CITY OF
Albuquerque

April 30, 1996

Martin J. Chávez, Mayor

Ronald Bohannan
Tierra West Dev.
4421 McCleod NE Suite D
Albuquerque, NM 87109

RE: RIO VOLCAN APARTMENTS, PHASE II (H10-D20). DRAINAGE REPORT FOR SITE DEVELOPMENT PLAN FOR BUILDING PERMIT, BUILDING PERMIT AND GRADING PERMIT APPROVALS. ENGINEER'S STAMP DATED 4-4-96.

Dear Mr. Bohannan:

Based on the information provided on your April 5, 1996 submittal, the above referenced project is approved for Site Development Plan for Building Permit and for Grading Permit.

A SO #19 Permit will required to tie into the existing inlet on Ladera Drive. Please submit two copies of the plan sheet with the appropriate sign off block for SO #19 Permit approval. Building Permit will not be released prior to SO #19 Permit approval.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

CITY OF
Albuquerque

September 9, 1997

Martin J. Chávez, Mayor

Ronald Bohannan, P.E.
Tierra West Dev.
4421 McLeod Road. NE
Suite D
Albuquerque, NM 87109

RE: RIO VOLCAN APARTMENTS, PHASE 2 (H10-D20). DRAINAGE REPORT SUBMITTAL FOR SITE DEVELOPMENT PLAN FOR BUILDING PERMIT, BUILDING PERMIT, AND SO #19 PERMIT. ENGINEER'S STAMP DATED AUGUST 19, 1997.

Dear Mr. Bohannan:

Based on the information provided on your August 19, 1997 submittal, the above referenced project is approved for Site Development Plan for Building Permit, Building Permit, and SO #19 Permit.

A separate permit is required for construction within the City right-of-way. A copy of this approval letter must be on hand when applying for the excavation permit.

An Engineer's Certification will be required prior to Certificate of Occupancy approval.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

Lisa Ann Manwill, P.E.
Hydrology

c: Arlene Portillo
Andrew Garcia
File

CITY OF ALBUQUERQUE

PUBLIC WORKS DEPARTMENT

September 9, 1997

INTEROFFICE CORRESPONDENCE HYDROLOGY DIVISION

TO: Desiderio Salas, Street Maintenance Division

FROM: Lisa Ann Manwill, P.E. Engineering Associate, PWD LAM

SUBJECT: **PRIVATE DRAINAGE FACILITIES WITHIN PUBLIC RIGHT-OF-WAY DRAINAGE FILE NUMBER H10-D20.**

Transmitted herewith, is a copy of the approved drainage plan for the referenced project incorporating the SO #19 design.

This plan is being submitted to you for permitting and inspection. Please provide this section with a signed-off copy per the signature block upon construction and acceptance by your office.

As you are aware, the signed off SO #19 is required by this office for Certificate of Occupancy release; therefore your expeditious processing of this plan would be greatly appreciated and would avoid any unnecessary delay in the release of the Certificate of Occupancy.

Thank you for your cooperation and if you should have any questions and/or comments, please feel free to call me at 924-3984.

Attachment

File copy

JN 960024

cc: Ron Wathaspon
Jack Weston

CITY OF
Albuquerque

April 30, 1996

Martin J. Chávez, Mayor

Ronald Bohannan
Tierra West Dev.
4421 McCleod NE Suite D
Albuquerque, NM 87109

RE: RIO VOLCAN APARTMENTS, PHASE II (H10-D20). DRAINAGE REPORT FOR SITE DEVELOPMENT PLAN FOR BUILDING PERMIT, BUILDING PERMIT AND GRADING PERMIT APPROVALS. ENGINEER'S STAMP DATED 4-4-96.

Dear Mr. Bohannan:

Based on the information provided on your April 5, 1996 submittal, the above referenced project is approved for Site Development Plan for Building Permit and for Grading Permit.

A SO #19 Permit will required to tie into the existing inlet on Ladera Drive. Please submit two copies of the plan sheet with the appropriate sign off block for SO #19 Permit approval. Building Permit will not be released prior to SO #19 Permit approval.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

RECEIVED
AUG 19 1997
HYDROLOGY SECTION

DRAINAGE REPORT

FOR

RIO VOLCAN APARTMENTS, PHASE II

(Ladera Apartments)

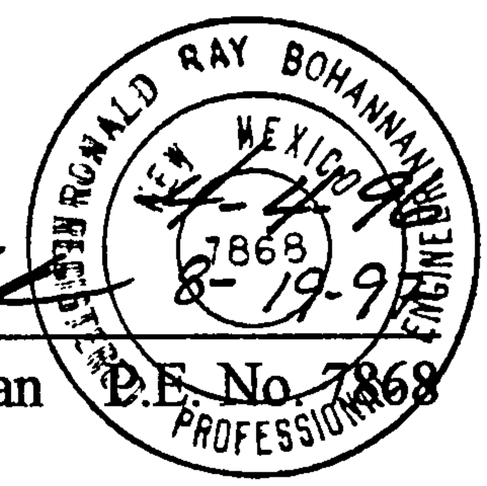
Prepared by

Tierra West Development Management Services
4421 McLeod Road NE, Suite D
Albuquerque, New Mexico 87109

