

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

N-8/D4

PROJECT TITLE: EL RANCHO GRANDE, UNIT 17 **NOW COMBINED w/ 16** ZONE MAP / DRG. FILE #: N8-D4
DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: A Portion of Tract 16-D, Bulk Land Plat for El Rancho Grande, Tracts 16-A, 16-B, 16-C, 16-D, 16-E, & 16-F
CITY ADDRESS: _____

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: Fred Arfman or Asa Nilsson-Weber
ADDRESS: 128 Monroe St. NE PHONE: 268-8828 or (972) 491-9736
CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: Curb, Inc CONTACT: Bo Johnson
ADDRESS: 5160 San Francisco NE PHONE: 899-9656
CITY, STATE: Albuquerque, New Mexico ZIP CODE: 87109

ARCHITECT: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich
ADDRESS: P.O.Box 30701 PHONE: 884-1990
CITY, STATE: Albuquerque, New Mexico ZIP CODE: 87190

CONTRACTOR: _____ CONTACT: _____
ADDRESS: _____ PHONE: _____
CITY, STATE: _____ ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

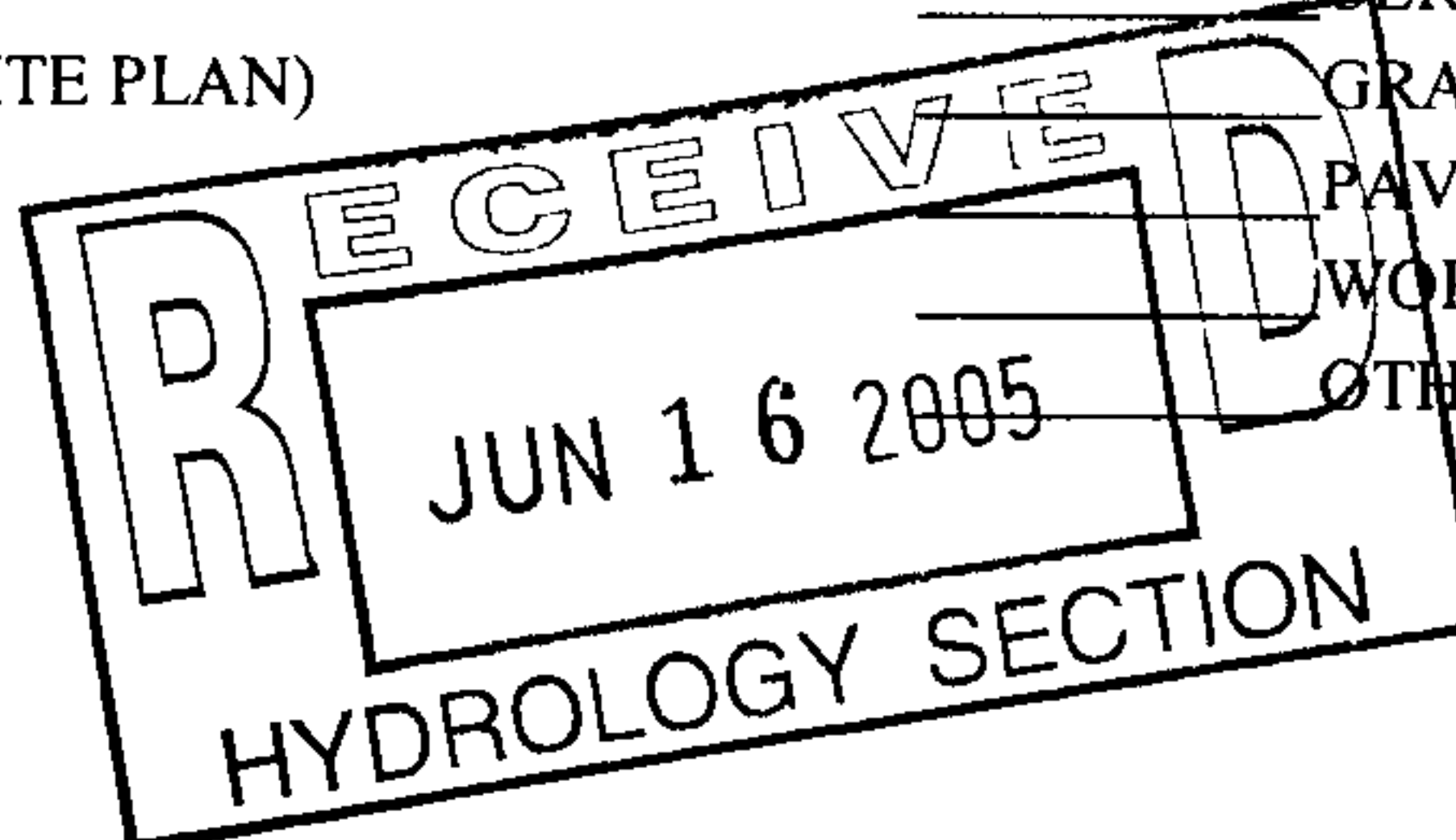
PREVIOUSLY SUBMITTED AS PART OF UNIT 16
____ DRAINAGE REPORT
____ DRAINAGE PLAN 1ST *REQUIRES TCL or equal*
____ DRAINAGE PLAN RESUBMITTAL
____ CONCEPTUAL GRADING & DRAINAGE PLAN
☒ GRADING PLAN
____ EROSION CONTROL PLAN
____ ENGINEER'S CERTIFICATION (HYDROLOGY)
____ CLOMR / LOMR
____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ ENGINEER'S CERTIFICATION (TCL)
____ ENGINEER'S CERTIFICATION (DRB APPR, SITE PLAN)
____ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

____ SIA / FINANCIAL GUARANTEE RELEASE
☒ PRELIMINARY PLAT APPROVAL
☒ S. DEV. PLAN FOR SUB'D APPROVAL
____ S. DEV. PLAN FOR BLDG. PERMIT APPR.
____ SECTOR PLAN APPROVAL
____ FINAL PLAT APPROVAL
____ FOUNDATION PERMIT APPROVAL
____ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY (PERM)
____ CERTIFICATE OF OCCUPANCY (TEMP)
____ GRADING PERMIT APPROVAL
____ PAVING PERMIT APPROVAL
____ WORK ORDER APPROVAL
____ OTHER

WAS A PRE-DESIGN CONFERENCE ATTENDED:

____ YES
____ NO
____ COPY PROVIDED

DATE SUBMITTED: Thursday, June 16, 2005

BY: _____

Fred C. Arfman, PE
for Isaacson & Arfman, P.A.

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

1. Conceptual Grading and Drainage Plan: Required for approval of Site Development Plans greater than five acres and Sector Plans
2. Drainage Plans: Required for building permits, grading permits, paving permits and site plans less than five acres
3. Drainage Report: Required for subdivisions containing more than ten (10) lots or constituting five acres or more.

New Concepts, Inc.

NM Lic. No. 28334

Utility and Engineering Construction

PHONE (505) 452-8910

FAX (505) 452-1909



February 8, 2006

Mr. Charles Haegelin
Curb, Inc.
5160 San Francisco N.E.
Albuquerque, New Mexico 87109

Re: El Rancho Grande Unit 17
COA Project: 7428.82

NOW COMBINED
w/ 16

Attached is our unit price proposal for the referenced project based on our interpretation of the plans dated August 15, 2005 as drawn by Issacson and Arfman Engineering.

