LADERA POND 16B
DRAINAGE ANALYSIS
FOR TRACT X-1-A2,
UNIVERSITY OF ALBUQUERQUE URBAN CENTER

December 2015

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INTRODUCTION

This report summarizes the drainage analysis completed to determine if there is available volume in the Ladera Pond 16B, located at the southwest corner of Atrisco and Western Trail, to drain the proposed commercial site at the northwest corner of Coors Boulevard and St. Joseph's Drive (Tract X-1-A2, University of Albuquerque Urban Center). The watershed draining to Ladera Pond 16B was delineated using City of Albuquerque LiDAR contours, previous drainage studies, and record drawings. The previous drainage studies used include "Supplemental Hydrology Study of the San Antonio Arroyo, Coors Boulevard to the Rio Grande", March 10, 1992, by Clifford E Anderson and "Drainage Master Plan for Coors Village Subdivision" February 29, 2000, by Thompson Engineering Consultants, Inc. This study included preparing an AHYMO hydrologic model for the watershed under fully developed conditions.

METHODOLOGY

The hydrologic and hydraulic criteria in Section 22 of the City of Albuquerque Development Process Manual (DPM), entitled "Drainage, Flood Control, and Erosion Control," was followed to perform the analyses given in this report. The design storm used for the developed conditions of the Trails area is the 100-year, 24-hour storm event for peak flow and volume computations. An AHYMO model for the fully developed conditions was completed to analyze the basins draining to the Ladera Pond 16B.

AHYMO MODEL DEVELOPMENT

DRAINAGE BASIN DELINEATION

Drainage basins were delineated by following the basins identified in previous drainage studies, using record drawings, and LiDAR contours. The Exhibit at the end of the report shows the drainage basins and existing storm drain system. The watershed was divided into 24 drainage basins. Most of the basins that drain to the Ladera Pond 16B are developed. There are a few office and commercial sites that are not currently developed. For this study, all basins were assumed to be developed using their current land use.

DEVELOPED CONDITIONS MODEL

The developed conditions model was constructed by first inputting all drainage improvements that have been built within the existing subdivisions and sites. Information from all existing drainage reports and record drawings were used to provide input to the AHYMO model. Basin numbering generally followed the San Antonio Arroyo Study by Anderson. The Petroglyph National Monument is located west of Unser Boulevard. This area will remain mostly undeveloped. There is a series of ponds located in the Unser Boulevard right-of-way that accepts runoff from the basins west of Unser. The majority of the basins draining to Ladera Pond 16B have single-family residential lots. Chapparal Elementary School is located directly west of the pond. There are some commercial tracts north and east of the pond. There is a tract east of the pond that is zoned for offices. South of the pond are two tracts that have churches. Table 1 shows the basin characteristics included in this study.

Table 1 Developed Drainage Basin Characteristics

BASIN	AREA	LAND TREATMENT				Q	VOL
	ACRES	A	B	C	D	CFS	AC-FT
162.1	19.24	0.0	28.2	28.2	43.6	61.58	2.419
162.2	22.03	0.0	8.8	8.8	82.4	86.17	3.925
162.3	21.30	0.0	30.4	30.5	39.1	44.07	1.691
162.4	8.47	0.0	12.5	12.5	75.0	32.01	1.426
162.5	21.94	0.0	5.0	5.0	90.0	88.93	4.138
163.1	91.61	90.0	1.5	2.1	6.4	140.67	4.340
163.2	17.74	90.0	1.5	2.1	6.4	26.38	0.840
163.3	9.38	90.0	1.5	2.1	6.4	13.96	0.444
163.4	7.27	90.0	1.5	2.1	6.4	10.82	0.344
163.5	17.21	0.0	30.5	30.5	39.0	53.63	2.056
163.6	11.82	0.0	5.0	5.0	90.0	47.88	2.227
163.7	16.82	0.0	25.0	25.0	50.0	55.81	2.260
163.8	15.63	0.0	25.0	25.0	50.0	51.81	2.100
163.9	13.36	0.0	80.0	15.0	5.0	29.66	0.872
163.10	37.05	0.0	33.8	33.9	32.3	110.79	4.092
163.11	5.72	0.0	12.5	12.5	75.0	21.60	0.963
164.1	12.30	90.0	1.5	2.1	6.4	18.30	0.583
164.2	17.10	90.0	1.5	2.1	6.4	25.44	0.810
164.3	25.02	90.0	1.5	2.1	6.4	37.21	1.185
164.4	20.66	90.0	1.5	2.1	6.4	30.74	0.979
164.5	18.79	90.0	1.5	2.1	6.4	27.95	0.890
164.6	17.02	0.0	20.3	20.3	59.4	59.43	2.504
164.7	41.68	0.0	15.2	15.2	69.6	153.28	6.708
164.8	20.05	0.0	25.8	25.9	48.3	65.92	2.649