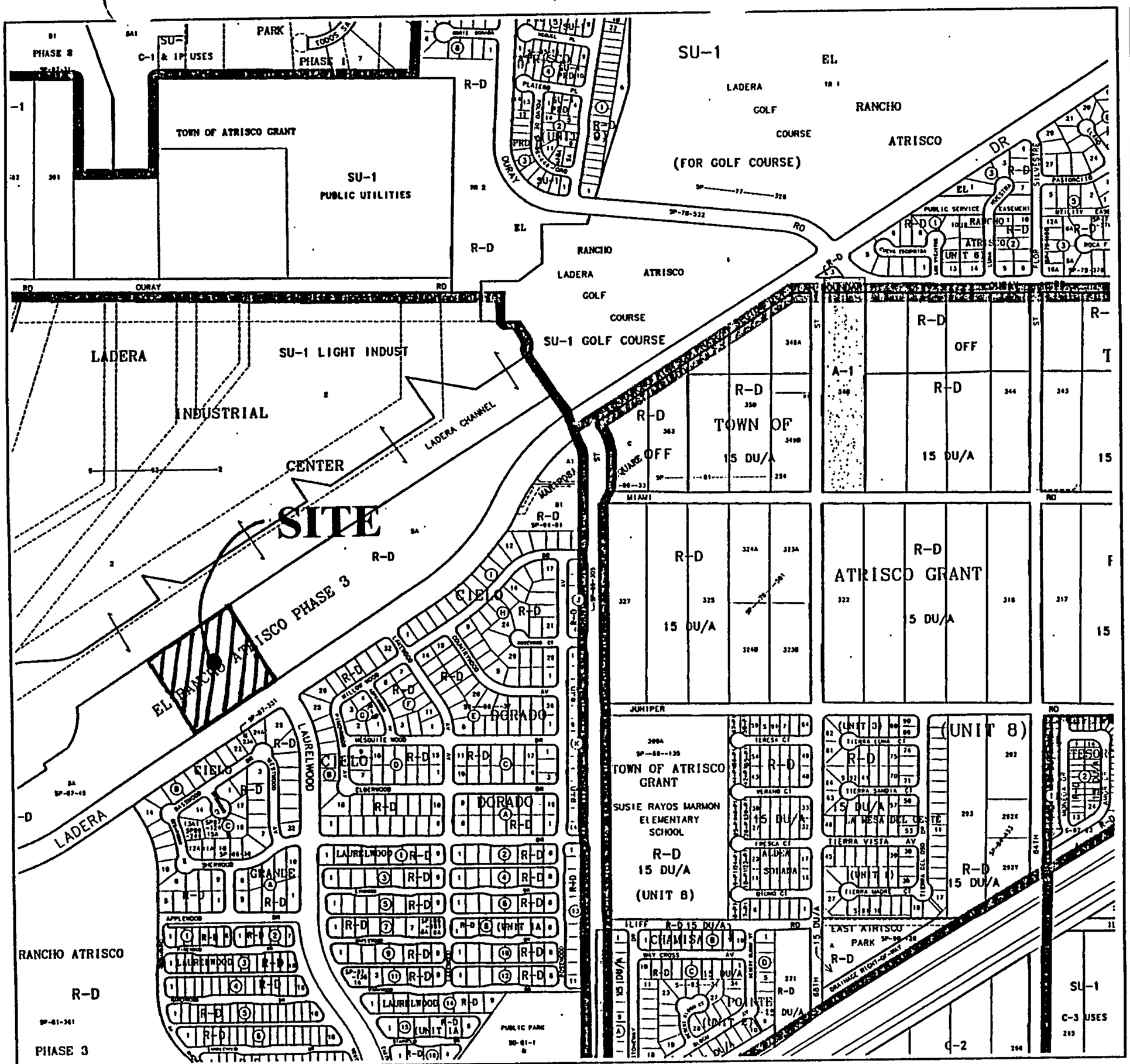
Prepared for

Jack Westman
4155 Montgomery Boulevard, NE
Albuquerque, New Mexico 87109

APRIL, 1996



Ronald R. Bohannan P.E. No. 7868



SCALE IN FEET

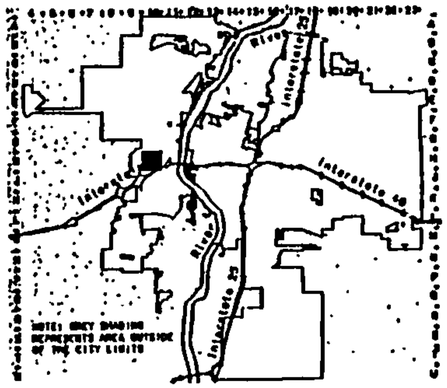
250 0 500 1000

PHOTOCOPY--NOT TO SCALE

North

Albuquerque Geographic Information System

© Planning Department
Map Amended through September 22, 1994



LEGAL DESCRIPTION

T10N
R2E
SEC 10

UNIFORM PROPERTY CODE
1-010-069

H-10-Z

INTRODUCTION

Phase II of Rio Volcan Apartments is a 124 unit multifamily apartment complex that will be located Northeast of Phase I of Rio Volcan Apartments between Unser Boulevard and the Laurelwood subdivision containing 5.333 acres. The present zoning is R-D, which will remain the same. Located to the South is Laurelwood Subdivision and to the East is a new housing development entitled Traditions. The site is located on zone atlas page H-10 and has been highlighted.

The site development plan has been submitted by Tierra West Management Services to the Design Review Board. We are requesting this Grading and Drainage Management Plan to be reviewed for Site Plan for building permit and Grading and Drainage plan approval.

EXISTING CONDITIONS

A. The site currently is undeveloped and sheet flows from the Northwest to the northeast to Ladera Drive. The natural fall is approximately 2.29 percent with approximately 16 feet of fall in 700 feet.

B. The site currently does not have any 100 year flood zone on the property as shown on FEMA Panel 350002-0021. The site lies adjacent to the Mirheaven system. The 100 year storm is contained within the channel. See attached sheet for FEMA Map.

C. The soils from the SCS Soil Survey of Bernalillo County are Bluepoint and Pajarito loamy fine sands and are classified as Hydrologic Soil Group "A" and "B" soils.

