



City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 02/2013)

C12D003B4

Project Title: Noahs at Fountain Plaza Building Permit #: _____ City Drainage #: _____

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

Legal Description: LOT 1A FOUNTAIN HILLS PLAZA

City Address: VISTA FUENTES ROAD NW

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: FOUNTAIN HILLS LLC Contact: _____

Address: PO BOX 920798 EL PASO TX 79902

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

Architect: _____ Contact: JOE SIMONS

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:

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

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

- ☐ SIA/FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ 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
- ☐ 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 ☒ No _____ Copy Provided

DATE SUBMITTED: 3/3/15 By: JH/M

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Rio Grande Engineering of NM, LLC

February 18, 2015

Hydrology Division
Planning Department
City of Albuquerque

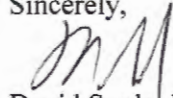
Re: Noah's at Fountain Plaza Grading and Drainage Plan (C12/D003B4)

The following is in response to Ms. Amy L.D. Niese comments dated September 30, 2014.

1. The entire length of Vista Fuente Road is included in the calculation for the street flows on the addendum (attached). The new calculations for the street flow is 9.17 cfs on the north side of the street and 1.65 cfs on the south side of the street. The total street flows are 10.82cfs, refer to sheet 1 and sheet 2.
2. The ponding capacity provided for the first flush ponds is larger than required, as mentioned in the above referenced letter. It is desired to retain the ponds as shown on the grading plan.
3. The elevation contours for the first flush ponds have been corrected.
4. Elevation contours have been added to address the concern regarding how this site will tie into the adjoining property to the east. There are proposed retaining walls on the other two sides, the top of wall and bottom of wall elevations are included.
5. Bottom of wall elevations are included on the grading plan where sidewalk elevations are called out.
6. Calculations showing the 18in laterals are sufficiently sized are included, refer to sheet 3.
7. An electronic submittal is included.

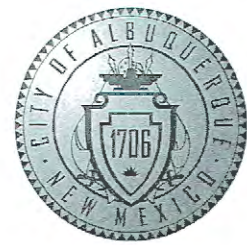
Thank you for your consideration.

Sincerely,



David Soule, PE
Rio Grande Engineering of NM, LLC

CITY OF ALBUQUERQUE



September 30, 2014

Mr. David Soule
Rio Grande Engineering
PO Box 93924
Albuquerque, NM 87199

**Re: Noah's at Fountain Plaza
Grading and Drainage Plan
Engineer's Stamp Date 9-15-14 (C12D003B4)**

Dear Mr. Soule,

Based upon the information provided in your submittal received September 24, 2014, the above referenced plan cannot be approved for Grading Permit nor Building Permit until the following comments are addressed:

1. As we discussed, the area provided for Vista Fuente Road should be the full length of the road before the proposed inlets which was your original intention. The area provided is not accurate which will impact the sizing of the inlets. Provide the revised area and associated calculations.
2. Calculations were provided for the First Flush. (Please note, use "First Flush" instead of "Water Harvesting".) Your design was for the area of the site times 0.34 inches. The ponds can be sized for the impervious area times 0.34 inches.
3. The contour elevations of the First Flush ponds do not match what is being called out in the text for the ponds. Please revise.
4. How is the site tying into exiting grades along the perimeter? Provide contours or spot elevations showing how that is being accomplished.
5. Provide bottom of wall elevations where sidewalk elevations are called out.
6. Include calculations showing the 18 inch laterals are sufficiently sized.
7. For the electronic submittal, include all attachments to the report such as the grading and drainage plan, previous report exhibits, and the DTIS.

If you have any questions, you can contact me at 924-3994.

Sincerely,

Amy L. D. Niese, P.E.
Senior Engineer, Hydrology
Planning Department

C: e-mail

Addendum 1

Vista Fuente street flows

$$8231\text{f} \times 40\text{ft} = 32920\text{sf} = 0.756\text{ac}$$

$$\text{Peak flows for street(zone 1)} = 4.37\text{cfs/ac} \times 0.756\text{ac} = 3.30\text{ cfs}$$

$$\text{Each half of the street generates } 3.30\text{cfs}/2 = 1.65\text{cfs}$$

North half of the street retains:

$$1\text{- flows generated by Noah's event center} = 7.52\text{cfs}$$

$$2\text{- flows generated by Vista Fuente road} = 1.65\text{cfs}$$

$$\text{Total} = 9.17\text{cfs}$$

$$\text{South half of the street} = 1.65\text{cfs}$$

Depth of flow on north side of Vista Fuente is approx. = 0.39 ft (see sheet 5 of 5)

Depth of flow on south side of Vista Fuente is approx. = 0.24ft (see sheet 5 of 5)

Catch Basin Capacities

For north side of Vista Fuente - from plate 22.3 D-5

At a depth of 0.39ft - grate capacity is 8 cfs

Since the flow on the north side of the street is 9.17cfs, thus a double grate type "A" catch basin will be needed.

For north side of Vista Fuente - from plate 22.3 D-5

At a depth of 0.24 - grate capacity is 3 cfs

Since the flow on the south half of Vista Fuente is 1.65cfs - 1 grate is sufficient, thus a single type "A" catch basin is needed.



Catch Basin Lateral Capacities

For 18 inch laterals at a slope of 3.09%.

Orifice capacity

$$Q = CA(\sqrt{2gh})$$

$$C = 0.82$$

$$A = 1.767 \text{ sf}$$

$$h = (18 \text{ in} / (12 \text{ in/ft})) / 2 = 0.75 \text{ ft}$$

$$g = 32.2 \text{ ft/s}^2$$

$$\text{thus } Q = (0.82 \times 1.67) \times (\sqrt{2 \times 32.2 \times 0.75}) = 10.1 \text{ cfs}$$

therefor since 10.1 cfs is greater than 9.17cfs or 1.67 cfs the orifice has capacity with respect to these street flows.

18 inch pipe capacities

$$Q = (1.49/n) \times (A \times R^{2/3} \times s^{1/2})$$

$$n = .013$$

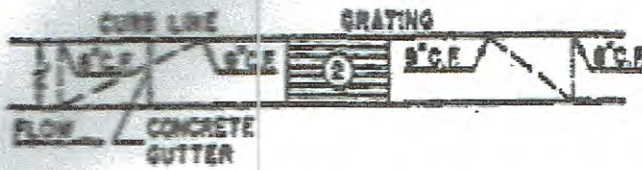
$$A = 1.167 \text{ sf}$$

$$R = A/P = 1.767 \text{ sf} / 4.71 \text{ ft} = 0.375$$

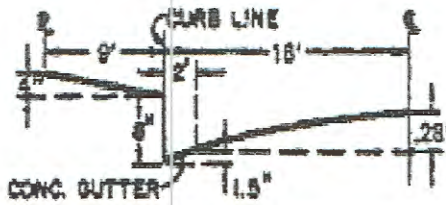
$$s = 0.0309$$

$$Q = (1.49/.013) \times (1.767 \times 0.375^{.67} \times 0.0309^{.5}) = 18.45 \text{ cfs}$$

Thus since 18.45cfs is greater than 9.17 cfs or 1.67 cfs the laterals have capacity with respect to these street flows.



