REVISED
DRAINAGE REPORT

For

THE ESTATES AT GLENDALE

Albuquerque, New Mexico

Prepared by

Rio Grande Engineering
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JANUARY 2015

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Appendix

Map

PURPOSE

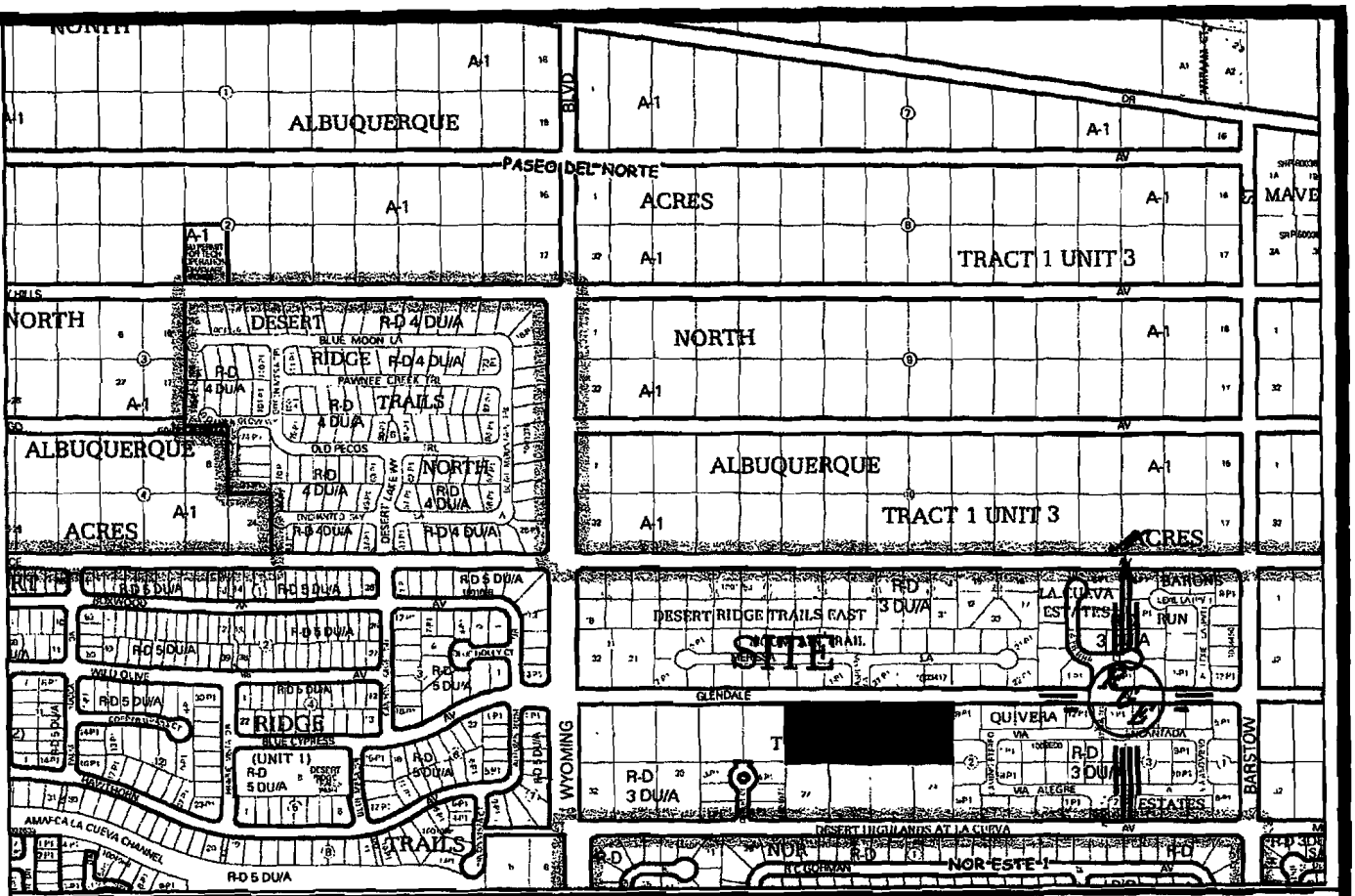
The purpose of this report is to provide the Drainage Management Plan for the development of a 14-lot subdivision located on Glendale Avenue between Wyoming Boulevard and Barstow Street NE. This plan was prepared in accordance with the City of Albuquerque design regulations, utilizing the City of Albuquerque's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