D. Presently the Mirheaven channel removes all upland flow from the north except a small area between the channel and the north property line. This area contains a future bike trial that will continue to drain into the site.

E. Phase I of Rio Volcan drains internally and is collected in a drop inlet then carried to

an existing drop inlet on Ladera Drive. The entrance to the south of the property drains straigth into Ladera Drive at the developed flow rate. See the Rio Volcan Grading and Drainage Management Plan H-10/D-16 for flow rates and direction of flows.

F. Traditions Subdivion, located just North of the property drains along Traditions Drive to Laurelwood Place and then into Ladera Drive at the developed rate.

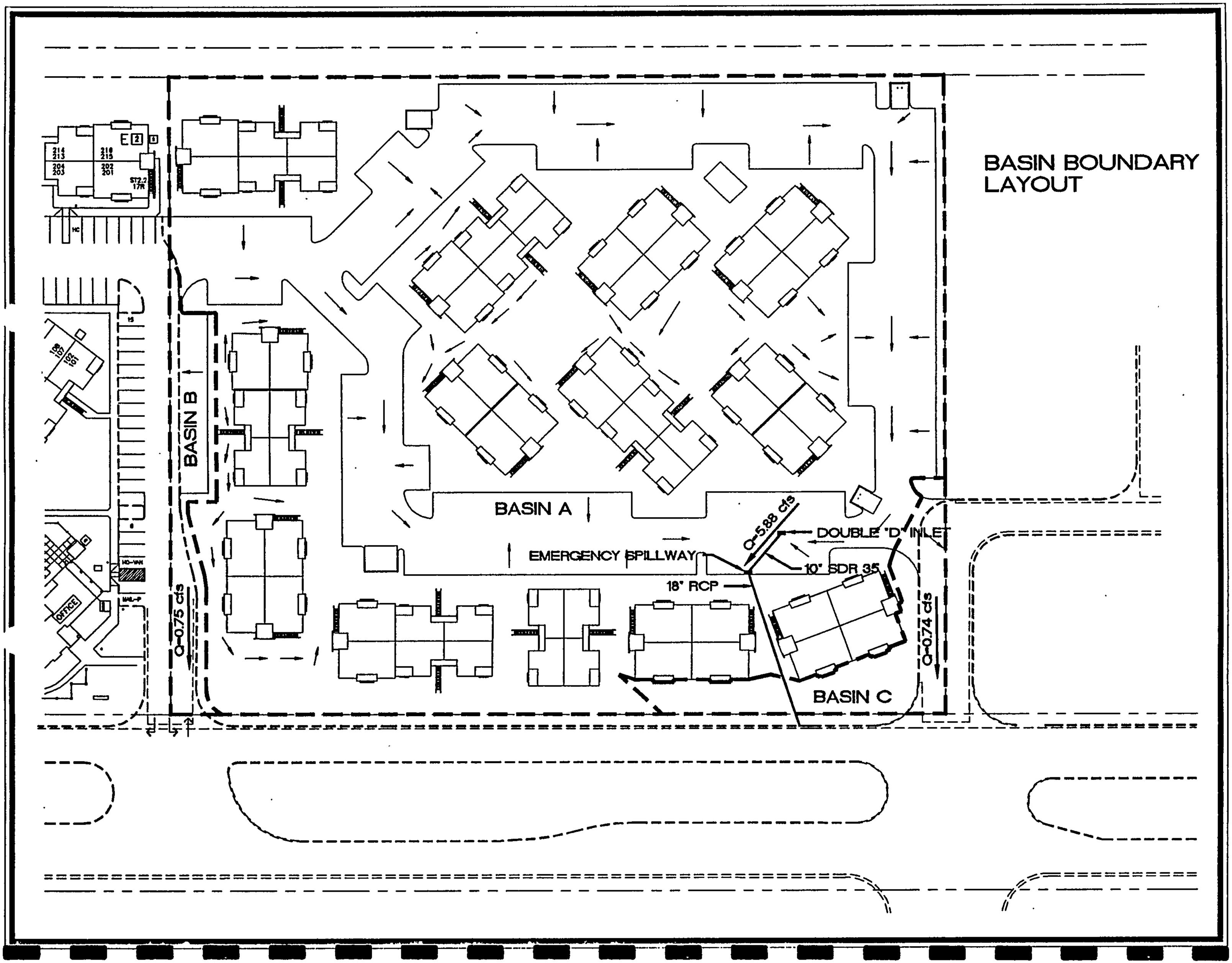
G. The existing flow rate from the existing basin in the property are at 11.42 cfs for a 100 year storm.

ON-SITE DRAINAGE MANAGEMENT PLAN

The internal flows from the site will flow to a drop inlet at a confined rate. The site has been divided into three basins (see Grading & Drainage Plan in map pocket). Basins B & C are small basins that will drain to Ladera Drive and will drain discharge at a fully developed rate. Flow out of Basins B & C amounts to 0.75 cfs and 0.65 cfs. Basin A with a flow rate of 17.78 cfs will drain internally within the streets and the parking lots to the south parking area. The runoff is routed to a controlled pond and collected in a drop inlet with a 10.0" SDR 35 pipe and taken to an existing drop inlet on Ladera Drive at confined rate of 5.88 cfs. The total peak discharge from site to Ladera Drive is 7.37 cfs, which is less than the allowable discharge of 12.17 cfs. A 10" pipe will act as the orfice plate to limit the flows, a 12" pipe will exceed the allowable discharge, requiring an orfice plate.