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



D=DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

100
90
80
70
60
50
40
30
25
20
15
10
5
1
IN
100
90
80
70
60
50
40
30
25
20
15
10
5
1
CFS PER INLET
AT 0.24' FLOW DEPTH
3 cfs per inlet @ 0.24' flow depth

Street Capacity Calculations

2-17-15

VISTA FUENTE

40' F-F Street Section with 8" curb

Slope= 0.04

For water depths less than 0.125 feet

$$Y = \text{Water Depth}$$

$$A = Y^2$$

$$P = \text{SQRT}(257 \cdot Y^2) + Y$$

$$R = 0.017$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703	0.0047	0.0004	0.0008	0.4903	0.0049	0.8641	0.0082
0.02	0.0032	0.3406	0.0094	0.0025	0.0050	0.7784	0.0156	0.9699	0.0192
0.04	0.0128	0.6812	0.0188	0.0158	0.0316	1.2356	0.0494	1.0887	0.0448
0.06	0.0288	1.0219	0.0282	0.0466	0.0933	1.6191	0.0971	1.1648	0.0733
0.08	0.0512	1.3625	0.0376	0.1004	0.2008	1.9614	0.1569	1.2220	0.1039
0.1	0.0800	1.7031	0.0470	0.1821	0.3642	2.2759	0.2276	1.2683	0.1362
0.12	0.1152	2.0437	0.0564	0.2961	0.5922	2.5701	0.3084	1.3075	0.1699
0.125	0.1250	2.1289	0.0587	0.3301	0.6603	2.6410	0.3301	1.3164	0.1785

For water depths greater than 0.125 ft but less than 0.405 ft

$$Y1 = Y - 0.125$$

$$A2 = A1 + 2 \cdot Y1 + 25 \cdot Y1^2$$

$$P2 = P1 + \text{SQRT}(2501 \cdot Y1^2)$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.1356	2.3840	0.0569	0.3507	0.7015	2.5860	0.3362	1.2639	0.1763
0.16	0.2256	3.9143	0.0576	0.5886	1.1772	2.6087	0.4174	1.1493	0.1921
0.2	0.4156	5.9547	0.0698	1.2318	2.4636	2.9637	0.5927	1.1679	0.2451
0.24	0.6856	7.9951	0.0858	2.3309	4.6619	3.3997	0.8159	1.2230	0.3121
0.28	1.0356	10.0355	0.1032	3.9833	7.9667	3.8463	1.0770	1.2810	0.3862
0.32	1.4656	12.0759	0.1214	6.2810	12.5619	4.2855	1.3714	1.3351	0.4650
0.3464	1.7932	13.4225	0.1336	8.1930	16.3861	4.5688	1.5826	1.3680	0.5190
0.39	2.4106	15.6466	0.1441	12.1117	24.2233	5.0243	1.9595	1.4178	0.6109
0.405	2.6450	16.4117	0.1612	13.6943	27.3886	5.1774	2.0969	1.4337	0.6433

← Q = 1.65 cfs

← Q = 9.17 cfs

For water depths greater than 0.405 ft but less than 0.667 ft

$$Y2 = Y - 0.405$$

$$A3 = A2 + Y2^2 \cdot 20$$

$$P3 = P2 + Y2$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.41	2.7250	16.4167	0.1660	14.3887	28.7773	5.2802	2.1649	1.4532	0.6622
0.44	3.2050	16.4467	0.1949	18.8333	37.6667	5.8762	2.5855	1.5612	0.7760
0.47	3.6850	16.4767	0.2236	23.7364	47.4729	6.4414	3.0274	1.6558	0.8904
0.5	4.1650	16.5067	0.2523	29.0749	58.1498	6.9808	3.4904	1.7398	1.0053
0.55	4.9650	16.5567	0.2999	38.8880	77.7761	7.8324	4.3078	1.8612	1.1985
0.5945	5.6770	16.6012	0.3420	48.5331	97.0663	8.5491	5.0824	1.9540	1.3722
0.63	6.2450	16.6367	0.3754	56.8123	113.6246	9.0972	5.7313	2.0198	1.5119
0.667	6.8370	16.6737	0.4100	65.9712	131.9424	9.6491	6.4360	2.0821	1.6586

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

$$Y3 = Y - 0.667$$

$$A4 = A3 + 16 \cdot Y3 + 25 \cdot Y3^2$$

$$P4 = P3 + \text{SQRT}(2501 \cdot Y3^2)$$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	7.3922	18.3240	0.4034	70.5577	141.1154	9.5449	6.6814	2.0104	1.6708
0.73	7.9442	19.8243	0.4007	75.4895	150.9791	9.5024	6.9368	1.9600	1.6911
0.75	8.3372	20.8245	0.4004	79.1745	158.3491	9.4965	7.1224	1.9324	1.7087
0.77	8.7502	21.8247	0.4009	83.1762	166.3525	9.5056	7.3193	1.9090	1.7292
0.8	9.4072	23.3250	0.4033	89.7748	179.5495	9.5432	7.6345	1.8803	1.7646
0.82	9.8702	24.3252	0.4058	94.5744	189.1488	9.5818	7.8571	1.8647	1.7909
0.85	10.6022	25.8255	0.4105	102.3832	204.7664	9.6568	8.2083	1.8458	1.8342

d1



City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 02/2013)

012D00384

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

Architect: _____ Contact: JOE SIMONS

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Address: _____

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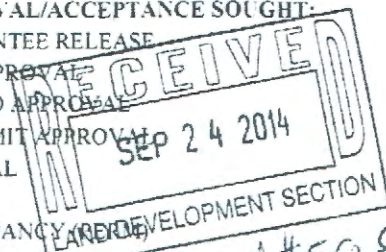
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- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ GRADING CERTIFICATION
- ☐ SO-19 APPROVAL
- ☐ ESC PERMIT APPROVAL
- ☐ ESC CERT. ACCEPTANCE
- ☐ OTHER (SPECIFY) _____



Paid \$50.00 ✓

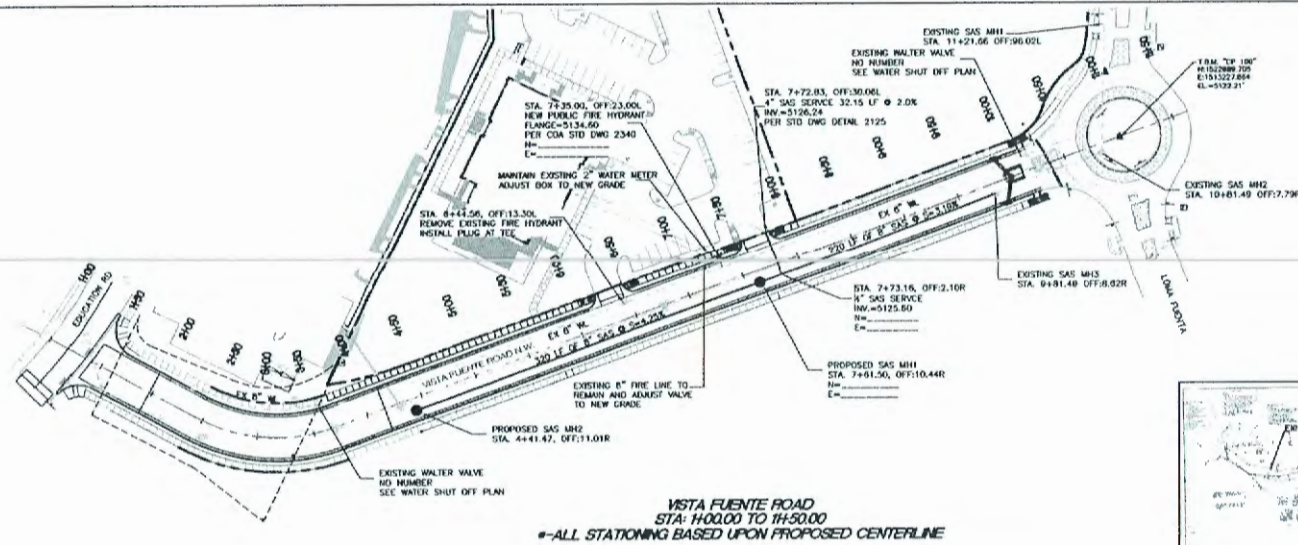
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DATE SUBMITTED: 9/24/14 By: [Signature]

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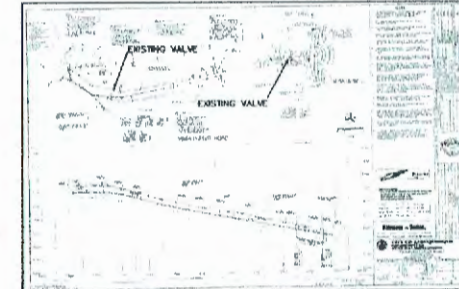
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Ad - Lot Files



