City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 02/2013)

Project Title: ESTATES AT GLENDALE UNIT 2 Building Permit #: _____ City Drainage #: _____

DRB#: _____ EPC#: _____ Work Order#: _____

Legal Description: TRACTS A&B THE ESTATES AT GLENDALE

City Address: GLENDALE BETWEEN WYOMING AND BARSTWO

Engineering Firm: RIO GRANDE ENGINEERING Contact: DAVID SOULE

Address: PO BOX 93924, ALBUQUERQUE, NM 87199

Phone#: 505.321.9099 Fax#: 505.872.0999 E-mail: DAVID@RIOGRANDEENGINEERING.COM

Owner: RANDY SCHMILLE Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Architect: NA Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Surveyor: CONSTRUCTION SURVEY TECHNOLOGIES Contact: JOHN GALLEGOS

Address: _____

Phone#: 917.8921 Fax#: _____ E-mail: _____

Contractor: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

TYPE OF SUBMITTAL:

- x DRAINAGE REPORT
- ____ DRAINAGE PLAN 1st SUBMITTAL
- x DRAINAGE PLAN RESUBMITTAL
- ____ CONCEPTUAL G & D PLAN
- X GRADING PLAN
- ____ EROSION & SEDIMENT CONTROL PLAN (ESC)
- ____ ENGINEER'S CERT (HYDROLOGY)
- ____ CLOMR/LOMR
- ____ TRAFFIC CIRCULATION LAYOUT (TCL)
- ____ ENGINEER'S CERT (TCL)
- ____ ENGINEER'S CERT (DRB SITE PLAN)
- ____ ENGINEER'S CERT (ESC)
- ____ SO-19
- ____ OTHER (SPECIFY)

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

- ____ SIA/FINANCIAL GUARANTEE RELEASE
- X PRELIMINARY PLAT APPROVAL
- X S. DEV. PLAN FOR SUB'D APPROVAL
- ____ S. DEV. FOR BLDG. PERMIT APPROVAL
- ____ SECTOR PLAN APPROVAL
- ____ FINAL PLAT APPROVAL
- ____ CERTIFICATE OF OCCUPANCY (PERM)
- ____ CERTIFICATE OF OCCUPANCY (TCL TEMP)
- ____ FOUNDATION PERMIT APPROVAL
- ____ BUILDING PERMIT APPROVAL
- x GRADING PERMIT APPROVAL
- ____ PAVING PERMIT APPROVAL
- ____ WORK ORDER APPROVAL
- ____ GRADING CERTIFICATION
- ____ SO-19 APPROVAL
- ____ ESC PERMIT APPROVAL
- ____ ESC CERT. ACCEPTANCE
- ____ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED: ____ Yes X No ____ Copy Provided

DATE SUBMITTED: 10/7/14 By: _____

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location, and scope to the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the followin

1. **Conceptual Grading and Drainage Plan**: Required for approval of Site Development Plans greater than five (5) acres and Sector Plans
2. **Drainage Plans**: Required for building permits, grading permits, paving permits and site plans less than five (5) acres
3. **Drainage Report**: Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more
4. **Erosion and Sediment Control Plan:** Required for any new development and redevelopment site with 1-acre or more of land disturbing area, including project less than 1-acre than are part of a larger common plan of development

REVISED
DRAINAGE REPORT

For

THE ESTATES AT GLENDALE

Albuquerque, New Mexico

Prepared by

Rio Grande Engineering
PO Box 93924
Albuquerque, New Mexico 87199

SEPTEMBER 2014

10/13/14

David Soule P.E. No. 14522

TABLE OF CONTENTS

Appendix

Map

Site Grading and Drainage Plan

PURPOSE

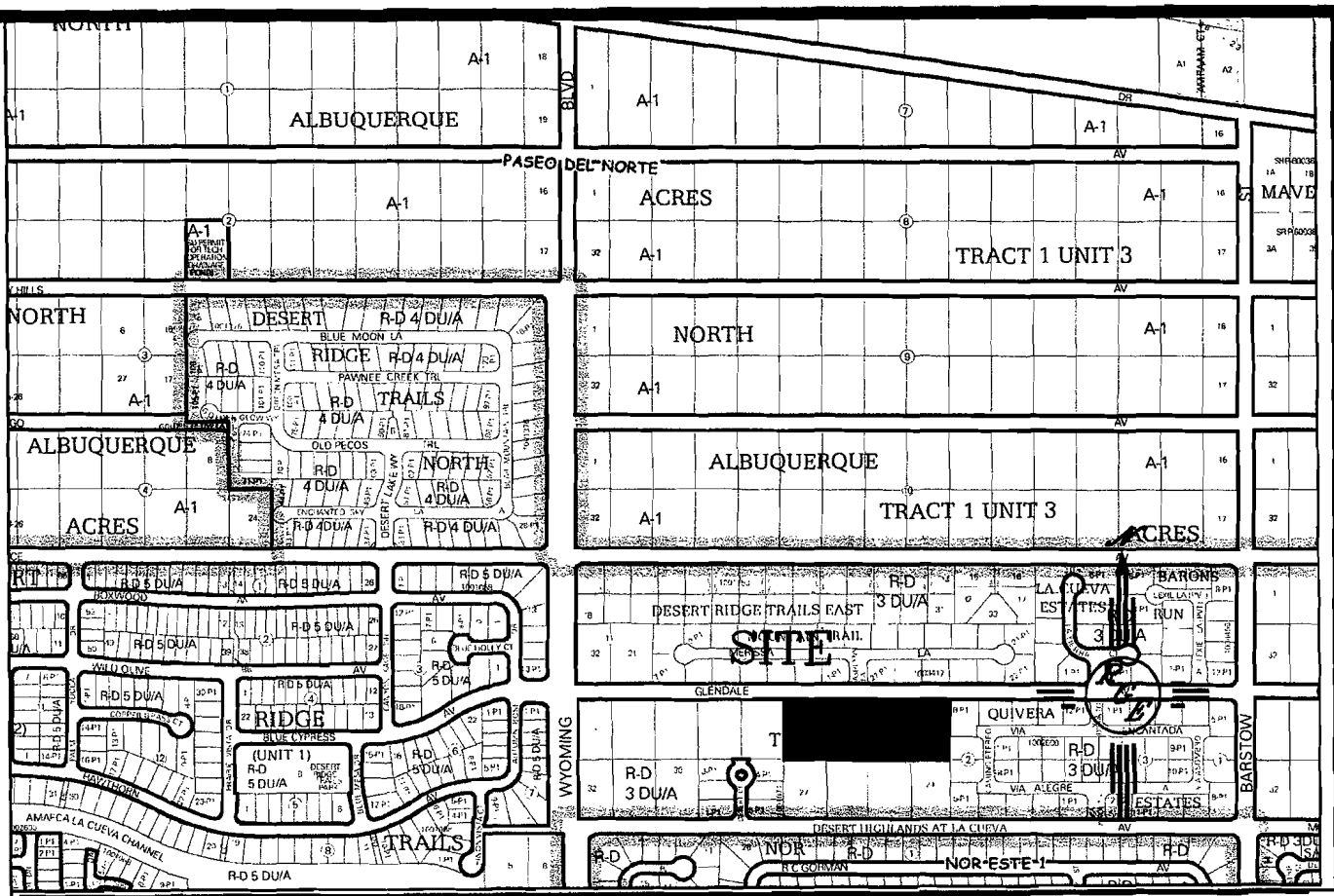
The purpose of this report is to provide the Drainage Management Plan for the development of a 14-lot subdivision located on Glendale Avenue between Wyoming Boulevard and Barstow Street NE. This plan was prepared in accordance with the City of Albuquerque design regulations, utilizing the City of Albuquerque's 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