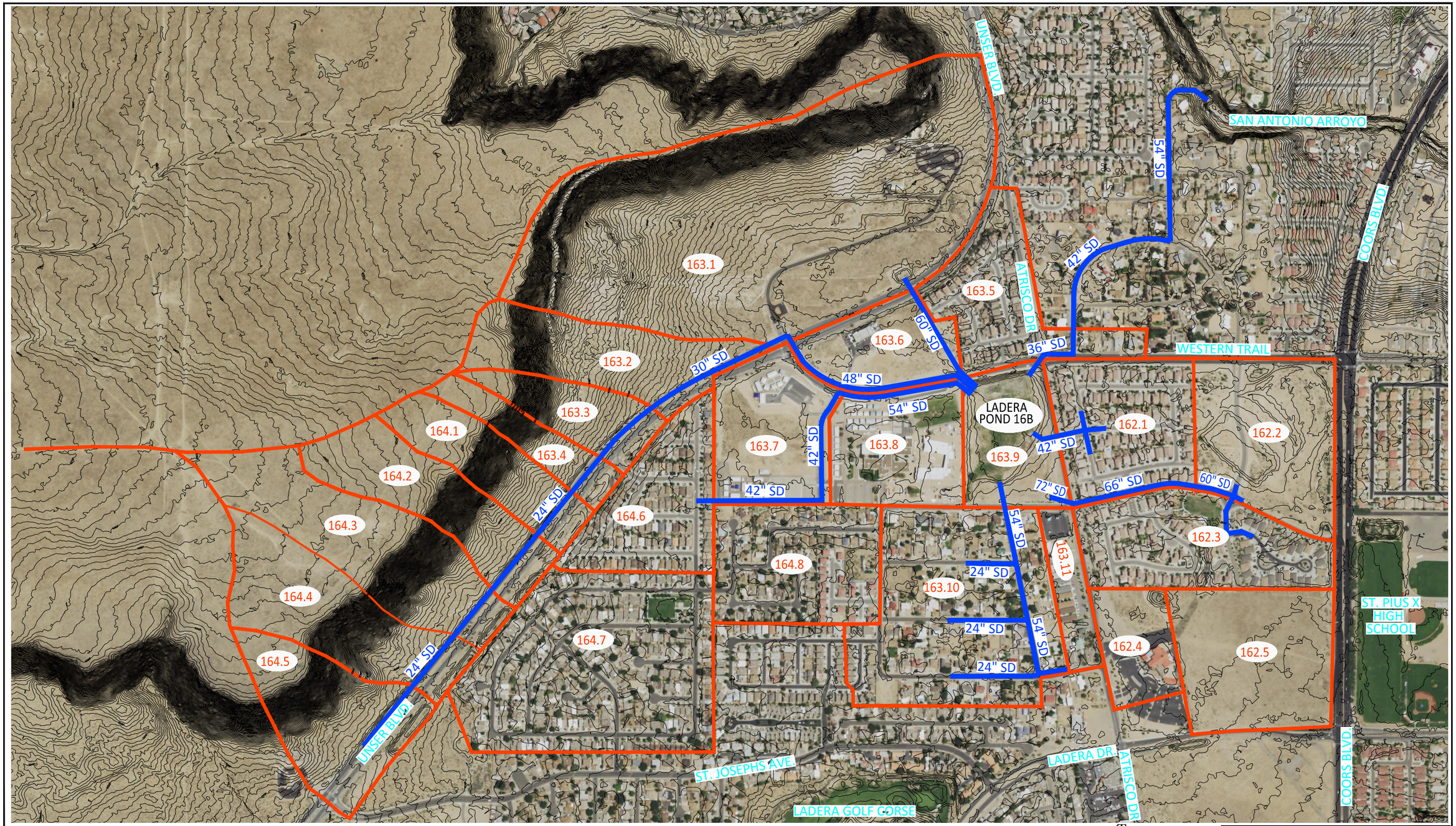
LADERA POND 16B

Ladera Pond 16B has six storm drains that flow into the pond and one 36" RCP storm drain that drains the pond by discharging it to the San Antonio Arroyo to the north. Three separate storm drains enter the pond at the northwest corner. These three storm drains are a 48" RCP in Western Trail, a 54" RCP from the school, and a 60" RCP from the Petroglyph area to the north. A 54" RCP storm drain, draining the Sloan's Acres area, discharges to the pond from the south. A 42" RCP storm drain from the east drains a subdivision directly east. And a 72" RCP storm drain in the southeast corner drains the remainder of the area to the east. Also, runoff from Milne Road drains into the pond at the southwest corner.

The commercial site at the northwest corner of Coors and St. Joseph's (Tract X-1-A2, University of Albuquerque Urban Center) is proposed to install a storm drain to convey runoff from the site and the adjacent church to Ladera Pond 16B along Atrisco Drive from the south. The existing volume in Ladera Pond 16B using the City of Albuquerque LiDAR contours is 40.13 acre-feet at an elevation of 5108. The AHYMO model results show that there is available volume in Ladera Pond 16B to drain the proposed commercial site and adjacent church to the pond. The total detained volume in the developed condition including these two sites is 31.63 acre-feet with a 100-year water surface elevation of 5106.93. Therefore, Ladera Pond 16B will have more than one foot of freeboard. Table 2 shows the pertinent pond characteristics for Ladera Pond 16B.

Table 2 Developed Detention Pond Characteristics

POND	DRAIN AREA (ac)	Q100 IN (cfs)	Q100 OUT (cfs)	MAX VOL (ac-ft)	V100 (ac-ft)	TOP ELEV	BOTTOM ELEV	WSEL
Ladera Pond 16B		923.70	37.73	40.13	31.63	5108	5100	5106.93



N

600 300 0 300 600

SCALE: 1"=600'

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LADERA POND 16B BASIN BOUNDARY EXHIBIT

