

# CITY OF ALBUQUERQUE



Richard J. Berry, Mayor

March 31, 2017

David Soule, P.E.  
Rio Grande Engineering  
P.O. Box 93924  
Albuquerque, NM, 87199

**RE: 5209 Montano Plaza NE**  
**Grading Plan**  
**Stamp Date: 3/8/17**  
**Hydrology File: E11D005**

Dear Mr. Soule:

Based upon the information provided in your submittal received 3/10/2017, the Grading Plan and Drainage Report is approved for Building Permit and Grading Permit.

Please attach a copy of this approved plan in the construction sets for Building Permit processing. Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

If you have any questions, please contact me at 924-3995 or [rbrissette@cabq.gov](mailto:rbrissette@cabq.gov).

Sincerely,

*Renee C. Brissette*

Reneé C. Brissette, P.E.  
Senior Engineer, Hydrology  
Planning Department



# City of Albuquerque

Planning Department

Development & Building Services Division

## DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

**Project Title:** \_\_\_\_\_ **Building Permit #:** \_\_\_\_\_ **City Drainage #:** \_\_\_\_\_

**DRB#:** \_\_\_\_\_ **EPC#:** \_\_\_\_\_ **Work Order#:** \_\_\_\_\_

**Legal Description:** \_\_\_\_\_

**City Address:** \_\_\_\_\_

**Engineering Firm:** \_\_\_\_\_ **Contact:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone#:** \_\_\_\_\_ **Fax#:** \_\_\_\_\_ **E-mail:** \_\_\_\_\_

**Owner:** \_\_\_\_\_ **Contact:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone#:** \_\_\_\_\_ **Fax#:** \_\_\_\_\_ **E-mail:** \_\_\_\_\_

**Architect:** \_\_\_\_\_ **Contact:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone#:** \_\_\_\_\_ **Fax#:** \_\_\_\_\_ **E-mail:** \_\_\_\_\_

**Other Contact:** \_\_\_\_\_ **Contact:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone#:** \_\_\_\_\_ **Fax#:** \_\_\_\_\_ **E-mail:** \_\_\_\_\_

Check all that Apply:

**DEPARTMENT:**

- ☐ HYDROLOGY/ DRAINAGE  
☐ TRAFFIC/ TRANSPORTATION  
☐ MS4/ EROSION & SEDIMENT CONTROL

**TYPE OF SUBMITTAL:**

- ☐ ENGINEER/ ARCHITECT CERTIFICATION  
  
☐ CONCEPTUAL G & D PLAN  
☐ GRADING PLAN  
☐ DRAINAGE MASTER PLAN  
☐ DRAINAGE REPORT  
☐ CLOMR/LOMR  
  
☐ TRAFFIC CIRCULATION LAYOUT (TCL)  
☐ TRAFFIC IMPACT STUDY (TIS)  
☐ EROSION & SEDIMENT CONTROL PLAN (ESC)  
  
☐ OTHER (SPECIFY) \_\_\_\_\_

**CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:**

- ☐ BUILDING PERMIT APPROVAL  
☐ CERTIFICATE OF OCCUPANCY  
  
☐ PRELIMINARY PLAT APPROVAL  
☐ SITE PLAN FOR SUB'D APPROVAL  
☐ SITE PLAN FOR BLDG. PERMIT APPROVAL  
☐ FINAL PLAT APPROVAL  
☐ SIA/ RELEASE OF FINANCIAL GUARANTEE  
☐ FOUNDATION PERMIT APPROVAL  
☐ GRADING PERMIT APPROVAL  
☐ SO-19 APPROVAL  
☐ PAVING PERMIT APPROVAL  
☐ GRADING/ PAD CERTIFICATION  
☐ WORK ORDER APPROVAL  
☐ CLOMR/LOMR  
  
☐ PRE-DESIGN MEETING  
☐ OTHER (SPECIFY) \_\_\_\_\_

IS THIS A RESUBMITTAL?: ☐ Yes ☐ No

DATE SUBMITTED: \_\_\_\_\_ By: DAVID SOULE

COA STAFF: \_\_\_\_\_ ELECTRONIC SUBMITTAL RECEIVED: \_\_\_\_\_

DRAINAGE REPORT

For

**5209 Montano Plaza NW**  
**Albuquerque, New Mexico**

Prepared by

Rio Grande Engineering  
PO Box 93924  
Albuquerque, New Mexico 87199

March 2017



David Soule P.E. No. 14522

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Site Hydrology ..... A

Hydraulic Model..... B

**Map**

Site Grading and Drainage Plan

**PURPOSE**

The purpose of this report is to provide the Drainage Management Plan for the development of a 0.38 acre residential building located at 5209 Montano Plaza. This plan was prepared in accordance with the City of Albuquerque design regulations, utilizing the City of Albuquerque’s Development Process Manual drainage guidelines. This report will demonstrate that the grading does not adversely affect the surrounding properties, nor the upstream or downstream facilities.

**INTRODUCTION**

The subject of this report, as shown on the Exhibit A, is a 1.6-acre parcel of land located at the south west terminus of Montano Plaza Court Northeast. The legal description of this site is lot 3 Montano Vista. As shown on FIRM map35013C0114H, the entire site is located within Flood Zone X. The site does appear to have been graded in the past when the overall development was developed. The site contains native grasses and hard packed paths. Several retaining walls exist on the site. Due to a restrictive height restriction, the finished floor is lower than it would typically be. The site is impacted by upland flows from the adjacent residential structures. The site is surrounded by fully developed sites on all sides with retaining walls. The site currently free discharges as sheet flow to the adjacent roadway. The development of the site will require the site to discharge at a rate equal to or less than the existing conditions and retain the first flush water quality volume onsite.