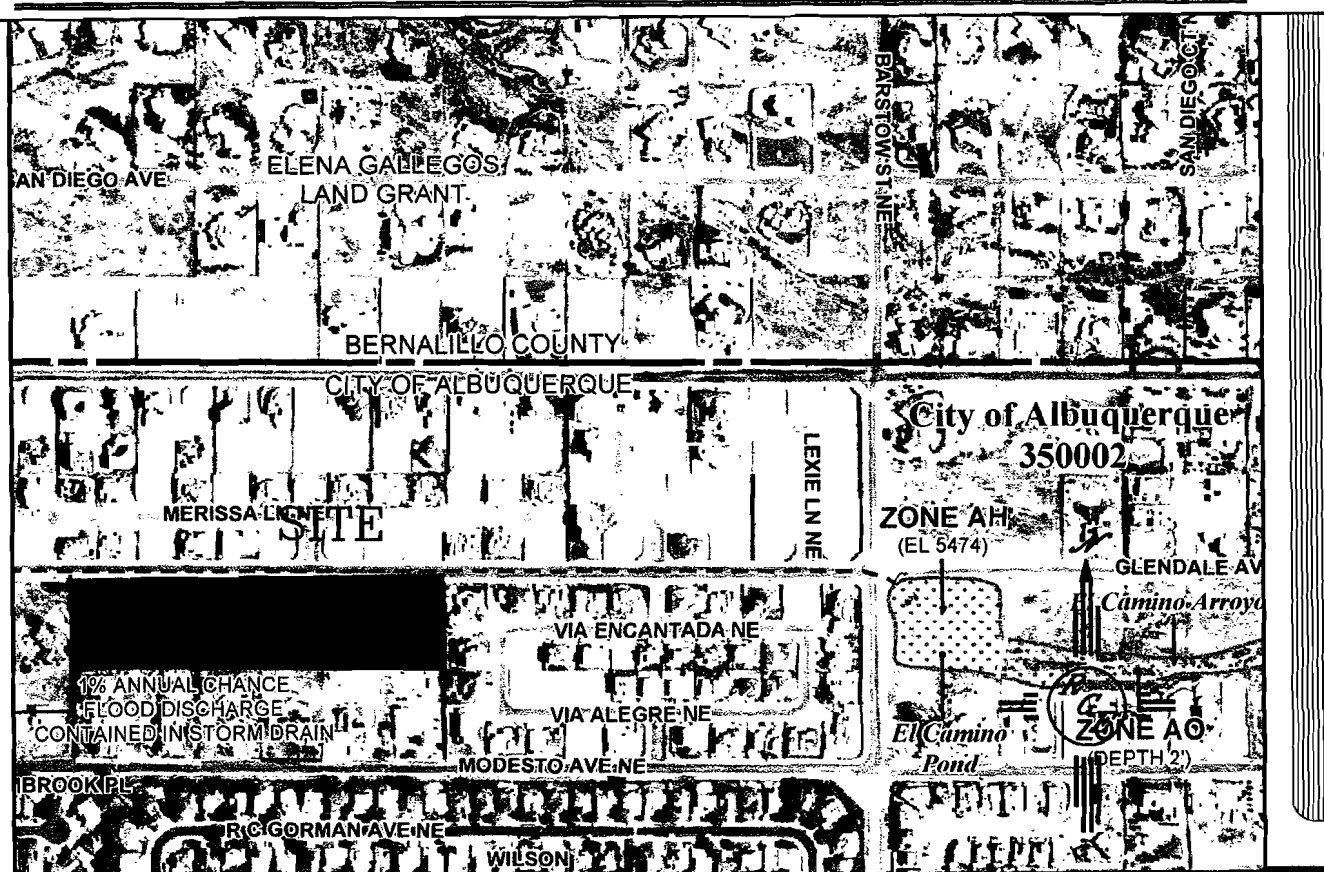
The subject of this report, as shown on the Exhibit A, is a 3.55-acre parcel of land located on the south side of Glendale Avenue between Wyoming Boulevard and Barstow Street NE. The legal description of this site is tracts A&B the Estates at Glendale Subdivision. As shown on FIRM map35013C0133H, the entire site is located within Flood Zone X. The site has had grading activities upon it over the past several years. The site contains a desiltation pond constructed with phase one and multiple stock piles of material have been deposited thru ought the site. Due to the upstream construction, the site is not affected by any upland flows from the north or east. The site is impacted by the adjacent lots to the south. The site currently free discharges to a large pond located at the northwest corner of the site. The development of the site will require the site to discharge at a rate equal to or less than the fully developed conditions assumed for this site in the governing North Albuquerque Acres Master Drainage Plan (NAAMDP), which relevant excerpts can be found in appendix A.

EXISTING CONDITIONS

The site currently does have ponds and stockpiles on it and has been impacted by human development over the years. The site is the second phase of the Estates at Glendale project. The site was initially designed by John Mackenzie by report found in city of Albuquerque drainage file. The site is impacted by minor upland flows from the 4 developed lots to the south. The site currently discharges all of its flow to the North West corner to a temporary retention pond



VICINITY MAP: B-19-Z



FIRM MAP: 35001C0133H

The site is located within basins 204.0 of the NAAMDP. The adjacent infrastructure improvements within Glendale were constructed with phase one of this development. Two 24" storm drain pipes were stubbed into the property with the initial phase. All downstream improvements are in place and accepted by the city of Albuquerque..