APPENDIX A
DEVELOPED CONDITIONS HYDROLOGIC MODEL

— AHYMO Input File
— AHYMO Summary File

```
*
*                          LADERA POND 16B WATERSHED
*                   HYDROLOGIC MODEL--DEVELOPED CONDITIONS
*                              29 DECEMBER 2015
*
*
*******************************************************************************
*
*       HYDROLOGIC MODEL FOR WATERSHED BASINS
*       100-YEAR, 24-HOUR STORM:
*
*
*
*           PRECIPITATION:
*                 P60 =   1.84"
*                 P360 =  2.20"
*                 P1440 = 2.66"
*
*
*
*******************************************************************************
*
START               TIME=0.0 HR  PUNCH CODE=0
*
*
*
RAINFALL            TYPE=2   RAIN QUARTER=0.0 IN
                    RAIN ONE=1.84 IN  RAIN SIX=2.20 IN
                    RAIN DAY=2.66 IN  DT=0.05  HRS
SEDIMENT BULK       CODE=1  FACTOR=1.0
*
*
*S*****************************************************************************
*S**********  COMPUTE UNSER DETENTION BASIN SYSTEM
*S**********  FROM AMAFCA SAN ANTONIO ARROYO DRAINAGE STUDY
*
COMPUTE NM HYD      ID=1  HYD NO=164.5  DA=.02936 SQ MI
                    %A=90  %B=1.5  %C=2.1 %D=6.4
                    TP=-.133 HR  RAIN=-1
PRINT HYD           ID=1 CODE=10
*
ROUTE RESERVOIR     ID=30 HYD=164.55  INFLOW ID=1 CODE=10
                    OUTFLOW   STORAGE     DEPTH
                    0         0           0
                    37.8      0.1         0.1
                    37.9      14.9        3.65
                    38.0      15.0        3.75
*
PRINT HYD           ID=30 CODE=10
*
*ROUTE FLOW THROUGH 125' 36" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.00796
                     DIA=3.0  N=0.013
ROUTE MCUNGE         ID=31 HYD=164.56 INFLOW ID=30
                     DT=0.0  L=125 NS=0  SLOPE=0.00796
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=31 CODE=0
*
* ROUTE THROUGH POND 3
*
ROUTE RESERVOIR     ID=32 HYD=164.57  INFLOW ID=31 CODE=10
                    OUTFLOW   STORAGE     DEPTH
                    0         0           0
```

```
                    0.63        0.1          1
                    0.93        0.11         2
                    1.31        0.74         4
                    1.61        1.91         6
                    1.67        2.26         6.5
*
PRINT HYD           ID=32 CODE=10
*
*
*ROUTE FLOW THROUGH 115' 24" RCP TO POND 4
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0174
                     DIA=2.0  N=0.013
ROUTE MCUNGE         ID=33 HYD=164.58 INFLOW ID=32
                     DT=0.0  L=115 NS=0  SLOPE=0.0174
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=33 CODE=0
*
*
COMPUTE NM HYD       ID=2  HYD NO=164.4  DA=.03229 SQ MI
                    %A=90  %B=1.5  %C=2.1 %D=6.4
                    TP=-.133 HR  RAIN=-1
PRINT HYD           ID=2 CODE=10
*
*
ROUTE RESERVOIR     ID=34 HYD=164.44  INFLOW ID=2 CODE=10
                    OUTFLOW   STORAGE     DEPTH
                    0         0           0
                    63.8      0.1         0.1
                    63.9      14.9        4.4
                    64.0      15.0        4.5
*
PRINT HYD           ID=34 CODE=10
*
*ROUTE FLOW THROUGH 158' 36" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.00796
                     DIA=3.0  N=0.013
ROUTE MCUNGE         ID=35 HYD=164.45 INFLOW ID=34
                     DT=0.0  L=158 NS=0  SLOPE=0.00796
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=35 CODE=0
*
ADD HYD             ID=36 HYD=164.46 ID I=33 II=35
PRINT HYD           ID=36 CODE=10
*
*
* ROUTE THROUGH POND 4
*
ROUTE RESERVOIR     ID=37 HYD=164.47  INFLOW ID=36 CODE=10
                    OUTFLOW   STORAGE     DEPTH
                    0         0           0
                    0.78      0.01        1
                    1.36      0.19        2
                    1.75      0.56        3
                    2.30      1.70        5
                    2.80      3.08        7
*
PRINT HYD           ID=37 CODE=10
*
*
*ROUTE FLOW THROUGH 82' 24" RCP TO POND 5
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0367
                     DIA=2.0  N=0.013
```

```
ROUTE MCUNGE          ID=38 HYD=164.48 INFLOW ID=37
                      DT=0.0  L=82 NS=0  SLOPE=0.0367
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD             ID=38 CODE=0
*
*
COMPUTE NM HYD       ID=3  HYD NO=164.3  DA=.03909 SQ MI
                     %A=90  %B=1.5  %C=2.1 %D=6.4
                     TP=-.133 HR  RAIN=-1
PRINT HYD            ID=3 CODE=10
*
*
ROUTE RESERVOIR      ID=39 HYD=164.33  INFLOW ID=3 CODE=10
                     OUTFLOW   STORAGE     DEPTH
                     0         0           0
                     63.8      0.1         0.1
                     63.9      14.9        4.4
                     64.0      15.0        4.5
*
PRINT HYD            ID=39 CODE=10
*
*ROUTE FLOW THROUGH 173' 36" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.00796
                      DIA=3.0  N=0.013
ROUTE MCUNGE          ID=40 HYD=164.34 INFLOW ID=34
                      DT=0.0  L=173 NS=0  SLOPE=0.00796
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD             ID=40 CODE=0
*
*TOTAL FLOW INTO POND 5
ADD HYD              ID=41 HYD=164.35 ID I=38 II=40
PRINT HYD            ID=41 CODE=10
*
*
* ROUTE THROUGH POND 5
*
ROUTE RESERVOIR      ID=42 HYD=164.36  INFLOW ID=41 CODE=10
                     OUTFLOW   STORAGE     DEPTH
