

CITY OF ALBUQUERQUE



September 20, 2005

John M. MacKenzie, PE.
Mark Goodwin & Associates, PA.
PO Box 90606
Albuquerque, NM 87199

**Re: Anasazi Ridge Subdivision, Grading and Drainage Plan
Engineer's Stamp dated 9-15-05 (A10-D2)**

Dear Mr. MacKenzie,

P.O. Box 1293

Based upon the information provided in your submittal dated 9-15-05, the above referenced plan is approved as Amended for Preliminary Plat Action by the DRB. Once the Board approves the plan please submit a Mylar copy for my signature in order to obtain a Rough Grading Permit.

Albuquerque

Prior to Final Plat or Work Order, the Musseter report detailing all improvements to the Calabacillas Arroyo must be finalized and any revisions to this grading plan must be coordinated and re-examined.

New Mexico 87103

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).

www.cabq.gov

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

7595 01
02

Sincerely,

Rudy E. Rael Associate Engineer
Planning Department.
Development and Building Services
RB

C: Chuck Carusso DMD
C: Lynn Mazur, AMAFCA
CC: file

DRAINAGE REPORT
for
Anasazi Ridge Subdivision

Prepared for

*Tiffany Homes SW
P.O. Box 2010
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(505) 898-6338*

Prepared by

*Mark Goodwin & Associates, PA
P.O. Box 90606
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November 2004



I. PROJECT DESCRIPTION

This report has been prepared in support of a proposed 42.16 acre single family residential development to be located on Albuquerque's west side. Specifically, the site is bounded on the north and east by the Calabacillas Arroyo, on the south by the future McMahon Boulevard right-of-way, and on the west by the currently platted Universe Boulevard right-of-way which is currently encumbered by a utility and drainage easement. City officials have indicated that long range street plans call for Universe Boulevard swinging further to the west adjacent to this site upon development of the roadway (Plate 1 - Vicinity Map).

II. DRAINAGE DESIGN CRITERIA AND RELATED STUDIES

The design criteria used in this report was in accordance with Section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, January 1993 Edition. The 100-year, 6-hour storm event, was analyzed to determine street capacities using $P(1hr) = 1.87"$, $P(6hr) = 2.20"$, and $P(24hr) = 2.66"$. The onsite Land Treatment values used for the developed state were Treatment B = 42 and Treatment D = 58. AHYMO printouts are provided within Appendix A.

III. EXISTING TOPOGRAPHY

North Side of McMahon Blvd.: *Portions of this site are currently encumbered by 100-year and 500-year flood plains. This site currently falls from the southwest to the northeast at slopes ranging from 2% to over 25% along the banks of the natural arroyo. Storm flows from this site discharge, at various locations, into the Calabacillas Arroyo.*

South Side of McMahon Blvd.: *The existing topography on this approximate 6.2 acre site shows the site primarily falling from west to east, with a ridge line splitting the flows, allowing portions to discharge to the northeast, and portions to the southeast. An existing retaining wall along the western edge of the Seville, Unit 7 subdivision intercepts portions of the existing flows generated from this site. Once encountering the wall, flows are routed to the north to the future McMahon Blvd. right-of-way. None of this site is encumbered by a floodplain.*

IV. OFFSITE RUNOFF

North Side of McMahon Blvd.: *Plate 2 - Off-site Drainage Basin Map shows that the only off-site flows that would impact this site originate from the west. Off-site flows from basins OS-1 = 11.96 cfs and OS-2 = 38.93 cfs, are currently intercepted by a graded bar-ditch constructed along the western edge of an existing gravel road that provides access to the PNM substation located near the northwest. In addition, flow from off-site basin OS-3 are intercepted and routed through a detention facility built in conjunction with the substation site.*

With the existing diversions defined above, all storm runoff from the west of the proposed Anasazi Ridge site is routed to the north and enters the Calabacillas Arroyo upstream of this site. With that, there are no off-site storm waters impacting the Anasazi Ridge site.