EMERGENCY SPILLWAY

A Single "C" inlet is provided to carry the flows from Basin A in case the Double "D" gets clogged or some other situation occurs. The Single "C" inlet has capacity of 18.12 cfs, which is


BASIN BOUNDARY LAYOUT
BASIN A
BASIN B
BASIN C
EMERGENCY SPILLWAY
DOUBLE "D" INLET
Q=5.88 cfs
10" SDR 35
18" RCP
Q=0.75 cfs
Q=0.74 cfs
OFFICE

enough for the 17.78 cfs generated by Basin A.

DOWNSTREAM CAPACITY

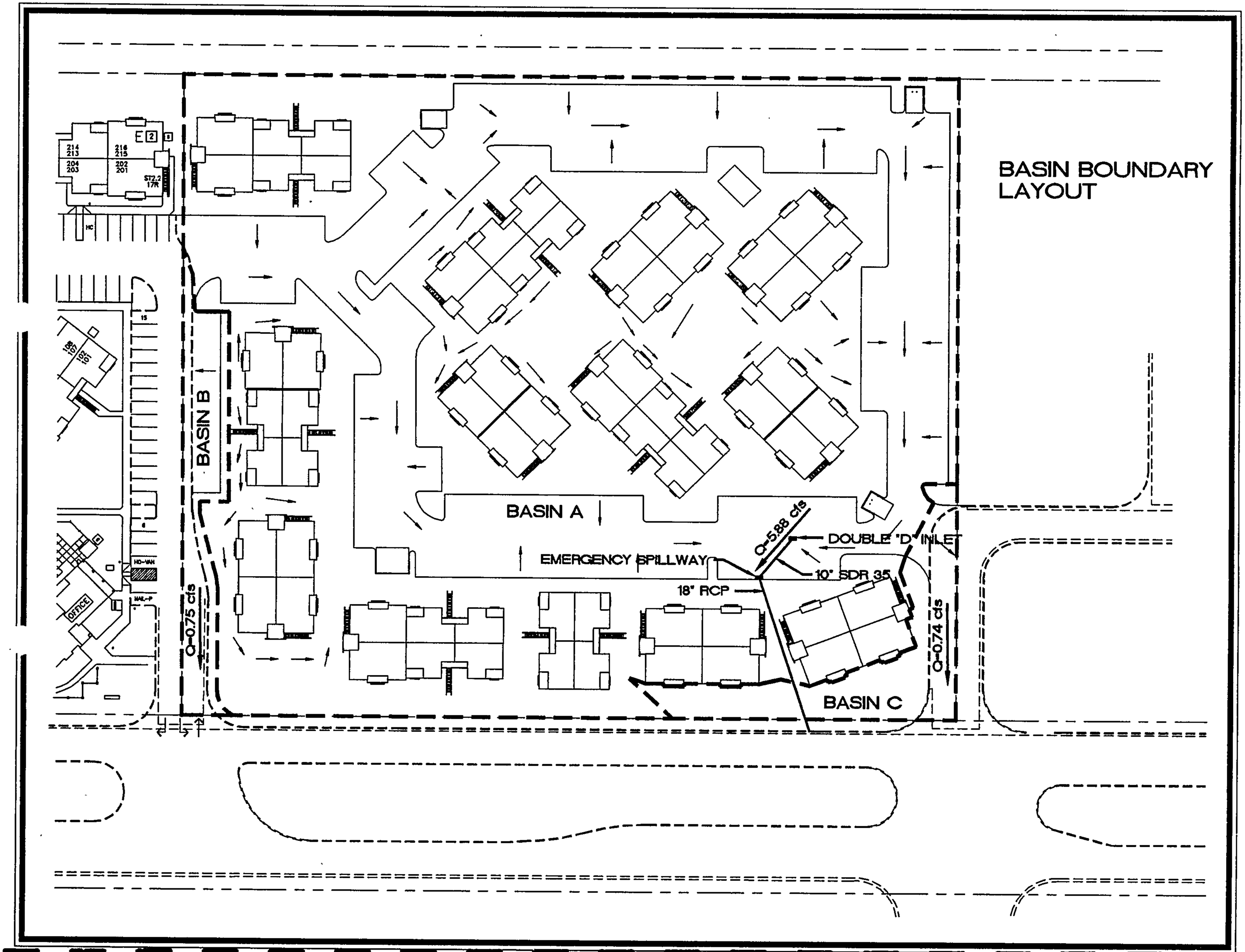
Special Assessment District 212 included a storm drain as part of Ladera Drive NW. The design accounted for development of the site, but using the 1983 hydrology criteria. A new analysis was completed by Isaacson & Arfman using the new methodology. Under that project, additional improvements are being added to increase capacity in Ladera Drive storm drain. However, the capacity was used by the previous development resulting in a limitation of discharge from the remaining properties. The proposed improvements will allow the storm drain to flow under pressure flow. Based on Isaacson & Arfman Drainage Report (H10/D13) the allowable discharge is 2.28 cfs/acre, allowing to a total discharge of 12.17 cfs from our site. The developed discharge from this site is 7.37 cfs.

INFRASTRUCTURE LIST

The design solution will route flow to an existing drop inlet on Ladera Drive. As such, there will not be any drainage infrastructure list items required for this project requiring a guarantee.

RUNOFF

CALCULATIONS


BASIN BOUNDARY LAYOUT
BASIN A
BASIN B
BASIN C
EMERGENCY SPILLWAY
DOUBLE "D" INLET
10" SDR 35
18" RCP
Q=5.88 cfs
Q=0.75 cfs
Q=0.74 cfs
OFFICE
HC

SAMPLE CALCULATIONS FOR BASIN A

The site is @ Zone 1

LAND TREATMENT

Treatment D:

D = 60 % for apartments

Treatment B:

B = 20.00 %

Treatment C:

C = 20.00 %

DEPTH (INCHES) @ 100-YEAR STORM

P_{60} = 1.87 inches

P_{360} = 2.20 inches

P_{1440} = 2.66 inches

DEPTH (INCHES) @ 10-YEAR STORM

P_{60} = 1.87 x 0.667
= 1.25 inches

P_{360} = 1.47

P_{1440} = 1.77

From attached AHYMO calculations:

Hydrograph Identification = 101.10
$Q_{p-100yr}$ = 17.78 cfs, Vol. = 0.620 AC-FT,

Hydrograph Identification = 111.10
Q_{p-10yr} = 10.72 cfs, Vol. = 0.358 AC-FT

See the summary output from AHYMO calculations.