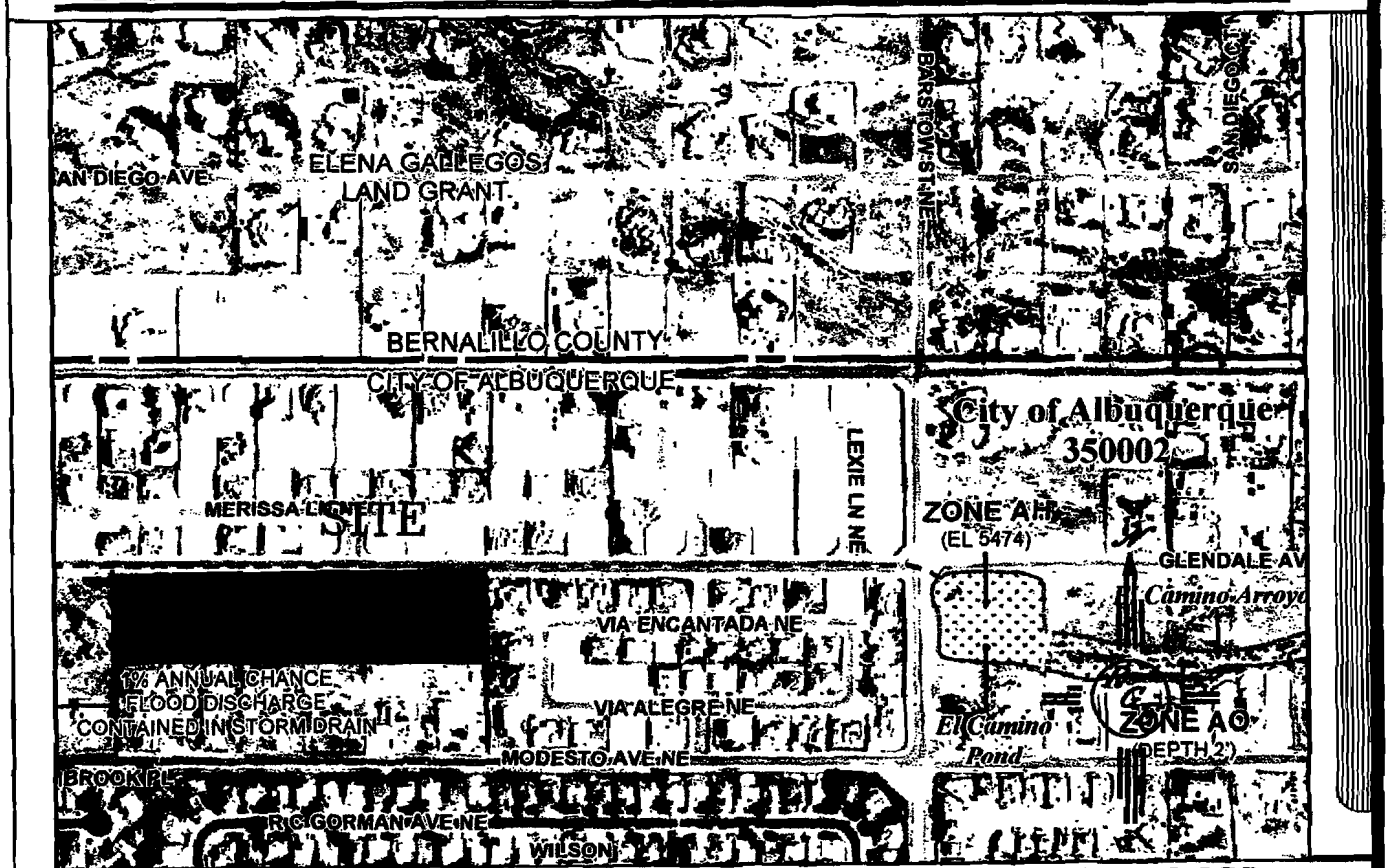
The subject of this report, as shown on the Exhibit A, is a 3.55-acre parcel of land located on the south side of Glendale Avenue between Wyoming Boulevard and Barstow Street NE. The legal description of this site is tracts A&B the Estates at Glendale Subdivision. As shown on FIRM map35013C0133H, the 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. The subdivision is required to retain the first .34" of rain or 182 cubic feet per lot. The slopes of the lots preclude front yard ponds so an alternative underground catchment basin- stormtech DC780 is required. Due to the density of the lots the underground chambers will be increased to capture the excess in flow. The site contains 58% land treatment D. The basins are designed to capture the flow generated by 1600 square feet of impervious area of each lot, which constitutes 14% of the total site. To estimate the attenuated flow we have substituted the 14% type D treatment for type C. The resultant flow will be less than the calculated but this method was used to be conservative. The infiltrator systems details and specification have been added as a detail sheet. All the flow leaving the site will be conveyed via surface drainage to a set of double A inlets located at the intersection of North star lane and north star place. 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 flow is allowed to enter the site and drain to the street through the new lots. The peak flow affecting each lot has been shown on the hydraulic spread sheet. The flow from basin I is currently captured by a concrete rundown constructed with unit 1. 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 generated 9.67 and when combined with the upland flow discharges 14.96 CFS. Basin B contains the western portion of the subdivision and North star lane, this basin generated 3.53 cfs, and discharges 6.41 cfs when combined with upland basin. Basin C contains the rear yards of lots 11-14. This basin generates .88 cfs and 1,384 cubic feet of storm water. Due to the commitments to the adjacent properties within phase one we are not allowed to construct new retaining wall directly adjacent to the existing wall existing. Therefore we have placed the underground storage chambers in the rear yards to capture the flow generated from this basin. We have accounted for the emergency overflow by placing turned blocks and a sidewalk culvert at Glendale.

A street capacity calculation spreadsheet located in appendix C shows this flow is safely conveyed within the roadway. The inlets are in a sump condition and appendix C shows they have capacity, in the event of clogging the flow will raise to the flow line water block .56' above the grate and discharge down Glendale. 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. 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 catchment basins.

