CITY OF ALBUQUERQUE

Planning Department
David Campbell, Director

Mayor Timothy M. Keller

July 24, 2018

Dennis Lorenz, P.E.
Lorenz Design & Consulting
2501 Rio Grande NW, Suite A
Albuquerque, NM 87104

RE: Eagle Ranch MVD-Retail Phase2
Eagle Ranch Rd
Grading Plan Stamp Date: 7/10/18
Drainage Report Stamp Date: 7/10/18
Hydrology File: B13D002C

Dear Mr. Lorenz:

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

Based on the submittal received on 7/12/18, the Grading Plan and Drainage Report are approved for Building Permit.

Prior to Certificate of Occupancy (For Information):

1. Engineer's Certification, per the DPM Chapter 22.7: *Engineer's Certification Checklist For Non-Subdivision* is required.

If you have any questions, please contact me at 924-3695 or dpeterson@cabq.gov.

Sincerely,

Dana Peterson, P.E.
Senior Engineer, Planning Dept.
Development Review Services

AMENDED
DRAINAGE REPORT
FOR
EAGLE RANCH NM MVD - RETAIL

Albuquerque, New Mexico

Prepared For:

Allen Sigmon Real Estate Group
9201 Montgomery Boulevard NE
Albuquerque, New Mexico 87111

Prepared by:

LORENZ
DESIGN & CONSULTING, LLC
Civil Engineering | Construction Management

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APPENDIX INDEX

PLAN AMENDMENT

This Amendment to the approved Drainage Report is presented to update the site plan for the Eagle Ranch Retail Center located along Eagle Ranch Road NW. Construction of the NM MVD (Phase 1) is complete. Certificate of Occupancy was issued March 2018. Revisions to the Eagle Ranch Retail Center (Phase 2) site plan are minor and are limited to revisions along the south project boundary. The sough parking lot is reduced in size to allow the retaining walls to be moved away from the lot line. This change reduces the scope and cost of the retaining wall. Revisions to the project hydrology are minimal. No adjustment to planned or constructed improvements is necessary.

PURPOSE AND SCOPE

This project involves the development of the subject property for New Mexico MVD, and Eagle Ranch Retail Center. The project proposes site improvements to support the development, including access, grading, drainage and utility improvements.

The purpose of this report is to outline the criteria for development of the site and demonstrate that this project will not negatively impact the project site, or upstream and downstream properties. This report is prepared and submitted in support of a pending building permit application.

The scope of this report is to provide analysis of the existing and improved conditions utilizing storm drainage modeling tools, thereby demonstrating the before and after behavior of the project site during rainfall events. It will be demonstrated that this project will be developed in accordance with the City of Albuquerque, Development Process Manual, Volume 2, and the City of Albuquerque Drainage Ordinance.

EXISTING CONDITIONS

The 6.77-acre project site is presently undeveloped. The site is bounded north by developed residential property, on the west by Irving Boulevard NW, on the south by developed institutional property and undeveloped property, and on the east by Eagle Ranch Road NW. Site topography is very rugged and steep. Excess runoff generally drains from west to east, discharging to Eagle Ranch Road. All undeveloped excess runoff is intercepted by the Eagle Ranch Storm Drainage System that drains to the Calabacillas Arroyo, approximately one-quarter mile northeast from the site. New Mexico MVD was constructed as Phase 1 of the project. All required downstream improvements are in place.

No offsite flows enter the property. As shown by FIRM Panel 35001C0108G, this

property is not located within a mapped 100 year floodplain.

PROPOSED CONDITIONS

As shown by the Grading and Drainage Plan (see back pocket), the property is to be developed to support the proposed Eagle Ranch Retail Center. This is a phased project. The New Mexico MVD was constructed as Phase 1. Eagle Ranch Retail Center will be developed as Phase 2. Phase 3 (3.60 aces) will be developed in the future. Site plans for Phase 3 will be presented to EPC and DRB for approval. A Phase 3 Grading and Drainage Plan will be submitted to support the planning and building permit process.

All drainage flows will be managed by grading and drainage improvements recommended by this plan. All excess runoff will be routed through landscaping improvements and first flush detention ponds prior to discharge to a proposed private storm drain system. The existing private storm drain system constructed as Phase 1, connects to an existing 36" stubout that drains to an 84" storm drain located within Eagle Ranch Rd NW. The 84" storm drain flows to the Calabacillas Arroyo. This storm drain, along with a parallel 60" storm drain allows all properties in the area to free discharge to the public system. Cottonwood Pointe, a previous development that did not materialize on this site, was granted free discharge. Other downstream developments, Aspen Ranch Apartments, Kia Auto Dealership, and Venture Commerce Center, were all granted free discharge by benefit of the public storm drainage system. Documentation for all of these Drainage Plans is provided in the Appendix.

As shown by the Grading & Drainage Plan – Overall Site and Drainage Plan, the developed site is divided into 6 drainage basins. Each drainage basin is described below:

Basin A represents Phase 2. Undeveloped Basin "A"' runoff drains to a temporary erosion control pond located south of the NM-MVD site. Future Phase 2 flows will drain to the private storm drain system.

Basin B is the NM-MVD site. All flows drain through landscaping improvements to First Flush Pond "B", which connects to the private storm drain system.

Basin C-1 is the Eagle Ranch Retail site. All flows drain through landscaping improvements to First Flush Pond "C", which connects to the private storm drain system.

Basin C-2 is a small basin located behind the south retaining wall. This area drains by a proposed storm inlet and pipe to Basin C-1.

Basin D is a portion of the existing NM MVD access road. All flows drain to the private storm drain system.

Basin E is the existing portion of the site access road. All flows drain to the private storm drain system.

90th Percentile Storm

In accordance with the City of Albuquerque Drainage Ordinance, effective May 12, 2014, all new development projects are required to manage the runoff which occurs during the 90th percentile storm event. In order to comply with this criteria, where practical, all "first flush" surface drainage shall be routed through landscaped areas before release into downstream drainage facilities.

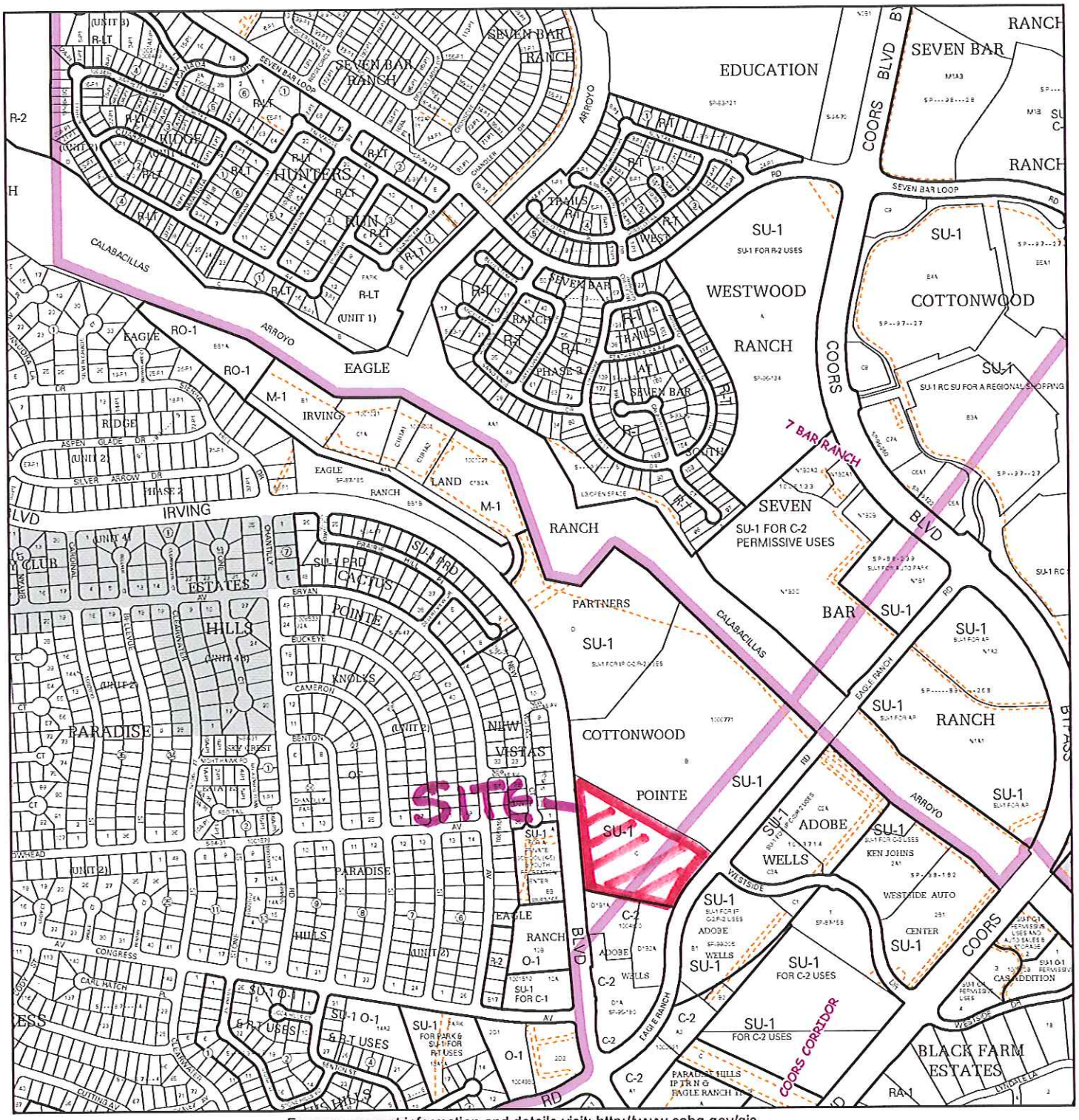
As shown by the calculations, the site easily satisfies the first flush requirement.

CALCULATIONS

Hydrology

The calculations contained herein define the 100-year/6-hour rainfall event falling within the project site and contributing off-site areas under existing and developed conditions. The hydrology is per the City of Albuquerque, Development Process Manual, Chapter 22, Volume 2, 1997 Revision. The AHYMO 97 model is used to determine peak runoff. The calculations are presented to demonstrate the capacity and function of all proposed storm drainage improvements.