                     0         0           0
                     1.11      0.11        1
                     1.57      0.46        2
                     1.92      0.84        3
                     2.48      1.72        5
                     2.93      2.76        7
                     3.51      4.63        10
                     3.59      4.97        11
*
PRINT HYD            ID=42 CODE=10
*
*
*ROUTE FLOW THROUGH 180' 24" RCP TO POND 6
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0056
                      DIA=2.0  N=0.013
ROUTE MCUNGE          ID=43 HYD=164.37 INFLOW ID=42
                      DT=0.0  L=180 NS=0  SLOPE=0.0056
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD             ID=43 CODE=0
*
*
COMPUTE NM HYD       ID=4  HYD NO=164.2  DA=.02672 SQ MI
                     %A=90  %B=1.5  %C=2.1 %D=6.4
```

```
                    TP=-.133 HR  RAIN=-1
PRINT HYD           ID=4 CODE=10
*
*
ROUTE RESERVOIR     ID=44 HYD=164.24  INFLOW ID=4 CODE=10
                    OUTFLOW   STORAGE     DEPTH
                    0         0           0
                    63.8      0.1         0.1
                    63.9      14.9        4.4
                    64.0      15.0        4.5
*
PRINT HYD           ID=44 CODE=10
*
*ROUTE FLOW THROUGH 169' 36" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.00796
                     DIA=3.0  N=0.013
ROUTE MCUNGE         ID=45 HYD=164.25 INFLOW ID=44
                     DT=0.0  L=169 NS=0  SLOPE=0.00796
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=45 CODE=0
*
* TOTAL FLOW INTO POND 6
ADD HYD             ID=46 HYD=164.26 ID I=43 II=45
PRINT HYD           ID=46 CODE=10
*
*
* ROUTE THROUGH POND 6
*
ROUTE RESERVOIR     ID=47 HYD=164.27  INFLOW ID=46 CODE=10
                    OUTFLOW   STORAGE     DEPTH
                    0         0           0
                    1.68      0.08        2
                    2.38      0.35        3
                    2.91      0.65        4
                    3.76      1.36        6
                    4.44      2.24        8
                    4.90      3.01        9.5
*
PRINT HYD           ID=47 CODE=10
*
*
*ROUTE FLOW THROUGH 600' 24" RCP TO POND 7
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.005
                     DIA=2.0  N=0.013
ROUTE MCUNGE         ID=48 HYD=164.28 INFLOW ID=47
                     DT=0.0  L=600 NS=0  SLOPE=0.005
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=48 CODE=0
*
*
COMPUTE NM HYD      ID=5  HYD NO=164.1  DA=.01922 SQ MI
                    %A=90  %B=1.5  %C=2.1 %D=6.4
                    TP=-.133 HR  RAIN=-1
PRINT HYD           ID=5 CODE=10
*
*
ROUTE RESERVOIR     ID=49 HYD=164.14  INFLOW ID=5 CODE=10
                    OUTFLOW   STORAGE     DEPTH
                    0         0           0
                    21.8      0.1         0.1
                    21.9      14.9        2.9
                    22.0      15.0        3.0
```

```
*
PRINT HYD            ID=49 CODE=10
*
*ROUTE FLOW THROUGH 170' 24" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.00817
                     DIA=2.0  N=0.013
ROUTE MCUNGE         ID=50 HYD=164.15 INFLOW ID=49
                     DT=0.0  L=170 NS=0  SLOPE=0.00817
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=50 CODE=0
*
* TOTAL FLOW INTO POND 7
ADD HYD              ID=51 HYD=164.16 ID I=48 II=50
PRINT HYD            ID=51 CODE=10
*
*
*
COMPUTE NM HYD       ID=6  HYD NO=163.4  DA=.01136 SQ MI
                     %A=90  %B=1.5  %C=2.1 %D=6.4
                     TP=-.133 HR  RAIN=-1
PRINT HYD            ID=6 CODE=10
*
*
ROUTE RESERVOIR      ID=52 HYD=163.44  INFLOW ID=6 CODE=10
                     OUTFLOW   STORAGE     DEPTH
                     0         0           0
                     37.8      0.1         0.1
                     37.9      14.9        3.65
                     38.0      15.0        3.75
*
PRINT HYD            ID=52 CODE=10
*
*ROUTE FLOW THROUGH 167' 30" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.00742
                     DIA=2.5  N=0.013
ROUTE MCUNGE         ID=53 HYD=163.45 INFLOW ID=52
                     DT=0.0  L=167 NS=0  SLOPE=0.00742
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=53 CODE=0
*
* TOTAL FLOW INTO POND 7
ADD HYD              ID=54 HYD=163.46 ID I=51 II=53
PRINT HYD            ID=54 CODE=10
*
*
* ROUTE THROUGH POND 7
*
ROUTE RESERVOIR      ID=55 HYD=163.47  INFLOW ID=54 CODE=10
                     OUTFLOW   STORAGE     DEPTH
                     0         0           0
                     1.90      0.04        3
                     2.68      0.24        4
                     3.28      0.56        5
                     4.24      1.43        7
                     5.02      2.57        9
                     5.69      4.00        11
                     5.85      4.39        11.5
*
PRINT HYD            ID=55 CODE=10
*
*
*ROUTE FLOW THROUGH 400' 24" RCP TO POND 7
```

```
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.011
                     DIA=2.0  N=0.013
ROUTE MCUNGE         ID=56 HYD=163.48 INFLOW ID=55
                     DT=0.0  L=400 NS=0  SLOPE=0.011
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=56 CODE=0
*
*
COMPUTE NM HYD       ID=7  HYD NO=163.3  DA=.01466 SQ MI
                     %A=90  %B=1.5  %C=2.1 %D=6.4
                     TP=-.133 HR  RAIN=-1
PRINT HYD            ID=7 CODE=10
*