**EXISTING CONDITIONS**

The site is currently undeveloped and impacted by upland flows. The adjacent sites to the west discharges 1.58 cfs that enters as sheet flow. The site is located in flood zone x. The site currently generates 0.73 cfs and discharges a combined peak flow rate of 2.31 cfs as sheet flow to the Montano Plaza roadway. The site has a severe height restriction placed upon the construction. All downstream improvements are in place and maintained by the city of Albuquerque.



VICINITY MAP:

B-14-Z



FIRM MAP:

FM35001C0114H

## **PROPOSED CONDITIONS**

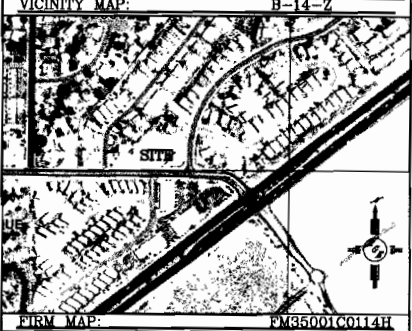
The proposed improvements consist of a new single family residence. The finished floor height is set due to a height restriction. Due to the surrounding walls, the house development will require retaining walls integral with the slab, such that the exterior grade is higher than the finished floor in certain areas. The onsite and upland flows are shown in appendix A. The upland flows and the main part of the house drain to a rear pond. The contributing flows have a peak discharge of 2.32 cfs. This pond will contain a submersible sump pump that will discharge .15 cfs to the front where it will flow into Montano Plaza. The pond will also have an 8" overflow. As shown in appendix B, the pond has been modeled utilizing AHYMO. The pond will detain the 100-year 6-hour, peak flow and discharge at a peak rate of 1.13 cfs. The remainder of the house will drain along the northern boundary via an 8" storm drain that discharges to a 319 cubic foot first flush pond that spills to the street. As shown in appendix B, the pipe has a capacity of 1.05 cfs, which is greater than the 0.38 cfs generated. The proposed development will have a total peak discharge of 1.51 cfs, which is less than the historical discharge rate. Due to the unique drainage solution, a drainage covenant for the ponds, storm drains and pumps must be executed prior to issuance of building permit.

## **SUMMARY AND RECOMMENDATIONS**

This project is a development of a residential infill development within the fully developed northwest heights watershed. The development of this site will retain the first flush volume onsite. The site will discharge less than existing conditions. The drainage structures have been adequately sized. The development of this site will not negatively impact the upstream nor downstream facilities. Since this site does not exceed 1 acre, erosion and sediment Control Plan will not be required, a NPDES permit will also be required prior to any construction activity. A drainage covenant shall be required to assure property functionality of the drainage management systems.

EROSION CONTROL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-OFF ON SITE DURING CONSTRUCTION.
3. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
4. REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL ACCEPTANCE OF ANY PROJECT.



LEGAL DESCRIPTION:  
LOT 3, MONTANO VISTA

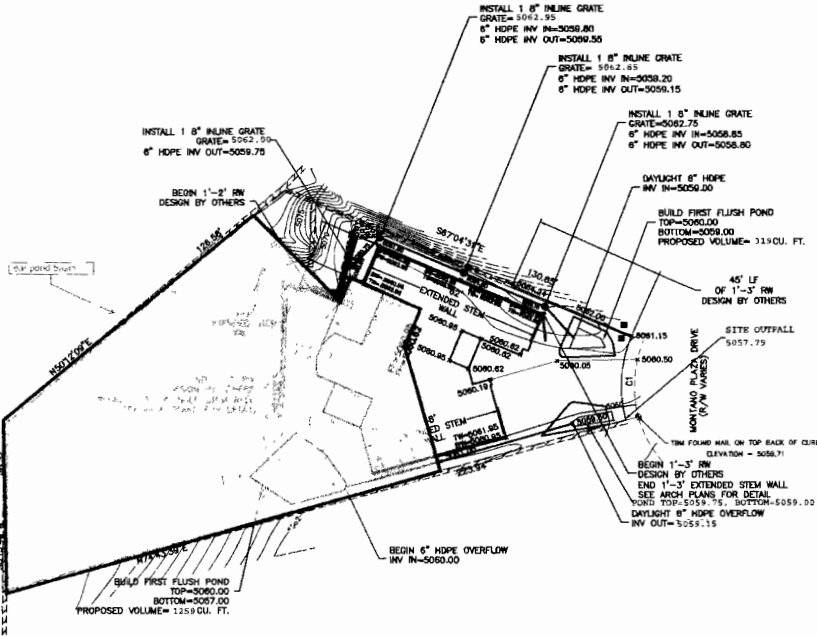
- NOTES:
1. ALL SPOT ELEVATIONS REPRESENT FLOWLINE ELEVATION UNLESS OTHERWISE NOTED.
  2. LONG TERM MAINTENANCE OF GRSITE STORM DRAIN IS REQUIRED TO MAINTAIN ADEQUATE DRAINAGE

LEGEND

- EXISTING CONTOUR
- EXISTING INDEX CONTOUR
- PROPOSED CONTOUR
- PROPOSED INDEX CONTOUR
- SLOPE 1% (SLOPE 1% = 1' IN 100')
- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- BOUNDARY
- CENTERLINE
- RIGHT-OF-WAY
- EXISTING CURB AND GUTTER
- PROPOSED CMU RETAINING WALL



CAUTION:  
EXISTING UTILITIES ARE NOT SHOWN.  
IT SHALL BE THE SOLE RESPONSIBILITY  
OF THE CONTRACTOR TO CONDUCT ALL  
NECESSARY FIELD INVESTIGATIONS PRIOR  
TO ANY EXCAVATION TO DETERMINE THE  
ACTUAL LOCATION OF UTILITIES & OTHER  
IMPROVEMENTS.