South Side of McMahon Blvd.: *Given that this site is naturally higher than the neighboring terrain, very little off-site flows impact this site. Minor flows sheet flow onto the site from the west, and immediately exit the site to the south.*

V. DEVELOPED DRAINAGE CONDITIONS

North Side of McMahon Blvd. (Developed Units 1 & 2): As depicted on the proposed Anasazi Ridge Grading & Drainage plan included in Plate 1, in the developed state storm waters will be routed via on-site streets to storm drain collection points located throughout the eastern lower half of the subdivision (please refer to street and storm drain calculations). A low point in both the storm drain system and the street system has been established at the intersection of Ancients Road NW & Kayenta Avenue NW. Any storm waters not previously intercepted by drop inlets will be collected at this location. Calculations show that a total of 148 cfs (100-year, 6-hour storm) will be collected in the on-site storm drain system. The collected developed storm flows will outfall into the adjacent Calabacillas Arroyo within the hard-lined channel section proposed with the McMahon Blvd. Crossing Structure (plans still being finalized by City's design engineer).

South Side of McMahon Blvd. (Developed Unit 3): The enclosed Unit 3 Grading & Drainage plan shows developed flows surface discharging to two separate exit points. The estimated 9.05 cfs of developed flows generated from developed sub-basin DB-1 is intercepted by Calle Vizcaya NW, and routed to the east. Existing Type 'A' drop inlets within the Seville, Unit 7 subdivision were designed to accept these off-site flows from further west in Calle Vizcaya. Included street capacity calculations show that there is sufficient capacity in the existing section of Calle Vizcaya to convey these additional flows to the drop inlets.

Flows from developed sub-basin DB-2 ($Q = 9.82$ cfs) are shown surface discharging to Sipapu Drive. The flows will be carried south in the street to a proposed 10' concrete rundown, which will deliver the flows to the McMahon Boulevard right-of-way via an opening in the proposed new curb. Once in McMahon, the flows will be routed to the east to the new crossing structure, proposed by the City of Albuquerque, over the Calabacillas Arroyo. Included within the project infrastructure list will be a section of temporary asphalt, with temporary asphalt curb, along the north side of McMahon Blvd., between this site, and the proposed permanent section further to the east.

VI. PROJECT PHASING

Upon receiving approval of the Grading & Drainage submittal, and upon approval of the arroyo narrowing studies, plans call for the grading of the entire Anasazi Ridge site. Infrastructure improvements will be constructed in two separate phases. Unit 1, totaling 91 lots, includes the southwestern portion of the site. All of Unit 1 is outside the flood plain encumbered areas. The 24 lots comprising Unit 3, south of McMahon Blvd., will likely also be fully developed within the first phase, given that it too is outside the floodplain encumbered area. Further development within the area defined as Unit 2 will not occur until a CLOMR is approved by FEMA.

As seen on the Grading & Drainage Plan, there are no storm drain improvements required within the Unit 1 designated area. Interim, adequately sized, detention basins will be constructed at the bottom of all streets to collect developed storm flows from Unit 1. Rip-rap lined emergency spillways are proposed within each temporary basin. Any storm flows discharging from the ponds will be routed within the downstream graded streets to the aforementioned low point. With the eventual development of Unit 2, the remaining infrastructure will be completed, which includes the necessary storm drain improvements identified on the Grading & Drainage Plan.

VII. CONCLUSION

With the significant analysis being done, and with the sequencing of construction as presented, the development of the Anasazi Ridge Subdivision will have no adverse impacts upstream or downstream of the site.



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Consulting Engineers

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e-mail: dmgs@swcp.com

PROJECT Anasazi Ridge
SUBJECT Developed Basins
BY JSD DATE 11-11-04
CHECKED _____ DATE _____
SHEET _____ OF _____