Paving	97,384.05
Water	60,445.08
Storm & Sanitary Sewer	50,540.50
Gibson Blvd. RCP Storm	8,850.00
Subtotal	217,219.63
Permits*	1,000.00
Subtotal	218,219.63
GRT @ 6.75%	14,729.83
TOTAL	232,949.46

217,219.63
+ 6,750.00

231,881.96

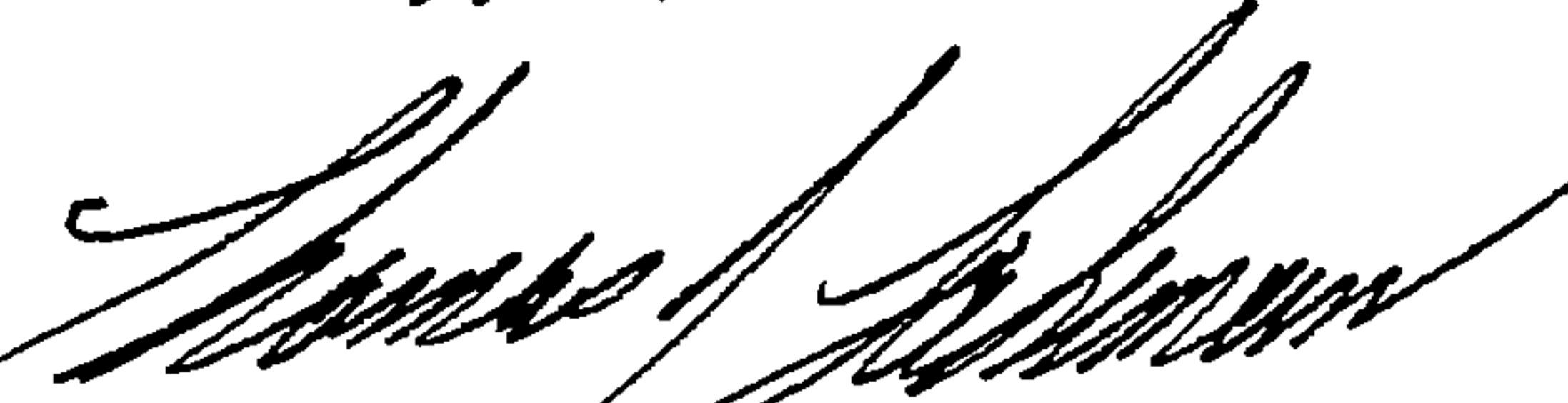
Note: It is our understanding that this work will be change ordered into El Rancho Grande 16.
COA Project #: 7428.81

This proposal excludes ALL cost of SWPPP, NPDES Permit, engineering fees, expansion charges, pro-rata fees, permits, staking, testing, water meters, rock excavation, traffic control, barricading, import or expost of material, seeding, trash removal, relocation or removal of existing utilitites, dry utilities, landscaping, fences or walls.

* Permits will be billed at invoice cost.

If you have any questions please feel free to contact me.

Sincerely yours,


Thomas J. Lakeman
President


Accepted: 2/15/06

☐
MAIN OFFICE
508 Paragon SE
PO Box 9555
Albuquerque, N.M. 87119-9555

1

El Rancho Grande Unit 17
Revised

ITEM	DESCRIPTION	UNIT	EST QTY	UNIT PRICE	TOTAL BID
	PAVING				
301.020	SUBGRADE PREP, 12"	SY	2753	1.75	4,817.75
336.022	RES ASP CONC, TYPE C, 1-1/2", M	SY	5506	7.50	41,295.00
336.120	TK CT	SY	2753	0.10	275.30
340.010	SDWK, 4", PCC	SY	111	31.00	3,441.00
340.025	WLCHR ACC RAMP, 4" PCC	EA	6	1,020.00	6,120.00
340.030	VLY GUT & CURB, PCC	SY	220	64.00	14,080.00
340.050	C & G, STD, PCC	LF	210	16.00	3,360.00
340.090	ROLL CURB, PCC	LF	1149	15.00	17,235.00
510.100	CUT-OFF WALL, PCC	CY	2	330.00	660.00
510.10X	CUT-OFF WALL, PCC, REM&DISP	CY	2	135.00	270.00
510.110	STR CONC 4000, RPCC FORM	CY	3	700.00	1,750.00
	TYPE III BARRICADES	EA	1	425.00	425.00
	ADJ Ext VLV & MH	EA	0	410.00	-
	3 WIRE FENCE W/WOOD POSTS	LF	340	10.75	3,655.00
	Total Paving				97,384.05
	WATER SYSTEM				
801.001	4" WL PVC C-900	LF	244	11.00	2,684.00
801.002	6" WL PVC C-900	LF	1022	13.00	13,286.00
801.009	18" WL DIP	LF	118	61.56	7,264.08
801.059	NON PRESS CONN	EA	3	650.00	1,950.00
801.065	DI FIT, MJ, 4"-14", WL	LB	1015	1.80	1,827.00
801.066	DI FIT, MJ, 16"-36", WL	LB	390	2.40	936.00
801.081	4" GATE VLV	EA	1	455.00	455.00
801.081	6" GATE VLV	EA	3	485.00	1,455.00
801.095	1" AIR/VAC RELEASE VLV	EA	1	7,500.00	7,500.00
801.105	VLV BOX	EA	4	472.50	1,890.00
801.113	FH, 4'	EA	1	2,520.00	2,520.00
801.150	MJ REST GLND, 4"-8"	EA	36	53.00	1,908.00
801.15X	MJ REST GLND, 18"	EA	2	200.00	400.00
801.155	JNT REST HRNSS, 4"-8"	EA	17	83.00	1,411.00
801.158	JNT REST HRNSS, 14"-24"	EA	3	348.00	1,044.00
802.760	3/4" NS WTR LN, SS, NWM	EA	3	707.50	2,122.50
802.770	3/4" NS WTR LN, DS, NWM	EA	7	927.50	6,492.50
801.059	NON PRESS CONN, w/FIT, 18" WL	EA	1	5,300.00	5,300.00
	Total Water				60,445.08

2

El Rancho Grande Unit 17
Revised

	STORM & SANITARY SEWER				
701.010	TRCH, BF, 4-15" SAS, <8'	LF	469	9.50	4,455.50
701.020	TRCH, BF, 4-15" SAS, 8-12'	LF	395	13.00	5,135.00
901.030	8" SAS PIPE	LF	864	9.00	7,776.00
901.500	MH CONN, <15" Wet Conn	EA	2	750.00	1,500.00
905.050	4" NEW SAS SVC	EA	18	548.00	9,864.00
915.040	CTH BSN, C, DG	EA	1	5,100.00	5,100.00
920.070	MH, 4' DIA, C or E, 6'-10'D	EA	6	2,785.00	16,710.00
	Total Storm & Sanitary Sewer				50,540.50
	GIBSON BLVD RCP STORM				
701.110	TRCH, BF, 18-36" SWR, 8-12'	LF	118	16.00	1,888.00
910.017	36" RCP, III	LF	118	59.00	6,962.00
					8,850.00
	TOTAL PROJECT				\$ 217,219.63

Change Order *

page ____ of ____

Project Name: El Rancho Grande Unit 16

City Project No. 742881

Today's Date: _____

Project A/E: Isaacson & Arfman, P.A.

Change Order No. 1

Phone: (505) 268-8828

Work Order Date: 8-15-2005

Contractor: New Concepts Inc.

Phone: (505) 452-8910

Original Contract Amount

1,618,566.24

Previous Contract Amount

Adjustment This Change Order

232,949.46 231,831.96

Change Order Revised Total

1,851,515.70 1,850,448.20

Original Contract Time

(Consecutive Calendar Days)

150 CD

Previous Contract Time

150 CD

Adjustments This Change Order

50 CD

Revised Contract Time

200 CD

Reasons for Change(s):

☒ Changed Scope ☐ Field Conditions ☐ Over/Underruns ☐ Emergency ☐ Other

Cost Adjustment Was:

☒ Contract Unit Price Extension ☒ Negotiated ☐ Force Account ☐ Other

In accordance with the contract between Curb, Inc. (Owner) and New Concepts, Inc. (Contractor) dated July 18, 2005, this document constitutes a binding contractual modification and comprises the total compensation due to the contractor for the work and contract time defined in this Change Order. Section 11.10 of the General Conditions is made a part of this Change Order and incorporated herein as though set forth in full.

This change order consists of this page and all attachments, which have been given consecutive page numbers.

CONCUR:

RECOMMEND:

APPROVED:

[Signature] 2-8-06
Contractor Date

[Signature] 3-2-06
BRC Chairman Date

[Signature] 3-02-06
City Engineer Date

[Signature] 2/15/06
Owner Date

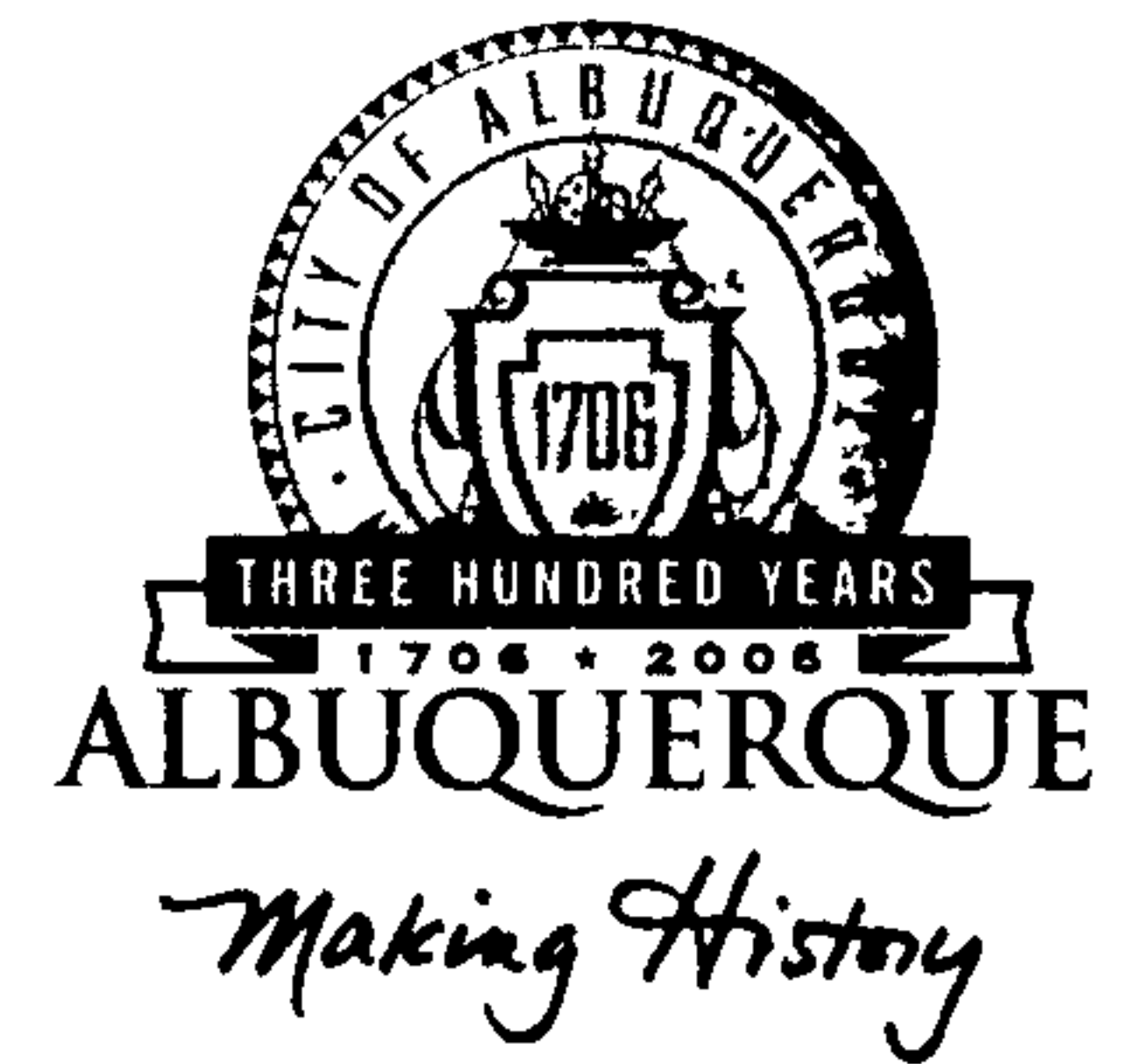
[Signature] 02-21-06
Engineer Date

* CHANGE ORDER COMBINED

EL RANCHO 17 INTO EL. R.-16

[Signature] 08.20.15

CITY OF ALBUQUERQUE



July 8, 2005

Fred Arfman, PE
Isaacson & Arfman
128 Monroe NE
Albuquerque, NM 87108

Re: El Rancho Grande, Units ~~17~~ Subdivision Grading Plan
Engineer's Stamp dated 6-15-05, (N8/D~~5~~)

JE 8-24-15
NOW COMBINED
WITH 16

4 (NOW)

Dear Mr. Arfman,

P.O. Box 1293

Based upon the information provided in your submittal dated 6-16-05, the above referenced plan is approved for Preliminary Plat action by the DRB. Once that board approves the plan, please submit a mylar copy for my signature in order to obtain a Rough Grading Permit.

Albuquerque

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Municipal Development Department, Hydrology section at 768-3654 (Charles Caruso).

New Mexico 87103

If you have any questions, you can contact me at 924-3986.

www.cabq.gov

Sincerely,

Bradley L. Bingham, PE
Principal Engineer, Planning Dept.
Development and Building Services

C: Chuck Caruso DMD
file

February 20, 2007



CERTIFICATE OF COMPLETION AND ACCEPTANCE

Curb, Inc.
Curb West Inc.
5160 San Francisco Rd NE
Albuquerque, NM 87109-4640

RE: El Rancho Grande Unit 16
Project Number: 742881

Dear Mr. Bo K. Johnson:

This is to certify that the City of Albuquerque accepts the construction of the infrastructure provided in the Work Order Construction Plans, City project number 742881. The work was completed pursuant to the required public infrastructure listed in the Subdivision Improvements Agreement (SIA) Procedure B, between Curb West Inc. and the City of Albuquerque executed on August 9, 2005.

P.O. Box 1293

Having satisfied the requirements referenced above, the SIA and any associated Financial Guaranty, held by the City, can now be released. The indemnity and hold harmless provisions of the SIA in favor of the City shall remain in effect. The contractor's warranty period will begin February 20, 2007 and is effective for a period of one (1) year.

Albuquerque

Please be advised this Certificate of Completion and Acceptance shall only become effective upon final plat approval and filing in the Bernalillo County Clerk's office.

New Mexico 87103

Should you have any questions or issues regarding this project, please contact me at (505) 924-3996.

www.cabq.gov

Sincerely,

Richard Dourte, P.E.
City Engineer
Development & Building Services
Planning Department

2-21-07

cc: MARK GOODWIN & ASSOC. (e-mail)
NEW CONCEPTS (e-mail)
DMD Maps & Records, Ivan Taylor (e-mail)
Peter Chang, DMD Street Maintenance (e-mail)
Richard Zamora, DMD Street Maintenance (e-mail)
SIA File, City Project Number 742881

RELEASE OF AGREEMENT

TITLE OF PROJECT: EL RANCHO GRANDE, UNIT 16
SUBDIVIDER: CURB, INC.
CITY PROJECT NO. 742881

THIS RELEASE IS EXECUTED THIS 15 DAY OF March 20 07.

WHEREAS, the City of Albuquerque, New Mexico, a municipal corporation ("City") and [name of subdivider/developer:] CURB, INC. ("Subdivider"), entered into a (name of agreement:) SUBDIVISION IMPROVEMENT AGREEMENT ("AGREEMENT"), dated the 9th day of AUGUST 2005, recorded on AUGUST 11, 2005, in the records of the Clerk of Bernalillo County, New Mexico at Book BCR: A101, pages 6853 through 96853, whereby the Subdivider agreed to complete certain infrastructure improvements; and

WHEREAS, the Subdivider has completed the improvements to the satisfaction of the City and has otherwise fully performed all of its obligations under the above-mentioned Agreement.

NOW THEREFORE, in consideration of the above, the City does hereby release and discharge Subdivider from all obligations and covenants contained in the above-mentioned Agreement. Any performance/warranty bond or labor and material payment bond provided by the Subdivider shall remain in effect according to the terms of those bonds.

APPROVED BY:

CITY OF ALBUQUERQUE, NEW MEXICO

[Signature]
City Engineer

Development & Building Services

Dated: 3-01-07

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

2-22-07

This instrument was acknowledged before me on 1 day of March, 2007 by Richard Duarte City Engineer, of the City of Albuquerque, a municipal corporation, on behalf of said corporation.

My Commission Expires:

7.30.2008



OFFICIAL SEAL
CLAIRE SENOVA
NOTARY PUBLIC
STATE OF NEW MEXICO
7.30.08

[Signature]
Notary Public

Figure 24

Rev. 07/02



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Page: 1 of 1
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RELEASE OF LIEN

TITLE OF PROJECT: EL RANCHO GRANDE I, UNIT 16
SUBDIVIDER: CURB, INC.
CITY PROJECT NO.: 742881

The City of Albuquerque, lienholder under a certain Claim and Notice of Lien filed of record August 11, 2005 in the office of the Bernalillo County Clerk in Misc. Book A101 at page(s) 6853 as Document No.: 2005117202 releases and discharges the following real property described in said Lien, from the Lien and operation thereof.

REAL PROPERTY RELEASED: EL RANCHO GRANDE Unit 16, Properties filed in the Bernalillo County Clerks records, Bk. A2005C, Page 319, Document # 2005143855

REAL PROPERTY RELEASED & FORMER LEGAL DESCRIPTION: Tract 16-E, as shown on Bulk Land Plat for Tracts 16-A, 16-B, 16-C, 16-D, 16-E & 16-F EL RANCHO GRANDE, filed in the office of the County Clerk of Bernalillo County, New Mexico, on January 31, 2005, in Book 2005C, Page 41, Document Number 2005014732.