ENGINEER'S SEAL	5209 MONTANO PLAZA	DATE
	GRADING AND DRAINAGE PLAN	3-02-17
3/8/17		21713-10007-10-00-17
DAVID S. G. #14522	1000 SOUTH AVENUE DE SUITE 100 ALBUQUERQUE, NM 87101 (505) 255-1000	SHEET #
		21713



Weighted E Method

											100-Year, 6-hr.			24-hour
Basin	Area (sf)	Area (acres)	Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Volume (ac-ft)
			%	(acres)	%	(acres)	%	(acres)	%	(acres)				
NATIVE	16756.00	0.385	0%	0	100%	0.385	0%	0	0%	0.000	0.670	0.021	0.78	0.021
UPLAND	19425.00	0.446	0%	0	10%	0.045	40%	0.17837	50%	0.223	1.448	0.054	1.58	0.068
PROPOSED	16756.00	0.385	0%	0	40%	0.154	34%	0.13079	26%	0.100	1.117	0.036	1.12	0.042
REAR POND BASIN	11887.00	0.273	0%	0	45%	0.123	39%	0.10643	16%	0.044	1.003	0.023	0.75	0.026
FRONT BASIN	4869.00	0.112	0%	0	28%	0.031	22%	0.02436	50%	0.056	1.395	0.013	0.38	0.017
INCREASE												0.014	0.34	0.021
TOTAL TO PUMP	31312.00	0.72	0%	0.00	23%	0.17	40%	0.28	37%	0.27	1.279	0.077	2.32	0.094

Equations:

Weighted E = Ea\*Aa + Eb\*Ab + Ec\*Ac + Ed\*Ad / (Total Area)

Volume = Weighted D \* Total Area

Flow = Qa \* Aa + Qb \* Ab + Qc \* Ac + Qd \* Ad

PUMP  
67GPM= .15 CFS  
425 CF/HOUR

Where for 100-year, 6-hour storm- zone 1

Ea= 0.44	Qa= 1.29
Eb= 0.67	Qb= 2.03
Ec= 0.99	Qc= 2.87
Ed= 1.97	Qd= 4.37

ONSITE Conditons

FIRST FLUSH WATER QUALITY VOLUME

	REQUIRED (CF)	PROVIDED (CF)
WATER QUALITY	123	478

This site is within a developed subdivision. The lots free discharge. This lot has recorded height restrictions, therefor the finished floor is required to be lower than it would norma  
The site is surrounded by existing retaining walls, therefor the new home will incorporate walls into the footing and walls of the structure. The lot has an upland basin that general  
1.58 cfs. The proposed development will continue to accept the upland flows. The onsite and upland flows will be captured by a pond and inlets. the flow will discharge to the fron  
lot where the flow will drain out over the sidewalk. Due to the need to utilize pipe to drain the site will have an overflow in addition to the pump

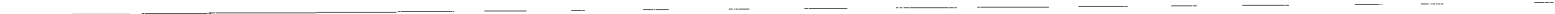
**APPENDIX B**  
**HYDRAULIC MODEL**  
**AND CALCULATIONS**

VOLUME CALCULATIONS

OUTLET	inlet bottom POND OUTLET	ACTUAL ELEV.	DEPTH (FT)	AREA SF	VOLUME PER UNIT	VOLUME CUMULATIVE	VOLUME AC-FT	Q (CFS)
		57.00	0.00	6.00	0	1	0.000	0.00
		58.00	0.00	45.0000	25.5	26.5	0.001	0.13
		59.00	0.00	256.0000	150.5000	177	0.004	0.13
		59.75	0.00	485.0000	370.5000	547.5	0.013	0.13
		60.50	0.67	1526.0000	1005.5000	1553	0.036	1.13

Orifice Equation  
Q = CA SQRT(2gH)

C = 0.6  
Diameter (in) 8  
Area (ft^2)= 0.34906585  
g = 32.2  
H (Ft) = Depth of water above center of orifice  
Q (CFS)= Flow



```
*S      AHYMO - REAR POND WITH PUMP
*S      POND ROUTING

START          TIME=0.0  PUNCH CODE=0

RAINFALL       TYPE=2
               QUARTER=0.0  ONE= 1.87 IN
               SIX= 2.20 IN  DAY= 2.66 IN  DT = 0.05 HR

COMPUTE NM HYD  ID=1  HYD NO=101  DA= .001089 SQ MI
                PER A=0  PER B=23.0  PER C=40.0  PER D=37.00

                TP=-.145  MASSRAIN=-1

PRINT HYD      ID=1  CODE=3

* ROUTE THE TOTAL FLOW THROUGH THE PROPOSED RESERVOIR
ROUTE RESERVOIR ID=2  HYD NO=102  INFLOW=1  CODE=3
                OUTFLOW(CFS)  STORAGE(AC-FT)  ELEV(FT)
                0.00          0.000          57.00
                0.15          0.001          58.00
                0.15          0.004          59.00
                0.15          0.013          59.75
                1.14          0.036          60.50

PRINT HYD      ID=2  CODE=3

FINISH
```