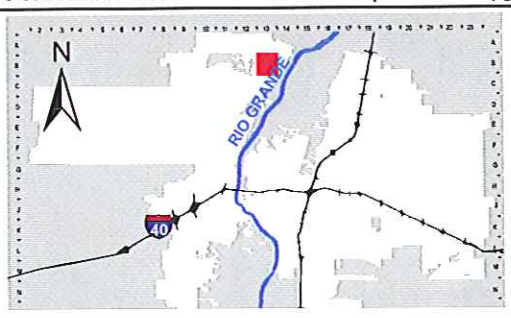
MAPS



For more current information and details visit: http://www.cabq.gov/gis

Albuquerque Geographic Information System

Map amended through: 1/28/2



PROJECT LOCATION MAP

Figure 1

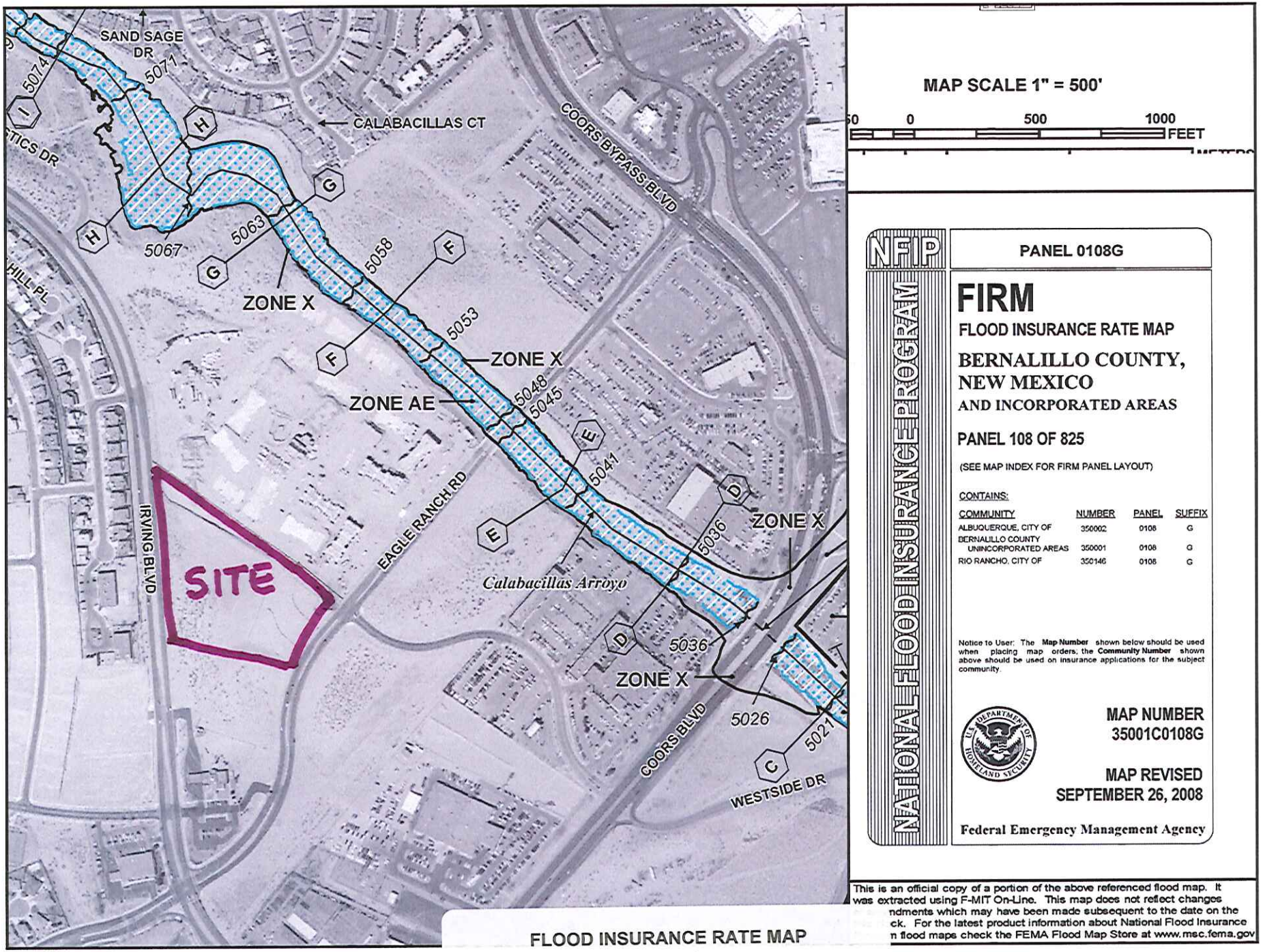
Zone Atlas Page:

B-13-Z

Selected Symbols

- SECTOR PLANS
- Design Overlay Zones
- City Historic Zones
- H-1 Buffer Zone
- Petroglyph Mon.
- Escarpment
- 2 Mile Airport Zone
- Airport Noise Contours
- Wall Overlay Zone

0 750 1,500 Feet



FLOOD INSURANCE RATE MAP

Figure 2

CALCULATIONS

FIRST FLUSH CRITERIA

FIRST FLUSH POND DESIGN

FIRST FLUSH CRITERIA

By ordinance the site is required to retain the 90th percentile rainfall depth. In order to comply with this criterion, where practical, all surface areas will be routed through landscaped areas before release to downstream public drainage facilities. The proposed plan will rout runoff through 2 proposed first flush detention ponds and a third first flush retention pond. Storage in excess of the 90th percentile rainfall will be provided as illustrated below.

90th percentile depth	0.44”	
Less initial abstraction		0.10”
Total retained depth		0.34”

The first flush requirement will be based on Phase 1&2 development. Phase 3 will provide its own first flush storage at the time of development.

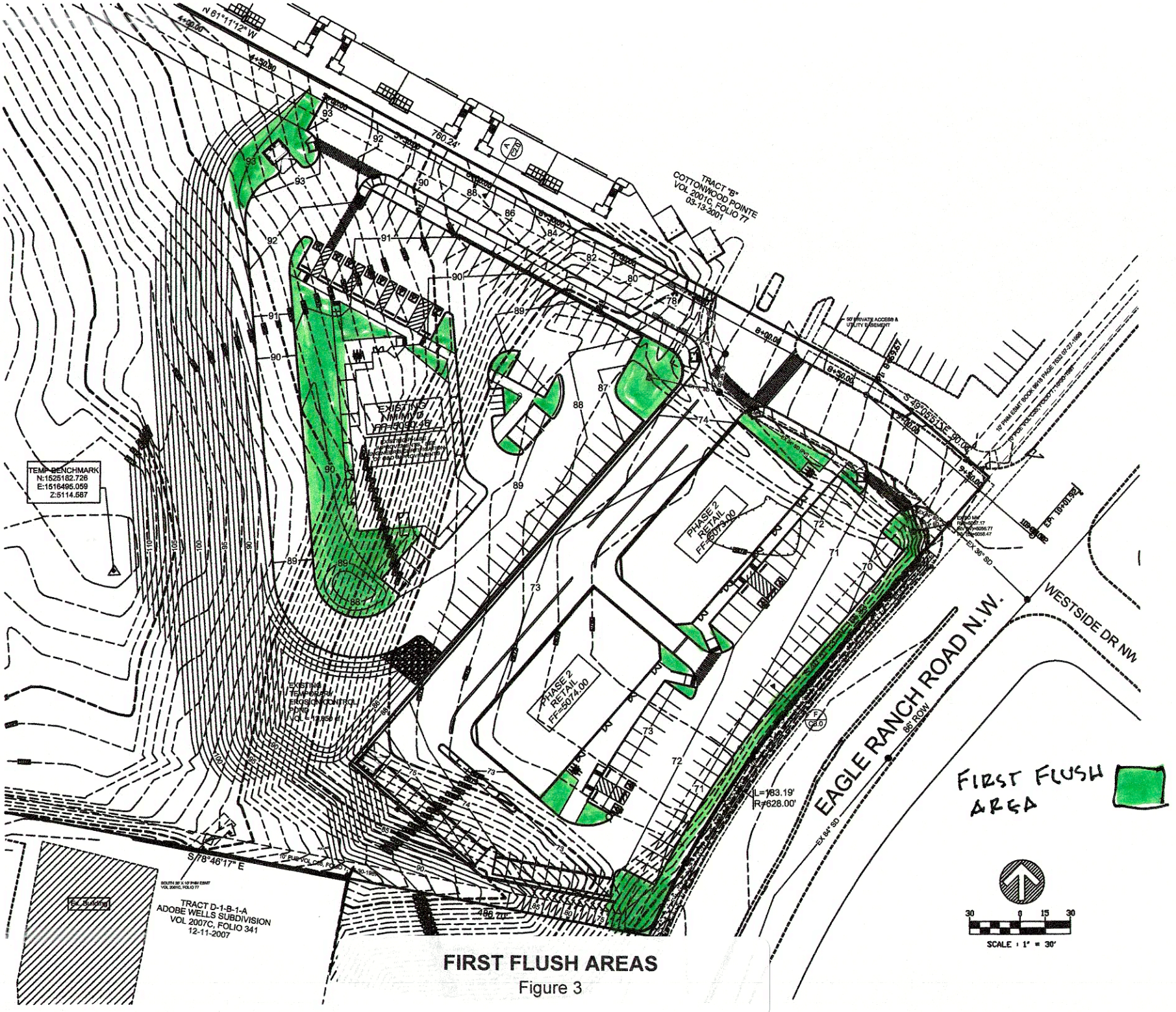
Phase 1&2 Area Type D = 2.28 ac.
Storage requirement = Ad(0.34”) = 2.28 ac(43,560 sf/ac)(0.34”/12”/ft) = 2,814 cf

First Flush storage provided:

Total Phase I landscape area = 0.74 ac.
Landscape area too steep to accept first flush flow = 0.40 ac
Total landscape area available for first flush use = 0.34 ac (See Figure 3)

All landscape areas shall be graded 3” below adjacent paved surfaces

Total first flush volume = 0.34 ac(43,560sf/ac)(0.25’)=3,703 cf
This volume does not include storage provided in the proposed first flush detention ponds or the temporary erosion control pond.



FIRST FLUSH AREAS

Figure 3

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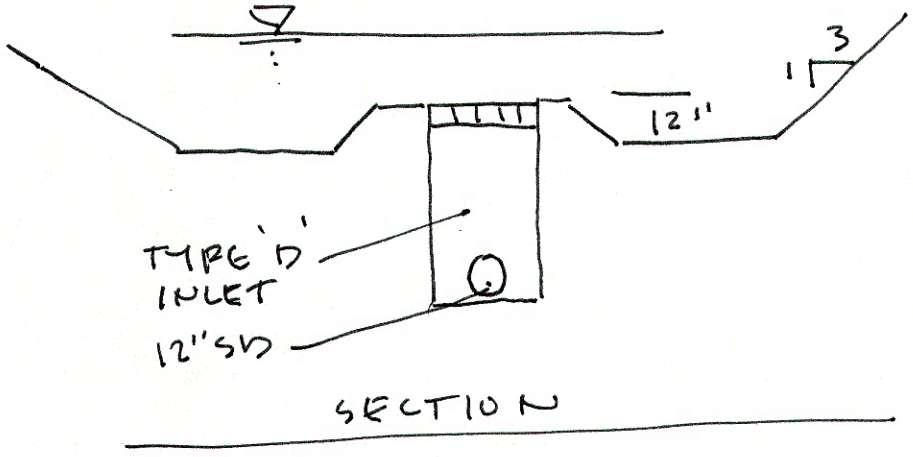
PROJECT E. RANCH
DATE 2·2017 PAGE

TYPE 'D' INLET @ FIRST FLUSH POND S

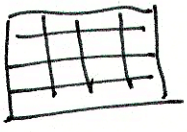


SECTION

POND 'B' Q = 4.7 CFS
POND 'C' Q = 6.2 CFS

DETERMINE SUBMERGED INLET CAPACITY FOR ABOVE POND ROUTING TABLE:

① INLET GRATE



OPEN AREA = 4.31 SF

$Q = CA\sqrt{2gh}$ $C = 0.6$

H	Q
0	0
1'	20.8
2'	29.4

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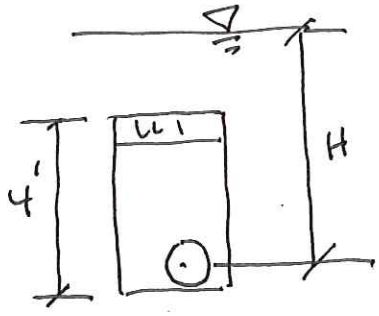
PROJECT E. RANCH
DATE 2.2017 PAGE

② CHECK 12" SD INLET CONTROL



$A_{12" PIPE} = 0.79 SF$

$C = 0.6$

$Q = CA\sqrt{2gH}$

H	Q
0	0
3.5	7.11
4.5	8.07
5.5	8.92

⇒

③ CHECK 12" SD PIPE FLOW BY MANNINGS

POND	PIPE S	Q CFS
B	33.0	20.0
C	48.0	24.1

⇒ LIMITING VARIABLE IS INLET CONTROL

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PROJECT E. RANCH
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POND ROUTING TABLES FOR AHYMO.