WITNESS my hand and seal this 7 day of March, 2007

Millicent Santillanes
City Clerk
City of Albuquerque
Bernalillo County, New Mexico

APPROVED:

Richard Dourte
Richard Dourte, City Engineer
Date: 3-01-07

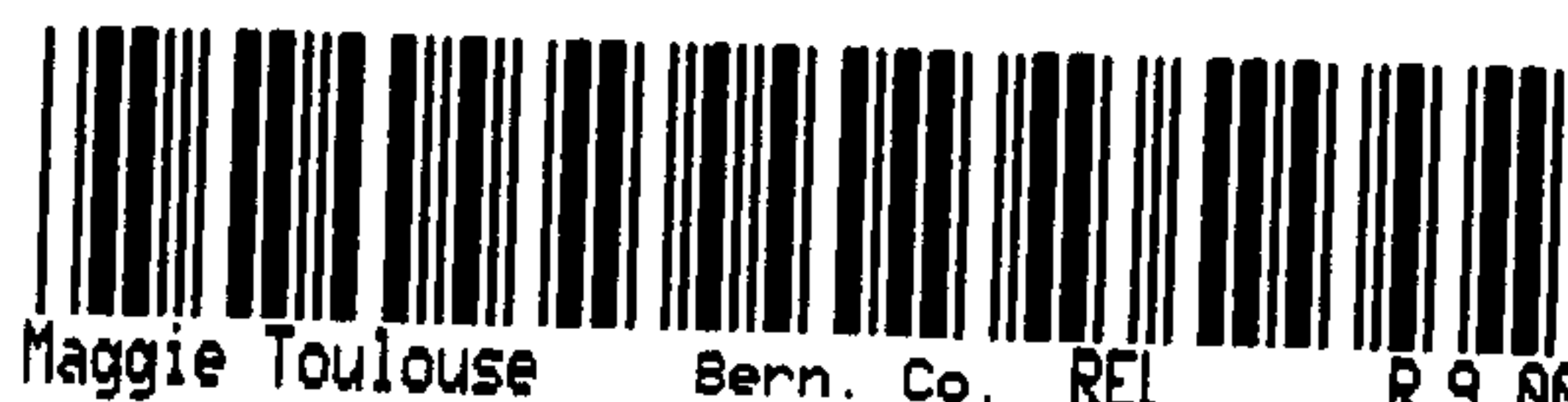
STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

On this the 7th day of March 2007, before me appeared Millicent Santillanes to me personally known, who being by me duly sworn or affirmed did say that she is the City Clerk of the City of Albuquerque, County of Bernalillo, State of New Mexico, and that said instrument was signed and sealed in behalf of said City of Albuquerque by authority of its City Council and the laws of the State of New Mexico and of said City of Albuquerque, and the County Clerk acknowledged said instrument to be the free act and Claim and Notice of Lien of the City of Albuquerque.

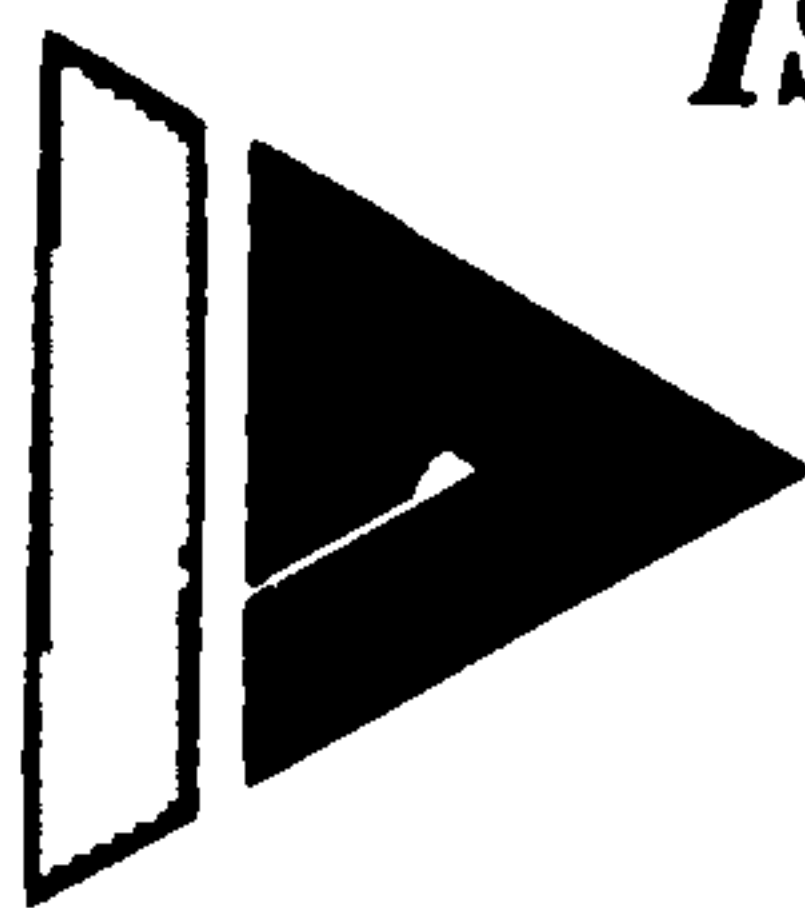
My Commission Expires:

Antonietta J. Candalaria
Notary Public

2/17/07 Figure 31



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ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Albuquerque, NM

DRAINAGE REPORT

FOR

**EL RANCHO GRANDE
UNIT 16**

**A 159-LOT SINGLE FAMILY
RESIDENTIAL SUBDIVISION**

**ALBUQUERQUE, NEW MEXICO
APRIL 2005**

DRAINAGE REPORT

FOR

EL RANCHO GRANDE UNIT 16

**A 159-LOT SINGLE FAMILY
RESIDENTIAL SUBDIVISION**

**ALBUQUERQUE, NEW MEXICO
APRIL 2005**

Prepared by:

**ISAACSON & ARFMAN, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
(505) 268-8828**



Fred C. Arfman 04.21.05
Fred C. Arfman, PE Date

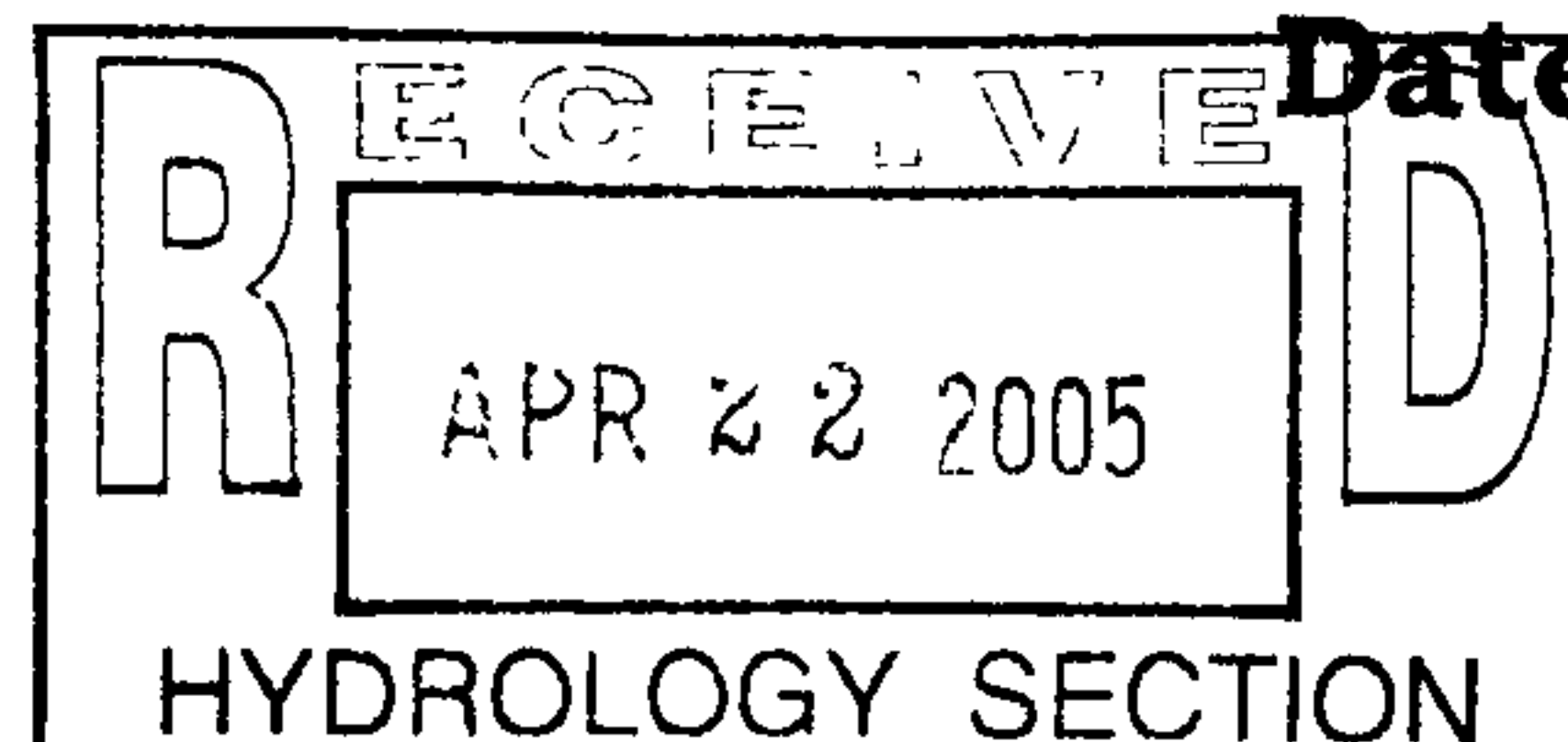


TABLE OF CONTENTS

VICINITY MAP

FLOODPLAIN MAP

- I. PROJECT INFORMATION**
- II. INTRODUCTION**
- III. EXISTING CONDITIONS**
 - ONSITE
 - OFFSITE
- IV. PROPOSED CONDITIONS**
- V. SUMMARY & CONCLUSIONS**

APPENDICES

APPENDIX A: Offsite Flows

Offsite Basin Map

Runoff & Volume Calculations for Offsite Basins

APPENDIX B: Proposed Conditions

Overall Basin Map

Land Treatment Detail

Runoff Calculations for Master Basins

Runoff Calculations for Sub-Basins

APPENDIX C: Street Flow Capacity

Street Flow Depth Summary Table

APPENDIX D: Rundowns and Sidewalk Culverts

Rundown Exhibit

Rundown Capacity Calculations

Sidewalk Culvert Capacity Calculations

APPENDIX E: Storm Drain Calculations

Sump Inlet Capacity Calculations

Hydraflow Plan View Exhibit

Hydraflow Storm Drain Calculations

APPENDIX F: Pond Volume, Standpipe and Amole Arroyo Outfall Calculations

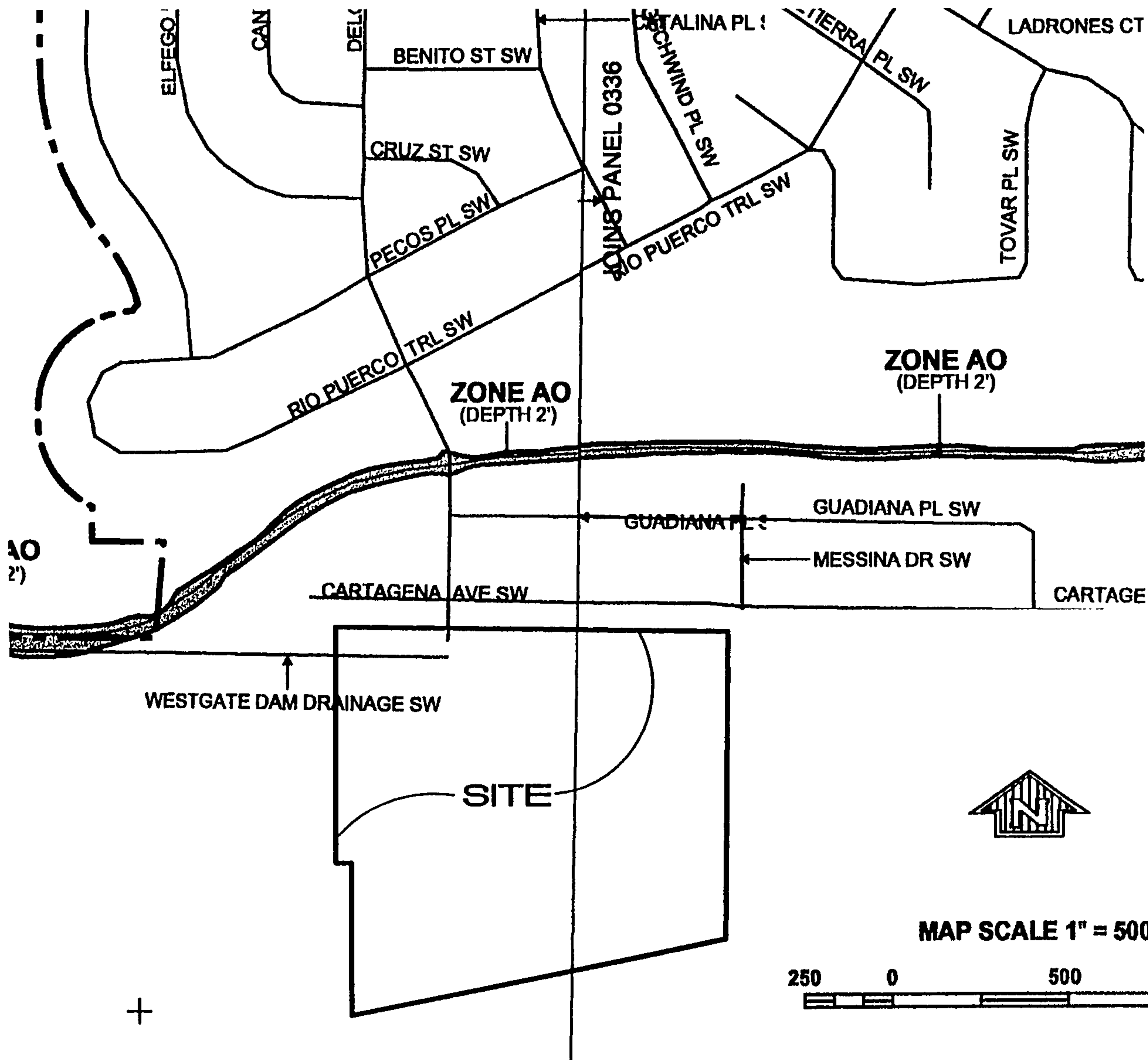
POCKETS

Grading & Drainage Plans--Unit 16

Retaining Wall Plans---Unit 16

Sub-Basin and Storm Drain Plan

FLOODPLAIN MAP



NFIP PANEL 0317E

FIRM
FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO
AND INCORPORATED AREAS

PANEL 317 OF 825
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	NUMBER	PANEL	REVISION
ALBUQUERQUE, CITY OF	350000	0317	1
BERNALILLO COUNTY	350001	0317	1

Notes to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
35001C0317E
MAP REVISED
NOVEMBER 19, 2003
Federal Emergency Management Agency

NFIP PANEL 0336E

FIRM
FLOOD INSURANCE RATE MAP
BERNALILLO COUNTY,
NEW MEXICO
AND INCORPORATED AREAS

PANEL 336 OF 825
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY	NUMBER	PANEL	REVISION
ALBUQUERQUE, CITY OF	350000	0336	2
BERNALILLO COUNTY	350001	0336	1

Notes to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
35001C0336E
MAP REVISED
NOVEMBER 19, 2003
Federal Emergency Management Agency

PROJECT INFORMATION

PROPOSED LEGAL DESCRIPTION:

El Rancho Grande Subdivision, Unit 16

EXISTING LEGAL DESCRIPTION:

All of Tract 16E and a portion of Tract 16-F
of Bulk Land Plat for El Rancho Grande
(Filed 1/31/05 in Book 2005C, Pg. 41)

ENGINEER:

Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM 87108
(505) 268-8828
Attn: Fred C. Arfman

SURVEYOR:

Aldrich Land Surveying
(505) 884-1990
Attn: Tim Aldrich, NMPLS No. 7719

DEVELOPER:

Curb, Inc
c/o Bokay Construction
(505) 899-9656
Attn: Bo Johnson

NUMBER OF PROPOSED LOTS: 159

TOTAL AREA: 24.776 Acres

FLOOD PLAIN:

Zone X
This site lies outside the 100-year flood (Zone X) based on Firm Maps
#35001C0317 and #35001C0336, dated November 19, 2003

II. INTRODUCTION

El Rancho Grande Subdivision, Unit 16, is a 159-lot, single-family residential subdivision. The proposed site is located northwest of the intersection of Messina Drive and Gibson Blvd., south of the existing Westgate Heights Subdivision, west of El Rancho Grande, Unit 11, and undeveloped land to the west (Parcel 2-A, Lands of Rio Bravo Partners), and north of future Gibson Boulevard.

