VOLCANO HEIGHTS
DRAINAGE COMPILATION REPORT

REVISED

DECEMBER 2011

Prepared For

City of Albuquerque
Albuquerque, NM

Prepared By

WILSON & COMPANY

Wilson & Company, Inc., Engineers & Architects
4900 Lang Ave, NE
Albuquerque, NM 87109
505-348-4000

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I, Daniel S. Aguirre, P.E., do hereby certify that this report was prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico

Daniel S. Aguirre, P.E.
NMPE No. 11955

12/12/11
Date

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WILSON & COMPANY

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SECTION 1 – PURPOSE

The purpose of this drainage report is to provide a compilation of the storm drain infrastructure constructed and proposed to be constructed within the portions of the Lyon storm drain watershed, the Piedras Marcadas Dam watershed and the Mariposa Detention Basin watershed. The report identifies allowable flows from the sub-basins within these watersheds for the 100-year 6-hour event.

1.1 Introduction

This report summarizes proposed hydrologic conditions; provides the design for fully developed peak flows; provides recommendations; and identifies downstream drainage capacities.

1.2 Existing Reports

Existing drainage reports providing information used in this report include:

"Boca Negra – Mariposa Arroyo Drainage Management Plan", dated April 2005, by Resource Technology, Inc.
"La Cuentista Subdivision Drainage Report", dated November 2003, by Wilson & Company, Inc.
"Paseo del Norte Drainage Report", dated August 16, 2004, by Wilson & Company, Inc.
"Amendment to the Trails Unit II Drainage Master Plan", dated August 2007, by Wilson & Company, Inc.

Guidelines and recommendations from the above reports were incorporated into this drainage report where possible.

SECTION 2 - HYDROLOGIC ANALYSIS

There are three ultimate discharge points affected by the infrastructure described in this report. The first area discharges a portion to the Lyon Boulevard storm drain system with a 100-year 24-hour overflow to Petroglyph National Monument discharging to the Piedras Marcadas Dam. This area is bound by the Trails Unit IV and Unser Boulevard to the south and the Chamisa basin to the north. The allowable discharge for this area is described below and shown on Plate 1.

Discharge Point	Allowable Discharge	Ultimate Discharge Point
Chamisa Storm Drain	45 cfs	Lyon Boulevard Storm Drain
Unser Detention Basin	285 cfs	Low Flows diverted to Lyon Boulevard Storm Drain
	120 cfs	Maximum Overflow to Petroglyph National Monument

The second Area ultimately discharges to the Piedras Marcadas Dam. This area is bound by Paseo del Norte and the Trails Unit IV to the south, the aforementioned basin to the northwest, and the Chamisa basin line to the North. A portion of the watershed is collected in a storm drain system below Unser Blvd. and is directed to the Unser Detention Basin. We recommend the Unser Detention Basin and the Chamisa Detention basins be connected to allow low flows to discharge to the Lyon Storm Drain. This will limit the high frequency erosive discharge to the Petroglyph National Monument. The Unser Detention basin would include an overflow weir that would have a maximum capacity of 120 cfs discharge to the monument and ultimately to the Piedras Marcadas Arroyo. The remainder of the watershed drains to a storm drain system beneath Paseo del Norte and also discharges into the Piedras Marcadas Arroyo.

The third discharge point is the Mariposa Basin. The areas contributing to the Mariposa Basin includes storm water runoff west of Unser Boulevard and south of Paseo del Norte Including Basins N1 and N2 on the east side of Unser. These areas discharge to the Boca Negra Detention Dam through various infrastructures including the Unser storm drain, the Universe storm drain and the Boca Negra channel. Additional areas include La Cuentista Subdivision and SAD 228. The flow from these additional areas discharges at several locations to the Petroglyph National Monument where it is conveyed to the Mariposa basin through overland flow. The southeast portion of SAD 228 is drained by a storm drain in Unser Boulevard to join with the discharge from the Boca Negra Dam and conveyed to the Boca Negra Arroyo in the Atrisco storm drain as shown on Plate 1, in Appendix B. See Figure 1 for Vicinity map.

2.1 Methodology

Hydrologic modeling used for the existing infrastructure designs and calculations shown in this report are performed using the 1997 version of The Arid-Lands Hydrologic Model (AHYMO) in accordance with the City of Albuquerque Development process Manual (DPM), section 22.2, December 1999 for the given 100-year, 6-hour storm event. The AHYMO input, summary and output files for the developed conditions are included in Appendix A. Hydraflow Storm Sewers 2005 software by Intelisolve was used to size the underground storm systems for modeling purposes and are for information only project specific reports and calculations are required for actual design of future infrastructure. See Appendix A for calculations summary.

2.2 Design Storm Precipitation

AHYMO was used to calculate proposed runoff. The rainfall values used were for the 1 and 6 - hour precipitation for a 100-year storm event. Rainfall values were obtained from precipitation frequency data server NOAA Atlas 14.

Table 1: Precipitation Values

Return Period (yrs)	1 hr Rainfall (in)	6 hr Rainfall (in)
100	1.7	2.2

2.3 Land Treatments

Proposed land treatment percentages used in the AHYMO Computer model are based on the original Paseo del Norte drainage report dated August 2004. See Table 2 below for land treatment percentages.

Table 2: Land Treatment Percentages

Land Use	Type A	Type B	Type C	Type D
Residential/Town homes	0%	15%	35%	50%
Residential	0%	10%	40%	50%
Commercial	0%	10%	10%	80%
Open Space	100%	0%	0%	0%
Roadway	0%	10%	0%	90%

2.1 Existing and Proposed Conditions

2.4.1 Existing Conditions

The existing topography slopes generally from the northwest to the northeast, east, and southeast. The Chamisa Storm Drain and Chamisa Detention Basin are constructed, the Trails Subdivision west of Universe and portions of the La Cuentista subdivision are constructed, Vista Vieja is constructed and the downstream section of the storm drain system beneath Paseo del Norte is constructed. The remainder of the infrastructure is future although several projects in the area are currently in the design phase.

2.4.2 Proposed Conditions

Each of the ultimate discharge points identified have limited peak flow capacities driving the need to look at the activities in this area as a whole. This planning document recommends ponds located throughout the basin to restrict flows to meet downstream capacities. The analysis points shown on Plate 1 represent allowable flows to meet the infrastructure capacities.

Pond 11 detains flows originating in sub-basins K1, K2, K3, K4, ST11, and E2.1. These flows will be discharged into the Chamisa Basin and are to be limited to 45 cfs.

The Chamisa Detention Basin and the Unser Detention Basin act as a system and their design will be detailed in a future study. The Chamisa Detention Basin accepts flow from sub-basins 1, 2, 3, E1, E2, F, F1, U1, and U2 in addition to storm water originating outside of this report's scope. The Chamisa Detention Basin and Unser Detention Basin will be joined to allow flows in the smaller more frequent events to discharge (5 year event minimum) to the Lyon Boulevard storm drain. Then in larger events a portion of the discharge will overflow a weir structure to the Piedras Marcadas Arroyo in the Petroglyph National Monument with a maximum discharge of 120 cfs during the 100-year 6-hour event.

Basins identified in this report as 4A, 4B and part of Paseo del Norte Blvd located immediately south of Paseo del Norte and east of Unser Blvd discharge to proposed Pond 10. A proposed storm system in Paseo Del Norte Blvd will convey routed flows from Pond 10, runoff from sub-basins north of Paseo Del Norte Blvd and Bain A to the existing 72" storm drain pipe in Paseo Del Norte Blvd.

Pond 2 detains flows from the sub-basins south and east of Unser Blvd. The outlet pipe from this pond and the storm system in Paseo Del Norte Blvd tie into the existing 72" storm drain. The allowable discharge at this point will be 620 cfs. The existing 72" storm drain ultimately discharges into the existing concrete culvert boxes conveying flows to the Piedras Marcadas Dam.

The Universe Boulevard storm drain accepts flows generated from the roadway, the Trails Subdivision pond system and the area contained in basins labeled M1 and M2-B, ultimately discharging to the proposed Boca Negra Dam. The Unser storm drain system shall not receive flows from areas located below elevation 5339.

Flows generated from areas below elevation 5339 including areas a portion of the area designated as SAD 228 discharge to a new 54" storm drain parallel to Unser Boulevard with an 80 cfs capacity. This storm drain discharges to the Atrisco storm drain below at a confluence with the primary principal spillway from the proposed Boca Negra Dam. The storm drain system conveys these flows to the Boca Negra Arroyo with a ultimate discharge to the Mariposa Basin.

Ponds 6, 7, 8 and 9 detain flows before discharging allowable amounts through overland flow to the Mariposa Basin. Refer to Plate 1 in Appendix B for pond locations and allowable discharge rates. Exhibit 1 in Appendix B shows basin boundaries and major discharge points in color. See Table 3 for Basin Summary.

Table 3: Basin Summary								
BASIN	AREA (SQ MI)	AREA (ACRE)	LAND TREATMENT (%)				Q_{100} (CFS)	VOL_{100} (AC-FT)
			A	B	C	D		
BASINS DRAINING TO THE CHAMISA BASIN THROUGH POND 11[1]								
E2.1	0.0124	7.93	0	15	35	50	26	0.91
K1	0.0238	15.23	0	10	10	80	55	2.17
K2	0.0059	3.78	0	10	10	80	14	0.54
K3	0.0148	9.47	0	10	10	80	34	1.35
K4	0.0196	12.54	0	10	10	80	46	1.78
ST11	0.0068	4.33	0	10	0	90	14	0.65
BASINS DRAINING TO THE UNSER DETENTION BASIN								
1	0.0132	8.47	0	10	15	75	27	0.97
2	0.0113	7.23	0	10	15	75	26	1.00
3	0.0151	9.66	0	10	15	75	35	1.33
11A	0.0066	4.20	0	10	10	80	15	0.60
E1	0.0118	7.52	0	15	35	50	24	0.86
E2	0.0453	28.97	0	15	35	50	85	0.94
F	0.0043	2.77	0	15	35	50	9	0.26
PDN1	0.0196	12.51	0	10	0	90	37	1.89
U1	0.0158	10.11	0	10	0	90	38	1.53
U2	0.0259	16.60	0	10	0	90	49	2.34
BASINS DRAINING INTO POND 2								
5	0.0298	19.07	0	10	10	80	69	2.71
6	0.0355	22.70	0	10	10	80	83	3.23
8	0.0198	12.67	0	10	10	80	46	1.80
9	0.0316	20.20	0	10	10	80	74	2.87
10	0.0567	36.29	0	10	10	80	122	5.16
13	0.0626	40.06	0	10	10	80	140	5.70
11B	0.0553	35.37	0	10	0	90	116	5.03
11C	0.0332	21.23	0	10	10	80	77	3.02
12A	0.0308	19.71	0	10	10	80	72	2.80
6A	0.0153	9.77	0	10	10	80	33	1.39
ST1	0.0141	9.04	0	10	0	90	31	1.37
ST2	0.0109	7.00	0	10	0	90	24	1.06
ST3	0.0069	4.39	0	10	0	90	15	0.66
ST4	0.0077	4.94	0	10	0	90	17	0.75

Table 3-Continued: Basin Summary								
BASIN	AREA (SQ MI)	AREA (ACRE)	LAND TREATMENT (%)				Q_{100} (CFS)	VOL_{100} (AC-FT)
			A	B	C	D		
BASINS DRAINING INTO PASEO DEL NORTE STORM DRIAN SYSTEM								
4A[4]	0.0388	24.83	0	10	10	80	90	3.53
4B[4]	0.0080	5.12	0	10	10	80	19	0.73
PDN2[4]	0.0126	8.06	0	10	0	90	30	1.22
7	0.0354	22.66	0	10	10	80	77	3.22
12B	0.0144	9.22	0	10	10	80	34	1.31
PDN3	0.0151	9.66	0	10	0	90	30	1.46
PDN4	0.0111	7.13	0	10	0	90	25	1.08
A	0.0275	17.60	0	5	10	85	66	2.60
BASINS DRAINING INTO PIEDRAS MARCADAS								
B	0.0211	13.53	100	0	0	0	16	0.46
F1	0.0204	13.08	0	60	40	0	28	0.78
G	0.1032	66.05	100	0	0	0	80	2.22
H	0.3826	244.84	100	0	0	0	288	8.24
PDN5	0.0198	12.66	0	10	0	90	48	1.91
PDN6	0.0185	11.82	0	10	0	90	45	1.79
BASINS DRAINING INTO BOCA NEGRA DAM								
UNIVERSE BLVD								
P1	0.0313	20.00	25	26	27	22	44	1.52
P2	0.1094	70.02	0	25	25	50	153	7.85
P3	0.0515	32.96	0	25	25	50	63	3.70
UNSER BLVD								
M1	0.1381	88.38	0	10	40	50	234	10.25
M2-B	0.0201	21.79	0	10	40	50	41	1.49
*N1[2]	0.0814	52.10	0	10	40	50	146	6.05
N2	0.0246	15.74	0	10	40	50	51	1.83
T1	0.0890	56.96	0	10	40	50	149	6.61
*U0[3]	0.0319	20.42	0	10	40	50	49	2.37
BASIN DRAINING INTO ATRISCO STORM DRAIN								
M2-A	0.1145	64.35	5	30	35	30	142	6.52
M3	0.1793	114.75	0	10	40	50	303	13.32
BASIN DRAINING INTO POND-6								
M3-1	0.0534	34.17	0	10	40	50	108	3.97
BASIN DRAINING INTO POND-7								
M4	0.0172	11.01	0	10	40	50	36	1.28
BASIN DRAINING INTO POND-8								
M5	0.0707	45.25	0	10	40	50	137	5.25

Table 3-Continued: Basin Summary								
BASIN	AREA (SQ MI)	AREA (ACRE)	LAND TREATMENT (%)				Q_{100} (CFS)	VOL_{100} (AC-FT)
			A	B	C	D		
BASIN M6 DRAINING INTO POND-9 AND ESCARPMENT								
M6-15	0.0003	1.01	0	10	40	50	3	0.02
M6-26	0.0075	4.01	0	10	40	50	13	0.56

NOTES:

* DIVIDED FLOW

1 - 45 CFS FROM BASIN E2 DRAINS INTO CHAMISA STORM DRAIN (5 CFS/LOT)

2- 90 CFS DRAINS INTO LA CUENTISTA SUBDIVISION

3 - 19 CFS DRAINS INTO THE 48" OUTLET FROM BOCA NEGRA DAM

4- ROUTED THROUGH POND 10

5- FREE DISCAHRGE.

