00
ADD HYD	111.10	1& 2	3	3.78726	2958.77	337.459	1.67070	1.700	1.221	
ROUTE	111.20	3	1	3.78726	2971.40	337.455	1.67068	1.700	1.226	
COMPUTE NM HYD	110.00	-	2	.04352	77.84	2.590	1.11568	1.500	2.795	PER IMP=17.90
ADD HYD	110.10	1& 2	3	3.83078	3005.77	340.044	1.66437	1.700	1.226	
ROUTE	110.20	3	1	3.83078	3020.72	340.041	1.66435	1.700	1.232	
COMPUTE NM HYD	109.00	-	2	.02638	44.83	1.386	.98515	1.500	2.655	PER IMP=9.30

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	108.00	-	3	.00781	13.04	.391	.93979	1.500	2.608	PER IMP= 6.30
ADD HYD	109.10	1& 2	4	3.85716	3040.43	341.427	1.65971	1.700	1.232	
ADD HYD	109.20	3& 4	1	3.86497	3046.16	341.818	1.65825	1.700	1.231	
ROUTE	109.30	1	2	3.86497	3065.75	341.814	1.65823	1.700	1.239	
COMPUTE NM HYD	107.00	-	1	.02163	35.79	1.061	.92000	1.500	2.585	PER IMP=5.00
ADD HYD	107.10	1& 2	3	3.88660	3081.46	342.876	1.65412	1.700	1.239	
ROUTE	107.20	3	1	3.88660	3100.11	342.869	1.65409	1.700	1.246	
COMPUTE NM HYD	106.00	-	2	.04128	70.14	2.169	.98515	1.500	2.655	PER IMP= 9.30
ADD HYD	106.10	1& 2	3	3.92788	3130.97	345.038	1.64706	1.700	1.245	
ROUTE	106.20	3	1	3.92788	3152.35	345.033	1.64704	1.700	1.254	
COMPUTE NM HYD	105.00	-	2	.02584	43.91	1.358	.98515	1.500	2.655	PER IMP= 9.30
COMPUTE NM HYD	104.00	-	3	.01579	28.25	.940	1.11568	1.500	2.796	PER IMP=17.90
ADD HYD	104.10	2& 3	4	.04163	72.16	2.297	1.03465	1.500	2.708	
ADD HYD	104.20	1& 4	2	3.96951	3184.14	347.330	1.64061	1.700	1.253	
ROUTE	104.30	2	1	3.96951	3229.79	347.326	1.64059	1.700	1.271	
COMPUTE NM HYD	103.00	-	2	.02997	49.99	1.502	.93979	1.500	2.606	PER IMP=6.30
ADD HYD	103.10	1& 2	3	3.99948	3251.75	348.828	1.63534	1.700	1.270	
ROUTE	103.20	3	1	3.99948	3204.75	348.815	1.63528	1.750	1.252	
COMPUTE NM HYD	101.00	-	2	.08444	155.06	5.213	1.15761	1.500	2.869	PER IMP=19.30
COMPUTE NM HYD	102.00	-	3	.02692	48.15	1.602	1.11568	1.500	2.795	PER IMP=17.90
ADD HYD	101.10	1& 2	4	4.08392	3259.13	354.029	1.62541	1.750	1.247	
ADD HYD	101.20	3& 4	10	4.11084	3275.92	355.630	1.62207	1.750	1.245	
COMPUTE NM HYD	509.00	-	4	.04047	65.81	3.396	1.57350	1.600	2.541	PER IMP=48.00
ROUTE RESERVOIR	509.01	4	5	.04047	65.81	3.396	1.57350	1.600	2.541	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	509.10	5	4	.04047	10.00	3.369	1.56079	2.050	.386	
COMPUTE NM HYD	508.00	-	5	.13308	133.97	12.165	1.71390	1.900	1.573	PER IMP=56.40
ADD HYD	508.10	4& 5	6	.17355	143.72	15.533	1.67820	1.900	1.294	
ROUTE	508.20	6	4	.17355	143.82	15.533	1.67819	1.900	1.295	
ROUTE	508.30	4	5	.17355	85.52	15.529	1.67774	2.300	.770	
COMPUTE NM HYD	506.00	-	4	.68388	837.40	61.485	1.68573	1.750	1.913	PER IMP=54.70
ROUTE	506.10	4	6	.68388	838.26	61.485	1.68573	1.750	1.915	
ROUTE	506.20	6	4	.68388	588.87	61.481	1.68563	1.950	1.345	
COMPUTE NM HYD	507.00	-	6	.72551	954.83	64.910	1.67751	1.700	2.056	PER IMP=54.20
ADD HYD	507.10	4& 5	7	.85743	651.63	77.010	1.68404	1.950	1.187	
ADD HYD	507.20	6& 7	4	1.58294	1404.49	141.920	1.68105	1.800	1.386	
ROUTE	507.30	4	6	1.58294	601.69	141.412	1.67503	2.300	.594	
ROUTE	507.40	6	5	1.58294	578.03	141.371	1.67455	2.500	.571	
COMPUTE NM HYD	505.00	-	4	.57826	822.12	52.957	1.71713	1.650	2.221	PER IMP=56.60
ROUTE	505.10	4	6	.57826	822.10	52.957	1.71713	1.650	2.221	
ROUTE	505.20	6	4	.57826	576.82	52.957	1.71713	1.850	1.559	
ADD HYD	505.30	4& 5	6	2.16120	865.37	194.329	1.68595	2.200	.626	
COMPUTE NM HYD	503.00	-	4	.10759	146.82	10.827	1.88681	1.750	2.132	PER IMP=66.80
ADD HYD	503.19	19& 4	4	10.33936	737.32	579.366	1.05066	1.800	.111	
ROUTE	503.10	4	5	10.33936	692.18	576.658	1.04574	1.900	.105	
ADD HYD	503.20	6& 5	4	12.50056	1488.25	770.986	1.15643	1.950	.186	
COMPUTE NM HYD	502.00	-	5	.09216	186.66	10.893	2.21613	1.600	3.165	PER IMP=86.60
ROUTE RESERVOIR	502.01	5	6	.09216	186.66	10.893	2.21613	1.600	3.165	
ROUTE	502.10	6	5	.09216	159.02	10.893	2.21613	1.700	2.696	

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	502.20	5& 4	6	12.59272	1580.73	781.878	1.16418	1.950	.196	
COMPUTE NM HYD	501.00	-	4	.02172	55.59	2.515	2.17101	1.500	3.999	PER IMP=84.20
ROUTE RESERVOIR	501.01	4	5	.02172	55.59	2.515	2.17101	1.500	3.999	
ROUTE	501.10	5	4	.02172	33.51	2.515	2.17103	1.600	2.411	
ADD HYD	501.20	4& 6	5	12.61444	1603.87	784.393	1.16592	1.900	.199	
COMPUTE NM HYD	504.00	-	4	.89619	1124.16	83.793	1.75311	1.750	1.960	PER IMP=58.90
ADD HYD	504.10	4& 5	1	13.51063	2606.13	868.187	1.20487	1.800	.301	
ROUTE RESERVOIR	504.98	1	19	13.51063	345.43	724.753	1.00581	6.500	.040	AC-FT= 230.193
ROUTE	504.99	19	18	13.51063	345.44	724.748	1.00580	6.500	.040	
COMPUTE NM HYD	500.00	-	6	.00628	16.08	.727	2.16935	1.500	4.002	PER IMP=84.00
COMPUTE NM HYD	316.00	-	1	.02386	44.99	1.390	1.09203	1.500	2.946	PER IMP= 6.90
ROUTE RESERVOIR	316.01	1	3	.02386	44.99	1.390	1.09203	1.500	2.946	
ROUTE	316.10	3	1	.02386	44.92	1.390	1.09205	1.500	2.942	
COMPUTE NM HYD	325.00	-	2	.00553	11.57	.415	1.40754	1.500	3.269	PER IMP=28.90
ADD HYD	325.10	1& 2	3	.02939	56.49	1.805	1.15138	1.500	3.003	
DIVIDE HYD	325.20	3	1	.01470	28.25	.902	1.15138	1.500	3.003	
	325.30	AND	2	.01470	28.25	.902	1.15138	1.500	3.003	
ROUTE	325.40	2	3	.01470	27.15	.902	1.15143	1.550	2.887	
ADD HYD	325.50	3& 6	4	.02098	42.84	1.629	1.45615	1.500	3.192	
DIVIDE HYD	325.60	4	3	.01049	21.42	.814	1.45615	1.500	3.192	
	325.60	AND	6	.01049	21.42	.814	1.45615	1.500	3.192	
ROUTE	325.70	6	4	.01049	21.25	.815	1.45621	1.500	3.166	
ROUTE	325.70	3	6	.01049	21.25	.815	1.45621	1.500	3.166	
ADD HYD	325.80	6& 4	2	.02098	42.50	1.629	1.45614	1.500	3.166	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	324.00	-	3	.01196	14.22	.690	1.08199	1.650	1.858	PER IMP= 6.20
ROUTE	324.10	1	4	.01470	20.88	.902	1.15143	1.600	2.220	
ADD HYD	324.20	3& 4	1	.02666	34.48	1.593	1.12023	1.600	2.021	
ADD HYD	324.30	1& 2	3	.04763	73.44	3.221	1.26816	1.550	2.409	
DIVIDE HYD	324.40	3	1	.02382	36.72	1.611	1.26816	1.550	2.409	
	324.40	AND	2	.02382	36.72	1.611	1.26816	1.550	2.409	
ROUTE	324.70	1	5	.02382	37.08	1.611	1.26821	1.550	2.433	
ROUTE	324.80	2	4	.02382	37.08	1.611	1.26821	1.550	2.433	
ADD HYD	324.11	4& 5	2	.04763	74.16	3.222	1.26818	1.550	2.433	
ROUTE	324.50	2	1	.04763	54.44	3.222	1.26821	1.700	1.786	
COMPUTE NM HYD	323.00	-	2	.00343	7.15	.255	1.39320	1.500	3.256	PER IMP=27.90
ROUTE	323.10	2	3	.00343	3.53	.255	1.39334	1.650	1.607	
ADD HYD	323.20	1& 3	2	.05106	57.88	3.476	1.27658	1.650	1.771	
COMPUTE NM HYD	321.00	-	1	.06053	157.93	7.222	2.23704	1.500	4.077	PER IMP=88.20
ADD HYD	321.10	2& 1	3	.11159	186.11	10.698	1.79756	1.500	2.606	
COMPUTE NM HYD	322.00	-	4	.09103	209.83	10.635	2.19046	1.550	3.602	PER IMP=85.30
ADD HYD	322.10	3& 4	2	.20262	395.32	21.333	1.97408	1.500	3.049	
ROUTE	322.20	2	1	.20262	394.51	21.333	1.97408	1.500	3.042	
COMPUTE NM HYD	320.00	-	4	.00482	10.79	.420	1.63271	1.500	3.497	PER IMP=44.60
ADD HYD	320.10	1& 4	12	.20744	405.29	21.752	1.96614	1.500	3.053	
COMPUTE NM HYD	225.00	-	1	.02082	54.04	2.463	2.21770	1.500	4.055	PER IMP=87.00
ROUTE	225.10	1	2	.02082	52.71	2.463	2.21773	1.500	3.956	
COMPUTE NM HYD	223.00	-	1	.01050	27.63	1.269	2.26606	1.500	4.112	PER IMP=90.00
ROUTE RESERVOIR	223.01	1	3	.01050	27.63	1.269	2.26606	1.500	4.112	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
DIVIDE HYD	223.10	3	1	.00525	13.82	.634	2.26603	1.500	4.112	
	223.20	AND	4	.00525	13.82	.634	2.26603	1.500	4.112	
ROUTE	223.30	4	3	.00525	8.95	.635	2.26614	1.600	2.664	
ADD HYD	223.40	3& 2	5	.02607	59.56	3.097	2.22743	1.500	3.570	
ROUTE	223.50	1	2	.00525	7.18	.635	2.26614	1.650	2.137	
COMPUTE NM HYD	224.00	-	4	.02225	58.12	2.658	2.24027	1.500	4.081	PER IMP=88.40
ADD HYD	224.10	4& 5	1	.04832	117.68	5.755	2.23333	1.500	3.805	
ROUTE	322.20	12	3	.20744	413.14	21.752	1.96614	1.550	3.112	
COMPUTE NM HYD	226.00	-	4	.01463	37.55	1.700	2.17902	1.500	4.011	PER IMP=84.60
ADD HYD	226.10	3& 4	4	.22207	446.04	23.453	1.98016	1.550	3.138	
ROUTE RESERVOIR	226.01	4	6	.22207	446.04	23.453	1.98016	1.550	3.138	
ADD HYD	226.20	6& 1	3	.27039	556.02	29.208	2.02541	1.550	3.213	
ROUTE	226.30	3	4	.27039	535.99	29.208	2.02541	1.550	3.097	
ADD HYD	226.40	2& 4	5	.27564	542.22	29.842	2.02999	1.550	3.074	
COMPUTE NM HYD	222.00	-	4	.08660	195.76	9.564	2.07067	1.500	3.532	PER IMP=77.80
ADD HYD	222.10	5& 4	2	.36224	735.41	39.406	2.03971	1.550	3.172	
COMPUTE NM HYD	221.00	-	4	.06353	150.76	6.487	1.91459	1.500	3.708	PER IMP=68.00
ADD HYD	221.10	2& 4	1	.42577	868.48	45.893	2.02104	1.550	3.187	
ROUTE	221.20	1	2	.42577	829.35	45.893	2.02104	1.600	3.044	
COMPUTE NM HYD	220.00	-	1	.05896	123.94	4.948	1.57350	1.500	3.285	PER IMP=48.00
ADD HYD	220.10	1& 2	3	.48473	916.52	50.841	1.96660	1.600	2.954	
COMPUTE NM HYD	219.00	-	1	.07179	150.92	6.025	1.57350	1.500	3.285	PER IMP=48.00
ADD HYD	219.10	1& 3	2	.55652	1030.65	56.866	1.91589	1.550	2.894	
ROUTE	219.20	2	3	.55652	1007.35	56.866	1.91589	1.600	2.828	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	218.00	-	4	.05788	121.67	4.857	1.57350	1.500	3.285	PER IMP=48.00
ADD HYD	218.10	3& 4	1	.61440	1092.92	61.723	1.88364	1.600	2.779	
COMPUTE NM HYD	216.00	-	4	.01310	27.55	1.099	1.57350	1.500	3.286	PER IMP=48.00
ROUTE	216.10	4	2	.01310	21.84	1.099	1.57354	1.550	2.605	
COMPUTE NM HYD	217.00	-	3	.02827	59.43	2.372	1.57350	1.500	3.285	PER IMP=48.00
ADD HYD	217.10	3& 2	4	.04137	77.87	3.472	1.57348	1.500	2.941	
COMPUTE NM HYD	215.00	-	3	.02934	61.68	2.462	1.57350	1.500	3.285	PER IMP=48.00
ADD HYD	215.10	3& 4	2	.07071	139.55	5.934	1.57349	1.500	3.084	
ADD HYD	215.20	1& 2	3	.68511	1199.90	67.657	1.85163	1.600	2.737	
ROUTE	215.30	3	1	.68511	1170.31	67.657	1.85163	1.650	2.669	
COMPUTE NM HYD	214.00	-	4	.03392	71.31	2.847	1.57350	1.500	3.285	PER IMP=48.00
ADD HYD	214.10	4& 1	2	.71903	1213.27	70.504	1.83851	1.600	2.637	
COMPUTE NM HYD	211.00	-	1	.02593	54.51	2.176	1.57350	1.500	3.285	PER IMP=48.00
COMPUTE NM HYD	212.00	-	3	.02755	57.92	2.312	1.57350	1.500	3.285	PER IMP=48.00
ADD HYD	212.10	1& 3	4	.05348	112.44	4.488	1.57349	1.500	3.285	
ROUTE	212.20	4	1	.05348	107.47	4.488	1.57352	1.550	3.140	
COMPUTE NM HYD	213.00	-	3	.00817	17.19	.686	1.57350	1.500	3.287	PER IMP=48.00
ADD HYD	213.10	3& 1	4	.06165	122.92	5.174	1.57350	1.500	3.115	
ADD HYD	213.20	2& 4	1	.78068	1315.66	75.677	1.81758	1.600	2.633	
ROUTE	213.40	1	2	.78068	1310.99	75.677	1.81758	1.650	2.624	
COMPUTE NM HYD	210.00	-	1	.04379	92.05	3.675	1.57350	1.500	3.285	PER IMP=48.00
ADD HYD	210.10	1& 2	3	.82447	1374.42	79.352	1.80462	1.600	2.605	
COMPUTE NM HYD	209.00	-	1	.01777	37.36	1.491	1.57350	1.500	3.285	PER IMP=48.00
COMPUTE NM HYD	207.00	-	2	.01669	29.19	1.013	1.13769	1.500	2.733	PER IMP=23.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	207.10	1& 2	4	.03446	66.56	2.504	1.36240	1.500	3.018	
ROUTE	207.20	4	1	.03446	65.02	2.504	1.36243	1.500	2.948	
COMPUTE NM HYD	208.00	-	2	.00314	6.61	.264	1.57350	1.500	3.291	PER IMP=48.00
ADD HYD	208.10	1& 2	4	.03760	71.63	2.767	1.38003	1.500	2.977	
ADD HYD	208.20	4& 3	1	.86207	1430.83	82.120	1.78610	1.600	2.593	
ROUTE	208.30	1	2	.86207	1439.77	82.120	1.78610	1.650	2.610	
COMPUTE NM HYD	206.00	-	5	.01983	27.53	.812	.76800	1.500	2.169	PER IMP=5.00
COMPUTE NM HYD	205.00	-	1	.01974	27.41	.809	.76800	1.500	2.169	PER IMP=5.00
COMPUTE NM HYD	204.00	-	3	.00763	10.60	.313	.76800	1.500	2.171	PER IMP=5.00
ADD HYD	204.10	1& 3	4	.02737	38.01	1.121	.76798	1.500	2.170	
ROUTE	204.20	4	1	.02737	35.79	1.121	.76801	1.550	2.043	
COMPUTE NM HYD	203.00	-	3	.00960	13.33	.393	.76800	1.500	2.170	PER IMP=5.00
ADD HYD	203.10	1& 3	4	.03697	48.28	1.514	.76798	1.550	2.041	
ADD HYD	203.20	4& 5	1	.05680	74.07	2.326	.76798	1.550	2.038	
ROUTE	203.30	1	3	.05680	73.33	2.327	.76800	1.550	2.017	
COMPUTE NM HYD	202.00	-	1	.03805	87.86	3.707	1.82672	1.500	3.608	PER IMP=62.50
ADD HYD	202.10	1& 2	4	.90012	1487.61	85.827	1.78781	1.650	2.582	
ADD HYD	202.20	4& 3	1	.95692	1545.40	88.153	1.72728	1.650	2.523	
ROUTE	202.30	1	2	.95692	1567.78	88.153	1.72728	1.650	2.560	
COMPUTE NM HYD	201.00	-	1	.03518	61.53	1.978	1.05411	1.500	2.733	PER IMP=13.70
COMPUTE NM HYD	200.00	-	3	.05438	102.49	3.329	1.14770	1.500	2.945	PER IMP=14.00
ADD HYD	200.10	1& 2	4	.99210	1602.65	90.131	1.70341	1.650	2.524	
ADD HYD	200.20	3& 4	12	1.04648	1659.99	93.459	1.67453	1.650	2.479	
ADD HYD	200.30	12&10	1	5.15732	4687.92	449.090	1.63271	1.750	1.420	