I. FIRST FLUSH POND 'B'		
ELEVATION	QOUT	STORAGE
ft	cfs	af
84.0	0	0
85.0	8.07	0.00893
86.0	8.92	0.02397
I. FIRST FLUSH POND 'C'		
ELEVATION	QOUT	STORAGE
ft	cfs	af
67.5	0	0
68.0	8.07	0.00181
69.0	8.92	0.00955

BASIN 'A' TEMPORARY EROSION CONTROL POND DESIGN

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PROJECT E-RANCH
DATE 2-2017 PAGE

TEMP EC POND - UNDEV BASIN 'A'

PER ATTACH: $Q_{100} = 9.4$ CFS

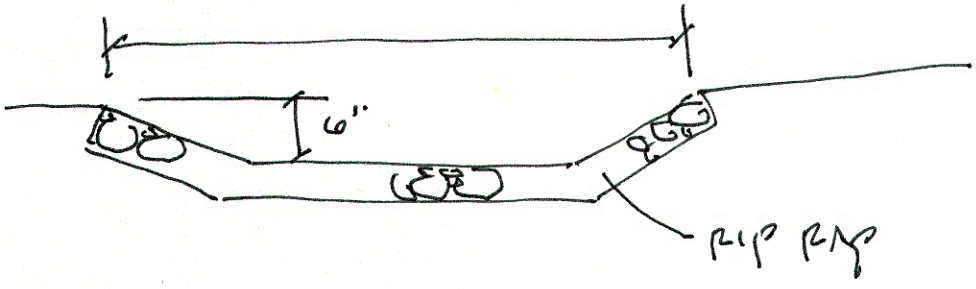
$V_{100} = 0.262$ AF

$= 11,413$ CF

$\Rightarrow$ 11,500 CF PROVIDED / 12,650 CF AS-BUILT

EMERGENCY SPILLWAY

$Q_{100} = 9.4$ CFS



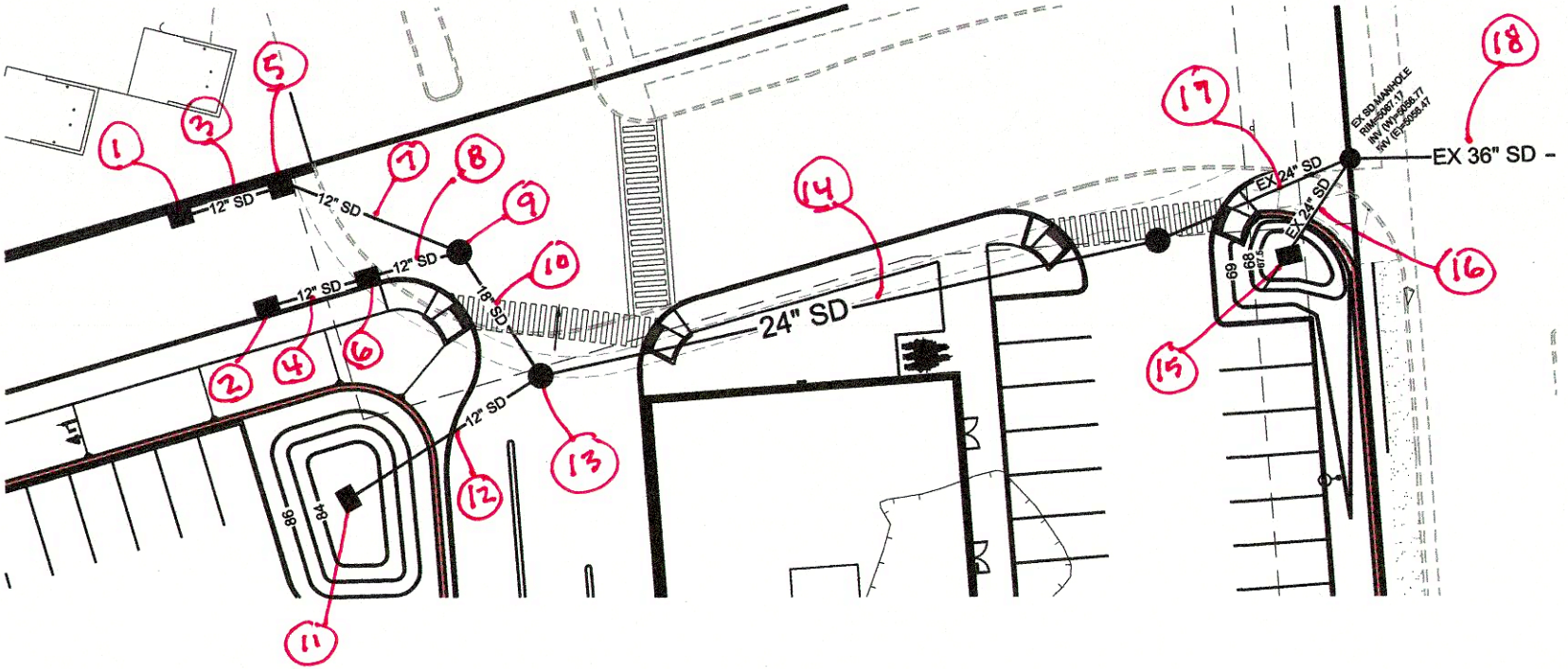
$Q = C L H^{3/2}$

$C = 2.5$

$H = 0.5'$

$L = Q / CH^{3/2} = 10.6'$ USE 12'

STORM DRAINAGE SYSTEM



STORM DRAIN SYSTEM

NTS

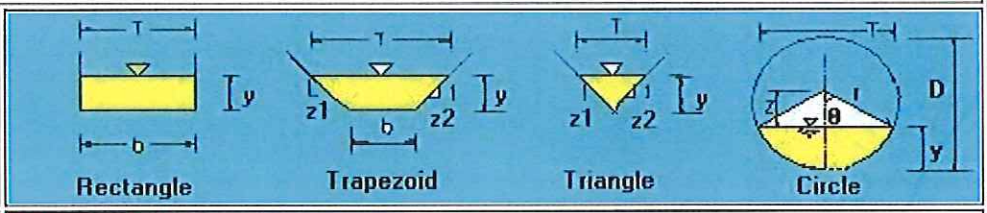
① ANALYSIS POINT
SEE SD INVENTORY

EAGLE RANCH NM MVD - RETAIL
STORM DRAIN SYSTEM INVENTORY

ANALYSIS POINT	Q100 cfs	DRAINAGE STRUCTURE	STREET DEPTH ft	PIPE SLOPE %	CAPACITY cfs	COMMENTS
1	8.3	TYPE C INLET	0.24	-	3.5	
2	8.3	TYPE C INLET	0.24	-	3.5	
3	3.5	12" SD	-	7.2	9.2	
4	3.5	12" SD	-	7.2	9.2	
5	5.5	TYPE C INLET	0.20	-	2.0	
6	5.5	TYPE C INLET	0.20	-	2.0	TOTAL 6.7 CFS SURFACE FLOW TO EAGLE RANCH
7	5.5	12" SD	-	11.1	11.5	
8	5.5	12" SD	-	35.4	20.7	
9	11.0	4' DIA SD MH	-	-	-	
10	11.0	18" SD	-	2.0	14.5	
11	4.7	TYPE D INLET	-	-	20.8	AT H=1.0'
12	4.7	12" SD	-	33.0	20.0	
13	15.7	4' DIA SD MH	-	-	-	
14	15.7	24" SD	-	6.8	58.0	
15	6.0	TYPE D INLET	-	-	20.8	AT H=1.0'
16	6.0	EXISITNG 24" SD	-	2.0	31.3	
17	21.8	EXISTING 24" SD	-	2.0	31.3	
18	21.8	EXISTING 36" SD	-	** 2.0	92.1	** ASSUMED SLOPE
19	0.3	SO. RET WALL DI	-	4.0	1.2	

The open channel flow calculator

Select Channel Type: Triangle



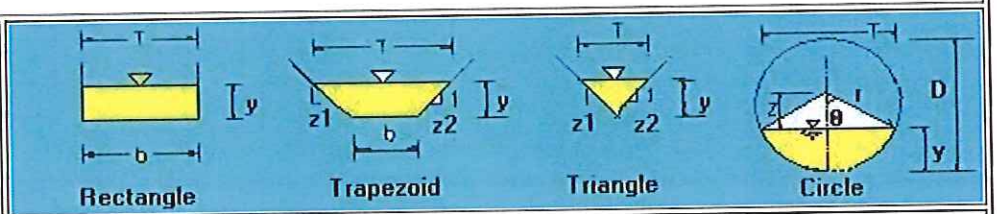
Velocity(V)&Discharge(Q) | Select unit system: Feet(ft)

Channel slope: .072 ft/ft	Water depth(y): .24 ft	Bottom W(b) 0 ft
Flow velocity 5.6749 ft/s	LeftSlope (Z1): 50 to 1 (H:V)	RightSlope (Z2): 1 to 1 (H:V)
Flow discharge 8.3353 ft^3/s	Input n value .017 or select n	
Calculate!	Status: Calculation finished	Reset
Wetted perimeter 12.34 ft	Flow area 1.47 ft^2	Top width(T) 12.24 ft
Specific energy 0.74 ft	Froude number 2.89	Flow status Supercritical flow
Critical depth 0.37 ft	Critical slope 0.0074 ft/ft	Velocity head 0.5 ft

1/2 STREET FLOW AT AP 1+2

The open channel flow calculator

Select Channel Type: Triangle

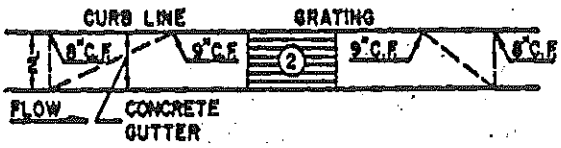


Velocity(V)&Discharge(Q) | Select unit system: Feet(ft)

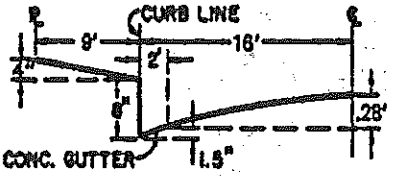
Channel slope: .072 ft/ft	Water depth(y): .195 ft	Bottom W(b) 0 ft
Flow velocity 4.9413 ft/s	LeftSlope (Z1): 50 to 1 (H:V)	RightSlope (Z2): 1 to 1 (H:V)
Flow discharge 4.7913 ft^3/s	Input n value .017 or select n	
Calculate!	Status: Calculation finished	Reset
Wetted perimeter 10.03 ft	Flow area 0.97 ft^2	Top width(T) 9.95 ft
Specific energy 0.57 ft	Froude number 2.79	Flow status Supercritical flow
Critical depth 0.29 ft	Critical slope 0.008 ft/ft	Velocity head 0.38 ft

½ STREET FLOW AT AP 5+6

GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

PLATE 22.3 D-5

PROJECT HYDROLOGY

EAGLE RANCH NM MVD - RETAIL
HYDROLOGY SUMMARY

BASIN	AREA	AREA	LAND TREATMENT AREAS (Percent)				Q 100	VOL 100
	acres	sq. mi.	A	B	C	D	cfs	ac-ft
EXISTING CONDITION								
SITE	6.77	0.01058	0	82	15	3	18.0	0.512
PROPOSED CONDITION								
SITE	6.77	0.01058	0	51	5	34	22.2	0.707
A	3.60	0.00563	0	85	15	0	9.4	0.262
B	1.16	0.00181	0	15	15	70	4.7	0.163
C	1.51	0.00236	0	11	11	78	6.1	0.212
C.1	1.41	0.00220	0	11	12	77	5.8	0.203
C.2	0.10	0.00016	0	0	100	0	0.3	0.009
D	0.27	0.00042	0	0	20	80	1.2	0.040
E	0.26	0.00041	0	3	3	94	1.2	0.041
FUTURE DEVELOPED CONDITION								
SITE	6.77	0.01058	0	8	12	80	28.3	0.993
A	3.60	0.00563	0	5	10	85	15.4	0.543
B	1.16	0.00181	0	15	15	70	4.7	0.163
C	1.51	0.00236	0	11	17	72	6.1	0.212
C.1	1.41	0.00220	0	11	12	77	5.8	0.203
C.2	0.10	0.00016	0	0	100	0	0.3	0.009
D	0.27	0.00042	0	0	20	80	1.2	0.040
E	0.26	0.00041	0	3	3	94	1.2	0.041