This report also includes drainage recommendations for the future units to the west of this site (referred to as Future Unit 17 in this report). The site falls within AMAFCA's Amole-Hubbell Drainage Management Plan (Amole-Hubbell DMP), prepared by Leedshill-Hirkenhoff, dated July 22, 1999, as modified by the Design Report for Amole Arroyo, prepared by Isaacson & Arfman, P.A., dated August 2003.

III. EXISTING CONDITIONS

ONSITE:

The proposed Unit 16 along with future Unit 17 is a 44.2-acre undeveloped tract of land, with native grasses and scrub brush. The site slopes to the east toward Messina Drive and southeast to Gibson Blvd. at 4-5%.

OFFSITE:

Approximately 156 cfs of offsite flows enter Unit 16 from the west, east of Westgate Dam and north of the future Gibson Blvd alignment. A portion of the Sacate Blanco Basin 60104, as defined in the Amole-Hubbel DMP, was added to the Amole Arroyo basin by the Amole Arroyo Design Report. However, until that land is developed, these flows will continue to discharge onto the proposed El Rancho Grande, Unit 16. See Appendix A for offsite basin maps and runoff and volume calculations.

IV. PROPOSED CONDITIONS

Grading & Drainage Plan for the proposed Unit 16 is in the pocket at the back of this report. Land treatments for the development are as follows:

Type A	0%	(See Land Treatment Detail in Appendix B.)
Type B	19%	
Type C	19%	
Type D	62%	

The Overall Basin Map in Appendix B shows the 100-year flows from each master basin. The flows will be intercepted by storm drain systems in Messina Drive and Gibson Blvd and be conveyed via a 54" storm drain south in Messina Drive to a pond located in the proposed development to the south--Sierra Ranch Subdivision, which is being designed by Bohannan-Huston, Inc. The storm drain was designed to carry developed flows from El Rancho Grande, Future Unit 17, Parcel 2-A and a portion of 118th Street.

The following table summarizes the total flows from onsite basins A-H and offsite flows that enter Messina and Gibson.

Basin ID	Q-100 (cfs) to Messina	Q-100 (cfs) to Gibson
A	33.3	
B	35.7	
C	27.1	
D		5.1
E		4.5
F		14.6
G		19.9
H		18.7
I (Messina)	3.9	
J (Gibson)		27.6
K (Offsite from 118th St)		13.5
L (Delgado Entrance)		2.0
2-A (Parcel 2-A)		55.7
Total Q-100 (cfs)	100	161.6

The master basins were divided into sub-basins to obtain Analysis Points (AP) at critical locations to determine street flow depths and inlet capacities. (See back pocket)

The street flow depth summary table in Appendix C shows the flow depths at the various analysis points. All streets will have mountable curb except in the locations listed below (and at storm drain inlet locations).

Unit 16 Standard Curb

- Crandall Rd Delgado-Messina
- Denton Rd West Property Line-Messina
- Golinda Rd Delgado to Messina
- Delgado Dr Gibson to Crandall Road & Crandall Road to North Property Line
- Panola St Lots 16/17, Bl. G to South End
- Messina Gibson to North Property Line
- Gibson West Property Line to Messina
-

Future Unit 17 Standard Curb

- Denton Rd Lots 9/10, Bl. C to Unit 16 Property Line
- Street 'N' South Line of Lot 15, Bl. A
- Street 'K2' Lots 10/11, Bl. F to East End
- Gibson West Property Line to Unit 16

The storm drain system for the ultimate build-out scenario is shown on the Sub-Basin and Storm Drain Plan in the back pocket. The inlets and manholes are numbered to correspond with the storm drain calculations (see Hydraflow Storm Drain Calculations in Appendix E). A model of the future storm drain for Future Unit 17, Parcel 2-A and 118th Street was also included in the Hydraflow Storm Drain Calculations. According to the preliminary plans for the Anderson Heights Development by Mark Goodwin & Assoc., there will be inlets in 118th Street and a storm drain connecting to the Gibson Blvd storm drain.

The main line storm drain sizes and locations are summarized below.

Unit 16 Storm Drain Size

- Gibson Blvd 42"-36"
- Messina Dr 42"-24"
- Golinda Rd 24"
- Denton Rd 24"

Future Unit 17 Storm Drain Size

- Gibson Blvd 36"-30"
- Street 'N' 24"

Capacities for the inlets on-grade were determined from DPM Plates 22.3 D-5 (Single Types 'A' and 'C' inlets) and 22.3 D-6 (double Type 'C' inlets) using the flow depths from the Street Depth Summary Table (Appendix C) at the corresponding analysis points. The inlet types and capacities are listed on the Sub-Basin and Storm Drain Plan.

There are three sump inlets proposed at the ends of Panola Street and Garland Court adjacent to Gibson Blvd and Future Street 'K2' adjacent to Delgado Drive (See Appendix E for sump inlet calculations). In order to provide an outlet for the flows in case of an emergency overflow, openings shall be provided in the wall at Gibson and in the future wall in Delgado.

Following is a summary of inlet locations.

Unit 16 # of Inlets

- Delgado Entrance 1
- Denton Rd Lots 12/13, Bl. J 4
- Golinda Rd at Garland Ct 4
- Panola St at south end 1 (sump)
- Garland Ct at south end 1 (sump)
- Gibson adjacent to Panola St 1
- Gibson adjacent to Garland Ct 4
- Messina south of Golinda Rd 4
- Messina north of Denton Rd 4

Future Unit 17 # of Inlets

- Street 'N' Entrance 4
- Street 'K2' (at Delgado) 1 (sump)

In Unit 16, a 10-foot concrete rundown is proposed at the end of Odessa Court. The flows will be discharged to Gibson through a sidewalk culvert. See Sheet 5 of the Grading & Drainage Plan for Unit 16 in the back pocket for a section of the rundown.

See Appendix D for Rundown and Sidewalk Culvert Capacity Calculations.

TEMPORARY PONDS

Three temporary ponds will handle the offsite flows (156 cfs) from the west. Pond 1 accepts 58.2 cfs from Basin OFF-1B and is a desiltation pond with an overflow to the Amole Arroyo. The flows outfall to the Amole Arroyo at 0.83% and then enters the channel bank which has 3:1 slope. At the outfall location, the channel banks in the Amole Arroyo are lined 2/3 of the way up. The velocity of the flows entering the channel is 2.3 fps at the 0.83% slope and 6.1 fps at the channel bank (see Appendix F for Amole Arroyo outfall calculations). No additional riprap is proposed in this location.

Pond 2 accepts 10.7 cfs from Basin OFF-2B, and Pond 3, which is located at the southwest corner of Future Unit 17, accepts 81.5 cfs. A temporary PVC standpipe will collect 5.4 cfs from Basin OFF-4B at the southeast corner of Future Unit 17 and will discharge these flows into the storm drain system in Delgado Drive.

The ponds and standpipe are shown on Sheet 4 of the Grading Plan in the back pocket. Also, see Appendix A for an offsite basin map and runoff calculations and Appendix F for standpipe calculations.

V. SUMMARY & CONCLUSIONS

Based on information in previous sections, it is recommended that the following items be constructed:

Unit 16:

1. Mountable curb on all street except as listed below:

- Crandall Rd Delgado-Messina
- Denton Rd West Property Line-Messina
- Golinda Rd Delgado to Messina
- Delgado Dr Gibson to Crandall Road & Crandall Road to North Property Line
- Panola St Lots 16/17, Bl. G to South End
- Messina Gibson to North Property Line
- Gibson West Property Line to Messina

2. Main Line Storm Drains and Inlets

<u>Location</u>	<u>Storm Drain Size</u>
• Gibson Blvd	42"-36"
• Messina Dr	42"-24"
• Golinda Rd	24"
• Denton Rd	24"

<u>Location</u>	<u># of Inlets</u>
• Delgado Entrance	1
• Denton Rd Lots 12/13, Bl. J	4
• Golinda Rd at Garland Ct	4
• Panola St at south end	1 (sump)
• Garland Ct at south end	1 (sump)
• Gibson adjacent to Panola St	1
• Gibson adjacent to Garland Ct	4
• Messina south of Golinda Rd	4
• Messina north of Denton Rd	4

3. 10' Concrete Rundown

<u>Location</u>	<u># Sidewalk Culverts</u>
-----------------	----------------------------

- Odessa Ct to Gibson 1-2'

4. Three temporary retention ponds and one temporary standpipe in Future Unit 17.

Future Unit 17:

1. Mountable curb on all streets except as listed below.

<u>Location</u>	<u>Standard Curb</u>
• Denton Rd	Lots 9/10, Bl. C to Unit 16 Property Line
• Street 'N'	South Line of Lot 15, Bl. A
• Street 'K2'	Lots 10/11, Bl. F to East End
• Gibson Blvd	West Property Line to Unit 16

2. Main line storm drains as listed.

<u>Location</u>	<u>Storm Drain Size</u>
• Gibson Blvd	36"-30"
• Street 'N'	24"

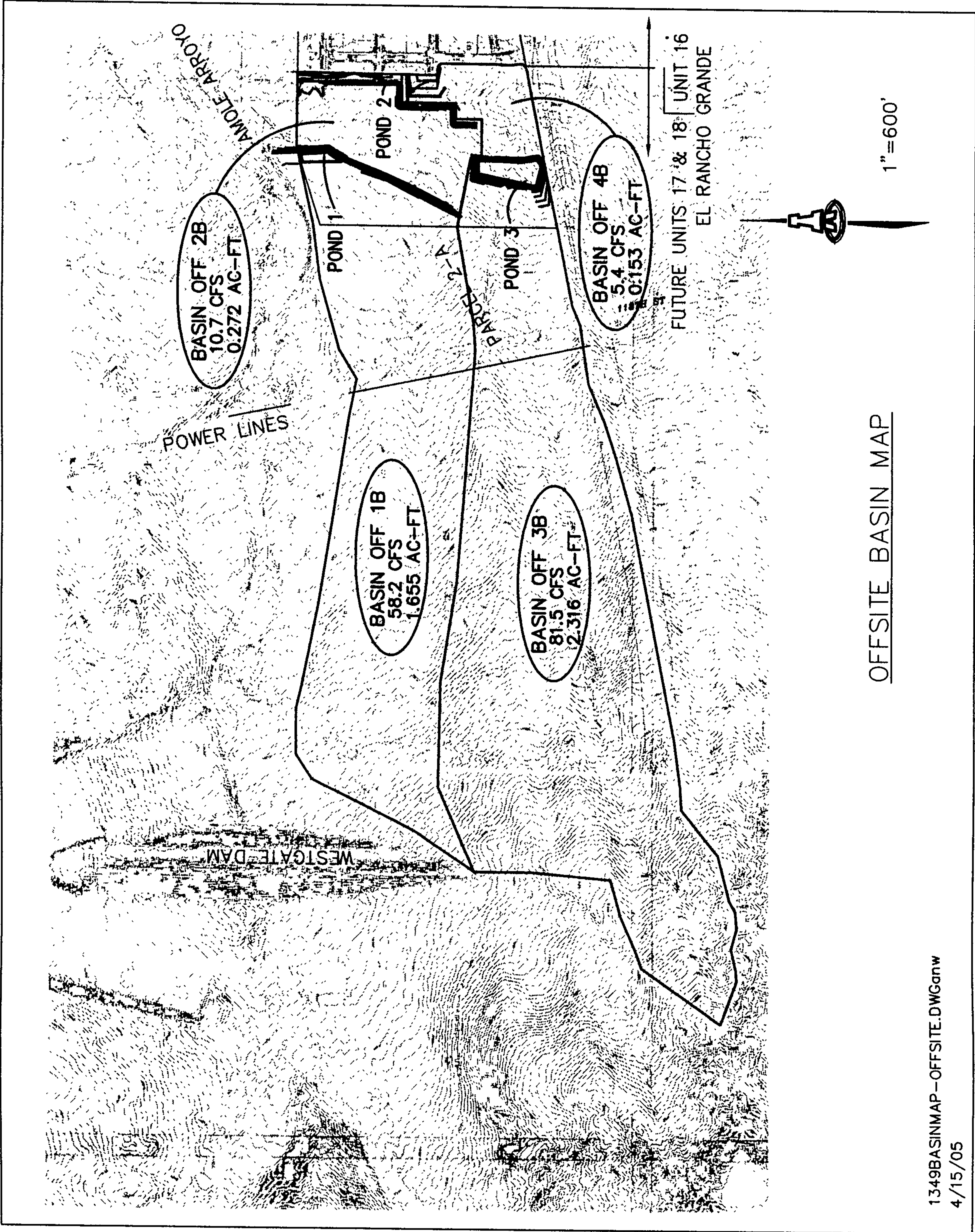
<u>Location</u>	<u># of Inlets</u>
• Street 'N' Entrance	4
• End of Street 'K2' (sump)	

3. 10' Rundown

<u>Location</u>
• Between stubs at St. 'M2'

APPENDIX A

Offsite Flows



OFFSITE BASIN MAP

RUNOFF CALCULATIONS FOR EXISTING CONDITIONS (Q_{100})

100-YEAR, 6-HOUR STORM

Per the City of Albuquerque D P M Section 22.2

PROJECT NAME: EL RANCHO GRANDE, UNITS 16 & FUTURE 17 & 18

JOB NUMBER: 1349

PRECIP ZONE	Q_{100} RUNOFF RATES (cfs/Ac)			
	A	B	C	D
1	1.29 ✓	2.03 ✓	2.87 ✓	4.37 ✓
2	1.56	2.28	3.14	4.70
3	1.87	2.60	3.45	5.02
4	2.20	2.92	3.73	5.25

% LAND TREATMENTS				
	TREAT TYPE 1	TREAT TYPE 2	TREAT TYPE 3	TREAT TYPE 4
A	100			
B	0			
C	0			
D	0			
S% =	100	0	0	0

PRECIPITATION ZONE.

1

TREATMENT TYPE 1							
BASIN #	LAND TREATMENT AREAS (Ac)					Q_{100} (cfs)	REMARKS
	A_{TOTAL}	A_A	A_B	A_C	A_D		
OFF2B	8.264	8.26	0	0	0	10.7	OFFSITE FUTURE UNIT 17
OFF 1B	45.141	45.14	0	0	0	58.2	OFFSITE WEST OF FUTURE UNITS TO AMOLE ARROYO
OFF 3B	63.153	63.15	0	0	0	81.5	OFFSITE WEST OF FUTURE UNITS TO POND 3
OFF 4B	4.161	4.16	0	0	0	5.4	OFFSITE FUTURE UNIT 18 TO STAND PIPE

- * FUTURE INTERIM CONDITIONS--UNIT 17 DEVELOPMENT WITH POWERLINE PONDS IN PLACE
- ** INTERIM CONDITIONS--UNIT 16 DEVELOPMENT WITH POWERLINE PONDS IN PLACE
- *** INTERIM CONDITIONS--UNIT 16 DEVELOPMENT WITHOUT POWERLINE PONDS IN PLACE

VOLUME CALCULATIONS FOR EXISTING CONDITIONS (V_{100})

100-YEAR, 6-HOUR STORM

Per the City of Albuquerque D P M Section 22.2

PROJECT NAME: EL RANCHO GRANDE, UNITS 16 & FUTURE 17 & 18
JOB NUMBER: 1349

PRECIP ZONE	E ₃₆₀ EXCESS PRECIPITATION (in.)			
	A	B	C	D
1	0.44 ✓	0.67 ✓	0.99 ✓	1.97 ✓
2	0.53	0.78	1.13	2.12
3	0.66	0.92	1.29	2.36
4	0.80	1.08	1.46	2.64

% LAND TREATMENTS				
	TREAT TYPE 1	TREAT TYPE 2	TREAT TYPE 3	TREAT TYPE 4
A	100	0	0	0
B	0	0	0	0
C	0	0	0	0
D	0	0	0	0
S% =	100	0	0	0