6- DRAINS INTO POND 9.

SECTION 3 – HYDRAULIC ANALYSIS

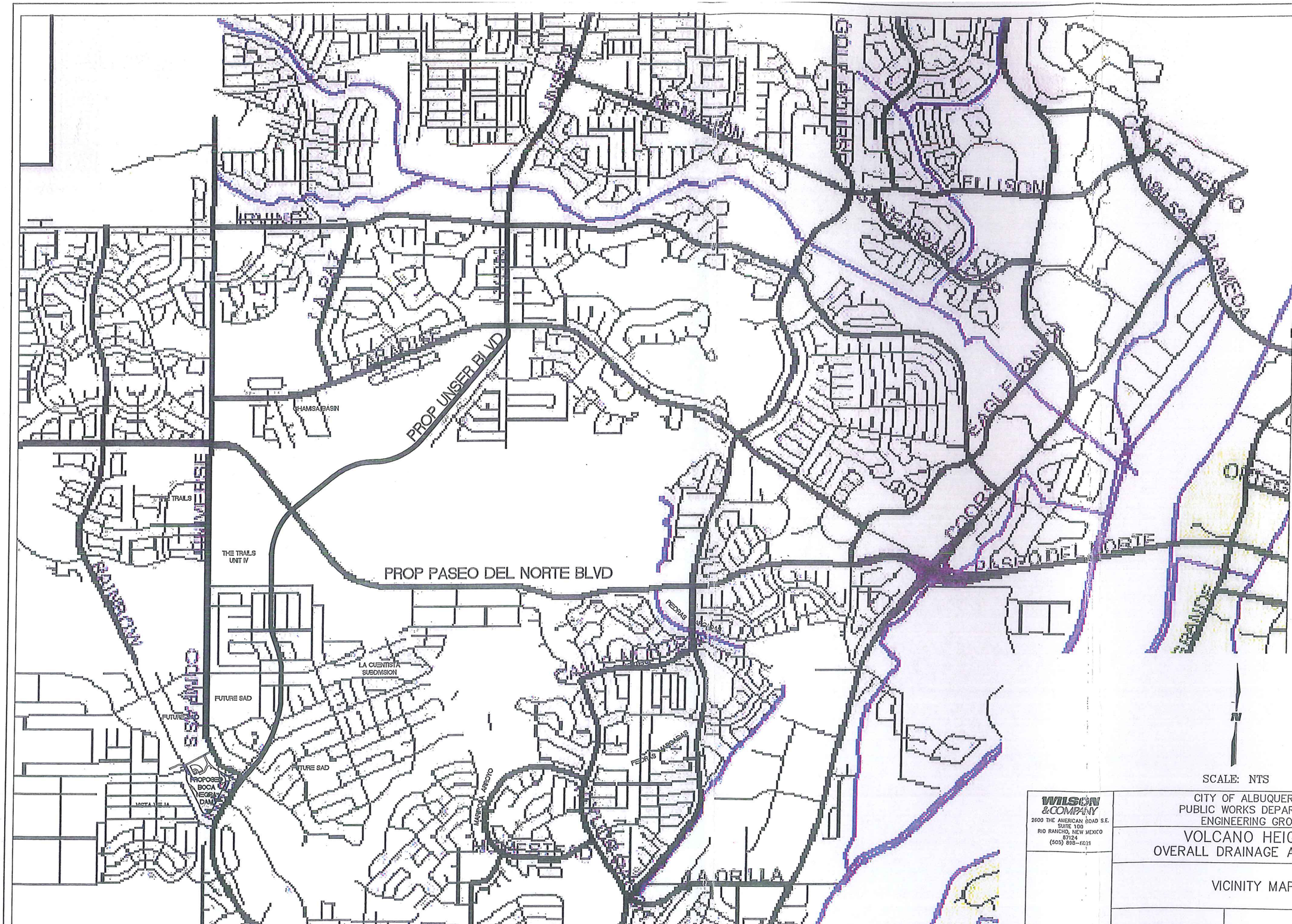
3.1 Storm Drain Analysis

Analyses for these systems were modeled using HydraFlow Storm Sewers 2005 by Intelisolve. The conceptual storm drain systems was modeled for planning and study purposes detailed design calculations are required for final infrastructure design. The proposed system may be found on Plate 1 in Appendix B.

SECTION 4 - CONCLUSION AND RECOMMENDATIONS

Proposed storm drain facilities have been evaluated and modeled to convey the developed runoff from the sub basins identified in this report. Plate 1 summarizes the proposed storm drain system for development of Volcano Heights as delineated in this report. The following table is a summary of the 100 year design flows recommended to be used for the design of infrastructure located within the boundaries identified on Plate 1.

Table 4 - Analysis Point Summary		
Analysis Point	Location	Q_{100} (cfs)
AP1	PdN at the Petoglyph national Monument	620
AP2	PdN at Sub-Basin B Entry	643
AP3	PdN Xing of Piedras Marcadas	288
AP4	Piedras Marcadas Arroyo below PdN	824
AP5	The Trails at Proposed Unser Blvd	227
AP6	Proposed Unser Blvd at Rosa Parks	330
AP7	Proposed Unser Blvd at SAD 228	439
AP8	Universe Blvd at Albuquerque Public School	176



SCALE: NTS

WILSON & COMPANY 2600 THE AMERICAN ROAD S.E. SUITE 100 RIO RANCHO, NEW MEXICO 87124 (505) 898-1021	CITY OF ALBUQUERQUE PUBLIC WORKS DEPARTMENT ENGINEERING GROUP
	VOLCANO HEIGHTS OVERALL DRAINAGE AREA MAP
	VICINITY MAP
	FIGURE 1

C:\PERSONAL\PEN\FIGURE 1.dwg 4/16/2010 9:37:59 AM MST

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APPENDIX A

```
AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) -                    - VERSION:  1997.02c      RUN DATE (MON/DAY/YR) =12/09/2011
INPUT FILE = M:\RR\0887DF~1\AE_DATA\CALCS\AHYMO\PROPVH~1.TXT                         USER NO.= AHYMO-C-9803c01UNMLIB-AH

                              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      NOTATION

*S*************************************************************************
*S
*S                  100 YEAR 6 HOUR STORM - PROPOSED RUNOFF ANALYSIS
*S                  RAINFALL DATA FROM NOAA ATLAS 14
*S
*S*************************************************************************
START                                                                                                   TIME=       .00
LOCATION                        BERNALILLO COUNTY
RAINFALL  TYPE= 1                                                                                       RAIN6=    2.200
*S
*S
*S ------------------------------------------------------------------------
*S SUB-BASINS NORTH AND WEST OF UNSER BLVD. TO POND 11,
*S ULTIMATELY DISCHARGING TO CHAMISA BASIN
*S ------------------------------------------------------------------------
*S
*S COMPUTE BASIN "E2.1" ***********************************************
COMPUTE NM HYD        200.10   -    99        .01243        25.55        .913      1.37668    1.500    3.211 PER IMP=  50.00
*S
*S THE TRAILS UNIT 4 - NORTH BASINS
*S COMPUTE BASIN "K1" *************************************************
COMPUTE NM HYD        200.20   -    **        .02380        55.46       2.166      1.70664    1.500    3.641 PER IMP=  80.00
*S COMPUTE BASIN "K2" *************************************************
COMPUTE NM HYD        200.30   -    **        .00590        13.76        .537      1.70664    1.500    3.644 PER IMP=  80.00
*S
*S COMPUTE BASIN "K3" *************************************************
COMPUTE NM HYD        200.40   -    **        .01480        34.49       1.347      1.70664    1.500    3.641 PER IMP=  80.00
*S
*S COMPUTE BASIN "K4" *************************************************
COMPUTE NM HYD        200.50   -    **        .01959        45.65       1.783      1.70664    1.500    3.641 PER IMP=  80.00
*S
*S
*S COMPUTE BASIN "ST11" ***********************************************
COMPUTE NM HYD        200.60   -    **        .00676        13.96        .654      1.81350    1.567    3.228 PER IMP=  90.00
*S
*S ADD SUB-BASINS "K1" AND "K2"  ++++++++++++++++++++++++++++++++++++++++++++
ADD HYD               200.70 **&**  **        .02970        69.22       2.703      1.70662    1.500    3.642
*S
*S ADD SUB-BASINS "K3" AND "K4"   +++++++++++++++++++++++++++++++++++++++++++
ADD HYD               200.80 **&**  **        .03439        80.14       3.130      1.70663    1.500    3.641
*S
*S ADD SUB-BASINS "K1", "K2" AND "E2.1"  ++++++++++++++++++++++++++++++++++++
ADD HYD               200.90 99&**  **        .04213        94.76       3.616      1.60927    1.500    3.515
*S
*S ADD SUB-BASINS "K1", "K2", "E2.1" AND "K3", "K4"  ++++++++++++++++++++++++
ADD HYD               200.10 **&**  **        .07652       174.91       6.746      1.65302    1.500    3.572
*S
*S
*S ------------------------------------------------------------------------
*S SUB-BASINS NORTH AND WEST OF UNSER BLVD W/ OVERFLOW OF STORMS (5 YR EVENT MIN
```

```
                              FROM  TO                    PEAK         RUNOFF                TIME TO    CFS       PAGE =   2
                  HYDROGRAPH   ID   ID         AREA     DISCHARGE      VOLUME      RUNOFF     PEAK     PER
COMMAND         IDENTIFICATION  NO.  NO.      (SQ MI)     (CFS)        (AC-FT)    (INCHES)  (HOURS)   ACRE      NOTATION
```

```
*S TO THE CHAMISA DETENTION. THE UNSER DETENTION BASIN OUTFLOW IS LIMITED
*S TO 120 CFS.  FLOWS ULTIMATELY DISCHARGE TO AP3
*S ---------------------------------------------------------------------------
*S COMPUTE BASIN "1" ************************************************************
COMPUTE NM HYD          1.10   -     1        .01324        27.21        .972      1.37668    1.500    3.211 PER IMP=  50.00
*S
*S COMPUTE BASIN "2" ************************************************************
COMPUTE NM HYD          1.20   -     2        .01130        25.87        .997      1.65421    1.500    3.578 PER IMP=  75.00
*S
*S ADD SUB-BASINS "1" AND "2" ++++++++++++++++++++++++++++++++++++++++++++++++++
ADD HYD                 1.30  1& 2  11        .02454        53.09       1.969      1.50445    1.500    3.380
*S
*S COMPUTE BASIN "U1" (UNSER TO PDN)*********************************************
COMPUTE NM HYD          1.40   -     4        .01580        38.16       1.528      1.81350    1.500    3.774 PER IMP=  90.00
*S
*S ADD SUB-BASINS "1", "2" AND "U1"  ++++++++++++++++++++++++++++++++++++++++++
ADD HYD                 1.50 11& 4  13        .04034        91.25       3.497      1.62549    1.500    3.534
*S
*S
*S COMPUTE BASIN "PDN1" *********************************************************
COMPUTE NM HYD          1.90   -    **        .01955        37.08       1.891      1.81350    1.600    2.964 PER IMP=  90.00
*S
*S ADD SUB-BASINS "1", "2", "U1" AND "PDN1"  ++++++++++++++++++++++++++++++++++
ADD HYD               200.11 13&**  **        .05989       120.82       5.388      1.68686    1.533    3.152
*S
*S
*S COMPUTE BASIN "3" ************************************************************
COMPUTE NM HYD          2.60   -     3        .01510        34.57       1.332      1.65421    1.500    3.577 PER IMP=  75.00
*S
*S ADD SUB-BASINS "1", "2", "U1", "PDN1" AND "3"+++++++++++++++++
ADD HYD                 2.70 **& 3  14        .07499       154.62       6.720      1.68028    1.500    3.222
*S
*S COMPUTE BASIN "E1" ***********************************************************
COMPUTE NM HYD          2.80   -    10        .01175        24.15        .863      1.37668    1.500    3.211 PER IMP=  50.00
*S
*S ADD SUB-BASINS "E1", "1", "2","3" AND "U1" ++++++++++++++++++++++++++++++++++
ADD HYD                 2.90 10&14  15        .08674       178.77       7.583      1.63915    1.500    3.220
*S
*S COMPUTE BASIN "E2" ***********************************************************
COMPUTE NM HYD          3.00   -    11        .04526        85.32       3.323      1.37668    1.533    2.946 PER IMP=  50.00
*S
*S ADD SUB-BASINS "E2","E1", "1", "2","3" AND "U1" ++++++++++++++++++++++++++++
ADD HYD                 3.20 15&11  16        .13200       262.23      10.906      1.54915    1.533    3.104
*S COMPUTE BASIN "U2" (UNSER NORTH OF PDN)***************************************
*S
COMPUTE NM HYD          3.30   -    20        .02593        48.61       2.508      1.81350    1.600    2.929 PER IMP=  90.00
*S
*S ADD SUB-BASINS "E1","E1", "1", "2","3","U1" AND "U2"  ++++++++++++++++++++++
ADD HYD                 3.40 20&16  17        .15793       305.56      13.414      1.59256    1.533    3.023
*S
*S COMPUTE BASIN "F" ************************************************************
*S
```