AHYMO OUTPUT FILES

AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4) - Ver. S4.01a, Rel: 01a RUN DATE (MON/DAY/YR) =07/12/2018

INPUT FILE = C:\Users\dennis\Desktop\Ahymo Files\Eagle.Ranch.txt USER NO.= Lorenz-NMSingleA33825816

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= 0.00
LOCATION		ALBUQUERQUE								
RAINFALL TYPE= 1 NOAA 14										RAIN6= 2.200
COMPUTE NM HYD	EX-SITE	-	1	0.01058	18.03	0.512	0.90738	1.533	2.663	PER IMP= 3.00
COMPUTE NM HYD	DEV-SITE	-	2	0.01058	22.21	0.707	1.25306	1.533	3.280	PER IMP= 34.00
COMPUTE NM HYD	EXIST-A	-	3	0.00563	9.37	0.262	0.87394	1.533	2.603	PER IMP= 0.00
COMPUTE NM HYD	DEV-B	-	4	0.00184	4.73	0.163	1.65535	1.533	4.011	PER IMP= 70.00
COMPUTE NM HYD	DEV-C	-	5	0.00236	6.14	0.212	1.68281	1.533	4.063	PER IMP= 72.00
COMPUTE NM HYD	DEV-C.1	-	6	0.00220	5.81	0.203	1.72625	1.533	4.128	PER IMP= 77.00
COMPUTE NM HYD	DEV-C.2	-	7	0.00016	0.34	0.009	1.08627	1.533	3.295	PER IMP= 0.00
COMPUTE NM HYD	DEV-D	-	8	0.00042	1.16	0.040	1.78024	1.533	4.298	PER IMP= 80.00
COMPUTE NM HYD	DEV-E	-	9	0.00041	1.16	0.041	1.89406	1.500	4.457	PER IMP= 94.00
COMPUTE NM HYD	FUTURE-A	-	10	0.00550	15.02	0.531	1.81072	1.500	4.268	PER IMP= 85.00
COMPUTE NM HYD	FUTURE-SITE	-	11	0.01058	28.29	0.993	1.75988	1.533	4.178	PER IMP= 80.00
ROUTE RESERVOIR	POND.B.OUT	4	12	0.00184	4.75	0.163	1.65518	1.533	4.022	AC-FT= 0.005
ROUTE RESERVOIR	POND.C.OUT	5	13	0.00236	6.16	0.212	1.68269	1.533	4.076	AC-FT= 0.001
ADD HYD	SD 10& 8		14	0.00592	16.18	0.571	1.80846	1.500	4.270	
FINISH										

```
     AHYMO PROGRAM (AHYMO-S4)                    - Version: S4.01a - Rel: 01a
         RUN DATE (MON/DAY/YR) = 07/12/2018
         START TIME (HR:MIN:SEC) = 10:28:33     USER NO.= Lorenz-NMSingleA33825816
         INPUT FILE = C:\Users\dennis\Desktop\Ahymo Files\Eagle.Ranch.txt

**************************************************************************
*                      EAGLE VISTA - NM MVD-RETAIL
*                           PROJECT HYDROLOGY
**************************************************************************
START               TIME=0.0  PUNCH CODE=0
LOCATION            ALBUQUERQUE
     City of Albuquerque soil infiltration values (LAND FACTORS) used for computations.
     Land Treatment     Initial Abstr.(in)    Unif. Infilt.(in/hour)
           A            0.65                  1.67
           B            0.50                  1.25
           C            0.35                  0.83
           D            0.10                  0.04

RAINFALL            TYPE=1  RAIN QUARTER=0.0  RAIN ONE=1.87
                    RAIN SIX=2.20  RAIN DAY=2.66  DT=0.03333 HRS

               6-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE AREAS (NM & AZ) - D1
               DT =   0.033330 HOURS       END TIME =     5.999400 HOURS
                 0.0000  0.0015  0.0029  0.0045  0.0061  0.0077  0.0096
                 0.0114  0.0133  0.0154  0.0175  0.0219  0.0264  0.0311
                 0.0361  0.0412  0.0466  0.0521  0.0577  0.0635  0.0693
                 0.0753  0.0814  0.0878  0.0946  0.1014  0.1091  0.1168
                 0.1296  0.1477  0.1657  0.1898  0.2140  0.2429  0.2767
                 0.3105  0.3612  0.4120  0.4810  0.5686  0.6562  0.8890
                 1.1224  1.3042  1.4336  1.5629  1.6282  1.6932  1.7463
                 1.7873  1.8282  1.8567  1.8850  1.9097  1.9304  1.9512
                 1.9670  1.9827  1.9942  2.0015  2.0087  2.0151  2.0215
                 2.0273  2.0326  2.0378  2.0426  2.0474  2.0521  2.0568
                 2.0614  2.0636  2.0659  2.0681  2.0702  2.0724  2.0744
                 2.0764  2.0784  2.0803  2.0823  2.0842  2.0860  2.0879
                 2.0896  2.0914  2.0931  2.0948  2.0965  2.0982  2.0999
                 2.1015  2.1030  2.1046  2.1062  2.1077  2.1092  2.1107
                 2.1122  2.1136  2.1150  2.1164  2.1178  2.1192  2.1206
                 2.1220  2.1233  2.1246  2.1260  2.1273  2.1286  2.1299
                 2.1312  2.1324  2.1337  2.1349  2.1362  2.1374  2.1386
                 2.1398  2.1410  2.1422  2.1434  2.1446  2.1457  2.1469
                 2.1480  2.1492  2.1503  2.1514  2.1525  2.1536  2.1547
                 2.1558  2.1569  2.1580  2.1591  2.1601  2.1612  2.1622
                 2.1633  2.1643  2.1653  2.1663  2.1673  2.1684  2.1693
                 2.1703  2.1713  2.1723  2.1733  2.1742  2.1752  2.1762
                 2.1771  2.1781  2.1790  2.1799  2.1809  2.1818  2.1827
                 2.1836  2.1845  2.1854  2.1863  2.1872  2.1881  2.1890
                 2.1898  2.1907  2.1916  2.1924  2.1933  2.1941  2.1950
                 2.1958  2.1967  2.1975  2.1983  2.1992  2.2000
```

```
*************************************************************************
************************
* EXISTING CONDITIONS  *
************************
* SITE - 6.77 ACRES
COMPUTE NM HYD      ID=1  HYD NO=EX-SITE  DA=0.010578 SQ MI
                    PER A=0 PER B=82 PER C=15  PER D=3
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   1.2529    CFS   UNIT VOLUME =   0.9897       B =   526.28      P60 = 1.8700
     AREA =     0.000317 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.127107HR    TP =  0.133300HR    K/TP RATIO =  0.953538     SHAPE CONSTANT, N =  3.706151
     UNIT PEAK =   25.793    CFS   UNIT VOLUME =   0.9996       B =   335.08      P60 = 1.8700
     AREA =     0.010261 SQ MI    IA =   0.47680 INCHES    INF =   1.18505 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=1  CODE=20

                                    HYDROGRAPH FROM AREA EX-SITE

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         1.333       1.3         2.666       0.3         4.000       0.0         5.333       0.0
     0.667       0.0         2.000       1.6         3.333       0.0         4.666       0.0         5.999       0.0

    RUNOFF VOLUME =     0.90738 INCHES      =       0.5119 ACRE-FEET
    PEAK DISCHARGE RATE =      18.03 CFS  AT   1.533 HOURS   BASIN AREA =  0.0106 SQ. MI.



************************
* DEVELOPED CONDITIONS  *
************************
* SITE - 6.77 ACRES
COMPUTE NM HYD      ID=2  HYD NO=DEV-SITE  DA=0.010578 SQ MI
                    PER A=0 PER B=51 PER C=15  PER D=34
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   14.199    CFS   UNIT VOLUME =   0.9985       B =   526.28      P60 = 1.8700
     AREA =     0.003597 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.125282HR    TP =  0.133300HR    K/TP RATIO =  0.939847     SHAPE CONSTANT, N =  3.762211
```

```
     UNIT PEAK =   17.755    CFS   UNIT VOLUME =   0.9995       B =   339.00      P60 = 1.8700
     AREA =     0.006981 SQ MI    IA =   0.46591 INCHES    INF =   1.15455 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=2  CODE=20

                                    HYDROGRAPH FROM AREA DEV-SITE

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         2.000       2.6         4.000       0.0         5.999       0.1
     0.667       0.0         2.666       0.3         4.666       0.0         6.666       0.0
     1.333       3.9         3.333       0.1         5.333       0.0

    RUNOFF VOLUME =     1.25306 INCHES     =       0.7069 ACRE-FEET
    PEAK DISCHARGE RATE =      22.21 CFS  AT   1.533 HOURS   BASIN AREA =  0.0106 SQ. MI.



* EXISTING BASIN A - 3.60 ACRES
COMPUTE NM HYD      ID=3  HYD NO=EXIST-A  DA=0.005625 SQ MI
                    PER A=0 PER B=85 PER C=15 PER D=0
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.127223HR    TP =  0.133300HR    K/TP RATIO =  0.954412     SHAPE CONSTANT, N =  3.702639
     UNIT PEAK =   14.129    CFS   UNIT VOLUME =   0.9993       B =   334.84      P60 = 1.8700
     AREA =     0.005625 SQ MI    IA =   0.47750 INCHES    INF =   1.18700 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=3  CODE=20

                                    HYDROGRAPH FROM AREA EXIST-A

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         1.333       0.5         2.666       0.1
     0.667       0.0         2.000       0.8         3.333       0.0

    RUNOFF VOLUME =     0.87394 INCHES     =       0.2622 ACRE-FEET
    PEAK DISCHARGE RATE =       9.37 CFS  AT   1.533 HOURS   BASIN AREA =  0.0056 SQ. MI.



* BASIN B - 1.18 ACRES
COMPUTE NM HYD      ID=4  HYD NO=DEV-B  DA=0.001844 SQ MI
                    PER A=0 PER B=15 PER C=15 PER D=70
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   5.0961    CFS   UNIT VOLUME =   0.9973       B =   526.28      P60 = 1.8700
```

```
     AREA =     0.001291 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.118429HR    TP =  0.133300HR    K/TP RATIO =  0.888442     SHAPE CONSTANT, N =  3.992344
     UNIT PEAK =   1.4719    CFS   UNIT VOLUME =   0.9915       B =   354.66      P60 = 1.8700
     AREA =     0.000553 SQ MI    IA =   0.42500 INCHES    INF =   1.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=4  CODE=20

                                    HYDROGRAPH FROM AREA DEV-B

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         1.333       1.2         2.666       0.0         4.000       0.0         5.333       0.0
     0.667       0.0         2.000       0.6         3.333       0.0         4.666       0.0         5.999       0.0

    RUNOFF VOLUME =     1.65535 INCHES     =       0.1628 ACRE-FEET
    PEAK DISCHARGE RATE =       4.73 CFS  AT   1.533 HOURS   BASIN AREA =  0.0018 SQ. MI.



* BASIN C - 1.51 ACRES
COMPUTE NM HYD      ID=5  HYD NO=DEV-C  DA=0.002360 SQ MI
                    PER A=0 PER B=11 PER C=17 PER D=72
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   6.7085    CFS   UNIT VOLUME =   0.9976       B =   526.28      P60 = 1.8700
     AREA =     0.001699 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.115737HR    TP =  0.133300HR    K/TP RATIO =  0.868247     SHAPE CONSTANT, N =  4.092369
     UNIT PEAK =   1.7910    CFS   UNIT VOLUME =   0.9929       B =   361.28      P60 = 1.8700
     AREA =     0.000661 SQ MI    IA =   0.40893 INCHES    INF =   0.99500 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=5  CODE=20

                                    HYDROGRAPH FROM AREA DEV-C

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         1.333       1.6         2.666       0.1         4.000       0.0         5.333       0.0
     0.667       0.0         2.000       0.8         3.333       0.0         4.666       0.0         5.999       0.0

    RUNOFF VOLUME =     1.68281 INCHES     =       0.2118 ACRE-FEET
    PEAK DISCHARGE RATE =       6.14 CFS  AT   1.533 HOURS   BASIN AREA =  0.0024 SQ. MI.
```

```
* BASIN C.1 - 1.41 ACRES
COMPUTE NM HYD      ID=6  HYD NO=DEV-C.1  DA=0.00220 SQ MI
                    PER A=0 PER B=11 PER C=12 PER D=77
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   6.6880    CFS   UNIT VOLUME =   0.9976       B =   526.28      P60 = 1.8700
     AREA =     0.001694 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.117883HR    TP =  0.133300HR    K/TP RATIO =  0.884345     SHAPE CONSTANT, N =  4.012281
     UNIT PEAK =   1.3513    CFS   UNIT VOLUME =   0.9907       B =   355.99      P60 = 1.8700
     AREA =     0.000506 SQ MI    IA =   0.42174 INCHES    INF =   1.03087 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=6  CODE=20

                                    HYDROGRAPH FROM AREA DEV-C.1

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         1.333       1.6         2.666       0.1         4.000       0.0         5.333       0.0
     0.667       0.0         2.000       0.8         3.333       0.0         4.666       0.0         5.999       0.0

    RUNOFF VOLUME =     1.72625 INCHES     =       0.2025 ACRE-FEET
    PEAK DISCHARGE RATE =       5.81 CFS  AT   1.533 HOURS   BASIN AREA =  0.0022 SQ. MI.


* BASIN C.2 - 0.10 ACRES
COMPUTE NM HYD      ID=7  HYD NO=DEV-C.2  DA=0.00016 SQ MI
                    PER A=0 PER B=0 PER C=100 PER D=0
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.105867HR    TP =  0.133300HR    K/TP RATIO =  0.794199     SHAPE CONSTANT, N =  4.514592
     UNIT PEAK =  0.46588    CFS   UNIT VOLUME =   0.9728       B =   388.14      P60 = 1.8700
     AREA =     0.000160 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=7  CODE=20

                                    HYDROGRAPH FROM AREA DEV-C.2

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         0.667       0.0         1.333       0.0         2.000       0.0
```

```
    RUNOFF VOLUME =     1.08627 INCHES     =       0.0093 ACRE-FEET
    PEAK DISCHARGE RATE =       0.34 CFS  AT   1.533 HOURS   BASIN AREA =  0.0002 SQ. MI.


* BASIN D - 0.27 ACRES
COMPUTE NM HYD      ID=8  HYD NO=DEV-D  DA=0.000422 SQ MI
                    PER A=0 PER B=0 PER C=20 PER D=80
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   1.3329    CFS   UNIT VOLUME =   0.9911       B =   526.28      P60 = 1.8700
     AREA =     0.000338 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.105867HR    TP =  0.133300HR    K/TP RATIO =  0.794199     SHAPE CONSTANT, N =  4.514592
     UNIT PEAK =  0.24575    CFS   UNIT VOLUME =   0.9486       B =   388.14      P60 = 1.8700
     AREA =     0.000084 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=8  CODE=20

                                    HYDROGRAPH FROM AREA DEV-D

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         1.333       0.3         2.666       0.0         4.000       0.0         5.333       0.0
     0.667       0.0         2.000       0.2         3.333       0.0         4.666       0.0         5.999       0.0

    RUNOFF VOLUME =     1.78024 INCHES     =       0.0401 ACRE-FEET
    PEAK DISCHARGE RATE =       1.16 CFS  AT   1.533 HOURS   BASIN AREA =  0.0004 SQ. MI.


* BASIN E - 0.26 ACRES
COMPUTE NM HYD      ID=9  HYD NO=DEV-E  DA=0.000406 SQ MI
                    PER A=0 PER B=3 PER C=3 PER D=94
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   1.5067    CFS   UNIT VOLUME =   0.9922       B =   526.28      P60 = 1.8700
     AREA =     0.000382 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.118429HR    TP =  0.133300HR    K/TP RATIO =  0.888442     SHAPE CONSTANT, N =  3.992344
     UNIT PEAK =  0.64813E-01CFS   UNIT VOLUME =   0.8761       B =   354.66      P60 = 1.8700
     AREA =     0.000024 SQ MI    IA =   0.42500 INCHES    INF =   1.04000 INCHES PER HOUR
```

```
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=9  CODE=20

                                    HYDROGRAPH FROM AREA DEV-E

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         1.333       0.3         2.666       0.0         4.000       0.0         5.333       0.0
     0.667       0.0         2.000       0.2         3.333       0.0         4.666       0.0         5.999       0.0

    RUNOFF VOLUME =     1.89406 INCHES     =       0.0410 ACRE-FEET
    PEAK DISCHARGE RATE =       1.16 CFS  AT   1.500 HOURS   BASIN AREA =  0.0004 SQ. MI.


* FUTURE BASIN A - 3.55 ACRES
COMPUTE NM HYD      ID=10  HYD NO=FUTURE-A  DA=0.00550 SQ MI
                    PER A=0 PER B=5 PER C=10 PER D=85
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   18.457    CFS   UNIT VOLUME =   0.9988       B =   526.28      P60 = 1.8700
     AREA =     0.004675 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.114242HR    TP =  0.133300HR    K/TP RATIO =  0.857028     SHAPE CONSTANT, N =  4.150443
     UNIT PEAK =   2.2595    CFS   UNIT VOLUME =   0.9944       B =   365.08      P60 = 1.8700
     AREA =     0.000825 SQ MI    IA =   0.40000 INCHES    INF =   0.97000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=10  CODE=20

                                    HYDROGRAPH FROM AREA FUTURE-A

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         2.000       2.2         4.000       0.0         5.999       0.1
     0.667       0.0         2.666       0.2         4.666       0.0         6.666       0.0
     1.333       4.2         3.333       0.0         5.333       0.1

    RUNOFF VOLUME =     1.81072 INCHES     =       0.5311 ACRE-FEET
    PEAK DISCHARGE RATE =      15.02 CFS  AT   1.500 HOURS   BASIN AREA =  0.0055 SQ. MI.


* FUTURE SITE - 6.77 ACRES
COMPUTE NM HYD      ID=11  HYD NO=FUTURE-SITE  DA=0.010578 SQ MI
                    PER A=0 PER B=8 PER C=12  PER D=80
```