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE = WG_DMP.DAT USER NO. = STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE RESERVOIR	200.03	1	2	5.15732	75.87	349.037	1.26896	7.000	.023	AC-FT=345.673
*S *LH USED IN AMOLE DMP										
*S ROUTE THRU RAISED DAM WITH NO EMERGENCY SPILLWAY FLOWING										
*S this is as-built topography from filing sheet + raised										
ROUTE RESERVOIR	WG_DMP.HYD	1	2	5.15732	73.47	170.999	.62169	7.350	.022	AC-FT=346.738
ROUTE RESERVOIR	200.03	1	2	5.15732	75.87	349.031	1.26894	7.000	.023	AC-FT=345.682
ROUTE RESERVOIR	200.03	1	2	5.15732	51.64	233.944	.85053	12.000	.016	AC-FT=362.336
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/11/1998
INPUT FILE = PL_DMP1.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE

```
START                                                                          TIME=.00
*S
*S      POWERLINE CHANNEL
*S      WITH MANAGEMENT PLAN IN PLACE
*S
*S
*S 100-YR, 24-HR STORM
*S FILE NAME: PL_DMP1.DAT
*S BY: RICHARD STOCKTON   PEER REVIEWED BY: CLINT DODGE
*S LAST REVISION: 05-11-98
*S*****************************************************************************
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM THE POWERLINE
*S WATERSHED.  FLOW FROM THIS BASIN IS CONVEYED TO THE AMOLE DETENTION FACILITY
*S VIA THE AMOLE ARROYO.  BASIN BOUNDARIES WERE DETERMINED FROM NOVEMBER 1995
*S AERIAL, TOPOGRAPHICAL MAPS AND PREVIOUS STUDIES.
*S
*S*********************************************************************
*S ANALYSIS ASSUMPTIONS:
*S*********************************************************************
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.
*S
*S 2. THE PUNCH HYD COMMAND WAS ADDED TO THE END OF THIS FILE SO THE OUTFALL
*S    HYDROGRAPH COULD BE USED IN THE AMOLE ARROYO ALTERNATIVE ANALYSIS MODEL
*S    AA_DMP.DAT, WHICH WILL BE USED IN THE ANALYSIS OF THE AMOLE/HUBBLE
*S    LAKE DETENTION SYSTEM.
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AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994          RUN DATE (MON/DAY/YR) =05/11/1998
INPUT FILE = PL_DMP1.DAT                                                                   USER NO.= STOCKTON.S94

                                 FROM TO                    PEAK        RUNOFF                TIME TO   CFS        PAGE = 1
                   HYDROGRAPH    ID   ID        AREA      DISCHARGE     VOLUME      RUNOFF    PEAK      PER
COMMAND          IDENTIFICATION  NO.  NO.     (SQ MI)      (CFS)       (AC-FT)    (INCHES)  (HOURS)   ACRE

*S
*S 3. NO BULKING FACTOR HAS BEEN ADDED SINCE SEDIMENT PONDS HAVE BEEN INCLUDED.
*S
*S 4. BASINS 10001 TO 10005 HAVE BEEN DELETED FROM THE EXISTING CONDITIONS MODEL
*S    BY THE PROPOSED I-40 DIVERSION CHANNEL...
*S
*S 5. THE DETENTION TIMES IN THIS RUN ARE VERY LONG.  SO A DT=0.15 WAS USED
*S    FOR THIS RUN.  THE MODIFY TIME COMMAND WAS ADDED AT THE END OF THIS RUN
*S    TO CONVERT THE TIME STEP TO 0.05 HRS FOR USE IN THE SUBSEQUENT MODELS.
*S
*S*************************************************************************
*S
*S  THE TOTAL VOLUME FROM THIS RUN IS 98.086 AF.  THE TOTAL VOLUME INDICATED
*S  IN HYD=PL_DMP1.HYD=42.699 AF, HAS A TRUNCATED VOLUME OF 55.387 AF.  THEREFOR
*S  THE TRUNCATED VOLUME OF 55.4 AF SHOULD BE ADDED TO SUBSEQUENT RUNS TO
*S  OBTAIN THE TOTAL VOLUME.
*S
*S*************************************************************************
*S
*S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL  TYPE= 2                                                                                          RAIN24=2.660
*S CALCULATE THE FLOW FROM SUB-BASIN 10006.
COMPUTE NM HYD      10006.00   -     2        .28340       576.57      25.248      1.67040    1.500    3.179 PER IMP=56.00
*S ROUTE FLOW FROM SUB-BASIN 10006.5 THROUGH 2-12'x6' RCB UNDER CENTRAL.
*S NOTE: THE HYDRAULIC PROPERTIES OF 2-12'x6' RCB IS APPROXIMATELY THE
*S SAME AS A 169" DIA PIPE.
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AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/11/1998
INPUT FILE = PL_DMP1.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	10006.60	2	11	.28340	583.71	25.248	1.67041	1.500	3.218	
*S CALCULATE THE FLOW FROM SUB-BASIN 10007.										
COMPUTE NM HYD	10007.00	-	2	.04780	103.28	4.833	1.89576	1.500	3.376	PER IMP=70.00
*S ROUTE FLOW FROM SUB-BASIN 10007 THROUGH 8'x4' RCB UNDER CENTRAL.										
*S NOTE: THE HYDRAULIC PROPERTIES OF 8'x4' RCB IS APPROXIMATELY THE										
*S SAME AS A 81" DIA PIPE.										
ROUTE	10007.50	2	5	.04780	106.27	4.833	1.89580	1.500	3.474	
*S ROUTE FLOW FROM SUB-BASIN 10007.5 TO 200 FEET SOUTH OF CENTRAL AND										
*S POWERLINE CHANNEL.										
ROUTE	10007.60	5	12	.04780	85.25	4.833	1.89583	1.650	2.787	
*S CALCULATE THE FLOW FROM SUB-BASIN 10008.										
COMPUTE NM HYD	10008.00	-	2	.02150	32.66	1.300	1.13397	1.500	2.374	PER IMP=30.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 10006.6 TO THE FLOW FROM SUB-BASIN 10008.										
ADD HYD	10008.10	11& 2	3	.30490	616.37	26.548	1.63259	1.500	3.159	
*S ROUTE FLOW FROM SUB-BASIN 10008.1 DOWN POWERLINE CHANNEL										
*S THROUGH SUB-BASIN 10009, 200 FEET SOUTH OF CENTRAL.										
ROUTE	10008.50	3	11	.30490	631.67	26.548	1.63259	1.500	3.237	
*S ADD THE ROUTED FLOW FROM SUB-BASIN 10007.6 TO THE ROUTED FLOW										
*S FROM SUB-BASIN 10008.5										
*S HYD=10008.2 IS *****AP 11*****										
ADD HYD	10008.20	12&11	3	.35270	716.08	31.381	1.66826	1.500	3.172	
*S ROUTE FLOW FROM SUB-BASIN 10008.2 DOWN POWERLINE CHANNEL										
*S THROUGH SUB-BASIN 10009, TO SEDIMENT BASIN ENTRANCE.										
ROUTE	10008.60	3	11	.35270	715.61	31.381	1.66827	1.500	3.170	
*S CALCULATE THE FLOW FROM SUB-BASIN 10009.										
COMPUTE NM HYD	10009.00	-	2	.08150	174.01	8.131	1.87074	1.500	3.336	PER IMP=69.00

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/11/1998
INPUT FILE = PL_DMP1.DAT USER NO.= STOCKTON.S94

PAGE = 1

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
*S ADD THE ROUTED FLOW FROM SUB-BASIN 10008.6 TO THE FLOW FROM										
*S SUB-BASIN 10009, FLOW ENTERS INTO SED BASIN.										
*S HYD NO. 10009.1 IS ******* AP 12 ******										
ADD HYD	10009.10	11& 2	3	.43420	889.62	39.513	1.70627	1.500	3.201	
*S CALCULATE THE FLOW FROM SUB-BASIN 10010.										
COMPUTE NM HYD	10010.00	-	2	.05910	122.73	5.656	1.79454	1.500	3.245	PER IMP=65.00
*S ADD THE FLOW FROM SUB-BASIN 10010 TO THE COMBINED FLOW IN THE SED BASIN.										
ADD HYD	10010.10	2& 3	3	.49330	1012.35	45.169	1.71684	1.500	3.207	
*S CALCULATE THE FLOW FROM SUB-BASIN 10011.										
COMPUTE NM HYD	10011.00	-	2	.12400	231.90	9.370	1.41681	1.500	2.922	PER IMP=41.00
*S ADD THE FLOW FROM SUB-BASIN 10011 TO THE COMBINED FLOW IN THE SED BASIN.										
ADD HYD	10011.10	2& 3	3	.61730	1244.26	54.539	1.65657	1.500	3.149	
*S CALCULATE THE FLOW FROM SUB-BASIN 10012.										
COMPUTE NM HYD	10012.00	-	2	.04890	90.72	3.679	1.41058	1.500	2.899	PER IMP=41.00
*S ADD THE FLOW FROM SUB-BASIN 10012 TO THE COMBINED FLOW IN THE SED BASIN.										
ADD HYD	10011.10	2& 3	3	.66620	1334.97	58.218	1.63852	1.500	3.131	
*S ROUTE TOTAL FLOW THROUGH SEDIMENTATION BASIN. LIMIT DISCHARGE TO 20CFS										
ROUTE RESERVOIR	10012.80	3	8	.66620	18.98	58.161	1.63692	2.850	.045	AC-FT=44.897
*S HYD NO. 10012.8 IS ******* AP 13 ******										
*S ROUTE OUTFLOW FROM SED BASIN DOWN POWERLINE CHANNEL THROUGH SUB-BASIN 10013.										
ROUTE	10012.60	8	11	.66620	18.98	58.160	1.63690	3.000	.045	
*S CALCULATE THE FLOW FROM SUB-BASIN 10013.										
COMPUTE NM HYD	10013.00	-	2	.09380	178.79	7.416	1.48236	1.500	2.978	PER IMP=45.00
*S ADD THE ROUTE FLOW FROM SUB-BASIN 10012.6 TO THE FLOW FROM SUB-BASIN 10013.										
ADD HYD	10013.10	11& 2	3	.76000	186.71	65.576	1.61782	1.500	.384	
*S ROUTE TOTAL FLOW THROUGH LINEAR POND. LIMIT DISCHARGE TO 20CFS										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/11/1998
INPUT FILE = PL_DMP1.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE RESERVOIR	POND.13	3	8	.76000	19.09	64.834	1.59952	7.950	.039	AC-FT=6.679
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 10013.1 DOWN POWERLINE CHANNEL										
*S THROUGH SUB-BASIN 10014.										
ROUTE	10013.50	8	11	.76000	19.09	64.830	1.59943	7.950	.039	
*S CALCULATE THE FLOW FROM SUB-BASIN 10014.										
COMPUTE NM HYD	10014.00	-	2	.08610	158.64	6.341	1.38092	1.500	2.879	PER IMP=39.00
*S ADD THE ROUTE FLOW FROM SUB-BASIN 10013.5 TO THE FLOW FROM SUB-BASIN 10014.										
ADD HYD	10014.10	11& 2	3	.84610	159.87	71.171	1.57720	1.500	.295	
*S CALCULATE THE FLOW FROM SUB-BASIN 10015.										
COMPUTE NM HYD	10015.00	-	2	.09760	192.48	8.155	1.56668	1.500	3.081	PER IMP=49.00
*S ADD THE ROUTE FLOW FROM SUB-BASIN 10014.5 TO THE FLOW FROM SUB-BASIN 10015.										
ADD HYD	10015.10	3& 2	4	.94370	352.35	79.327	1.57611	1.500	.583	
*S ROUTE FLOW THROUGH POND										
ROUTE RESERVOIR	POND.15	4	3	.94370	19.37	78.687	1.56341	15.300	.032	AC-FT=13.118
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 10015.1 DOWN POWERLINE CHANNEL										
*S THROUGH SUB-BASIN 10016.										
ROUTE	10015.50	3	11	.94370	19.37	78.681	1.56327	15.300	.032	
*S CALCULATE THE FLOW FROM SUB-BASIN 10016.										
COMPUTE NM HYD	10016.00	-	2	.09900	186.08	7.576	1.43476	1.500	2.937	PER IMP=42.00
*S ADD THE ROUTE FLOW FROM SUB-BASIN 10015.5 TO THE FLOW FROM SUB-BASIN 10016.										
ADD HYD	10016.10	11& 2	3	1.04270	190.55	86.256	1.55107	1.500	.286	
*S ROUTE FLOW THROUGH POND										
ROUTE RESERVOIR	POND.16	3	8	1.04270	19.55	85.855	1.54386	24.000	.029	AC-FT=7.099
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 10016.1 DOWN POWERLINE CHANNEL										
*S THROUGH SUB-BASIN 10017.										
ROUTE	10016.50	8	11	1.04270	19.55	85.848	1.54373	24.000	.029	

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/11/1998
INPUT FILE = PL_DMP1.DAT USER NO.= STOCKTON.S94

PAGE = 1

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
*S CALCULATE THE FLOW FROM SUB-BASIN 10017.										
COMPUTE NM HYD	10017.00	-	2	.09600	162.65	5.996	1.17116	1.500	2.647	PER IMP=28.00
*S ADD THE ROUTE FLOW FROM SUB-BASIN 10016.5 TO THE FLOW FROM SUB-BASIN 10017.										
ADD HYD	10017.10	11& 2	3	1.13870	167.61	91.844	1.51232	1.500	.230	
*S ROUTE FLOW THROUGH POND										
ROUTE RESERVOIR	POND.17	3	8	1.13870	19.50	91.444	1.50572	26.250	.027	AC-FT=6.009
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 10017.1 THRU SUB-BASIN 10018										
ROUTE	10017.50	8	11	1.13870	19.50	91.428	1.50547	26.400	.027	
*S CALCULATE THE FLOW FROM SUB-BASIN 10018.										
COMPUTE NM HYD	10018.00	-	2	.06600	105.49	4.434	1.25959	1.500	2.497	PER IMP=34.00
*S ADD THE ROUTE FLOW FROM SUB-BASIN 10017.5 TO THE FLOW FROM SUB-BASIN 10018.										
*S HYD NO. 10018.1 IS ***** AP 14 *****										
ADD HYD	10018.10	11& 2	3	1.20470	109.12	95.862	1.49200	1.500	.142	
*S ROUTE FLOW THROUGH POND										
ROUTE RESERVOIR	POND.18	3	8	1.20470	19.36	95.262	1.48267	35.550	.025	AC-FT=6.719
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 10018.1 DOWN POWERLINE CHANNEL										
*S TO THE AMOLE ARROYO (AP 02).										
ROUTE	PL_DMP1.HYD	8	11	1.20470	19.36	95.246	1.48241	35.550	.025	
MODIFY TIME	PL_DMP1.HYD	11	11	1.20470	19.36	42.699	.66457	29.950	.025	
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
START										TIME=.00
*S										
*S	SNOW VISTA									
*S	WITH MANAGEMENT PLAN IN PLACE									
*S										
*S										
*S 100-YR, 24-HR STORM WITH NO SEDIMENT**										
*S FILE NAME : SV_DMP1.DAT										
*S BY: TOM BLAINE AND RICHARD STOCKTON/K. JACOBSEN										
*S LAST REVISION: 06-08-99 (PIPE FOR POND.71 CHANGED AND HYD=400)										
*S100 YEAR 24HR STORM DEVELOPED CONDITION										
RAINFALL TYPE= 2										RAIN24=2.660
COMPUTE NM HYD	100.00	-	2	.13520	340.82	15.597	2.16311	1.500	3.939	PER IMP=85.00
ROUTE RESERVOIR	100.10	2	5	.13520	111.60	15.611	2.16501	1.850	1.290	AC-FT=4.075
ROUTE	100.20	5	3	.13520	112.75	15.611	2.16502	1.400	1.303	
ROUTE	100.30	3	10	.13520	114.14	15.611	2.16502	1.450	1.319	
COMPUTE NM HYD	110.00	-	2	.07170	181.36	8.272	2.16311	1.500	3.952	PER IMP=85.00
ROUTE RESERVOIR	110.10	2	5	.07170	59.19	8.377	2.19060	2.600	1.290	AC-FT=.001
ROUTE	110.20	5	11	.07170	61.29	8.377	2.19061	1.400	1.336	
COMPUTE NM HYD	120.00	-	2	.04030	101.99	4.649	2.16311	1.500	3.954	PER IMP=85.00
ROUTE RESERVOIR	120.10	2	5	.04030	33.30	4.654	2.16525	1.850	1.291	AC-FT= 1.219
ADD HYD	120.20	11& 5	12	.11200	94.58	13.031	2.18148	1.400	1.319	
ROUTE	120.30	12	11	.11200	95.88	13.031	2.18148	1.400	1.338	
COMPUTE NM HYD	130.00	-	2	.03770	95.41	4.349	2.16311	1.500	3.954	PER IMP=85.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE RESERVOIR	130.10	2	5	.03770	31.10	4.349	2.16310	1.850	1.289	AC-FT=1.142
ADD HYD	130.20	11& 5	12	.14970	126.97	17.380	2.17685	1.400	1.325	
ADD HYD	130.30	10&12	12	.28490	238.38	32.991	2.17123	1.450	1.307	
ROUTE	130.40	12	90	.28490	241.75	32.991	2.17124	1.450	1.326	
COMPUTE NM HYD	140.00	-	2	.04300	105.07	4.718	2.05746	1.500	3.818	PER IMP=79.00
ROUTE RESERVOIR	140.10	2	5	.04300	35.50	4.739	2.06628	1.800	1.290	AC-FT=1.198
ROUTE	140.20	5	11	.04300	36.97	4.739	2.06630	1.400	1.343	
COMPUTE NM HYD	150.00	-	2	.02420	55.95	2.451	1.89898	1.500	3.612	PER IMP= 70.00
ROUTE RESERVOIR	150.10	2	5	.02420	19.99	2.456	1.90318	1.800	1.291	AC-FT=.589
ADD HYD	150.20	11& 5	12	.06720	56.96	7.195	2.00755	1.400	1.324	
COMPUTE NM HYD	170.00	-	70	.02853	65.96	2.889	1.89898	1.500	3.612	PER IMP=70.00
ROUTE RESERVOIR	150.10	70	5	.02853	23.61	2.893	1.90140	1.800	1.293	AC-FT=.693
ADD HYD	170.20	12& 5	12	.09573	80.56	10.088	1.97591	1.400	1.315	
ROUTE	150.30	12	11	.09573	83.24	10.088	1.97592	1.400	1.359	
COMPUTE NM HYD	160.00	-	2	.02170	50.17	2.198	1.89898	1.500	3.612	PER IMP=70.00
ROUTE RESERVOIR	160.10	2	5	.02170	15.89	2.198	1.89896	1.850	1.144	AC-FT=.888
ADD HYD	160.20	11& 5	12	.11743	94.99	12.286	1.96168	1.850	1.264	
ROUTE	170.40	12	11	.11743	94.99	12.286	1.96169	1.850	1.264	
COMPUTE NM HYD	180.00	-	2	.02810	64.96	2.846	1.89898	1.500	3.612	PER IMP=70.00
ROUTE RESERVOIR	180.10	2	5	.02810	23.20	2.854	1.90432	1.800	1.290	AC-FT=.684
ADD HYD	180.20	11& 5	10	.14553	118.19	15.140	1.95061	1.850	1.269	
ROUTE	180.30	10	11	.14553	118.20	15.140	1.95061	1.850	1.269	
COMPUTE NM HYD	190.00	-	2	.03130	79.22	3.611	2.16311	1.500	3.955	PER IMP=85.00
ROUTE RESERVOIR	190.10	2	5	.03130	25.80	3.611	2.16310	1.850	1.288	AC-FT=.950

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	190.00	90& 5	1	.31620	267.54	36.602	2.17043	1.450	1.322	
ROUTE	190.20	1	10	.31620	271.17	36.602	2.17043	1.450	1.340	
ADD HYD	190.30	11&10	12	.46173	380.80	51.742	2.10114	1.450	1.289	
COMPUTE NM HYD	200.00	-	2	.02520	49.60	2.074	1.54349	1.500	3.075	PER IMP=52.00
*S THE VOLUME FROM 200.1 IS THE SNOW VISTA POND VOLUME UNDER DEV. COND.										
*S HYD=200.1 IS *****AP 21.1*****										
ADD HYD	200.10	2&12	10	.48693	423.42	53.816	2.07228	1.450	1.359	
ROUTE RESERVOIR	200.20	10	3	.48693	387.71	53.814	2.07218	2.000	1.244	AC-FT=6.455
*S HYD=200.2 IS *****AP 21*****										
MODIFY TIME	200.20	3	3	.48693	388.53	53.814	2.07218	1.950	1.247	
*S BEGIN ONSITE WATERSHED										
COMPUTE NM HYD	210.00	-	2	.00920	20.66	.871	1.77514	1.500	3.509	PER IMP=61.00
ADD HYD	210.10	3& 2	10	.49613	393.57	54.685	2.06667	1.900	1.239	
ROUTE	210.20	10	11	.49613	393.76	54.684	2.06663	1.950	1.240	
COMPUTE NM HYD	220.00	-	2	.00800	17.97	.757	1.77514	1.500	3.510	PER IMP=61.00
ADD HYD	220.10	11& 2	10	.50413	397.90	55.441	2.06200	1.950	1.233	
ROUTE	220.20	10	11	.50413	397.80	55.440	2.06198	1.900	1.233	
COMPUTE NM HYD	230.00	-	2	.00940	21.11	.890	1.77514	1.500	3.509	PER IMP=61.00
ADD HYD	230.10	11& 2	10	.51353	403.48	56.330	2.05673	1.850	1.228	
ROUTE	230.20	10	11	.51353	404.02	56.330	2.05670	1.900	1.229	
COMPUTE NM HYD	240.00	-	2	.01450	32.56	1.373	1.77514	1.500	3.509	PER IMP=61.00
*S END ONSITE WATERSHED										
ADD HYD	240.10	11& 2	10	.52803	412.58	57.702	2.04897	1.800	1.221	
COMPUTE NM HYD	250.00	-	2	.00220	5.04	.201	1.71016	1.500	3.582	PER IMP=50.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	250.10	10& 2	11	.53023	414.22	57.903	2.04756	1.800	1.221	
COMPUTE NM HYD	260.00	-	2	.01570	34.01	1.443	1.72289	1.500	3.385	PER IMP=60.00
ROUTE	260.10	2	15	.01570	32.36	1.443	1.72292	1.550	3.221	
COMPUTE NM HYD	270.00	-	2	.01020	20.61	.841	1.54680	1.500	3.157	PER IMP=50.00
ADD HYD	270.10	15& 2	16	.02590	52.62	2.284	1.65352	1.500	3.175	
DIVIDE HYD	270.20	16	15	.02035	25.79	1.795	1.65352	1.500	1.980	
	270.30	AND	3	.00555	26.84	.489	1.65352	1.500	7.556	
ROUTE	270.40	3	16	.00555	24.11	.489	1.65360	1.550	6.788	
COMPUTE NM HYD	280.00	-	2	.00220	5.42	.243	2.07506	1.500	3.850	PER IMP=80.00
ADD HYD	280.10	16& 2	17	.00775	28.88	.733	1.77310	1.550	5.821	
ADD HYD	280.20	17&11	10	.53798	419.19	58.636	2.04361	1.750	1.217	
ROUTE	280.30	10	11	.53798	419.02	58.632	2.04348	1.750	1.217	
COMPUTE NM HYD	290.00	-	2	.00670	12.00	.421	1.17900	1.500	2.799	PER IMP=25.00
ADD HYD	290.10	11& 2	10	.54468	424.08	59.053	2.03284	1.700	1.217	
COMPUTE NM HYD	300.00	-	2	.07090	179.34	8.179	2.16311	1.500	3.952	PER IMP=85.00
ROUTE RESERVOIR	300.10	2	5	.07090	58.60	8.192	2.16634	1.850	1.291	AC-FT=2.142
ROUTE	300.20	5	11	.07090	58.59	8.192	2.16636	2.350	1.291	
COMPUTE NM HYD	310.00	-	2	.08640	214.61	9.724	2.11028	1.500	3.881	PER IMP=82.00
ROUTE RESERVOIR	310.10	2	5	.08640	71.30	9.826	2.13237	1.800	1.289	AC-FT=2.505
ADD HYD	310.20	11& 5	12	.15730	129.89	18.018	2.14769	2.300	1.290	
ROUTE	310.30	12	11	.15730	129.89	18.018	2.14769	2.300	1.290	
ROUTE	310.40	11	13	.15730	129.89	18.018	2.14769	2.350	1.290	
COMPUTE NM HYD	320.00	-	2	.05470	122.45	5.283	1.81093	1.500	3.498	PER IMP=65.00
ROUTE RESERVOIR	320.10	2	5	.05470	16.32	5.206	1.78457	2.100	.466	AC-FT=3.035

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	320.20	5	11	.05470	16.32	5.205	1.78432	2.150	.466	
COMPUTE NM HYD	330.00	-	2	.02380	53.29	2.299	1.81093	1.500	3.498	PER IMP=65.00
ADD HYD	330.10	11& 2	12	.07850	63.27	7.504	1.79239	1.500	1.259	
ADD HYD	330.20	12&13	14	.23580	190.99	25.522	2.02940	1.500	1.266	
ROUTE	330.30	14	12	.23580	189.79	25.521	2.02938	1.550	1.258	
ROUTE	330.40	12	11	.23580	190.04	25.521	2.02933	1.550	1.259	
ROUTE	330.50	15	17	.02035	25.49	1.795	1.65356	1.550	1.957	
ROUTE	330.60	17	16	.02035	25.11	1.795	1.65356	1.550	1.928	
COMPUTE NM HYD	340.00	-	2	.01550	31.31	1.279	1.54680	1.500	3.156	PER IMP=50.00
ADD HYD	340.10	16& 2	15	.03585	55.01	3.073	1.60737	1.500	2.398	
ROUTE	340.20	15	16	.03585	54.76	3.073	1.60739	1.500	2.387	
ROUTE	340.30	16	15	.03585	54.42	3.073	1.60739	1.500	2.372	
COMPUTE NM HYD	350.00	-	2	.04830	97.54	3.985	1.54680	1.500	3.155	PER IMP=50.00
ADD HYD	350.10	15& 2	16	.08415	151.96	7.058	1.57260	1.500	2.822	
ROUTE	350.20	16	15	.08415	151.86	7.058	1.57261	1.500	2.820	
ROUTE	350.30	15	16	.08415	150.38	7.058	1.57261	1.500	2.792	
COMPUTE NM HYD	360.00	-	2	.02080	42.01	1.716	1.54680	1.500	3.156	PER IMP=50.00
ADD HYD	360.10	16& 2	15	.10495	192.40	8.774	1.56748	1.500	2.864	
ADD HYD	360.20	15&11	17	.34075	379.27	34.295	1.88709	1.500	1.739	
ROUTE	360.30	17	16	.34075	377.82	34.295	1.88708	1.500	1.732	
ADD HYD	360.40	16&10	15	.88543	741.01	93.348	1.97675	1.600	1.308	
COMPUTE NM HYD	370.00	-	2	.01830	36.97	1.510	1.54680	1.500	3.156	PER IMP=50.00
ROUTE RESERVOIR	370.10	2	5	.01830	6.64	1.510	1.54678	2.050	.567	AC-FT=.768

*S HYD=AP22 IS *****AP 22*****

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	AP22	5&15	22	.90373	747.11	94.857	1.96804	1.600	1.292	
ROUTE	100.00	22	88	.90373	752.81	94.856	1.96801	1.600	1.302	
*S COMPUTE HYD FOR BASIN 301.61										
COMPUTE NM HYD	301.61	-	61	.03590	84.71	3.399	1.77514	1.500	3.687	PER IMP=61.00
*S ROUTE ID=61 THROUGH POND.61										
ROUTE RESERVOIR	.61	61	1	.03590	26.35	3.411	1.78163	1.750	1.147	AC-FT= 1.154
*S ROUTE THIS FLOW DOWN THE 24" STORM DRAIN PIPE TO POND.62										
ROUTE	.61	1	11	.03590	26.36	3.411	1.78166	1.800	1.147	
*S HYDROGRAPH ID = 11 IS THE ROUTED FLOW OUT OF POND.61										
*S COMPUTE HYD FOR BASIN 301.62										
COMPUTE NM HYD	301.62	-	62	.03440	81.18	3.257	1.77514	1.500	3.687	PER IMP=61.00
*S ROUTE ID=62 THROUGH POND.62										
ROUTE RESERVOIR	.62	62	1	.03440	25.02	3.267	1.78046	1.800	1.136	AC-FT= 1.098
*S ROUTED FLOW OUT OF POND.62										
*S ADD HYD ID=11 TO ID=1 AND ROUTE THIS FLOW THROUGH THE 30" STORM DRAIN										
*S TO POND.63										
ADD HYD	POND.62	1&11	1	.07030	51.38	6.678	1.78106	1.800	1.142	
ROUTE	.62	1	12	.07030	51.40	6.678	1.78107	1.800	1.142	
*S HYDROGRAPH ID = 12 IS THE ROUTED FLOW DOWN THE 30" STORM DRAIN PIPE										
*S COMPUTE HYD FOR BASIN 301.63										
COMPUTE NM HYD	301.63	-	63	.03440	81.18	3.257	1.77514	1.500	3.687	PER IMP=61.00
*S ROUTE ID=63 THROUGH POND.63										
ROUTE RESERVOIR	.63	63	1	.03440	25.02	3.267	1.78046	1.800	1.136	AC-FT=1.098
*S ROUTED FLOW OUT OF POND.63										

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE
*S ADD HYD ID=12 TO ID=1 AND ROUTE THIS FLOW THROUGH THE 36" STORM DRAIN									
*S TO POND.64									
ADD HYD	POND.63	1&12	1	.10470	76.42	9.944	1.78086	1.800	1.140
ROUTE	.63	1	13	.10470	76.44	9.944	1.78087	1.800	1.141
*S HYDROGRAPH ID = 13 IS THE ROUTED FLOW DOWN THE 36" STORM DRAIN PIPE									
*S TO THE INLET OF POND.64 TO THIS STORM DRAIN PIPE									
*S COMPUTE HYD FOR BASIN 301.64									
COMPUTE NM HYD	301.64	-	64	.03440	81.18	3.257	1.77514	1.500	3.687 PER IMP=61.00
*S ROUTE ID=64 THROUGH POND.64									
ROUTE RESERVOIR	.64	64	1	.03440	25.02	3.267	1.78046	1.800	1.136 AC-FT=1.098
*S ROUTED FLOW OUT OF POND.64									
*S ADD HYD ID=13 TO ID=1 AND ROUTE THIS FLOW THROUGH THE 36" STORM DRAIN									
*S TO POND.65									
ADD HYD	POND.64	1&13	1	.13910	101.46	13.211	1.78076	1.800	1.140
ROUTE	.64	1	14	.13910	101.46	13.211	1.78077	1.800	1.140
*S HYDROGRAPH ID = 14 IS THE ROUTED FLOW DOWN THE 36" STORM DRAIN PIPE									
*S TO THE INLET OF POND.64 TO THIS STORM DRAIN PIPE									
*S COMPUTE HYD FOR BASIN 301.65									
COMPUTE NM HYD	301.65	-	65	.03440	81.18	3.257	1.77514	1.500	3.687 PER IMP=61.00
*S ROUTE ID=65 THROUGH POND.65									
ROUTE RESERVOIR	.65	65	1	.03440	25.02	3.267	1.78046	1.800	1.136 AC-FT=1.098
*S ROUTED FLOW OUT OF POND.65									
*S ADD HYD ID=14 TO ID=1 AND ROUTE THIS FLOW THROUGH THE 36" STORM DRAIN									
*S TO SNOW VISTA CHANNEL									

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE
ADD HYD	POND.65	1&14	1	.17350	126.48	16.477	1.78070	1.800	1.139
*S COMPUTE HYD FOR BASIN 301.05									
COMPUTE NM HYD	301.05	-	5	.03280	77.40	3.105	1.77514	1.500	3.687 PER IMP=61.00
*S TOTAL FLOW AT AP-22.1 IN SNOW VISTA CHANNEL									
ADD HYD	301.00	88& 1	3	1.07723	870.85	111.334	1.93785	1.600	1.263
*S HYD=AP22.1 IS *****AP 22.1*****									
ADD HYD	AP22.1	3& 5	2	1.11003	916.28	114.439	1.93304	1.600	1.290
ROUTE	301.60	2	1	1.11003	925.36	114.436	1.93299	1.600	1.303
*S COMPUTE HYD FOR BASIN 301.04									
COMPUTE NM HYD	301.04	-	4	.07660	180.72	7.252	1.77515	1.500	3.686 PER IMP=61.00
*S HYD=AP22.2 IS *****AP 22.2*****									
ADD HYD	AP22.2	1& 4	1	1.18663	1031.47	121.688	1.92280	1.600	1.358
ROUTE	300.00	1	9	1.18663	1037.20	121.687	1.92278	1.600	1.366
*S COMPUTE HYD FOR BASIN 301.71									
COMPUTE NM HYD	301.71	-	71	.06940	163.75	6.570	1.77514	1.500	3.687 PER IMP=61.00
*S ROUTE THIS FLOW DOWN THE 60" STORM DRAIN PIPE LINE TO 301.72									
ROUTE	.71	71	11	.06940	167.38	6.570	1.77515	1.500	3.769
*S COMPUTE HYD FOR BASIN 301.72									
COMPUTE NM HYD	301.72	-	72	.04220	99.58	3.995	1.77514	1.500	3.687 PER IMP=61.00
*S ADD BASIN 301.71 AND ROUTE THIS FLOW DOWN THE 60" STORM DRAIN PIPE LINE TO 3									
ADD HYD	301.72	72&11	2	.11160	266.96	10.566	1.77514	1.500	3.738
ROUTE	.71	2	11	.11160	269.93	10.566	1.77515	1.500	3.779
*S COMPUTE HYD FOR BASIN 301.74									
COMPUTE NM HYD	301.74	-	74	.00910	21.88	.830	1.71015	1.500	3.757 PER IMP=50.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
*S ADD BASIN 301.72 AND BASIN 301.74										
ADD HYD	301.74	74&11	11	.12070	291.81	11.396	1.77024	1.500	3.778	
COMPUTE NM HYD	301.73	-	73	.01940	45.78	1.837	1.77514	1.500	3.688	PER IMP=61.00
*S ADD HYDGRAPHS FROM										
ADD HYD	301.73	73&11	4	.14010	337.60	13.232	1.77092	1.500	3.765	
*S COMPUTE HYD FOR BASIN 301.03										
COMPUTE NM HYD	301.03	-	3	.34380	810.21	32.549	1.77514	1.500	3.682	PER IMP=61.00
*S HYDROGRAPH ID 73 IS THE INFLOW TO THE SNOW VISTA CHANNEL AT AP-23										
ADD HYD	301.03	3& 4	73	.48390	1147.81	45.781	1.77392	1.500	3.706	
*S HYD=AP23 IS *****AP 23*****										
ADD HYD	AP23	9&73	1	1.67053	2058.10	167.468	1.87966	1.500	1.925	
ROUTE	400.00	1	2	1.67053	2065.12	167.468	1.87965	1.500	1.932	
ROUTE	500.00	2	3	1.67053	2022.43	167.464	1.87961	1.500	1.892	
ROUTE	600.00	3	4	1.67053	2008.97	167.462	1.87960	1.550	1.879	
*S COMPUTE HYD FOR BASIN 301.02										
COMPUTE NM HYD	301.02	-	2	.03910	92.26	3.702	1.77514	1.500	3.687	PER IMP=61.00
ROUTE RESERVOIR	.02	2	1	.03910	44.19	3.702	1.77514	1.650	1.766	AC-FT=.152
ADD HYD	AP23.1	4& 1	3	1.70963	2048.99	171.164	1.87720	1.550	1.873	
ROUTE	700.00	3	2	1.70963	2040.10	171.156	1.87711	1.550	1.865	
*S COMPUTE HYD FOR BASIN 301.01										
COMPUTE NM HYD	301.01	-	1	.07810	184.26	7.394	1.77514	1.500	3.686	PER IMP=61.00
ROUTE RESERVOIR	.01	1	5	.07810	102.50	7.394	1.77514	1.600	2.051	AC-FT=1.789
ADD HYD	AP23.2	5& 2	6	1.78773	2142.56	178.549	1.87266	1.550	1.873	
ROUTE	800.00	6	4	1.78773	2038.68	178.537	1.87252	1.600	1.782	

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = SV_DMP.DAT USE NO.= STOCTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
*S COMPUTE HYD FOR BASIN 301.00										
COMPUTE NM HYD	300.00	-	1	.05156	121.66	4.881	1.77514	1.500	3.687	PER IMP=61.00
ROUTE RESERVOIR	.01	1	5	.05156	42.85	4.881	1.77514	1.750	1.298	AC-FT= 1.790
*S HYD=AP24 IS *****AP 24*****										
ADD HYD	AP24	5& 4	2	1.83929	2081.41	183.418	1.86979	1.600	1.768	
ROUTE	SV_DMP2.HYD	2	66	1.83929	2062.57	183.409	1.86969	1.600	1.752	
FINISH										

AMOLE-HUBBLE DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194)- AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR =06/08/1999
INPUT FILE = UN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
START										TIME=.00
*S										
*S UNSER DIVERSION AND SAD 214										
*S										
*S										
*S 100YR 24-HR STORM WITHOUT SEDIMENT										
*S FILE NAME: UN_DMP.DAT										
*S BY: RICHARD STOCKTON PEER REVIEWED BY:										
*S LAST REVISION: 06-08-99 (kmj HYD=170.96 CONVERGE)										
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM AREA TRIBUTORY TO										
*S THE SAD 214 DETENTION POND. THE OUTFLOW HYDROGRAPH FROM THIS MODEL										
*S WILL BE USED IN THE TIERRA BAYITA MODEL TB_DMP.DAT.										
*S ANALYSIS ASSUMPTIONS:										
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.										
*S										
*S100 YEAR 24HR STORM DEVELOPED CONDITION										
RAINFALL TYPE= 2										RAIN24= 2.660
COMPUTE NM HYD	120.00	-	1	.11250	273.85	12.099	2.01648	1.500	3.803	PER IMP=75.00
COMPUTE NM HYD	120.00	-	1	.11250	188.65	12.099	2.01647	1.650	2.620	PER IMP=75.00
ROUTE RESERVOIR	120.02	1	5	.11250	65.22	12.101	2.01688	2.150	.906	AC-FT= 4.505
ROUTE	120.03	5	1	.11250	65.23	12.101	2.01689	2.150	.906	
ROUTE	120.04	1	11	.11250	65.22	12.101	2.01689	2.150	.906	
COMPUTE NM HYD	130.00	-	1	.06880	167.77	7.399	2.01648	1.500	3.810	PER IMP=75.00
COMPUTE NM HYD	130.00	-	1	.06880	115.74	7.399	2.01648	1.650	2.629	PER IMP=75.00
ADD HYD	130.02	1&11	10	.18130	161.44	19.500	2.01672	1.650	1.391	
ROUTE RESERVOIR	130.03	10	5	.18130	98.61	19.500	2.01672	2.200	.850	AC-FT= 4.027

AMOLE-HUBBLE DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194)- AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR =06/08/1999
INPUT FILE = UN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	130.04	5	10	.18130	98.70	19.500	2.01673	2.200	.851	
ROUTE RESERVOIR	130.05	10	5	.18130	93.19	19.500	2.01673	2.400	.803	AC-FT= 2.665
ROUTE	130.06	5	10	.18130	93.07	19.500	2.01674	2.450	.802	
COMPUTE NM HYD	140.00	-	1	.14840	284.06	15.960	2.01648	1.600	2.991	PER IMP=75.00
COMPUTE NM HYD	140.00	-	1	.14840	212.35	15.960	2.01648	1.750	2.236	PER IMP=75.00
ADD HYD	140.02	10& 1	12	.32970	234.80	35.460	2.01661	1.750	1.113	
ROUTE RESERVOIR	140.03	12	5	.32970	144.35	35.460	2.01663	2.400	.684	AC-FT= 6.588
ROUTE	140.04	5	10	.32970	144.33	35.460	2.01663	2.400	.684	
COMPUTE NM HYD	150.00	-	1	.04300	104.90	4.624	2.01648	1.500	3.812	PER IMP=75.00
COMPUTE NM HYD	150.00	-	1	.04300	72.39	4.624	2.01647	1.650	2.630	PER IMP=75.00
ADD HYD	150.02	10& 1	10	.37270	158.40	40.085	2.01661	2.150	.664	
ROUTE RESERVOIR	150.03	10	5	.37270	125.02	40.085	2.01661	2.750	.524	AC-FT= 5.610
ROUTE	150.04	5	10	.37270	124.95	40.085	2.01661	2.750	.524	
ROUTE	150.05	10	2	.37270	124.93	40.085	2.01661	2.750	.524	
COMPUTE NM HYD	160.10	-	1	.05170	126.11	5.560	2.01648	1.500	3.811	PER IMP=75.00
*S HYD=160.12 IS *****AP 33.2*****										
ADD HYD	160.12	1& 2	11	.42440	147.57	45.645	2.01659	1.500	.543	
ROUTE	160.13	11	2	.42440	147.38	45.645	2.01659	1.500	.543	
ROUTE	160.14	2	19	.42440	144.67	45.645	2.01659	1.550	.533	
*S BEGIN UNSER BOULEVARD STORM DRAIN SYSTEM BETWEEN I-40 AND THE FUTURE TIERRA										
*S BAYITA STORM DRAIN										
COMPUTE NM HYD	170.10	-	2	.06330	160.19	7.303	2.16311	1.500	3.954	PER IMP=85.00
ROUTE RESERVOIR	170.15	2	6	.06330	47.17	7.303	2.16310	1.900	1.164	AC-FT= 2.776
COMPUTE NM HYD	170.20	-	3	.00770	14.44	.563	1.37071	1.500	2.929	PER IMP=40.00
COMPUTE NM HYD	170.30	-	4	.00370	9.65	.444	2.25115	1.500	4.074	PER IMP=90.00
ADD HYD	170.31	6& 4	5	.06700	50.35	7.747	2.16795	1.800	1.174	

AMOLE-HUBBLE DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194)- AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR =06/08/1999
INPUT FILE = UN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	170.32	3& 5	2	.07470	61.91	8.310	2.08577	1.550	1.295	
COMPUTE NM HYD	170.40	-	3	.00600	12.57	.523	1.63484	1.500	3.273	PER IMP=55.00
ADD HYD	170.43	2& 3	5	.08070	73.11	8.833	2.05224	1.550	1.416	
DIVIDE HYD	170.44	5	2	.06936	41.00	7.591	2.05224	1.400	.924	
	170.45	AND	11	.01134	32.11	1.242	2.05224	1.550	4.423	
ROUTE	170.46	2	1	.06936	42.95	7.591	2.05225	1.450	.968	
ROUTE	170.47	1	3	.06936	43.50	7.591	2.05225	1.450	.980	
COMPUTE NM HYD	170.50	-	2	.00290	7.14	.321	2.07506	1.500	3.848	PER IMP=80.00
ADD HYD	170.51	2& 3	4	.07226	49.76	7.912	2.05315	1.450	1.076	
ROUTE	170.48	11	2	.01134	29.01	1.242	2.05292	1.600	3.996	
ADD HYD	170.52	4& 2	2	.08360	75.18	9.154	2.05312	1.600	1.405	
ROUTE	170.55	2	3	.08360	75.48	9.154	2.05312	1.600	1.411	
COMPUTE NM HYD	170.60	-	2	.00180	4.44	.199	2.07506	1.500	3.853	PER IMP=80.00
ADD HYD	170.61	2& 3	4	.08540	78.51	9.353	2.05358	1.600	1.437	
COMPUTE NM HYD	170.70	-	2	.08590	217.10	9.910	2.16311	1.500	3.949	PER IMP=85.00
ROUTE RESERVOIR	170.71	2	3	.08590	56.59	9.910	2.16310	1.950	1.029	AC-FT= 4.098
COMPUTE NM HYD	170.80	-	2	.00540	14.07	.648	2.25116	1.500	4.072	PER IMP=90.00
ADD HYD	170.81	3& 2	5	.09130	60.85	10.558	2.16830	1.800	1.041	
ADD HYD	170.82	4& 5	2	.17670	138.92	19.912	2.11285	1.600	1.228	
COMPUTE NM HYD	170.90	-	3	.00470	11.56	.520	2.07507	1.500	3.844	PER IMP=80.00
ADD HYD	170.91	3& 2	4	.18140	146.81	20.432	2.11187	1.600	1.265	
DIVIDE HYD	170.92	4	2	.15976	92.00	17.994	2.11187	1.450	.900	
	170.93	AND	10	.02164	54.81	2.438	2.11187	1.600	3.957	
DIVIDE HYD	170.95	10	11	.02113	48.00	2.380	2.11187	1.550	3.549	
	170.94	AND	3	.00051	6.81	.058	2.11188	1.600	20.715	
ROUTE	170.96	3	4	.00051	4.09	.058	2.12695	1.650	12.429	

AMOLE-HUBBLE DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194)- AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR =06/08/1999
INPUT FILE = UN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	170.97	2	3	.15976	92.91	17.994	2.11188	1.500	.909	
COMPUTE NM HYD	171.10	-	2	.00210	5.48	.252	2.25115	1.500	4.078	PER IMP=90.00
ADD HYD	171.11	4& 2	5	.00261	7.29	.310	2.22638	1.600	4.360	
ADD HYD	171.12	3& 5	2	.16237	99.37	18.304	2.11372	1.600	.956	
DIVIDE HYD	171.13	2	3	.16237	99.37	18.304	2.11372	1.600	.956	
	171.14	AND	9	.00000	.00	.000	.00000	-.050	.000	
ROUTE	171.15	3	10	.16237	99.30	18.304	2.11372	1.600	.956	
COMPUTE NM HYD	171.00	-	3	.00220	5.74	.264	2.25115	1.500	4.078	PER IMP=90.00
ROUTE	171.01	11	4	.02113	47.97	2.380	2.11224	1.650	3.547	
ADD HYD	171.02	3& 4	2	.02333	51.05	2.645	2.12530	1.650	3.419	
DIVIDE HYD	171.03	2	3	.01407	20.00	1.595	2.12530	1.500	2.221	
	171.04	AND	6	.00926	31.05	1.049	2.12530	1.650	5.240	
COMPUTE NM HYD	160.20	-	1	.03500	85.38	3.764	2.01648	1.500	3.812	PER IMP=75.00
ADD HYD	160.21	1& 3	2	.04907	105.38	5.359	2.04768	1.500	3.355	
ROUTE	160.22	2	1	.04907	104.55	5.359	2.04769	1.500	3.329	
ADD HYD	160.23	1&10	2	.21144	203.02	23.663	2.09839	1.500	1.500	
COMPUTE NM HYD	180.10	-	1	.03380	77.86	3.380	1.87475	1.500	3.599	PER IMP=68.00
ADD HYD	180.11	1& 2	3	.24524	280.87	27.043	2.06757	1.500	1.790	
*S HYD=180.12 IS *****AP 33.1*****										
ROUTE RESERVOIR	180.12	3	10	.24524	100.80	27.076	2.07009	2.450	.642	AC-FT= 6.984
ROUTE	180.13	10	2	.24524	100.80	27.076	2.07009	2.450	.642	
ADD HYD	180.14	19& 2	3	.66964	226.80	72.721	2.03619	2.750	.529	
ADD HYD	180.15	6& 9	1	.00926	31.05	1.049	2.12530	1.650	5.240	
*S HYD=UN_DMP.HYD IS *****AP 33*****										
ADD HYD	UN_DMP.DAT	3& 1	2	.67890	248.30	73.770	2.03740	1.550	.571	
FINISH										

AMOLE-HUBBLE DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194)- AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR =06/08/1999
INPUT FILE = UN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/20/1998
INPUT FILE = 98_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTIFICATION

```
START                                                                                                  TIME=.00
*S
*S      98th STREET AND CENTRAL POND
*S
*S
*S 100YR 24-HR STORM WITHOUT SEDIMENT
*S FILE NAME: 98_DMP.DAT
*S BY: RICHARD STOCKTON  PEER REVIEWED BY:
*S LAST REVISION: 09-13-96
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM AREA TRIBUTORY TO
*S THE 98th STREET AND CENTRAL AVENUE DETENTION POND.  THE OUTFLOW HYDROGRAPH
*S FROM THIS MODEL WILL BE USED IN THE TIERRA BAYITA MODEL TB100D1B.DAT.
*S ANALYSIS ASSUMPTIONS:
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.
*S
*S 2. THE DIVIDE HYDS HAVE BEEN REMOVED FROM THE ORIGINAL RUNS TO
*S    SIMULATE NO BULKING.
*S
*S*********************************************************************
*S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL  TYPE= 2                                                                                      RAIN24=2.660
COMPUTE NM HYD        108.40   -     5        .14260       349.37      15.128      1.98911    1.500    3.828 PER IMP=70.00
COMPUTE NM HYD        108.30   -     1        .14780       300.21      14.210      1.80266    1.550    3.174 PER IMP=57.00
ROUTE                 108.38    1    2        .14780       294.63      14.210      1.80266    1.550    3.115
COMPUTE NM HYD        108.20   -     7        .17100       365.07      17.121      1.87734    1.500    3.336 PER IMP=63.00
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AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/20/1998
INPUT FILE = 98_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTIFICATION
*S COMBINE HYD'S 108.38 AND 108.2										
ADD HYD	108.29	7& 2	7	.31880	657.68	31.331	1.84271	1.550	3.223	
COMPUTE NM HYD	108.10	-	4	.17130	413.94	17.744	1.94219	1.500	3.776	PER IMP=67.00
ROUTE	108.18	4	8	.17130	407.12	17.744	1.94219	1.500	3.713	
ADD HYD	108.90	7& 8	9	.49010	1044.50	49.075	1.87748	1.550	3.330	
ROUTE RESERVOIR	502.00	9	10	.49010	86.64	49.072	1.87738	2.300	.276	AC-FT=32.189
COMPUTE NM HYD	109.00	-	1	.07200	181.35	8.299	2.16132	1.500	3.936	PER IMP=82.00
ROUTE	109.19	1	6	.07200	177.96	8.299	2.16133	1.500	3.862	
COMPUTE NM HYD	109.10	-	1	.04950	129.24	5.840	2.21211	1.500	4.079	PER IMP=85.00
ADD HYD	109.39	6& 1	6	.12150	307.20	14.139	2.18201	1.500	3.951	
ADD HYD	109.49	6& 5	6	.26410	656.56	29.267	2.07785	1.500	3.884	
ADD HYD	109.59	6&10	6	.75420	701.10	78.339	1.94758	1.500	1.452	
ROUTE RESERVOIR	98_DMP.HYD	6	10	.75420	68.07	78.343	1.94768	5.200	.141	AC-FT=28.041
*S HYD NO. 98_DMP.HYD IS ****AP 31****										
MODIFY TIME	98_DMP.HYD	10	10	.75420	69.08	78.343	1.94768	5.250	.143	
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/20/1998
INPUT FILE = AB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME=.00
*S										
*S ATRISCO BUSINESS PARK										
*S										
*S										
*S 100YR 24-HR STORM WITHOUT SEDIMENT										
*S FILE NAME: AB_DMP.DAT										
*S BY: RICHARD STOCKTON PEER REVIEWED BY:										
*S LAST REVISION: 06-19-96										
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM AREA TRIBUTORY TO										
*S THE N/S COORS DETENTION POND. THE OUTFLOW HYDROGRAPH										
*S FROM THIS MODEL WILL BE USED IN THE AMOLE DEL NORTE MODEL AN100D1B.DAT.										
*S ANALYSIS ASSUMPTIONS:										
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.										
*S										
*S100 YEAR 24HR STORM DEVELOPED CONDITION										
RAINFALL TYPE= 2										RAIN24=2.660
*S BEGIN THE WATERSHED FOR THE AIRPORT ROAD STORM DRAIN **********										
COMPUTE NM HYD	200.10	-	2	.20810	513.44	23.189	2.08937	1.500	3.855	PER IMP=80.00
ROUTE RESERVOIR	200.11	2	3	.20810	13.32	23.141	2.08501	2.600	.100	AC-FT=16.792
MODIFY TIME	200.11	3	3	.20810	14.53	23.141	2.08501	2.550	.109	
COMPUTE NM HYD	200.20	-	2	.00420	10.15	.453	2.02224	1.500	3.777	PER IMP=77.00
ADD HYD	200.21	3& 2	4	.21230	18.72	23.594	2.08377	1.500	.138	
COMPUTE NM HYD	200.30	-	2	.00760	17.97	.820	2.02224	1.500	3.695	PER IMP=77.00
COMPUTE NM HYD	200.40	-	3	.00420	10.40	.469	2.09267	1.500	3.868	PER IMP=81.00
ADD HYD	200.41	2& 3	5	.01180	28.37	1.288	2.04726	1.500	3.756	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
INPUT FILE = AB_DMP.DAT

RUN DATE (MON/DAY/YR) =04/20/1998
USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE	200.45	5	11	.01180	21.24	1.288	2.04731	1.600	2.813	
COMPUTE NM HYD	200.50	-	3	.00350	8.67	.391	2.09267	1.500	3.869	PER IMP=81.00
ADD HYD	200.51	11& 3	3	.01530	28.34	1.679	2.05761	1.550	2.894	
COMPUTE NM HYD	200.60	-	1	.00700	17.40	.780	2.08937	1.500	3.885	PER IMP=80.00
ROUTE RESERVOIR	200.61	1	2	.00700	.45	.778	2.08482	2.600	.100	AC-FT=.565
MODIFY TIME	200.61	2	2	.00700	.49	.778	2.08482	2.550	.110	
ADD HYD	200.62	4& 2	1	.21930	19.04	24.372	2.08380	1.550	.136	
ROUTE	200.65	1	10	.21930	18.90	24.355	2.08237	1.550	.135	
ROUTE	200.66	3	11	.01530	24.29	1.679	2.05766	1.650	2.480	
COMPUTE NM HYD	210.10	-	2	.07480	185.71	8.335	2.08937	1.500	3.879	PER IMP=80.00
ROUTE RESERVOIR	210.11	2	3	.07480	4.78	8.306	2.08202	2.600	.100	AC-FT= 6.043
MODIFY TIME	210.11	3	3	.07480	5.29	8.306	2.08202	2.550	.110	
ADD HYD	210.12	10& 3	10	.29410	22.60	32.661	2.08228	1.600	.120	
COMPUTE NM HYD	210.20	-	2	.00780	18.09	.841	2.02224	1.500	3.623	PER IMP=77.00
DIVIDE HYD	210.21	2	3	.00705	11.00	.760	2.02219	1.450	2.440	
	210.22	AND	6	.00075	7.09	.081	2.02219	1.500	14.670	
ADD HYD	210.23	10& 3	10	.30115	33.60	33.421	2.08088	1.600	.174	
COMPUTE NM HYD	210.30	-	2	.00250	6.19	.279	2.09268	1.500	3.871	PER IMP=81.00
ADD HYD	210.31	11& 2	11	.01780	27.66	1.958	2.06251	1.600	2.428	
COMPUTE NM HYD	210.40	-	2	.01170	29.08	1.304	2.08937	1.500	3.883	PER IMP=80.00
ROUTE RESERVOIR	210.41	2	4	.01170	.73	1.300	2.08322	2.600	.098	AC-FT=.946
MODIFY TIME	210.41	4	4	.01170	.81	1.300	2.08322	2.550	.108	
ADD HYD	210.42	10& 4	13	.31285	34.20	34.721	2.08096	1.600	.171	
ADD HYD	210.43	6&11	12	.01855	31.08	2.039	2.06087	1.550	2.617	
ROUTE	210.46	13	10	.31285	34.00	34.699	2.07963	1.600	.170	
ROUTE	210.47	12	11	.01855	26.75	2.039	2.06091	1.650	2.253	
COMPUTE NM HYD	210.50	-	2	.00240	5.95	.268	2.09267	1.500	3.871	PER IMP=81.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
INPUT FILE = AB_DMP.DAT