* ADD TO OUTFLOW FROM POND 7
ADD HYD              ID=57 HYD=163.34 ID I=56 II=7
PRINT HYD            ID=57 CODE=10
*
*
ROUTE RESERVOIR      ID=58 HYD=163.35  INFLOW ID=57 CODE=10
                     OUTFLOW   STORAGE     DEPTH
                     0         0           0
                     37.8      0.1         0.1
                     37.9      14.9        3.65
                     38.0      15.0        3.75
*
PRINT HYD            ID=58 CODE=10
*
*ROUTE FLOW THROUGH 950' 30" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.00742
                     DIA=2.5  N=0.013
ROUTE MCUNGE         ID=59 HYD=163.36 INFLOW ID=58
                     DT=0.0  L=950 NS=0  SLOPE=0.00742
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=59 CODE=0
*
*
COMPUTE NM HYD       ID=8  HYD NO=163.2  DA=.02771 SQ MI
                     %A=90  %B=1.5  %C=2.1 %D=6.4
                     TP=-.133 HR  RAIN=-1
PRINT HYD            ID=8 CODE=10
*
*
* ADD TO OUTFLOW FROM POND 7 AND BASIN 156.3
ADD HYD              ID=60 HYD=163.24 ID I=59 II=8
PRINT HYD            ID=60 CODE=10
*
*
ROUTE RESERVOIR      ID=61 HYD=163.25  INFLOW ID=60 CODE=10
                     OUTFLOW   STORAGE     DEPTH
                     0         0           0
                     127.8     0.1         0.1
                     127.9     14.9        5.9
                     128.0     15.0        6.0
*
PRINT HYD            ID=61 CODE=10
*
*ROUTE FLOW THROUGH 1350' 54" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0035
                     DIA=4.5  N=0.013
ROUTE MCUNGE         ID=62 HYD=163.26 INFLOW ID=61
                     DT=0.0  L=1350 NS=0  SLOPE=0.0035
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
```

```
*
PRINT HYD             ID=62 CODE=0
*
*
*
COMPUTE NM HYD        ID=9  HYD NO=163.1  DA=.14314 SQ MI
                      %A=90  %B=1.5  %C=2.1 %D=6.4
                      TP=-.133 HR  RAIN=-1
PRINT HYD             ID=9 CODE=10
*
*
ROUTE RESERVOIR       ID=63 HYD=163.14  INFLOW ID=9 CODE=10
                      OUTFLOW   STORAGE     DEPTH
                      0         0           0
                      221.8     0.1         0.1
                      221.9     14.9        7.4
                      222.0     15.0        7.5
*
PRINT HYD             ID=63 CODE=10
*
*ROUTE FLOW THROUGH 950' 60" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.00628
                      DIA=5.0  N=0.013
ROUTE MCUNGE          ID=64 HYD=163.15 INFLOW ID=63
                      DT=0.0  L=950 NS=0  SLOPE=0.00628
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD             ID=64 CODE=0
*
*
*S****BASINS NORTH OF LADERA POND 16B****
*
COMPUTE NM HYD        ID=10  HYD NO=163.5  DA=.02689 SQ MI
                      %A=0  %B=30.5  %C=30.5 %D=39.0
                      TP=-.133 HR  RAIN=-1
PRINT HYD             ID=10 CODE=10
*
*
COMPUTE NM HYD        ID=11  HYD NO=163.6  DA=.01846 SQ MI
                      %A=0  %B=5.0  %C=5.0 %D=90.0
                      TP=-.133 HR  RAIN=-1
PRINT HYD             ID=11 CODE=10
*
*
ADD HYD               ID=65 HYD=163.55 ID I=10 II=11
PRINT HYD             ID=65 CODE=10
*
*
ADD HYD               ID=66 HYD=163.56 ID I=65 II=64
PRINT HYD             ID=66 CODE=10
*
*
*
*
*S****BASINS SOUTH AND WEST OF LADERA POND 16B****
*
COMPUTE NM HYD        ID=12  HYD NO=164.7  DA=.06513 SQ MI
                      %A=0  %B=15.2  %C=15.2 %D=69.6
                      TP=-.133 HR  RAIN=-1
PRINT HYD             ID=12 CODE=10
*
*
*
COMPUTE NM HYD        ID=13  HYD NO=164.6  DA=.02660 SQ MI
```

```
                    %A=0  %B=20.3  %C=20.3 %D=59.4
                    TP=-.133 HR  RAIN=-1
PRINT HYD           ID=13 CODE=10
*
ADD HYD             ID=67 HYD=164.65 ID I=12 II=13
PRINT HYD           ID=67 CODE=10
*
*ROUTE FLOW THROUGH 850' 42" RCP
*
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0035
                     DIA=3.5  N=0.013
ROUTE MCUNGE         ID=68 HYD=164.66 INFLOW ID=67
                     DT=0.0  L=850 NS=0  SLOPE=0.0035
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=68 CODE=0
*
*
*
COMPUTE NM HYD       ID=14  HYD NO=164.8  DA=.03133 SQ MI
                     %A=0  %B=25.8  %C=25.9 %D=48.3
                     TP=-.133 HR  RAIN=-1
PRINT HYD            ID=14 CODE=10
*
*
ADD HYD              ID=69 HYD=164.75 ID I=68 II=14
PRINT HYD            ID=69 CODE=10
*
*ROUTE FLOW THROUGH 700' 42" RCP
*
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0035
                     DIA=3.5  N=0.013
ROUTE MCUNGE         ID=70 HYD=164.76 INFLOW ID=69
                     DT=0.0  L=850 NS=0  SLOPE=0.0035
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=70 CODE=0
*
*
COMPUTE NM HYD       ID=15  HYD NO=163.7  DA=.02628 SQ MI
                     %A=0  %B=25.0  %C=25.0 %D=50.0
                     TP=-.133 HR  RAIN=-1
PRINT HYD            ID=15 CODE=10
*
ADD HYD              ID=71 HYD=D163.75 ID I=70 II=15
PRINT HYD            ID=71 CODE=10
*
*ROUTE FLOW THROUGH 850' 54" RCP
*
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0035
                     DIA=4.5  N=0.013
ROUTE MCUNGE         ID=72 HYD=163.76 INFLOW ID=71
                     DT=0.0  L=850 NS=0  SLOPE=0.0035
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=72 CODE=0
*
*
COMPUTE NM HYD       ID=16  HYD NO=163.8  DA=.02442 SQ MI
                     %A=0.0  %B=25.0  %C=25.0 %D=50.0
                     TP=-.1333 HR  RAIN=-1
PRINT HYD            ID=16 CODE=10