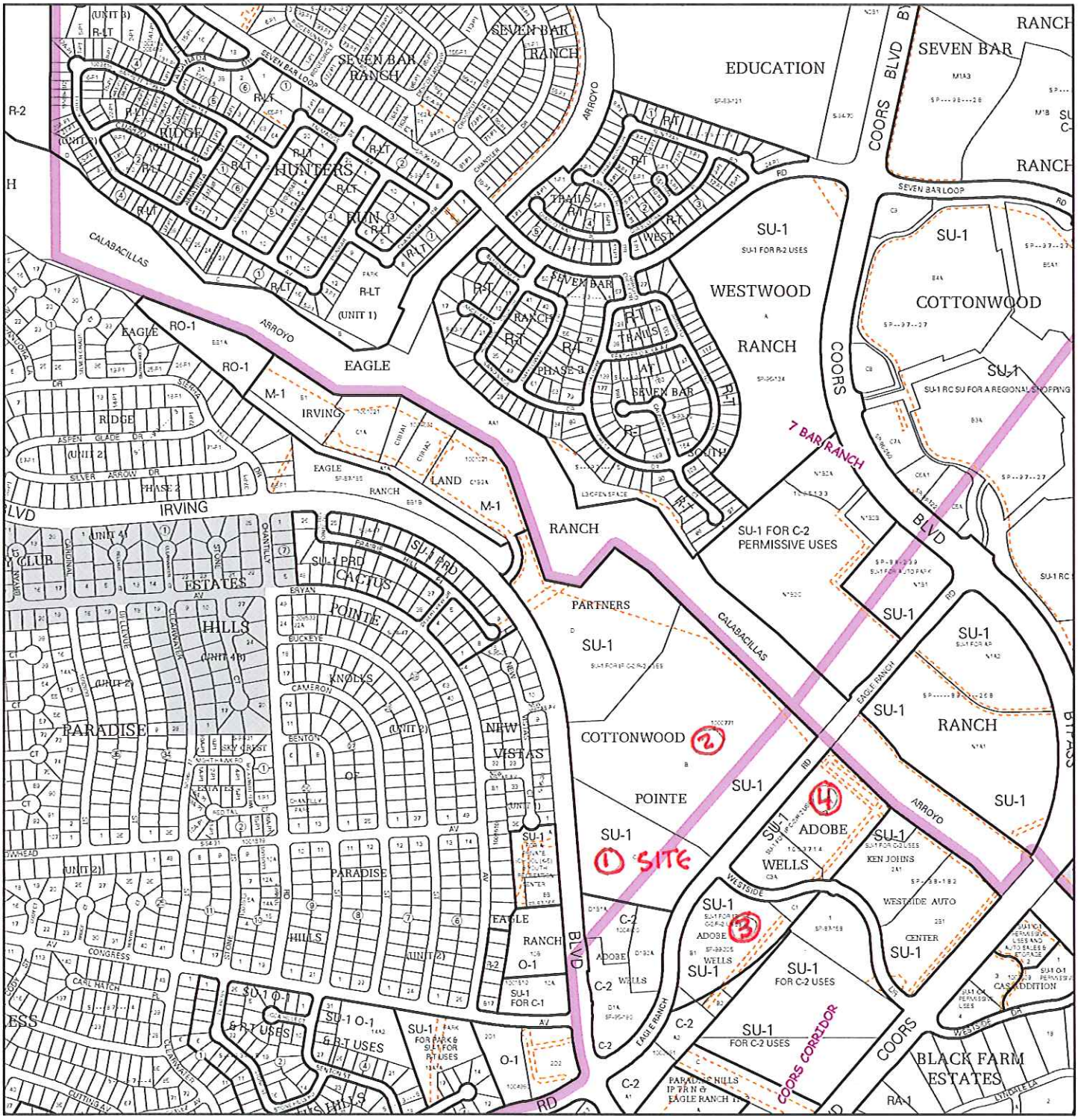
```
                    TP=0.1333 HR  MASS RAIN=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   33.410    CFS   UNIT VOLUME =   0.9990       B =   526.28      P60 = 1.8700
     AREA =     0.008462 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330


     K =  0.115917HR    TP =  0.133300HR    K/TP RATIO =  0.869594     SHAPE CONSTANT, N =  4.085527
     UNIT PEAK =   5.7268    CFS   UNIT VOLUME =   0.9980       B =   360.83      P60 = 1.8700
     AREA =     0.002116 SQ MI    IA =   0.41000 INCHES    INF =   0.99800 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.033330

PRINT HYD           ID=11  CODE=20

                                    HYDROGRAPH FROM AREA FUTURE-SITE

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         2.000       4.0         4.000       0.0         5.999       0.1
     0.667       0.0         2.666       0.3         4.666       0.1         6.666       0.0
     1.333       7.7         3.333       0.1         5.333       0.1

    RUNOFF VOLUME =     1.75988 INCHES      =       0.9929 ACRE-FEET
    PEAK DISCHARGE RATE =      28.29 CFS  AT   1.533 HOURS   BASIN AREA =  0.0106 SQ. MI.



**************************************************************
* ROUTE DEVELOPED BASIN B THROUGH DETENTION POND B           *
* THRU 12 INCH SD TO STORM MANHOLE                           *
**************************************************************
ROUTE RESERVOIR     ID=12 HYD NO=POND.B.OUT  INFLOW ID=4  CODE=10
                    OUT (CFS)   STORAGE (AC-FT)    ELEV (FT)
                    0.0           0                  84.00
                    8.07          0.00893            85.00
                    8.92          0.02397            86.00

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

    TIME      INFLOW    ELEV      VOLUME    OUTFLOW
    (HRS)     (CFS)     (FEET)    (AC-FT)   (CFS)

     0.00       0.00     84.00       0.000      0.00
     0.33       0.00     84.00       0.000      0.00
     0.67       0.00     84.00       0.000      0.00
     1.00       0.14     84.01       0.000      0.12
     1.33       1.21     84.14       0.001      1.10
     1.67       2.69     84.36       0.003      2.91
     2.00       0.65     84.08       0.001      0.68
```

```
     2.33       0.19     84.02      0.000      0.20
     2.67       0.05     84.01      0.000      0.05
     3.00       0.01     84.00      0.000      0.01
     3.33       0.01     84.00      0.000      0.01
     3.67       0.01     84.00      0.000      0.01
     4.00       0.01     84.00      0.000      0.01
     4.33       0.01     84.00      0.000      0.01
     4.67       0.01     84.00      0.000      0.01
     5.00       0.01     84.00      0.000      0.01
     5.33       0.01     84.00      0.000      0.01
     5.67       0.02     84.00      0.000      0.02
     6.00       0.02     84.00      0.000      0.02
     6.33       0.00     84.00      0.000      0.00
 PEAK DISCHARGE =        4.747 CFS - PEAK OCCURS AT HOUR    1.53
 MAXIMUM WATER SURFACE ELEVATION =       84.588
 MAXIMUM STORAGE =        0.0053 AC-FT      INCREMENTAL TIME=    0.033330HRS

PRINT HYD           ID=12 CODE=20

                                    HYDROGRAPH FROM AREA POND.B.OUT

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000      0.0          1.333      1.1          2.666      0.1          4.000      0.0          5.333      0.0
     0.667      0.0          2.000      0.7          3.333      0.0          4.666      0.0          5.999      0.0

    RUNOFF VOLUME =     1.65518 INCHES     =       0.1628 ACRE-FEET
    PEAK DISCHARGE RATE =       4.75 CFS  AT   1.533 HOURS   BASIN AREA =  0.0018 SQ. MI.



**********************************************************************
* ROUTE DEVELOPED BASIN C THROUGH DETENTION POND B                   *
* THRU 12 INCH SD TO 24" SD                                          *
**********************************************************************
ROUTE RESERVOIR     ID=13 HYD NO=POND.C.OUT  INFLOW ID=5  CODE=10
                    OUT (CFS)   STORAGE (AC-FT)    ELEV (FT)
                    0.0           0                  67.50
                    8.07          0.00181            68.00
                    8.92          0.00955            69.00

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

    TIME      INFLOW    ELEV      VOLUME    OUTFLOW
    (HRS)     (CFS)     (FEET)    (AC-FT)   (CFS)

     0.00       0.00     67.50      0.000      0.00
     0.33       0.00     67.50      0.000      0.00
     0.67       0.00     67.50      0.000      0.00
     1.00       0.18     67.51      0.000      0.18
```

```
     1.33       1.60     67.60      0.000      1.57
     1.67       3.49     67.72      0.001      3.54
     2.00       0.84     67.55      0.000      0.85
     2.33       0.25     67.52      0.000      0.25
     2.67       0.06     67.50      0.000      0.06
     3.00       0.02     67.50      0.000      0.02
     3.33       0.01     67.50      0.000      0.01
     3.67       0.01     67.50      0.000      0.01
     4.00       0.01     67.50      0.000      0.01
     4.33       0.01     67.50      0.000      0.01
     4.67       0.01     67.50      0.000      0.01
     5.00       0.02     67.50      0.000      0.02
     5.33       0.02     67.50      0.000      0.02
     5.67       0.02     67.50      0.000      0.02
     6.00       0.03     67.50      0.000      0.03
     6.33       0.00     67.50      0.000      0.00
 PEAK DISCHARGE =        6.156 CFS - PEAK OCCURS AT HOUR    1.53
 MAXIMUM WATER SURFACE ELEVATION =       67.881
 MAXIMUM STORAGE =        0.0014 AC-FT      INCREMENTAL TIME=    0.033330HRS

PRINT HYD           ID=13 CODE=20

                                      HYDROGRAPH FROM AREA POND.C.OUT

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         1.333       1.6         2.666       0.1         4.000       0.0         5.333       0.0
     0.667       0.0         2.000       0.9         3.333       0.0         4.666       0.0         5.999       0.0

    RUNOFF VOLUME =     1.68269 INCHES     =       0.2118 ACRE-FEET
    PEAK DISCHARGE RATE =       6.16 CFS  AT   1.533 HOURS   BASIN AREA =  0.0024 SQ. MI.


ADD HYD             ID=14  HYD NO=SD INLETS  ID I=10  ID II=8
PRINT HYD           ID=14  CODE=20

                                      HYDROGRAPH FROM AREA SD

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     0.000       0.0         2.000       2.3         4.000       0.0         5.999       0.1
     0.667       0.0         2.666       0.2         4.666       0.0         6.666       0.0
     1.333       4.5         3.333       0.0         5.333       0.1

    RUNOFF VOLUME =     1.80846 INCHES     =       0.5712 ACRE-FEET
    PEAK DISCHARGE RATE =      16.18 CFS  AT   1.500 HOURS   BASIN AREA =  0.0059 SQ. MI.

FINISH
    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 10:28:33
```

