CITY OF ALBUQUERQUE

ALBUQUERQUE
Making History

August 18, 2005

Mr. Mark Goodwin, PE
MARK GOODWIN & ASSOCIATES
P.O. Box 90606
Albuquerque, NM 87199

RE: KENSINGTON SUBDIVISION, UNIT 6 (H-10/D23D)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 08/17/2004
Engineers Certification dated 08/18/2005

Dear Mark:

P.O. Box 1293

Based upon the information provided in your Engineer's Certification Submittal dated 08/18/2005, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

Albuquerque

If you have any questions, you can contact me at 924-3982.

Sincerely,

New Mexico 87103

Arlene V. Portillo
Plan Checker, Planning Dept.- Hydrology
Development and Building Services

www.cabq.gov

C: Marilyn Maldonado, COA# 691382
File

DRAINAGE REPORT

for

KENSINGTON, UNIT 6

APRIL 2004

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PROJECT DESCRIPTION

An 18 lot single-family residential subdivision is proposed in this report for a 2.36 acre undeveloped tract located at the southeast corner of Ladera Drive NW and 72nd Street NW. As reflected on the vicinity map located on Figure 1 of this report, in addition to Ladera Drive to the north and 72nd Street to the west, this site is further fronted by Miami Road along the southern boundary and existing homes (Ladera Vista Subdivision) to the east.

METHODOLOGY & PREVIOUS REPORTS

Per recommendations provided within the City of Albuquerque Development Process Manual (DPM), the AHYMO computer model was used in this hydrological analysis. The analysis was performed using variables associated with the 100-year, 6-hour storm event. Copies of the AHYMO input and output files are included within Appendix A of this report.

Manning's Equation was utilized in determining street and drainage channel capacities.

Previously submitted drainage reports for the Ladera Vista and Kensington Subdivisions were referenced in preparing this report.

EXISTING CONDITIONS

As stated earlier in this report, the site is previously undeveloped with sparse desert vegetation covering the site. The topographical fall is from west to east at slopes ranging between ½ to 3 percent. During the construction of the Ladera Vista Subdivision, an earthen bar ditch was constructed along the eastern side of this site to intercept and divert flows to both Miami Road and Ladera Drive. It is estimated that 3.72 cfs is generated onsite in a 100-year, 6-hour event. With 8" vertical constructed along Ladera, 72nd and Miami Road, no offsite flows impact this site. This site is not located within a 100-year flood zone.

PROPOSED CONDITIONS

As shown on the enclosed Grading & Drainage plan, a single access point is proposed off of Miami Road with a circular turnaround (cul de sac) at the northern edge of the site abutting Ladera Drive.