*
*
```

```
ADD HYD             ID=73 HYD=D163.85 ID I=72 II=16
PRINT HYD           ID=73 CODE=10
*
*
COMPUTE NM HYD      ID=17  HYD NO=163.10  DA=.05790 SQ MI
                    %A=0.0  %B=33.8  %C=33.9 %D=32.3
                    TP=-.1333 HR  RAIN=-1
PRINT HYD           ID=17 CODE=10
*
*
ADD HYD             ID=74 HYD=D163.105 ID I=73 II=17
PRINT HYD           ID=74 CODE=10
*
*
COMPUTE NM HYD      ID=18  HYD NO=163.11  DA=.00894 SQ MI
                    %A=0.0  %B=12.5  %C=12.5 %D=75.0
                    TP=-.1333 HR  RAIN=-1
PRINT HYD           ID=18 CODE=10
*
ADD HYD             ID=75 HYD=D163.115 ID I=74 II=18
PRINT HYD           ID=75 CODE=10
*
*
*S LADERA POND 16B BASIN
*
COMPUTE NM HYD      ID=19  HYD NO=163.9  DA=.02087 SQ MI
                    %A=0.0  %B=80.0  %C=15.0 %D=5.0
                    TP=-.1333 HR  RAIN=-1
PRINT HYD           ID=19 CODE=10
*
ADD HYD             ID=76 HYD=163.95 ID I=75 II=19
PRINT HYD           ID=76 CODE=10
*
*
*S****BASINS EAST OF LADERA POND 16B****
*
*
COMPUTE NM HYD      ID=20  HYD NO=162.2  DA=.03441 SQ MI
                    %A=0.0  %B=8.8  %C=8.8 %D=82.4
                    TP=-.133 HR  RAIN=-1
PRINT HYD           ID=20 CODE=10
*
*ROUTE FLOW THROUGH 1200' 66" RCP
*
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.005
                     DIA=5.5  N=0.013
ROUTE MCUNGE         ID=77 HYD=162.5 INFLOW ID=20
                     DT=0.0  L=1200 NS=0  SLOPE=0.005
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=77 CODE=0
*
*
*
*
COMPUTE NM HYD      ID=21  HYD NO=162.3  DA=.02208 SQ MI
                    %A=0  %B=30.4  %C=30.5 %D=39.1
                    TP=-.133 HR  RAIN=-1
PRINT HYD           ID=21 CODE=10
*
ADD HYD             ID=78 HYD=162.35 ID I=77 II=21
PRINT HYD           ID=78 CODE=10
*
*
```

```
*
*
COMPUTE NM HYD       ID=22  HYD NO=162.1  DA=.03006 SQ MI
                     %A=0  %B=28.2  %C=28.2 %D=43.6
                     TP=-.133 HR  RAIN=-1
PRINT HYD            ID=22 CODE=10
*
ADD HYD              ID=79 HYD=162.15 ID I=78 II=22
PRINT HYD            ID=79 CODE=10
*
*
*S****OXBOW COMMERCIAL SITE****
*
COMPUTE NM HYD       ID=23  HYD NO=162.5  DA=.03429 SQ MI
                     %A=0.0  %B=5.0  %C=5.0 %D=90.0
                     TP=-.133 HR  RAIN=-1
PRINT HYD            ID=23 CODE=10
*
*
*ROUTE FLOW THROUGH 600' 54" RCP
*
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.005
                      DIA=4.5  N=0.013
ROUTE MCUNGE          ID=80 HYD=162.55 INFLOW ID=23
                      DT=0.0  L=600 NS=0  SLOPE=0.005
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD             ID=80 CODE=0
*
*
*S*****ST. JOSEPHS CHURCH********
*
COMPUTE NM HYD       ID=24  HYD NO=162.4  DA=.01324 SQ MI
                     %A=0.0  %B=12.5  %C=12.5 %D=75.0
                     TP=-.133 HR  RAIN=-1
PRINT HYD            ID=24 CODE=10
*
*
ADD HYD              ID=81 HYD=162.45 ID I=80 II=24
PRINT HYD            ID=81 CODE=10
*
*
*ROUTE FLOW THROUGH 600' 60" RCP
*
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.005
                      DIA=5.0  N=0.013
ROUTE MCUNGE          ID=82 HYD=162.55 INFLOW ID=81
                      DT=0.0  L=600 NS=0  SLOPE=0.005
                      MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD             ID=82 CODE=0
*
ADD HYD              ID=83 HYD=162.0 ID I=79 II=82
PRINT HYD            ID=83 CODE=10
*
*
ADD HYD              ID=84 HYD=163.01 ID I=62 II=66
PRINT HYD            ID=84 CODE=10
*
*
ADD HYD              ID=85 HYD=163.0 ID I=76 II=84
PRINT HYD            ID=85 CODE=10
*
*
```

```
ADD HYD             ID=86 HYD=162.34 ID I=83 II=85
PRINT HYD           ID=86 CODE=10
*
*
*SROUTE FLOWS THROUGH LADERA POND 16B
*
ROUTE RESERVOIR     ID=87 HYD=LADERAPOND16B  INFLOW ID=86 CODE=10
                    OUTFLOW   STORAGE     DEPTH
                    0         0           5100
                    1.0       0.82        5101
                    10.0      3.29        5102
                    21.0      7.19        5103
                    25.0      12.30       5104
                    30.0      18.30       5105
                    34.0      24.88       5106
                    38.0      32.13       5107
                    42.0      40.13       5108
*
*
PRINT HYD           ID=87 CODE=10
*
*ROUTE OUTFLOW THROUGH 1850' 36" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0028
                     DIA=3.0  N=0.013
ROUTE MCUNGE         ID=88 HYD=163.17 INFLOW ID=87
                     DT=0.0  L=1850 NS=0  SLOPE=0.0028
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=88 CODE=0
*
*
*ROUTE OUTFLOW THROUGH 250' 42" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0028
                     DIA=3.5  N=0.013
ROUTE MCUNGE         ID=89 HYD=163.18 INFLOW ID=88
                     DT=0.0  L=250 NS=0  SLOPE=0.0028
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=89 CODE=0
*
*
*ROUTE OUTFLOW THROUGH 950' 54" RCP
COMPUTE RATING CURVE CID=1  VS NO=1  CODE=-1   SLP=0.0028
                     DIA=4.5  N=0.013
ROUTE MCUNGE         ID=89 HYD=163.19 INFLOW ID=88
                     DT=0.0  L=950 NS=0  SLOPE=0.0028
                     MATCODE=0 REGCODE=0 CCODE=0 MM CODE=0
*
PRINT HYD            ID=89 CODE=0
*
*S DISCHARGE INTO THE SAN ANTONIO ARROYO
*
*
*S*************************************************************************
*
*S******END OF LADERA POND 16B DRAINAGE ANALYSIS
*
FINISH
```