TABLE 1.

DRAINAGE BASINS

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI²)
A	215128	4.9387	0.007717
B	7664	0.1759	0.000275
C	9776	0.2244	0.000351

TABLE 2.

BASIN RUNOFF CACULATION RESULTS (under proposed conditions)

SUB-BASIN	Q -100(CFS)	Q -10(CFS)
A	17.78	10.72
B	0.75	0.49
C	0.74	0.41

TABLE 3.

BASIN RUNOFF CACULATION RESULTS (under existing conditions)

SUB-BASIN	Q -100(CFS)	Q -10(CFS)
A	10.02	3.79
B	0.75	0.49
C	0.65	0.33

SEE FOLLOWING SHEET FOR SAMPLE CALCULATION ON THE BASIN RUN-OFF

DROP INLET,

ORIFICE PLATE,

& POND CALCULATIONS

STORM SEWER INLET TYPE "DBL-D"

Effective area of the grate

L = 88 ¾" - 2(6") - 6" - 14"(½")

ENDS CENTER PIECES MIDDLE BARS

L = 63 ¾" = 5.3125'

W = 25"(½") - 13"(½")

CENTER PIECES

W = 19" = 1.5833'

Area:

A = L x W
= 5.3125 x 1.5833
= 8.41 SF

Using 50% clogging factor:

A = 8.41 - 0.5(8.41)
= 4.21

Q = CA√(2gH)
C = 0.6
A = 4.21
Q = 17.78

Solve for H:

$$H = \left(\frac{Q}{CA}\right)^2 \frac{1}{2g}$$

$$H = \left(\frac{17.78}{0.6(4.21)}\right)^2 \frac{1}{2(32.2)}$$

H = 0.77'

ORIFICE EQUATION

$Q = CA\sqrt{(2gH)}$

C = 0.6
A = πr^2, r = 10.0/24
g = 32.2
H = Water Depth
Q = Flow

V= Q/A
V= 10.69

POND VOLUME CALCULATIONS

Volume = 13.59 * D (from bottom of the inlet to the top of inlet)

Inlet Depth = 3.56'

Ab - Bottom of the pond surface area (top of inlet)
At - Top of the pond surface area
D - Water Depth (from top of inlet)
Dt - Total pond depth (from top of inlet to maximum water depth)
C - Change in surface area / Water depth

Volume = Ab * D + .05 * C * D^2

C = (At - Ab) / Dt

Ab =	13.59 sf
At =	7,277.39 sf
Dt =	1.98 ft
Dia =	0.83 ft
R =	0.4167 ft
C=	3,668.59 ft/lf-depth

PARKING LOT PONDING TABLE

ELEV.	WT. ELEV.	V (CF)	V (AC-FT)	10.00" OUT-FLOW (CFS)
5156.97	0.00	0.00	0.00	0.00
5157.07	0.10	1.36	0.00003	0.83
5157.17	0.20	2.72	0.00006	1.17
5157.27	0.30	4.08	0.00009	1.44
5157.37	0.40	5.44	0.00012	1.66
5157.47	0.50	6.80	0.00016	1.86
5157.57	0.60	8.15	0.00019	2.03
5157.67	0.70	9.51	0.00022	2.20
5157.77	0.80	10.87	0.00025	2.35
5157.87	0.90	12.23	0.00028	2.49
5157.97	1.00	13.59	0.00031	2.63
5158.47	1.50	20.39	0.00047	3.22
5158.97	2.00	27.18	0.00062	3.71
5159.47	2.50	33.98	0.00078	4.15
5160.50	3.53	47.97	0.00110	4.93
5160.60	3.63	4450.79	0.10218	5.00
5160.70	3.73	4814.66	0.11053	5.07
5160.80	3.83	5178.53	0.11888	5.14
5160.90	3.93	5542.40	0.12724	5.21
5161.00	4.03	5906.27	0.13559	5.27
5161.10	4.13	6270.14	0.14394	5.34
5161.20	4.23	6634.01	0.15230	5.40
5161.30	4.33	6997.88	0.16065	5.46
5161.40	4.43	7361.75	0.16900	5.53
5161.50	4.53	7725.62	0.17736	5.59
5161.60	4.63	8089.49	0.18571	5.65
5161.70	4.73	8453.36	0.19406	5.71
5161.80	4.83	8817.23	0.20242	5.77
5161.90	4.93	9181.10	0.21077	5.83
5162.00	5.03	9544.97	0.21912	5.89

EMERGENCE SPILLWAY

CALCULATIONS

EMERGENCY SPILLWAY CALCULATION

A drop inlet is used for the emergency spillway.
See the following calculations for drop inlet capacity.

DROP INLET CAPACITY SINGLE "C"

THROAT

H= 1.02-0.52/2 = 0.76

Q= CA√2gh

A= Area of the throat opening

= 0.60(2.05)√2(32.2)0.76 = 8.61 cfs

GRATE

H= 1.02-0.54/2 = 0.75

Q= CA√2gh

A= The effective area of the grate (same as a single "d")

= 0.60(2.28)√2(32.2)0.75 = 9.51 cfs

$Q_t = Q_{throat} + Q_{grate}$
8.61 cfs + 9.51 cfs = 18.12 cfs

SEE GRADING AND DRAINAGE PLAN FOR STORM SEWER LOCATION.