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 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:

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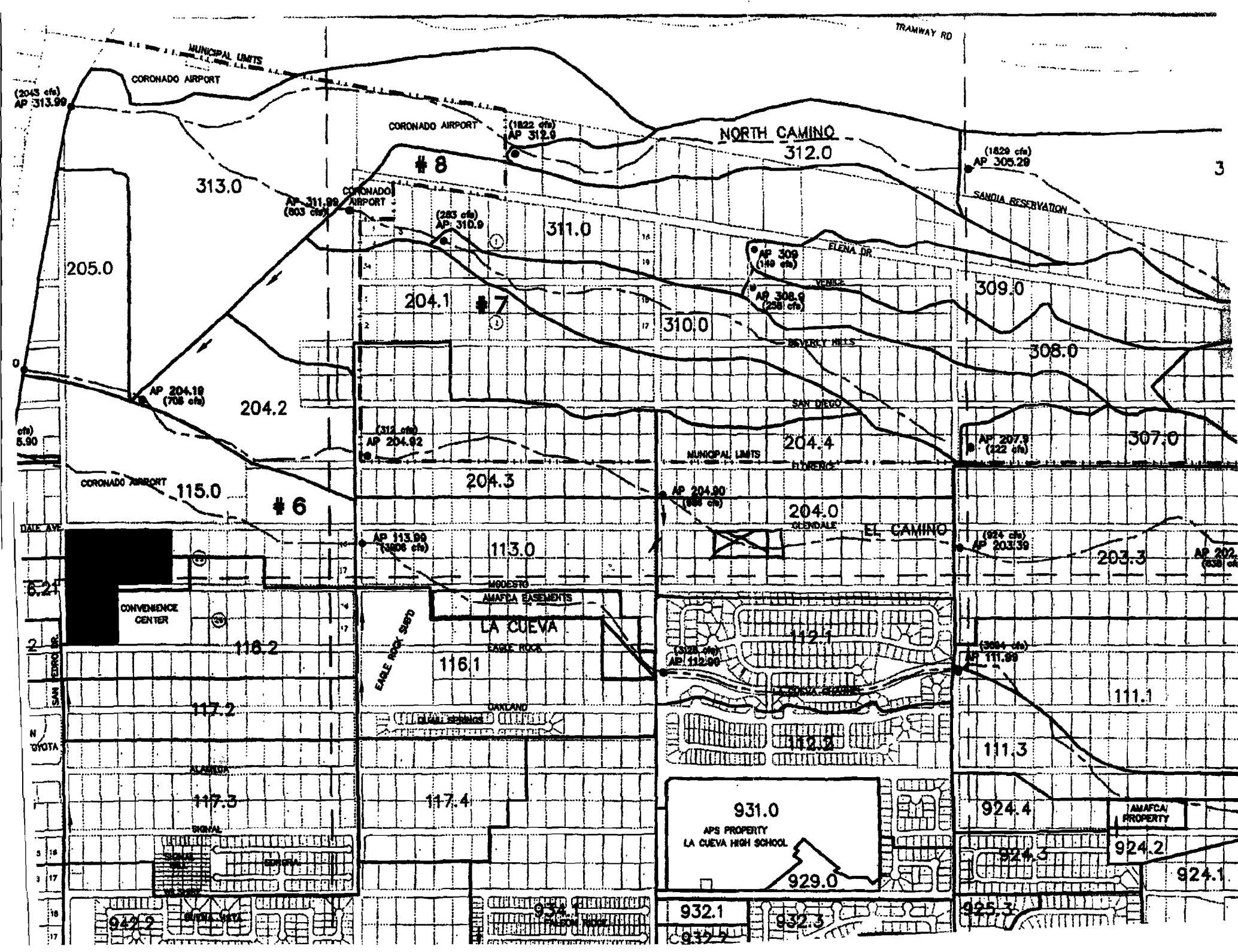
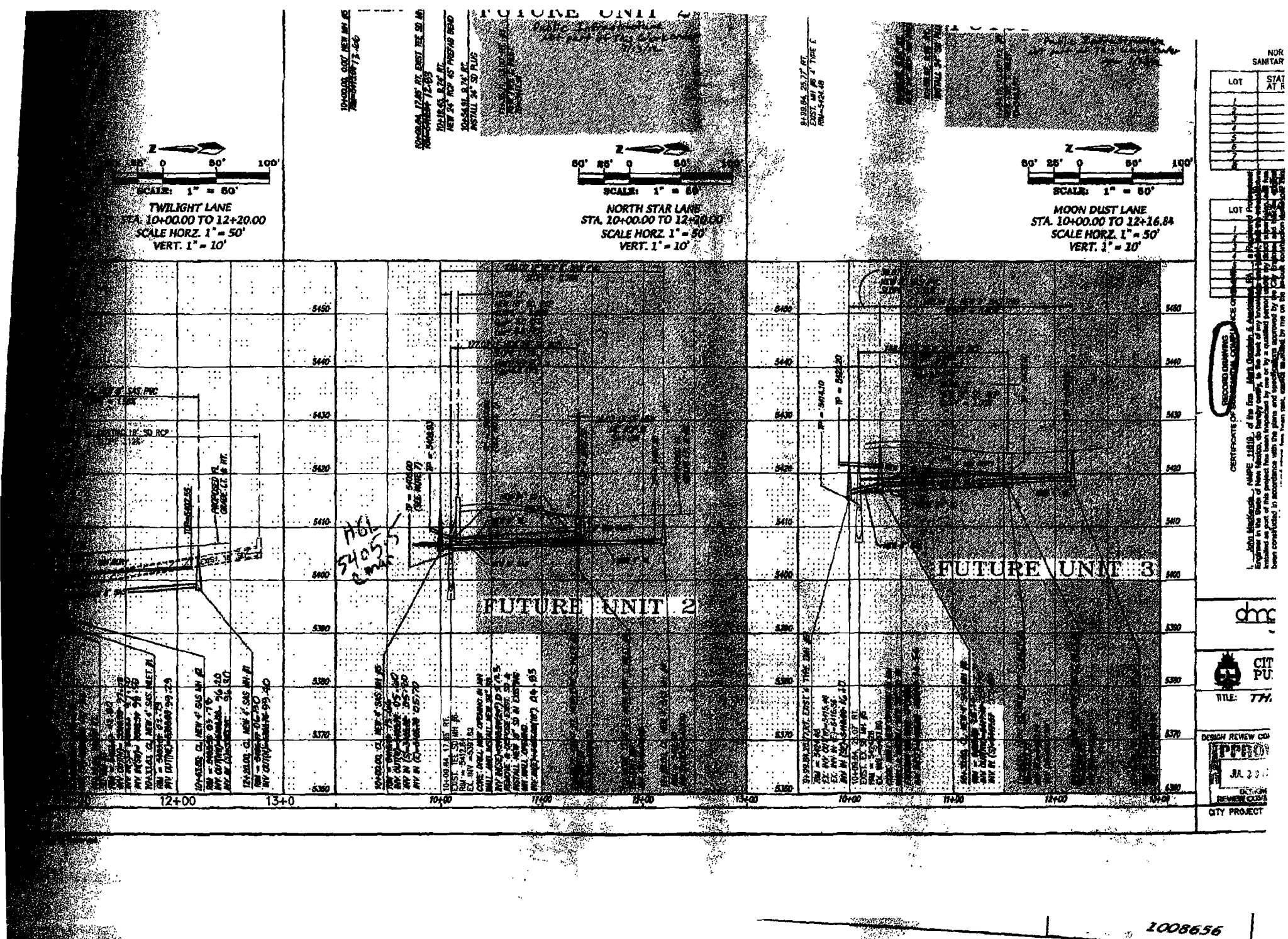
October 1998