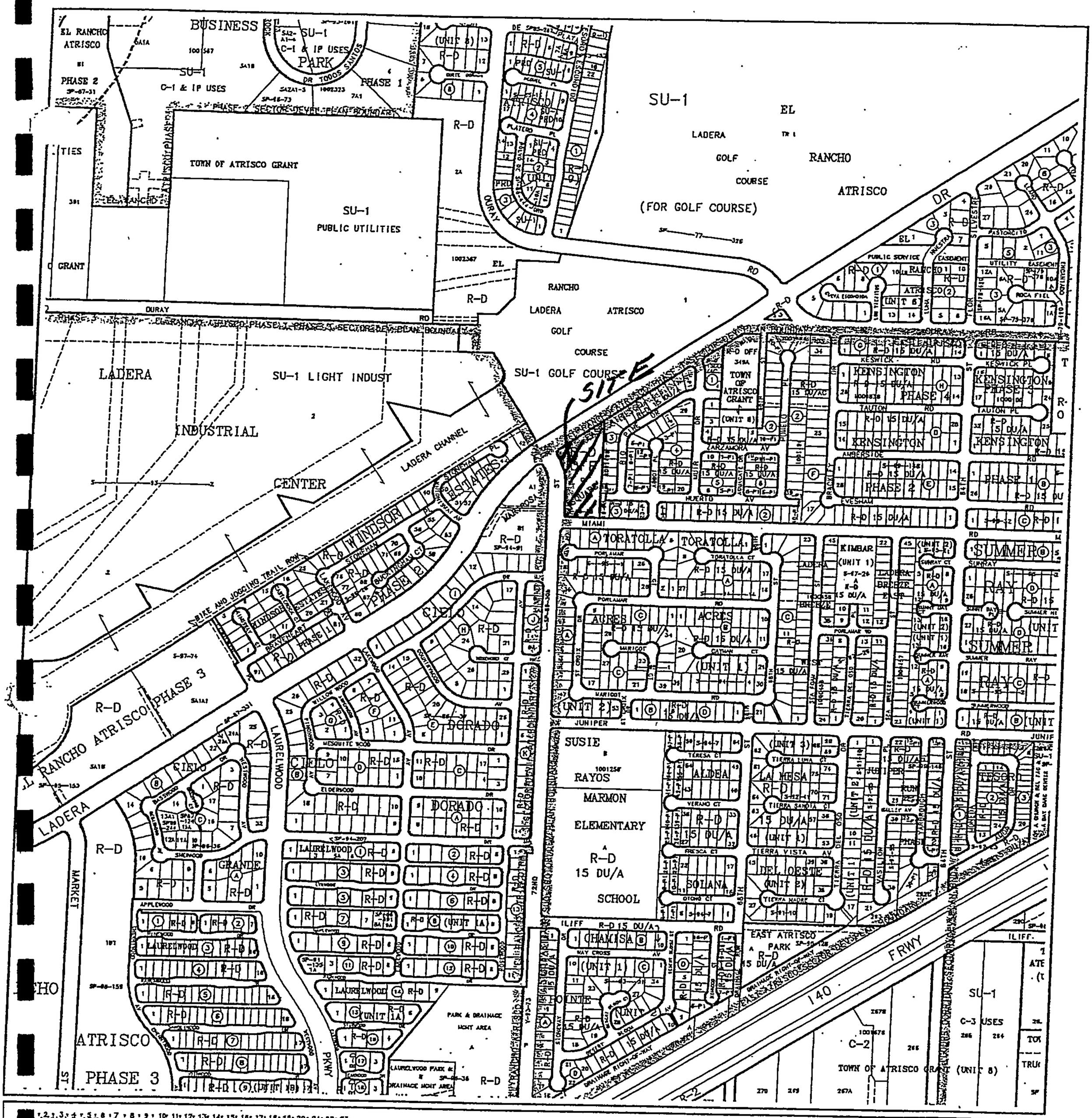
The drainage management plan for this site includes a water block at the proposed intersection on Miami Road to keep offsite flows from entering this site. On-site developed flows will surface discharge to the new street which will be constructed to fall to the north to Ladera Drive. An adequately designed concrete drainage channel will deliver an estimated 7.65 cfs of developed run-off to Ladera Drive during a 100-year, 6-hour storm event.

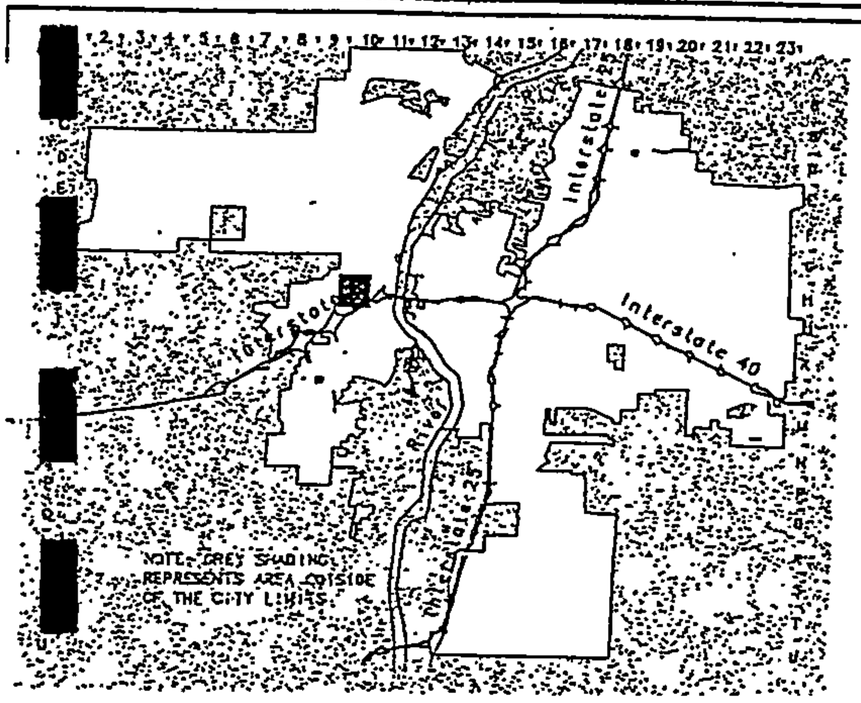
Although the Ladera Vista Drainage Report, Figure 2, had recommended that developed flows from this site should discharge south to Miami Road, that routing was not chosen for the following reasons:

- *Adjacent to this site, Miami Road is nearly 2' higher in elevation than Ladera Drive. As such, a large amount of import material would be required along Ladera Drive to get the site to drain to the south. Retaining walls would have been required all along the Ladera frontage.*
- *All existing storm flows on the south side of Ladera Drive are routed to the south at 72nd Street where they are intercepted by a series of inlets set in a sump condition within 72nd Street. With that, the only flow within Ladera Drive between this site and the nearest catch point, just west of Ouray Road, is that which falls on the roadway itself. The included hydraulic analysis shows that there is more than adequate capacity in Ladera to accept an additional 7.65 cfs from this site.*

SUMMARY

The development of the Kensington, Unit 6, as defined in this report, will have little or no adverse impact downstream of this site.





CITY OF
Albuquerque

A Albuquerque G Geographic I Information S System

PLANNING DEPARTMENT

GRAPHIC SCALE IN FEET

250 0 750 1000

Zone Atlas Page

H-10-Z

Map Amended through January 21, 2003

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

****

*****

*****FIRST LOOK AT EXISTING FLOWS FROM THIS SITE

*****

COMPUTE NM HYD ID=1 HYD NO=101.0 AREA=0.0037 SQ MI
PER A=80 PER B=0 PER C=20 PER D=0
TP=0.1333 HR MASS RAINFALL=-1

K = .152120HR TP = .133300HR K/TP RATIO = 1.141188
SHAPE CONSTANT, N = 3.102909
UNIT PEAK = 8.0525 CFS UNIT VOLUME = .9981 B = 290.11 P60 = 1.8700
AREA = .003700 SQ MI IA = .59000 INCHES INF = 1.50200 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.00

RUNOFF VOLUME = .52252 INCHES = .1031 ACRE-FEET
PEAK DISCHARGE RATE = 3.72 CFS AT 1.533 HOURS BASIN AREA = .0037 SQ. MI.

*****

*****NEXT LOOK AT DEVELOPED CONDITIONS

*****

COMPUTE NM HYD ID=3 HYD NO=103.0 AREA=0.0037 SQ MI
PER A=0 PER B=48.7 PER C=0 PER D=51.3
TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000
SHAPE CONSTANT, N = 7.106420
UNIT PEAK = 7.4938 CFS UNIT VOLUME = .9978 B = 526.28 P60 = 1.8700
AREA = .001898 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

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          K =    .130992HR    TP =    .133300HR    K/TP RATIO =    .982685
SHAPE CONSTANT, N =  3.593448
          UNIT PEAK =    4.4214    CFS    UNIT VOLUME =    .9973        B =
327.09      P60 = 1.8700
          AREA =       .001802 SQ MI    IA =    .50000 INCHES    INF =
1.25000 INCHES PER HOUR
          RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =    .033330

     PRINT HYD                ID=3 CODE=1

                                        PARTIAL HYDROGRAPH   103.00


          RUNOFF VOLUME =     1.33331 INCHES      =         .2631 ACRE-FEET
          PEAK DISCHARGE RATE =      7.65 CFS  AT    1.500 HOURS   BASIN
AREA =    .0037 SQ. MI.


     *****
     *****LOOK AT FLOW GENERATED WITHIN LADERA ROAD
     *****
     COMPUTE NM HYD           ID=4 HYD NO=105 AREA=0.0024 SQ MI
                                   PER A=0 PER B=39.9 PER C=0 PER D=60.1
                                   TP=0.1333 HR MASS RAINFALL=-1

          K =    .072649HR    TP =    .133300HR    K/TP RATIO =    .545000
SHAPE CONSTANT, N =  7.106420
          UNIT PEAK =    5.6947    CFS    UNIT VOLUME =    .9973        B =
526.28      P60 = 1.8700
          AREA =       .001442 SQ MI    IA =    .10000 INCHES    INF =
.04000 INCHES PER HOUR
          RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =    .033330


          K =    .130992HR    TP =    .133300HR    K/TP RATIO =    .982685
SHAPE CONSTANT, N =  3.593448
          UNIT PEAK =    2.3497    CFS    UNIT VOLUME =    .9943        B =
327.09      P60 = 1.8700
          AREA =       .000958 SQ MI    IA =    .50000 INCHES    INF =
1.25000 INCHES PER HOUR
          RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER
METHOD - DT =    .033330

     PRINT HYD                ID=4 CODE=1

                                        PARTIAL HYDROGRAPH   105.00


          RUNOFF VOLUME =     1.44754 INCHES      =         .1853 ACRE-FEET
          PEAK DISCHARGE RATE =      5.29 CFS  AT    1.500 HOURS   BASIN
AREA =    .0024 SQ. MI.