STORM FLOWS FROM DEVELOPED SUB-BASINS

FROM EARLIER CALCS:

$$D'/LOT = 3200 SF = 0.0735 AC$$

$$ROADS = 20\% 'B' + 80\% 'D'$$

DB-1:

$$AREA = 10.00 AC \quad \#LOTS = 63 \quad ROW = 1.43 AC$$

TREATMENT TOTALS:

$$D: \overset{LOTS}{(63 \times 0.0735 AC)} + \overset{ROADS}{(0.80 \times 1.43 AC)} = 5.77 AC = 57.8\%$$

$$B: 10.00 - 5.77 = 4.23 AC = 42.3\%$$

$$FROM AHYMO, Q = 34.96 cfs$$

DB-2:

$$AREA = 9.11 AC \quad \#LOTS = 59 \quad ROW = 2.00 AC$$

TREATMENT TOTALS:

$$D: (59 \times 0.0735 AC) + (0.80 \times 2.00 AC) = 5.94 AC = 65\%$$

$$B: 9.11 - 5.94 = 3.17 AC = 35\%$$

$$FROM AHYMO, Q = 32.25 cfs$$

DB-3:

$$AREA = 8.36 AC \quad \#LOTS = 43 \quad ROW = 1.80 AC$$

TREATMENT TOTALS:

$$D: (43 \times 0.0735 AC) + (0.80 \times 1.80 AC) = 4.60 AC = 55\%$$

$$B: 8.36 - 4.60 = 3.76 AC = 45\%$$

$$FROM AHYMO, Q = 27.78 cfs$$

DB-4:

$$AREA = 8.00 AC \quad \#LOTS = 46 \quad ROW = 1.83 AC$$

TREATMENT TOTALS:

$$D: (46 \times 0.0735 AC) + (0.80 \times 1.83 AC) = 4.85 AC = 61\%$$

$$B: 8.00 - 4.85 = 3.15 AC = 39\%$$

$$FROM AHYMO, Q = 27.64 cfs$$



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PROJECT _____
SUBJECT _____
BY _____ DATE _____
CHECKED _____ DATE _____
SHEET _____ OF _____

DB-5:

AREA = 5.75 AC #LOTS = 31 ROW = 1.89 AC

TREATMENT TOTALS:

D: $(31 \times .0735 \text{ AC}) + (.80 \times 1.89 \text{ AC}) = 3.79 \text{ AC} = 66\%$

B: $5.75 - 3.79 = 1.96 \text{ AC} = 34\%$

FROM AHYMO, $Q = 20.58 \text{ cfs}$

DB-6:

AREA = 1.40 AC #LOTS = 0 ROW = 1.40 AC

TREATMENT TOTALS:

D: $(0 \times .0735 \text{ AC}) + (.80 \times 1.40 \text{ AC}) = 1.12 \text{ AC} = 80\%$

B: $20\% \times 1.40 = 0.28 \text{ AC} = 43\%$

FROM AHYMO, $Q = 5.51 \text{ cfs}$

$\therefore$ Total developed $Q = 148.08 \text{ cfs}$

20.58 cfs + 5.51 cfs = 26.09 cfs
26.09 cfs + 121.99 cfs = 148.08 cfs
148.08 cfs + 0 cfs = 148.08 cfs



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PROJECT Anasazi Ridge
SUBJECT Street Cols.
BY JSD DATE 11-11-04
CHECKED _____ DATE _____
SHEET 1 OF 4

BASKETWEAVER AVE

1. West of Atlatl Dr.

$$Q \text{ in st.} = 29 \text{ lots} \times .55 \text{ cfs/lot} = 15.95 \text{ cfs}$$

28' F-F, S = 2.07%

Roll Curb

$$\text{Try } d = 0.28', A = 4.485F, R = .157, n = .017$$

$$V = 1.49 (.157)^{1/4} (.02)^{5/8} / .017 = 3.59 \text{ fps}$$

$$Q = VA = (3.59)(4.48) = 16.06 \text{ cfs}$$

$$d + V^2/2g = .28 + (3.59)^2/64.4 = .48'$$

$$.48' < .53' \text{ OK}$$

$\therefore$ Roll curb on Basketweaver west of Atlatl.