PROPOSED CONDITIONS

The proposed improvements consist of a new 14-lot subdivision serviced by private paved roadway. The lots shall free discharge to the roadway and be conveyed within the roadway to the available downstream storm drain. Each lot will be required to retain the first .34" of rain or 255 cubic feet per lot. The slopes of the lots preclude front yard ponds so an alternative underground catchment basin- stormtech SC740 is required. A copy of the product sheet is located in appendix B. The minimum length is shown on the grading plan. All the flow leaving the site will be conveyed via surface drainage to a set of single A inlets located at the entrance to the property. As shown on the drainage basin map and hydraulic spread sheet located in appendix B, the site is affected by 9 small basins from the adjacent property. The largest basing G generates 2.34 cfs, to allow for historical upland flow the south wall will have 3 turned blocks at each property corner and a turned block every 20. As shown on the Turned block weir equation sheet, 3 turned blocks adequately passes the largest of the basins. The spacing of the turned blocks allows the flows to easily pass thru the wall. Each lot is graded to allow the flow to enter the site and flow to the street via surface flow.

The onsite drainage contains 3 basins. Basin A is the majority of the lots and North star Place. This basin combined with the upland flow generates 13.81 CFS. This corresponds to Analysis point 1 on the drainage basin map. A street capacity calculation spreadsheet located in appendix C shows this flow is safely conveyed within the roadway with mountable curbs. Basin B includes lots 1 and 10 along with North star lane and the front yards of lots 11-14. This basin combined with upland basins generates 18.89 cfs (AP2). A street capacity calculation

spreadsheet located in appendix C shows this flow is safely conveyed within the roadway with standard curbs. As shown in appendix C each single grated inlet captures 8.25 cfs, therefore 2.39 cfs by passes the inlets. As shown on the as built drawings located in appendix A, the HGL at the storm drain connection at main is 5405.50. The HGL's have not been calculated at this time, based upon manning's equation, each pipe will not flow full so the HGL slope will be less than the slope of the pipe therefore the HGL will be less than the top of pipe at each inlet. This flow enters the fully developed Glendale roadway at a rate less than historical, therefore has no affect and is captured by downstream inlets. Basin C contains the rear portion of lots 11-14. This basin combined with the upland basins discharge 2.92 cfs at the northwest wall. As shown in the Turned Blocks Wier calculation sheet, 3 turned blocks safely passes the flows. The flow exists via a 2'x4' gravel 'french-sump' drain against the wall and exists at existing grade. The flow is conveyed to the roadway via a 2' sidewalk culvert which as shown in appendix C has adequate capacity.. The proposed land treatment will conform to the residential density assumptions of the NAADMP. The site discharge is reduced to these master plan assumptions by the creation of water quality ponds in front yards. The impervious area is consistent with table A.5 of the DPM, utilizing 3.5 dwelling units per acre.

SUMMARY AND RECOMMENDATIONS

This project is a development of residential subdivision with the North Albuquerque Acres Master Drainage plan. The development is consistent with the land use assumptions of the plan. The surrounding development diverted the majority of the upland flow. The minor flow from the 4 developed lots to the south is allowed to pass thru the site. The discharge will enter the downstream storm drain where it was anticipated. The inlets, pipes and roadways have been shown to provide the required capacity. The site has been designed in accordance with City of Albuquerque Drainage ordinance. This drainage plan and report conforms to the governing drainage regulations of the City. Since the effected area site encompasses more than 1 acre, a NPDES permit will be required prior to any construction activity.

APPENDIX A

North Albuquerque Acres Master Drainage Plan

And

Excerpts of phase one as-builts

FINAL
NORTH ALBUQUERQUE ACRES
MASTER DRAINAGE PLAN

Prepared For:

City of Albuquerque

Prepared By:

Resource Technology, Inc.

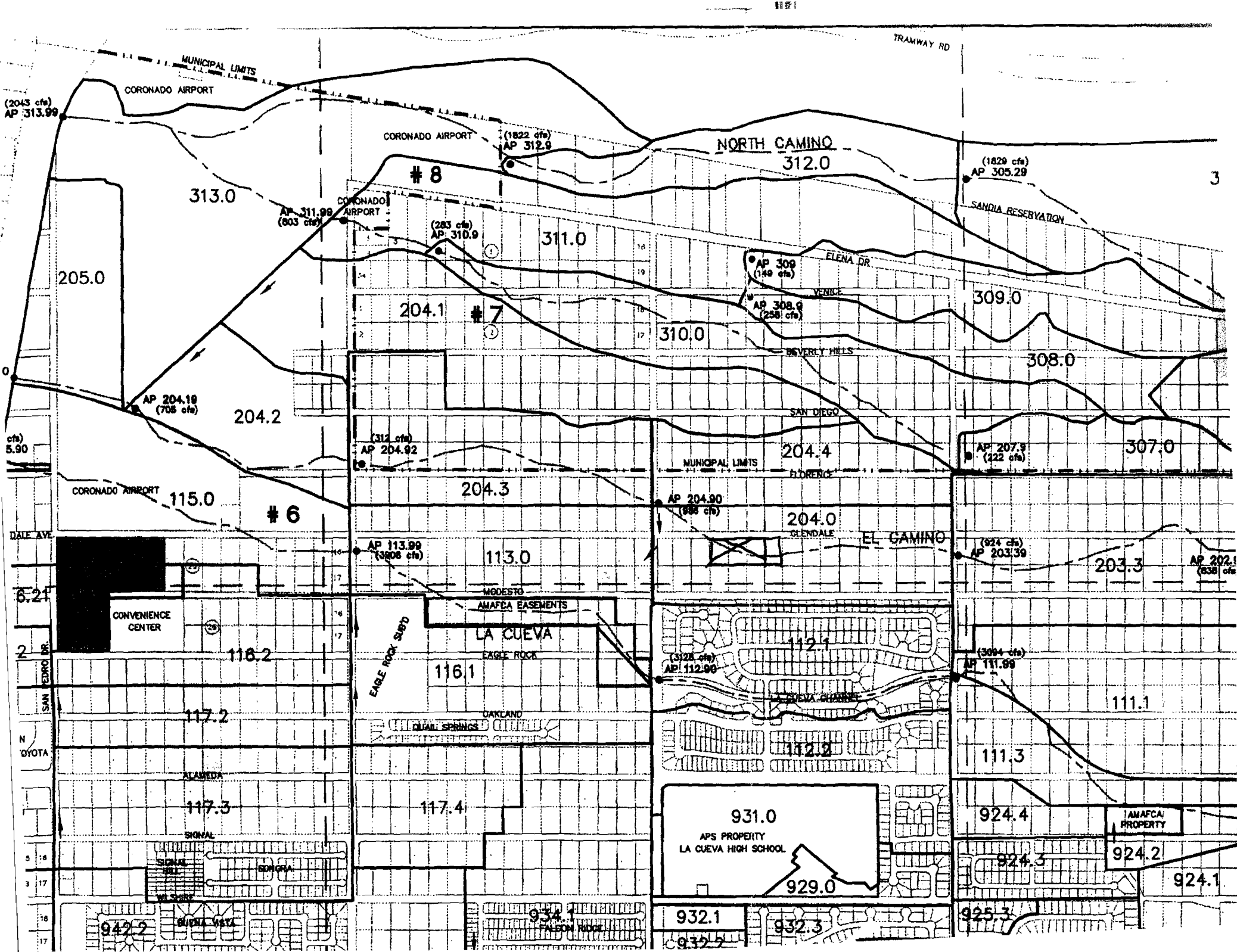
ENGINEERS AND ENVIRONMENTAL SCIENTISTS
1720-B Randolph Road SE, Albuquerque, NM 87106
Telephone (505) 243-7300
Fax (505) 243-7400
rti@nmia.com