AHYMO

INPUT & OUTPUT,

& SUMMARY OUTPUT

FILES FOR

THE PARKING PONDING

```
*****************************************************************
*                RIO VOLCAN APARTMENTS, PHASE II                *
*****************************************************************
*         100-YEAR, 6-HR STORM  (PONDING CALCULATIONS)          *
*****************************************************************
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                     RAIN DAY=2.66 IN DT=0.03333 HR
COMPUTE NM HYD       ID=1 HYD NO=101.1 AREA=0.007717 SQ MI
                     PER A=0.00 PER B=20.00 PER C=20.00 PER D=60.00
                     TP=-0.1333 HR MASS RAINFALL=-1
*
* LOT PONDING
*
ROUTE RESERVOIR      ID=2 HYD NO=501.1 INFLOW ID=1 CODE=24
                     OUTFLOW(CFS)      STORAGE(AC-FT)  ELEVATION(FT)
                         0.00            0.00000        5156.97
                         1.83            0.00002        5157.07
                         1.17            0.00003        5157.17
                         1.44            0.00005        5157.27
                         1.66            0.00006        5157.37
                         1.86            0.00008        5157.47
                         2.03            0.00009        5157.57
                         2.20            0.00011        5157.67
                         2.35            0.00012        5157.77
                         2.49            0.00014        5157.87
                         2.63            0.00016        5157.97
                         3.33            0.00023        5158.47
                         3.71            0.00031        5158.97
                         4.15            0.00039        5159.47
                         4.93            0.00055        5160.50
                         5.00            0.10163        5160.60
                         5.07            0.10998        5160.70
                         5.14            0.11833        5160.80
                         5.21            0.12669        5060.90
                         5.27            0.13504        5061.00
                         5.34            0.14339        5061.10
                         5.40            0.15175        5061.20
                         5.46            0.16010        5061.30
                         5.53            0.16845        5061.40
                         5.59            0.17681        5061.50
                         5.65            0.18516        5061.60
                         5.71            0.19351        5061.70
                         5.77            0.20187        5061.80
                         5.83            0.21022        5061.90
                         5.89            0.21857        5062.00

***
INISH
```

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 04/03/1996
         START TIME (HR:MIN:SEC) = 09:55:48     USER NO.= R_BOHANN.I01
         INPUT FILE = C:\AHYMO\PND.DAT

*****************************************************************
*                 RIO VOLCAN APARTMENTS, PHASE II               *
*****************************************************************
*          100-YEAR, 6-HR STORM  (PONDING CALCULATIONS)         *
*****************************************************************
START                TIME=0.0
*
* BASIN A
*
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                     RAIN DAY=2.66 IN DT=0.03333 HR

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
DT =    .033330 HOURS        END TIME =     5.999400 HOURS
   .0000   .0016   .0033   .0050   .0067   .0085   .0103
   .0122   .0141   .0160   .0180   .0201   .0222   .0243
   .0266   .0289   .0312   .0337   .0362   .0388   .0415
   .0443   .0472   .0502   .0534   .0567   .0601   .0637
   .0675   .0715   .0758   .0809   .0865   .0924   .1050
   .1334   .1771   .2398   .3254   .4379   .5814   .7600
   .9780  1.1804  1.2649  1.3363  1.3997  1.4575  1.5106
  1.5600  1.6061  1.6493  1.6900  1.7284  1.7646  1.7989
  1.8314  1.8623  1.8915  1.9193  1.9456  1.9518  1.9576
  1.9630  1.9682  1.9732  1.9780  1.9825  1.9869  1.9912
  1.9953  1.9993  2.0031  2.0068  2.0104  2.0140  2.0174
  2.0207  2.0240  2.0272  2.0303  2.0333  2.0363  2.0392
  2.0420  2.0448  2.0475  2.0502  2.0528  2.0554  2.0580
  2.0605  2.0629  2.0653  2.0677  2.0700  2.0723  2.0746
  2.0768  2.0790  2.0812  2.0833  2.0855  2.0875  2.0896
  2.0916  2.0936  2.0956  2.0976  2.0995  2.1014  2.1033
  2.1051  2.1070  2.1088  2.1106  2.1124  2.1141  2.1159
  2.1176  2.1193  2.1210  2.1227  2.1244  2.1260  2.1276
  2.1292  2.1308  2.1324  2.1340  2.1355  2.1371  2.1386
  2.1401  2.1416  2.1431  2.1446  2.1460  2.1475  2.1489
  2.1504  2.1518  2.1532  2.1546  2.1560  2.1573  2.1587
  2.1600  2.1614  2.1627  2.1640  2.1654  2.1667  2.1680
  2.1692  2.1705  2.1718  2.1731  2.1743  2.1756  2.1768
  2.1780  2.1792  2.1804  2.1817  2.1829  2.1840  2.1852
  2.1864  2.1876  2.1887  2.1899  2.1910  2.1922  2.1933
  2.1944  2.1956  2.1967  2.1978  2.1989  2.2000

COMPUTE NM HYD       ID=1 HYD NO=101.1 AREA=0.007717 SQ MI
                     PER A=0.00 PER B=20.00 PER C=20.00 PER D=60.00
                     TP=-0.1333 HR MASS RAINFALL=-1

    K =   .072649HR    TP =   .133300HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   18.280    CFS   UNIT VOLUME =    .9988       B =   526.28      P60 = 1.8700
    AREA =      .004630 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .033330