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	3.50	-	21	.00433	8.91	.318	1.37668	1.500	3.215	PER IMP= 50.00

```
*S
*S ADD SUB-BASINS "E1","E1", "1", "2","3","U1", "U2" AND "F"++++++++++++++++++++
```

```
ADD HYD                 3.60 17&21  18        .16226       314.09      13.732      1.58679    1.533    3.025
*S
*S COMPUTE BASIN "11A" ************************************************************
*S
COMPUTE NM HYD          3.70   -    22        .00656        15.30        .597      1.70664    1.500    3.643 PER IMP=  80.00
*S
*S ADD SUB-BASINS "E1","E1", "1", "2","3","U1", "U2", "F" AND "11A" +++++++++++++
*S THIS IS THE FLOW THAT IS BEING CONTRIBUTED TO THE UNSER DETENTION BASIN
ADD HYD                 3.60 18&22  19        .16882       328.67      14.329      1.59145    1.533    3.042
*S
*S THE OVERFLOW FOR THE CHAMISA DETENTION BASIN SHALL BE DONE IN A FUTURE STUDY.
*S THE UNSER DETENTION BASIN LIMITS FLOW TO 120 CFS
*S ROUTE THROUGH UNSER DETENTION BASIN  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
ROUTE RESERVOIR        POND1   19   **        .16882       115.34      14.324      1.59089    1.867    1.067 AC-FT=    7.267
*S ROUTE BASINS TO AP-3 THROUGH PNM BOUNDARY
*S
*S COMPUTE BASIN "F1" *************************************************************
*S
COMPUTE NM HYD          3.90   -    23        .02044        28.58        .779       .71481    1.500    2.185 PER IMP=    .00
*S ROUTE THROUGH SUB-BASIN "H" IN CHANNEL "H" TO AP-3
ROUTE MCUNGE            4.10   **   25        .16882       114.53      14.250      1.58269    2.567    1.060 CCODE =      .1
*S
*S COMPUTE BASIN "H" **************************************************************
*S
COMPUTE NM HYD          4.20   -    26        .38256       288.36       8.238       .40375    1.533    1.178 PER IMP=    .00
*S
*S ADD SUB-BASINS "F1", DISCHARGE FROM POND-1 AND "H"+++++(AP-3)+++++++++++++++++
ADD HYD                 4.30 26&25  27        .55138       288.37      22.488       .76472    1.533     .817
*S
*S
*S ---------------------------------------------------------------------------
*S BASINS EAST OF UNSER AND SOUTH OF PASEO DEL NORTE BLVD
*S ---------------------------------------------------------------------------
*S
*S COMPUTE BASIN "4A" *************************************************************
*S
COMPUTE NM HYD          5.00   -    40        .03880        90.40       3.532      1.70664    1.500    3.641 PER IMP=  80.00
*S COMPUTE BASIN "4B" *************************************************************
*S
COMPUTE NM HYD          5.50   -    70        .00800        18.65        .728      1.70664    1.500    3.643 PER IMP=  80.00
*S
*S ADD SUB-BASINS "4A"AND "4B"+++++++++++++++++++++++++++++++++++++++++++++++++++
ADD HYD                 5.60 70&40  43        .04680       109.05       4.260      1.70663    1.500    3.641
*S
*S
*S COMPUTE BASIN "PDN2" ***********************************************************
*S
COMPUTE NM HYD          5.30   -    60        .01260        30.43       1.219      1.81350    1.500    3.774 PER IMP=  90.00
*S
```

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 = 4 NOTATION

```
*S ADD SUB-BASINS "4A", "4B" AND "PDN2"+++++++++++++++++++++++++++++++++++++++++
ADD HYD                42.10 60&43  42        .05940       139.49       5.478      1.72930    1.500    3.669
*S
*S ROUTE THROUGH POND-10  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
ROUTE RESERVOIR        POND10   42   **        .05940        18.59       5.375      1.69665    2.133     .489 AC-FT=    3.945
*S
*S
```

```
*S ---------------------------------------------------------------------------
*S BASINS NORTH OF PASEO DEL NORTE BLVD TO EXISTING 72" IN PDN
*S ---------------------------------------------------------------------------
*S COMPUTE BASIN "7" ***********************************************************
*S
COMPUTE NM HYD          5.70   -    80        .03540        77.49       3.222      1.70664    1.533    3.420 PER IMP=  80.00
*S
*S ADD SUB-BASINS "POND 10" AND "7"+++++++++++++++++++++++++++++++++++++++++++
ADD HYD                 5.20 **&80  44        .09480        82.43       8.597      1.70038    1.533    1.359
*S
*S COMPUTE BASIN "12B" *********************************************************
*S
COMPUTE NM HYD          5.90   -    90        .01440        33.56       1.311      1.70664    1.500    3.642 PER IMP=  80.00
*S
*S ADD SUB-BASINS "POND 10", "7" AND "12B"++++++++++++++++++++++++++++++++++++++
ADD HYD                 6.00 90&44  45        .10920       114.41       9.908      1.70120    1.533    1.637
*S
*S COMPUTE BASIN "PDN3" ********************************************************
*S
COMPUTE NM HYD          6.10   -    **        .01509        30.10       1.460      1.81351    1.567    3.117 PER IMP=  90.00
*S
*S ****************************************************************
*S ADD SUB-BASINS "POND 10", "7","12B" AND PDN3+++++++++++++++++++++++++++++++++
ADD HYD                 6.00 **&45  48        .12429       143.17      11.367      1.71483    1.533    1.800
*S
*S COMPUTE BASIN "PDN4" ********************************************************
*S
COMPUTE NM HYD          6.30   -    **        .01114        24.99       1.077      1.81350    1.533    3.505 PER IMP=  90.00
*S
*S ADD SUB-BASINS "POND 10", "7","12B",PDN3 AND "PDN4"++++++++++++++++++++++++++
ADD HYD                 6.20 48&**  46        .13543       168.16      12.445      1.72295    1.533    1.940
*S
*S ****************************************************************
*S ROUTE SUB-BASINS THROUGH PIPE IN "PDN4">>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
ROUTE MCUNGE            6.21   46   **        .13543       167.01      12.443      1.72272    1.533    1.927 CCODE =      .2
*S
*S COMPUTE BASIN "A" ***********************************************************
*S
COMPUTE NM HYD          9.30   -    72        .02750        65.96       2.603      1.77452    1.500    3.748 PER IMP=  85.00
*S FLOWS INTO EXISTING 72" PDN STORM SYSTEM
*S ADD SUB-BASINS "POND 10", "7","12B","PDN3","PDN4" AND A ++++++++++++++++++++
*S
ADD HYD                 9.40 72&**  73        .16293       229.78      15.046      1.73146    1.533    2.204
*S
```

```
                                FROM  TO                    PEAK         RUNOFF                TIME TO    CFS       PAGE =   5
                     HYDROGRAPH  ID   ID        AREA      DISCHARGE      VOLUME      RUNOFF      PEAK     PER
COMMAND            IDENTIFICATION NO.  NO.     (SQ MI)      (CFS)        (AC-FT)    (INCHES)   (HOURS)   ACRE      NOTATION
```

```
*S
*S ****************************************************************
*S ****************************************************************
*S FLOWS INTO POND 2************************************************************
*S
*S
*S COMPUTE BASIN "5" ***********************************************************
*S
COMPUTE NM HYD          5.10   -    50        .02980        69.43       2.712      1.70664    1.500    3.641 PER IMP=  80.00
*S COMPUTE BASIN "6A" **********************************************************
*S
```

```
COMPUTE NM HYD          7.00   -    60        .01527        33.25       1.390      1.70664    1.533    3.402 PER IMP=  80.00
*S
*S ADD SUB-BASINS "5" AND "6A"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++
ADD HYD                49.10 60&50  49        .04507       102.01       4.102      1.70663    1.500    3.536
*S
*S COMPUTE BASIN "6" ***********************************************************
*S
COMPUTE NM HYD          7.10   -    61        .03547        82.64       3.229      1.70664    1.500    3.641 PER IMP=  80.00
*S
*S ADD SUB-BASINS "6", "5" AND "6A"+++++++++++++++++++++++++++++++++++++++++++++++++++
ADD HYD                 7.20 49&61  50        .08054       184.65       7.331      1.70663    1.500    3.582
*S
*S COMPUTE BASIN "8" ***********************************************************
*S
COMPUTE NM HYD          7.30   -    62        .01980        46.14       1.802      1.70664    1.500    3.641 PER IMP=  80.00
*S
*S ADD SUB-BASINS "6","6A" AND "8"+++++++++++++++++++++++++++++++++++++++++++++++++++
ADD HYD                 7.40 50&62  51        .10034       230.79       9.133      1.70663    1.500    3.594
*S
*S COMPUTE BASIN "9" ***********************************************************
*S
COMPUTE NM HYD          7.50   -    63        .03156        73.54       2.873      1.70664    1.500    3.641 PER IMP=  80.00
*S
*S ADD SUB-BASINS "6","6A","8" AND "9"++++++++++++++++++++++++++++++++++++++++++++++++
ADD HYD                 7.60 51&63  52        .13190       304.33      12.006      1.70663    1.500    3.605
*S
*S ROUTE SUB-BASINS THROUGH PIPE IN UPPER HALF "ST1">>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
ROUTE MCUNGE            7.51   52    1        .13190       303.29      12.005      1.70658    1.533    3.593 CCODE =      .2
*S
*S COMPUTE BASIN "12A" *********************************************************
*S
COMPUTE NM HYD          7.70   -    64        .03080        71.76       2.803      1.70664    1.500    3.641 PER IMP=  80.00
*S
*S ADD SUB-BASINS "6","6A","8","9" AND "12A"++++++++++++++++++++++++++++++++++++++++
ADD HYD                 7.80  1&64  53        .16270       371.66      14.809      1.70659    1.533    3.569
*S
*S COMPUTE BASIN "10" **********************************************************
*S
COMPUTE NM HYD          7.90   -    65        .05670       122.05       5.161      1.70664    1.533    3.363 PER IMP=  80.00
*S
```



```
                          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 ADD SUB-BASINS "6","6A","8","9","12A" AND "10"++++++++++++++++++++++++++++++++++++
ADD HYD                 8.00 53&65  54        .21940       493.72      19.969      1.70660    1.533    3.516
*S
*S
*S COMPUTE BASIN "ST1" *********************************************************
*S
COMPUTE NM HYD          8.10   -    66        .01413        30.89       1.367      1.81350    1.533    3.416 PER IMP=  90.00
*S
*S ADD SUB-BASINS "6","6A","8","9","12A","10" AND "ST1"++++++++++++++++++++++++++++
ADD HYD                 8.20 66&54  55        .23353       524.61      21.336      1.71307    1.533    3.510
*S
*S
*S
*S COMPUTE BASIN "ST2"*********************************************************
*S
```

```
COMPUTE NM HYD          8.30   -    67        .01094        23.92       1.058      1.81350    1.533    3.417 PER IMP=  90.00
*S
*S ADD SUB-BASINS "6","6A","8","9","12A","10","ST1" AND "ST2"+++++++++++++++++++
ADD HYD                 8.40 55&67  56        .24447       548.53      22.394      1.71756    1.533    3.506
*S
*S
*S
*S ---------------------------------------------------------------------------
*S REMAINDER OF SUB-BASINS IN INTERNAL STREET TO POND 2
*S ---------------------------------------------------------------------------
*S
*S COMPUTE BASIN "13" ***********************************************************
*S
COMPUTE NM HYD          6.50   -    **        .06260       139.56       5.698      1.70664    1.500    3.484 PER IMP=  80.00
*S
*S COMPUTE BASIN "11B" **********************************************************
*S
COMPUTE NM HYD          8.50   -    68        .05527       116.14       5.031      1.70664    1.533    3.283 PER IMP=  80.00
*S
*S ADD BASINS "11B" AND "13"+++++++++++++++++++++++++++++++
ADD HYD                 6.60 **&68  **        .11787       254.39      10.729      1.70664    1.533    3.372
*S
*S
*S COMPUTE BASIN "ST3" **********************************************************
*S
COMPUTE NM HYD          8.70   -    69        .00686        15.01        .664      1.81350    1.533    3.418 PER IMP=  90.00
*S
*S ADD SUB-BASINS "11B" AND "ST3"++++++++++++++++++++++++++++++++++
ADD HYD                 8.80 **&69  58        .12473       269.40      11.392      1.71251    1.533    3.375
*S
*S COMPUTE BASIN "ST4" **********************************************************
*S
COMPUTE NM HYD          8.90   -    **        .00772        16.89        .747      1.81350    1.533    3.418 PER IMP=  90.00
*S
*S ADD SUB-BASINS "11B","ST3" AND "ST4"+++++++++++++++++++++++++++++++++++++
ADD HYD                 9.00 58&**  59        .13245       286.28      12.139      1.71840    1.533    3.377
*S
```

```
                          FROM  TO                    PEAK        RUNOFF                TIME TO    CFS       PAGE =   7
                HYDROGRAPH  ID   ID        AREA     DISCHARGE     VOLUME      RUNOFF      PEAK     PER
COMMAND       IDENTIFICATION NO.  NO.     (SQ MI)     (CFS)       (AC-FT)   (INCHES)   (HOURS)   ACRE      NOTATION

*S COMPUTE BASIN "11C" **********************************************************
*S
COMPUTE NM HYD          9.10   -    71        .03317        77.29       3.019      1.70664    1.500    3.641 PER IMP=  80.00
*S
*S ADD SUB-BASINS "13", "11B","ST3","ST4" AND "11C"+++++++++++++++++++++++++++++
*S
ADD HYD                 9.20 71&59  60        .16562       359.92      15.158      1.71604    1.533    3.396
*S
*S
*S ALL DISCHARGE TO POND 2
*S ADD ALL SUB-BASINS NORTH OF PDN AND REMAINDER OF INTERNAL STREETS +++++++++++
*S DISCHARGING TO POND 2
*S
ADD HYD                 9.50 56&60  74        .41009       908.45      37.552      1.71695    1.533    3.461
*S
*S ROUTE THROUGH POND-2  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
ROUTE RESERVOIR        POND2   74   **        .41009       472.54      37.513      1.71515    1.700    1.800 AC-FT=   14.362
*S
*S ALL DISCHARGE FROM POND 2, BASIN A AND BASINS NORTH OF PDN
```

```
*S TO EXISTING 72" PDN STORM SYSTEM (AP-1)
*S
ADD HYD                 9.51 73&**  **        .57302       620.23      52.559      1.71979    1.667    1.691
*S
*S
*S EXISTING PDN STORM SYSTEM
*S
*S ROUTE AP-1 THROUGH PIPE IN "PDN5" (AP-1 TO AP-2)>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
ROUTE MCUNGE            9.60   **    1        .57302       619.44      52.540      1.71917    1.700    1.689 CCODE =      .2
*S COMPUTE BASIN "PDN5" ********************************************************
*S
COMPUTE NM HYD          9.70   -    75        .01978        47.77       1.913      1.81350    1.500    3.774 PER IMP=  90.00
*S
*S ADD ALL SUB-BASINS NORTH OF PDN, SOUTH OF UNSER,"A" AND "PDN5"+++++++++++++++
ADD HYD                 9.80  1&75  76        .59280       640.82      54.453      1.72231    1.700    1.689
*S COMPUTE BASIN "B" ***********************************************************
*S
COMPUTE NM HYD          9.90   -    77        .02114        15.98        .455       .40375    1.500    1.181 PER IMP=    .00
*S
*S ADD ALL SUB-BASINS N. OF PDN, S. UNSER,"A","PDN5"AND "B"++++++++(AP-2)+++++++
ADD HYD                10.00 76&77  78        .61394       647.99      54.908      1.67691    1.700    1.649
*S
*S ROUTE THROUGH "PDN6" IN PIPE (AP-2)>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
ROUTE MCUNGE          788.10   78   **        .61394       644.55      54.887      1.67627    1.700    1.640 CCODE =      .2
*S
*S COMPUTE BASIN "G" (AP-3)*****************************************************
*S
COMPUTE NM HYD         10.11   -    28        .10320        79.53       2.222       .40375    1.500    1.204 PER IMP=    .00
*S
*S
*S ADD ALL SUB-BASINS NORTH OF PDN, SOUTH OF UNSER,"A","B","PDN5"AND "G"++++++++
```