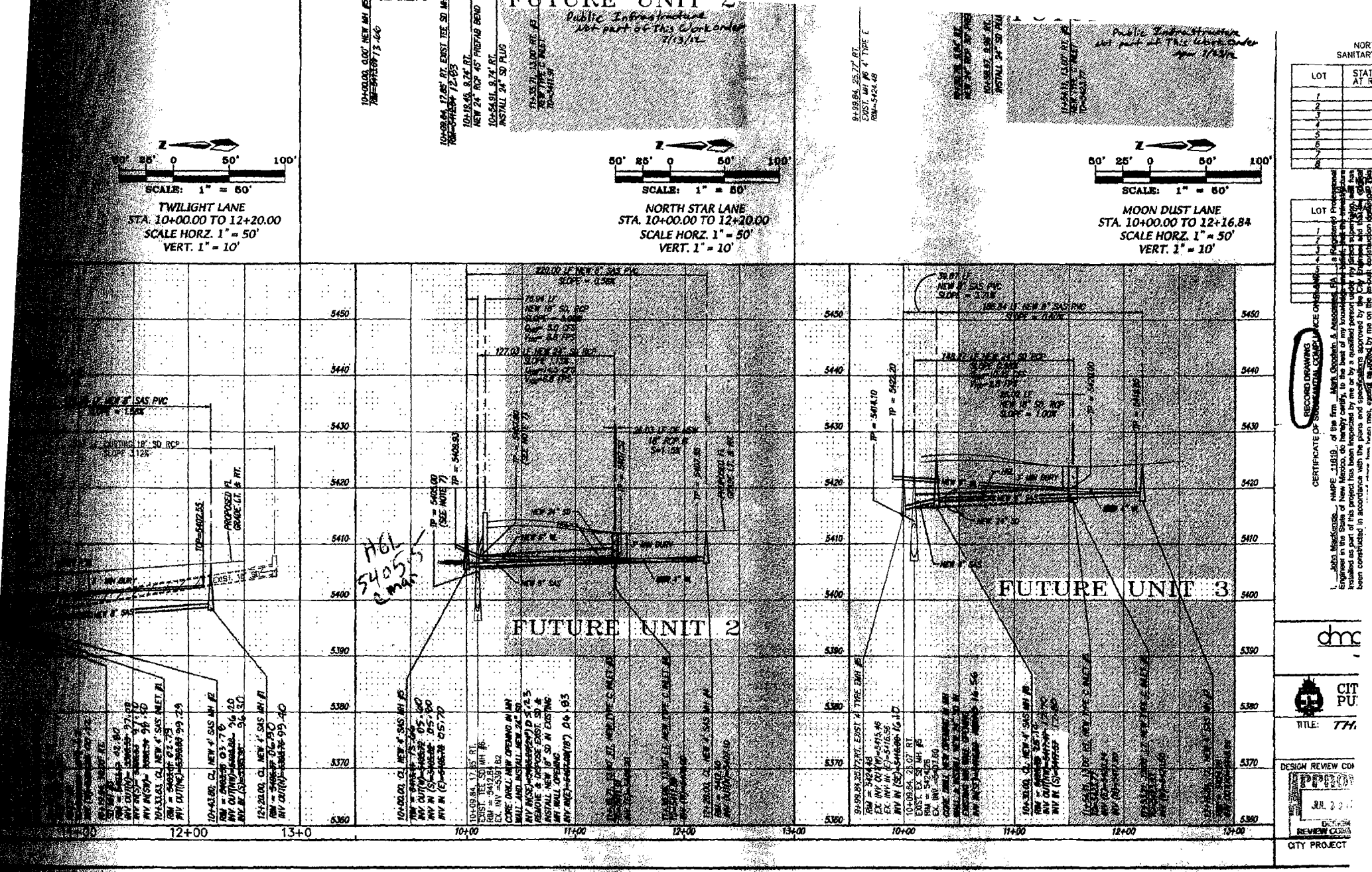
October 1998

TABLE A-4

EL CAMINO ARROYO SUB-BASIN CHARACTERISTICS

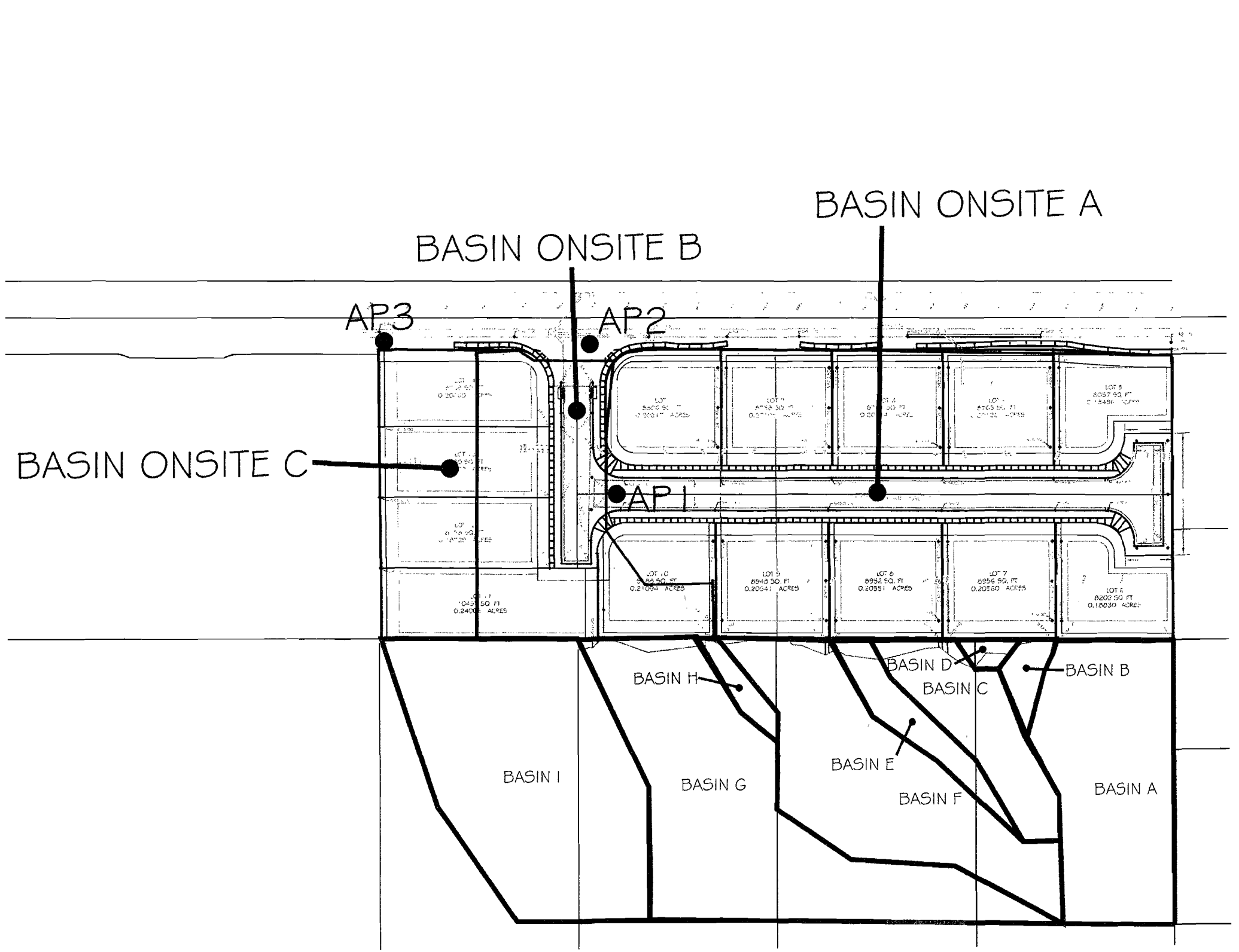
Basin ID	Hydrologic Condition	Basin Area (mi^2)	Land Treatment %				TP (hrs)
			A	B	C	D	
201	Existing	.1339	95	0	0	5	.133
	Future	.1339	95	0	0	5	.133
200	Existing	.3030	65	20	15	0	.167
	Future	.3030	65	20	15	0	.167
202.1	Existing	.1031	84	0	8	8	.133
	Future	.1031	22	23	38	17	.133
202.2	Existing	.1099	70	5	15	10	.14
	Future	.1099	22	23	38	17	.14
202.3	Existing	.0684	60	10	15	15	.133
	Future	.0518	11	26	33	30	.133
203.1	Existing	.1258	80	0	10	10	.14
	Future	.1258	22	23	38	17	.14
203.2	Existing	.0485	80	0	10	10	.133
	Future	.0394	11	26	33	30	.133
203.3	Existing	.0558	80	0	10	10	.133
	Future	.1259	20	20	34	26	.133
204	Existing	.2119	80	0	10	10	.21
	Future	.0773	20	20	34	26	.133
204.2	Existing	.1333	80	0	10	10	.14
	Future	.0687	8	22	25	45	.14
204.1	Existing	.1484	80	0	10	10	.18
	Future	.1288	17	22	31	30	.18
204.3	Future	.0870	10	15	30	45	.133
204.4	Future	.0546	21	21	36	22	.133
205	Existing	.0459	10	0	20	70	.133
	Future	.0543	0	10	20	70	.133
206.1	Existing	.1221	75	5	10	10	.150
	Future	.1221	0	20	30	50	.150