TABLE A-4

EL CAMINO ARROYO SUB-BASIN CHARACTERISTICS

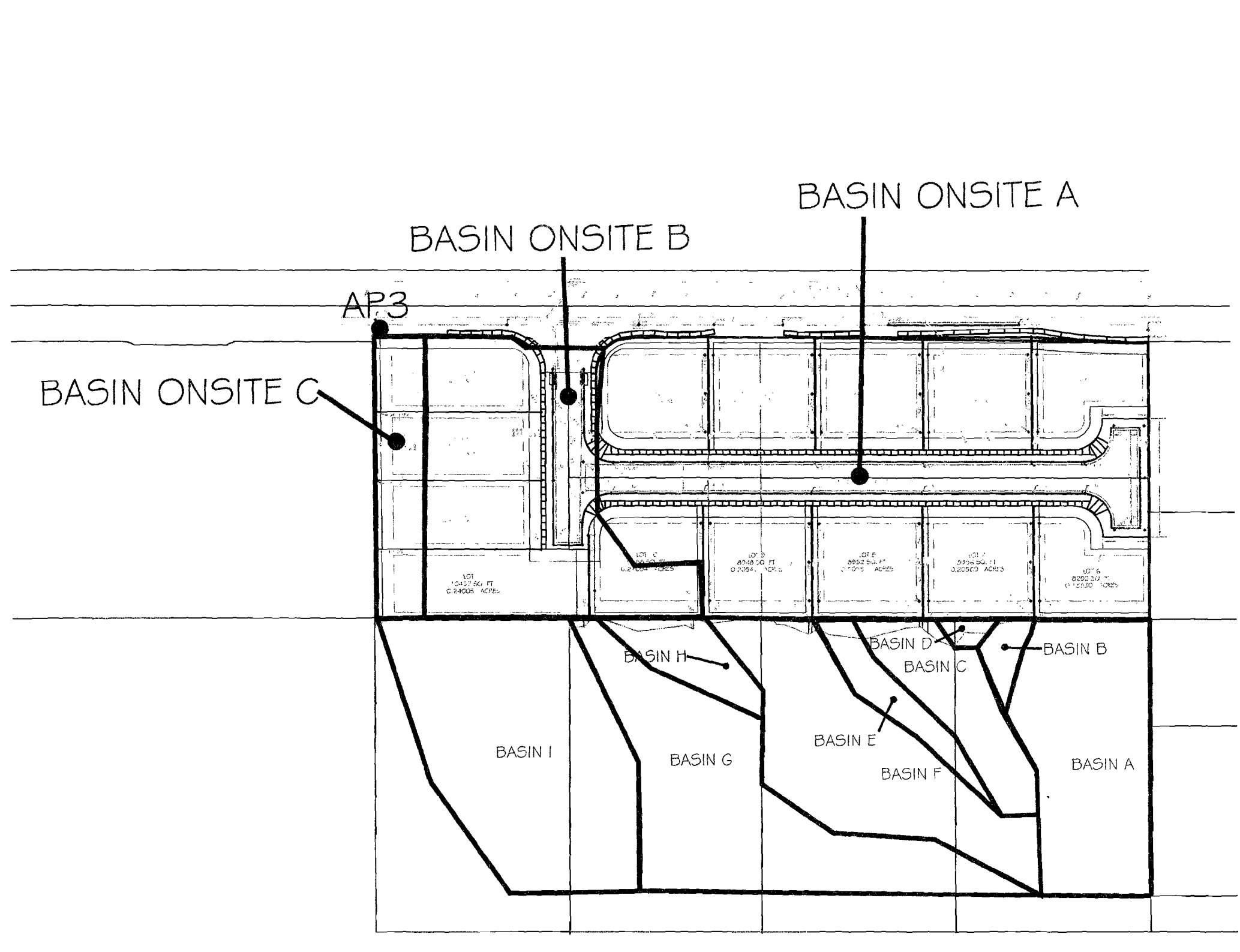
Basin ID	Hydrologic Condition	Basin Area (mi^2)	Land Treatment %				TP (hrs)
			A	B	C	D	
201	Existing	.1339	95	0	0	5	.133
	Future	.1339	95	0	0	5	.133
200	Existing	.3030	65	20	15	0	.167
	Future	.3030	65	20	15	0	.167
202.1	Existing	.1031	84	0	8	8	.133
	Future	.1031	22	23	38	17	.133
202.2	Existing	.1099	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
313.0
205.0
204.1
#8
#7
#6
311.0
310.0
204.2
204.3
115.0
204.4
204.0
NORTH CAMINO
312.0
SANDIA RESERVATION
ELENA DR
VENICE
BEVERLY HILLS
SAN DIEGO
FLORENCE
EL CAMINO
309.0
308.0
307.0
203.3
DALE AVE
CONVENIENCE CENTER
6.21
MODESTO
AMAFCA EASEMENTS
LA CUEVA
EAGLE ROCK
EAGLE ROCK SWD
116.2
116.1
117.2
OAKLAND
ALAMEDA
117.3
117.4
112.1
112.3
111.1
111.3
924.4
924.3
924.2
924.1
931.0
APS PROPERTY
LA CUEVA HIGH SCHOOL
929.0
932.1
932.3
932.2
934.1
942.2
SAN PEDRO DR.
N GYOTA