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 = 8 NOTATION
*S										
ADD HYD	10.12	28&**	**	.71714	696.48	57.109	1.49314	1.567	1.517	
*S										
*S COMPUTE BASIN "PDN6"										
*S										
COMPUTE NM HYD	10.20	-	79	.01847	44.61	1.786	1.81350	1.500	3.774	PER IMP= 90.00
*S										
*S ADD ALL SUB-BASINS TO "PDN6"+++										
ADD HYD	10.30	**&79	80	.73561	733.18	58.895	1.50119	1.567	1.557	
*S										
*S										
*S ADD FLOWS TO AP-4++++(PIEDRAS MARCADAS)+++++++++++++++++++++++++++++++++++++										
ADD HYD	10.40	27&80	81	1.28699	1012.90	81.383	1.18566	1.567	1.230	
*S										
*S ----------										
*S UNIVERSE STORM DRAIN TO BOCA NEGRA DAM										
*S ----------										
*S										
*S COMPUTE STATE LAND OFFICE BASIN, P1 (SPLIT FROM SCHOOL SITE)****************										
COMPUTE NM HYD	P2B	-	50	.03125	44.34	1.515	.90878	1.533	2.217	PER IMP= 22.00
*S										
*S										
*S ROUTE THROUGH PIPE IN UNIVERSE BLVD>>										

```
ROUTE MCUNGE          TRSLO1   50   71        .03125        43.94       1.510       .90626    1.567    2.197 CCODE =      .1
*S
*S  BASIN P2 (HIGH SCHOOL) FROM UNIVERSE STORM DRAIN STUDY***********************
COMPUTE NM HYD           P2A   -    72        .10940       152.78       7.852      1.34570    1.633    2.182 PER IMP=  50.00
*S ADD STATE LAND OFFICE & HIGH SCHOOL+++++++++++++++++++++++++++++++++++++++++++
ADD HYD                TR.HS 71&72  73        .14065       194.24       9.362      1.24806    1.600    2.158
*S
*S ROUTE THROUGH PIPE IN UNIVERSE BLVD>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
ROUTE MCUNGE            TRHS   73   74        .14065       179.11       9.240      1.23175    1.700    1.990 CCODE =      .2
*S
*S BASIN P3 (FUTURE SAD) FROM UNIVERSE STORM DRAIN STUDY*****************
COMPUTE NM HYD            P3   -    75        .05150        63.39       3.696      1.34570    1.667    1.923 PER IMP=  50.00
*S
*S ADD UNIVERSE SUB-BASINS TO BOCA NEGRA DAM+++++++++++++++++++++++++++++++++++++
ADD HYD                TR.HS 74&75  76        .19215       242.47      12.936      1.26229    1.700    1.972
*S
*S ---------------------------------------------------------------------------
*S UNSER BLVD SOUTH OF THE GRANT LINE TO BOCA NEGRA DAM
*S ---------------------------------------------------------------------------
*S
*S COMPUTE SUB-BASIN THE TRAILS UNIT 4 (SUB-BASIN T1)***************************
*S ASSUME AN AREA OF 10 ACRES FOR THE THREE PONDS IN THIS SUB-BASIN
*S
COMPUTE NM HYD         10.10   -    10        .08900       148.83       6.612      1.39293    1.567    2.613 PER IMP=  50.00
*S
*S RECALL POND K DISCHARGE FROM THE TRAILS SUBDIVISION**************************
*S
```

```
* PASEO DEL NORTE DRAINAGE ANALYSIS
* WILSON & COMPANY PROJECT X3210022
* DEVELOPED CONDITIONS MODEL
* 100 YR 6 HR STORM EVENT
* DATE: DECEMBER 2011
* FILE: X:\Public\PROJECTS\X3210022\Drainage Report\DOCS\AHYMO\PROP VH.TXT

*S*****************************************************************************
*S
*S      100 YEAR 6 HOUR STORM - PROPOSED RUNOFF ANALYSIS
*S      RAINFALL DATA FROM NOAA ATLAS 14
*S
*S*****************************************************************************

START           0.0 HOURS
LOCATION        BERNALILLO COUNTY
RAINFALL        TYPE=1  RAIN QUARTER=0.0 IN     RAIN ONE=1.70 IN
                RAIN SIX=2.20 IN        RAIN DAY=0 IN   DT=0.033333 HR
*S
*S
*S ---------------------------------------------------------------------------
*S SUB-BASINS NORTH AND WEST OF UNSER BLVD. TO POND 11,
*S ULTIMATELY DISCHARGING TO CHAMISA BASIN
*S ---------------------------------------------------------------------------
*
*S
*S COMPUTE BASIN "E2.1" ********************************************************

COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.020  K=0.7
                LENGTH=480 FT  SLOPE=0.020  K=2.0

COMPUTE NM HYD  ID=99   HYD NO=200.1    DA=0.01243 SQ MI
                PER A=0   PER B=15  PER C=35   PER D=50
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=99   CODE=1
*S
*S THE TRAILS UNIT 4 - NORTH BASINS
*S COMPUTE BASIN "K1" **********************************************************
*

COMPUTE LT TP   LCODE=1 NK=3 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.02  K=0.7
                LENGTH=600 FT  SLOPE=0.02   K=2.0
                LENGTH=100 FT  SLOPE=0.02   K=3.0

COMPUTE NM HYD  ID=200  HYD NO=200.2    DA=0.0238 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=200  CODE=1

*S COMPUTE BASIN "K2" **********************************************************

COMPUTE LT TP   LCODE=1 NK=1 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.020  K=0.7

COMPUTE NM HYD  ID=201  HYD NO=200.3    DA=0.0059 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=201  CODE=1

*S
*S COMPUTE BASIN "K3" **********************************************************

COMPUTE LT TP   LCODE=1 NK=3 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.020  K=0.7
                LENGTH=600 FT  SLOPE=0.020   K=2.0
                LENGTH=100 FT  SLOPE=0.020   K=3.0

COMPUTE NM HYD  ID=202  HYD NO=200.4    DA=0.0148 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=202  CODE=1

*S
```

```
*S COMPUTE BASIN "K4" ********************************************************************

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=590 FT  SLOPE=0.020   K=2.0

COMPUTE NM HYD   ID=203  HYD NO=200.5    DA=0.01959 SQ MI
                 PER A=0   PER B=10  PER C=10   PER D=80
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=203  CODE=1
*S
*S
*S COMPUTE BASIN "ST11" ************************************************************
*

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=1730 FT  SLOPE=0.020   K=2.0

COMPUTE NM HYD   ID=204  HYD NO=200.6    DA=0.006758 SQ MI
                 PER A=0   PER B=10  PER C=0   PER D=90
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=204  CODE=1

*S
*S ADD SUB-BASINS "K1" AND "K2"  ++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=205  HYD NO=200.7    ID I=200        ID II=201
PRINT HYD        ID=205  CODE=1

*S
*S ADD SUB-BASINS "K3" AND "K4"   ++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=206  HYD NO=200.8    ID I=202        ID II=203
PRINT HYD        ID=206  CODE=1
*S
*S ADD SUB-BASINS "K1", "K2" AND "E2.1"  ++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=207  HYD NO=200.9    ID I=99         ID II=205
PRINT HYD        ID=207  CODE=1
*S
*S ADD SUB-BASINS "K1", "K2", "E2.1" AND "K3", "K4"  ++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=208  HYD NO=200.10   ID I=206        ID II=207
PRINT HYD        ID=208  CODE=1
*S
*S
*S ------------------------------------------------------------------------------
*S SUB-BASINS NORTH AND WEST OF UNSER BLVD W/ OVERFLOW OF STORMS (5 YR EVENT MIN)
*S TO THE CHAMISA DETENTION. THE UNSER DETENTION BASIN OUTFLOW IS LIMITED
*S TO 120 CFS.  FLOWS ULTIMATELY DISCHARGE TO AP3
*S ------------------------------------------------------------------------------

*S COMPUTE BASIN "1" ***********************************************************************
*

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=275 FT  SLOPE=0.020   K=2.0

COMPUTE NM HYD   ID=1    HYD NO=1.1      DA=0.01324 SQ MI
                 PER A=0   PER B=15  PER C=35   PER D=50
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=1    CODE=1
*S

*S COMPUTE BASIN "2" ***********************************************************************
*
COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=280 FT  SLOPE=0.020   K=2.0

COMPUTE NM HYD   ID=2    HYD NO=1.2      DA=0.0113 SQ MI
                 PER A=0   PER B=10  PER C=15   PER D=75
                 TP=0.0  MASS RAIN=-1
```

```
PRINT HYD        ID=2    CODE=1

*S
*S ADD SUB-BASINS "1" AND "2" ++++++++++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=11   HYD NO=1.3      ID I=1  ID II=2
PRINT HYD        ID=11   CODE=1
*S

*S COMPUTE BASIN "U1" (UNSER TO PDN)*****************************************************
*
COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=280 FT  SLOPE=0.020   K=2.0

COMPUTE NM HYD   ID=4    HYD NO=1.4      DA=0.0158 SQ MI
                 PER A=0   PER B=10  PER C=0   PER D=90
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=4    CODE=1

*S
*S ADD SUB-BASINS "1", "2" AND "U1"  ++++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=13   HYD NO=1.5      ID I=11 ID II=4
PRINT HYD        ID=13   CODE=1
*S

*S
*S COMPUTE BASIN "PDN1" ************************************************************
*

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=2510 FT  SLOPE=0.020   K=2.0

COMPUTE NM HYD   ID=209  HYD NO=1.9      DA=0.01955 SQ MI
                 PER A=0   PER B=10  PER C=0   PER D=90
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=209  CODE=1
*S
*S ADD SUB-BASINS "1", "2", "U1" AND "PDN1"  ++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=210  HYD NO=200.11   ID I=13 ID II=209
PRINT HYD        ID=210  CODE=1
*S

*S
*S COMPUTE BASIN "3" ***********************************************************************
*

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=470 FT  SLOPE=0.020   K=2.0

COMPUTE NM HYD   ID=3    HYD NO=2.6      DA=0.0151 SQ MI
                 PER A=0   PER B=10  PER C=15   PER D=75
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=3    CODE=1

*S
*S ADD SUB-BASINS "1", "2", "U1", "PDN1" AND "3"+++++++++++++++++

ADD HYD          ID=14   HYD NO=2.7      ID I=210        ID II=3
PRINT HYD        ID=14   CODE=1

*S
*S COMPUTE BASIN "E1" **********************************************************************
*
COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.030  K=0.7
                 LENGTH=1060 FT  SLOPE=0.030   K=2.0

COMPUTE NM HYD   ID=10   HYD NO=2.8      DA=0.01175 SQ MI
                 PER A=0   PER B=15  PER C=35   PER D=50
                 TP=0.0  MASS RAIN=-1
```

```
PRINT HYD       ID=10   CODE=1

*S
*S ADD SUB-BASINS "E1", "1", "2","3" AND "U1" ++++++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=15   HYD NO=2.9      ID I=10 ID II=14
PRINT HYD       ID=15   CODE=1

*S
*S COMPUTE BASIN "E2" ******************************************************************
*
COMPUTE LT TP   LCODE=1 NK=3 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.030  K=0.7
                LENGTH=600 FT  SLOPE=0.030  K=2.0
                LENGTH=1800 FT  SLOPE=0.030   K=3.0

COMPUTE NM HYD  ID=11   HYD NO=3.0      DA=0.045259 SQ MI
                PER A=0   PER B=15  PER C=35   PER D=50
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=11   CODE=1

*S
*S ADD SUB-BASINS "E2","E1", "1", "2","3" AND "U1" ++++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=16   HYD NO=3.2      ID I=15 ID II=11
PRINT HYD       ID=16   CODE=1

*S COMPUTE BASIN "U2" (UNSER NORTH OF PDN)*****************************************************
*S

COMPUTE LT TP   LCODE=1 NK=3 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.02  K=0.7
                LENGTH=600 FT  SLOPE=0.02   K=2.0
                LENGTH=2550 FT  SLOPE=0.02   K=3.0

COMPUTE NM HYD  ID=20   HYD NO=3.3      DA=0.025933 SQ MI
                PER A=0   PER B=10  PER C=0   PER D=90
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=20   CODE=1

*S