    K =   .118429HR    TP =   .133300HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   8.2130    CFS   UNIT VOLUME =    .9988       B =   354.67      P60 = 1.8700
```

AREA = .003087 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

*
* LOT PONDING
*
ROUTE RESERVOIR ID=2 HYD NO=501.1 INFLOW ID=1 CODE=24

OUTFLOW(CFS)	STORAGE(AC-FT)	ELEVATION(FT)
0.00	0.00000	5156.97
1.83	0.00002	5157.07
1.17	0.00003	5157.17
1.44	0.00005	5157.27
1.66	0.00006	5157.37
1.86	0.00008	5157.47
2.03	0.00009	5157.57
2.20	0.00011	5157.67
2.35	0.00012	5157.77
2.49	0.00014	5157.87
2.63	0.00016	5157.97
3.33	0.00023	5158.47
3.71	0.00031	5158.97
4.15	0.00039	5159.47
4.93	0.00055	5160.50
5.00	0.10163	5160.60
5.07	0.10998	5160.70
5.14	0.11833	5160.80
5.21	0.12669	5060.90
5.27	0.13504	5061.00
5.34	0.14339	5061.10
5.40	0.15175	5061.20
5.46	0.16010	5061.30
5.53	0.16845	5061.40
5.59	0.17681	5061.50
5.65	0.18516	5061.60
5.71	0.19351	5061.70
5.77	0.20187	5061.80
5.83	0.21022	5061.90
5.89	0.21857	5062.00

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

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
.00	.00	5156.97	.000	.00
.80	.00	5156.97	.000	.00
1.60	12.61	5061.45	.173	5.56
2.40	.69	5160.58	.080	4.98
3.20	.13	5156.97	.000	.02
4.00	.08	5156.97	.000	.00
4.80	.08	5156.97	.000	.03
5.60	.09	5156.97	.000	.05
6.40	.01	5156.97	.000	.00

PEAK DISCHARGE = 5.879 CFS - PEAK OCCURS AT HOUR 1.80
MAXIMUM WATER SURFACE ELEVATION = 5061.982
MAXIMUM STORAGE = .2171 AC-FT INCREMENTAL TIME= .033330HRS

****

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 09:55:48

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/03/1996

INPUT FILE = C:\AHYMO\PND.DAT USER NO.= R_BOHANN.I01

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= 1										RAIN6= 2.200
COMPUTE NM HYD	101.10	-	1	.00772	17.78	.620	1.50556	1.500	3.600	PER IMP= 60.00
ROUTE RESERVOIR	501.10	1	2	.00772	5.88	.620	1.50561	1.800	1.190	AC-FT= .217
FINISH										

100-YEAR & 10-YEAR

RUNOFF

AHYMO INPUT AND

SUMMARY OUTPUT FILES

(UNDER EXISTING AND PROPOSED CONDITIONS)

```
*****************************************************************
*****      Drainage Calculation for RIO VOLCAN, PHASE II      *****
*****************************************************************
*****       100-YEAR, 6-HOUR STORM PROPOSED CONDITIONS        *****
*****************************************************************
START                TIME=0.0
*****
***** BASIN A
*****
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                     RAIN DELAY=2.66 IN DT=0.03333 HR
COMPUTE NM HYD       ID=1 HYD NO=101.1 AREA=0.007717 SQ MI
                     PER A=0.00 PER B=20.00 PER C=20.00 PER D=60.00
                     TP=0.1333 HR MASS RAINFALL=-1
*****
***** BASIN B
*****
COMPUTE NM HYD       ID=1 HYD NO=101.2 AREA=0.000275 SQ MI
                     PER A=0.00 PER B=05.00 PER C=05.00 PER D=90.00
                     TP=0.1333 HR MASS RAINFALL=-1
*****
***** BASIN C
*****
COMPUTE NM HYD       ID=1 HYD NO=101.2 AREA=0.000351 SQ MI
                     PER A=0.00 PER B=30.00 PER C=30.00 PER D=40.00
                     TP=0.1333 HR MASS RAINFALL=-1
*****************************************************************
*****       10-YEAR, 6-HOUR STORM PROPOSED CONDITIONS         *****
*****************************************************************
START                TIME=0.0
*****
***** BASIN A
*****
RAINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                     RAIN ONE=1.25 IN RAIN SIX=1.47 IN
                     RAIN DELAY=1.77 IN DT=0.03333 HR
COMPUTE NM HYD       ID=1 HYD NO=110.1 AREA=0.007717 SQ MI
                     PER A=0.00 PER B=20.00 PER C=20.00 PER D=60.00
                     TP=0.1333 HR MASS RAINFALL=-1
*****
***** BASIN B
*****
COMPUTE NM HYD       ID=1 HYD NO=110.2 AREA=0.000275 SQ MI
                     PER A=0.00 PER B=05.00 PER C=05.00 PER D=90.00
                     TP=0.1333 HR MASS RAINFALL=-1
*****
***** BASIN C
*****
COMPUTE NM HYD       ID=1 HYD NO=101.2 AREA=0.000351 SQ MI
                     PER A=0.00 PER B=30.00 PER C=30.00 PER D=40.00
                     TP=0.1333 HR MASS RAINFALL=-1
*****
FINISH
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/03/1996