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'
FUTURE UNIT 2
FUTURE UNIT 3
12+00
13+0
10+00
11+00
12+00
13+00
10+00
11+00
12+00
10+00
5450
5440
5430
5420
5410
5400
5390
5380
5370
5360
HGL 5405
RECORD DRAWING
1008656

APPENDIX B

SITE HYDROLOGY


BASIN ONSITE A
BASIN ONSITE B
AP3
BASIN ONSITE C
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 A (acres)	Treatment B %	Treatment B (acres)	Treatment C %	Treatment C (acres)	Treatment D %	Treatment D (acres)	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
BASIN A	24002	0.551	20%	0.1102	20.0%	0.110	34.0%	0.18734	26%	0.143	1.368	0.063	1.86
BASIN B	1858	0.043	0%	0	0.0%	0.000	0.0%	0	100%	0.043	2.360	0.008	0.21
BASIN C	10260	0.236	20%	0.04711	20.0%	0.047	34.0%	0.08008	26%	0.061	1.368	0.027	0.79
BASIN D	897	0.021	20%	0.00412	20.0%	0.004	34.0%	0.007	26%	0.005	1.368	0.002	0.07
BASIN E	4927	0.113	20%	0.02262	20.0%	0.023	34.0%	0.03846	26%	0.029	1.368	0.013	0.38
BASIN F	25284	0.580	20%	0.11609	20.0%	0.116	34.0%	0.19735	26%	0.151	1.368	0.066	1.96
BASIN G	31607	0.726	20%	0.14512	20.0%	0.145	34.0%	0.2467	26%	0.189	1.368	0.083	2.45
BASIN H	5619	0.129	20%	0.0258	20.0%	0.026	34.0%	0.04386	26%	0.034	1.368	0.015	0.43
BASIN I	19312	0.443	20%	0.08867	20.0%	0.089	34.0%	0.15074	26%	0.115	1.368	0.051	1.50
ONSITE A	106556	2.446	0%	0	22.0%	0.538	34.0%	0.8317	44%	1.076	1.679	0.342	9.67
ONSITE B	38854	0.892	0%	0	22.0%	0.196	34.0%	0.30327	44%	0.392	1.679	0.125	3.53
ONSITE C	9890	0.227	0%	0	22.0%	0.050	34.0%	0.07719	44%	0.100	1.679	0.032	0.90
INFILTRATOR CAPTURE	1600	0.037	0%	0	0.0%	0.000	0.0%	0	100%	0.037	2.360	0.007	0.18
TOTAL ONSITE PROPOSED	155300	3.565	0%	0	25.0%	0.891	37.0%	1.31912	38%	1.355	1.604	0.477	13.67
TOTAL ONSITE ALLOWED	155300	3.565	8%	0.28522	22.0%	0.784	25.0%	0.8913	45%	1.604	1.640	0.487	13.70
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

UPLAND 9.65 TOTAL

AFFECTED LOT	
6	1.86 CFS
7	0.28 CFS
8	1.18 CFS
9	1.96 CFS
10	0.43 CFS
11	2.45 CFS

EX. CHANNEL ON LOT11 1.50 CFS

ALLOWABLE DISCHARGE PER PREVIOUS REPORT 23.84 CFS(UPLAND AND ONSITE)
ALLOWABLE DISCHARGE ONSITE 13.70 CFS ONSITE
EACH INFILTRATOR CAPTURES 314 CF EQUAVALENT TO 1600 SF OF IMPERVIOUS AREA
TOTAL IMPERVIOUS AREA CAPTURED=22400 SF OR 14% OF TOTAL AREA
REAR YARD GENERATION 0.22 CFS 346.03 CF
FIRST FLUSH REQUIREMENT (CF)= 2552.0967 TOTAL 182.29 PER LOT
STREET FLOW
NORTH STAR PLACE 14.95 CFS (ONSITEA+A+B+C+D+E+F)
NORTH STAR LANE 6.41 CFS (ONSITE B+G+H)
INLETS 21.35 CFS