     FINISH

          NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 16:40:13
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STREET CAPACITIES

1. *On-Site Street*

Section is 26' F-F

Mountable curb, slope = 0.50%

Look at worst case - north end

Q = .425 cfs • 18 lots = 7.65 cfs

Use flow depth of 0.33'

A = (.07' x 26') + 2(½(.26) •13) = 5.20 sf

Rh= A/Wp = 5.20 / (26 + .66) = .195

$V = 1.49(R)^{2/3}(S)^{½}/n = 1.49(.195)^{.67}(.005)^{½}/.017 = 2.07$ *fps*

Q = VA = 2.07(5.20) = 10.76 cfs

10.76 > 7.65 → OK

$d = v^2/2q = .33 = (2.07)^2/64.4 = .40$

.40 < .53 → OK

2. *Ladera Drive*

South ½ (east bound) = 24' F-F

8" V.C. S = 0.50 (worst case)

Q = 7.65 cfs (onsite) + 5.29 cfs (Ladera -AHYMO) = 12.94 cfs

d = 0.48'

A = ½(.48 • 24) = 5.76 sf

Rh = 5.76 / 24 + .48 = 0.235

$V = 1.49\ (.235)^{.67}\ (.005)^{½} / .017 = 2.35$ *fps*

Q = VA = 2.35 (5.76) = 13.54 cfs > 12.94 OK

$d + v^2 / 2q = .48 + (2.35)^2 / 64.4 = 0.57' < .85$ *OK*

DEVELOPED CONDITIONS

(Total Area = 2.36 acres)

1. *Find Q per lot:*

Pads	=	*35' x 48'* =	*1,680 sf*
Drives	=	*20' x 20'* =	*400 sf*
			2,080 sf

∴ 2,080 • 18 = 37,440 sf = 0.86 ac → 'D'

2. *Find Q in ROW:*

20% 'B' & 80% 'D'

ROW Area = 0.50 acres

'B' = 0.10 acres *'D' = 0.40 acres*

3. *Total Treatment Types:*

'D'	*= 0.86 acres + 0.40 acres =*	*1.26 acres*	=	*53.4 %*
'B'	*= 2.36 acres - 1.26 acres =*	*1.1 acres*	=	*46.6 %*

4. *Rainfall:*

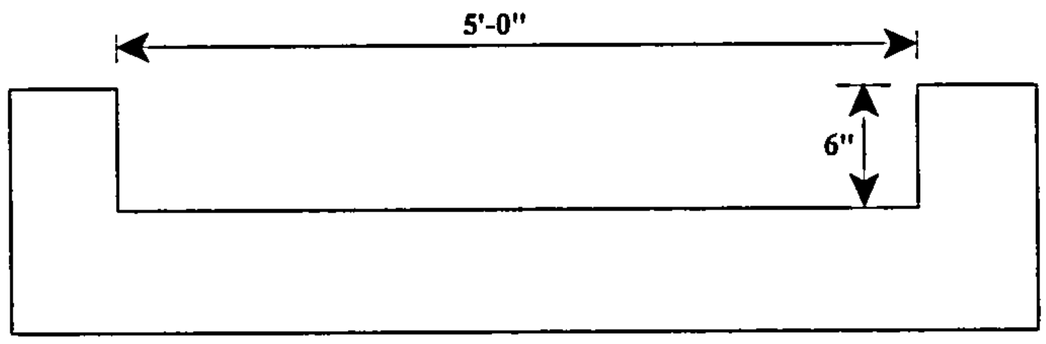
P1	*=1.87 inches*	*P6*	*=2.20 inches*	*P24*	*= 2.66 inches*

5. *From AHYMO Output:*

Q dev	=	*7.65 cfs*		
Q/lot	=	*7.65 / 18*	=	*0.425 cfs*

CONCRETE CHANNEL

Q des. = *7.65 cfs*



$Q = 1.49A(Rh)^{.67}(S)^{.5}/n$

$A = 2.5$ sf

$Rh = 2.5 / (5+1) = 4.17$

$S = .50\ \%$

$R = .013$

$Q = 1.49\ (2.5)(.417)^{.67}(.005)^{.5}/.013 = 11.3$ cfs

$11.3 > 7.65$ OK

Note: Since it is likely that pedestrian access will be needed from subdivision to Ladera Drive, SW grate will be specified on channel to serve as access point.