206.2	Existing	.0561	75	5	10	10	.133
	Future	.0561	0	20	30	50	.133
206.3	Existing	.0480	0	7	7	86	.133
	Future	.0480	0	7	7	86	.133
206.4	Existing	.0327	40	25	5	30	.133
	Future	.0327	0	20	30	50	.133


TRAMWAY RD
MUNICIPAL LIMITS
CORONADO AIRPORT
(2043 cfs)
AP 313.99
CORONADO AIRPORT
(1822 cfs)
AP 312.9
NORTH CAMINO
312.0
(1829 cfs)
AP 305.29
SANDIA RESERVATION
8
313.0
AP 311.99
(803 cfs)
CORONADO AIRPORT
(283 cfs)
AP 310.9
311.0
AP 309
(149 cfs)
ELENA DR
VENICE
AP 308.9
(258 cfs)
309.0
205.0
204.1
7
310.0
BEVERLY HILLS
308.0
AP 204.19
(705 cfs)
204.2
SAN DIEGO
(312 cfs)
AP 204.92
204.4
AP 207.9
(222 cfs)
307.0
MUNICIPAL LIMITS
FLORENCE
CORONADO AIRPORT
115.0
6
204.3
AP 204.90
(886 cfs)
204.0
GLENDALE
EL CAMINO
DALE AVE
AP 113.99
(3906 cfs)
113.0
(924 cfs)
AP 203.39
203.3
MODESTO
AMAFCA EASEMENTS
CONVENIENCE CENTER
LA CUEVA
EAGLE ROCK
EAGLE ROCK SUBD
116.2
116.1
112.1
(3128 cfs)
AP 112.90
(3094 cfs)
AP 111.99
LA CUEVA CHANNEL
SAN PEDRO DR
117.2
OAKLAND
QUAIL SPRINGS
111.1
N TOYOTA
112.2
111.3
ALAMEDA
117.3
117.4
931.0
APS PROPERTY
LA CUEVA HIGH SCHOOL
929.0
924.4
AMAFCA PROPERTY
924.2
924.3
924.1
SIGNAL
SIGNAL
GEORGIA
WILSHIRE
942.2
BUENA VISTA
934.1
FALCON RIDGE
932.1
932.3
925.3
932.2