AHYMO.OUT  
AHYMO PROGRAM (AHYMO-S4) - Version: S4.01a - Rel: 01a  
RUN DATE (MON/DAY/YR) = 03/09/2017  
START TIME (HR:MIN:SEC) = 18:41:54 USER NO.=  
RioGrandeSingleA41963517  
INPUT FILE = C:\Documents and Settings\Owner\Desktop\2017  
jobs\1712-montano plaza\POND.txt

\*S AHYMO - REAR POND WITH PUMP  
\*S POND ROUTING

START TIME=0.0 PUNCH CODE=0

RAINFALL TYPE=2  
QUARTER=0.0 ONE= 1.87 IN  
SIX= 2.20 IN DAY= 2.66 IN DT = 0.05 HR

24-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE  
AREAS (NM & AZ) - D1

DT =	0.050000	HOURS	END TIME =	24.000002	HOURS
0.0000	0.0022	0.0045	0.0069	0.0096	0.0123
0.0197	0.0264	0.0336	0.0412	0.0494	0.0578
0.0753	0.0844	0.0946	0.1052	0.1168	0.1387
0.2020	0.2430	0.2937	0.3614	0.4375	0.5689
1.1234	1.3695	1.5635	1.6610	1.7465	1.8079
1.8994	1.9306	1.9592	1.9828	1.9979	2.0087
2.0273	2.0352	2.0426	2.0499	2.0568	2.0625
2.0692	2.0724	2.0754	2.0784	2.0813	2.0842
2.0896	2.0923	2.0949	2.0974	2.0999	2.1023
2.1069	2.1092	2.1115	2.1136	2.1158	2.1179
2.1220	2.1240	2.1260	2.1280	2.1299	2.1318
2.1356	2.1374	2.1392	2.1411	2.1428	2.1446
2.1481	2.1498	2.1514	2.1531	2.1548	2.1564
2.1596	2.1612	2.1628	2.1643	2.1658	2.1674
2.1704	2.1718	2.1733	2.1747	2.1762	2.1776
2.1804	2.1818	2.1832	2.1845	2.1859	2.1872
2.1899	2.1912	2.1924	2.1937	2.1950	2.1963
2.1988	2.2000	2.2013	2.2026	2.2038	2.2051
2.2077	2.2089	2.2102	2.2115	2.2128	2.2141
2.2166	2.2179	2.2192	2.2204	2.2217	2.2230
2.2256	2.2268	2.2281	2.2294	2.2307	2.2319
2.2345	2.2358	2.2371	2.2383	2.2396	2.2409
2.2434	2.2447	2.2460	2.2473	2.2486	2.2498
2.2524	2.2537	2.2549	2.2562	2.2575	2.2588
2.2613	2.2626	2.2639	2.2652	2.2664	2.2677
2.2703	2.2716	2.2728	2.2741	2.2754	2.2767
2.2792	2.2805	2.2818	2.2831	2.2843	2.2856
2.2882	2.2894	2.2907	2.2920	2.2933	2.2946
2.2971	2.2984	2.2997	2.3009	2.3022	2.3035
2.3061	2.3073	2.3086	2.3099	2.3112	2.3124
2.3150	2.3163	2.3176	2.3188	2.3201	2.3214
2.3239	2.3252	2.3265	2.3278	2.3291	2.3303
2.3329	2.3342	2.3354	2.3367	2.3380	2.3393
2.3418	2.3431	2.3444	2.3457	2.3469	2.3482
2.3508	2.3521	2.3533	2.3546	2.3559	2.3572
2.3597	2.3610	2.3623	2.3636	2.3648	2.3661
2.3687	2.3699	2.3712	2.3725	2.3738	2.3750