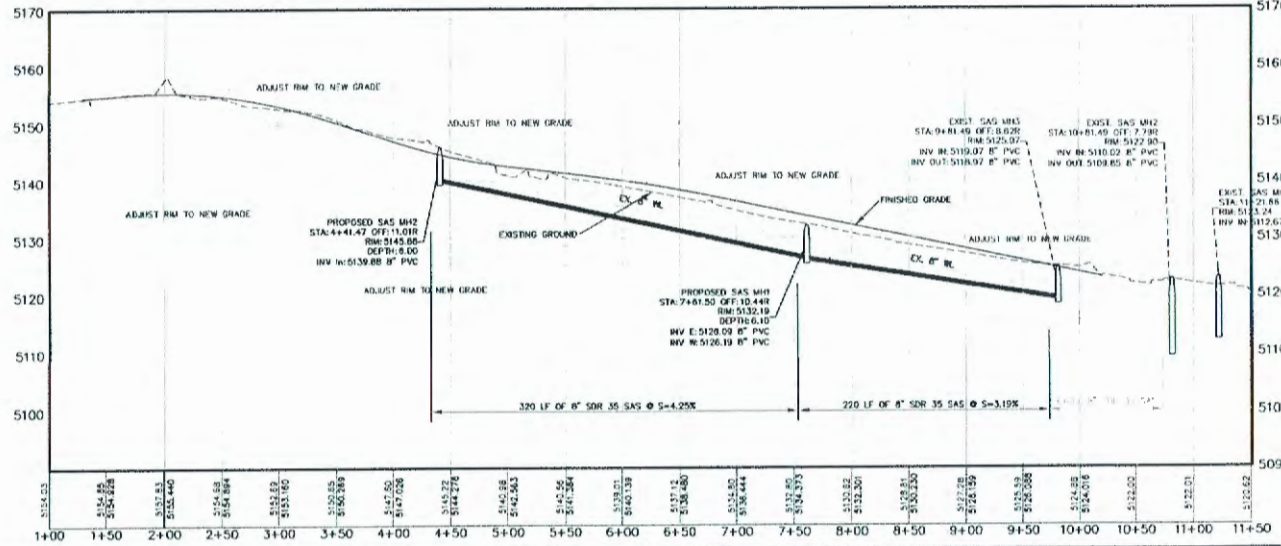
- UTILITY NOTES:**
1. CONTRACTOR RESPONSIBLE FOR LOCATION OF ALL EXISTING UTILITIES PRIOR TO WORK.
 2. EXISTING 8\"/>

- LEGEND**
- EXISTING SAS MANHOLE
 - EXISTING WATER VALVE
 - EXISTING FIRE HYDRANT
 - EXISTING STORM DRAIN MANHOLE
 - EXISTING WATER LINE
 - EXISTING SAS LINE
 - PROPOSED SANITARY SEWER
 - PROPOSED SAS MANHOLE PER COA STD DWG 2102
 - PROPOSED SANITARY SEWER SERVICE LINE PER COA STD DWG
 - PROPOSED FIRE HYDRANT PER COA STD DWG 2340
 - PROPOSED GATE VALVE PER COA STD DWG



- GENERAL NOTE:**
1. ALL MANHOLE RIMS TO BE ADJUSTED TO NEW GRADE.
 2. ALL EXISTING UTILITIES TO BE FIELD VERIFIED PRIOR TO CONSTRUCTION. ANY DAMAGE AND REPAIRS SHALL BE SOLE RESPONSIBILITY OF THE CONTRACTOR.

- WATER SHUTOFF NOTES:**
1. THE CONTRACTOR SHALL COORDINATE WITH THE WATER UTILITY AUTHORITY SEVEN (7) DAYS IN ADVANCE OF PERFORMING WORK THAT WILL AFFECT THE PUBLIC WATER OR SANITARY SEWER INFRASTRUCTURE. WORK REQUIRING SHUTOFF OF FACILITIES DESIGNATED AS MASTER PLAN FACILITIES MUST BE COORDINATED WITH THE WATER UTILITY 14 DAYS IN ADVANCE OF PERFORMING SUCH WORK. ONLY WATER UTILITY CREWS ARE AUTHORIZED TO OPERATE PUBLIC VALVES. SHUT OFF REQUEST MUST BE MADE ONLINE AT [HTTP://BOWMA.ORG/WATER_SHUT_OFF_AND_TURN_ON_PROCEDURES](http://BOWMA.ORG/WATER_SHUT_OFF_AND_TURN_ON_PROCEDURES).
 2. VALVES SHALL BE OPERATED BY BOWMA EMPLOYEES ONLY.
 3. EMERGENCY SHUT-OFF PLAN INVOLVES SHUTTING OFF EXISTING GATE VALVES ON 8\"/>



SCALE: HORIZ. 1"=50'
VERT. 1"= 5'

Rio Grande Engineering
Bernalillo County Public Works Division Engineering Group

TITLE: **VISTA FUENTE ROAD IMPROVEMENTS**
UTILITY IMPROVEMENTS
VISTA FUENTE RD

DESIGN REVIEW COMMITTEE: CITY ENGINEER APPROVAL: NO. / DATE / YR: NO. / DATE / YR:

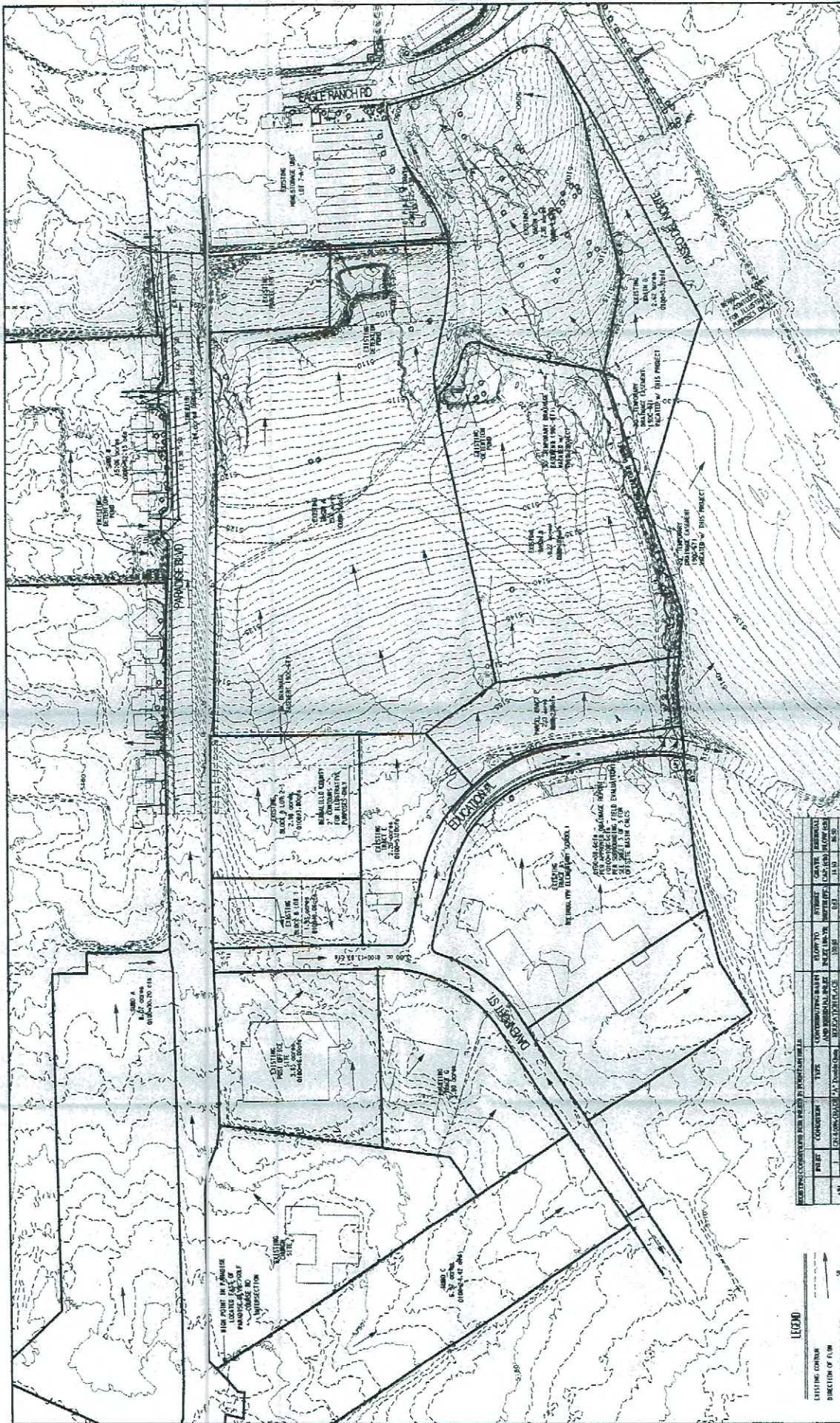
CITY PROJECT NO. XXXXX ZONE MAP NO. C-12-2 SHEET 5 OF 6