*S ADD SUB-BASINS "E1","E1", "1", "2","3","U1" AND "U2"  ++++++++++++++++++++++++++

ADD HYD         ID=17   HYD NO=3.4      ID I=20 ID II=16
PRINT HYD               ID=17   CODE=1

*S
*S COMPUTE BASIN "F" *******************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=1 ISLOPE=-1
                LENGTH=320 FT  SLOPE=0.020  K=0.7

COMPUTE NM HYD  ID=21   HYD NO=3.5      DA=0.00433 SQ MI
                PER A=0   PER B=15  PER C=35   PER D=50
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=21   CODE=1

*S
*S ADD SUB-BASINS "E1","E1", "1", "2","3","U1", "U2" AND "F"++++++++++++++++++++++++++

ADD HYD         ID=18   HYD NO=3.6      ID I=17 ID II=21
PRINT HYD       ID=18   CODE=1

*S
*S COMPUTE BASIN "11A" *****************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.020  K=0.7
                LENGTH=80 FT  SLOPE=0.020  K=2.0

COMPUTE NM HYD  ID=22   HYD NO=3.7      DA=0.00656 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1
```

```
PRINT HYD        ID=22   CODE=1
*S
*S ADD SUB-BASINS "E1","E1", "1", "2","3","U1", "U2", "F" AND "11A" +++++++++++++++++++++++++
*S THIS IS THE FLOW THAT IS BEING CONTRIBUTED TO THE UNSER DETENTION BASIN

ADD HYD          ID=19   HYD NO=3.6      ID I=18 ID II=22
PRINT HYD        ID=19   CODE=1

*S

*S THE OVERFLOW FOR THE CHAMISA DETENTION BASIN SHALL BE DONE IN A FUTURE STUDY.
*S THE UNSER DETENTION BASIN LIMITS FLOW TO 120 CFS
*S ROUTE THROUGH UNSER DETENTION BASIN
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

ROUTE RESERVOIR          ID=220  HYD=POND1       INFLOW ID=19 CODE=10
                         OUTFLOW(CFS)    STORAGE(AC-FT)  ELEV(FT)
                                 0               0       0
                                 10              2.0     1
                                 20              3.5     2
                                 50              5.0     3
                                 80              6.0     4
                                 110             7.0     5
                                 130             8.0     6
                                 150             9.5     7
                                 170             11.0    8


PRINT HYD        ID=220  CODE=10

*S ROUTE BASINS TO AP-3 THROUGH PNM BOUNDARY
*S
*S COMPUTE BASIN "F1" *******************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=1 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7

COMPUTE NM HYD   ID=23   HYD NO=3.9      DA=0.02044 SQ MI
                 PER A=0   PER B=60  PER C=40    PER D=0
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=23   CODE=1

*S ROUTE THROUGH SUB-BASIN "H" IN CHANNEL "H" TO AP-3

COMPUTE RATING CURVE     CID=1    VS NO=1 NO SEGS=1
                         MIN ELEV=0       MAX ELEV=4.50
                         CH SLOPE=0.020  FP SLOPE=0.020
                         N=0.038         DIST=52.0
                         DIST     ELEV    DIST    ELEV
                         0.0      5.0     6.0     0.0
                         46.0     0.0     52.0    5.0

ROUTE MCUNGE             ID=25    HYD NO=4.1      INFLOW ID=220
                         DT=0.0  L=6500 FT       NS=0    SLOPE=0.020
                         MATCODE=0       REGCODE=0       CCODE=0 MM CODE=0

PRINT HYD        ID=25   CODE=1

*S
*S COMPUTE BASIN "H" ********************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=3 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.040  K=0.7
                 LENGTH=2100 FT  SLOPE=0.060  K=2.0
                 LENGTH=4000 FT  SLOPE=0.060  K=3.0

COMPUTE NM HYD   ID=26   HYD NO=4.2      DA=0.38256 SQ MI
                 PER A=100   PER B=0  PER C=0    PER D=0
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=26   CODE=1

*S
*S ADD SUB-BASINS "F1", DISCHARGE FROM POND-1 AND "H"+++++(AP-3)+++++++++++++++++++++

ADD HYD          ID=27   HYD NO=4.3      ID I=26 ID II=25
```

```
PRINT HYD       ID=27   CODE=1
*S
*S
*S ---------------------------------------------------------------------------
*S BASINS EAST OF UNSER AND SOUTH OF PASEO DEL NORTE BLVD
*S ---------------------------------------------------------------------------

*S
*S COMPUTE BASIN "4A" ************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.020  K=0.7
                LENGTH=760 FT  SLOPE=0.020  K=2.0

COMPUTE NM HYD  ID=40   HYD NO=5.0      DA=0.0388 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=40   CODE=1

*S COMPUTE BASIN "4B" ************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.020  K=0.7
                LENGTH=410 FT  SLOPE=0.020  K=2.0

COMPUTE NM HYD  ID=70   HYD NO=5.5      DA=0.0080 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=70   CODE=1

*S
*S ADD SUB-BASINS "4A"AND "4B"+++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=43   HYD NO=5.6      ID I=70 ID II=40
PRINT HYD       ID=43   CODE=1
*S
*S

*S COMPUTE BASIN "PDN2" ************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.020  K=0.7
                LENGTH=750 FT  SLOPE=0.020  K=2.0

COMPUTE NM HYD  ID=60   HYD NO=5.3      DA=0.0126 SQ MI
                PER A=0   PER B=10  PER C=0   PER D=90
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=60   CODE=1


*S
*S ADD SUB-BASINS "4A", "4B" AND "PDN2"+++++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=42   HYD NO=42.1     ID I=60 ID II=43
PRINT HYD       ID=42   CODE=1
*
*S
*S ROUTE THROUGH POND-10  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

ROUTE RESERVOIR         ID=421  HYD=POND10      INFLOW ID=42 CODE=10
                        OUTFLOW(CFS)    STORAGE(AC-FT)  ELEV(FT)
                                0               0       0
                                5               2       2
                                10              3       4
                                20              4.1     6


PRINT HYD       ID=421  CODE=10
*S
*S
*S ---------------------------------------------------------------------------
*S BASINS NORTH OF PASEO DEL NORTE BLVD TO EXISTING 72" IN PDN
*S ---------------------------------------------------------------------------
```

```
*S COMPUTE BASIN "7" ************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=1150 FT  SLOPE=0.020  K=2.0

COMPUTE NM HYD   ID=80   HYD NO=5.7      DA=0.0354 SQ MI
                 PER A=0   PER B=10  PER C=10   PER D=80
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=80   CODE=1

*S
*S ADD SUB-BASINS "POND 10" AND "7"+++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=44   HYD NO=5.2      ID I=421        ID II=80
PRINT HYD        ID=44   CODE=1
*S
*S COMPUTE BASIN "12B" ***********************************************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=800 FT  SLOPE=0.020  K=2.0

COMPUTE NM HYD   ID=90   HYD NO=5.9      DA=0.0144 SQ MI
                 PER A=0   PER B=10  PER C=10   PER D=80
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=90   CODE=1

*S
*S ADD SUB-BASINS "POND 10", "7" AND "12B"+++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=45   HYD NO=6.0      ID I=90 ID II=44
PRINT HYD        ID=45   CODE=1

*S
*S COMPUTE BASIN "PDN3" **********************************************************
*S

COMPUTE LT TP    LCODE=1 NK=3 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=500 FT  SLOPE=0.020  K=2.0
                 LENGTH=2130 FT  SLOPE=0.020  K=3.0

COMPUTE NM HYD   ID=100  HYD NO=6.1      DA=0.01509 SQ MI
                 PER A=0   PER B=10  PER C=0   PER D=90
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=100  CODE=1
*S
*S ******************************************************************
*S ADD SUB-BASINS "POND 10", "7","12B" AND PDN3+++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=48   HYD NO=6.0      ID I=100        ID II=45
PRINT HYD        ID=48   CODE=1

*S

*S COMPUTE BASIN "PDN4" **********************************************************
*S

COMPUTE LT TP    LCODE=1 NK=3 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=500 FT  SLOPE=0.020  K=2.0
                 LENGTH=1130 FT  SLOPE=0.020  K=3.0

COMPUTE NM HYD   ID=110  HYD NO=6.3      DA=0.01114 SQ MI
                 PER A=0   PER B=10  PER C=0   PER D=90
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=110  CODE=1
*S
*S ADD SUB-BASINS "POND 10", "7","12B",PDN3 AND "PDN4"+++++++++++++++++++++++++++++++

ADD HYD          ID=46   HYD NO=6.2      ID I=48 ID II=110
```

```
PRINT HYD       ID=46   CODE=1
*S
*S ************************************************************************

*S ROUTE SUB-BASINS THROUGH PIPE IN "PDN4">>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.01
                        DIA=7.0 FT      N=0.013

ROUTE MCUNGE    ID=772  HYD NO=6.21     INFLOW ID=46
                DT=0.0  L=1500  NS=0    SLP=0.01
                MATCODE=0       REGCODE=0       CCODE=0 MM CODE=0

PRINT HYD       ID=772  CODE=1
*S
*
*S COMPUTE BASIN "A" ************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.03  K=0.7
                LENGTH=1100 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD  ID=72   HYD NO=9.3      DA=0.0275 SQ MI
                A=0  B=5  C=10  D=85
                TP=0.0  MASSRAIN=-1

PRINT HYD       ID=72   CODE=1
*

*S FLOWS INTO EXISTING 72" PDN STORM SYSTEM
*S ADD SUB-BASINS "POND 10", "7","12B","PDN3","PDN4" AND A +++++++++++++++++++++++++++++++++++++++++++++++
*S
ADD HYD         ID=73   HYD NO=9.4      ID I=72 ID II=772
PRINT HYD       ID=73   CODE=1
*S
*S
*S ************************************************************************
*S ************************************************************************
*S FLOWS INTO POND 2************************************************************
*S
*S
*S COMPUTE BASIN "5" ************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.020  K=0.7
                LENGTH=650 FT  SLOPE=0.020  K=2.0

COMPUTE NM HYD  ID=50   HYD NO=5.1      DA=0.0298 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=50   CODE=1


*S COMPUTE BASIN "6A" ************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=3 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.020  K=0.7
                LENGTH=500 FT  SLOPE=0.020  K=2.0
                LENGTH=1040 FT  SLOPE=0.020  K=3.0

COMPUTE NM HYD  ID=60   HYD NO=7.0      DA=0.01527 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=60   CODE=1

*S
*S ADD SUB-BASINS "5" AND "6A"++++++++++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=49   HYD NO=49.1     ID I=60 ID II=50
PRINT HYD       ID=49   CODE=1

*S
*S COMPUTE BASIN "6" ************************************************************
*S
```

```
COMPUTE LT TP    LCODE=1 NK=3 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.02  K=0.7
                 LENGTH=600 FT  SLOPE=0.02  K=2.0
                 LENGTH=150 FT  SLOPE=0.02  K=3.0

COMPUTE NM HYD   ID=61   HYD NO=7.1      DA=0.03547 SQ MI
                 PER A=0   PER B=10  PER C=10   PER D=80
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=61   CODE=1

*S
*S ADD SUB-BASINS "6", "5" AND "6A"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=50   HYD NO=7.2      ID I=49 ID II=61
PRINT HYD        ID=50   CODE=1

*S
*S COMPUTE BASIN "8" ****************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.02  K=0.7
                 LENGTH=480 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD   ID=62   HYD NO=7.3      DA=0.0198 SQ MI