AHYMO.OUT						
2.3776	2.3789	2.3802	2.3814	2.3827	2.3840	2.3853
2.3865	2.3878	2.3891	2.3904	2.3917	2.3929	2.3942
2.3955	2.3968	2.3980	2.3993	2.4006	2.4019	2.4032
2.4044	2.4057	2.4070	2.4083	2.4095	2.4108	2.4121
2.4134	2.4147	2.4159	2.4172	2.4185	2.4198	2.4210
2.4223	2.4236	2.4249	2.4262	2.4274	2.4287	2.4300
2.4313	2.4325	2.4338	2.4351	2.4364	2.4377	2.4389
2.4402	2.4415	2.4428	2.4440	2.4453	2.4466	2.4479
2.4492	2.4504	2.4517	2.4530	2.4543	2.4555	2.4568
2.4581	2.4594	2.4607	2.4619	2.4632	2.4645	2.4658
2.4670	2.4683	2.4696	2.4709	2.4722	2.4734	2.4747
2.4760	2.4773	2.4785	2.4798	2.4811	2.4824	2.4837
2.4849	2.4862	2.4875	2.4888	2.4900	2.4913	2.4926
2.4939	2.4952	2.4964	2.4977	2.4990	2.5003	2.5015
2.5028	2.5041	2.5054	2.5067	2.5079	2.5092	2.5105
2.5118	2.5130	2.5143	2.5156	2.5169	2.5182	2.5194
2.5207	2.5220	2.5233	2.5245	2.5258	2.5271	2.5284
2.5297	2.5309	2.5322	2.5335	2.5348	2.5360	2.5373
2.5386	2.5399	2.5412	2.5424	2.5437	2.5450	2.5463
2.5475	2.5488	2.5501	2.5514	2.5527	2.5539	2.5552
2.5565	2.5578	2.5590	2.5603	2.5616	2.5629	2.5642
2.5654	2.5667	2.5680	2.5693	2.5705	2.5718	2.5731
2.5744	2.5757	2.5769	2.5782	2.5795	2.5808	2.5820
2.5833	2.5846	2.5859	2.5872	2.5884	2.5897	2.5910
2.5923	2.5935	2.5948	2.5961	2.5974	2.5987	2.5999
2.6012	2.6025	2.6038	2.6050	2.6063	2.6076	2.6089
2.6102	2.6114	2.6127	2.6140	2.6153	2.6165	2.6178
2.6191	2.6204	2.6217	2.6229	2.6242	2.6255	2.6268
2.6280	2.6293	2.6306	2.6319	2.6332	2.6344	2.6357
2.6370	2.6383	2.6395	2.6408	2.6421	2.6434	2.6447
2.6459	2.6472	2.6485	2.6498	2.6510	2.6523	2.6536
2.6549	2.6562	2.6574	2.6587	2.6600		

COMPUTE NM HYD ID=1 HYD NO=101 DA= .001089 SQ MI  
PER A=0 PER B=23.0 PER C=40.0 PER D=37.00  
TP=-.145 MASSRAIN=-1

K = 0.079025HR TP = 0.145000HR K/TP RATIO = 0.545000 SHAPE  
CONSTANT, N = 7.106428  
UNIT PEAK = 1.4624 CFS UNIT VOLUME = 0.9926 B = 526.28  
P60 = 1.8700  
AREA = 0.000403 SQ MI IA = 0.10000 INCHES INF = 0.04000  
INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  
0.050000

K = 0.125137HR TP = 0.145000HR K/TP RATIO = 0.863012 SHAPE  
CONSTANT, N = 4.119233  
UNIT PEAK = 1.7177 CFS UNIT VOLUME = 0.9938 B = 363.04  
P60 = 1.8700  
AREA = 0.000686 SQ MI IA = 0.40476 INCHES INF = 0.98333  
INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  
0.050000

PRINT HYD ID=1 CODE=3

PARTIAL HYDROGRAPH 101.00

TIME	FLOW	TIME	FLOW	TIME	FLOW
Page 2					

		AHYMO.OUT					
TIME	FLOW		TIME	FLOW			
HRS	HRS	CFS	HRS	HRS	CFS	HRS	CFS
	CFS			CFS			
14.850	0.000	0.0	19.800	4.950	0.0	9.900	0.0
	0.150	0.0		0.0			
15.000	0.0	0.0	19.950	5.100	0.0	10.050	0.0
	0.300	0.0		0.0			
15.150	0.0	0.0	20.100	5.250	0.0	10.200	0.0
	0.450	0.0		0.0			
15.300	0.0	0.0	20.250	5.400	0.0	10.350	0.0
	0.600	0.0		0.0			
15.450	0.0	0.0	20.400	5.550	0.0	10.500	0.0
	0.750	0.0		0.0			
15.600	0.0	0.0	20.550	5.700	0.0	10.650	0.0
	0.900	0.0		0.0			
15.750	0.0	0.0	20.700	5.850	0.0	10.800	0.0
	1.050	0.1		0.0			
15.900	0.0	0.1	20.850	6.000	0.0	10.950	0.0
	1.200	0.2		0.0			
16.050	0.0	0.2	21.000	6.150	0.0	11.100	0.0
	1.350	0.6		0.0			
16.200	0.0	0.6	21.150	6.300	0.0	11.250	0.0
	1.500	2.3		0.0			
16.350	0.0	2.3	21.300	6.450	0.0	11.400	0.0
	1.650	1.6		0.0			
16.500	0.0	1.6	21.450	6.600	0.0	11.550	0.0
	1.800	0.7		0.0			
16.650	0.0	0.7	21.600	6.750	0.0	11.700	0.0
	1.950	0.4		0.0			
16.800	0.0	0.4	21.750	6.900	0.0	11.850	0.0
	2.100	0.2		0.0			
16.950	0.0	0.2	21.900	7.050	0.0	12.000	0.0
	2.250	0.1		0.0			
17.100	0.0	0.1	22.050	7.200	0.0	12.150	0.0
	2.400	0.1		0.0			
17.250	0.0	0.1	22.200	7.350	0.0	12.300	0.0
	2.550	0.0		0.0			
17.400	0.0	0.0	22.350	7.500	0.0	12.450	0.0
	2.700	0.0		0.0			
17.550	0.0	0.0	22.500	7.650	0.0	12.600	0.0
	2.850	0.0		0.0			
17.700	0.0	0.0	22.650	7.800	0.0	12.750	0.0
	3.000	0.0		0.0			
17.850	0.0	0.0	22.800	7.950	0.0	12.900	0.0
	3.150	0.0		0.0			
18.000	0.0	0.0	22.950	8.100	0.0	13.050	0.0
	3.300	0.0		0.0			
18.150	0.0	0.0	23.100	8.250	0.0	13.200	0.0
	3.450	0.0		0.0			
18.300	0.0	0.0	23.250	8.400	0.0	13.350	0.0
	3.600	0.0		0.0			
18.450	0.0	0.0	23.400	8.550	0.0	13.500	0.0
	3.750	0.0		0.0			
18.600	0.0	0.0	23.550	8.700	0.0	13.650	0.0
	3.900	0.0		0.0			
18.750	0.0	0.0	23.700	8.850	0.0	13.800	0.0
	4.050	0.0		0.0			
18.900	0.0	0.0	23.850	9.000	0.0	13.950	0.0
	4.200	0.0		0.0			
19.050	0.0	0.0	24.000	9.150	0.0	14.100	0.0
	4.350	0.0		0.0			
19.200	0.0	0.0	24.150	9.300	0.0	14.250	0.0
				0.0			