INPUT FILE = C:\AHYMO\BAS10.DAT USER NO.= R_BOHANN.I01

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= 1										RAIN6= 2.200
COMPUTE NM HYD	101.10	-	1	.00772	17.78	.620	1.50556	1.500	3.600	PER IMP= 60.00
COMPUTE NM HYD	101.20	-	1	.00028	.75	.027	1.85050	1.500	4.256	PER IMP= 90.00
COMPUTE NM HYD	101.20	-	1	.00035	.74	.024	1.27560	1.500	3.282	PER IMP= 40.00
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.470
COMPUTE NM HYD	110.10	-	1	.00772	10.72	.358	.86984	1.500	2.170	PER IMP= 60.00
COMPUTE NM HYD	110.20	-	1	.00028	.49	.017	1.14585	1.500	2.758	PER IMP= 90.00
COMPUTE NM HYD	101.20	-	1	.00035	.41	.013	.68583	1.500	1.846	PER IMP= 40.00
FINISH										

```
*************************************************************************
*****        Drainage Calculation for RIO VOLCAN, PHASE II        *****
*************************************************************************
*****         100-YEAR, 6-HOUR STORM EXISTING CONDITIONS          *****
*************************************************************************
START                 TIME=0.0
*****
***** BASIN A
*****
RAINFALL              TYPE=1 RAIN QUARTER=0.0 IN
                      RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                      RAIN DELAY=2.66 IN DT=0.03333 HR
COMPUTE NM HYD        ID=1 HYD NO=101.1 AREA=0.007717 SQ MI
                      PER A=0.00 PER B=100.00 PER C=0.00 PER D=0.00
                      TP=0.1333 HR MASS RAINFALL=-1
*****
***** BASIN B
*****
COMPUTE NM HYD        ID=1 HYD NO=101.2 AREA=0.000275 SQ MI
                      PER A=0.00 PER B=05.00 PER C=05.00 PER D=90.00
                      TP=0.1333 HR MASS RAINFALL=-1
*****
***** BASIN C
*****
COMPUTE NM HYD        ID=1 HYD NO=101.2 AREA=0.000351 SQ MI
                      PER A=0.00 PER B=40.00 PER C=40.00 PER D=20.00
                      TP=0.1333 HR MASS RAINFALL=-1
*************************************************************************
*****         10-YEAR, 6-HOUR STORM EXISTING CONDITIONS           *****
*************************************************************************
START                 TIME=0.0
*****
***** BASIN A
*****
RAINFALL              TYPE=1 RAIN QUARTER=0.0 IN
                      RAIN ONE=1.25 IN RAIN SIX=1.47 IN
                      RAIN DELAY=1.77 IN DT=0.03333 HR
COMPUTE NM HYD        ID=1 HYD NO=110.1 AREA=0.007717 SQ MI
                      PER A=0.00 PER B=100.00 PER C=0.00 PER D=0.00
                      TP=0.1333 HR MASS RAINFALL=-1
*****
***** BASIN B
*****
COMPUTE NM HYD        ID=1 HYD NO=110.2 AREA=0.000275 SQ MI
                      PER A=0.00 PER B=05.00 PER C=05.00 PER D=90.00
                      TP=0.1333 HR MASS RAINFALL=-1
*****
***** BASIN C
*****
COMPUTE NM HYD        ID=1 HYD NO=101.2 AREA=0.000351 SQ MI
                      PER A=0.00 PER B=40.00 PER C=40.00 PER D=20.00
                      TP=0.1333 HR MASS RAINFALL=-1
*****
FINISH
```

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/03/1996

INPUT FILE = c:\ahymo\exbas.dat USER NO.= R_BOHANN.I01

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= 1										RAIN6= 2.200
COMPUTE NM HYD	101.10	-	1	.00772	10.02	.275	.66738	1.533	2.028	PER IMP= .00
COMPUTE NM HYD	101.20	-	1	.00028	.75	.027	1.85050	1.500	4.256	PER IMP= 90.00
COMPUTE NM HYD	101.20	-	1	.00035	.65	.020	1.04564	1.500	2.893	PER IMP= 20.00
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 1.470
COMPUTE NM HYD	110.10	-	1	.00772	3.79	.092	.22437	1.533	.767	PER IMP= .00
COMPUTE NM HYD	110.20	-	1	.00028	.49	.017	1.14585	1.500	2.758	PER IMP= 90.00
COMPUTE NM HYD	101.20	-	1	.00035	.33	.009	.50183	1.500	1.482	PER IMP= 20.00
FINISH										

CITY OF
Albuquerque

August 3,1998

Ron Bohannan
Tierra West , LCC
4421 McCleod Rd. NE Suite D
Albuquerque, New Mexico 87109

RE: ENGINEER CERTIFICATION FOR RIO VOLCAN APARTMENT COMPLEX PHASE TWO (H10-D20) CERTIFICATION STATEMENT DATED 7/23/98

Dear Mr. Bohannan:

Based on the information provided on your July 23,1998 submittal, Engineer Certification for the above referenced site is acceptable for temporary CO.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya

Bernie J. Montoya CE
Associate Engineer

CODE ADMINISTRATION DIVISION
CITY OF ALBUQUERQUE, P.O. BOX 1293
MECHANICAL SECTION

Location: 1919 LADERA N W

Type of Inspection: 18" STORM LINE TIE INTO CITY STORM LINE

Date: 4-28-98 19

Approved: [illegible] Inspector

FORM B-20 P111201

City project # 5247.91
Rio Volcan Apts.

RECEIVED
JUL 23 1998
HYDROLOGY SECTION

CITY OF
Albuquerque

July 8,1998

Shahab Biazar
Tierra West, LLC
4421 McCleod Rd. NE Suite D
Albuquerque, New Mexico 87109

RE: ENGINEER CERTIFICATION FOR RIO VOLCAN APARTMENT COMPLEX PHASE TWO COMPLEXES 15,22, AND23 (H10-D20) CERTIFICATION STATEMENT DATED 5/13/98

Dear Mr. Bohannan:

Based on the information provided on your May 14,1998 submittal, temporary Engineer Certification for the above referenced buildings 15,22, and 23 is acceptable.

If I can be of further assistance, please feel free to contact me at 924-3986.

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya

Bernie J. Montoya CE
Associate Engineer