                 PER A=0   PER B=10  PER C=10   PER D=80
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=62   CODE=1

*S
*S ADD SUB-BASINS "6","6A" AND "8"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=51   HYD NO=7.4      ID I=50 ID II=62
PRINT HYD        ID=51   CODE=1
*S
*S COMPUTE BASIN "9" ****************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.02  K=0.7
                 LENGTH=890 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD   ID=63   HYD NO=7.5      DA=0.03156 SQ MI
                 PER A=0   PER B=10  PER C=10   PER D=80
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=63   CODE=1

*S
*S ADD SUB-BASINS "6","6A","8" AND "9"+++++++++++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=52   HYD NO=7.6      ID I=51 ID II=63
PRINT HYD        ID=52   CODE=1

*S
*S ROUTE SUB-BASINS THROUGH PIPE IN UPPER HALF "ST1">>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
COMPUTE RATING CURVE     CID=1   VS NO=1 CODE=-1 SLP=0.022
                         DIA=5.0 FT      N=0.013

ROUTE MCUNGE     ID=1    HYD NO=7.51     INFLOW ID=52
                 DT=0.0  L=1566  NS=0    SLP=0.022
                 MATCODE=0       REGCODE=0       CCODE=0 MM CODE=0

PRINT HYD        ID=1    CODE=1
*S
*S COMPUTE BASIN "12A" **************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.02  K=0.7
                 LENGTH=820 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD   ID=64   HYD NO=7.7      DA=0.0308 SQ MI
                 PER A=0   PER B=10  PER C=10   PER D=80
                 TP=0.0  MASS RAIN=-1
```

```
PRINT HYD       ID=64   CODE=1

*S
*S ADD SUB-BASINS "6","6A","8","9" AND "12A"+++++++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=53   HYD NO=7.8      ID I=1  ID II=64
PRINT HYD       ID=53   CODE=1

*S
*S COMPUTE BASIN "10" ************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.02  K=0.7
                LENGTH=1270 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD  ID=65   HYD NO=7.9      DA=0.0567 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=65   CODE=1

*S
*S ADD SUB-BASINS "6","6A","8","9","12A" AND "10"+++++++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=54   HYD NO=8.0      ID I=53 ID II=65
PRINT HYD       ID=54   CODE=1

*S
*S
*S COMPUTE BASIN "ST1" ***********************************************************
*S

COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.02  K=0.7
                LENGTH=1400 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD  ID=66   HYD NO=8.1      DA=0.01413 SQ MI
                PER A=0   PER B=10  PER C=0   PER D=90
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=66   CODE=1

*S
*S ADD SUB-BASINS "6","6A","8","9","12A","10" AND "ST1"++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=55   HYD NO=8.2      ID I=66 ID II=54
PRINT HYD       ID=55   CODE=1
*S
*S

*S
*S COMPUTE BASIN "ST2"************************************************************
*S
COMPUTE LT TP   LCODE=1 NK=2 ISLOPE=-1
                LENGTH=400 FT  SLOPE=0.02  K=0.7
                LENGTH=1400 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD  ID=67   HYD NO=8.3      DA=0.01094 SQ MI
                PER A=0   PER B=10  PER C=0   PER D=90
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=67   CODE=1

*S
*S ADD SUB-BASINS "6","6A","8","9","12A","10","ST1" AND "ST2"+++++++++++++++++++++++++++++++++

ADD HYD         ID=56   HYD NO=8.4      ID I=55 ID II=67
PRINT HYD       ID=56   CODE=1
*S
*S
*S

*S ---------------------------------------------------------------------------
*S REMAINDER OF SUB-BASINS IN INTERNAL STREET TO POND 2
*S ---------------------------------------------------------------------------
*S
*S COMPUTE BASIN "13" ************************************************************
```

```
*S

COMPUTE LT TP    LCODE=1 NK=3 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.020  K=0.7
                 LENGTH=600 FT  SLOPE=0.020  K=2.0
                 LENGTH=680 FT  SLOPE=0.020  K=3.0

COMPUTE NM HYD   ID=120  HYD NO=6.5      DA=0.0626 SQ MI
                 PER A=0   PER B=10  PER C=10   PER D=80
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=120  CODE=1

*S

*S COMPUTE BASIN "11B" ************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.02  K=0.7
                 LENGTH=1400 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD   ID=68   HYD NO=8.5      DA=0.05527 SQ MI
                 PER A=0   PER B=10  PER C=10   PER D=80
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=68   CODE=1
*S
*S ADD BASINS "11B" AND "13"+++++++++++++++++++++++++++++

ADD HYD          ID=681  HYD NO=6.6      ID I=120        ID II=68
PRINT HYD        ID=681  CODE=1
*S

*S
*S COMPUTE BASIN "ST3" ************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.02  K=0.7
                 LENGTH=1400 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD   ID=69   HYD NO=8.7      DA=0.00686 SQ MI
                 PER A=0   PER B=10  PER C=0   PER D=90
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=69   CODE=1

*S
*S ADD SUB-BASINS "11B" AND "ST3"+++++++++++++++++++++++++++++++

ADD HYD          ID=58   HYD NO=8.8      ID I=681        ID II=69
PRINT HYD        ID=58   CODE=1

*S
*S COMPUTE BASIN "ST4" ************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.02  K=0.7
                 LENGTH=1400 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD   ID=588  HYD NO=8.9      DA=0.00772 SQ MI
                 PER A=0   PER B=10  PER C=0   PER D=90
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=588  CODE=1

*S
*S ADD SUB-BASINS "11B","ST3" AND "ST4"++++++++++++++++++++++++++++++++

ADD HYD          ID=59   HYD NO=9.0      ID I=58 ID II=588
PRINT HYD        ID=59   CODE=1

*S
*S COMPUTE BASIN "11C" ************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
```

```
                LENGTH=400 FT  SLOPE=0.02  K=0.7
                LENGTH=50 FT  SLOPE=0.02  K=2.0

COMPUTE NM HYD  ID=71   HYD NO=9.1      DA=0.03317 SQ MI
                PER A=0   PER B=10  PER C=10   PER D=80
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=71   CODE=1

*S
*S ADD SUB-BASINS "13", "11B","ST3","ST4" AND "11C"++++++++++++++++++++++++++++++++
*S
ADD HYD         ID=60   HYD NO=9.2      ID I=71 ID II=59
PRINT HYD       ID=60   CODE=1
*S
*S
*********************************************************************************************
*S ALL DISCHARGE TO POND 2
***************************************************************************************
*S ADD ALL SUB-BASINS NORTH OF PDN AND REMAINDER OF INTERNAL STREETS
++++++++++++++++++++++++++++++++++++++++++
*S DISCHARGING TO POND 2
*S
ADD HYD         ID=74   HYD NO=9.5      ID I=56 ID II=60

PRINT HYD       ID=74   CODE=1

*S
*S ROUTE THROUGH POND-2  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>

ROUTE RESERVOIR         ID=601  HYD=POND2       INFLOW ID=74 CODE=10
                        OUTFLOW(CFS)    STORAGE(AC-FT)  ELEV(FT)
                                0               0       5290
                                20              5       5291
                                40              7       5292
                                300             9       5293
                                350             13      5295
                                530             15      5296

PRINT HYD       ID=601  CODE=10
*S
*
*********************************************************************************************
*S ALL DISCHARGE FROM POND 2, BASIN A AND BASINS NORTH OF PDN
*S TO EXISTING 72" PDN STORM SYSTEM (AP-1)
***************************************************************************************
*S
ADD HYD         ID=744  HYD NO=9.51     ID I=73 ID II=601

PRINT HYD       ID=744  CODE=1
*S
*S


******************************************************************************
*S EXISTING PDN STORM SYSTEM
******************************************************************************************
*S
*S ROUTE AP-1 THROUGH PIPE IN "PDN5" (AP-1 TO AP-2)>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.01
                        DIA=7.0 FT      N=0.013

ROUTE MCUNGE    ID=1    HYD NO=9.6      INFLOW ID=744
                DT=0.0  L=1500  NS=0    SLP=0.01
                MATCODE=0       REGCODE=0       CCODE=0 MM CODE=0

PRINT HYD       ID=1    CODE=1

*S COMPUTE BASIN "PDN5" ***************************************************************
*S

COMPUTE LT TP   LCODE=1 NK=3 ISLOPE=-1
                LENGTH=50 FT  SLOPE=0.02  K=0.7
                LENGTH=250 FT  SLOPE=0.02  K=2.0
                LENGTH=900 FT  SLOPE=0.02  K=3.0

COMPUTE NM HYD  ID=75   HYD NO=9.7      DA=0.01978 SQ MI
                PER A=0   PER B=10  PER C=0   PER D=90
```

```
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=75   CODE=1

*S
*S ADD ALL SUB-BASINS NORTH OF PDN, SOUTH OF UNSER,"A" AND
"PDN5"++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=76   HYD NO=9.8      ID I=1  ID II=75

PRINT HYD        ID=76   CODE=1

*S COMPUTE BASIN "B" ************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=3 ISLOPE=-1
                 LENGTH=200 FT  SLOPE=0.03  K=0.7
                 LENGTH=200 FT  SLOPE=0.02  K=2.0
                 LENGTH=1000 FT  SLOPE=0.03  K=3.0

COMPUTE NM HYD   ID=77   HYD NO=9.9      DA=0.02114 SQ MI
                 PER A=100   PER B=0  PER C=0   PER D=0
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=77   CODE=1

*S
*S ADD ALL SUB-BASINS N. OF PDN, S. UNSER,"A","PDN5"AND
"B"++++++++(AP-2)+++++++++++++++++++++++++++++++++++++++++++

ADD HYD          ID=78   HYD NO=10.0     ID I=76 ID II=77

PRINT HYD        ID=78   CODE=1

*S
*S ROUTE THROUGH "PDN6" IN PIPE (AP-2)>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
COMPUTE RATING CURVE    CID=1   VS NO=1 CODE=-1 SLP=0.01
                        DIA=7.0 FT      N=0.013

ROUTE MCUNGE     ID=788  HYD NO=788.1    INFLOW ID=78
                 DT=0.0  L=1000  NS=0    SLP=0.01
                 MATCODE=0       REGCODE=0       CCODE=0 MM CODE=0

PRINT HYD        ID=788  CODE=1
*S
*S COMPUTE BASIN "G" (AP-3)*************************************************************
*S

COMPUTE LT TP    LCODE=1 NK=3 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.060  K=0.7
                 LENGTH=350 FT  SLOPE=0.060  K=2.0
                 LENGTH=1050 FT  SLOPE=0.060  K=3.0

COMPUTE NM HYD   ID=28   HYD NO=10.11    DA=0.1032 SQ MI
                 PER A=100   PER B=0  PER C=0   PER D=0
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=28   CODE=1
*S
*S

*S ADD ALL SUB-BASINS NORTH OF PDN, SOUTH OF UNSER,"A","B","PDN5"AND
"G"+++++++++++++++++++++++++++++++++++++++

*S
ADD HYD          ID=281  HYD NO=10.12    ID I=28 ID II=788

PRINT HYD        ID=281  CODE=1
*S

*S COMPUTE BASIN "PDN6" *********************************************************
*S

COMPUTE LT TP    LCODE=1 NK=3 ISLOPE=-1
                 LENGTH=50 FT  SLOPE=0.02  K=0.7
                 LENGTH=250 FT  SLOPE=0.02  K=2.0
                 LENGTH=1200 FT  SLOPE=0.02  K=3.0
```

```
COMPUTE NM HYD  ID=79   HYD NO=10.2     DA=0.01847 SQ MI
                PER A=0   PER B=10  PER C=0   PER D=90
                TP=0.0  MASS RAIN=-1