HYDROLOGIC DATA		HYDROLOGIC DATA		HYDROLOGIC DATA	
19.350	4.500	0.0	9.450	0.0	14.400
19.500	4.650	0.0	9.600	0.0	14.550
19.650	4.800	0.0	9.750	0.0	14.700
RUNOFF VOLUME = 1.51664 INCHES = 0.0881 ACRE-Feet PEAK DISCHARGE RATE = 2.32 CFS AT 1.550 HOURS BASIN AREA = 0.0011 SQ. MI.					

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
0.00	0.00	57.00	0.000	0.00
0.15	0.00	57.00	0.000	0.00
0.30	0.00	57.00	0.000	0.00
0.45	0.00	57.00	0.000	0.00
0.60	0.00	57.00	0.000	0.00
0.75	0.00	57.00	0.000	0.00
0.90	0.01	57.01	0.000	0.00
1.05	0.07	57.24	0.000	0.04
1.20	0.17	57.80	0.001	0.12
1.35	0.59	59.75	0.013	0.15
1.50	2.29	59.93	0.019	0.39
1.65	1.58	60.45	0.035	1.08
1.80	0.68	60.44	0.034	1.06
1.95	0.35	60.26	0.029	0.82
2.10	0.20	60.08	0.023	0.59
2.25	0.12	59.95	0.019	0.41
2.40	0.08	59.85	0.016	0.28
2.55	0.04	59.78	0.014	0.19
2.70	0.03	59.75	0.013	0.15
2.85	0.02	59.75	0.013	0.15
3.00	0.01	59.75	0.013	0.15
3.15	0.00	59.75	0.013	0.15
3.30	0.00	59.75	0.013	0.15
3.45	0.00	59.75	0.013	0.15
3.60	0.00	59.75	0.013	0.15
3.75	0.00	57.32	0.000	0.05
3.90	0.00	57.06	0.000	0.01
4.05	0.00	57.02	0.000	0.00
PEAK DISCHARGE =	1.130	CFS	- PEAK	OCCURS AT HOUR

1.70

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AHYMO.OUT  
MAXIMUM WATER SURFACE ELEVATION = 60.493  
MAXIMUM STORAGE = 0.0358 AC-FT INCREMENTAL TIME= 0.050000HRS

PRINT HYD ID=2 CODE=3

PARTIAL HYDROGRAPH 102.00

TIME	TIME FLOW HRS CFS	FLOW CFS	TIME	TIME FLOW HRS CFS	FLOW CFS	TIME	FLOW CFS
14.850	0.000 0.0	0.0	19.800	4.950 0.0	0.0	9.900	0.0
15.000	0.150 0.0	0.0	19.950	5.100 0.0	0.0	10.050	0.0
15.150	0.300 0.0	0.0	20.100	5.250 0.0	0.0	10.200	0.0
15.300	0.450 0.0	0.0	20.250	5.400 0.0	0.0	10.350	0.0
15.450	0.600 0.0	0.0	20.400	5.550 0.0	0.0	10.500	0.0
15.600	0.750 0.0	0.0	20.550	5.700 0.0	0.0	10.650	0.0
15.750	0.900 0.0	0.0	20.700	5.850 0.0	0.0	10.800	0.0
15.900	1.050 0.0	0.0	20.850	6.000 0.0	0.0	10.950	0.0
16.050	1.200 0.0	0.1	21.000	6.150 0.0	0.0	11.100	0.0
16.200	1.350 0.0	0.2	21.150	6.300 0.0	0.0	11.250	0.0
16.350	1.500 0.0	0.4	21.300	6.450 0.0	0.0	11.400	0.0
16.500	1.650 0.0	1.1	21.450	6.600 0.0	0.0	11.550	0.0
16.650	1.800 0.0	1.1	21.600	6.750 0.0	0.0	11.700	0.0
16.800	1.950 0.0	0.8	21.750	6.900 0.0	0.0	11.850	0.0
16.950	2.100 0.0	0.6	21.900	7.050 0.0	0.0	12.000	0.0
17.100	2.250 0.0	0.4	22.050	7.200 0.0	0.0	12.150	0.0
17.250	2.400 0.0	0.3	22.200	7.350 0.0	0.0	12.300	0.0
17.400	2.550 0.0	0.2	22.350	7.500 0.0	0.0	12.450	0.0
17.550	2.700 0.0	0.2	22.500	7.650 0.0	0.0	12.600	0.0
17.700	2.850 0.0	0.2	22.650	7.800 0.0	0.0	12.750	0.0
17.850	3.000 0.0	0.2	22.800	7.950 0.0	0.0	12.900	0.0
18.000	3.150 0.0	0.2	22.950	8.100 0.0	0.0	13.050	0.0
18.150	3.300 0.0	0.2	23.100	8.250 0.0	0.0	13.200	0.0
18.300	3.450 0.0	0.2	23.250	8.400 0.0	0.0	13.350	0.0
18.450	3.600 0.0	0.2	23.400	8.550 0.0	0.0	13.500	0.0
18.600	3.750 0.0	0.0	23.550	8.700 0.0	0.0	13.650	0.0