RUN DATE (MON/DAY/YR) =04/20/1998
USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	210.51	2&11	11	.02095	29.96	2.307	2.06449	1.650	2.234	
COMPUTE NM HYD	210.60	-	3	.07000	173.84	7.800	2.08937	1.500	3.880	PER IMP=80.00
ROUTE RESERVOIR	210.61	3	4	.07000	4.45	7.787	2.08585	2.600	.099	AC-FT=5.652
MODIFY TIME	210.61	4	4	.07000	4.83	7.787	2.08585	2.550	.108	
ADD HYD	210.62	4&10	10	.38285	37.79	42.486	2.08077	1.650	.154	
COMPUTE NM HYD	210.70	-	2	.00330	8.17	.368	2.09267	1.500	3.869	PER IMP=81.00
ROUTE	210.71	2	12	.00330	4.83	.368	2.09282	1.600	2.285	
COMPUTE NM HYD	210.80	-	3	.00280	6.94	.313	2.09267	1.500	3.871	PER IMP=81.00
ADD HYD	210.81	3&12	12	.00610	10.56	.681	2.09251	1.550	2.706	
COMPUTE NM HYD	210.90	-	2	.00170	4.22	.190	2.09267	1.500	3.876	PER IMP=81.00
ADD HYD	210.91	12& 2	12	.00780	14.64	.870	2.09251	1.500	2.933	
ADD HYD	210.92	12&11	11	.02875	41.59	3.178	2.07209	1.600	2.260	
ADD HYD	210.93	11&10	10	.41160	79.29	45.664	2.08016	1.600	.301	
COMPUTE NM HYD	211.10	-	2	.01170	29.08	1.304	2.08937	1.500	3.883	PER IMP=80.00
ROUTE RESERVOIR	211.11	2	3	.01170	.74	1.301	2.08477	2.600	.098	AC-FT=.947
MODIFY TIME	211.11	3	3	.01170	.81	1.301	2.08477	2.550	.108	
ADD HYD	211.12	3&10	11	.42330	79.88	46.965	2.08029	1.600	.295	
ROUTE	211.13	11	10	.42330	74.71	46.891	2.07702	1.700	.276	
*S BEGIN THE AREA SOUTH OF BLUEWATER ROAD										
COMPUTE NM HYD	220.10	-	2	.00350	8.67	.391	2.09267	1.500	3.869	PER IMP=81.00
COMPUTE NM HYD	220.20	-	3	.03130	77.77	3.488	2.08937	1.500	3.882	PER IMP=80.00
ROUTE RESERVOIR	220.21	3	4	.03130	2.01	3.478	2.08339	2.600	.100	AC-FT=2.528
MODIFY TIME	220.21	4	4	.03130	2.21	3.478	2.08339	2.550	.110	
ROUTE	220.22	4	5	.03130	2.21	3.473	2.08053	2.550	.110	
ADD HYD	220.23	2& 5	3	.03480	9.39	3.864	2.08174	1.500	.421	
COMPUTE NM HYD	220.30	-	2	.04470	111.05	4.981	2.08937	1.500	3.882	PER IMP=80.00
ROUTE RESERVOIR	220.31	2	4	.04470	2.87	4.963	2.08191	2.600	.100	AC-FT=3.611

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
INPUT FILE = AB_DMP.DAT

RUN DATE (MON/DAY/YR) =04/20/1998
USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
MODIFY TIME	220.31	4	4	.04470	3.17	4.963	2.08191	2.550	.111	
ADD HYD	220.32	3& 4	2	.07950	11.17	8.827	2.08183	1.500	.220	
COMPUTE NM HYD	220.40	-	4	.00180	4.36	.194	2.02224	1.500	3.784	PER IMP=77.00
ADD HYD	220.41	2& 4	1	.08130	15.53	9.021	2.08051	1.500	.298	
COMPUTE NM HYD	220.50	-	3	.03130	77.77	3.488	2.08937	1.500	3.882	PER IMP=80.00
ROUTE RESERVOIR	220.51	3	4	.03130	2.01	3.478	2.08339	2.600	.100	AC-FT=2.528
MODIFY TIME	220.51	4	4	.03130	2.21	3.478	2.08339	2.550	.110	
ADD HYD	220.52	4& 1	3	.11260	16.80	12.499	2.08131	1.500	.233	
ADD HYD	220.53	10& 3	2	.53590	86.81	59.390	2.07792	1.650	.253	
ROUTE	220.54	2	10	.53590	86.83	59.380	2.07757	1.700	.253	
*S BEGIN THE AREA SOUTH OF THE ATRISCO BUSINESS PARK										
COMPUTE NM HYD	220.60	-	2	.01980	49.20	2.206	2.08937	1.500	3.883	PER IMP=80.00
ROUTE RESERVOIR	220.61	2	3	.01980	1.27	2.199	2.08223	2.600	.100	AC-FT=1.599
MODIFY TIME	220.61	3	3	.01980	1.40	2.199	2.08223	2.550	.111	
COMPUTE NM HYD	220.70	-	4	.00270	6.69	.301	2.09267	1.500	3.871	PER IMP=81.00
ADD HYD	220.71	4& 3	5	.02250	7.48	2.500	2.08347	1.500	.519	
ADD HYD	220.72	10& 5	2	.55840	91.24	61.880	2.07780	1.650	.255	
ROUTE	220.73	2	10	.55840	88.33	61.797	2.07504	1.750	.247	
*S BEGIN AREA SOUTH OF CENTRAL BOULEVARD										
COMPUTE NM HYD	230.10	-	2	.00180	4.49	.201	2.08937	1.500	3.895	PER IMP=80.00
ROUTE RESERVOIR	230.11	2	20	.00180	3.55	.201	2.08922	1.550	3.084	AC-FT=.017
ROUTE	230.12	20	3	.00180	3.34	.201	2.08965	1.650	2.899	
COMPUTE NM HYD	230.20	-	2	.00520	12.93	.579	2.08937	1.500	3.886	PER IMP=80.00
ROUTE RESERVOIR	230.21	2	20	.00520	10.88	.579	2.08931	1.550	3.269	AC-FT=.040
ADD HYD	230.22	20& 3	4	.00700	13.81	.780	2.08930	1.600	3.083	
ROUTE	230.23	4	11	.00700	13.89	.780	2.08941	1.600	3.100	
COMPUTE NM HYD	230.30	-	2	.00240	6.09	.277	2.16311	1.500	3.963	PER IMP=85.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/20/1998
INPUT FILE = AB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	230.31	2&11	3	.00940	19.03	1.057	2.10812	1.550	3.164	
ADD HYD	230.32	10& 3	1	.56780	101.55	62.854	2.07558	1.700	.279	
ROUTE	230.33	1	10	.56780	101.58	62.850	2.07545	1.700	.280	
*S END OF AIRPORT ROAD STORM DRAIN										
*S BEGIN COORS CONNECTION STORM DRAIN										
COMPUTE NM HYD	230.50	-	2	.00660	16.59	.741	2.10487	1.500	3.927	PER IMP=80.00
ROUTE RESERVOIR	530.51	2	20	.00660	6.52	.741	2.10483	1.750	1.544	AC-FT=.225
ROUTE	230.52	20	4	.00660	6.52	.741	2.10490	1.750	1.544	
COMPUTE NM HYD	230.60	-	2	.00230	6.13	.280	2.28382	1.500	4.162	PER IMP=90.00
ROUTE	230.61	2	3	.00230	4.53	.280	2.28404	1.600	3.080	
COMPUTE NM HYD	230.70	-	2	.00580	14.69	.669	2.16311	1.500	3.958	PER IMP=85.00
ADD HYD	230.71	3& 2	1	.00810	18.45	.949	2.19732	1.500	3.559	
ADD HYD	230.72	4& 1	5	.01470	23.53	1.690	2.15577	1.500	2.501	
ROUTE	230.73	5	4	.01470	23.55	1.690	2.15582	1.550	2.503	
COMPUTE NM HYD	230.80	-	2	.01120	28.14	1.257	2.10487	1.500	3.926	PER IMP=80.00
ROUTE RESERVOIR	230.81	2	20	.01120	15.80	1.257	2.10485	1.650	2.205	AC-FT=.249
ADD HYD	230.82	20& 4	5	.02590	38.39	2.947	2.13375	1.550	2.316	
ROUTE	230.83	5	2	.02590	38.60	2.947	2.13378	1.550	2.328	
ADD HYD	230.84	2&10	11	.59370	134.83	65.798	2.07800	1.650	.355	
ROUTE	230.85	11	10	.59370	134.67	65.793	2.07783	1.650	.354	
ROUTE	230.86	10	11	.59370	134.86	65.785	2.07759	1.700	.355	
*S BEGIN THE AREA NORTH OF CENTRAL AVENUE BETWEEN UNSER AND THE WEST 66										
*S ADDITION										
COMPUTE NM HYD	240.10	-	2	.03330	81.24	3.581	2.01648	1.500	3.812	PER IMP=75.00
ROUTE RESERVOIR	240.11	2	20	.03330	58.81	3.581	2.01647	1.600	2.760	AC-FT=.416
ROUTE	240.12	20	3	.03330	58.37	3.581	2.01649	1.600	2.739	
COMPUTE NM HYD	240.20	-	4	.01250	25.65	1.319	1.97801	1.550	3.206	PER IMP=71.00