C

APPENDIX C

HYDRAULIC CALCULATIONS

Street Capacity Calculations

NORTHSTAR PLACE

26' F-F Street Section with 4" curb

Slope= 0.03

Q=14.95 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
0.3601	2.80726	15.69	0.18	13.49	26.99	4.81	1.73	1.41	0.56106
0.38	3.122725	16.69	0.19	15.47	30.94	4.95	1.88	1.42	0.59436
0.4196	3.809389	18.67	0.20	19.99	39.98	5.25	2.20	1.43	0.66299
0.4603	4.596832	20.70	0.22	25.52	51.04	5.55	2.56	1.44	0.73635
0.504	5.534525	22.89	0.24	32.52	65.05	5.88	2.96	1.46	0.81782
0.513	5.7395	23.34	0.25	34.11	68.22	5.94	3.05	1.46	0.8349

Street Capacity Calculations

north star lane

28' F-F Street Section with 8" curb

Slope= 0.005

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
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
0.74	7.43	18.32	0.41	25.15	50.30	3.39	2.51	0.69	0.4446941
0.76	7.79	19.32	0.40	26.28	52.56	3.37	2.56	0.68	0.4455653
0.78	8.17	20.32	0.40	27.53	55.06	3.37	2.63	0.67	0.4476018
0.8	8.58	21.32	0.40	28.89	57.78	3.37	2.69	0.66	0.4506645
0.847	9.60	23.68	0.41	32.52	65.05	3.39	2.87	0.65	0.4612712

DROP INLET CALCULATIONS

INLET	TYPE OF INLET	AREA (SF)	Q (CFS)	H (FT)	H ALLOW (FT)
1	DOUBLE 'A'	11.84	23	0.1628	0.56

ORIFICE EQUATION

Q = CA sqrt(2gH)

C = 0.6

g = 32.2

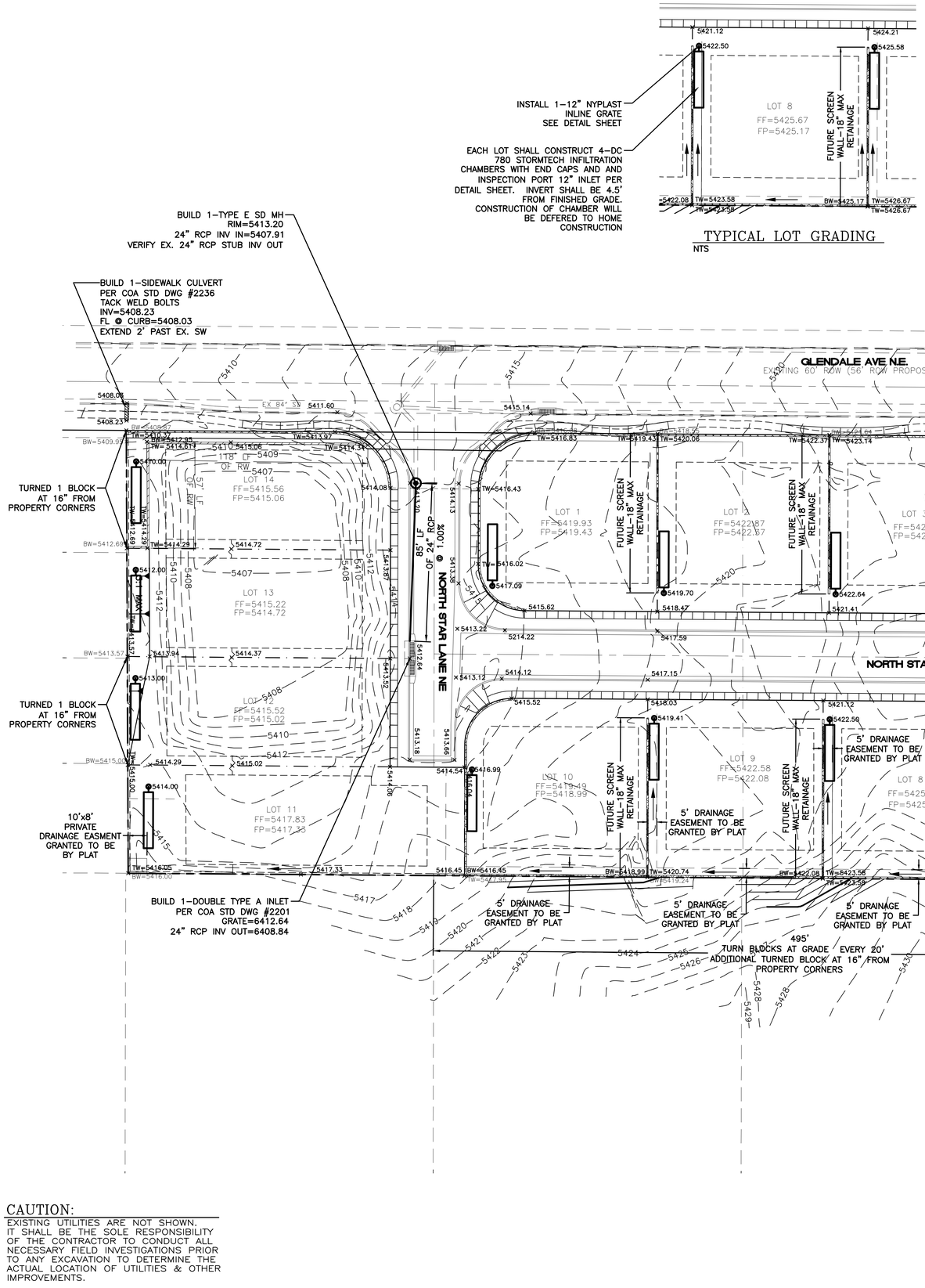
Pipe Capacity

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
24" RCP	24	1	3.14	0.5	22.68	21.35	6.80

Manning's Equation:

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

A = Area
R = D/4
S = Slope
n = 0.013



TYPICAL LOT GRADING

NTS

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.