EXHIBITS

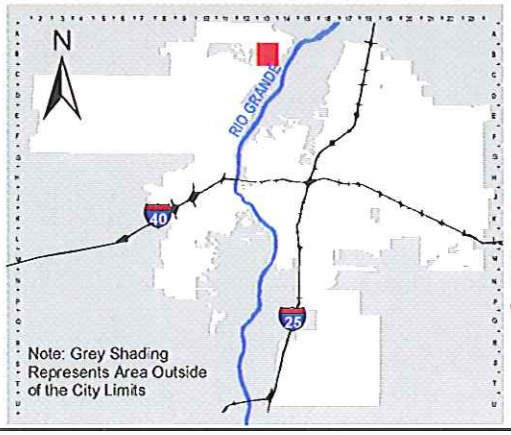
DOWNSTREAM CAPACITY EXHIBITS



For more current information and details visit: http://www.cabq.gov/gis

Albuquerque Geographic Information System

Map amended through: 4/2/2012



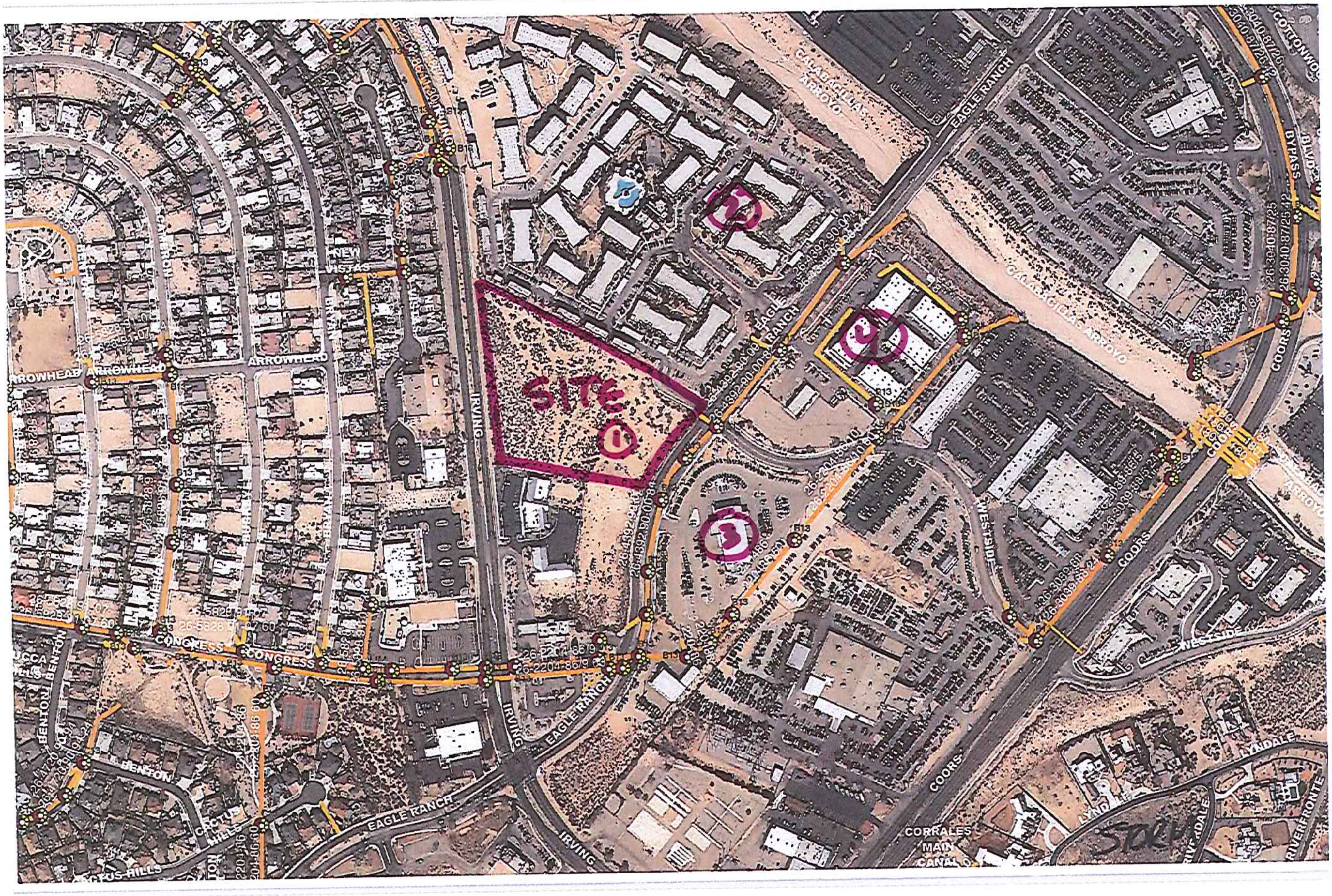
Zone Atlas Page:

B-13-Z

Selected Symbols

- SECTOR PLANS
- Design Overlay Zones
- City Historic Zones
- H-1 Buffer Zone
- Petroglyph Mon.
- Escarpment
- 2 Mile Airport Zone
- Airport Noise Contours
- Wall Overlay Zone

0 750 1,500 Feet


SITE ①
IRVING
COORS
EAGLE RANCH
WESTSIDE
CALABACILLAS ARROYO
CORRALES MAIN CANAL
ARROWHEAD
CONGRESS
BENTON
BYPASS
STORM

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

(1)

October 25, 2001

Daniel S. Aguirre, P.E.
Wilson & Company
4900 Lang Ave. NE
Albuquerque, NM 87109

Attn: John A. Tellez, E.I.