DESIGNED BY: DRAM DATE: 8-14
DRAWN BY: DSM DATE: 8-14
CHECKED BY: JDS DATE: 8-14

AS BUILT INFORMATION				CONTRACTOR			
NO.	DATE	BY	REMARKS	NO.	DATE	BY	REMARKS
1	8/14/14	DRAM	DESIGN	1	8/14/14	DRAM	DESIGN
2	8/14/14	DSM	DRAWN	2	8/14/14	DSM	DRAWN
3	8/14/14	JDS	CHECKED	3	8/14/14	JDS	CHECKED
4	8/14/14	JDS	ENGINEER	4	8/14/14	JDS	ENGINEER

APPENDIX B

Excerpts of Fountain Hills Master Drainage Plan



Bohannan & Huston
 Company 1 7500 Jefferson Ave. Albuquerque, NM 87106-1306
 ENGINEERING - SURVEYING - CIVIL - ELECTRICAL - MECHANICAL
 SHEET 5 OF 7

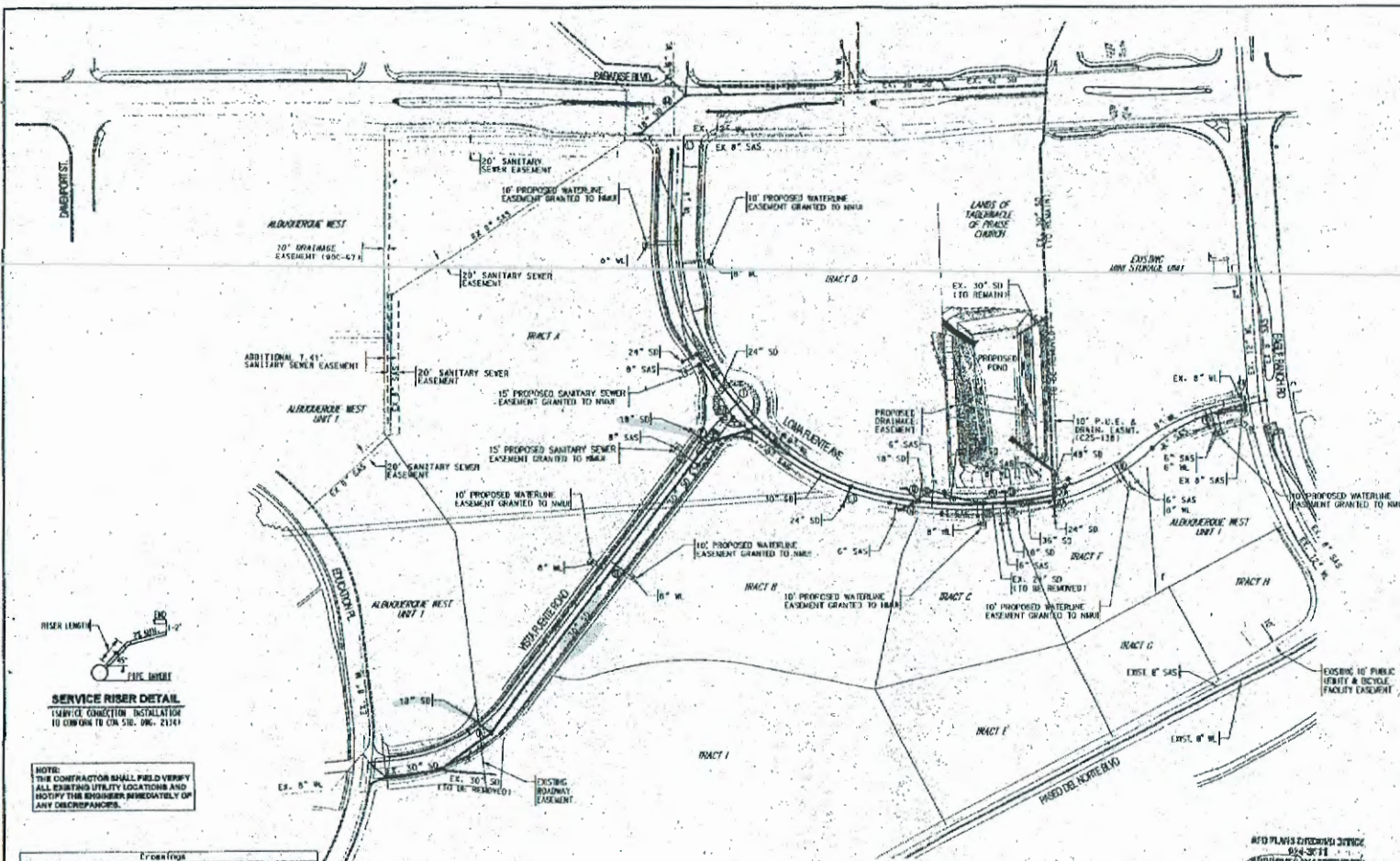


FOUNTAIN HILLS
 GRADING & DRAINAGE MANAGEMENT PLAN
 EXISTING BASINS MAP
 ALBUQUERQUE, NEW MEXICO
 JUNE, 2007

PROJECT	CONTRACTOR	DATE	REVISION	BY	CHKD	APPD
1	BOHANNAN & HUSTON	06/01/07	1	BOHANNAN	HUSTON	HUSTON
2	BOHANNAN & HUSTON	06/01/07	2	BOHANNAN	HUSTON	HUSTON
3	BOHANNAN & HUSTON	06/01/07	3	BOHANNAN	HUSTON	HUSTON
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9	BOHANNAN & HUSTON	06/01/07	9	BOHANNAN	HUSTON	HUSTON
10	BOHANNAN & HUSTON	06/01/07	10	BOHANNAN	HUSTON	HUSTON

LEGEND

EXISTING CONTOUR
 DIRECTION OF FLOW
 EXISTING STORM DRAIN LINE
 PROPOSED STORM DRAIN LINE
 PROPOSED STORM DRAIN INLET
 PROPOSED STORM DRAIN MANHOLE
 PROPOSED STORM DRAIN STRUCTURE
 POND CONTOUR

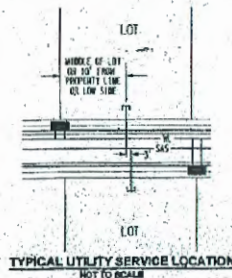


LEGEND

PROPOSED CURB AND GUTTER	---
EXISTING CURB AND GUTTER	---
FUTURE CURB AND GUTTER	---
PROPOSED STORM DRAIN MANHOLE	⊙
EXISTING STORM DRAIN MANHOLE	⊙
PROPOSED SANITARY SEWER MANHOLE	⊙
EXISTING SANITARY SEWER MANHOLE	⊙
PROPOSED FIRE HYDRANT	+
PROPOSED GATE VALVE	+
EXISTING GATE VALVE	+
PROPOSED STORM DRAIN	---
PROPOSED SANITARY SEWER	---
PROPOSED WATER LINE	---
STORM DRAIN RILEY	---
STORM DRAIN CEMENT	---
EXISTING STORM DRAIN	---
EXISTING SANITARY SEWER	---
EXISTING WATER LINE	---

Profile

STATION	SAS	SD	W	Clearance
A	18" TP 45.79	8" DP 46.56	2.77	
B	30" TP 28.65	8" DP 29.60	1.95	
C	8" TP 15.09	30" BP 16.80	1.71	
D	8" TP 15.20	8" BP 20.08	5.88	
E	8" TP 12.84	18" TP 14.55	1.71	
F	8" TP 10.30	8" BP 15.29	4.99	
G	8" TP 09.75	30" BP 11.51	1.77	
H	8" TP 11.09	24" TP 14.81	3.72	
I	8" TP 03.54	24" DP 08.53	5.00	
J	8" TP 19.35	8" BP 22.57	3.22	
K	8" TP 20.50	8" BP 25.12	4.62	
L	8" TP 03.08	8" TP 02.12	0.96	
M	8" TP 09.74	8" BP 16.37	6.63	
N	8" TP 01.10	8" BP 30.66	2.56	
O	8" TP 09.28	8" BP 13.46	4.18	
P	8" BP 05.50	8" TP 00.53	5.07	
Q	8" BP 03.08	8" TP 02.12	0.96	
R	8" TP 09.06	8" BP 16.37	7.31	
S	8" TP 04.00	8" BP 15.44	1.44	
T	8" TP 04.51	24" BP 08.80	4.29	
U	8" TP 00.39	8" BP 04.69	4.30	
V	8" BP 08.28	8" TP 08.19	0.09	
W	8" TP 12.60	8" BP 15.53	2.93	