PRINT HYD       ID=79   CODE=1

*S
*S ADD ALL SUB-BASINS TO "PDN6"+++++++++++++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=80   HYD NO=10.3     ID I=281        ID II=79

PRINT HYD       ID=80   CODE=1
*S
*S
*S ADD FLOWS TO AP-4++++(PIEDRAS MARCADAS)++++++++++++++++++++++++++++++++++++++

ADD HYD         ID=81   HYD NO=10.4     ID I=27 ID II=80

PRINT HYD       ID=81   CODE=1
*S
*S ------------------------------------------------------------------------------
*S UNIVERSE STORM DRAIN TO BOCA NEGRA DAM
*S ------------------------------------------------------------------------------
*S

*S  COMPUTE STATE LAND OFFICE BASIN, P1 (SPLIT FROM SCHOOL
SITE)*************************************************
*
COMPUTE LT TP         LCODE=1  NK=2  ISLOPE=-1
                            LENGTH=400  SLOPE=0.0148  K=1.0
                            LENGTH=1100  SLOPE=0.0148  K=2.0
*
COMPUTE NM HYD      ID=50  HYD=P2B  DA=0.03125 SQ MI
                            A=25  B=26 C=27  D=22
                            TP=0.0  MASSRAIN=-1
PRINT HYD                   ID=50  CODE=5
*S
*S
*S ROUTE THROUGH PIPE IN UNIVERSE BLVD>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
COMPUTE RATING CURVE  CID=1  VS NO=1  CODE=-1  SLP=0.02
                            DIA=2.5  N=0.013
ROUTE MCUNGE          ID=71  HYD=TRSLO1  INFLOW ID=50
                            DT=0.0   L=1100  NS=0   SLOPE=0.022
                            MATCODE=0  REGCODE=0  CCODE=0  MM CODE=0
PRINT HYD             ID=71 CODE=5
*S
*S  BASIN P2 (HIGH SCHOOL) FROM UNIVERSE STORM DRAIN STUDY**********************
*
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                            LENGTH=400  SLOPE=0.0148  K=1.0
                            LENGTH=1600  SLOPE=0.0148  K=2.0
                            LENGTH=1300  SLOPE=0.0148  K=3.0
*
COMPUTE NM HYD      ID=72  HYD=P2A  DA=0.1094 SQ MI
                            A=0  B=25 C=25  D=50
                            TP=0.0  MASSRAIN=-1
PRINT HYD                   ID=72  CODE=5
*S ADD STATE LAND OFFICE & HIGH SCHOOL++++++++++++++++++++++++++++++++++++++++
ADD HYD              ID=73 HYD=TR.HS  ID I=71 II=72
PRINT HYD            ID=73 CODE=5
*S
*S ROUTE THROUGH PIPE IN UNIVERSE BLVD>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
COMPUTE RATING CURVE  CID=1  VS NO=1  CODE=-1  SLP=0.013
                            DIA=4  N=0.013
*
ROUTE MCUNGE          ID=74  HYD=TRHS  INFLOW ID=73
                            DT=0.0   L=1700  NS=0   SLOPE=0.013
                            MATCODE=0  REGCODE=0  CCODE=0  MM CODE=0
PRINT HYD             ID=74  CODE=5
*S
*S BASIN P3 (FUTURE SAD) FROM UNIVERSE STORM DRAIN STUDY*****************
*
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                            LENGTH=400  SLOPE=0.0084  K=0.7
                            LENGTH=1600  SLOPE=0.0084  K=2.0
                            LENGTH=400  SLOPE=0.0084  K=3.0
*
COMPUTE NM HYD      ID=75  HYD=P3  DA=0.0515 SQ MI
                            A=0  B=25  C=25  D=50
```

```
                    TP=0.0  MASSRAIN=-1
PRINT HYD
                ID=75  CODE=5
*S
*S ADD UNIVERSE SUB-BASINS TO BOCA NEGRA DAM+++++++++++++++++++++++++++++++++++
ADD HYD          ID=76 HYD=TR.HS  ID I=74 II=75
PRINT HYD        ID=76 CODE=5
*S
*S ---------------------------------------------------------------------------
*S UNSER BLVD SOUTH OF THE GRANT LINE TO BOCA NEGRA DAM
*S ---------------------------------------------------------------------------
*S
*S COMPUTE SUB-BASIN THE TRAILS UNIT 4 (SUB-BASIN T1)****************************************
*S ASSUME AN AREA OF 10 ACRES FOR THE THREE PONDS IN THIS SUB-BASIN
*S
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                      LENGTH=400  SLOPE=0.02  K=0.7
                      LENGTH=900  SLOPE=0.02  K=2.0
                      LENGTH=1500  SLOPE=0.02  K=3.0

COMPUTE NM HYD      ID=10  HYD=10.1  DA=0.089 SQ MI
                      A=0  B=10  C=40  D=50
                    TP=0.0  MASSRAIN=-1

PRINT HYD               ID=10  CODE=5
*S
*S RECALL POND K DISCHARGE FROM THE TRAILS SUBDIVISION**********************************
*S
RECALL HYD      ID=70   HYD=TRAIL.POND  DT=0.0
PRINT HYD       ID=70   CODE=5
*S

*S ADD POND K DISCHARGE FROM THE TRAILS SUBDIVISION++++++++++++++++++++++++++++
*S
ADD HYD          ID=12 HYD=TR.HS  ID I=10 II=70
PRINT HYD        ID=12 CODE=5
*
*S
*S SAD 228 WEST OF UNSER BLVD
*S
*S COMPUTE SUB-BASIN M1 - WEST OF UNSER*****************************************************
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                      LENGTH=400  SLOPE=0.02  K=0.7
                      LENGTH=800  SLOPE=0.02  K=2.0
                      LENGTH=1500  SLOPE=0.02  K=3.0

COMPUTE NM HYD     ID=13  HYD=10.2  DA=0.138 SQ MI
               A=0  B=10  C=40  D=50
               TP=0.0  MASSRAIN=-1

PRINT HYD      ID=13  CODE=5
*S
*S ROUTE SUB-BASIN M1 THROUGH POND-3>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
ROUTE RESERVOIR         ID=113  HYD=POND3       INFLOW ID=13 CODE=10
                        OUTFLOW (CFS)   STORAGE (AC-FT) ELEV (FT)
                                0               0       0
                                20              1.0     1
                                40              2.0     2
                                60              3.0     3
                                80              4.0     4.0
                                100             4.5     5.0

PRINT HYD      ID=113  CODE=10
*S
*S
*S ADD BASINS M1 AND TRAILS UNIT IV++++++++++++++++++++++++++++++++++++++++++++++++++++++
*S
ADD HYD          ID=14 HYD=10.3  ID I=12 II=113
PRINT HYD        ID=14 CODE=5
*S

*S COMPUTE SUB-BASIN N1 - EAST OF UNSER*****************************************************
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                      LENGTH=400  SLOPE=0.02  K=0.7
                      LENGTH=600  SLOPE=0.02  K=2.0
                      LENGTH=1390  SLOPE=0.02  K=3.0

COMPUTE NM HYD     ID=15  HYD=10.4  DA=0.0814 SQ MI
```

```
                A=0  B=10  C=40  D=50
                TP=0.0  MASSRAIN=-1

PRINT HYD       ID=15  CODE=5
*S
*S
*S DIVIDE BASIN N1 FOR ALLOWABLE EXISTING FLOWS THROUGH LA CUENTISTA ////////////////////

DIVIDE HYD      ID=15   Q=90    ID I=9  HYD=10.5
                                ID II=16        HYD=10.6

PRINT HYD       ID=9    CODE=1
PRINT HYD       ID=16   CODE=1
*S
*S ADD SUB-BASINS M1 AND N1(DIVIDED)++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
*S
ADD HYD              ID=17 HYD=10.7  ID I=16 II=14
PRINT HYD            ID=17 CODE=5
*S
*
*S COMPUTE SUB-BASIN N2 - EAST OF UNSER*****************************************************
COMPUTE LT TP         LCODE=1  NK=2  ISLOPE=-1
                            LENGTH=400  SLOPE=0.02  K=0.7
                            LENGTH=700  SLOPE=0.02  K=2.0

COMPUTE NM HYD     ID=18  HYD=10.8  DA=0.0246 SQ MI
                A=0  B=10  C=40  D=50
                TP=0.0  MASSRAIN=-1

PRINT HYD       ID=18  CODE=5
*S
*S ADD SUB-BASINS "N1", "M1" AND N2++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
*S
ADD HYD              ID=19 HYD=10.9  ID I=18 II=17
PRINT HYD            ID=19 CODE=5
*S
*S
*S COMPUTE SUB-BASIN UNSER U0***************************************************
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                            LENGTH=400  SLOPE=0.02  K=0.7
                            LENGTH=700  SLOPE=0.02  K=2.0
                            LENGTH=4125  SLOPE=0.02  K=3.0

COMPUTE NM HYD     ID=20  HYD=11.1  DA=0.0319 SQ MI
                A=0  B=10  C=40  D=50
                TP=0.0  MASSRAIN=-1

PRINT HYD       ID=20  CODE=5
*S
*S
*S DIVIDE SUB BASIN UNSER- SEPARATE BYPASS FLOWS FROM BOCA NEGRA DAM/////////////////////
*S
DIVIDE HYD      ID=20   Q=19    ID I=30 HYD=30.1
                                ID II=31        HYD=30.2
PRINT HYD       ID=30   CODE=1
PRINT HYD       ID=31   CODE=1
*S
*S ADD SUB-BASINS EAST AND WEST OF UNSER++++++++++++++++++++++++++++++++++++++++++++++++++++++++
*S
ADD HYD              ID=21 HYD=11.2  ID I=31 II=19
PRINT HYD            ID=21 CODE=5
*S
*S
*S COMPUTE SUB-BASIN M2-A - WEST OF UNSER***************************************************
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                            LENGTH=400  SLOPE=0.02  K=0.7
                            LENGTH=600  SLOPE=0.02  K=2.0
                            LENGTH=2600  SLOPE=0.02  K=3.0

COMPUTE NM HYD     ID=22  HYD=11.3  DA=0.1145 SQ MI
                A=5  B=35  C=35  D=30
                TP=0.0  MASSRAIN=-1

PRINT HYD       ID=22  CODE=5
*S
*S
*S ROUTE SUB-BASIN M2-A THROUGH POND-4A>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
ROUTE RESERVOIR         ID=124  HYD=POND4       INFLOW ID=22 CODE=10
```

```
                        OUTFLOW (CFS)   STORAGE (AC-FT) ELEV (FT)
                        0                    0              0
                        3                    1.0            1
                        16                   2.0            2
                        18                   3.0            3
                        22                   4.5            4

PRINT HYD       ID=124  CODE=10
*S
*S COMPUTE SUB-BASIN M2-B - WEST OF UNSER*****************************************************
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                            LENGTH=400  SLOPE=0.02  K=0.7
                            LENGTH=600  SLOPE=0.02  K=2.0
                            LENGTH=500  SLOPE=0.02  K=3.0

COMPUTE NM HYD     ID=24  HYD=11.4  DA=0.0201 SQ MI
                A=0  B=10  C=40  D=50
                TP=0.0  MASSRAIN=-1

PRINT HYD       ID=24  CODE=5
*S
*S
*S ADD ALL UNSER BLVD SUB-BASINS TO BOCA NEGRA DAM
*S
ADD HYD              ID=25 HYD=11.5  ID I=21 II=24
PRINT HYD            ID=25 CODE=5
*S


*S SAD 228 EAST OF UNSER BLVD
*S
*S COMPUTE SUB-BASIN M3 - EAST OF UNSER*****************************************
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                            LENGTH=400  SLOPE=0.02  K=0.7
                            LENGTH=800  SLOPE=0.02  K=2.0
                            LENGTH=1500  SLOPE=0.02  K=3.0

COMPUTE NM HYD     ID=26  HYD=11.7  DA=0.1793 SQ MI
                A=0  B=10  C=40  D=50
                TP=0.0  MASSRAIN=-1

PRINT HYD       ID=26  CODE=5
*S
*S
*S ROUTE SUB-BASIN M3 THROUGH POND-5>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
ROUTE RESERVOIR         ID=125  HYD=POND5       INFLOW ID=26 CODE=10
                        OUTFLOW (CFS)   STORAGE (AC-FT) ELEV (FT)
                        0                    0              0
                        20                   1.0            1.5
                        30                   1.8            2.5
                        40                   6.5            6.5
                        50                   8.5            7.5

*S
PRINT HYD       ID=125  CODE=10
*S
*S
*S ADD ROUTED FLOWS FROM PONDS 4 AND 5+++++++++++++++++++++++++++++++++++++++++++++++
*S
ADD HYD              ID=27 HYD=11.8  ID I=124 II=125
PRINT HYD            ID=27 CODE=5
*S
*S

*S ADD ROUTED FLOWS FROM POND-4, POND-5 AND 19 CFS UNSER BLVD BYPASS++++++++++++++++++++++++
*S
ADD HYD              ID=29 HYD=11.9  ID I=27 II=30