Re: Cottonwood Pointe (B-13/D002C) Rough Grading & Drainage Plan, Engineer's stamp dated 10-23-01

Dear Mr. Aguirre,

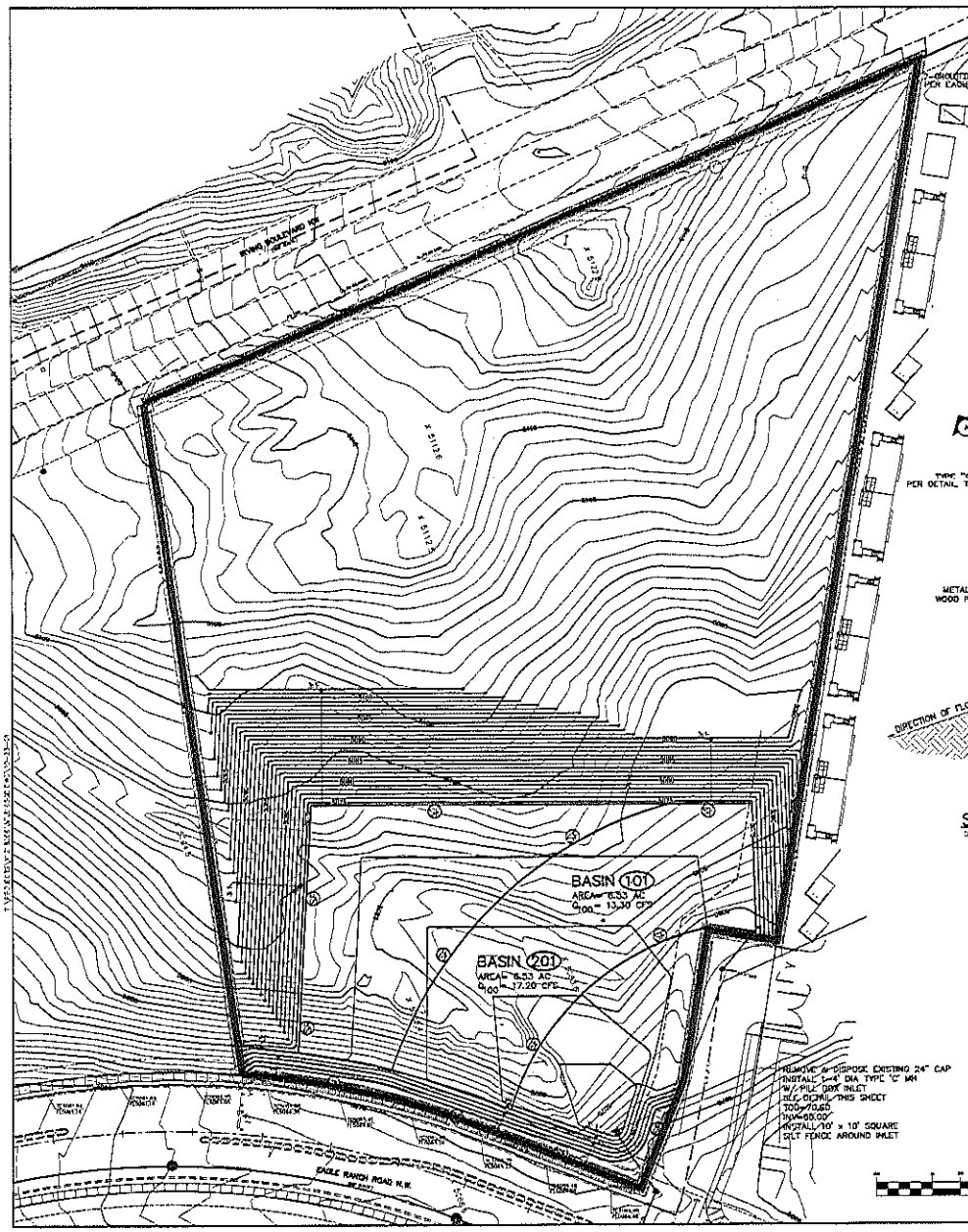
Based on the information provided in your submittal dated Oct. 24, 2001, the above-referenced project is approved for Rough Grading.

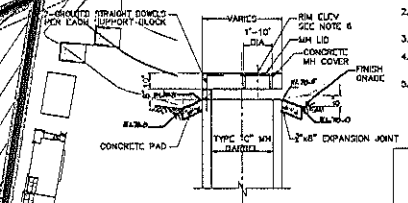
If you have any questions, please call me at 924-3988.

Sincerely,

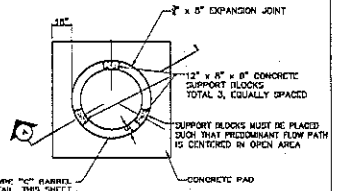
Nancy Musinski, P.E.
Hydrology/Utility Development
City of Albuquerque Public Works

xc: File





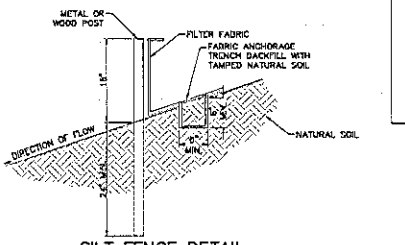
SECTION C-C



SLAB TOP INLET PLAN

PILL BOX INLET

NTS



SILT FENCE DETAIL

SCALE: 1"=1'

GENERAL NOTES

1. CONCRETE FOR PRECAST RING SEGMENTS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI @ 28 DAYS.
2. CEMENT GROUT ALL RECESS AREAS PER SECTION S 23 OF THE NMSH & TD SPECIFICATION, 1994 EDITION.
3. ALL BOLTS SHALL BE STAINLESS STEEL ASTM A325 BOLTS.
4. BOLT THREADS SHALL BE EXCLUDED FROM SHEAR PLANE CONNECTION.
5. PILL BOX INLET MH RIM IS 24" ABOVE FINISH GRADE. USE CITY OF ALBUQUERQUE MANHOLE FRAME & COVER STD DWG 2110.

COTTONWOOD POINTE

Drainage Report

Site Location: Cottonwood Pointe is located between Irving Boulevard and Eagle Ranch Rd and south of Aspen Ranch apartments. Proposed development is for regrading of the site. Future development includes construction of new apartments, parking lots, concrete walkways and landscaping.

Methodology: Section 22.2 of City of Albuquerque DPM was followed to calculate the design volume. The criteria and formulas in Parts A were followed using the 100-year frequency 6-hour rainfall as the design storm. The site is located in Zone 1 as determined from Table A-1. The total storm volume was calculated as per section A-A. The peak discharge was calculated as per section A-B.

Existing Conditions: The site consists of only one basin, Basin 101, which encompasses the entire site. Currently, the drainage from this basin sheet flows east towards Eagle Ranch Rd, which then drains into the Las Calabacillas Arroyo.

Existing volumetric runoff and peak discharge quantities are as shown below:

Table 1 - Existing Conditions

Basin	Area (ac)	A (%)	B (%)	C (%)	D (%)	V_{100} (ac-ft)	Q_p (cfs)
101	6.53	0	100	0	0	0.565	13.3
Total	6.53					0.565	13.3

Table 1 - provides a breakdown of existing volumetric runoff and peak discharge of the site.

Proposed Conditions: The proposed basin, Basin 201, remained the same as the existing basin. No grading improvements to the site resulted land treatments from existing conditions. Drainage will sheet flow towards the northeast corner of the site into Eagle Ranch Rd, via a proposed storm drain.

Proposed volumetric runoff and peak discharge quantities are as shown below:

Table 2 - Proposed Conditions

Basin	Area (ac)	A (%)	B (%)	C (%)	D (%)	V_{100} (ac-ft)	Q_p (cfs)
201	6.53	0	100	0	0	0.565	17.2
Total	6.53					0.565	17.2

Table 2 - provides a breakdown of proposed volumetric runoff and peak discharge of the site.

Due to these proposed improvements the total amount of runoff will increase by approximately .34% or 0.124 ac-ft. Peak discharge increased approximately 29% or 3.9 cfs.

Conclusion: All proposed runoff will be diverted to the northeast corner of the site into an existing 84" storm drain located in Eagle Ranch Rd, through a 24" corrugated metal stand pipe. This storm drain was designed to carry all drainage from Aspen Ranch apartments and Cottonwood Pointe.

GENERAL NOTES:

1. THE CONTRACTOR SHALL INSURE THAT NO SOIL ERODES FROM THE SITE INTO PRIVATE PROPERTY.
2. THE CONTRACTOR MUST OBTAIN A "TOP SOIL DISTURBANCE PERMIT" PRIOR TO BEGINNING EARTHWORK.
3. ALL DISTURBED AREAS SHALL BE SEEDED PER THE COA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITION.
4. THE CONTRACTOR SHALL ENSURE THAT ALL EROSION CONTROL MEASURES OUTLINED ON THIS PLAN ARE ALL PROPERLY INSTALLED AND FUNCTIONAL AT THE COMPLETION OF THE PROJECT.

LEGEND

5070	EXISTING MINOR CONTOUR
5070	EXISTING MAJOR CONTOUR
	PROPOSED INTERMEDIATE CONTOUR
5175	PROPOSED INDEX CONTOUR
	EXISTING MANHOLE
+ 5359.16	EXISTING SPOT ELEVATION
73x2	PROPOSED SPOT ELEVATION
BASIN 101	EXISTING BASIN DESIGNATION
BASIN 201	PROPOSED BASIN DESIGNATION
	PROPOSED BASIN BOUNDARY
	EXISTING BASIN BOUNDARY
	PROPOSED RETAINING WALL
	PROPOSED INLET
	EXISTING STORM DRAIN INLET
	EXISTING EASEMENT
	EXISTING ROW
	EXISTING PRUDENT LINE
	PROPOSED SILT FENCE
	EXISTING WATERLINE
	OVERHEAD POWER LINE
	EXISTING POWER POLE
	EXISTING STORM DRAIN MANHOLE
	SILT FENCE

GRAPHIC SCALE

(IN FEET)
1 inch = 40 ft

APPROVED FOR ROUGH GRADING ± 1'

COA DATE

WCCA #X1215066
OCT. 2001

SITE LOCATION

LOCATION MAP
ZONE ATLAS MAP NO. B-13

SITE LOCATION

SOILS MAP
REFERENCE: SCS BERNALILLO COUNTY SOIL SURVEY SHEET NO. 10

SITE LOCATION

FLOOD INSURANCE MAP
REFERENCE: FLOOD INSURANCE STUDY PANEL 168

LEGAL DESCRIPTION

A PORTION OF TRACT E AND ALL OF TRACTS F AND G SITUATED IN THE TOWN OF ALAMEDA GRANT WITHIN PROJECTED SECTION 7, TOWNSHIP 11 NORTH, RANGE 3 EAST, NEW MEXICO PRINCIPAL MERIDIAN, BERNALILLO COUNTY, NEW MEXICO; MORE SPECIFICALLY SHOWN AND DESIGNATED ON THE PLAT ENTITLED "SUBDIVISION PLAT MAP FOR ADOBE WELLS TAPROWDOM", FILED FOR RECORD IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, NEW MEXICO, ON OCTOBER 30, 1987, IN VOLUME C39, FOLIO 7.