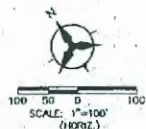


RESTRAINING JOINT TABLE

MECHANICAL JOINTS	LENGTH OF RESTRAINED JOINTS	
	8"	10"
8" X 8" TEE	1	1
8" X 8" TEE	1	1
8" HORIZ. BEND	16	20
45° HORIZ. BEND	7	8
22.5° HORIZ. BEND	4	5
11.25° HORIZ. BEND	2	2
90° VALVE/AMP	42	50
22.5° VERT. BEND (UPPER)	6	7
(LOWER)	3	3
11.25° VERT. BEND (UPPER)	0	3
(LOWER)	2	1

* NOTE:
8" W, 8" W, & 10" W TO BE PVC (D-300)
12" W, & 14" W TO BE DUCTILE IRON PIPE

- NOTE:**
1. ALL MECHANICAL JOINTS SHALL BE RESTRAINED AT THE FITTING.
 2. THE CONTRACTOR SHALL PROVIDE A MINIMUM PIPE LENGTH OF 10 FT FROM ALL MECHANICAL JOINTS. ALL PIPE JOINTS WITHIN 20 FT OF WJ SHALL BE RESTRAINED AT THE CONTRACTOR'S EXPENSE.
 3. THE CONTRACTOR SHALL RESTRAIN ALL PIPE JOINTS IN THE SPECIFIED DISTANCE LISTED IN THE TABLE ABOVE. (SEE NOTE 2 ABOVE).
 4. THE CONTRACTOR SHALL RESTRAIN ALL FIRE HYDRANT JOINTS FROM THE TEE ON THE MAIN TO THE FIRE HYDRANT FLANGE.
 5. ALL CAPS SHALL UTILIZE PVC BLOCKS, UNLESS OTHERWISE NOTED.
 6. RESTRAINED LENGTH IS ON LARGE SIDE ON ALL REDUCERS.
 7. RESTRAIN ALL JOINTS BETWEEN UPPER AND LOWER VERTICAL BENDS.

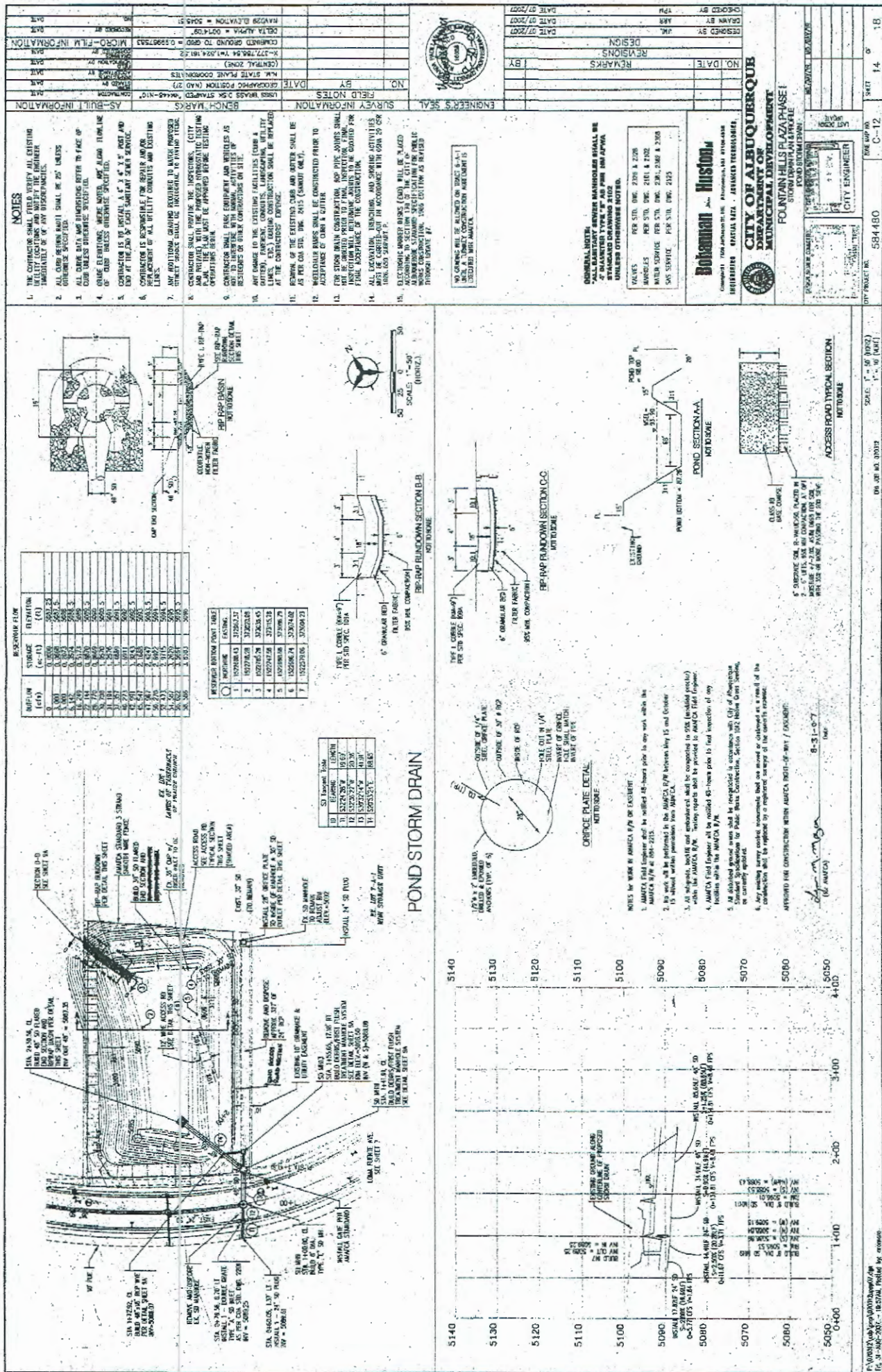


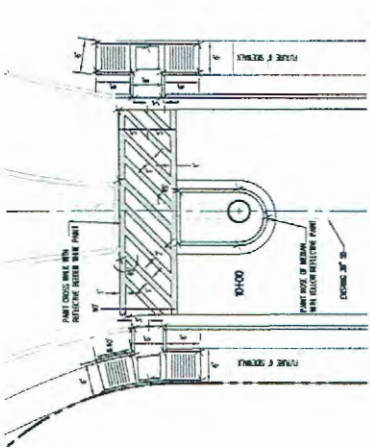
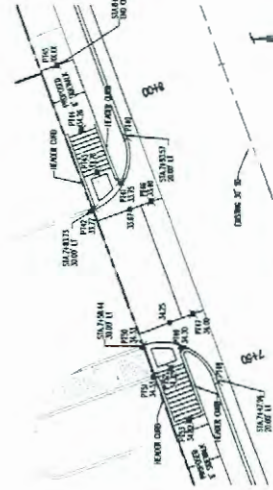
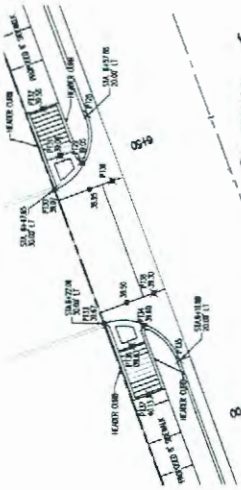
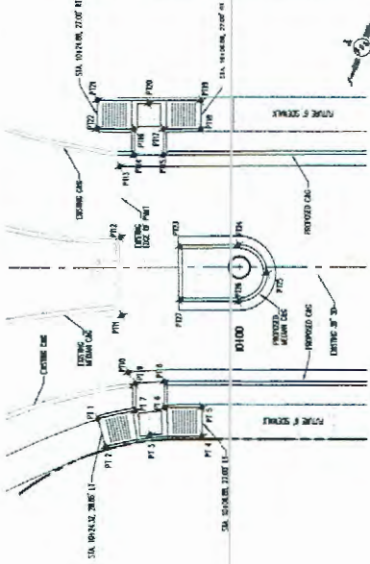
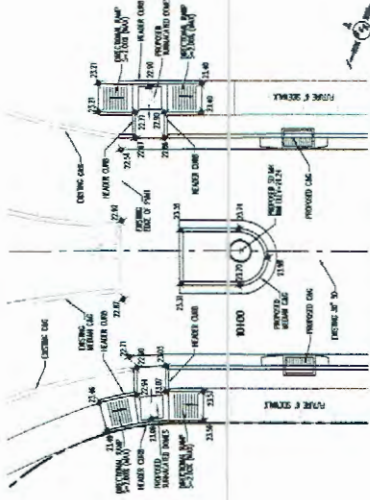
Bohannon & Huston
Civil Engineers & Surveyors
1000 Johnson Blvd., Suite 200, Albuquerque, NM 87106-4330
ALBUQUERQUE • SPATIAL DATA • ADVANCED TECHNOLOGIES