PRINT HYD            ID=29 CODE=5
*S
*S

*S COMPUTE SUB-BASIN M4 - SOUTH OF LA CUENTISTA SUBD.*****************************************
COMPUTE LT TP         LCODE=1  NK=2  ISLOPE=-1
                            LENGTH=400  SLOPE=0.02  K=0.7
                            LENGTH=600  SLOPE=0.02  K=2.0

COMPUTE NM HYD     ID=241  HYD=12.2  DA=0.0172 SQ MI
                A=0  B=10  C=40  D=50
```

```
                TP=0.0  MASSRAIN=-1

PRINT HYD         ID=241  CODE=5
*S
*S
*S ROUTE SUB-BASIN M4 THROUGH POND-7 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
ROUTE RESERVOIR           ID=127  HYD=POND7        INFLOW ID=241 CODE=10
                          OUTFLOW (CFS)   STORAGE (AC-FT) ELEV (FT)
                          0                       0               0
                          5                       0.6             1
                          7                       1.0             2
                          10                      1.5             2.2

*S
PRINT HYD         ID=127  CODE=10
*S
*S
*S COMPUTE SUB-BASIN M5 - SOUTH OF LA CUENTISTA SUBD.*******************************************
COMPUTE LT TP          LCODE=1  NK=2  ISLOPE=-1
                              LENGTH=400 FT  SLOPE=0.0125  K=0.7
                            LENGTH=1230 FT  SLOPE=0.0410   K=2.0

COMPUTE NM HYD      ID=251  HYD=12.3  DA=0.0707 SQ MI
                    A=0  B=10  C=40  D=50
                    TP=0.0  MASSRAIN=-1

PRINT HYD          ID=251  CODE=5
*S
*S
*S ROUTE SUB-BASIN M5 THROUGH POND-8 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S

ROUTE RESERVOIR           ID=128  HYD=POND8        INFLOW ID=251 CODE=10
                          OUTFLOW (CFS)   STORAGE (AC-FT) ELEV (FT)
                          0                       0               0
                          20                      1               1
                          30                      3               4

*S
PRINT HYD         ID=128  CODE=10
*S
*S
*S COMPUTE SUB-BASIN M6 - SOUTH OFBASIN M5*********************************
*S

COMPUTE LT TP    LCODE=1 NK=2 ISLOPE=-1
                 LENGTH=400 FT  SLOPE=0.0287  K=0.7
                 LENGTH=370 FT  SLOPE=0.0138   K=2.0

COMPUTE NM HYD   ID=252  HYD NO=12.4     DA=0.0065 SQ MI
                 PER A=0   PER B=10  PER C=40   PER D=50
                 TP=0.0  MASS RAIN=-1

PRINT HYD        ID=252  CODE=1
*S
*S ******************************************************************

*S DIVIDE FLOWS INTO POND9 FROM FREE DISCHARGE
DIVIDE HYD       ID=252  Q=11     ID=51   HYD NO=51.1
                                  ID=52   HYD NO=52.1

PRINT HYD        ID=51   CODE=1
PRINT HYD        ID=52   CODE=1
*S

*S ******************************************************************
*S ROUTE SUB-BASIN M6 THROUGH POND-9 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S

ROUTE RESERVOIR           ID=130  HYD=POND9        INFLOW ID=51 CODE=10
                          OUTFLOW (CFS)   STORAGE (AC-FT) ELEV (FT)
                          0                       0               5316.4
                          1                       0.113           5317
                          8                       0.200           5318


*S
PRINT HYD        ID=130  CODE=10
```

```
*S

*S COMPUTE SUB-BASIN M3-1 - EAST OF UNSER******************************************
COMPUTE LT TP         LCODE=1  NK=3  ISLOPE=-1
                            LENGTH=400  SLOPE=0.02  K=0.7
                            LENGTH=800  SLOPE=0.02  K=2.0
                            LENGTH=300  SLOPE=0.02  K=3.0

COMPUTE NM HYD      ID=254  HYD=13.3  DA=0.05339 SQ MI
                A=0  B=10  C=40  D=50
                TP=0.0  MASSRAIN=-1

PRINT HYD       ID=254  CODE=5
*S
*S
*S ROUTE SUB-BASIN M3-1 THROUGH POND-6 >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
*S
ROUTE RESERVOIR         ID=129  HYD=POND6       INFLOW ID=254 CODE=10
                        OUTFLOW (CFS)   STORAGE (AC-FT) ELEV (FT)
                        0                       0              0
                        2                       1.3            1
                        40                      2.1            1.5

*S
PRINT HYD       ID=129  CODE=10
*S


*S
FINISH

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

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

APPENDIX B

APPENDIX C

CITY OF ALBUQUERQUE

Parks and Recreation Department
OPEN SPACE DIVISION

Richard J. Berry, Mayor **Barbara Baca, Director**

October 21, 2011

Mr. Steven Metro
Wilson & Company
4900 Lang Ave. NE
Albuquerque, NM 87109

Regarding: Open Space Division Letter of Concurrence with SAD 228 Drainage and Trails Planning Adjacent to Boca Negra Canyon, Petroglyph National Monument

Dear Mr. Metro;

The City of Albuquerque Open Space Division (OSD), in coordination with staff from the National Park Service, Petroglyph National Monument Unit (PETR), has reviewed the Drainage Report "Volcano Heights Drainage Compilation Report" dated October, 2011, as prepared by Wilson & Company.

OSD and PETR approve and concur with the proposed controlled outlet flows from the Drainage Ponds as summarized below:

Pond 6 Allowable Outlet Flow = 40 c.f.s.
Pond 7 Allowable Outlet Flow = 10 c.f.s.
Pond 8 Allowable Outlet Flow = 30 c.f.s.
Pond 9 Allowable Outlet Flow = 10 c.f.s.

The attached map shows the proposed ponds and the compilation of drainage outlets for the areas above the PETR escarpment. In general, the allowable drainage flows over the escarpment are less than half of the historic flows from the subject-area with no development, as we negotiated and agreed upon.

It is my understanding that, per OSD and PETR staff comments (during a meeting on October 17, 2011, at the Wilson & Company office), the Pond 6 emergency overflow location will be moved to the east and additional native/local basalt rip-rap will be added to the overflow in order to ensure the flows at the escarpment are spread out and dissipated so as to prevent channelization and erosion in the canyon below.

In addition, we concur with the proposed escarpment trail alignment, both horizontal and vertical. The proposed trail alignment follows the bladed roadways for Compass and Vista del Prado streets which will reduce grading impacts to the Petroglyph National Monument and Boca Negra canyon.

PO Box 1293
Albuquerque
NM 87103
www.cabq.gov

Further, it is my understanding that proposed the fencing surrounding Pond #6 and the adjacent lift-station will be eliminated and replaced with native vegetation per OSD and PETR recommendation.

Thank you for your cooperation and responsiveness to the interests of the public in this matter.

Should you have any questions or need additional information, please feel free to contact me.

Sincerely,

Matthew F. Schmader, Ph.D.
Superintendent, Open Space Division

Attachment – Volcano Heights Drainage Compilation Report Exhibit 1

Copy: Barbara C. Baca, Director, Parks and Recreation Department
Joseph P. Sanchez, Superintendent, NPS PETR

WILSON
&COMPANY

4900 Lang Ave NE

Albuquerque, NM 87109

505-348-4000 phone

Arizona
California
Colorado
Florida
Kansas
Missouri
Nebraska
New Mexico
Oklahoma
Texas
Utah

To: Shahab Biazar, P.E.
Development and Building Services
City of Albuquerque

From: Daniel S. Aguirre, P.E.

Date: October 24, 2011 File Number: X3-210-022

Re: Volcano Heights Drainage Compilation Report

Dear Mr. Biazar,

The intent of this report is to share with the City and AMAFCA the planning concepts used over the past 8-10 years in this area and to bring to your attention the system limitations based on the existing and planned infrastructure. This report is not intended to be used for design but to identify the allowable discharge at specific points in the area based on the concepts followed with past projects. I have updated the report per your comments to fix any identified errors and tried to explain the intent below. Please remember that any projects in the area require a detailed analysis and do not need to follow the exact concepts used for the purposes of this report.

Please see below responses to your comments of the review of the drainage report dated August 24, 2011:

1. **Any discharge to the Petroglyph National Monument has to be approved by Open Space.** This report is based on several approved reports that have been completed over the pasted several years. These flows have been approved via the Paseo Del Norte Extension drainage report, La Cuentista Subdivision, Vista Vieja Subdivision and Boca Negra Dam plus others. An additional meeting was held with Open Space on October 17, 2011 to discuss all discharges into open space. The Map has been slightly modified based on this meeting in the SAD 228 area and a copy of a letter of approval will be sent to your office when received from Open Space.

2. **Please confirm the allowable discharge from Pond 11 to Chamisa storm drain system.** AMAFCA required that the Chamisa Storm Drain take the 45 cfs from adjacent lots. The flow is shown in the approved drainage report for the Paseo Del Norte Extension and should be included in the Chamisa storm drain report.

3. **How was the capacity determined to allow the Unser Detention Basin to drain to Chamisa Detention Basin?** This is a proposed system (concept only) to prevent low flows from discharging to the Petroglyph National Monument (PETR) during low flow (erosive) events. We created a pond to store water with a minimal discharge to the Chamisa detention basin ultimately discharging to the Lyon Blvd storm drain for low flows (up to 10 year event) once the pond fills to the 10 year volume it will start to spill to PETR through a weir up to the 120 cfs originally identified as historic flow. This was intended to reduce erosion at the PETR discharge point and can be redesigned and modified with a more detailed analysis or other concepts when final design is completed.

4. **Can some of the flows proposed for Unser Detention Basin drain south to the Paseo Del Norte Storm Drain System?** The existing Paseo Del Norte Storm Drain System was designed and constructed based on the roadway original alignment. The existing storm drain system has a limited capacity and would require additional ponds to accept flows from other subbasins. If you incorporate the right amount of detention you can modify in final design plans.

5. **May need to run the runoff calculations based on the 100-year, 24-hour storm based on the duration of the discharge for the detention ponds. Please stay consistent between all the drainage reports for this area. Most of the runoff calculations for the SAD 228 where based on the 100-year, 24-hour storm.** This report serves as a guide to develop allowable flows at specific discharge points. Hydrology calculations need to be modeled in future studies as each area is developed in the same manner that has been done with SAD 228. The final models will be determined based on the requirements for the design.

6. **Flow numbers for Basins K2, M5, M6, and T1 are not the same on the Plate-1, Table-1/Plate-1 and AHYMO calculations. T1 basin area is different from the AHYMO calculations and what is shown on the Plate-1.** All numbers corrected.