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =12/29/2015
INPUT FILE = C:\Projects\LADERA~1\LADERA~1.TXT USER NO.= AHYMO-I-9702a01000K21-AH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.660
SEDIMENT BULK										PK BF = 1.00
*S********** COMPUTE UNSER DETENTION BASIN SYSTEM										
*S********** FROM AMAFCA SAN ANTONIO ARROYO DRAINAGE STUDY										
COMPUTE NM HYD	164.50	-	1	.02936	27.95	.890	.56849	1.500	1.488	PER IMP= 6.40
ROUTE RESERVOIR	164.55	1	30	.02936	26.81	.890	.56848	1.550	1.427	AC-FT= .071
ROUTE MCUNGE	164.56	30	31	.02936	26.81	.890	.56847	1.550	1.427	CCODE = .0
ROUTE RESERVOIR	164.57	31	32	.02936	1.28	.890	.56836	2.400	.068	AC-FT= .693
ROUTE MCUNGE	164.58	32	33	.02936	1.28	.890	.56836	2.400	.068	CCODE = .0
COMPUTE NM HYD	164.40	-	2	.03229	30.74	.979	.56849	1.500	1.487	PER IMP= 6.40
ROUTE RESERVOIR	164.44	2	34	.03229	30.11	.979	.56848	1.550	1.457	AC-FT= .047
ROUTE MCUNGE	164.45	34	35	.03229	30.11	.979	.56848	1.550	1.457	CCODE = .0
ADD HYD	164.46	33&35	36	.06165	31.13	1.869	.56842	1.550	.789	
ROUTE RESERVOIR	164.47	36	37	.06165	1.88	1.869	.56841	2.750	.048	AC-FT= .824
ROUTE MCUNGE	164.48	37	38	.06165	1.88	1.869	.56841	2.750	.048	CCODE = .0
COMPUTE NM HYD	164.30	-	3	.03909	37.21	1.185	.56849	1.500	1.487	PER IMP= 6.40
ROUTE RESERVOIR	164.33	3	39	.03909	36.45	1.185	.56848	1.550	1.457	AC-FT= .057
ROUTE MCUNGE	164.34	34	40	.03229	30.11	.979	.56848	1.550	1.457	CCODE = .0
ADD HYD	164.35	38&40	41	.09394	31.59	2.848	.56844	1.550	.525	
ROUTE RESERVOIR	164.36	41	42	.09394	1.97	2.848	.56836	3.800	.033	AC-FT= .913
ROUTE MCUNGE	164.37	42	43	.09394	1.97	2.848	.56836	3.800	.033	CCODE = .2
COMPUTE NM HYD	164.20	-	4	.02672	25.44	.810	.56849	1.500	1.488	PER IMP= 6.40
ROUTE RESERVOIR	164.24	4	44	.02672	24.92	.810	.56847	1.550	1.457	AC-FT= .039
ROUTE MCUNGE	164.25	44	45	.02672	24.92	.810	.56847	1.550	1.457	CCODE = .0
ADD HYD	164.26	43&45	46	.12066	26.24	3.658	.56838	1.550	.340	
ROUTE RESERVOIR	164.27	46	47	.12066	2.90	3.657	.56834	2.450	.038	AC-FT= .644
ROUTE MCUNGE	164.28	47	48	.12066	2.90	3.657	.56834	2.500	.038	CCODE = .2
COMPUTE NM HYD	164.10	-	5	.01922	18.30	.583	.56849	1.500	1.488	PER IMP= 6.40
ROUTE RESERVOIR	164.14	5	49	.01922	16.07	.583	.56847	1.550	1.306	AC-FT= .074
ROUTE MCUNGE	164.15	49	50	.01922	16.07	.583	.56847	1.550	1.306	CCODE = .0
ADD HYD	164.16	48&50	51	.13988	18.12	4.240	.56836	1.550	.202	
COMPUTE NM HYD	163.40	-	6	.01136	10.82	.344	.56849	1.500	1.489	PER IMP= 6.40
ROUTE RESERVOIR	163.44	6	52	.01136	10.38	.344	.56846	1.550	1.428	AC-FT= .027
ROUTE MCUNGE	163.45	52	53	.01136	10.38	.344	.56846	1.550	1.428	CCODE = .0
ADD HYD	163.46	51&53	54	.15124	28.51	4.585	.56837	1.550	.295	
ROUTE RESERVOIR	163.47	54	55	.15124	3.51	4.584	.56835	2.750	.036	AC-FT= .770
ROUTE MCUNGE	163.48	55	56	.15124	3.51	4.584	.56835	2.750	.036	CCODE = .2
COMPUTE NM HYD	163.30	-	7	.01466	13.96	.444	.56849	1.500	1.488	PER IMP= 6.40
ADD HYD	163.34	56& 7	57	.16590	16.26	5.029	.56836	1.500	.153	
ROUTE RESERVOIR	163.35	57	58	.16590	15.68	5.029	.56836	1.550	.148	AC-FT= .041
ROUTE MCUNGE	163.36	58	59	.16590	15.58	5.029	.56838	1.600	.147	CCODE = .2
COMPUTE NM HYD	163.20	-	8	.02771	26.38	.840	.56849	1.500	1.488	PER IMP= 6.40
ADD HYD	163.24	59& 8	60	.19361	40.05	5.869	.56840	1.550	.323	
ROUTE RESERVOIR	163.25	60	61	.19361	40.08	5.869	.56840	1.550	.323	AC-FT= .031
ROUTE MCUNGE	163.26	61	62	.19361	39.67	5.868	.56829	1.600	.320	CCODE = .2
COMPUTE NM HYD	163.10	-	9	.14314	140.67	4.340	.56849	1.500	1.535	PER IMP= 6.40
ROUTE RESERVOIR	163.14	9	63	.14314	139.29	4.340	.56848	1.500	1.520	AC-FT= .063