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/20/1998
INPUT FILE = AB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	240.21	4& 3	5	.04580	82.53	4.900	2.00597	1.600	2.815	
ROUTE	240.22	5	15	.04580	81.93	4.900	2.00599	1.600	2.795	
COMPUTE NM HYD	240.30	-	3	.00800	20.10	.898	2.10487	1.500	3.926	PER IMP=80.00
ROUTE RESERVOIR	240.31	3	20	.00800	12.49	.898	2.10483	1.600	2.439	AC-FT=.151
ROUTE	240.32	20	4	.00800	12.28	.898	2.10492	1.650	2.398	
ADD HYD	240.33	4&15	16	.05380	93.78	5.798	2.02067	1.600	2.724	
COMPUTE NM HYD	240.40	-	2	.02310	42.45	2.260	1.83425	1.600	2.871	PER IMP=60.00
ROUTE RESERVOIR	240.41	2	3	.02310	29.29	1.074	.87164	1.850	1.981	AC-FT=1.190
ADD HYD	240.42	3&16	15	.07690	93.79	6.872	1.67552	1.600	1.906	
COMPUTE NM HYD	240.50	-	4	.00930	24.26	1.133	2.28382	1.500	4.075	PER IMP=90.00
ADD HYD	240.51	4&15	16	.08620	111.07	8.005	1.74114	1.600	2.013	
ROUTE RESERVOIR	240.52	16	15	.08620	96.76	8.005	1.74114	1.700	1.754	AC-FT=.552
ROUTE	240.53	15	5	.08620	97.17	8.005	1.74114	1.700	1.761	
COMPUTE NM HYD	240.60	-	2	.00650	16.96	.792	2.28382	1.500	4.076	PER IMP=90.00
*S BEGIN AREA SOUTH OF CENTRAL AVENUE BETWEEN UNSER AND AIRPORT										
ADD HYD	240.61	2& 5	3	.09270	105.09	8.796	1.77919	1.700	1.771	
ROUTE	240.62	3	4	.09270	104.46	8.796	1.77918	1.700	1.761	
COMPUTE NM HYD	250.10	-	2	.02470	62.04	2.773	2.10488	1.500	3.925	PER IMP=80.00
ADD HYD	250.11	4& 2	3	.11740	146.40	11.569	1.84770	1.500	1.948	
COMPUTE NM HYD	250.20	-	2	.00790	14.90	.599	1.42095	1.500	2.946	PER IMP=35.00
ADD HYD	250.21	3& 2	4	.12530	161.30	12.168	1.82079	1.500	2.011	
ROUTE	250.22	4	3	.12530	164.12	12.168	1.82079	1.550	2.047	
COMPUTE NM HYD	260.10	-	2	.03980	97.10	4.280	2.01648	1.500	3.812	PER IMP=75.00
ADD HYD	260.11	2& 3	4	.16510	256.28	16.448	1.86796	1.500	2.425	
ROUTE	260.12	4	2	.16510	257.18	16.448	1.86795	1.550	2.434	
COMPUTE NM HYD	270.10	-	3	.02220	54.17	2.388	2.01648	1.500	3.812	PER IMP=75.00
ADD HYD	270.11	3& 2	4	.18730	304.84	18.835	1.88555	1.550	2.543	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/20/1998
INPUT FILE = AB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE RESERVOIR	270.12	4	20	.18730	145.37	18.835	1.88553	2.000	1.213	AC-FT=5.010
ADD HYD	270.13	20&11	10	.78100	269.10	84.620	2.03154	1.750	.538	
COMPUTE NM HYD	270.20	-	3	.00710	17.98	.819	2.16311	1.500	3.957	PER IMP=85.00
DIVIDE HYD	270.21	3	2	.00326	2.00	.376	2.16307	1.300	.958	
	270.22	AND	4	.00384	15.98	.443	2.16307	1.500	6.504	
ADD HYD	270.23	10& 2	3	.78426	271.10	84.996	2.03208	1.750	.540	
ROUTE	270.24	3	10	.78426	271.46	84.987	2.03185	1.750	.541	
ROUTE	270.25	4	3	.00384	15.18	.443	2.16508	1.500	6.178	
ADD HYD	270.26	10& 3	4	.78810	277.02	85.430	2.03250	1.750	.549	
COMPUTE NM HYD	280.10	-	2	.00660	16.11	.710	2.01647	1.500	3.815	PER IMP=75.00
ROUTE RESERVOIR	280.11	2	20	.00660	6.51	.710	2.01643	1.750	1.540	AC-FT=.213
ADD HYD	280.12	4&20	3	.79470	283.52	86.140	2.03237	1.750	.557	
COMPUTE NM HYD	280.20	-	4	.00250	6.34	.288	2.16311	1.500	3.963	PER IMP=85.00
ADD HYD	280.21	3& 4	5	.79720	286.00	86.428	2.03278	1.750	.561	
COMPUTE NM HYD	280.30	-	6	.00450	8.64	.359	1.49614	1.500	2.998	PER IMP=50.00
ADD HYD	280.31	5& 6	7	.80170	289.23	86.787	2.02976	1.750	.564	
ROUTE	280.32	7	10	.80170	289.19	86.772	2.02941	1.750	.564	
COMPUTE NM HYD	290.10	-	2	.03144	67.47	2.789	1.66330	1.500	3.353	PER IMP=55.00
ROUTE RESERVOIR	290.11	2	20	.03144	28.20	2.789	1.66329	1.700	1.402	AC-FT=.836
ADD HYD	290.12	10&20	3	.83314	317.37	89.561	2.01559	1.750	.595	
ROUTE	290.13	3	4	.83314	317.61	89.553	2.01542	1.700	.596	
ROUTE	290.14	4	10	.83314	317.63	89.541	2.01514	1.700	.596	
COMPUTE NM HYD	290.20	-	2	.00690	17.48	.796	2.16311	1.500	3.958	PER IMP=85.00
ADD HYD	290.21	10& 2	3	.84004	325.47	90.337	2.01636	1.700	.605	
ROUTE	290.22	3	4	.84004	325.48	90.334	2.01629	1.700	.605	
ROUTE	AB_DMP.HYD	4	5	.84004	325.77	90.325	2.01609	1.700	.606	
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model- January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = TB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CSF)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE

```
START                                                                                    TIME= .00
*S
*S      TIERRA BAYITA
*S
*S
*S 100YR 24-HR STORM WITHOUT SEDIMENT
*S FILE NAME: TB_DMP.DAT
*S BY: RICHARD STOCKTON  PEER REVIEWED BY:
*S LAST REVISION: 06-08-99 (KMJ HYD=RR12,17.2,17.3,21.2,R13,R6,20.1,21.2)
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM AREA TRIBUTORY TO
*S THE N/S COORS DETENTION POND VIA THE TIERRA BAYITA CHANNEL.  THE OUTFLOW
*S HYDROGRAPH FROM THIS MODEL WILL BE USED IN THE AMOLE DEL NORTE MODEL AN100D1B
*S ANALYSIS ASSUMPTIONS:
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.
*S
*S 2. NO BULKING FOR DEVELOPED CONDITIONS
*S
*S 3. AP 33.1 AND AP 33.2 CAN BE FOUND ON THE UN_DMP.DAT RUN
*S
*S 4. AP 35.1 CAN BE FOUND ON THE AB_DMP.DAT RUN
*S
*S PMP 24HR GENERAL STORM DEVELOPED CONDITION
*S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL  TYPE= 2                                                                        RAIN24= 2.660
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AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model- January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = TB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CSF)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	11D	-	11	.02500	20.57	.586	.43936	1.500	1.286	PER IMP= .00
COMPUTE NM HYD	10D	-	10	.03360	34.90	1.127	.62911	1.500	1.623	PER IMP= 8.00
ADD HYD	10.10	10&11	1	.05860	55.47	1.713	.54815	1.500	1.479	
ROUTE	R1	1	2	.05860	39.93	1.713	.54817	1.600	1.065	
COMPUTE NM HYD	12D	-	12	.24070	485.83	27.235	2.12157	1.550	3.154	PER IMP=80.00
*S HYD=R12 IS *****AP 32*****										
ADD HYD	R12	12& 2	3	.29930	521.54	28.948	1.81351	1.550	2.723	
ROUTE	RR12	3	4	.29930	523.98	28.949	1.81351	1.600	2.735	
*S HYD=98_DMP.HYD IS *****AP 31*****										
*S RECALL FLOW FROM AMOLE DEL NORTE PHASE IIIC - DETENTION BASINS										
RECALL HYD	98_DMP.HYD	-	10	.75420	69.08	78.343	1.94768	5.250	.143	
COMPUTE NM HYD	19D	-	19	.08970	205.76	10.446	2.18343	1.550	3.584	PER IMP=83.00
ADD HYD	19.10	19&10	5	.84390	242.97	88.789	1.97274	1.550	.450	
ROUTE	R19.1	5	6	.84390	237.41	88.741	1.97168	1.550	.440	
ADD HYD	19.20	6& 4	7	1.14320	759.81	117.690	1.93027	1.600	1.038	
ROUTE	19.30	7	8	1.14320	766.03	117.673	1.93000	1.600	1.047	
COMPUTE NM HYD	16N	-	16	.03340	82.80	3.594	2.01779	1.500	3.873	PER IMP=72.00
ADD HYD	16.10	16& 8	9	1.17660	822.67	121.268	1.93249	1.600	1.092	
ROUTE	16.20	9	1	1.17660	826.80	121.257	1.93232	1.600	1.098	
COMPUTE NM HYD	17W	-	17	.08020	178.65	9.445	2.20818	1.550	3.481	PER IMP=85.00
ADD HYD	17.10	17& 1	2	1.25680	993.19	130.702	1.94992	1.600	1.235	
ROUTE	17.20	2	3	1.25680	999.87	130.687	1.94969	1.600	1.243	
ROUTE	17.30	3	4	1.25680	1002.39	130.680	1.94959	1.600	1.246	
COMPUTE NM HYD	21N	-	21	.02020	49.94	2.151	1.99699	1.500	3.863	PER IMP=70.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model- January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = TB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CSF)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	21.10	21& 4	5	1.27700	1036.57	132.831	1.95034	1.600	1.268	
ROUTE	21.20	5	6	1.27700	1037.66	132.802	1.94992	1.600	1.270	
*S UNSER BOULEVARD FLOWS TO CHANNEL										
*S CALCULATE FLOW FROM NORTH										
*S HYD=UN_DMP.HYD IS *****AP 33*****										
RECALL HYD	UN_DMP.DAT	-	2	.67890	248.30	73.770	2.03740	1.550	.571	
ROUTE	R2	2	3	.67890	247.01	73.770	2.03740	1.600	.568	
ROUTE	R3	3	4	.67890	247.54	73.770	2.03740	1.600	.570	
COMPUTE NM HYD	13D	-	13	.16640	338.38	19.250	2.16909	1.550	3.177	PER IMP=82.00
ROUTE	R13	13	5	.16640	341.93	19.250	2.16909	1.600	3.211	
ADD HYD	13.10	5& 4	5	.84530	589.47	93.020	2.06332	1.600	1.090	
COMPUTE NM HYD	17E	-	17	.06510	169.57	7.667	2.20817	1.500	4.070	PER IMP=85.00
ADD HYD	17.10	17& 5	7	.91040	722.22	100.687	2.07368	1.550	1.240	
ROUTE	R6	7	8	.91040	700.13	100.687	2.07368	1.600	1.202	
*S HYD=CHANNEL IS *****AP 34*****										
ADD HYD	CHANNEL	8& 6	9	2.18740	1737.79	233.489	2.00143	1.600	1.241	
*S CALCULATE FLOW FROM SOUTH THAT EMPTIES TO THE CHANNEL AT UNSER BLVD.										
COMPUTE NM HYD	16S	-	16	.11630	287.45	12.516	2.01779	1.500	3.862	PER IMP=72.00
COMPUTE NM HYD	20D	-	20	.13270	285.28	13.464	1.90245	1.500	3.359	PER IMP=66.00
ADD HYD	1620.00	16&20	1	.24900	572.72	25.980	1.95632	1.500	3.594	
ROUTE	20.10	1	2	.24900	554.46	25.980	1.95632	1.550	3.479	
COMPUTE NM HYD	21W	-	21	.11430	235.94	12.174	1.99699	1.550	3.225	PER IMP=70.00
ADD HYD	21.10	2&21	3	.36330	790.40	38.154	1.96911	1.550	3.399	
ROUTE	21.20	3	4	.36330	789.96	38.154	1.96911	1.550	3.398	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model- January, 1994
INPUT FILE = TB_DMP.DAT

RUN DATE (MON/DAY/YR) =06/08/1999
USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CSF)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	CHANNEL	4& 9	5	2.55070	2469.55	271.643	1.99683	1.600	1.513	
*S ROUTE FLOW DOWN CONCRETE TRAPAZOIDAL CHANNEL PARALLEL TO BRIDGE BLVD.										
ROUTE	R5	5	6	2.55070	2489.11	271.608	1.99657	1.600	1.525	
COMPUTE NM HYD	18W	-	18	.11220	222.61	11.236	1.87771	1.550	3.100	PER IMP=68.00
ADD HYD	18.10	18& 6	7	2.66290	2693.55	282.844	1.99156	1.600	1.580	
ROUTE	R7	7	8	2.66290	2708.19	282.829	1.99145	1.600	1.589	
COMPUTE NM HYD	21E	-	21	.06560	162.10	6.987	1.99699	1.500	3.861	PER IMP=70.00
ADD HYD	21.10	21& 8	9	2.72850	2819.16	289.816	1.99159	1.600	1.614	
ROUTE	R9	9	10	2.72850	2833.11	289.806	1.99152	1.600	1.622	
COMPUTE NM HYD	18E	-	18	.00750	16.30	.732	1.83088	1.500	3.396	PER IMP=70.00
ADD HYD	18.10	18&10	11	2.73600	2844.30	290.539	1.99108	1.600	1.624	
*S HYD=TB_DMP.HYD IS *****AP 35*****										
ROUTE	TB_DMP.HYD	11	12	2.73600	2856.19	290.527	1.99100	1.600	1.631	
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = TS_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
START										TIME=
.00										
*S										
*S TOWER/SAGE WATERSHED SAD 222										
*S										
*S										
*S 100-YR, 24-HR STORM WITH SEDIMENT										
*S FILE NAME: TS_DMP.DAT										
*S BY: RICHARD STOCKTON PEER REVIEWED BY: DEBORAH DIXON										
*S LAST REVISION: 06-8-99 (kmj HYD=AP#22R)										
RAINFALL TYPE= 2										RAIN24=2.660
COMPUTE NM HYD	A1-D&AP#1	-	3	.04580	103.28	4.897	2.00463	1.500	3.523	PER IMP=76.00
ROUTE	AP-1R	3	2	.04580	101.55	4.897	2.00464	1.550	3.464	
COMPUTE NM HYD	A2-D	-	3	.03950	89.28	4.001	1.89898	1.500	3.532	PER IMP=70.00
ADD HYD	AP#2	2& 3	10	.08530	185.32	8.897	1.95570	1.500	3.395	
ROUTE	AP#2R	10	2	.08530	184.43	8.897	1.95571	1.550	3.378	
COMPUTE NM HYD	A3-D	-	3	.04190	94.80	4.047	1.81093	1.500	3.535	PER IMP=65.00
ADD HYD	AP#3	2& 3	10	.12720	266.97	12.944	1.90801	1.550	3.279	
ROUTE	AP#3R	10	2	.12720	271.22	12.944	1.90801	1.550	3.332	
COMPUTE NM HYD	A4-D	-	3	.04390	101.56	4.858	2.07506	1.500	3.615	PER IMP=80.00
ADD HYD	AP#4	2& 3	10	.17110	368.16	17.802	1.95087	1.550	3.362	
ROUTE	AP#4R	10	2	.17110	371.05	17.802	1.95087	1.550	3.388	
COMPUTE NM HYD	A5-D	-	3	.04520	95.53	4.153	1.72289	1.500	3.302	PER IMP=60.00
ADD HYD	AP#5	2& 3	10	.21630	458.83	21.956	1.90323	1.550	3.314	
ROUTE	AP#5R	10	2	.21630	460.09	21.956	1.90323	1.550	3.324	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = TS_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	A6-D	-	3	.04520	88.89	3.729	1.54680	1.500	3.073	PER IMP=50.00
ADD HYD	PART_AP#9	2& 3	10	.26150	542.31	25.684	1.84162	1.550	3.240	
COMPUTE NM HYD	A7-D	-	3	.02060	40.52	1.699	1.54680	1.500	3.074	PER IMP=50.00
ADD HYD	PART_AP#9	10& 3	10	.28210	579.79	27.384	1.82009	1.550	3.211	
COMPUTE NM HYD	A8-D&AP#6	-	3	.05700	110.97	5.773	1.89898	1.550	3.042	PER IMP=70.00
ROUTE	AP&6R	3	2	.05700	108.92	5.773	1.89898	1.600	2.986	
COMPUTE NM HYD	A9-D	-	3	.01020	20.86	.841	1.54680	1.500	3.196	PER IMP=50.00
ADD HYD	AP#7	2& 3	20	.06720	123.22	6.614	1.84551	1.600	2.865	
ROUTE	AP#7R	20	2	.06720	123.98	6.614	1.84552	1.600	2.883	
COMPUTE NM HYD	A10-D	-	3	.01020	20.86	.841	1.54680	1.500	3.196	PER IMP=50.00
ADD HYD	AP#8	2& 3	20	.07740	138.28	7.456	1.80614	1.600	2.791	
ROUTE	AP#8R	20	2	.07740	136.11	7.456	1.80615	1.600	2.748	
ADD HYD	AP#9	10& 2	10	.35950	701.38	34.840	1.81709	1.550	3.048	
ROUTE	AP#9R	10	2	.35950	700.23	34.840	1.81709	1.550	3.043	
COMPUTE NM HYD	A11-D	-	3	.00860	20.85	.919	2.00463	1.500	3.787	PER IMP=76.00
ADD HYD	AP#10	2& 3	20	.36810	718.26	35.759	1.82147	1.550	3.049	
COMPUTE NM HYD	B1-D&AP#11	-	3	.02300	53.05	2.286	1.86376	1.500	3.604	PER IMP=68.00
ROUTE	AP#11R	3	2	.02300	49.30	2.286	1.86378	1.550	3.349	
COMPUTE NM HYD	B2-D	-	3	.03500	76.65	3.216	1.72289	1.500	3.422	PER IMP=60.00
ADD HYD	AP#12	2& 3	10	.05800	122.10	5.502	1.77874	1.500	3.289	
ROUTE	AP#12R	10	2	.05800	117.16	5.502	1.77876	1.550	3.156	
COMPUTE NM HYD	B3-D	-	3	.04360	81.77	3.597	1.54680	1.500	2.931	PER IMP=50.00
ADD HYD	AP#13	2& 3	10	.10160	196.47	9.099	1.67920	1.550	3.021	
ROUTE	AP#13R	10	2	.10160	195.91	9.099	1.67921	1.550	3.013	
COMPUTE NM HYD	B4-D	-	3	.02300	47.03	1.897	1.54680	1.500	3.195	PER IMP=50.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = TS_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	AP#14	2& 3	10	.12460	237.27	10.996	1.65476	1.550	2.975	
ROUTE	AP#14R	10	12	.12460	236.83	10.996	1.65477	1.550	2.970	
COMPUTE NM HYD	S1-D&AP#15	-	3	.03140	71.05	3.033	1.81093	1.500	3.536	PER IMP=65.00
ROUTE	AP-15R	3	2	.03140	69.21	3.033	1.81095	1.500	3.444	
COMPUTE NM HYD	S2-D	-	3	.01630	33.33	1.345	1.54680	1.500	3.195	PER IMP=50.00
ADD HYD	AP#16	2& 3	10	.04770	102.54	4.377	1.72066	1.500	3.359	
ROUTE	AP#16R	10	2	.04770	100.02	4.377	1.72068	1.550	3.276	
COMPUTE NM HYD	S3-D	-	3	.05670	111.51	4.678	1.54680	1.500	3.073	PER IMP=50.00
ADD HYD	AP#17	2& 3	10	.10440	208.85	9.055	1.62623	1.500	3.126	
ROUTE	AP#17R	10	2	.10440	208.86	9.055	1.62624	1.550	3.126	
COMPUTE NM HYD	S4-D	-	3	.04360	84.44	4.006	1.72289	1.550	3.026	PER IMP=60.00
ADD HYD	AP#18	2& 3	10	.14800	293.30	13.061	1.65471	1.550	3.096	
ROUTE	AP#18R	10	2	.14800	282.01	13.061	1.65471	1.550	2.977	
COMPUTE NM HYD	S5-D	-	3	.02380	51.78	2.165	1.70528	1.500	3.399	PER IMP=59.00
ADD HYD	AP#19	2& 3	10	.17180	327.26	15.226	1.66171	1.550	2.976	
ADD HYD	AP#20	12&10	10	.29640	564.09	26.222	1.65879	1.550	2.974	
ADD HYD	PART_AP#21	20&10	10	.66450	1282.35	61.981	1.74891	1.550	3.015	
COMPUTE NM HYD	B5-D_TWRPND	-	3	.03910	50.89	1.489	.71403	1.500	2.033	PER IMP= 5.00
ADD HYD	AP#21	10& 3	20	.70360	1329.61	63.470	1.69140	1.550	2.953	
ROUTE RESERVOIR	AP#22	20	12	.70360	24.77	63.388	1.68920	2.900	.055	AC-FT= 47.808
MODIFY TIME	AP#22	12	12	.70360	30.06	63.388	1.68920	2.950	.067	
ROUTE	AP#22R	12	2	.70360	30.05	63.307	1.68704	2.850	.067	
COMPUTE NM HYD	B6-D	-	3	.04590	63.53	4.433	1.81093	1.700	2.163	PER IMP=65.00
ADD HYD	AP#23	2& 3	10	.74950	89.65	67.740	1.69463	1.700	.187	
ROUTE	AP#23R	10	2	.74950	87.49	67.632	1.69193	1.750	.182	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = TS_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	B7-D	-	3	.05910	90.35	5.819	1.84615	1.650	2.389	PER IMP=67.00
ADD HYD	AP#24	2& 3	10	.80860	172.21	73.451	1.70320	1.700	.333	
ROUTE	AP#24R	10	2	.80860	170.31	73.358	1.70103	1.700	.329	
COMPUTE NM HYD	B8-D	-	3	.08910	80.38	7.350	1.54680	1.900	1.410	PER IMP=50.00
ADD HYD	TS2_DMP.HYD	2& 3	30	.89770	239.50	80.708	1.68572	1.750	.417	
COMPUTE NM HYD	A12-D&AP#26	-	3	.03590	84.31	3.838	2.00463	1.500	3.669	PER IMP=76.00
ROUTE	AP#26R	3	2	.03590	80.90	3.838	2.00464	1.550	3.521	
COMPUTE NM HYD	A13-D	-	3	.04520	79.18	4.366	1.81093	1.600	2.737	PER IMP=65.00
ADD HYD	AP#27	2& 3	10	.08110	159.76	8.204	1.89667	1.550	3.078	
ROUTE	AP#27R	10	2	.08110	152.20	8.204	1.89667	1.600	2.932	
COMPUTE NM HYD	A14-D	-	3	.04520	59.45	4.578	1.89897	1.750	2.055	PER IMP=70.00
ADD HYD	AP#28	2& 3	10	.12630	195.52	12.781	1.89749	1.600	2.419	
ROUTE	AP#28R	10	2	.12630	194.13	12.782	1.89749	1.600	2.402	
COMPUTE NM HYD	A15-D	-	3	.02530	44.20	2.325	1.72289	1.550	2.730	PER IMP=60.00
ADD HYD	PART_AP#33	2& 3	20	.15160	237.29	15.106	1.86835	1.600	2.446	
COMPUTE NM HYD	A17-D&AP#29	-	3	.01080	22.09	.891	1.54680	1.500	3.196	PER IMP=50.00
ROUTE	AP&29R	3	2	.01080	16.02	.891	1.54684	1.600	2.317	
COMPUTE NM HYD	A18-D	-	3	.01030	22.57	.946	1.72289	1.500	3.423	PER IMP=60.00
ADD HYD	AP#30	2& 3	10	.02110	35.43	1.837	1.63273	1.550	2.624	
ROUTE	AP&30R	10	2	.02110	25.29	1.837	1.63269	1.650	1.873	
COMPUTE NM HYD	A19-D	-	3	.01080	20.14	.992	1.72289	1.550	2.914	PER IMP=60.00
ADD HYD	AP#31	2& 3	10	.03190	43.04	2.830	1.66321	1.600	2.108	
ROUTE	AP#31R	10	2	.03190	42.34	2.830	1.66321	1.600	2.074	
COMPUTE NM HYD	A20-D	-	3	.00690	15.12	.634	1.72289	1.500	3.424	PER IMP=60.00
ADD HYD	AP#32	2& 3	10	.03880	52.59	3.464	1.67382	1.600	2.118	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = TS_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ROUTE	AP#32R	10	22	.03880	49.74	3.464	1.67381	1.650	2.003	
ADD HYD	AP#33	20&22	10	.19040	286.03	18.570	1.82870	1.600	2.347	
ROUTE	AP#33R	10	2	.19040	283.46	18.570	1.82870	1.650	2.326	
COMPUTE NM HYD	A16-D	-	3	.06380	71.41	5.263	1.54680	1.750	1.749	PER IMP=50.00
ADD HYD	TS1_DMP.HYD	2& 3	10	.25420	347.92	23.833	1.75795	1.650	2.139	
COMPUTE NM HYD	S6-D&AP#35	-	3	.03780	51.00	3.473	1.72289	1.700	2.108	PER IMP=60.00
ROUTE	AP#35R	3	2	.03780	50.09	3.473	1.72289	1.700	2.070	
COMPUTE NM HYD	S7-D	-	3	.05700	65.54	5.826	1.91658	1.850	1.797	PER IMP=71.00
ADD HYD	AP#36	2& 3	10	.09480	110.86	9.300	1.83933	1.800	1.827	
ROUTE	AP#36R	10	2	.09480	108.65	9.300	1.83934	1.850	1.791	
COMPUTE NM HYD	S8-D	-	3	.06830	81.37	6.468	1.77571	1.750	1.861	PER IMP=63.00
ADD HYD	AP#37	2& 3	10	.16310	189.29	15.768	1.81269	1.800	1.813	
ROUTE	AP#37R	10	2	.16310	188.47	15.768	1.81269	1.800	1.806	
COMPUTE NM HYD	S9-D	-	3	.07480	152.95	6.171	1.54680	1.500	3.195	PER IMP=50.00
ADD HYD	TS3_DMP.HYD	2& 3	20	.23790	235.52	21.939	1.72909	1.750	1.547	
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = DN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
START										TIME= .00
*S										
*S SUNRISE ESTATES										
*S										
*S										
*S 100YR 24-HR STORM WITHOUT SEDIMENT										
*S FILE NAME: DN_DMP.DAT										
*S BY: RICHARD STOCKTON PEER REVIEWED BY:										
*S LAST REVISION: 6-8-99 (kmj HYD=103.2 AND 105.2)										
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM AREA TRIBUTORY TO										
*S THE AMOLE DEL NORTE CHANNEL. THE OUTFLOW HYDROGRAPH FROM THIS MODEL WILL										
*S BE USED IN THE AMOLE DEL NORTE MODEL AN_DMP.DAT.										
*S ANALYSIS ASSUMPTIONS:										
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.										
*S										
*S100 YEAR 24HR STORM DEVELOPED CONDITION										
RAINFALL TYPE= 2										RAIN24= 2.660
*S BASIN 100 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL										
*S BE @ A DENSITY OF 4 DU/AC										
COMPUTE NM HYD	100.00	-	1	.07150	147.19	5.691	1.49238	1.500	3.217	PER IMP=42.00
*S BASIN 101 IS FULLY DEVELOPED WITH SINGLE FAMILY RESIDENTIAL HOMES										
*S WITH A DENSTIY OF 4 DU/AC										
COMPUTE NM HYD	101.00	-	2	.03700	60.32	2.249	1.13994	1.500	2.547	PER IMP=29.00
ADD HYD	101.01	1& 2	3	.10850	207.51	7.940	1.37218	1.500	2.988	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = DN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
*S **AREA 102 IS A MIDDLE SCHOOL (ONSITE DETENTION TO REDUCE RUNOFF)										
COMPUTE NM HYD	102.00	-	4	.04000	32.91	.937	.43936	1.500	1.286	PER IMP= .00
*S ROUTE THE SCHOOL'S RUNOFF IN A 28' F-F RESIDENTIAL STREET, S=2%										
*S ASSUME SECTION EXTENDS TO THE ROW LINE ON BOTH SIDES										
ROUTE	102.10	4	5	.04000	33.70	.937	.43939	1.550	1.316	
*S ADD THE ROUTED FLOW FROM 102 TO THE EARLIER TOTAL										
ADD HYD	102.30	3& 5	6	.14850	235.06	8.878	1.12092	1.500	2.473	
*S **BASIN 103 IS COMPLETELY DEVELOPED										
COMPUTE NM HYD	103.00	-	7	.04400	71.73	2.675	1.13994	1.500	2.547	PER IMP=29.00
*S ADD 103 TO TOTAL										
ADD HYD	103.10	6& 7	8	.19250	306.78	11.553	1.12527	1.500	2.490	
*S **ASSUME FLOW IS ROUTED IN 28' STREET AS EARLIER										
ROUTE	103.20	8	9	.19250	302.60	11.553	1.12527	1.550	2.456	
*S **AREA 104 IS FULLY DEVELOPED										
COMPUTE NM HYD	104.00	-	10	.04400	71.73	2.675	1.13994	1.500	2.547	PER IMP=29.00
*S ADD THE FLOW TO THE TOTAL										
ADD HYD	104.01	9&10	11	.23650	368.85	14.228	1.12800	1.500	2.437	
*S AREA 105 IS A PARK & COA WELL SITE										
COMPUTE NM HYD	105.00	-	12	.02100	28.93	.884	.78962	1.500	2.153	PER IMP= 7.00
ADD HYD	105.10	11&12	13	.25750	397.78	15.112	1.10040	1.500	2.414	
*S ROUTE THE FLOW TO THE EXISTING END OF SAPPHIRE ST.										
ROUTE	105.20	13	14	.25750	410.04	15.112	1.10040	1.550	2.488	
*S AREA 106 IS FULLY DEVELOPED										
COMPUTE NM HYD	106.00	-	15	.02177	35.50	1.324	1.13994	1.500	2.548	PER IMP=29.00

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = DN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE
*S BASIN 300.1 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @									
*S A DENSITY OF 4 DU/AC									
COMPUTE NM HYD	300.10	-	16	.01560	32.12	1.242	1.49238	1.500	3.217 PER IMP=42.00
*S **ADD THE FLOWS FROM BASINS 106 AND 300.1									
ADD HYD	106.10	15&16	17	.03737	67.62	2.565	1.28705	1.500	2.827
*S **TOTAL FLOW IN SAPHIRE ST AT ANALYSIS POINT A									
ADD HYD	106.15	14&17	18	.29487	471.24	17.677	1.12405	1.550	2.497
*S **BASIN 401.12, 401.14, 401.17, 300.2 AND 400.2 DRAINS TO SAPPHIRE ST.									
*S **BASIN 401.12 IS PART OF SUNRISE ESTATES UNIT 1									
COMPUTE NM HYD	401.12	-	19	.01126	23.19	.896	1.49238	1.500	3.218 PER IMP=42.00
*S **ADD THE FLOWS FROM HYDROGRAPH NO 401.12 AND 106.15									
ADD HYD	401.13	19&18	20	.30613	492.01	18.574	1.13760	1.550	2.511
*S **BASIN 300.2 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE									
*S @ A DENSITY OF 4 DU/AC									
COMPUTE NM HYD	300.20	-	1	.01180	24.30	.939	1.49238	1.500	3.218 PER IMP=42.00
*S ** BASIN 401.14 IS PART OF SUNRISE ESTATES UNIT 1									
COMPUTE NM HYD	401.14	-	2	.01117	23.00	.889	1.49238	1.500	3.218 PER IMP=42.00
*S **ADD FLOWS FROM HYDROGRAPH NO 401.14 AND 300.2									
ADD HYD	401.15	1& 2	3	.02297	47.30	1.828	1.49235	1.500	3.218
*S **ADD FLOWS FROM HYDROGRAPH NO 401.15 AND 401.13									
ADD HYD	401.16	3&20	4	.32910	534.39	20.402	1.16236	1.550	2.537
*S **BASIN 401.17 IS PART OF SUNRISE ESTATES UNIT 1									
COMPUTE NM HYD	401.17	-	5	.00661	13.62	.526	1.49238	1.500	3.219 PER IMP=42.00
*S **ADD FLOWS FROM HYDROGRAPH NO 401.16 AND 401.17									

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = DN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	401.18	4& 5	6	.33571	546.59	20.928	1.16886	1.550	2.544	
*S ** BASIN 405 DRAINS TO SAPPHIRE ST.										
COMPUTE NM HYD	405.00	-	7	.01393	29.03	1.133	1.52461	1.500	3.255	PER IMP=44.00
*S **ADD FLOWS FROM HYDROGRAPH NO 401.18 AND 405										
ADD HYD	405.10	6& 7	8	.34964	572.55	22.061	1.18304	1.550	2.559	
*S ** BASIN 403 DRAINS TO SAPPHIRE ST.										
COMPUTE NM HYD	403.00	-	9	.01480	30.48	1.178	1.49238	1.500	3.217	PER IMP=42.00
*S **ADD FLOWS FROM HYDROGRAPH NO 405.1 AND 403										
ADD HYD	405.15	8& 9	10	.36444	599.85	23.239	1.19560	1.550	2.572	
*S ** BASIN 400.2 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE										
*S @ A DENSITY OF 4 DU/AC										
COMPUTE NM HYD	400.20	-	11	.03222	67.09	2.619	1.52461	1.500	3.254	PER IMP=44.00
*S **ADD FLOWS FROM HYDROGRAPH NO 405.15 AND 400.2 TOGETHER TO GET THE FLOW										
*S IN SAPPHIRE ST. @ ANALYSIS PT B										
ADD HYD	405.16	10&11	12	.39666	659.86	25.858	1.22232	1.550	2.599	
*S**********										
*S**********										
*S **BASINS 200,201, & 202 DRAIN TO KIMELA DR										
COMPUTE NM HYD	200.00	-	13	.05300	86.39	3.222	1.13994	1.500	2.547	PER IMP=29.00
*S **ROUTE FLOW TO THE END OF KIMELA DR.										
ROUTE	200.10	13	14	.05300	85.06	3.222	1.13995	1.550	2.508	
COMPUTE NM HYD	201.00	-	15	.02600	42.39	1.581	1.13994	1.500	2.547	PER IMP=29.00
ADD HYD	201.10	15&14	16	.07900	124.93	4.803	1.13993	1.500	2.471	
*S **BASIN 202 IS AN ELEMENTARY SCHOOL (ONSITE DETENTION TO REDUCE RUNOFF)										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = DN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	202.00	-	17	.00925	7.62	.217	.43936	1.500	1.286	PER IMP= .00
*S **BASIN 202.05 IS THE ELEMENTARY SCHOOL PARKING LOT THAT WILL DRAIN TO KIMELA										
COMPUTE NM HYD	202.05	-	18	.00375	10.31	.485	2.42724	1.500	4.299	PER IMP=100.00
*S **ADD THE BASINS OF THE ELEMENTARY SCHOOL AND PARKING LOT										
ADD HYD	202.06	17&18	19	.01300	17.93	.702	1.01230	1.500	2.155	
*S **ADD THE BASINS TOGETHER TO GET THE FLOW IN KIMELA DR @ ANALYSIS PT C										
ADD HYD	202.10	16&19	20	.09200	142.86	5.505	1.12190	1.500	2.426	
*S**********										
*S**********										
*S **BASINS 402 THRU 404 ARE CURRENTLY UNDEVELOPED, FOR PURPOSES										
*S OF THIS REPORT, ASSUME ALL BASINS WILL BE BUILT OUT @ THEIR CURRENT										
*S ZONING										
*S **BASIN 402 IS UNIT 2 OF SUNRISE ESTATES										
COMPUTE NM HYD	402.00	-	6	.05200	107.04	4.139	1.49238	1.500	3.216	PER IMP=42.00
*S **ADD BASIN 402 TO THE TOTAL FLOW @ THE END OF EXTENDED KIMELA										
ADD HYD	402.10	20& 6	7	.14400	249.90	9.644	1.25568	1.500	2.712	
COMPUTE NM HYD	404.00	-	8	.01080	22.24	.860	1.49238	1.500	3.218	PER IMP=42.00
*S **ADD FLOW TO THAT IN KIMELA DR										
ADD HYD	404.10	7& 8	9	.15480	272.15	10.503	1.27219	1.500	2.747	
*S **ADD TO FLOW IN SAPPHIRE @ ANALYSIS PT D										
ADD HYD	404.20	9&12	10	.55146	917.09	36.362	1.23632	1.500	2.598	
*S DESIGN A ~~R~~D ETENTION FACILITY TO REDUCE TO FLOW TO THAT WHICH WILL										
*S FIT IN A 48" RCP @ S=1.8%										
ROUTE RESERVOIR	405.40	10	11	.55146	189.77	36.361	1.23632	1.950	.538	AC-FT= 18.060

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AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994          RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = DN_DMP.DAT                                                                    USER NO.= STOCKTON.S94

                                 FROM TO                      PEAK         RUNOFF                TIME TO    CFS
                    HYDROGRAPH    ID ID          AREA     DISCHARGE        VOLUME      RUNOFF     PEAK      PER
COMMAND           IDENTIFICATION  NO.NO.       (SQ MI)      (CFS)         (AC-FT)    (INCHES)  (HOURS)    ACRE


*S ROUTE FLOW FROM THE DETENTION POND TO THE AMOLE DEL NORTE CHANNEL
ROUTE             DN4_DMP.HYD   11   12        .55146       189.75        36.362      1.23632    2.000     .538
*S
*S HYD=DN4_DMP.HYD IS THE FLOW INTO THE AMOLE DEL NORTE AT ARENAL
*S*************************************************************************
*S*************************************************************************
*S **BASIN 500 IS UNIT ONE OF THE PROPOSED LONGFORD SD
COMPUTE NM HYD        500.00   -    16        .02491        51.27         1.982      1.49238    1.500    3.217 PER IMP=42.00
*S **BASIN 501 IS THE AREA PROPOSED AS FUTURE LONGFORD SD DRAINING
*S **DIRECTLY TO THE AMOLE CHANNEL
COMPUTE NM HYD        501.00   -    17        .03663        75.41         2.916      1.49238    1.500    3.217 PER IMP=42.00
*S **COMBINE BASINS 500 AND 501 TOGETHER TO REPRESENT THE NORTHERN PART OF THE
*S **LONGFORD SD
ADD HYD           DN2_DMP.HYD 16&17  18        .06154       126.68         4.898      1.49237    1.500    3.217
*S **BASIN 502 IS THE SOUTHERN PART OF THE LONGFORD SD
COMPUTE NM HYD    DN3_DMP.HYD   -    19        .05788       120.52         4.706      1.52461    1.500    3.254 PER IMP=44.00
*S **BASIN 503 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S **A DENSITY OF 4 DU/AC. THE DISCHARGE FROM THIS BASIN DRAINS TO THE AMOLE
*S DEL NORTE CHANNEL AND DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT
*S SITE.
COMPUTE NM HYD    DN1_DMP.HYD   -    20        .03752        77.24         2.986      1.49238    1.500    3.217 PER IMP=42.00
*S*************************************************************************
*S **BASIN 504 IS CURRENTLY UNDEVELOPED, ASSUME FUTURE DEVELOPMENT WILL BE @
*S **A DENSITY OF 4 DU/AC. THE DISCHARGE FROM THIS BASIN TRAVEL ALONG SAGE RD.
```

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/08/1999
INPUT FILE = DN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE
*S AND ENTERS THE AMOLE DEL NORTE CHANNEL, DOES NOT AFFECT THE ARENAL/UNSER									
*S DRAINAGE MANAGEMENT SITE.									
COMPUTE NM HYD	504.00	-	1	.03667	76.36	2.982	1.52461	1.500	3.254 PER IMP=44.00
*S **BASIN 505 IS FULLY DEVELOPED AND DRAINS SOUTH TO BLAKE RD..DISCHARGE FROM									
*S THIS BASIN DOES NOT AFFECT THE ARENAL/UNSER DRAINAGE MANAGEMENT SITE.									
COMPUTE NM HYD	505.00	-	2	.02618	42.68	1.592	1.13994	1.500	2.547 PER IMP=29.00
FINISH									