CITY OF ALBUQUERQUE
DEPARTMENT OF
MUNICIPAL DEVELOPMENT
FOUNTAIN HILLS PLAZA PHASE I
CENTRAL UTILITY PLAN

DATE: 07/20/07
DRAWN BY: JAR / SAR
CHECKED BY: JPM

PROJECT NO: 584480
SHEET: 9 OF 18





 City of Bernalillo		 State of New Mexico		 Federal Highway Administration	
		TITLE: 15TA FUENTE ROAD IMPROVEMENTS DE AILS		SHEET: 6 OF 6	
CITY PROJECT NO. XXXXX		ZONE MAP NO. C-12-7		DATE: 9/12/74	
CITY ENGINEER APPROVAL: _____ CITY ENGINEER: _____		DESIGNER: _____ DESIGNER: _____		DATE: 9-14	
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DRAINAGE REPORT

For

**Noah's Event Center at Fountain Hills
Albuquerque, New Mexico**

Prepared by

Rio Grande Engineering
PO Box 93924
Albuquerque, New Mexico 87199

September 2014



David Soule P.E. No. 14522

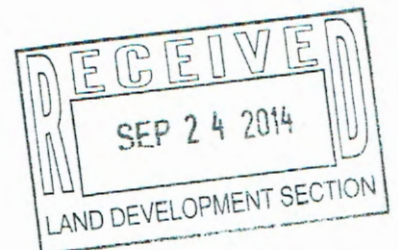


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Proposed Conditions	5
Summary	5

Appendix

Site Hydrology/Hydraulic Calculations	A
Excerpts from Fountain Hills Master Drainage Plan.....	B

Map

Site Grading and Drainage Plan

PURPOSE

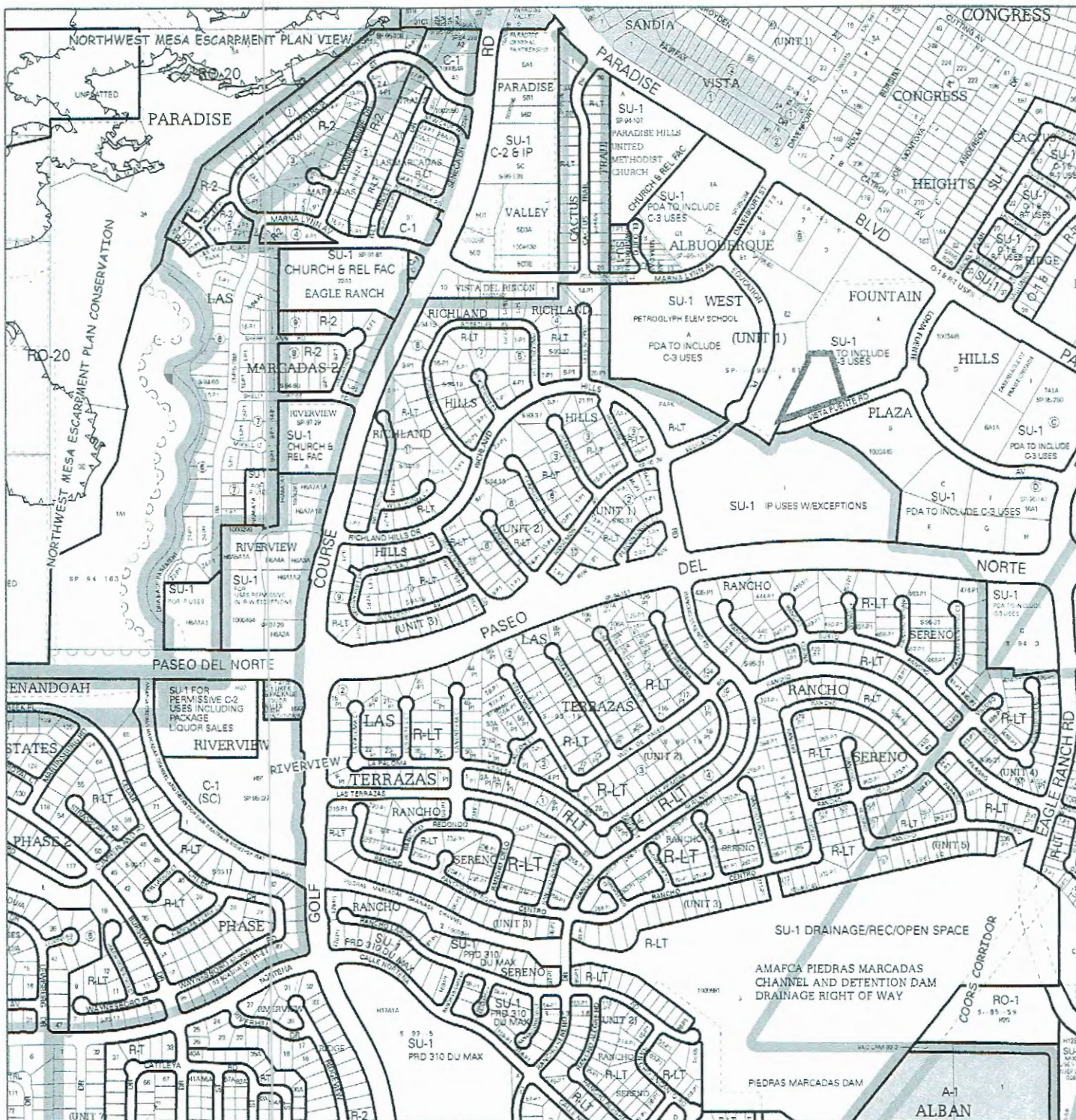
The purpose of this report is to provide the Drainage Management Plan for the development of a 2 acre lot located on Vista Fuentes Road between Education Place and Loma Fuentes Drive NW. This plan was prepared in accordance with the City of Albuquerque design regulations, utilizing the City of Albuquerque's Development Process Manual drainage guidelines. This report will demonstrate that the lot development and grading does not adversely affect the surrounding properties, nor the upstream or downstream facilities.