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE MCUNGE	163.15	63	64	.14314	137.87	4.317	.56548	1.550	1.505	CCODE = .1
*S****BASINS NORTH OF LADERA POND 16B****										
COMPUTE NM HYD	163.50	-	10	.02689	53.63	2.056	1.43384	1.500	3.116	PER IMP= 39.00
COMPUTE NM HYD	163.60	-	11	.01846	47.88	2.227	2.26249	1.500	4.053	PER IMP= 90.00
ADD HYD	163.55	10&11	65	.04535	101.51	4.284	1.77113	1.500	3.498	
ADD HYD	163.56	65&64	66	.18849	227.63	8.601	.85555	1.550	1.887	
*S****BASINS SOUTH AND WEST OF LADERA POND 16B****										
COMPUTE NM HYD	164.70	-	12	.06513	153.28	6.708	1.93103	1.500	3.677	PER IMP= 69.60
COMPUTE NM HYD	164.60	-	13	.02660	59.43	2.504	1.76530	1.500	3.491	PER IMP= 59.40
ADD HYD	164.65	12&13	67	.09173	212.70	9.212	1.88296	1.500	3.623	
ROUTE MCUNGE	164.66	67	68	.09173	153.78	8.450	1.72720	1.500	2.620	CCODE = .2
COMPUTE NM HYD	164.80	-	14	.03133	65.92	2.649	1.58510	1.500	3.287	PER IMP= 48.30
ADD HYD	164.75	68&14	69	.12306	219.70	11.098	1.69102	1.500	2.790	
ROUTE MCUNGE	164.76	69	70	.12306	157.50	10.242	1.56054	1.500	2.000	CCODE = .2
COMPUTE NM HYD	163.70	-	15	.02628	55.81	2.260	1.61257	1.500	3.318	PER IMP= 50.00
ADD HYD	D163.75	70&15	71	.14934	213.31	12.502	1.56969	1.500	2.232	
ROUTE MCUNGE	163.76	71	72	.14934	167.98	11.770	1.47780	1.550	1.758	CCODE = .2
COMPUTE NM HYD	163.80	-	16	.02442	51.81	2.100	1.61257	1.500	3.315	PER IMP= 50.00
ADD HYD	D163.85	72&16	73	.17376	219.05	13.871	1.49673	1.500	1.970	
COMPUTE NM HYD	163.10	-	17	.05790	110.79	4.092	1.32514	1.500	2.990	PER IMP= 32.30
ADD HYD	D163.105	73&17	74	.23166	329.84	17.963	1.45384	1.500	2.225	
COMPUTE NM HYD	163.11	-	18	.00894	21.60	.963	2.01877	1.500	3.776	PER IMP= 75.00
ADD HYD	D163.115	74&18	75	.24060	351.44	18.925	1.47483	1.500	2.282	
*S LADERA POND 16B BASIN										
COMPUTE NM HYD	163.90	-	19	.02087	29.66	.872	.78347	1.500	2.221	PER IMP= 5.00
ADD HYD	163.95	75&19	76	.26147	381.10	19.797	1.41965	1.500	2.277	
*S****BASINS EAST OF LADERA POND 16B****										
COMPUTE NM HYD	162.20	-	20	.03441	86.17	3.925	2.13900	1.500	3.913	PER IMP= 82.40
ROUTE MCUNGE	162.50	20	77	.03441	83.42	3.925	2.13861	1.550	3.788	CCODE = .2
COMPUTE NM HYD	162.30	-	21	.02208	44.07	1.691	1.43562	1.500	3.119	PER IMP= 39.10
ADD HYD	162.35	77&21	78	.05649	126.10	5.615	1.86382	1.500	3.488	
COMPUTE NM HYD	162.10	-	22	.03006	61.58	2.419	1.50858	1.500	3.201	PER IMP= 43.60
ADD HYD	162.15	78&22	79	.08655	187.68	8.034	1.74044	1.500	3.388	
*S****OXBOW COMMERCIAL SITE****										
COMPUTE NM HYD	162.50	-	23	.03429	88.93	4.138	2.26249	1.500	4.052	PER IMP= 90.00
ROUTE MCUNGE	162.55	23	80	.03429	87.59	4.136	2.26183	1.500	3.991	CCODE = .2
*S*****ST. JOSEPHS CHURCH********										
COMPUTE NM HYD	162.40	-	24	.01324	32.01	1.426	2.01877	1.500	3.778	PER IMP= 75.00
ADD HYD	162.45	80&24	81	.04753	119.60	5.562	2.19410	1.500	3.932	
ROUTE MCUNGE	162.55	81	82	.04753	116.02	5.561	2.19362	1.500	3.814	CCODE = .2
ADD HYD	162.00	79&82	83	.13408	303.70	13.594	1.90108	1.500	3.539	
ADD HYD	163.01	62&66	84	.38210	263.38	14.469	.71000	1.550	1.077	
ADD HYD	163.00	76&84	85	.64357	623.81	34.266	.99831	1.550	1.515	
ADD HYD	162.34	83&85	86	.77765	923.70	47.860	1.15396	1.500	1.856	
*SROUTE FLOWS THROUGH LADERA POND 16B										
ROUTE RESERVOIR LADERAPOND16		86	87	.77765	37.73	46.982	1.13279	2.550	.076	AC-FT= 31.632
ROUTE MCUNGE	163.17	87	88	.77765	37.54	46.946	1.13192	2.900	.075	CCODE = .2
ROUTE MCUNGE	163.18	88	89	.77765	37.54	46.943	1.13185	2.900	.075	CCODE = .2
ROUTE MCUNGE	163.19	88	89	.77765	37.54	46.936	1.13169	2.900	.075	CCODE = .2
*S DISCHARGE INTO THE SAN ANTONIO ARROYO										
*S**********										
*S******END OF LADERA POND 16B DRAINAGE ANALYSIS										
FINISH										