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/19/1998
INPUT FILE = AN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION

```
START                                                                    TIME=.00
*S
*S      AMOLE DEL NORTE WATERSHED
*S
*S
*S 100-YR, 24-HR STORM
*S FILE NAME: AN_DMP.DAT
*S BY: RICHARD STOCKTON   PEER REVIEWED BY: DEBORAH DIXON
*S LAST REVISION: 5-19-98
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM THE TIERRA BAYITA
*S BASIN, TOWER/SAGE BASIN AND THE SOUTH AMOLE DEL NORTE BASIN.  FLOWS FROM
*S THESE BASINS ARE CONVEYED TO AMOLE DETENTION FACILITY VIA THE AMOLE DEL
*S NORTE CHANNEL.  THIS MODEL TAKES TWO INFLOW HYDROGRAPHS DERIVED FROM MODELS
*S FOR THE TIERRA BAYITA CHANNEL AND FROM THE UNSER DIVERSION/ATRISCO BUSINESS
*S PARK, RESPECTIVELY.  THE TIERRA BAYITA MODEL WAS DEVELOPED BY GREINER (AND
*S ACCEPTED BY THE CITY), TO DETERMINE THE SYSTEM CAPACITY OF ALL MAJOR FACIL-
*S ITIES WITHIN THE TIERRA BAYITA BASIN.  GREINER'S MODEL INCLUDES THE UNSER
*S DIVERSION SYSTEM AND SAD 214 POND MODIFICATIONS, AS DESIGNED BY EASTERLING
*S AND ASSOCIATES (AND ACCEPTED BY THE AMAFCA), BY RECALLING THE OUTFLOW
*S HYDROGRAPH FROM THE UNSER DIVERSION MODEL.  ADDITIONALLY, EASTERING'S MODEL
*S INCLUDES THE ATRISCO BUSINESS PARK DEVELOPMENT.  THE MODEL'S OUTFLALL IS
*S INTO THE NORTH/SOUTH COORS DETENTION FACILITY, AS IS THE TIERRA BAYITA
*S CHANNEL.  DUE TO THE NUMBER OF AVAILABLE STORED HYDROGRAPHS (MAX=10) FOR
*S THIS PROJECT, THE TIERRA BAYITA AND UNSER DIVERSION MODELS WERE COMBINED.
*S
*S INCLUDED IN THE SOUTH AMOLE DEL NORTE BASIN, IS THE SUNRISE ESTATES
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AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/19/1998
INPUT FILE = AN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S DEVELOPMENT DEVELOPED BY FRED ARFMAN.										
*S										
*S NOTE: AN "D" (DEVELOPED) HAS BEEN PLACED IN FRONT OF EACH SUB-BASIN										
*S HYDROGRAPH DESIGNATION DUE TO THE LIMITATIONS OF AHYMO.										
*S										
*S ANALYSIS ASSUMPTIONS:										
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.										
*S										
*S 2. EXISTING DEVELOPMENTS WITH RETENTION PONDS ARE MODELED TO DISCHARGE										
*S FLOWS EQUIVALANT TO HISTORIC FLOW RATES. THIS IS ACHIEVED BY ADJUSTING										
*S THE LAND TREATMENT FACTORS TO PRE-DEVELOPMENT NUMBERS.										
*S										
*S 3. THE PUNCH HYD COMMAND WAS ADDED TO THE END OF THIS FILE SO THE OUTFALL										
*S HYDROGRAPH COULD BE USED IN THE AMOLE ARROYO DEVELOPED CONDITIONS MODEL										
*S AA_DMP.DAT, WHICH WILL BE USED IN THE ANALYSIS OF THE AMOLE & HUBBELL										
*S SYSTEM.										
*S										
*S100 YEAR 24HR STORM DEVELOPED CONDITION										
RAINFALL TYPE= 2										RAIN24= 2.660
*S RECALL HYDROGRAPH FROM THE TIERRA BAYITA BASIN										
*S HYD=TB_DMP.HYD IS *****AP 35*****										
RECALL HYD	TB_DMP.HYD	-	2	2.73600	2785.85	290.526	1.99099	1.600	1.591	
*S RECALL HYDROGRAPH FROM THE ATRISCO BUSINESS PARK										
*S HYD=AB_DMP.HYD IS *****AP 35.1*****										
RECALL HYD	AB_DMP.HYD	-	3	.84000	325.77	90.325	2.01618	1.700	.606	
*S ADD THE TWO RECALLED HYDROGRAPHS										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/19/1998
INPUT FILE = AN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ADD HYD	NPOND.IN	2& 3	4	3.57600	3097.16	380.851	1.99691	1.600	1.353	
*S ROUTE FLOWS THROUGH THE NORTH POND. PRIMARY SPILLWAY=24" PIPE										
*S AND OVER FLOW SPILLWAY IS WEIR FLOW INTO SOUTH POND.										
ROUTE RESERVOIR	NPOND.OUT	4	12	3.57600	3070.80	379.184	1.98817	1.600	1.342	AC-FT= 8.193
*S ROUTE COMBINED FLOW THROUGH THE SOUTH POND WITH THE ROUTE RESERVOIR.										
*S THE FLOW FROM HYDROGRAPH SPOND.OUT IS AP36.										
ROUTE RESERVOIR	SPOND.OUT	12	18	3.57600	1447.71	378.916	1.98677	2.050	.633	AC-FT= 68.403
*S HYD NO. SPOND.OUT IS ***** AP 36.1 *****										
*S END TIERRA BAYITA BASIN										
*S BEGIN THE TOWER/SAGE BASIN										
*S RECALL HYD FROM TOWER/SAGE AT TOWER RD										
RECALL HYD	TS1_DMP.HYD	-	10	.25420	347.92	23.833	1.75795	1.650	2.139	
*S ADD THE FLOW FROM TS_DMP.HYD TO THE N/S COORS OUTFLOW										
*S HYD=BEGIN.ADN IS *****AP 36*****										
ADD HYD	BEGIN.ADN	10&18	20	3.83020	1627.44	402.749	1.97158	2.000	.664	
*S ROUTE THE FLOW FROM BEGIN.ADN INTO THE AMOLE DEL NORTE CHANNEL TO SAN YGNACIO										
ROUTE	BEGIN.ADN	20	12	3.83020	1623.84	402.614	1.97092	2.050	.662	
*S RECALL HYD FROM TOWER/SAGE AT SAN YGNACIO RD										
RECALL HYD	TS2_DMP.HYD	-	30	.89770	239.28	80.708	1.68571	1.750	.416	
*S ADD THE FLOW FROM HYD=TS2_DMP.HYD TO THE FLOW IN THE AMOLE DEL NORTE										
*S HYD=ADN.SAN.YG IS *****AP 36.2*****										
ADD HYD	ADN.SAN.YG	30&12	3	4.72790	1806.11	483.322	1.91677	2.000	.597	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM SAN YGANCIO										
*S TO JUST UPSTREAM OF SAGE.										
ROUTE	D33001.5	3	12	4.72790	1804.75	483.127	1.91600	2.050	.596	
*S RECALL HYD FROM TOWER/SAGE AT SAGE										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/19/1998
INPUT FILE = AN_DMP.DAT USER NO.= STOCKTON.S94

PAGE = 1

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
RECALL HYD	TS3_DMP.HYD	-	20	.23790	235.52	21.939	1.72909	1.750	1.547	
*S ADD HYD=TS3_DMP.HYD TO THE FLOW IN THE AMOLE DEL NORTE										
*S HYD=ADN.SAGE IS *****AP 37*****										
ADD HYD	ADN.SAGE	12&20	3	4.96580	1984.69	505.066	1.90704	2.000	.624	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM SAGE TO JUST DOWNSTREAM										
*S OF THE SAGE CROSSING.										
ROUTE	D33002.5	3	12	4.96580	1983.24	505.018	1.90686	2.000	.624	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE SAGE CROSSING										
*S TO JUST UPSTREAM OF THE ARENAL CROSSING.										
ROUTE	D33004.5	12	9	4.96580	1985.80	504.792	1.90601	2.050	.625	
*S END TOWER/SAGE BASIN *** BEGIN SOUTH AMOLE DEL NORTE BASIN (350** SERIES)										
*S RECALL THE BASIN 503 HYDROGRAPH FROM THE SUNSET ESTATES MODEL.										
RECALL HYD	DN1_DMP.HYD	-	20	.03750	77.24	2.986	1.49317	1.500	3.218	
*S ADD THE RECALLED HYDROGRAPH TO THE COMBINED FLOW FROM SUB-BASIN 33004.5										
*S THIS IS THE TOTAL FLOW IN THE AMOLE DEL NORTE.										
ADD HYD	D35001.1	9&20	3	5.00330	1998.13	507.778	1.90291	2.050	.624	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE ARENAL CROSSING										
*S TO THE 6435 FEET NORTH OF THE AMOLE DETENTION FACILITY.										
ROUTE	D35001.5	3	11	5.00330	1998.60	507.688	1.90257	2.050	.624	
*S RECALL THE 501 & 500 HYDROGRAPHS FROM THE SUNSET ESTATES MODEL.										
RECALL HYD	DN2_DMP.HYD	-	17	.06150	126.68	4.898	1.49322	1.500	3.219	
*S ADD THE RECALLED HYDROGRAPH TO THE COMBINED FLOW FROM SUB-BASIN 35001.5										
*S THIS IS THE TOTAL FLOW IN THE AMOLE DEL NORTE.										
ADD HYD	D35001.2	17&11	3	5.06480	2018.82	512.586	1.89760	2.050	.623	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE ARENAL CROSSING										
*S TO THE 6035 FEET NORTH OF THE AMOLE DETENTION FACILITY.										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/19/1998
INPUT FILE = AN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE	D35001.6	3	11	5.06480	2015.68	512.442	1.89707	2.050	.622	
*S RECALL THE 502 HYDROGRAPH FROM THE SUNSET ESTATES MODEL.										
RECALL HYD	DN3_DMP.HYD	-	19	.05790	120.52	4.706	1.52409	1.500	3.252	
*S ADD THE RECALLED HYDROGRAPH TO THE COMBINED FLOW FROM SUB-BASIN 35001.6										
*S THIS IS THE TOTAL FLOW IN THE AMOLE DEL NORTE.										
ADD HYD	D35001.3	19&11	3	5.12270	2035.28	517.148	1.89285	2.050	.621	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE ARENAL CROSSING										
*S TO THE 5500 FEET NORTH OF THE AMOLE DETENTION FACILITY.										
ROUTE	D35001.7	3	11	5.12270	2034.66	517.125	1.89277	2.050	.621	
*S RECALL THE DEVELOPED CONDITIONS HYDROGRAPH FROM THE SUNSET ESTATES MODEL.										
RECALL HYD	DN4_DMP.HYD	-	22	.55150	190.05	36.362	1.23623	2.000	.538	
*S ADD THE RECALLED HYDROGRAPH TO THE COMBINED FLOW FROM SUB-BASIN 35001.7										
*S THIS IS THE TOTAL FLOW IN THE AMOLE DEL NORTE.										
ADD HYD	D35001.4	11&22	3	5.67420	2224.46	553.487	1.82896	2.050	.613	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM THE ARENAL CROSSING										
*S TO THE 5400 FEET NORTH OF THE AMOLE DETENTION FACILITY.										
ROUTE	D35001.8	3	11	5.67420	2204.18	553.159	1.82788	2.100	.607	
*S BASIN 35208										
COMPUTE NM HYD	D35208	-	2	.07330	139.85	6.583	1.68393	1.550	2.981	PER IMP=56.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35001.8 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35208.										
ADD HYD	D35208.1	11& 2	3	5.74750	2231.89	559.742	1.82604	2.100	.607	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 5362 FEET NORTH OF										
*S THE AMOLE DETENTION FACILITY TO 4807 _FEET NORTH OF THE AMOLE DETENTION FACIL										
ROUTE	D35208.5	3	11	5.74750	2234.88	559.616	1.82563	2.100	.608	
*S BASIN 35209										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/19/1998
INPUT FILE = AN_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	D35209	-	2	.04070	75.85	3.572	1.64566	1.550	2.912	PER IMP=54.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35208.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35209.										
ADD HYD	D35209.1	11& 2	3	5.78820	2250.04	563.188	1.82436	2.100	.607	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 4807 FEET NORTH OF										
*S THE AMOLE DETENTION FACILITY TO 3625 FEET NORTH OF THE AMOLE DETENTION FACILI										
ROUTE	D35209.5	3	12	5.78820	2238.07	562.876	1.82335	2.100	.604	
*S BASINS 35301, 35303, & 35305 THAT ARE IN THE EXISTING CONDITIONS MODEL										
*S HAVE BEEN REMOVED. THESE BASINS HAVE BEEN ADDED TO THE AMOLE										
*S ARROYO MODEL TO SIMULATE DIVERSION CREATED BT THE UNSER EXTENTION.										
*S (SEE THE RIO BRAVO SECTOR PLAN)										
*S BASIN 35302										
COMPUTE NM HYD	D35302	-	2	.16360	276.71	13.095	1.50076	1.550	2.643	PER IMP=41.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35209.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE COMBINED FLOW FROM SUB-BASIN 35302.1.										
ADD HYD	D35302.1	12& 2	4	5.95180	2296.06	575.971	1.81449	2.100	.603	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 3625 FEET NORTH OF										
*S THE AMOLE DETENTION FACILITY TO 2125 FEET NORTH OF THE AMOLE DETENTION FACILI										
ROUTE	D35302.5	4	12	5.95180	2272.27	575.584	1.81327	2.100	.597	
*S BASIN 35304 IS CURRENTLY DEVELOPED WITH MINIMAL VEGETATION.										
COMPUTE NM HYD	D35304	-	2	.09850	213.44	9.186	1.74851	1.500	3.386	PER IMP=60.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35302.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35304										
ADD HYD	D35304.1	12& 2	4	6.05030	2305.55	584.769	1.81221	2.100	.595	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 2125 FEET NORTH OF										
*S THE AMOLE DETENTION FACILITY TO 1325 FEET NORTH OF THE AMOLE DETENTION FACILI										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =05/19/1998
INPUT FILE = AN_DMP.DAT USER NO.= STOCKTON.S94

PAGE = 1

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE	D35304.5	4	12	6.05030	2294.15	584.560	1.81156	2.150	.592	
*S BASIN 35306 IS CURRENTLY PARTIALY DEVELOPED WITH MINIMAL VEGETATION.										
COMPUTE NM HYD	D35306	-	2	.09480	188.59	8.663	1.71345	1.500	3.108	PER IMP=59.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35304.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE COMBINED FLOW FROM SUB-BASIN 35306.1.										
ADD HYD	D35306.1	12& 2	4	6.14510	2325.85	593.223	1.81005	2.100	.591	
*S ROUTE THE COMBINED FLOWS IN THE AMOLE DEL NORTE FROM 1325 FEET NORTH OF										
*S THE AMOLE DETENTION FACILITY TO THE AMOLE DETENTION FACILITY.										
ROUTE	D35306.5	4	12	6.14510	2317.82	592.884	1.80901	2.150	.589	
*S BASIN 35307 IS CURRENTLY PARTIALY DEVELOPED WITH MINIMAL VEGETATION.										
COMPUTE NM HYD	D35307	-	2	.09730	168.09	8.316	1.60247	1.550	2.699	PER IMP=50.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 35306.5 (TOTAL FLOW IN AMOLE DEL NORTE										
*S CHANNEL) TO THE FLOW FROM SUB-BASIN 35307.										
*S HYD NO. AN_DMP.HYD IS ***** AP 39 *****										
ADD HYD	AN_DMP.HYD	12& 2	3	6.24240	2349.42	601.200	1.80580	2.150	.588	
*S THE COMBINED FLOW FROM SUB-BASIN AN_DMP IS THE TOTAL FLOW INTO THE AMOLE										
*S DETENTION FACILITY.										
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = SB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION

```
START                                                                                    TIME=.00
*S
*S      SACATE BLANCO WATERSHED
*S
*S
*S 100-YR, 24-HR STORM WITH SEDIMENT
*S FILE NAME: SB_DMP.DAT
*S BY: RICHARD STOCKTON   PEER REVIEWED BY: CLINT DODGE
*S LAST REVISION: 04-22-98
*S*************************************************************************
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM THE SACATE BLANCO
*S WATERSHED.  FLOWS FROM THIS BASIN IS CONVEYED TO THE AMOLE DETENTION FACILITY
*S VIA THE AMOLE ARROYO.  BASIN BOUNDARIES WERE DETERMINED FROM NOVEMBER 1995
*S AREIAL, TOPOGRAPHICAL MAPS AND PREVIOUS STUDIES.
*S
*S*********************************************************************
*S ANALYSIS ASSUMPTIONS:
*S*********************************************************************
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.
*S
*S 2. THE PUNCH HYD COMMAND WAS ADDED TO THE END OF THIS FILE SO THE OUTFALL
*S    HYDROGRAPH COULD BE USED IN THE AMOLE ARROYO DEVELOPED CONDITIONS MODEL
*S    AA_DMP.DAT, WHICH WILL BE USED IN THE ANALYSIS OF THE AMOLE/HUBBLE
*S    LAKE DETENTION SYSTEM.
*S
*S 3. FLOWS GENERATED FROM AREAS WEST OF THE POWERLINE ARE DIVERTED TO THE RIO
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AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = SB_DMP.DAT USER NO.= STOCKTON.S94


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                                FROM TO                    PEAK        RUNOFF                TIME TO    CFS
                   HYDROGRAPH   ID   ID        AREA     DISCHARGE     VOLUME      RUNOFF    PEAK       PER
COMMAND          IDENTIFICATION NO.  NO.     (SQ MI)     (CFS)       (AC-FT)    (INCHES)  (HOURS)     ACRE      NOTATION

*S     BRAVO CHANNEL.  THIS FACILITY IS CALLED THE SOUTH POWERLINE DIVERSION.
*S
*S 4. BULKING FACTORS OF 6% HAVE BEEN ADDED FOR DEVELOPED CONDITIONS
*S
*S*************************************************************************
*S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL  TYPE= 2                                                                                  RAIN24=2.660
*S CALCULATE THE FLOW FROM SUB-BASIN 60101.
*S BULK FLOWS 6%
SEDIMENT BULK                                                                                      PK BF =1.06
COMPUTE NM HYD        D60101   -     2        .04820       104.46       5.045      1.96269    1.500    3.386 PER IMP=67.00
*S ROUTE FLOW FROM SUB-BASIN 60101 THROUGH SUB-BASIN 60102.
ROUTE               D60101.5    2   11        .04820       105.73       5.045      1.96269    1.550    3.427
*S CALCULATE THE FLOW FROM SUB-BASIN 60102.
*S BULK FLOWS 6%
SEDIMENT BULK                                                                                      PK BF =1.06
COMPUTE NM HYD        D60102   -     2        .10190       197.93       9.956      1.83202    1.550    3.035 PER IMP=60.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 60101.5 TO THE FLOW FROM SUB-BASIN 60102.
ADD HYD             D60102.1 11& 2   3        .15010       303.66      15.002      1.87398    1.550    3.161
*S ROUTE COMBINED FLOW FROM SUB-BASIN 60102.1 THROUGH SUB-BASIN 60103.
ROUTE               D60102.5    3   11        .15010       298.24      15.002      1.87398    1.600    3.105
*S CALCULATE THE FLOW FROM SUB-BASIN 60103.
*S BULK FLOWS 6%
SEDIMENT BULK                                                                                      PK BF =1.06
COMPUTE NM HYD        D60103   -     2        .03920        75.49       3.485      1.66692    1.550    3.009 PER IMP=51.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 60102.5 TO THE FLOW FROM SUB-BASIN 60103.
```

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = SB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
ADD HYD	D60103.1	11& 2	9	.18930	370.74	18.487	1.83110	1.550	3.060	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN 60104.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60104	-	2	.03910	82.00	3.151	1.51117	1.500	3.277	PER IMP=40.00
*S ROUTE FLOW FROM SUB-BASIN 60104 THROUGH SUB-BASIN 60105.										
ROUTE	D60104.5	2	11	.03910	52.66	3.151	1.51119	1.600	2.104	
*S CALCULATE THE FLOW FROM SUB-BASIN 60105.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60105	-	2	.10400	211.83	9.800	1.76691	1.550	3.183	PER IMP=54.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 60104.5 TO THE FLOW FROM SUB-BASIN 60105.										
ADD HYD	D60105.1	11& 2	3	.14310	259.97	12.952	1.69703	1.550	2.839	
*S CALCULATE THE FLOW FROM SUB-BASIN 60106.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60106	-	2	.03640	82.27	3.287	1.69326	1.500	3.532	PER IMP=49.00
*S ROUTE FLOW FROM SUB-BASIN 60106 THROUGH SUB-BASIN 60105.										
ROUTE	D60106.5	2	11	.03640	47.54	3.287	1.69327	1.600	2.041	
*S CALCULATE THE FLOW FROM SUB-BASIN 60107A.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60107A	-	2	.01890	42.72	1.707	1.69326	1.500	3.532	PER IMP=49.00
*S ROUTE FLOW FROM SUB-BASIN 60107A THROUGH SUB-BASIN 60107B.										
ROUTE	D60107A.5	2	12	.01890	20.27	1.707	1.69328	1.650	1.676	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = SB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
*S CALCULATE THE FLOW FROM SUB-BASIN 60107B.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60107B	-	6	.04300	99.31	4.060	1.77034	1.500	3.609	PER IMP=54.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 60107A.5 TO THE FLOW FROM SUB-BASIN 60107B										
ADD HYD	D60107B.1	12& 6	7	.06190	110.89	5.767	1.74680	1.500	2.799	
*S ADD THE ROUTED FLOW FROM SUB-BASIN 60106.5 TO THE FLOW FROM SUB-BASIN 60105.										
ADD HYD	D60105.1	11& 2	4	.05530	79.86	4.994	1.69325	1.550	2.256	
*S ADD THE COMBINED FLOW FROM SUB-BASIN 60107B.1 TO THE COMBINED FLOW										
*S FROM SUB-BASIN 60105.1.										
ADD HYD	D60107B.2	7& 4	5	.11720	184.39	10.761	1.72153	1.550	2.458	
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 60107B.2 THROUGH SUB-BASIN 60112.										
ROUTE	D60107.5	5	15	.11720	157.56	10.761	1.72154	1.600	2.101	
*S CALCULATE THE FLOW FROM SUB-BASIN 60109.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60109	-	19	.05770	130.40	5.211	1.69326	1.500	3.531	PER IMP=49.00
*S CALCULATE THE FLOW FROM SUB-BASIN 60111.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60111	-	2	.01570	35.49	1.418	1.69326	1.500	3.532	PER IMP=49.00
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 60111 THROUGH SUB-BASIN 60109.										
ROUTE	D60111.5	2	11	.01570	34.86	1.418	1.69329	1.500	3.470	
*S ADD THE ROUTED FLOW FROM SUB-BASIN 60111.5 TO THE COMBINED FLOW										
*S FROM SUB-BASIN 60109.1.										
ADD HYD	D60111.2	19&11	3	.07340	165.26	6.629	1.69325	1.500	3.518	

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = SB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 60111.2 THROUGH SUB-BASIN 60112.										
ROUTE	D60111.6	3	11	.07340	131.78	6.629	1.69326	1.600	2.805	
*S CALCULATE THE FLOW FROM SUB-BASIN 60112.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60112	-	2	.09470	203.18	9.848	1.94985	1.550	3.352	PER IMP=66.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 60111.6 TO THE FLOW FROM SUB-BASIN 60112.										
ADD HYD	D60112.1 11& 2		3	.16810	334.04	16.477	1.83781	1.550	3.105	
*S ADD THE COMBINED FLOW FROM SUB-BASIN 60112.1 TO THE ROUTED FLOW										
*S FROM SUB-BASIN 60107B.5.										
ADD HYD	D60112.2 15& 3		4	.28530	472.84	27.237	1.79004	1.550	2.590	
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 60112.2 THROUGH SUB-BASIN 60118										
*S TO THE HEAD OF THE SACATE BLANCO DIVERSION CHANNEL.										
ROUTE	D60112.5	4	19	.28530	470.04	27.237	1.79004	1.600	2.574	
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60116	-	3	.08370	189.16	7.559	1.69326	1.500	3.531	PER IMP=49.00
*S ROUTE THE FLOW FROM SUB-BASIN 60116 THROUGH SUB-BASIN 60117,										
*S TO THE HEAD OF THE SACATE BLANCO DIVERSION CHANNEL.										
ROUTE	D60116.5	3	11	.08370	143.77	7.559	1.69326	1.600	2.684	
*S CALCULATE THE FLOW FROM SUB-BASIN 60117.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60117	-	2	.10650	227.03	11.394	2.00593	1.550	3.331	PER IMP=69.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 60116.5 TO THE FLOW FROM SUB-BASIN 60117										
*S HYD NO. D60117.1 IS ***** AP 61 *****										

AMOLE-HUBBELL DRAINAGE MANAGEMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = SB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
ADD HYD	D60117.1	11& 2	3	.19020	368.83	18.952	1.86833	1.550	3.030	
*S ADD THE COMBINED FLOW FROM SUB-BASIN 60117.1 TO THE ROUTED FLOW										
*S FROM SUB-BASIN 60112.5.										
ADD HYD	D60117.2	19& 3	4	.47550	819.59	46.190	1.82136	1.600	2.693	
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN 60117.2 THROUGH SUB-BASIN 60118,										
*S IN THE SACATE BLANCO DIVERSION CHANNEL.										
ROUTE	D60117.5	4	11	.47550	727.88	46.190	1.82136	1.650	2.392	
*S CALCULATE THE FLOW FROM SUB-BASIN 60118.										
*S BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	D60118	-	2	.08550	144.92	8.544	1.87366	1.600	2.648	PER IMP=63.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN 60117.5 TO THE FLOW FROM SUB-BASIN 60118.										
ADD HYD	D60118.1	11& 2	3	.56100	868.46	54.734	1.82933	1.650	2.419	
*S ADD THE COMBINED FLOW FROM SUB-BASIN 60118.1 TO THE COMBINED FLOW										
*S FROM SUB-BASIN 60103.1										
*S HYD NO. SB_DMP.HYD IS ***** AP 62 *****										
ADD HYD	SB_DMP.HYD	9& 3	99	.75030	1183.46	73.220	1.82978	1.650	2.465	
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION

```
START                                                                                    TIME= .00
*S
*S          RIO BRAVO
*S
*S
*S
*S 100-YR, 24-HR STORM WITHOUT SEDIMENT
*S FILE NAME: RB_DMP.DAT
*S BY: RICHARD STOCKTON
*S LAST REVISION: 4-22-98
*S*************************************************************************
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM FROM THE
*S SACATE BLANCO WATERSHED WEST OF THE POWERLINE EASEMENT (AKA SOUTH
*S POWERLINE DIVERSION AND DETENTION FACILITY); BORREGA SUB-BASINS 50103,
*S 50104, AND 50105; AND THE RIO BRAVO WATERSHED.  RIO BRAVO SUB-BASINS
*S B-2 AND PART OF B-4 THAT CONTRIBUTE TO THE RIO BRAVO CHANNEL ARE PONDED.
*S THE TOTAL DISCHARGE INTO THE RIO BRAVO CHANNEL IS LIMITED TO 520 CFS.
*S
*S FLOWS FROM THIS WATERSHED ARE CONVEYED TO HUBBLE LAKE DETENTION
*S FACILITY VIA THE HUBBLE LAKE/AMOLE DIVERSION CHANNEL.
*S
*S THE ORGINIAL RIO BRAVO MODEL WAS DEVELOPED BY AVID (AND ACCEPTED BY
*S THE COUNTY).  ASSUMPTIONS MADE IN THE AVID MODEL ARE INCORPORATED
*S HEREIN
*S
*S*********************************************************************
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AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION

```
*S ANALYSIS ASSUMPTIONS:
*S*********************************************************************
*S 1. ALL LAND IN THE RIO BRAVO BASIN IS MODELED AS DEVELOPED CONDITION AT 3 DU/
*S
*S 2. THE PUNCH HYD COMMAND WAS ADDED TO THE END OF THIS FILE SO THE OUTFALL
*S    HYDROGRAPH COULD BE USED IN THE AMOLE DEL NORTE EXISTING CONDITIONS MODEL
*S    AA100D1B.DAT, WHICH WILL BE USED IN THE ANALYSIS OF THE AMOLE ARROYO SYSTE
*S
*S 3. NO BULKING FACTORS WERE ADDED TO THE AREA TRIBUTARY TO THE RIO BRAVO
*S    CHANNEL DUE TO THE INCORPORATION OF DETENTION PONDS. HOWEVER, BULKING FACT
*S    HAVE BEEN ADDED TO BASINS TRIBUTARY TO HUBBELL CHANNEL AND LAKE.
*S
*S*************************************************************************
*S100 YEAR 24HR STORM DEVELOPED CONDITION
RAINFALL  TYPE= 2                                                          RAIN24=2.660
*S*************************************************************************
*S
*S*******************************************************
*S ADD BASINS FROM SOUTH POWERLINE DIVERSION
*S TO THE RIO BRAVO RUN
*S
*S*******************************************************
*S
*S·CALCULATE THE FLOW FROM SUB-BASIN A60104.
COMPUTE NM HYD        A60104   -     2        .11720       232.27       8.911      1.42564    1.500    3.097 PER IMP=40.00
*S
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AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
ROUTE RESERVOIR	POND1.OUT	2	10	.11720	21.17	8.900	1.42391	2.150	.282	AC-FT=5.928
*S										
*S ROUTE FLOWS TO POND 2										
ROUTE	1.00	10	11	.11720	21.15	8.899	1.42372	2.200	.282	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60106										
COMPUTE NM HYD	A60106	-	1	.04800	102.34	4.089	1.59742	1.500	3.331	PER IMP=49.00
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60107A										
COMPUTE NM HYD	A60107A	-	2	.03130	66.74	2.667	1.59742	1.500	3.332	PER IMP=49.00
*S										
ADD HYD	A60107A.1	1& 2	3	.07930	169.08	6.756	1.59741	1.500	3.332	
*S										
*S ROUTE THE COMBINED FLOW FROM SUB-BASIN A60107A.										
ROUTE	6107.50	3	12	.07930	166.14	6.756	1.59742	1.500	3.274	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60108										
COMPUTE NM HYD	A60108	-	1	.09240	175.23	6.561	1.33141	1.500	2.963	PER IMP=35.00
*S										
*S ROUTE FLOW FROM SUB-BASIN A60108 THROUGH SUB-BASIN A60109 TO POND 2										
ROUTE	A60108.5	1	10	.09240	174.15	6.561	1.33141	1.500	2.945	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60109										
COMPUTE NM HYD	A60109	-	2	.04140	88.27	3.527	1.59741	1.500	3.332	PER IMP=49.00
*S										
*S ADD THE ROUTED FLOW FROM SUB-BASIN A60107A.5 TO THE FLOW FROM SUB-BASIN A6010										

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
ADD HYD	POND2.A1	11&12	11	.19650	172.53	15.655	1.49382	1.500	1.372	
*S										
*S ADD THE ROUTED FLOW FROM SUB-BASIN POND2.A1 TO THE FLOW FROM SUB-BASIN A60108										
ADD HYD	POND2.A2	11&10	11	.28890	346.68	22.216	1.44187	1.500	1.875	
*S										
*S ADD THE ROUTED FLOW FROM SUB-BASIN POND2.A2 TO THE FLOW FROM SUB-BASIN A60109										
*S HYD=POND2.IN IS THE TOTAL INFLOW INTO POND 2.										
ADD HYD	POND2.IN	11& 2	11	.33030	434.95	25.743	1.46137	1.500	2.058	
*S										
*S ROUTE FLOW THROUGH POND 2										
ROUTE RESERVOIR	POND2.OUT	11	20	.33030	118.82	25.734	1.46080	1.900	.562	AC-FT=8.636
*S										
*S ROUTE FLOWS TO POND 3										
ROUTE	POND2.ROUTE	20	11	.33030	118.48	25.732	1.46069	1.950	.560	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60110										
COMPUTE NM HYD	A60110	-	1	.10460	208.73	8.052	1.44328	1.500	3.118	PER IMP=41.00
*S										
*S ROUTE FLOW FROM SUB-BASIN A60110 THROUGH SUB-BASIN A60111 TO POND 3										
ROUTE	A60110.5	1	10	.10460	201.72	8.052	1.44329	1.550	3.013	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60111										
COMPUTE NM HYD	A60111	-	1	.03840	81.88	3.272	1.59741	1.500	3.332	PER IMP=49.00
*S										
*S ADD THE ROUTED FLOW FROM SUB-BASIN A60110.5 TO THE FLOW FROM SUB-BASIN A60111										
ADD HYD	POND3.A1	11&10	11	.43490	243.92	33.783	1.45651	1.550	.876	

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S										
*S ADD THE ROUTED FLOW FROM POND2.ROUTE TO THE FLOW FROM SUB-BASIN A60111.										
*S HYD=POND3.IN IS THE TOTAL INFLOW INTO POND 3.										
ADD HYD	POND3.IN	11& 1	10	.47330	316.85	37.055	1.46794	1.550	1.046	
*S										
*S ROUTE FLOW THROUGH POND 3										
ROUTE RESERVOIR	POND3.OUT	10	30	.47330	167.14	37.051	1.46780	2.050	.552	AC-FT=6.019
*S										
*S ROUTE FLOWS TO POND 4										
ROUTE	POND3.ROUTE	30	10	.47330	166.95	37.050	1.46774	2.050	.551	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60113										
COMPUTE NM HYD	A60113	-	1	.05800	122.83	4.887	1.57974	1.500	3.309	PER IMP=48.00
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60116N										
COMPUTE NM HYD	A60116N	-	2	.03810	81.24	3.246	1.59741	1.500	3.332	PER IMP=49.00
*S										
*S ADD THE ROUTED FLOW FROM POND 3.ROUTE TO THE FLOW FROM SUB-BASIN A60113.										
ADD HYD	POND4.A1	10& 1	10	.53130	190.92	41.936	1.47997	1.850	.561	
*S										
*S ADD THE ROUTED FLOW FROM SUB-BASIN POND3.A1 TO THE FLOW FROM SUB-BASIN A60116										
*S HYD=POND2.IN IS THE TOTAL INFLOW INTO POND 2.										
ADD HYD	POND4.IN	10& 2	10	.56940	250.95	45.182	1.48783	1.500	.689	
*S										
*S ROUTE FLOW THROUGH POND 4										
ROUTE RESERVOIR	POND4.OUT	10	40	.56940	174.74	45.178	1.48769	2.250	.480	AC-FT=6.316

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

PAGE = 1

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S										
*S ROUTE FLOWS TO POND 5										
ROUTE	POND4.ROUTE	40	10	.56940	174.71	45.177	1.48764	2.250	.479	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60114										
COMPUTE NM HYD	A60114	-	1	.21620	418.65	15.759	1.36669	1.500	3.026	PER IMP=37.00
*S										
*S ROUTE FLOW FROM SUB-BASIN A60114 THROUGH SUB-BASIN A60116S TO POND 5.										
ROUTE	A60114.5	1	11	.21620	418.66	15.759	1.36670	1.500	3.026	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60115										
COMPUTE NM HYD	A60115	-	2	.07640	159.92	6.339	1.55577	1.500	3.271	PER IMP=47.00
*S										
*S ROUTE FLOW FROM SUB-BASIN A60115 THROUGH SUB-BASIN A60116S TO POND 5.										
ROUTE	A60115.5	2	12	.07640	157.53	6.339	1.55577	1.500	3.222	
*S										
*S CALCULATE THE FLOW FROM SUB-BASIN A60116S										
COMPUTE NM HYD	A60116S	-	1	.02440	52.03	2.079	1.59742	1.500	3.332	PER IMP=49.00
*S										
*S ADD THE ROUTED FLOW FROM POND4.ROUTE TO THE FLOW FROM SUB-BASIN A60114.5										
ADD HYD	POND5.A1	10&11	10	.78560	467.59	60.935	1.45435	1.500	.930	
*S										
*S ADD THE ROUTED FLOW FROM SUB-BASIN POND5.A1 TO THE FLOW FROM SUB-BASIN A60115										
ADD HYD	POND5.A2	10&12	10	.86200	625.12	67.275	1.46334	1.500	1.133	
*S										
*S ADD THE ROUTED FLOW FROM SUB-BASIN POND5.A2 TO THE FLOW SUB-BASIN A60116S.5										

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
*S HYD=POND5.IN IS THE TOTAL INFLOW INTO POND 5.										
ADD HYD	POND5.IN	10& 1	10	.88640	677.15	69.353	1.46703	1.500	1.194	
*S										
*S ROUTE FLOW THROUGH POND 5										
ROUTE RESERVOIR	POND5.OUT	10	50	.88640	356.43	69.348	1.46692	1.750	.628	AC-FT=9.742
*S										
*S ROUTE FLOWS TO POND 6										
ROUTE	POND5.ROUTE	50	10	.88640	354.19	69.344	1.46684	1.800	.624	
*S										
*S**********										
*S COMPUTE HYDROGRAPH FOR B-1OF RIO BRAVO										
COMPUTE NM HYD	201.00	-	1	.03080	60.47	2.240	1.36343	1.500	3.068	PER IMP=34.00
*S										
*S ROUTE B-1 THROUGH B-3. ASSUME LINED CHANNEL										
ROUTE	201.50	1	11	.03080	57.13	2.240	1.36345	1.550	2.898	
*S										
*S COMPUTE HYDROGRAPH FOR B-3 (WEST) FROM RIO BRAVO. REDUCE AREA TO 60 AC.										
COMPUTE NM HYD	203.00	-	1	.09380	184.30	6.821	1.36343	1.500	3.070	PER IMP=34.00
*S										
*S ADD THE ROUTED FLOWS FROM SUB-BASIN 201.5 TO THE FLOWS FROM SUB-BASIN 203										
ADD HYD	203.10	1&11	11	.12460	233.60	9.060	1.36343	1.500	2.929	
*S										
*S ADD THE ROUTED FLOW FROM POND 5.ROUTE TO THE FLOW FROM SUB-BASIN 201.5										
ADD HYD	POND6.IN	10&11	11	1.01100	443.31	78.405	1.45409	1.700	.685	
*S										
*S ROUTE FLOW THROUGH POND 6										

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
ROUTE RESERVOIR	POND6.OUT	11	60	1.01100	350.99	78.398	1.45397	2.050	.542	AC-FT=9.649
*S										
*S ROUTE FLOWS TO POND 6										
ROUTE	POND6.ROUTE	60	10	1.01100	350.57	78.395	1.45391	2.100	.542	
*S										
*S**********										
*S										
*S COMPUTE FLOWS FROM SUB-BASIN B-2 OF RIO BRAVO										
COMPUTE NM HYD	202.00	-	1	.07540	148.07	5.483	1.36343	1.500	3.068	PER IMP=34.00
*S										
*S ROUTE FLOWS TO POND 8										
ROUTE	202.50	1	11	.07540	120.09	5.483	1.36344	1.550	2.489	
*S										
*S COMPUTE HYDROGRAPH FOR B-4 (WEST) FROM RIO BRAVO REDUCE AREA TO 41 AC										
COMPUTE NM HYD	204.00	-	1	.06410	125.84	4.661	1.36343	1.500	3.067	PER IMP=34.00
*S										
*S ADD THE ROUTED FLOWS FROM SUB-BASIN 202.5 TO THE FLOWS FROM SUB-BASIN 204										
ADD HYD	204.10	1&11	11	.13950	233.42	10.144	1.36343	1.550	2.614	
*S										
*S COMPUTE FLOWS FROM SUB-BASIN 50103 FROM BORREGA										
COMPUTE NM HYD	103.00	-	1	.05400	99.16	3.665	1.27251	1.500	2.869	PER IMP=32.00
*S										
*S ROUTE FLOWS TO POND 7										
ROUTE	103.50	1	12	.05400	82.22	3.665	1.27252	1.550	2.379	
*S										
*S COMPUTE FLOWS FROM SUB-BASIN 50104 FROM BORREGA										

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

PAGE = 1

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
COMPUTE NM HYD	104.00	-	1	.03930	74.33	2.791	1.33141	1.500	2.955	PER IMP=35.00
*S										
*S ROUTE FLOWS TO POND 7										
ROUTE	104.50	1	13	.03930	66.47	2.791	1.33142	1.550	2.643	
*S										
*S ADD THE ROUTED FLOWS FROM SUB-BASIN 50103.5 TO THE ROUTED FLOWS										
*S FROM SUB-BASIN 50104.5										
ADD HYD	104.60	12&13	12	.09330	148.69	6.455	1.29731	1.550	2.490	
*S										
*S COMPUTE FLOWS FROM SUB-BASIN 50105 (WEST) FROM BORREGA										
*S REDUCE AREA TO 81 AC.										
COMPUTE NM HYD	105.00	-	1	.12660	269.64	10.786	1.59741	1.500	3.328	PER IMP=49.00
*S										
*S ADD THE ROUTED FLOWS FROM SUB-BASIN 50105 (WEST) TO THE ROUTED FLOWS										
*S FROM SUB-BASIN 50104.6										
ADD HYD	POND7.IN	1&12	12	.21990	389.39	17.241	1.47009	1.550	2.767	
*S										
*S ROUTE FLOWS THROUGH POND 7										
ROUTE RESERVOIR	POND7.OUT	12	70	.21990	58.43	17.241	1.47007	2.150	.415	AC-FT=10.015
*S										
*S ROUTE FLOWS TO POND 8										
ROUTE	7.00	70	12	.21990	58.44	17.241	1.47007	2.150	.415	
*S										
*S ADD THE FLOW FROM SUB-BASIN 204.1 TO THE FLOW FROM POND7.ROUTE										
ADD HYD	POND8.IN	11&12	11	.35940	278.54	27.385	1.42868	1.550	1.211	
*S										

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S ROUTE FLOWS THROUGH POND 8										
ROUTE RESERVOIR	POND8.OUT	11	80	.35940	56.42	27.384	1.42861	2.950	.245	AC-FT=9.098
*S										
*S ROUTE FLOWS TO JUNCTION										
ROUTE	8.00	80	11	.35940	56.42	27.384	1.42861	2.950	.245	
*S										
*S ADD THE FLOWS FROM POND6.ROUTE TO THE FLOWS FROM POND8.ROUTE										
*S AT THE JUNCTION POINT										
ADD HYD	JUNCTION 11&10	11		1.37040	404.28	105.778	1.44727	2.100	.461	
*S										
*S ROUTE THE FLOWS FROM THE JUNCTION POINT TO THE RIO BRAVO CHANNEL										
ROUTE	202.20	11	12	1.37040	401.21	105.772	1.44719	2.150	.457	
*S										
*S COMPUTE THE FLOW FROM SUB-BASIN B-3 (EAST) FROM RIO BRAVO										
*S REDUCE AREA TO 80 AC										
COMPUTE NM HYD	203.00	-	1	.12500	245.84	9.090	1.36343	1.500	3.073	PER IMP=34.00
*S										
*S ROUTE FLOWS FROM 203.0 IN A LOCAL POND CALLED POND 9										
ROUTE RESERVOIR	POND9.OUT	1	90	.12500	45.53	9.089	1.36342	1.950	.569	AC-FT= 4.967
*S										
*S ADD THE FLOW FROM POND9.OUT TO THE FLOW FROM SUB-BASIN 202.2										
*S THIS IS THE TOTAL FLOW INTO THE RIO BRAVO CHANNEL										
ADD HYD	CHANNEL.IN 12&90	99		1.49540	446.23	114.862	1.44019	2.150	.466	
*S										
*S ROUTE THE FLOWS IN THE RIO BRAVO CHANNEL TO THE HUBBELL CHANNEL										
ROUTE	.00	99	12	1.49540	443.06	114.855	1.44011	2.200	.463	

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S										
*S**********										
*S										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
*S COMPUTE HYDROGRAPH FOR B-5										
COMPUTE NM HYD	205.00	-	1	.34700	631.99	26.747	1.44524	1.550	2.846	PER IMP=34.00
*S										
*S ADD THE ROUTED FLOWS FROM CHANNEL.ROUTE TO THE FLOWS										
*S FROM SUB-BASIN B-5										
ADD HYD	RB1-DMP.HYD	1&12	99	1.84240	657.84	141.602	1.44108	1.550	.558	
*S HYD=RB1-DMP.HYD IS *****AP 43*****										
*S										
*S										
*S**********										
*S										
*S										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
*S COMPUTE HYDROGRAPH FOR B-4 (EAST) FROM RIO BRAVO REDUCE AREA TO 50.1 AC										
COMPUTE NM HYD	204.00	-	1	.07830	163.00	6.035	1.44524	1.500	3.253	PER IMP=34.00
*S										
*S ROUTE TOTAL FLOW THROUGH B-6 IN ARROYO										
ROUTE	202.20	1	2	.07830	80.81	6.035	1.44524	1.650	1.613	
*S										
*S COMPUTE HYDROGRAPH FOR B-6										

AMOLE-HUBBELL DRAINAGE MANAGMENT PLAN

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/22/1998
INPUT FILE = RB_DMP.DAT USER NO.= STOCKTON.S94

PAGE = 1

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										
COMPUTE NM HYD	206.00	-	1	.58100	576.74	39.005	1.25877	1.800	1.551	PK BF =1.06 PER IMP=16.00
*S										
*S ADD FLOW FROM B-4 (EAST) TO ROUTED FLOW										
*S HYD=RB2-DMP.HYD IS *****AP 44*****										
ADD HYD	RB2-DMP.HYD	1& 2	3	.65930	644.49	45.040	1.28091	1.750	1.527	
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/03/1998
INPUT FILE = BR_DMP1.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRES	NOTATION

```
START                                                                    TIME=.00
*S
*S      BORREGA WATERSHED
*S
*S
*S 100-YR, 24-HR STORM
*S FILE NAME: BR_DMP1.DAT
*S BY: RICHARD STOCKTON
*S LAST REVISION: 06-03-98
*S*************************************************************************
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM THE BORREGA
*S BASIN.  FLOWS FROM THIS BASIN IS CONVEYED TO HUBBLE LAKE DETENTION FACILITY
*S VIA THE BORREGA DIVERSION CHANNEL.
*S
*S*********************************************************************
*S ANALYSIS ASSUMPTIONS:
*S*********************************************************************
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.  DEVELOPED
*S    CONDITIONS ARE BASED ON LH'S RUNOFF CATAGPRY COLOR MAP.
*S
*S 2. THE PUNCH HYD COMMAND WAS ADDED TO THE END OF THIS FILE SO THE OUTFALL
*S    HYDROGRAPH COULD BE USED IN THE AMOLE DEL NORTE DEVELOPED CONDITIONS MODEL
*S    AA_DMP1.DAT, WHICH WILL BE USED IN THE ANALYSIS OF THE AMOLE ARROYO SYSTEM
*S
*S 3. BULKING FACTORS FOR THE ESCARPMENT EASEMENT UNDER DEVELOPED CONDITIONS,
*S    HAVE BEEN REMOVED DUE TO BORREGA DETENTION BASIN IN THIS ALTERNATIVE.
```

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/03/1998
INPUT FILE = BR_DMP1.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRES	PAGE = 1 NOTATION
*S										
*S**********										
*S100 YEAR 24HR STORM DEVELOPED CONDITION										
RAINFALL TYPE= 2										RAIN24= 2.660
*S**********										
*S LH BASIN NO. 50101										
COMPUTE NM HYD	101.10	-	1	.15400	310.44	12.024	1.46395	1.500	3.150	PER IMP=42.00
ROUTE	201.10	1	10	.15400	259.16	12.024	1.46395	1.550	2.629	
ROUTE	101.30	10	2	.15400	231.54	12.024	1.46395	1.650	2.349	
*S LH BASIN NO. 50102										
COMPUTE NM HYD	102.10	-	1	.19530	365.72	16.639	1.59741	1.550	2.926	PER IMP=49.00
ADD HYD	102.30	1& 2	2	.34930	549.40	28.663	1.53857	1.600	2.458	
*S LH BASIN NO. 50105 (EAST)										
COMPUTE NM HYD	105.10	-	1	.05210	110.96	4.439	1.59742	1.500	3.328	PER IMP=49.00
*S LH BASIN NO. 50106										
COMPUTE NM HYD	106.10	-	3	.09702	191.49	8.266	1.59742	1.500	3.084	PER IMP=49.00
ADD HYD	106.30	1& 3	4	.14912	302.45	12.704	1.59741	1.500	3.169	
ROUTE	106.40	4	3	.14912	299.94	12.704	1.59742	1.550	3.143	
*S LH BASIN NO. 50107										
COMPUTE NM HYD	107.10	-	1	.01146	24.42	.976	1.59741	1.500	3.329	PER IMP=49.00
ADD HYD	107.30	1& 3	3	.16058	321.72	13.681	1.59741	1.550	3.130	
ADD HYD	107.40	2& 3	2	.50988	864.62	42.343	1.55710	1.550	2.650	
ROUTE	107.50	2	3	.50988	685.48	42.343	1.55710	1.650	2.101	
*S LH BASIN NO. 50108										
COMPUTE NM HYD	108.10	-	1	.21455	350.95	18.279	1.59742	1.600	2.556	PER IMP=49.00
ADD HYD	108.30	1& 3	3	.72443	1005.15	60.622	1.56904	1.650	2.168	

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/03/1998
INPUT FILE = BR_DMP1.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRES	NOTATION
*S LH BASIN NO. 50109										
COMPUTE NM HYD	109.10	-	1	.19140	319.69	16.306	1.59742	1.550	2.610	PER IMP=49.00
ADD HYD	109.30	1& 3	3	.91583	1310.27	76.928	1.57497	1.600	2.235	
ROUTE	109.40	3	4	.91583	1309.38	76.928	1.57497	1.600	2.234	
ROUTE	109.50	4	3	.91583	1273.02	76.928	1.57497	1.650	2.172	
*S LH BASIN NO. 50201										
COMPUTE NM HYD	201.00	-	1	.14730	229.72	12.549	1.59741	1.600	2.437	PER IMP=49.00
*S LH BASIN NO. 50110										
COMPUTE NM HYD	110.00	-	2	.05248	109.45	4.377	1.56380	1.500	3.259	PER IMP=48.00
ADD HYD	110.10	4& 2	2	.96831	1386.41	81.305	1.57436	1.600	2.237	
ADD HYD	110.20	3& 1	4	1.06313	1492.89	89.477	1.57808	1.650	2.194	
*S ROUTE FLOW THROUGH BORREGA POND QMAX=225 CFS AT INLET TO HUBBELL LAKE										
ROUTE RESERVOIR	BPOND.OUT	4	99	1.06313	170.96	89.563	1.57958	2.500	.251	AC-FT=51.154
*S HYD=BPOND.OUT IS *****AP 51*****										
ROUTE	110.50	99	4	1.06313	170.95	89.563	1.57958	2.950	.251	
*S LH BASIN NO. 50111										
COMPUTE NM HYD	111.00	-	2	.05247	109.43	4.376	1.56381	1.500	3.259	PER IMP=48.00
ADD HYD	BR_DMP1.HYD	4& 2	2	1.11560	224.79	93.939	1.57884	1.550	.315	
*S HYD=BR_DMP1.HYD IS *****AP 52*****										
FINISH										

AMOLE-HUBBELL DRAINAGE MANAGEMENT

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE

```
START                                                                    TIME=.00
*S
*S      AMOLE ARROYO AND HUBBLE LAKE SYSTEM
*S
*S
*S 100-YR, 24-HR STORM WITH SEDIMENT
*S FILE NAME: AA_DMP2.DAT LOW FLOW ALT
*S BY: RICHARD STOCKTON / KAREN JACOBSEN
*S LAST REVISION: 3-10-99
*S*************************************************************************
*S THE PURPOSE OF THIS MODEL IS TO CALCULATE THE RUNOFF FROM THE AMOLE ARROYO,
*S FROM WESTGATE DAM THROUGH TO THE HUBBLE LAKE DETENTION FACILITY.  THIS RUN
*S USES THE RECALL HYD COMMAND TO INPUT HYDOGRAPHS FROM POWERLINE CHANNEL (PL),
*S SNOW VISTA CHANNEL (SV), SACATE BLANCO CHANNEL (SB), AMOLE DEL NORTE CHANNEL
*S (AN), RIO BRAVO (RB), AND THE BORREGA CHANNEL (BR).  THIS RUN ALSO CALCULATES
*S RUNOFF FROM SUB-BASINS ADJACENT TO THE CHANNEL THAT ARE NOT INCLUDED IN THE
*S ABOVE MENTIONED HYDROGRAPHS.
*S
*S*********************************************************************
*S
*S IMPORTANT NOTE1: ROUTE RESERVOIR DOES NOT INCLUDE ALL OF THE VOLUME FROM
*S                  WESTGATE DAM. THEREFORE, ADD ** 278 AC.FT ** OF VOLUME
*S                  TO ALL OF THE HYDROGRAPHS PUBLISHED IN THIS RUN.
*S                  THIS WILL ACCOUNT FOR THE VOLUME OF RUNOFF
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE

```
*S                    TRUNCATED FROM WESTGATE DAM.
*S
*S*********************************************************************
*S
*S IMPORTANT NOTE2: ROUTE RESERVOIR DOES NOT INCLUDE ALL OF THE VOLUME FROM
*S                  POWERLINE CHANNEL. THEREFORE, ADD ** 55.4 AC.FT ** OF VOLUME
*S                  TO THE AFFECTED HYDROGRAPHS PUBLISHED IN THIS RUN.
*S                  THIS WILL ACCOUNT FOR THE VOLUME OF RUNOFF
*S                  TRUNCATED FROM THE POWERLINE ALTERNATIVE.
*S
*S*********************************************************************
*S
*S IMPORTANT NOTE3: N/A
*S
*S*********************************************************************
*S
*S IMPORTANT NOTE4: ROUTE RESERVOIR DOES NOT INCLUDE ALL OF THE VOLUME FROM
*S                  AMOLE DEL NORTE. THEREFORE, ADD ** 3.2 AC.FT ** OF VOLUME
*S                  TO THE AFFECTED HYDROGRAPHS PUBLISHED IN THIS RUN.
*S                  THIS WILL ACCOUNT FOR THE VOLUME OF RUNOFF
*S                  TRUNCATED FROM THE AMOLE DEL NORTE ALTERNATIVE.
*S*********************************************************************
*S ANALYSIS ASSUMPTIONS:
*S*********************************************************************
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
INPUT FILE - AA_DMP2.DAT

RUN DATE (MON/DAY/YR) =06/09/1999
USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE

```
*S 1. ALL LAND IN THIS BASIN IS MODELED AS DEVELOPED CONDITION.
*S
*S 2. A BULKING FACTOR OF 15% HAS BEEN ADDED TO EACH UNDEVELOPED SUB-BASIN AND
*S    A BULKING FACTOR OF 6% HAS BEEN ADDED TO EACH DEVELOPED SUB-BASIN LIKELY
*S    TO PRODUCE SEDIMENT.  A BULKING FACTOR OF 3% HAS BEEN ADDED TO EACH
*S    DEVELOPED SUB-BASIN THAT COULD PROBIBLY PRODUCE SOME SEDIMENT, SUCH AS PAR
*S    AND SCHOOL PLAY GROUNDS.   AND, NO BULKING FACTOR FOR WELL DEFINED RESIDEN
*S    DEVELOPMENTS.
*S
*S 3. BOTH THE AMOLE DETENTION FACILITY AND HUBBELL LAKE DETENTION FACILITY
*S    PRINCIPAL SPILLWAYS ARE MODELED CLOSED.  THESE TWO FACILITIES ARE
*S    REPRESENTATED AS AP40.1 AND AP 50.1, RESPECTIVELY ON THE SUPPLEMENTAL
*S    MAPPING AND REPORT.
*S
*S 4. THE AMOLE BASIN HAS FREE DISCHARGE TO THE AMOLE ARROYO.  POWERLINE
*S    HAS A RESTRICTED DISCHARGE OF 20 AND SNOW VISTA IS FREE DISCHARGE.
*S    THE RUNOFF IS CONVEYED IN A HIGH FLOW CHANNEL TO THE AMOLE DETENTION FACIL
*S
*S 5. THIS ALTERNATIVE INCLUDES THE GUAC DETENTION BASIN.
*S
*S 6. THIS ALTERNATIVE INCLUDES BASINS 35301, 35303, AND 35305 FROM THE
*S    AN_DMP.DAT FILE AS A RESULT OF THE UNSER EXTENSION.
*S*************************************************************************
*S100 YEAR 24HR STORM DEVELOPED CONDITION
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
RAINFALL TYPE= 2										
2.660										RAIN24=
*S RECALL OUTFLOW HYDROGRAPH FROM THE WESTGATE DAM										
*S HYD NO. WG100D1B.HYD IS ***** AP 01 *****										
RECALL HYD	WG_DMP.HYD	-	5	5.15730	73.47	170.999	.62169	7.050	.022	
*S ROUTE FLOW TO AP02										
ROUTE	WG101.5	5	11	5.15730	73.47	170.585	.62018	7.400	.022	
*S CALCULATE FLOW FROM SUB-BASIN 00102										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										
COMPUTE NM HYD	102.00	-	2	.11190	218.60	9.283	1.55544	1.500	3.052	PK BF =1.06 PER IMP=47.00
*S ADD THE ROUTED FLOW FROM SUB-BASIN WG101.5 TO THE FLOW FROM SUB-BASIN 00102.										
ADD HYD	102.10	11& 2	3	5.26920	252.85	179.868	.64005	1.500	.075	
*S RECALL OUTFLOW HYDROGRAPH FROM POWERLINE CHANNEL										
*S										
*S IMPORTANT NOTE2: ROUTE RESERVOIR DOES NOT INCLUDE ALL OF THE VOLUME FROM										
*S POWERLINE CHANNEL. THEREFORE, ADD ** 20.6 AC.FT ** OF VOLUME										
*S TO THE AFFECTED HYDROGRAPHS PUBLISHED IN THIS RUN.										
*S THIS WILL ACCOUNT FOR THE VOLUME OF RUNOFF										
*S TRUNCATED FROM THE POWERLINE ALTERNATIVE. THE TOTAL										
*S TRUNCATED VOLUME TO THIS POINT IS 289.6 AC FT										
*S										
RECALL HYD	PL_DMP1.HYD	-	11	1.20470	19.34	42.699	.66457	29.900	.025	
ADD HYD	102.10	11& 3	3	6.47390	255.01	222.568	.64461	1.500	.062	

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
*S HYD=102.1 IS *** AP02 *****										
*S ROUTE FLOW IN THE AMOLE ARROYO TO 900 FEET EAST OF POWERLINE CHANNEL.										
ROUTE	102.50	3	12	6.47390	255.30	222.399	.64412	1.550	.062	
*S										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	00103A	-	2	.07170	162.04	6.475	1.69326	1.500	3.531	PER IMP=49.00
*S ROUTE FLOW THROUGH SUB-BASIN 00103B TO THE AMOLE ARROYO.										
ROUTE	00103A.5	2	11	.07170	100.85	6.475	1.69325	1.600	2.198	
*S CALCULATE FLOW FROM SUB-BASIN 00103B										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	00103B	-	2	.12070	202.77	10.858	1.68669	1.600	2.625	PER IMP=49.00
*S ADD THE ROUTE FLOW FROM SUB-BASIN 00103A.5 TO THE FLOW										
*S FROM SUB-BASIN 00103B.										
ADD HYD	00103B.1	11& 2	3	.19240	303.62	17.333	1.68913	1.600	2.466	
*S ADD THE COMBINED FLOW FROM SUB-BASIN 00103B.1 TO THE ROUTED FLOW										
*S IN THE AMOLE ARROYO.										
ADD HYD	00103B.2	12& 3	4	6.66630	542.07	239.732	.67428	1.550	.127	
*S ROUTE FLOW FROM SUB-BASIN 00103B.2 IN THE AMOLE ARROYO TO										
*S DELGADO STREET.										
ROUTE	00103B.5	4	11	6.66630	539.60	239.549	.67377	1.550	.126	
*S										
*S CALCULATE FLOW FROM SUB-BASIN 00104										

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	104.00	-	2	.01830	40.11	1.617	1.65724	1.500	3.424	PER IMP=49.00
*S ADD THE FLOW FROM SUB-BASIN 00104 TO THE ROUTED FLOW IN THE AMOLE ARROYO.										
*S HYD NO. 00104.1 IS ***** AP 02.1 *****										
ADD HYD	104.10	11& 2	3	6.68460	575.41	241.166	.67646	1.550	.134	
*S ROUTE FLOW FROM SUB-BASIN 00104 IN THE AMOLE ARROYO TO 2220 FEET WEST										
*S FOR SNOW VISTA CHANNEL										
ROUTE	104.50	3	11	6.68460	575.06	240.583	.67482	1.600	.134	
*S										
*S CALCULATE FLOW FROM SUB-BASIN 00105										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	105.00	-	2	.07670	162.57	6.690	1.63539	1.500	3.312	PER IMP=49.00
*S ADD THE FLOW FROM SUB-BASIN 00105 TO THE ROUTED FLOW IN THE AMOLE ARROYO.										
*S HYD NO. 00105.1 IS ***** AP 02.2 *****										
ADD HYD	105.10	11& 2	3	6.76130	693.16	247.273	.68572	1.600	.160	
*S ROUTE FLOW FROM SUB-BASIN 00105 IN THE AMOLE ARROYO TO SNOW VISTA CHANNEL.										
ROUTE	105.50	3	11	6.76130	696.60	247.190	.68549	1.600	.161	
*S										
RECALL HYD	SV_DMP2.HYD	-	2	1.83930	2062.57	183.408	1.86968	1.600	1.752	
*S CALCULATE FLOW FROM SUB-BASIN 00106.										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
COMPUTE NM HYD	106.00	-	3	.04150	93.97	3.820	1.72607	1.500	3.538	PER IMP=52.00
*S ADD THE OUTFLOW HYDROGRAPH FROM SNOW VISTA CHANNEL TO THE FLOW										
*S FROM BASIN 00106 .										
ADD HYD	106.10	3& 2	4	1.88080	2128.25	187.229	1.86651	1.600	1.768	
*S ADD THE FLOW FROM SV TO THE ROUTED FLOW IN THE AMOLE ARROYO.										
*S HYD NO. 00106.2 IS ***** AP 03 *****										
ADD HYD	106.20	11& 4	3	8.64210	2824.84	434.419	.94252	1.600	.511	
*S										
*S ROUTE COMBINED FLOW FROM SUB-BASIN 00106.2 IN THE AMOLE ARROYO TO										
*S 1970 FEET EAST OF THE SNOW VISTA CHANNEL.										
ROUTE	106.50	3	12	8.64210	2793.27	433.384	.94027	1.650	.505	
*S										
*S CALCULATE FLOW FROM SUB-BASIN 00107										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	107.00	-	2	.11970	239.60	11.019	1.72607	1.550	3.128	PER IMP=52.00
*S ROUTE FLOW THROUGH SUB-BASIN 00108 TO THE AMOLE ARROYO.										
ROUTE	107.50	2	11	.11970	166.84	11.019	1.72607	1.650	2.178	
*S CALCULATE FLOW FROM SUB-BASIN 00108										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	108.00	-	2	.22610	493.33	24.498	2.03158	1.550	3.409	PER IMP=71.00
*S ADD THE ROUTE FLOW FROM SUB-BASIN 00107.5 TO THE FLOW										
*S FROM SUB-BASIN 00108										

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
ADD HYD	108.10	11& 2	3	.34580	623.84	35.517	1.92582	1.550	2.819	
*S ADD THE COMBINED FLOW FROM SUB-BASIN 00108.1 TO THE ROUTED FLOW										
*S IN THE AMOLE ARROYO.										
ADD HYD	108.20	12& 3	4	8.98790	3310.59	468.901	.97819	1.650	.576	
*S CALCULATE FLOW FROM SUB-BASIN 00109										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	109.00	-	2	.06080	122.24	6.425	1.98135	1.550	3.142	PER IMP=68.00
*S ADD THE FLOW FROM SUB-BASIN 00109 TO THE COMBINED FLOW IN THE AMOLE ARROYO.										
ADD HYD	109.10	4& 2	3	9.04870	3411.82	475.326	.98493	1.650	.589	
*S ROUTE FLOW FROM SUB-BASIN 00109.1 IN THE AMOLE ARROYO TO THE SACATE BLANCO CH										
ROUTE	109.50	3	11	9.04870	3427.08	474.569	.98336	1.650	.592	
*S										
*S CALCULATE FLOW FROM SUB-BASIN 00110										
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%										
SEDIMENT BULK										PK BF =1.06
COMPUTE NM HYD	110.00	-	2	.06430	122.70	6.381	1.86074	1.550	2.982	PER IMP=64.00
*S ADD THE FLOW FROM SUB-BASIN 00110 TO THE ROUTED FLOW IN THE AMOLE ARROYO.										
ADD HYD	110.10	11& 2	3	9.11300	3526.01	480.950	.98955	1.650	.605	
*S										
RECALL HYD	SB_DMP.HYD	-	2	.75030	1183.46	73.220	1.82978	1.650	2.465	
*S										
*S ADD THE OUTFLOW HYDROGRAPH FROM THE SACATE BLANCO CHANNEL TO THE FLOW										
*S IN THE AMOLE ARROYO.										

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	
*S HYD NO. 00110.2 IS ***** AP 04 ***** WITHOUT UNSER EXTENSION S/D										
ADD HYD	110.20	3& 2	4	9.86330	4709.47	554.170	1.05347	1.650	.746	
*S COMPUTE THE FLOW FROM BASINS 35301, 35303, & 35305 FROM THE AMOLE										
*S DEL NORTE BASIN THAT IS DIVERTED FROM THE UNSER EXTENTION										
*S (SEE THE RIO BRAVO SECTOR PLAN)										
*S BASIN 35301										
COMPUTE NM HYD	D35301	-	2	.14200	304.27	15.475	2.04332	1.550	3.348	PER IMP=71.00
*S ROUTE THE FLOW FROM BASIN 35301 TO 35303										
ROUTE	D35301.5	2	5	.14200	302.78	15.475	2.04332	1.550	3.332	
*S BASIN 35303										
COMPUTE NM HYD	D35303	-	2	.09640	230.17	11.434	2.22402	1.500	3.731	PER IMP=81.00
*S ADD THE ROUTED FLOW FROM BASIN 35301.5 TO THE FLOW FROM BASIN 35303										
ADD HYD	D35303.1	2& 5	2	.23840	530.34	26.909	2.11638	1.550	3.476	
*S ROUTE THE FLOW FROM BASIN 35303 TO THE AMOLE ARROYO										
ROUTE	D35303.5	2	5	.23840	529.92	26.909	2.11638	1.550	3.473	
*S BASIN 35305										
COMPUTE NM HYD	D35305	-	2	.08410	192.67	9.950	2.21823	1.550	3.580	PER IMP=81.00
*S ADD THE ROUTED FLOW FROM BASIN 35303.5 TO THE FLOW FROM BASIN 35305										
ADD HYD	D35305.1	2& 5	11	.32250	722.59	36.859	2.14294	1.550	3.501	
*S ADD THE FLOW FROM BASIN 35305 TO THE FLOW IN THE AMOLE ARROYO										
ADD HYD	D35305.2	4&11	4	10.18580	5275.83	591.029	1.08796	1.650	.809	
*S ROUTE COMBINED FLOW IN THE AMOLE ARROYO TO THE AMOLE DETENTION FACILITY.										
*S HYD 00110.5 IS *****AP 04 *****WITH UNSER EXTENSION S/D										
ROUTE	110.50	4	11	10.18580	5293.38	590.666	1.08730	1.650	.812	

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE

```
*S  RECALL THE OUTFLOW HYDROGRAPH FROM THE AMOLE DEL NORTE WATERSHED
*S
*S IMPORTANT NOTE4: ROUTE RESERVOIR DOES NOT INCLUDE ALL OF THE VOLUME FROM
*S                  AMOLE DEL NORTE. THEREFORE, ADD ** 3.1 AC.FT ** OF VOLUME
*S                  TO THE AFFECTED HYDROGRAPHS PUBLISHED IN THIS RUN.
*S                  THIS WILL ACCOUNT FOR THE VOLUME OF RUNOFF
*S                  TRUNCATED FROM THE SNOW VISTA ALTERNATIVE. THE TOTAL
*S                  TRUNCATED VOLUME TO THIS POINT IS 430.7 AC FT
*S
RECALL HYD        AN_DMP.HYD   -    30       6.24240      2347.39     601.201      1.80580    2.150     .588
*S ADD THE FLOW FROM THE AMOLE ARROYO TO THE FLOW FROM THE AMOLE DEL NORTE
*S CHANNEL.  THIS IS THE TOTAL FLOW INTO THE AMOLE DETENTION FACILITY.
*S HYD NO. AP40 IS ***** AP 40 *****
ADD HYD                AP40 11&30  40      16.42820      6814.04    1191.866      1.36031    1.650     .648
*S
*S  IMPORTANT NOTE: RESERVOIR ROUTE DOES NOT INCLUDE ALL OF THE VOLUME FROM
*S                  WESTGATE DAM, PL, SV AND AN. THEREFORE, ADD VOLUME
*S                  TO THE OUTFLOW HYDROGRAPH FROM AMOLE DETENTION BASIN.
*S                  THIS WILL ACCOUNT FOR THE TOTAL VOLUME OF RUNOFF
*S                  TRUNCATED.  THE TOTAL TRUNCATED VOLUME TO THIS POINT
*S                  IS 474.5 AC FT.  OF THE TRUNCATED VOLUME, 273 AF IS CONTAINE
*S                  IN THE GUAC-AMOLE DETENTION BASIN AND THE 201 AF BALANCE
*S                  IS CONVEYED TO THE HUBBELL LAKE FACILITY. THE TOTAL VOLUME
*S                  OF THE GUAC-AMOLE DETENTION BASIN IS 1,352 AF.
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AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994          RUN DATE (MON/DAY/YR) =06/09/1999
  INPUT FILE - AA_DMP2.DAT                                                                  USER NO.= STOCKTON.S94

                              FROM TO                        PEAK          RUNOFF                    TIME TO      CFS
                  HYDROGRAPH   ID ID            AREA     DISCHARGE        VOLUME       RUNOFF         PEAK        PER
COMMAND         IDENTIFICATION NO.NO.        (SQ MI)      (CFS)          (AC-FT)     (INCHES)      (HOURS)      ACRE


*S
*S
*S ROUTE THE FLOW IN THE AMOLE DETENTION FACILITY WITH THE ROUTE RESERVOIR
ROUTE RESERVOIR    AMOLE.OUT   40   41      16.42820          .12        .558       .00064   30.000     .000 AC-FT=
1191.347
*S HYD NO. AMOLE.OUT IS ***** AP 41 *****
*S  NOTE: PRINCIPLE SPILLWAY IS MODELED AS CLOSED, THEREFORE AP 40.1 = 0 CFS
MODIFY TIME        AMOLE.OUT   41   41      16.42820          .28        .558       .00064   29.900     .000
*S  ROUTE THE OUTFLOW DOWN THE AMOLE/HUBBLE DIVERSION CHANNEL TO 300 FEET
*S  NORTH OF THE PROPOSED RIO BRAVO CROSSING
ROUTE                 AP40.5   41   11      16.42820          .28        .557       .00064   29.900     .000
*S CALCULATE THE FLOW FROM SUB-BASIN 40001
*S GENERATION OF SEDIMENT LIKELY, BULK FLOWS 6%
SEDIMENT BULK                                                                                                PK BF =1.06
COMPUTE NM HYD        D40001    -    2        .07170       140.83       6.640      1.73643    1.500    3.069 PER IMP=59.00
*S  ADD THE ROUTED FLOW FROM SUB-BASIN AP40.5 TO THE FLOW FROM SUB-BASIN 40001.
ADD HYD             D40001.1 11& 2   3      16.49990       140.85       7.197       .00818    1.500     .013
*S RECALL THE OUTFLOW HYDROGRAPH FROM THE NORTH PORTION OF RIO BRAVO
RECALL HYD       RB1_DMP.HYD   -    5       1.84240       657.84     141.602      1.44108    1.550     .558
*S ADD THE FLOW FROM THE RECALLED HYDROGRAPH TO THE FLOW FROM SUB-BASIN 40001.1
*S HYD NO. RB1.1 IS ***** AP 42 *****
ADD HYD               RB1.1  3& 5   4      18.34230       795.40     148.799       .15211    1.550     .068
*S ROUTE THE COMBINED FLOW INTO HUBBLE LAKE
ROUTE                 AP40.5    4   11      18.34230       815.73     148.798       .15211    1.550     .069
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AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994          RUN DATE (MON/DAY/YR) =06/09/1999
  INPUT FILE - AA_DMP2.DAT                                                                   USER NO.= STOCKTON.S94

                                FROM TO                        PEAK         RUNOFF                  TIME TO     CFS
                   HYDROGRAPH    ID ID          AREA     DISCHARGE        VOLUME       RUNOFF        PEAK        PER
COMMAND          IDENTIFICATION  NO.NO.       (SQ MI)      (CFS)         (AC-FT)     (INCHES)     (HOURS)      ACRE


*S RECALL THE OUTFLOW HYDROGRAPH FROM THE SOUTH PORTION OF RIO BRAVO.
RECALL HYD        RB2_DMP.HYD   -     5        .65930       644.49       45.040      1.28091      1.750      1.527
*S ADD THE FLOW FROM THE RECALL HYDROGRAPH TO THE TOTAL FLOW IN HUBBLE LAKE.
ADD HYD                  2.10 11& 5   3      19.00160      1217.18      193.838       .19127      1.650       .100
*S RECALL THE HYDROGRAPH FROM THE BORREGA WATERSHED.
RECALL HYD        BR_DMP1.HYD   -     5       1.11560       224.79       93.939      1.57884      1.550       .315
*S ADD THE FLOW FROM THE RECALL HYDROGRAPH TO THE TOTAL FLOW IN HUBBLE LAKE.
*S HYD NO. RB2.1 IS ***** AP 50 *****
ADD HYD                 RB2.1  3& 5   4      20.11720      1433.20      287.778       .26822      1.600       .111
*S ROUTE THE TOTAL FLOW INTO HUBBLE LAKE WITH THE ROUTE RESERVOIR.
*S
*S  IMPORTANT NOTE: RESERVOIR ROUTE DOES NOT INCLUDE ALL OF THE VOLUME FROM
*S                  WESTGATE DAM, PL, SV AND AN. THEREFORE, ADD VOLUME
*S                  TO THE OUTFLOW HYDROGRAPH FROM AMOLE DETENTION BASIN.
*S                  THIS WILL ACCOUNT FOR THE TOTAL VOLUME OF RUNOFF
*S                  TRUNCATED.  THE TOTAL TRUNCATED VOLUME TO THIS POINT
*S                  IS 474.5 AC FT.  OF THE TRUNCATED VOLUME, 273 AF IS CONTAINE
*S                  IN THE GUAC-AMOLE DETENTION BASIN AND THE 201 AF BALANCE
*S                  IS CONVEYED TO THE HUBBELL LAKE FACILITY.
*S
ROUTE RESERVOIR  HUBBLE.LAKE    4   99      20.11720          .04         .200       .00019     30.000       .000 AC-FT=287.683
*S  NOTE: PRINCIPLE SPILLWAY IS MODELED AS CLOSED, THEREFORE AP 50.1 = 0 CFS
*S HYD NO. 99 IS ***** AP 50.2 *****
MODIFY TIME      HUBBLE.LAKE   99   99      20.11720          .10         .200       .00019     29.900       .000
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AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =06/09/1999
INPUT FILE - AA_DMP2.DAT USER NO.= STOCKTON.S94

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE

FINISH