INTRODUCTION

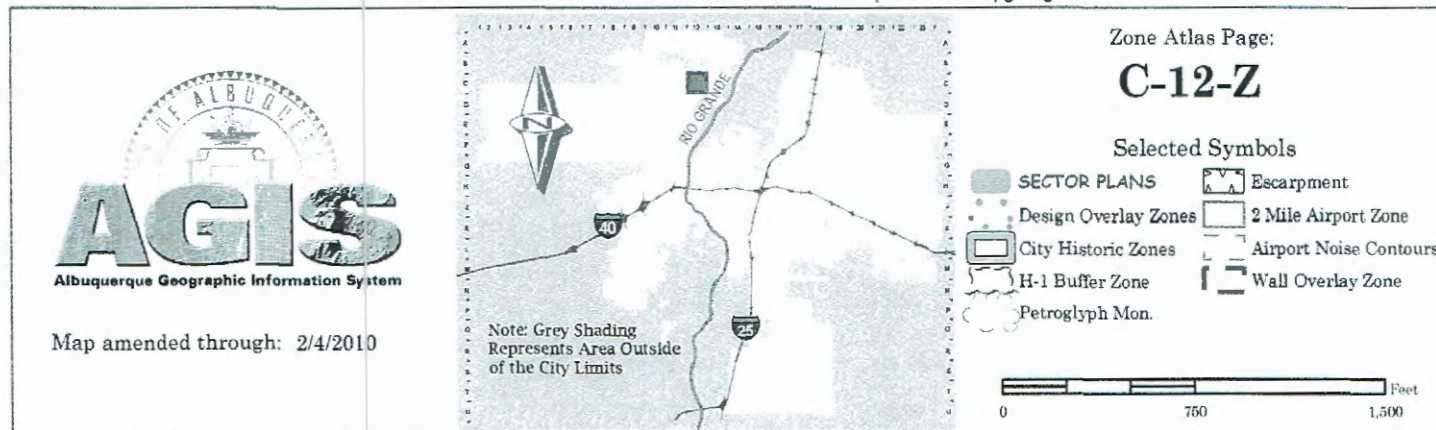
The subject of this report, as shown on the Exhibit A, is a 1.99-acre parcel of land located on the north side of Vista Fuentes Road between Education Place and Loma Fuentes Drive NW. The legal description of this site is Lot 1-A Fountain Hills Plaza. As shown on FIRM map3501C0116G, the entire site is located within Flood Zone X. The site is part of the Fountain Hills plaza master drainage plan. As part of this development Vista Fuentes Road will be constructed from Education place to Loma Fuentes Road

EXISTING CONDITIONS

The site appears to be in a native condition. Due to a large channelization and storm drain on the adjacent upstream lot, the site is not impacted by any upland flows. The site generally slopes from the northwest to the north east with average 6% grade. Currently discharges all of its flow to the south east.



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



PROPOSED CONDITIONS

The proposed improvements consist of a new 9000 square foot building and associated parking field. The scope of this project includes the construction of the Vista Fuentes roadway. The lot has been designed to retain on site 2982 cubic feet of water. The water quality volume based upon .34 Inches is 2466 cubic feet. As shown on the drainage hydraulic calculation sheet, each contributing basin generated enough flow to fill the shallow ponds. The site is part of basin B-1A of the fountain hills master drainage plan. This basin assumes a peak discharge rate of 4.18 cfs per acres. The developed conditions for this site will produce 7.52 cfs or 3.78 cfs per acre. The flow leaving the site will flow down vista Fuentes road and be captured by new inlets located at the round about intersection with Loma Fuentes. As shown on the street capacity spread sheet the combined onsite and roadway flows of 8.29 cfs will flow at a depth of .38' and will remain on the north half of the road. The inlets consist of a double A inlet on the north and a single A on the south. As show each grate has a capacity of 8 cfs so the inlets on the north side can handle the flow. Once the flow enters the existing storm drain it is conveyed to a regional detention pond for the fountain hills development.

SUMMARY AND RECOMMENDATIONS

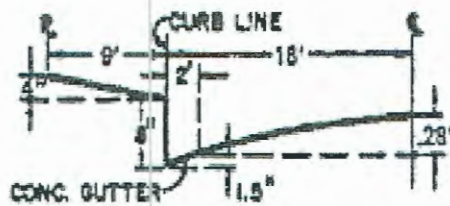
This project is a development of a commercial lot within the fountain hills plaza master plan. The development is allowed to discharge 8.32 cfs. Our discharge rate of 7.52 is less than allowed. Our site is graded such than the required water quality holding capacity of 2466 is exceeded. The site has been designed such than most paved areas drain thru these water quality ponds. The offsite roadway is being constructed with this development and has the capacity to convey all the flows generated by the development. 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
SITE HYDROLOGY

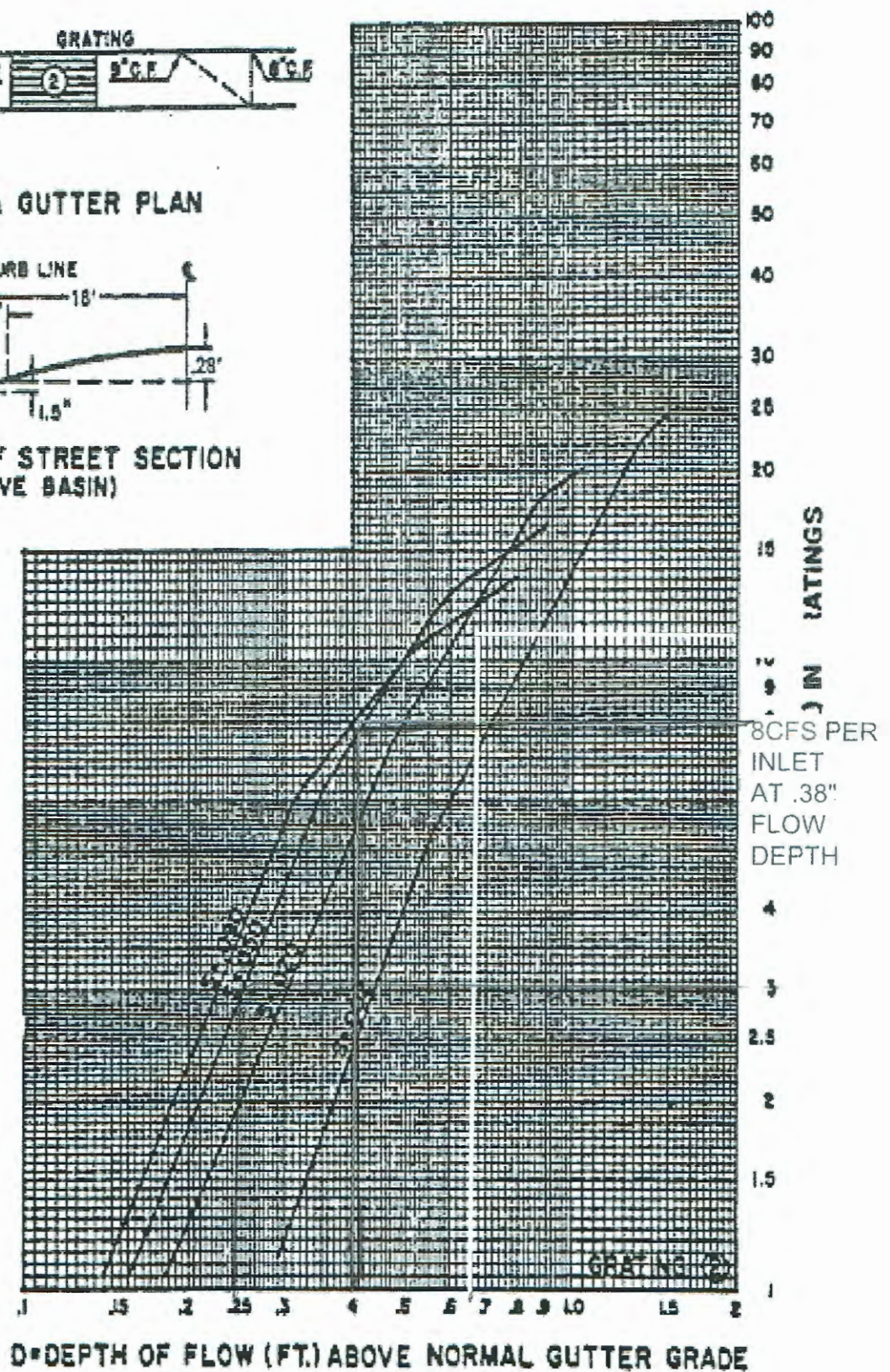
GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



Weighted E Method

EAGLE CREST

Existing Developed Basins

Basin	Area (sf)	Area (acres)	Treatment A		Treatment B		Treatment C		Treatment D		100-Year, 6-hr.		10-day
			%	(acres)	%	(acres)	%	(acres)	%	(acres)	Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
BASIN A1	12387	0.284	0%	0	15.0%	0.043	35.0%	0.09953	60%	0.171	1.629	0.039	1.12
BASIN B	26848	0.616	0%	0	5.0%	0.031	21.0%	0.12943	74%	0.456	1.699	0.087	2.43
BASIN C	7335	0.168	0%	0	12.0%	0.020	34.0%	0.05725	54%	0.091	1.481	0.021	0.60
BASIN D	10952	0.251	0%	0	3.0%	0.008	8.0%	0.02011	89%	0.224	1.853	0.039	1.05
BASIN E	17871	0.410	0%	0	8.0%	0.033	45.0%	0.18462	48%	0.197	1.445	0.049	1.46
BASIN F	10165	0.233	0%	0	10.0%	0.023	72.0%	0.16802	18%	0.042	1.134	0.022	0.71
BASIN G	1475	0.034	0%	0	0.0%	0.000	0.0%	0	100%	0.034	1.970	0.006	0.15
TOTAL	87033	1.998	0%	0	34.0%	0.157	16.0%	0.659	50%	1.214	1.576	0.262	7.52
VISTA FUENTE RD	7968	0.183	0%	0	0.0%	0.000	10.0%	0.01829	90%	0.165	1.872	0.029	0.77