FUTURE UNIT 2
FUTURE UNIT 3
SCALE: 1" = 50'
TWILIGHT LANE
STA. 10+00.00 TO 12+20.00
SCALE HORZ. 1" = 50'
VERT. 1" = 10'
SCALE: 1" = 50'
NORTH STAR LANE
STA. 10+00.00 TO 12+20.00
SCALE HORZ. 1" = 50'
VERT. 1" = 10'
SCALE: 1" = 50'
MOON DUST LANE
STA. 10+00.00 TO 12+16.84
SCALE HORZ. 1" = 50'
VERT. 1" = 10'
Public Infrastructure Not part of this Work Order 7/13/12
Public Infrastructure Not part of This Work Order 7/13/12
RECORD DRAWING
CERTIFICATE OF SUBSTANTIAL COMPLIANCE
DESIGN REVIEW COMMITTEE
CITY PROJECT
TITLE:
1008656

APPENDIX B

SITE HYDROLOGY


BASIN ONSITE A
BASIN ONSITE B
AP3
AP2
BASIN ONSITE C
AP1
BASIN H
BASIN D
BASIN C
BASIN B
BASIN I
BASIN G
BASIN E
BASIN F
BASIN A

Weighted E Method

EAGLE CREST

Existing Developed Basins

											100-Year, 6-hr.		
Basin	Area (sf)	Area (acres)	Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
			%	(acres)	%	(acres)	%	(acres)	%	(acres)			
BASIN A	24002	0.551	43%	0.23693	20.0%	0.110	20.0%	0.1102	17%	0.094	1.127	0.052	1.58
BASIN B	1931	0.044	43%	0.01906	20.0%	0.009	20.0%	0.00887	17%	0.008	1.127	0.004	0.13
BASIN C	10260	0.236	43%	0.10128	20.0%	0.047	20.0%	0.04711	17%	0.040	1.127	0.022	0.68
BASIN D	897	0.021	43%	0.00885	20.0%	0.004	20.0%	0.00412	17%	0.004	1.127	0.002	0.06
BASIN E	4927	0.113	43%	0.04864	20.0%	0.023	20.0%	0.02262	17%	0.019	1.127	0.011	0.32
BASIN F	25284	0.580	43%	0.24959	20.0%	0.116	20.0%	0.11609	17%	0.099	1.127	0.055	1.66
BASIN G	35490	0.815	43%	0.35034	20.0%	0.163	20.0%	0.16295	17%	0.139	1.127	0.077	2.34
BASIN H	1882	0.043	43%	0.01858	20.0%	0.009	20.0%	0.00864	17%	0.007	1.127	0.004	0.12
BASIN I	19312	0.443	43%	0.19064	20.0%	0.089	20.0%	0.08867	17%	0.075	1.127	0.042	1.27
ONSITE A	106556	2.446	0%	0	25.0%	0.612	37.0%	0.90509	38%	0.930	1.604	0.327	9.38
ONSITE B	29722	0.682	0%	0	25.0%	0.171	37.0%	0.25246	38%	0.259	1.604	0.091	2.62
ONSITE C	18770	0.431	0%	0	25.0%	0.108	37.0%	0.15943	38%	0.164	1.604	0.058	1.65
TOTAL ONSITE PROPOSED	155048	3.559	0%	0	25.0%	0.890	37.0%	1.31698	38%	1.353	1.604	0.476	13.65
TOTAL ONSITE ALLOWED	155048	3.559	8%	0.28475	22.0%	0.783	25.0%	0.88985	45%	1.602	1.640	0.486	13.68
TOTAL													

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)
Impervious= 7*(((3.5*3.5)+(5*3.5))^.5) 38 %
Volume = Weighted D * Total Area
UPLAND FLOW BASED UPON NAAMDP
Flow = Qa * Aa + Qb * Ab + Qc * Ac + Qd * Ad

Where for 100-year, 6-hour storm (zone 3)

Ea= 0.66	Qa= 1.87
Eb= 0.92	Qb= 2.6
Ec= 1.29	Qc= 3.45
Ed= 2.36	Qd= 5.02

FLOW SUMMARY

ANALYSIS POINT AP1	13.81 CFS
ANALYSIS POINT AP2	18.89 CFS
ANALYSIS POINT AP3	2.92 CFS
MAX FLOW AT TURNED BLOCK	2.34 CFS
ALLOWED DISCHARGE PER NAAMDP	13.68
ONSITE DISCHARGE	13.65

APPENDIX C

HYDRAULIC CALCULATIONS

Street Capacity Calculations

NORTHSTAR PLACE AT AP1

26' F-F Street Section with 4" curb

Slope= 0.03

Q=13.81 CFS

For water depths less than 0.0625 feet

Y= Water depth
Area = 16*Y^2
P= SQRT(1025*Y^2) + Y
n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.33	0.00	0.00	0.00	0.43	0.00	0.76	0.00691
0.02	0.0064	0.66	0.01	0.00	0.01	0.69	0.01	0.86	0.01624
0.025	0.01	0.83	0.01	0.01	0.02	0.80	0.02	0.89	0.02136
0.035	0.0196	1.16	0.02	0.02	0.04	1.00	0.03	0.94	0.03228
0.045	0.0324	1.49	0.02	0.04	0.08	1.18	0.05	0.98	0.04391
0.052	0.043264	1.72	0.03	0.06	0.11	1.30	0.07	1.01	0.0524
0.06	0.0576	1.98	0.03	0.08	0.16	1.43	0.09	1.03	0.0624
0.0625	0.0625	2.06	0.03	0.09	0.18	1.47	0.09	1.04	0.06559