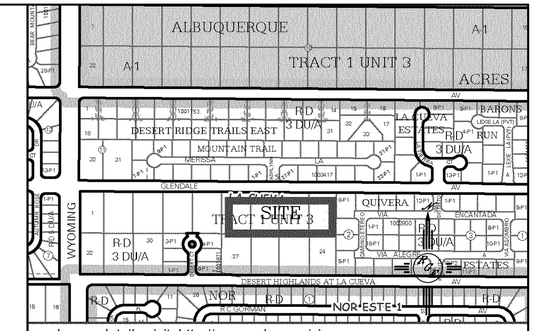
3. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT–OF–WAY.

4. REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.

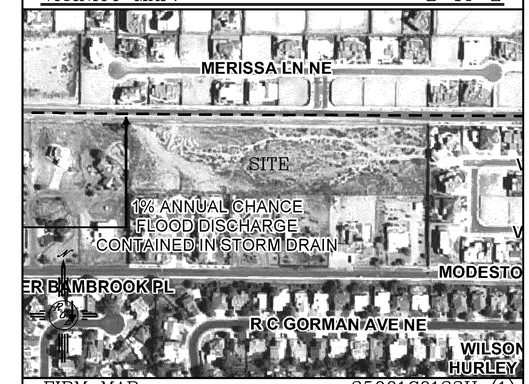
5. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL ACCEPTANCE OF ANY PROJECT.

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.



VICINITY MAP: B–19–Z



FIRM MAP: 35001C0133H (1)

LEGAL DESCRIPTION:

TR. A AND B, THE ESTATES AT GLENDALE

NOTES:

1. ALL SPOT ELEVATIONS REPRESENT FLOWLINE ELEVATION UNLESS OTHERWISE NOTED.

2. ALL RETAINING WALL DESIGN SHALL BE BY OTHERS.

LEGEND

- EXISTING CONTOUR
- EXISTING INDEX CONTOUR
- PROPOSED CONTOUR
- PROPOSED INDEX CONTOUR
- SLOPE TIE
- EXISTING SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- BOUNDARY
- CENTERLINE
- RIGHT–OF–WAY
- PROPOSED DRAINAGE EASEMENT
- PROPOSED CURB AND GUTTER
- EXISTING CURB AND GUTTER
- PROPOSED SCREEN WALL (18" MAX RETAINAGE)
- PROPOSED RETAINING WALL (HEIGHT VARIES–DESIGN BY OTHERS)
- EXISITNG SCREEN WALL

N

30 15 0 15 30

SCALE: 1"=30'

ENGINEER'S SEAL

DAVID SOULE NEW MEXICO 14522 REGISTERED PROFESSIONAL ENGINEER

1/5/15

DAVID SOULE P.E. #14522

ESTATES AT GLENDALE UNIT 2

GRADING AND DRAINAGE PLAN

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

DRAWN BY WCWJ

DATE 1–04–15

21425–LAYOUT–12–18–14

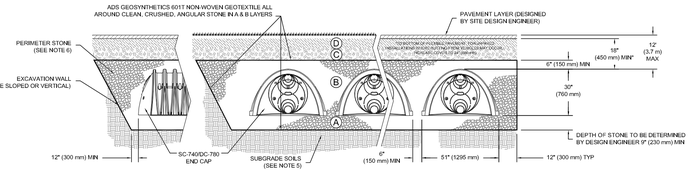
SHEET # —

JOB # 21425

ACCEPTABLE FILL MATERIALS: STORMTECH DC-780 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL**: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS, CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL**: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145* A-1, A-2-4, A-3 OR AASHTO M43* 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE**: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE (A LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43* 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE**: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE, NOMINAL SIZE DISTRIBUTION BETWEEN 3/4-2 INCH (20-50 mm)	AASHTO M43* 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. * *

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

1. DC-780 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. DC-780 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE "SITE DESIGN ENGINEER" REFERS TO THE ENGINEER RESPONSIBLE FOR THE DESIGN AND LAYOUT OF THE STORMTECH CHAMBERS FOR THIS PROJECT.
5. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
6. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
7. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