Equations:

Weighted E = $E_a \cdot A_a + E_b \cdot A_b + E_c \cdot A_c + E_d \cdot A_d / (\text{Total Area})$

Volume = Weighted D * Total Area

Flow = $Q_a \cdot A_a + Q_b \cdot A_b + Q_c \cdot A_c + Q_d \cdot A_d$

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

$E_a = 0.44$
 $E_b = 0.67$
 $E_c = 0.99$
 $E_d = 1.97$

$Q_a = 1.29$
 $Q_b = 2.03$
 $Q_c = 2.87$
 $Q_d = 4.37$

FLOW SUMMARY

LEAVING SITE

FLOW AT INLET

~~WATER HARVEST REQUIREMENT~~

~~FIRST FLUSH~~

FIRST FLUSH

7.52 CFS

8.29

2465.94 CUBIC FEET

VOLUME

CONTRIBUTING BASIN

POND A 1024 CF
 POND B 230 CF
 POND C 684
 POND D 26
 POND E 1018

1681.54 CF
 3802 CF
 905.14 CF
 1690.806 CF
 2151.519 CF

TOTAL 2982
 REQUIRED 2466

NOT RIGHT

Street Capacity Calculations

VISTA FUENTE

40' F-F Street Section with 8" curb

Slope= 0.04

For water depths less than 0.125 feet

Y= Water depth
 Area = $8 \cdot Y^2$
 P= $\text{SQRT}(257 \cdot Y^2) + Y$
 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	0.0008	0.1703	0.0047	0.0004	0.0008	0.4903	0.0049	0.8641	0.0082
0.02	0.0032	0.3406	0.0094	0.0025	0.0050	0.7784	0.0156	0.9699	0.0192
0.04	0.0128	0.6812	0.0188	0.0158	0.0316	1.2356	0.0494	1.0887	0.0448
0.06	0.0288	1.0219	0.0282	0.0466	0.0933	1.6191	0.0971	1.1648	0.0733
0.08	0.0512	1.3625	0.0376	0.1004	0.2008	1.9614	0.1569	1.2220	0.1039
0.1	0.0800	1.7031	0.0470	0.1821	0.3642	2.2759	0.2276	1.2683	0.1362
0.12	0.1152	2.0437	0.0564	0.2961	0.5922	2.5701	0.3084	1.3075	0.1699
0.125	0.1250	2.1289	0.0587	0.3301	0.6603	2.6410	0.3301	1.3164	0.1785

For water depths greater than 0.125 ft but less than 0.405 ft

Y1= Y - 0.125
 A2= $A1 + 2 \cdot Y1 + 25 \cdot Y1^2$
 P2= $P1 + \text{SQRT}(2501 \cdot Y1^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.1356	2.3840	0.0569	0.3507	0.7015	2.5860	0.3362	1.2639	0.1763
0.16	0.2256	3.9143	0.0576	0.5886	1.1772	2.6087	0.4174	1.1493	0.1921
0.2	0.4156	5.9547	0.0698	1.2318	2.4636	2.9637	0.5927	1.1679	0.2451
0.24	0.6856	7.9951	0.0858	2.3309	4.6619	3.3997	0.8159	1.2230	0.3121
0.28	1.0356	10.0355	0.1032	3.9833	7.9667	3.8463	1.0770	1.2810	0.3862
0.32	1.4656	12.0759	0.1214	6.2810	12.5619	4.2855	1.3714	1.3351	0.4650
0.3464	1.7932	13.4225	0.1336	8.1930	16.3861	4.5688	1.5826	1.3680	0.5190
0.39	2.4106	15.6466	0.1541	12.1117	24.2233	5.0243	1.9595	1.4178	0.6109
0.405	2.6450	16.4117	0.1612	13.6943	27.3886	5.1774	2.0969	1.4337	0.6433

For water depths greater than 0.405 ft but less than 0.667 ft

Y2= Y - 0.405
 A3= $A2 + Y2^2 \cdot 20$
 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)
0.41	2.7250	16.4167	0.1660	14.3887	28.7773	5.2802	2.1649	1.4532	0.6622
0.44	3.2050	16.4467	0.1949	18.8333	37.6667	5.8762	2.5855	1.5612	0.7760
0.47	3.6850	16.4767	0.2236	23.7364	47.4729	6.4414	3.0274	1.6558	0.8904
0.5	4.1650	16.5067	0.2523	29.0749	58.1498	6.9808	3.4904	1.7398	1.0053
0.55	4.9650	16.5567	0.2999	38.8880	77.7761	7.8324	4.3078	1.8612	1.1985
0.5945	5.6770	16.6012	0.3420	48.5331	97.0663	8.5491	5.0824	1.9540	1.3722
0.63	6.2450	16.6367	0.3754	56.8123	113.6246	9.0972	5.7313	2.0198	1.5119
0.667	6.8370	16.6737	0.4100	65.9712	131.9424	9.6491	6.4360	2.0821	1.6586

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

Y3= Y - 0.667
 A4= $A3 + 16 \cdot Y3 + 25 \cdot Y3^2$
 P4= $P3 + \text{SQRT}(2501 \cdot Y3^2)$

Depth (ft)	Area (ft ²)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	7.3922	18.3240	0.4034	70.5577	141.1154	9.5449	6.6814	2.0104	1.6708
0.73	7.9442	19.8243	0.4007	75.4895	150.9791	9.5024	6.9368	1.9600	1.6911
0.75	8.3372	20.8245	0.4004	79.1745	158.3491	9.4965	7.1224	1.9324	1.7087
0.77	8.7502	21.8247	0.4009	83.1762	166.3525	9.5056	7.3193	1.9090	1.7292
0.8	9.4072	23.3250	0.4033	89.7748	179.5495	9.5432	7.6345	1.8803	1.7646
0.82	9.8702	24.3252	0.4058	94.5744	189.1488	9.5818	7.8571	1.8647	1.7909
0.85	10.6022	25.8255	0.4105	102.3832	204.7664	9.6568	8.2083	1.8458	1.8342

C12 D003B4 NORTH'S GENT CTR-SOURCE 9/29/14

INLET SIZED?

2.5 AC DET POND?

FF $\frac{3}{8}$

-USE THIS WINDING JUST NEED AD NOT WHOLE SITE

$$1.214 \text{ AC} \times \frac{43560 \text{ SF}}{\text{AC}} \times \frac{.34 \text{ IN}}{12 \text{ IN}} \times \text{FT} = 1498 \text{ CF}$$

$$1.3790 \times 43560 \times .34 / 12 = 1701 \text{ CF}$$

$$2466 \rightarrow 1.998$$

$$4.18 \text{ CFS/AC} \times 1.99 \text{ AC} = 8.31 \text{ CFS ALLOW}$$

7.52 CFS ACTUAL ✓

$$8 \text{ PS2} \times 40 = 34080 \text{ SF} = .78 \text{ AC}$$

$$852 \times 24 = 20448 \text{ SF} = .46 \text{ AC}$$

$$822 \times 40 = 32,920 = .76$$

8.29 CFS FOR - ^{40' x 174'} IT WAS SUPPOSED TO BE VISTA FRONT + SITE BUT RD AREA NOT RIGHT
SUB & ONLY INTO TRUNK TO EAST SO THAT/ SHOULD USE THAT.

$$Q = \frac{1.49 A R^{2/3} S^{1/2}}{n} = \frac{1.49 (1.77) (.38)^{2/3} \sqrt{.04}}{.013} = 21.3 \text{ cfs FOR } 18''$$
$$A = \frac{\pi \cdot 1.5^2}{4} = 1.77 \quad R = \frac{1.5}{4} = .38 \quad S = .04 \quad n = .013$$

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