2. East of Jacol St.

$$Q \text{ in st.} = 69 \text{ lots} \times .55 \text{ cfs/lot} = 34.65 \text{ cfs}$$

28' F-F, S = 2.54%

8" V.C.

$$+ \text{ Try } d = .50', A = 10.08, R = .348, n = .017$$

$$V = 6.89 \text{ fps } d = 1.247.85 \text{ NO}$$

$$Q = 69.42$$

$$+ \text{ Try } d = .44, A = 8.45F, R = .291$$

$$V = 6.11 \text{ fps}, Q = 51.31 \text{ fps}, d + V^2/2g = 1.027.85 \text{ No}$$

$$+ \text{ Try } d = .38, A = 6.725F, R = .234$$

$$V = 5.28, Q = 35.47, d + V^2/2g = .81 < .85 \text{ OK}$$

$\therefore$ w/ design $Q = 34.65$, vert. curb from Atlatl east to end will work.



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PROJECT Anasazi Ridge
SUBJECT Street Hydraulics
BY JSD DATE 11-11-04
CHECKED _____ DATE _____
SHEET 2 OF 4

DESERT SPIRIT ROAD

1. West of Atloti Dr.

$$Q \text{ in st.} = 32 \text{ lots} \times .55 \text{ cfs/lot} = 17.5 \text{ cfs}$$
$$32' \text{ F-F}, S = 3.01\%$$

Roll Curb

$$\bullet \text{ Try } d = .33', A = 5.445 \text{ ft}, R = .167, n = .017$$

$$V = 4.58 \text{ fps}, Q = 24.9 \text{ cfs}, d + V^2/2g = .667.53 \text{ NO}$$

$$\bullet \text{ Try } d = .28', A = 3.925 \text{ ft}, R = .137, n = .017$$

$$V = 4.01 \text{ fps}, Q = 15.74 \text{ cfs}, d + V^2/2g = .537.53 \text{ fps}$$

$\therefore$ Roll Curb to Atloti & vert remainder east.

2. Check east end of Desert Spirit

$$Q \text{ in st.} = 59 \text{ lots} \times .55 \text{ cfs/lot} = 32.45 \text{ cfs}$$
$$32' \text{ F-F}, S = 1.25\%$$

Vertical Curb

$$d = .45', A = 9.285 \text{ ft}, R = .282$$

$$V = 4.20 \text{ fps}, Q = 38.94 \text{ cfs}, d + V^2/2g = .72 < .85 \text{ OK}$$

$\therefore$ Vert. Curb works to drop inlets at
Anasazi Ridge returns.



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PROJECT Anasazi Ridge
SUBJECT Street Calks
BY JSD DATE 11-11-04
CHECKED _____ DATE _____
SHEET 3 OF 4

ANCIENTS ROAD

1. West of Atlott Dr.

Q in 5 $\pm$ = 16 cfs, 32' F-F, $S = 3.12\%$, $n = .017$

Roll Curb

Try $d = .28'$, $A = 3.925f$, $R = .137$.

$V = 4.09$ fps, $Q = 16$ cfs, $d + V^2/2g = .53 \leq .53$ OK

$\therefore$ Roll curb west of Atlott works.

2. East of Cliff Dwellers Road Intersection. Four inlets upstream will intercept 40 cfs, leaving only 15.42 cfs in 5 $\pm$.

$Q = 15.42$ cfs, 32' F-F, $S = 0.60\%$, $n = .017$

Vert. Curb

Try $d = .40'$, $A = 7.685f$, $R = .234$

$V = 2.57$ fps, $Q = 19.70$ cfs, $d + V^2/2g = .50 < .85$ OK

$\therefore$ Vert. curb. from Atlott east to Anasazi



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PROJECT Anasazi Ridge
SUBJECT Street Cuts
BY TSD DATE 11-11-04
CHECKED _____ DATE _____
SHEET 4 OF 4

CLIFF DWELLERS ROAD

1. Look at lower portion, east of Cliff House Dr.

$Q = 27.64 \text{ cfs (worst case)}$, $28' \text{ F-F}$, $S = 0.72\%$

• Vert. Curb

try $d = .50'$, $A = 10.08 \text{ SF}$, $R = .348$, $n = .017$

$V = 3.67 \text{ fps}$, $Q = 37 \text{ cfs}$, $d + V^2/2g = .71 < .85$
OK

∴ Vertical curb from Cliff House east to drop inlets at Ancients Rd. intersection will work.

ANASAZI RIDGE AVE

1. Since road borders arroyo, and is main entrance into subdivision, vert. curb will be used throughout.