BENCH MARK

STATION MARK IS A STANDARD ACS BRASS TABLET STAMPED "2-B13", "BT" IN THE TOP ON A CONCRETE POST 0.2' INTOW THE GROUND. STATION IS LOCATED 8.5 MILES NW OF DOWNTOWN ALBUQUERQUE 0.29907705, DELTA ALPHA =-0014'25" ELEV.=5105.204 (SLD 1929)

OCT 24 2001

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING GROUP

PRELIMINARY SUBMISSION

COTTONWOOD POINTE
ROUGH GRADING & DRAINAGE PLAN

Design Review Committee	City Engineer Approval	Date Issued

City Project No.	Zone Map No.	Sheet	Of
XXXX.XX	B-13	1	1

CITY OF ALBUQUERQUE

(2)

December 27, 2011

Scott M. McGee, P.E.
9700 Tanoan Dr NE
Albuquerque, NM 87111

Re: Aspen Ranch Apartments Ph 2 Grading and Drainage Plan
Engineer's Stamp dated 11-22-11 (B13/D002B)

Dear Mr. McGee,

Based upon the information provided in your submittal received 11-23-11, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Curtis A. Cherne, P.E.
Principal Engineer, Planning Dept.
Development and Building Services

C: e-mail

PO Box 1293
Albuquerque
NM 87103
www.cabq.gov

(3)

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 6, 2004

Ronald Bohannan, P.E.
Tierra West, LLC
8509 Jefferson NE
Albuquerque, NM 87113

Re: KIA Auto Dealership, SE corner of Eagle Ranch Rd. and Westside Blvd., Grading and Drainage Report

Engineer's Stamp dated 1-29-04 (B13/D2D)

Dear Mr. Bohannan,

Based upon the information provided in your submittal received 1-30-04, the above referenced plan is approved for Building Permit. However, please note that a work order will be required for the proposed inlets. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology. Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. If you have any questions regarding this permit please feel free to call the DMD Storm Drainage Design section at 768-3654 (Charles Caruso) or 768-3645 (Bryan Wolfe).

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro
Engineering Associate, Planning Dept.
Development and Building Services

C: Charles Caruso, DMD Storm Drainage Design
File

DRAINAGE REPORT

For

West Side Kia Dealership
Adobe Wells Subdivision

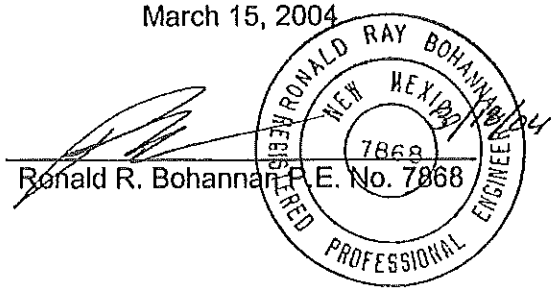
Prepared by

Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

Prepared for

Skye Inc.
3515 Seabreeze Lane
Corona Del Mar, Ca 92625

March 15, 2004



Ronald R. Bohannan, P.E. No. 7868

TABLE OF CONTENTS

LOCATION:

The 6-acre site is located in the southeast corner of the intersection of Eagle Ranch Road NW and Westside Drive, just west of Coors Boulevard. The site is bordered on the south by the undeveloped property and by existing car lots to the east. The purpose of this report is to provide the drainage analysis and management plan for the commercial site to include the proposed Kia dealership for site plan for subdivision and site plan for building permit in the central portion of the site.

DRAINAGE BASINS DESIGNATIONS:

For the purpose of this report, the existing and developed drainage basins were designated as follows.

Existing Undeveloped Basins:

Basin A-B	Entire site consisting of Tract B1.

Developed Conditions:

Basins A–B	Developed parcels with on-site connections to existing underground storm drain

EXISTING DRAINAGE CONDITIONS:

The site is currently undeveloped with the exception of a previously constructed storm drain and waterline that transverse the site from south to north along the east property line. This primarily undeveloped site accepts no upland flows. All upland flows were intercepted by the construction of the storm drain located in Eagle Ranch Road. Upland flows from the north are intercepted by Westside Boulevard and conveyed to an existing storm sewer at its intersection with Coors Boulevard. The onsite runoff primarily drains from west to east to existing drop inlets that connect to an existing 60" storm drain that eventually outfalls to the Calabacillas Arroyo.

During the construction of the Eagle Ranch Road, the flows that previously entered the 60" storm drain were rerouted to the new storm sewer constructed in the new roadway. The 60" storm drain located within the proposed Kia site was connected to the new storm sewer and is intended to act as an overflow only. The calculated undeveloped runoff from this site for a 100-year, 6-hour storm event under existing conditions is 7.77 cfs.

FIRM MAP AND SOIL CONDITIONS:

The site is located on FIRM Map 35001C0108 D, Panel Number 108, as shown on the attached excerpts. The map shows that the site does not lie within a 100-year flood plain.

The site contains a soil type designated as Bluepoint Series by the Soil Conservation Service Soil Survey of Bernalillo County. The Bluepoint series consists of deep, somewhat excessively drained soils formed in sandy alluvium and eolian sediments on alluvial fans and terraces. Slopes range from one to fifteen percent. Permeability is rapid. Runoff is slow and the hazard of blowing is severe.

ONSITE DRAINAGE MANAGEMENT PLAN:

The on-site developed basins A and B are shown on exhibit B. The basins will surface flow to individual drop inlets that are connected to an existing on site underground storm drain system. The project is planned to be constructed in two phases and although the drop inlets are in the Phase II area, they will be constructed with Phase I. Water quality inlets will be use for this site as shown on the grading and drainage plans. The storm drain system conveys the flows north to the Calabacillas Arroyo. The total peak discharge from the site for a 100-year, 6-hour storm is 24.5 cfs. The flows upland of the existing section of storm drain that traverses the proposed Kia site were previously rerouted into the new storm drain constructed in Eagle Ranch Road. The existing 60" storm drain was

not abandoned and is intended to act as an overflow for the new Eagle Ranch Road storm sewer. There is ample capacity in the older storm sewer to convey the flows form the proposed Kia development to the Calabacillas Arroyo.

Due to the relatively minor grade differences between this site and the existing adjacent property to the east, a retaining wall is required along a portion of the east property line. The retaining wall will be constructed as part of Phase II of this site. In the interim, an earthen berm will be constructed in Phase I to prevent cross lot drainage by directing the flows from the site to the proposed drop inlets that will also be constructed in Phase I. Runoff in excess of the 100-year, 6-hour design storm will overflow to the east in the vicinity of the proposed retaining wall.

CRITERIA:

The site was analyzed using the procedures outlined in the Development Process Manual Volume 2, Chapter 22. The Weighted-E method was used in estimating volumes and flow rates of runoff from on-site basins. The existing and developed conditions for on site basins were analyzed for a 100-year, 6-hour rainfall event.

SUMMARY:

The proposed development will surface flow to individual drop inlets that are connected to an existing on site underground storm drain system. The storm drain system conveys the flows north to the Calabacillas Arroyo. The total peak discharge from the site for a 100-year, 6-hour storm is 24.5 cfs. Eagle Ranch Road and West Side Boulevard intercept all upland flows. No upland flows enter the site.

CITY OF ALBUQUERQUE

(4)

March 16, 2007

Ronald Ray Bohannan, P.E.
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, NM 87109

Re: Venture Commerce Center Grading and Drainage Plan
Engineer's Stamp dated 3-15-07 (B13/D2E)

Dear Mr. Bohannan,

Based upon the information provided in your submittal received 3-2-07, the above referenced plan is approved for Building Permit and SO19 Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

A separate permit is required for construction within City R/W. A copy of this approval letter must be on hand when applying for the excavation permit.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit.

Also, prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

If you have any questions, you can contact me at 924-3695.

Sincerely,

Curtis A. Cherne, E.I.
Engineering Associate, Planning Dept.
Development and Building Services

3/19/07 C: file
MYLAR Sertil Kanbar, DMD
Antoinette Baldonado, Excavation and Barricading
Dwayne Schmitz, Street/Storm Drain Maintenance

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

DRAINAGE REPORT

for

Venture Commerce Center
Northeast Corner of Eagle Ranch/Westside Drive
Albuquerque, New Mexico

Prepared by

Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

Prepared for

Venture Corporation
125 Sir Francis Drake Blvd. - Third Floor
Larkspur, CA 94939

November 2006

RONALD RAY BOMANNAN REGISTERED PROFESSIONAL ENGINEER NEW MEXICO 7868

Ronald R. Bomannan P.E. No. 7868

RECEIVED
NOV 16 2006
HYDROLOGY SECTION

TABLE OF CONTENTS

Location

The site is located at the northeast corner of Westside Drive and Eagle Ranch Road. The site contains approximately 7.5 acres and is currently undeveloped (see attached Zone Atlas Map B-13). The property will be subdivided into two lots, with only the northerly 5 acres being developed at this time. The purpose of this report is to provide the drainage analysis and management plan for the project.

Existing Drainage Conditions

The site is currently undeveloped. No offsite runoff enters the site. The Calabacillas Arroyo is located to the north of the site and cuts off flows from that direction. Eagle Ranch Road and Westside Drive are located west and south of the site and prevent any offsite drainage from entering the site from those directions. The property to the east is developed as a car dealership and no water leaves the site.

FIRM Map

The site is located on FIRM Map 35001C0108E as shown on the attached excerpt. The map shows that the site does not lie within any 100-year flood plains. The Calabacillas Arroyo is located north of the site. The project is far enough to the west from the Arroyo to be outside the floodplain and prudent line limits.

Due to recent erosion problems in the Calabacillas Arroyo, AMAFCA is working with their consultant for a design for slope stabilization. This project will either enter into a funding agreement with AMAFCA for a portion of the cost of the proposed improvements, or construct improvements adjacent to the site. At this time, AMAFCA's design is not complete, and no decisions can be made.

On-Site Drainage Management Plan

The proposed drainage management plan is to collect the developed flows into two new on-site storm drain systems that outfall to the existing 60" storm drain on the east side of the site. The site is divided into eight (8) basins. Basins 1, 4, and 8 will drain to a new storm drain on the south side of the site. Basin 8 consists of the currently undeveloped tract to the south and has a developed flow of 8.56 cfs. This basin currently drains northeast towards the new project and an interim detention pond will capture the undeveloped flows until the basin is developed. A new 18" storm drain stub and catch basin will capture the undeveloped flows and convey them to the new south storm drain system. The 18" storm drain has capacity for the developed flow of 8.56 cfs from this site. The new southern storm drain system will drain a total of 17.16 cfs to the existing 60" storm drain. A new storm drain was constructed in Eagle Ranch Road as part of an SAD and the existing 60" is intended to act as an overflow for the new Eagle Ranch storm sewer. There is ample capacity in the older storm drain to convey the flows from this site and the flows from the upstream Kia Dealership.

Basins 2, 3, 5, and 6 will drain a total flow of 10.29 to the second new storm drain system located on the north side of the site. This new storm drain also outfalls to the existing 60" storm drain on the east side of the property. Basin 7 consists of the landscape area located north of the parking lot adjacent to the Calabacillas Arroyo. This basin has an undeveloped flow of 1.06 cfs and will continue the current drainage pattern of sheet flowing into the Calabacillas Arroyo. Water quality inlets are located at the end of both new storm drains before any flows from the site enter the existing 60" storm drain.

In the case of an emergency or storm greater than the 100-year event, the site will overflow out the entrances or to the Calabacillas Arroyo before any water enters the buildings.

Calculations

The Weighted E method from the "City of Albuquerque Development Process Manual Volume 11 – Design Criteria, 1997 Revision" was used to calculate the runoff and volume for the site.

Summary

The site generates a total developed flow of 28.51 cfs. Two new on-site storm drain systems will drain 27.45 cfs to the existing 60" storm drain located on the east side of the site. Basin 7 will continue the current drainage pattern and discharge 1.06 cfs directly to the Calabacillas Arroyo. Basin 8 is undeveloped at this time, but the new storm drain system has been designed to accept the future developed flow of 8.56 cfs.