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625
A2= A1 + 2*Y1 + 25*Y1^2
P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.063506	2.09	0.03	0.09	0.19	1.47	0.09	1.04	0.06598
0.1	0.172656	3.98	0.04	0.32	0.65	1.87	0.19	1.04	0.10566
0.13	0.311406	5.51	0.06	0.69	1.39	2.23	0.29	1.09	0.14572
0.16	0.495156	7.04	0.07	1.28	2.56	2.58	0.41	1.14	0.1894
0.2	0.810156	9.08	0.09	2.45	4.90	3.02	0.60	1.19	0.25153
0.207	0.873506	9.43	0.09	2.71	5.41	3.10	0.64	1.20	0.26277
0.2612	1.446942	12.20	0.12	5.29	10.58	3.65	0.95	1.26	0.35291
0.3025	**1.9825**	**14.31**	**0.14**	**8.04**	**16.08**	**4.05**	**1.23**	**1.30**	**0.42471**

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025
A3= A2 + Y2*13
P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	1.9895	14.31	0.14	8.09	16.17	4.06	1.23	1.30	0.42622
0.3039	2.0021	14.31	0.14	8.17	16.34	4.08	1.24	1.30	0.42894
0.3062	2.0343	14.31	0.14	8.39	16.78	4.12	1.26	1.31	0.43588
0.31	2.0875	14.31	0.15	8.76	17.51	4.19	1.30	1.33	0.44737
0.3125	2.1225	14.32	0.15	9.00	18.00	4.24	1.33	1.34	0.45494
0.32	2.2275	14.32	0.16	9.75	19.51	4.38	1.40	1.36	0.47767
0.3317	2.3913	14.34	0.17	10.97	21.94	4.59	1.52	1.40	0.51325
0.333	2.4095	14.34	0.17	11.11	22.22	4.61	1.54	1.41	0.51721

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333
A4= A3 + 13 * Y3 + 25 * Y3^2
P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.335	2.4376	14.44	0.17	11.27	22.55	4.63	1.55	1.41	0.52038

Street Capacity Calculations

NORTH STAR LANE

26' F-F Street Section with 8" curb

Slope= 0.005

Q=18.89 CFS

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.00	0.17	0.00	0.00	0.00	0.17	0.00	0.31	0.0016081
0.02	0.00	0.34	0.01	0.00	0.00	0.28	0.01	0.34	0.0039311
0.04	0.01	0.68	0.02	0.01	0.01	0.44	0.02	0.38	0.0095654
0.06	0.03	1.02	0.03	0.02	0.03	0.57	0.03	0.41	0.0160557
0.08	0.05	1.36	0.04	0.04	0.07	0.69	0.06	0.43	0.0231616
0.1	0.08	1.70	0.05	0.06	0.13	0.80	0.08	0.45	0.030757
0.12	0.12	2.04	0.06	0.10	0.21	0.91	0.11	0.46	0.0387629
0.125	0.13	2.13	0.06	0.12	0.23	0.93	0.12	0.47	0.0408217

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.14	2.38	0.06	0.12	0.25	0.91	0.12	0.45	0.0397601
0.16	0.23	3.91	0.06	0.21	0.42	0.92	0.15	0.41	0.0418764
0.2	0.42	5.95	0.07	0.44	0.87	1.05	0.21	0.41	0.0537489
0.24	0.69	8.00	0.09	0.82	1.65	1.20	0.29	0.43	0.0695702
0.2846	1.08	10.27	0.11	1.49	2.98	1.38	0.39	0.46	0.0896739
0.32	1.47	12.08	0.12	2.22	4.44	1.52	0.48	0.47	0.1068876
0.3551	1.91	13.87	0.14	3.15	6.29	1.65	0.59	0.49	0.124804
0.365	2.05	14.37	0.14	3.45	6.89	1.68	0.61	0.49	0.12999

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.12	14.38	0.15	3.64	7.29	1.72	0.64	0.50	0.1350191
0.4556	3.31	14.46	0.23	7.67	15.34	2.31	1.05	0.60	0.223263
0.4848	3.72	14.49	0.26	9.30	18.59	2.50	1.21	0.63	0.2541815
0.5	**3.94**	**14.51**	**0.27**	**10.19**	**20.38**	**2.59**	**1.30**	**0.65**	**0.2704223** XXX
0.54	4.50	14.55	0.31	12.70	25.40	2.83	1.53	0.68	0.3136088
0.5584	4.75	14.56	0.33	13.92	27.85	2.93	1.64	0.69	0.3336809
0.63	5.76	14.64	0.39	19.09	38.18	3.32	2.09	0.74	0.4129151
0.667	6.27	14.67	0.43	22.00	44.01	3.51	2.34	0.76	0.4545048

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.76	16.32	0.41	23.23	46.45	3.43	2.40	0.72	0.4471541
0.72	7.09	17.32	0.41	24.13	48.26	3.41	2.45	0.71	0.4451558

TURNED BLOCKS

Weir Equation:

$$Q = CLH^{3/2}$$

West drainage swale thru walls

Q= 2.92 cfs
C = 2.95
H = 0.5 ft
L = Length of weir

$$Q = 2.95 * .5 * ((0.5)\text{^}(3/2))$$

Each opening is 6"x6"
Each block has two openings
Each opening has .52 cfs capacity

For west lots
Therefore 2.92 cfs requires 6 openings and 3 turned blocks

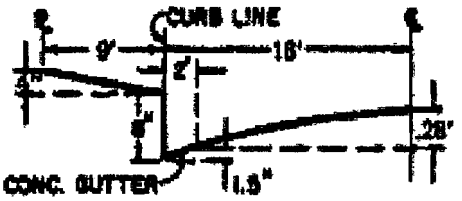
For south lots
Therefore 2.34 cfs requires 4.5 openings and 3 turned blocks

SIDEWALK CULVERT CAPACITY

Depth (ft)	Area (ft^2)	WP (ft)	R	Slope (%)	Q Provided (cfs)	Q Required (cfs)	Velocity (ft/s)
0.67	2.68	5.34	0.5018727	2	20.98	2.92	1.09
0.67	1.34	3.34	0.4011976	2	9.04	2.92	2.18

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

GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

INLET CALCULATION

PLATE 22.3 D-5

Pipe Capacity

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
24" RCP	24	1.13	3.14	0.5	18.44	16.50	5.25
18" RCP	18	2	1.77	0.375	11.39	8.25	4.67

Manning's Equation:

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

A = Area
R = D/4
S = Slope
n = 0.017

EROSION CONTROL NOTES:

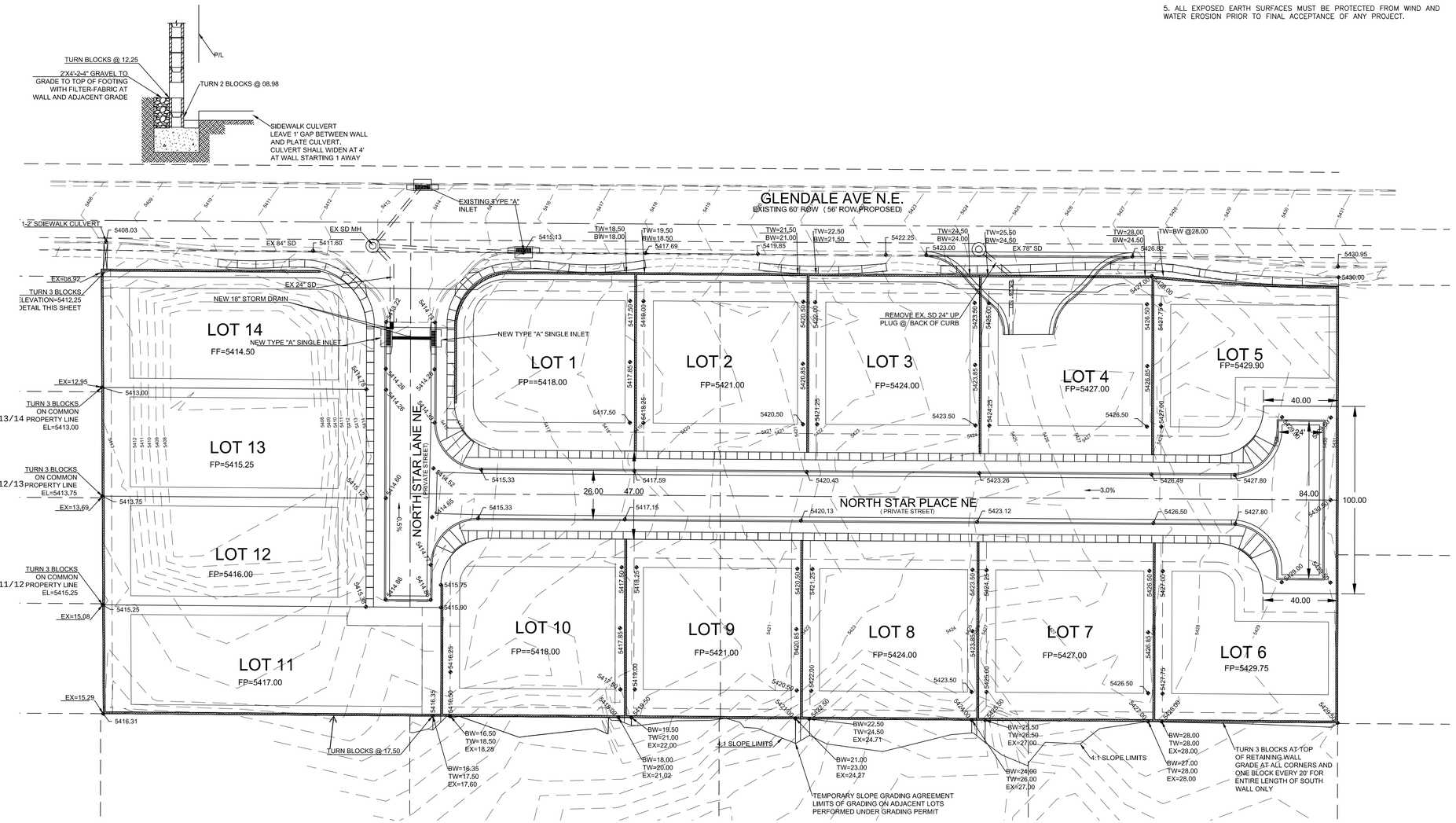
1. CONTRACTOR IS RESPONSIBLE FOR OBTAINING A TOPSOIL DISTURBANCE PERMIT PRIOR TO BEGINNING WORK.

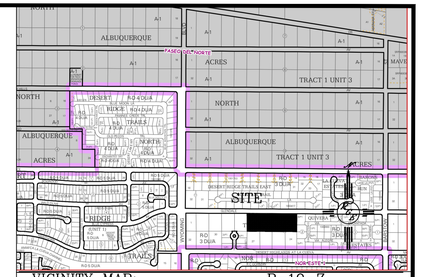
2. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN–OFF ON SITE DURING CONSTRUCTION.

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.





VICINITY MAP: B-19-Z

FIRM MAP: 35001C0133H

LEGAL DESCRIPTION:

TRACTS A AND B, THE ESTATES @ GLENDALE ESTATES

NOTES:

1. ALL SPOT ELEVATIONS REPRESENT FLOWLINE ELEVATION UNLESS OTHERWISE NOTED

2. ALL CURB AND GUTTER TO 4" MOUNTABLE–ROLL UNLESS OTHERWISE NOTED, EXCEPTING ALAMEDA AND OAKLAND WHICH SHALL BE 8" STANDARD.

3. ALL RETAINING WALL DESIGN SHALL BE BY OTHERS.

LEGEND

- EXISTING CONTOUR
- EXISTING INDEX CONTOUR
- 5414 — PROPOSED CONTOUR
- 5415 — PROPOSED INDEX CONTOUR
- SLOPE TIE
- 4048.25 — EXISTING SPOT ELEVATION
- 4048.25 — PROPOSED SPOT ELEVATION
- BOUNDARY
- CENTERLINE
- RIGHT–OF–WAY
- PROPOSED CURB AND GUTTER
- EXISTING CURB AND GUTTER
- PROPOSED SIDEWALK
- PROPOSED SETBACK
- PROPOSED LOT LINE
- PROPOSED SCREEN WALL
- PROPOSED RETAINING WALL

N

GRAPHIC SCALE

60 30 0 30 60

SCALE: 1"=30'

Rio Grande Engineering
1606 CENTRAL AVENUE SUITE 201
ALBUQUERQUE, NM 87106
(505) 872-0999

PROJECT TITLE:
ESTATES AT GLENDALE UNIT 2

DRAWING TITLE:
GRADING AND DRAINAGE

DAVID SQUIRE NEW MEXICO 14522 REGISTERED PROFESSIONAL ENGINEER
10/13/14

10-12-2014 | PROJECT NO. 090613 | 21331

DRAWING NO.
DRB 3.0