				AHYMO.OUT		
	3.900	0.0		8.850	0.0	13.800
18.750	0.0		23.700	0.0		0.0
	4.050	0.0		9.000	0.0	13.950
18.900	0.0		23.850	0.0		0.0
	4.200	0.0		9.150	0.0	14.100
19.050	0.0		24.000	0.0		0.0
	4.350	0.0		9.300	0.0	14.250
19.200	0.0		24.150	0.0		0.0
	4.500	0.0		9.450	0.0	14.400
19.350	0.0		24.300	0.0		0.0
	4.650	0.0		9.600	0.0	14.550
19.500	0.0					0.0
	4.800	0.0		9.750	0.0	14.700
19.650	0.0					0.0

RUNOFF VOLUME = 1.51636 INCHES = 0.0881 ACRE- FEET  
PEAK DISCHARGE RATE = 1.13 CFS AT 1.700 HOURS BASIN AREA =  
0.0011 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 18:41:54

Pipe Capacity

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
18HDPE	8	1	0.35	0.1666667	1.05	0.38	1.09

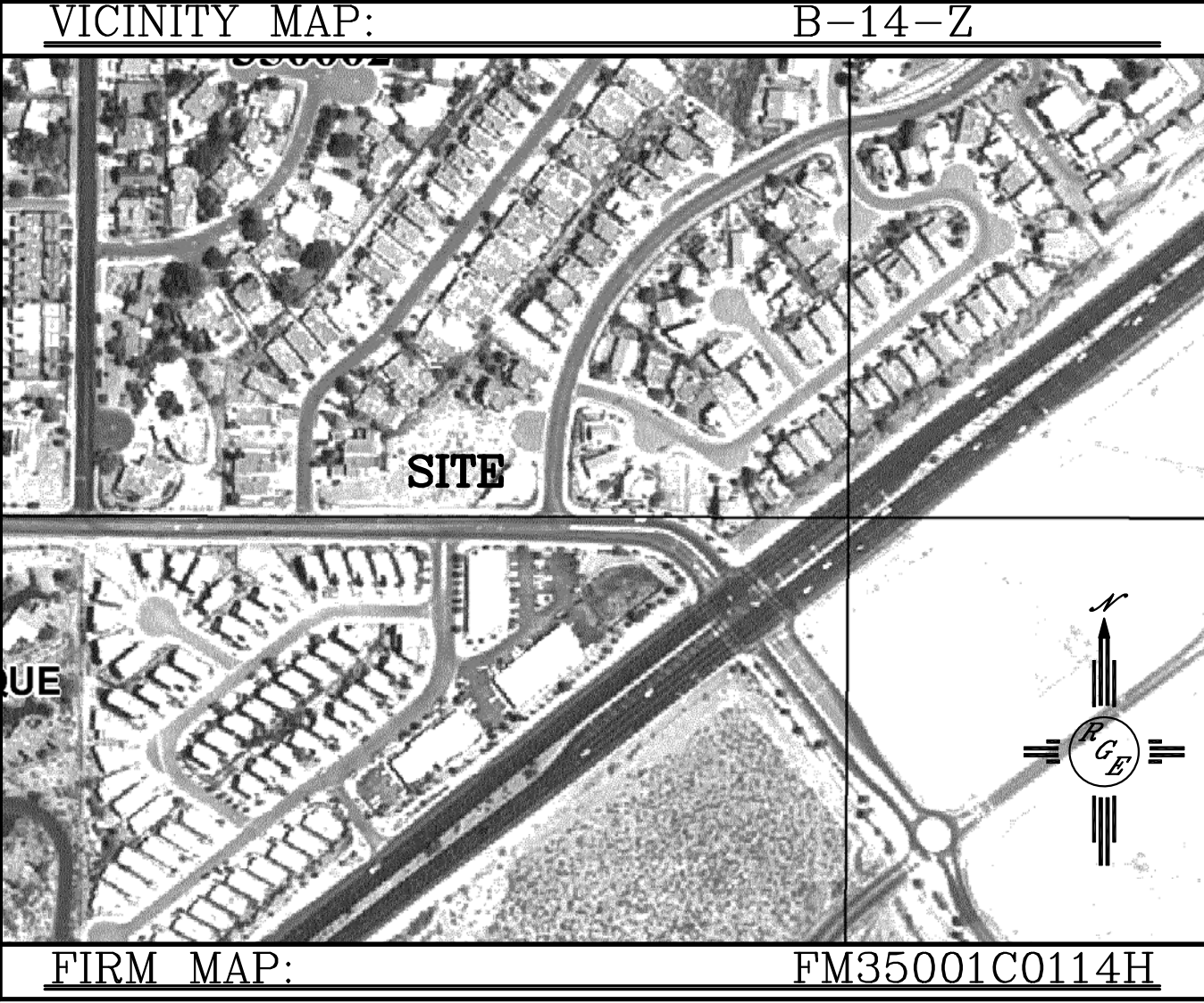
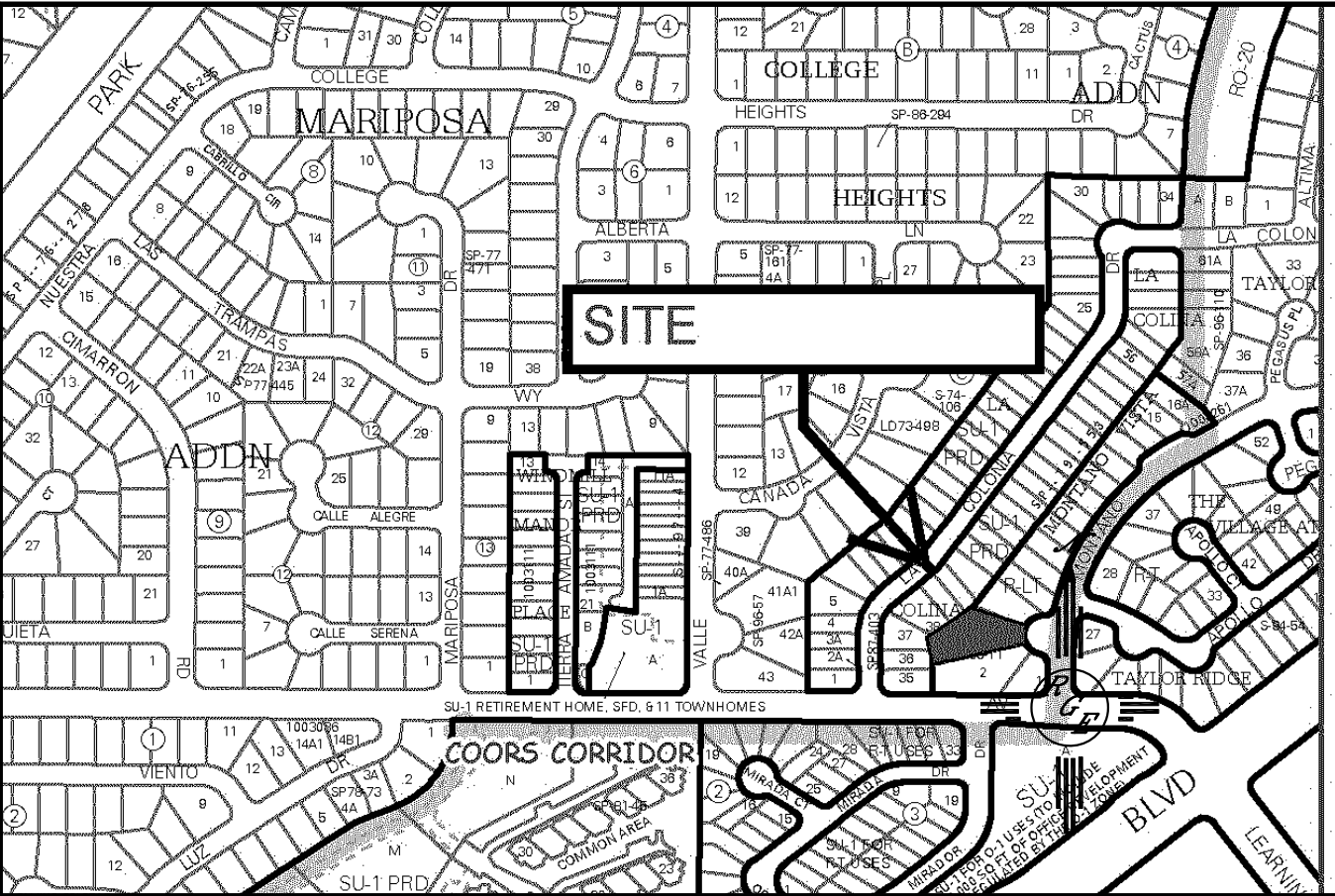
Manning's Equation:

$Q = 1.49/n * A * R^{(2/3)} * S^{(1/2)}$

- A = Area
- R = D/4
- S = Slope
- n = 0.015

EROSION CONTROL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-OFF ON SITE DURING CONSTRUCTION.
3. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
4. REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
5. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL ACCEPTANCE OF ANY PROJECT.



LEGAL DESCRIPTION:

LOT 3, MONTANO VISTA

NOTES:

1. ALL SPOT ELEVATIONS REPRESENT FLOWLINE ELEVATION UNLESS OTHERWISE NOTED.
2. LONG TERM MAINTANCE OF ONSITE STORM DRAIN IS REQUIRED TO MAINTAIN ADAQUATE DRAINAGE

LEGEND

- XXXX--- EXISTING CONTOUR
- XXXX--- EXISTING INDEX CONTOUR
- XXXX--- PROPOSED CONTOUR
- XXXX--- PROPOSED INDEX CONTOUR
- XXXX--- SLOPE TIE
- XXXX EXISTING SPOT ELEVATION
- XXXX PROPOSED SPOT ELEVATION
- BOUNDARY
- CENTERLINE
- RIGHT-OF-WAY
- ===== EXISTING CURB AND GUTTER
- ===== PROPOSED CMU RETAINING WALL