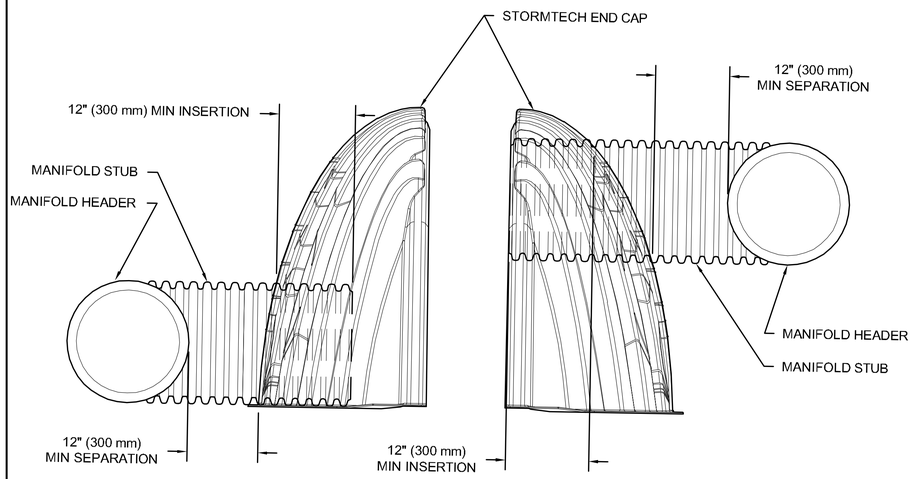
DC-780 STANDARD CROSS SECTION — DRAWN: JLM — CHECKED: JLM — DATE: 11/19/14 — PROJECT #: — DESCRIPTION — REV — DRW — CHK

StormTech — 4640 TRUEMAN BLVD HILLIARD, OH 43026 (800)733-7473

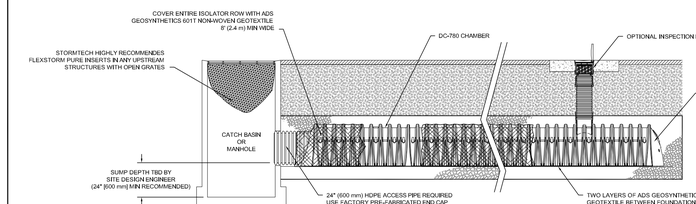
SHEET 1 OF 1

MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.



DC-780 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

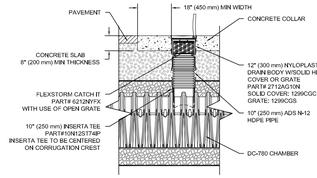
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR-FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



DC-780 INSPECTION PORT DETAIL
NTS

DC-780 ISOLATOR ROW DETAILS — DRAWN: JLM — CHECKED: JLM — DATE: 11/19/14 — PROJECT #: — DESCRIPTION — REV — DRW — CHK

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SHEET 1 OF 1

DC-780 TECHNICAL SPECIFICATION

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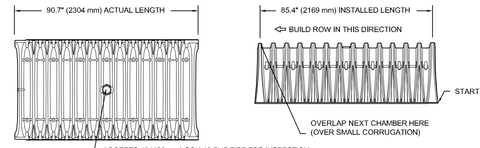
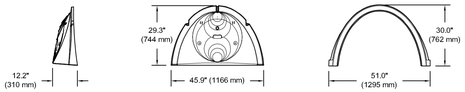


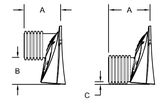
ACCEPTS 4" (100 mm) SCH 40 PVC PIPE FOR INSPECTION PORT. FOR PIPE SIZES LARGER THAN 4" (100 mm) UP TO 10" (250 mm) USE INSERTA TEE CONNECTION CENTERED ON A CHAMBER CREST CORRUGATION



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	46.2 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	78.4 CUBIC FEET	(2.20 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, 9" (229 mm) BELOW, AND 6" (152 mm) BETWEEN CHAMBERS



STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

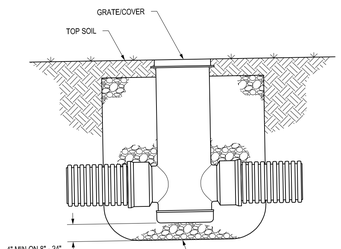
ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

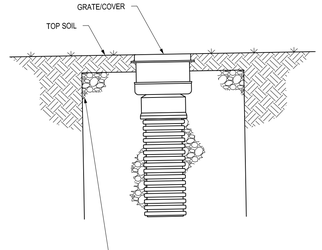
NOTE: ALL DIMENSIONS ARE NOMINAL

NON TRAFFIC INSTALLATION

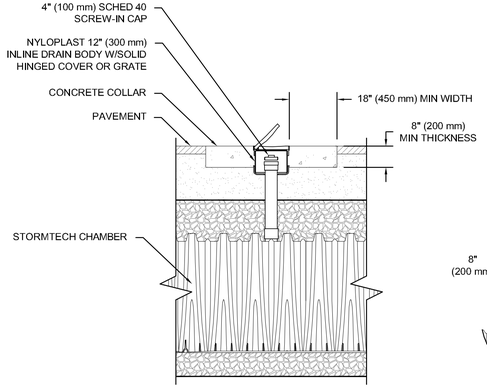
DRAIN BASIN



INLINE DRAIN



DRAWN BY CJA	MATERIAL	Nyloplast	3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com
DATE 9-30-99		TITLE	DRAIN BASIN & INLINE DRAIN NON TRAFFIC INSTALLATION
REVISED BY CCA	PROJECT NO./NAME	DWG NO.	7001-110-111 REV D
DATE 12-29-11			
DWG SIZE A	SCALE 1:25 SHEET 1 OF 1		



NOTES:
1. INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY
2. ALL SCHEDULE 40 FITTINGS TO BE SOLVENT CEMENTED.

CONNECTION DETAIL
NTS

ENGINEER'S SEAL — DAVID SOULE NEW MEXICO 14522 REGISTERED PROFESSIONAL ENGINEER

1/5/14

DAVID SOULE P.E. #14522

ESTATES AT GLENDALE UNIT 2

GRADING AND DRAINAGE DETAILS

Rio Grande Engineering
1606 CENTRAL AVENUE SE
SUITE 201
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