PRECIPITATION ZONE: 1

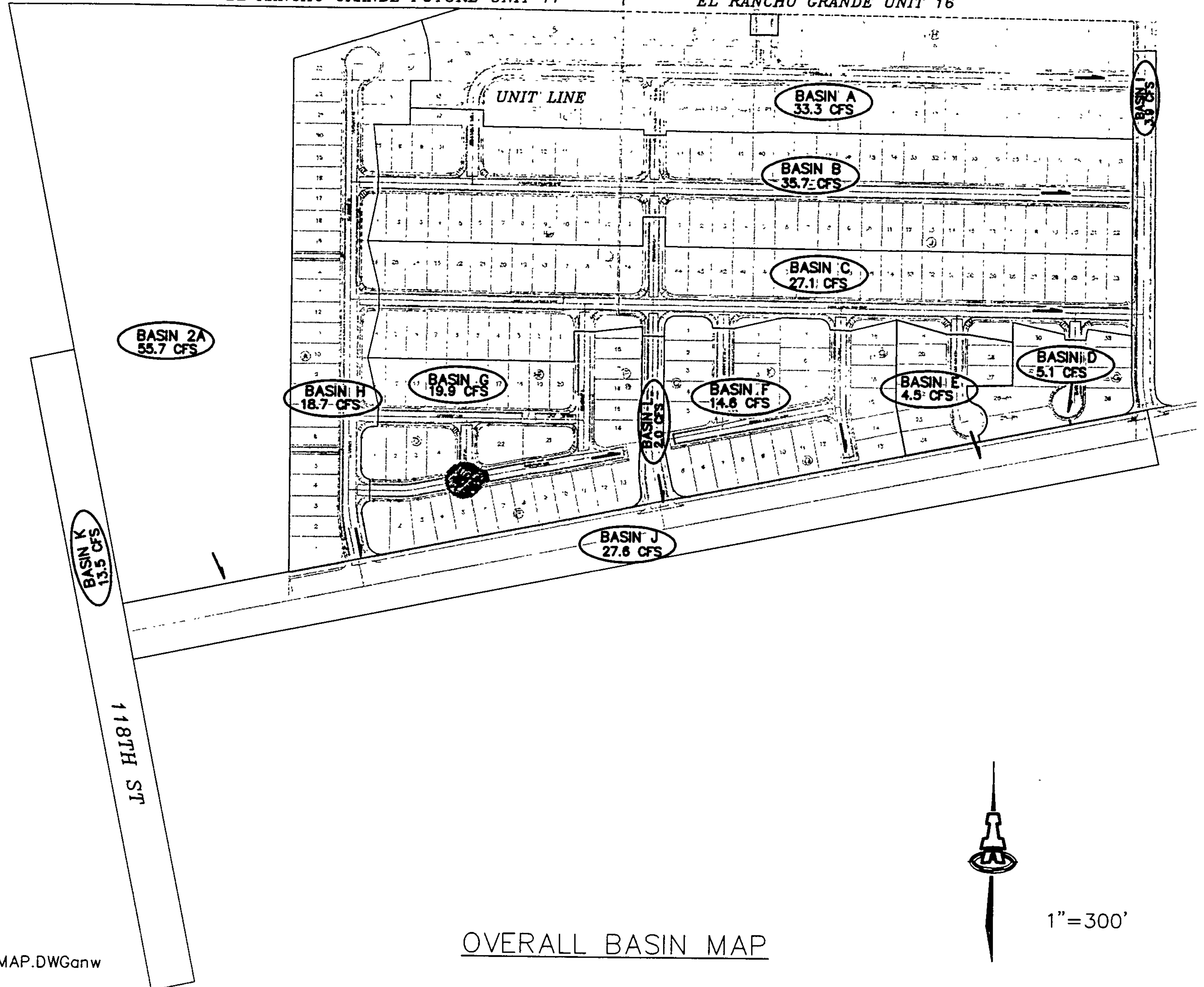
TREATMENT TYPE 1								
BASIN #	LAND TREATMENT AREAS (Ac)					V_{100} (Ac ft)	V_{100} (cu.ft.)	REMARKS
	A _{TOTAL}	A _A	A _B	A _C	A _D			
OFF2B	8.264	8.26	0	0	0	0.303 ✓	13199.3	OFFSITE FUTURE UNIT 17
OFF 1B	45.141	45.14	0	0	0	1.655 ✓	72099.2	OFFSITE WEST OF FUTURE UNITS TO AMOLE ARROYO
OFF 3B	63.153	63.15	0	0	0	2.316	100868.0	OFFSITE WEST OF FUTURE UNITS TO POND 3
OFF 4B	4.161	4.16	0	0	0	0.153	6645.9	OFFSITE FUTURE UNIT 18 TO STAND PIPE

APPENDIX B

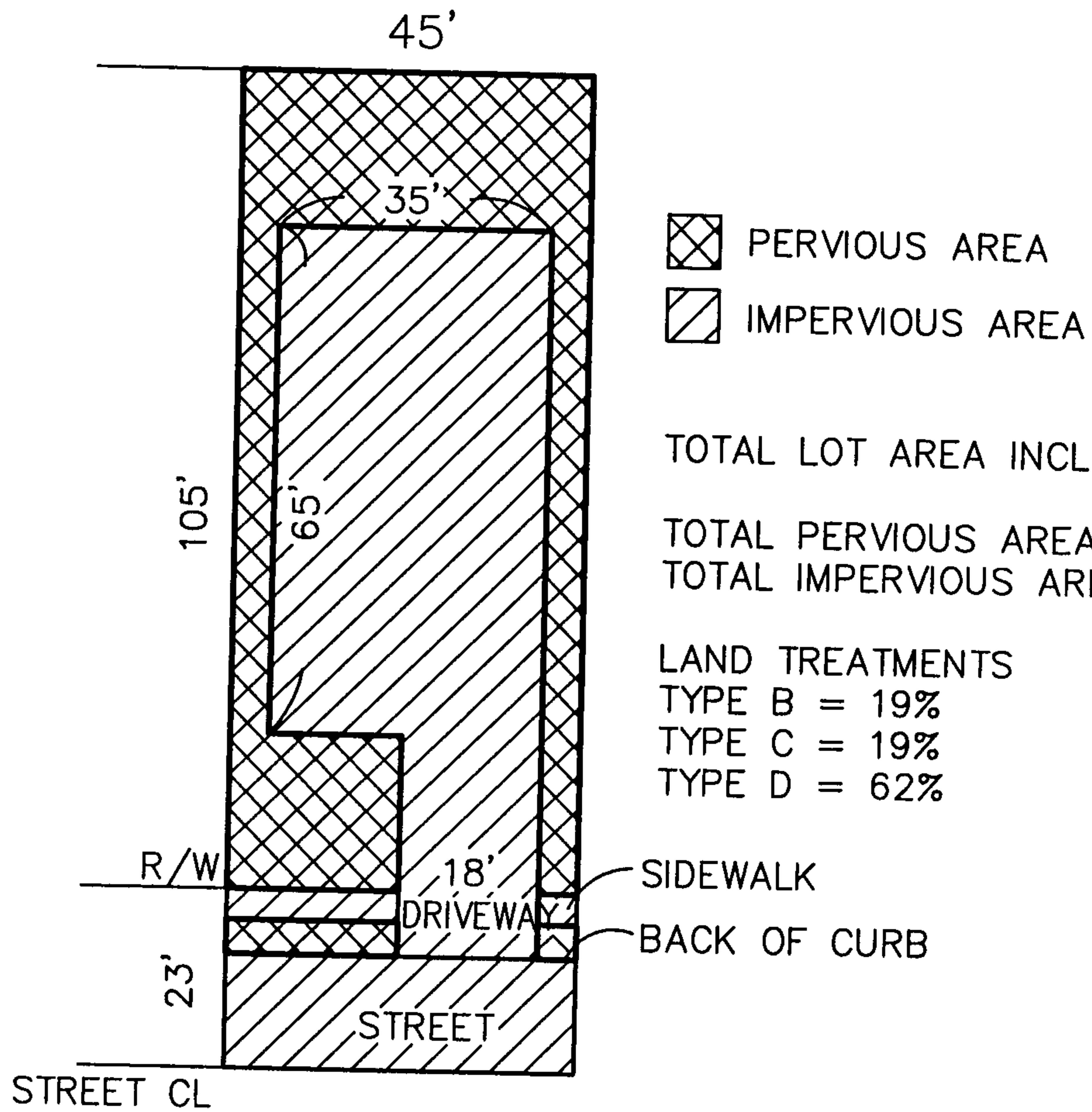
Proposed Conditions

EL RANCHO GRANDE FUTURE UNIT 17

EL RANCHO GRANDE UNIT 16



OVERALL BASIN MAP



TOTAL LOT AREA INCL. HALF STREET: 5760 SF

TOTAL PERVIOUS AREA: 2208 SF

TOTAL IMPERVIOUS AREA: 3552 SF

LAND TREATMENTS

TYPE B = 19%

TYPE C = 19%

TYPE D = 62%

LAND TREATMENT DETAIL

1"=30'

RUNOFF CALCULATIONS FOR DEVELOPED CONDITIONS (Q₁₀₀) **MASTER BASINS** **100-YEAR, 6-HOUR STORM** Per the City of Albuquerque D.P.M. Section 22.2

PROJECT NAME: EL RANCHO GRANDE, UNITS 16 & FUTURE 17
JOB NUMBER: 1349

PRECIP ZONE	Q ₁₀₀ RUNOFF RATES (cfs/Ac)			
	A	B	C	D
1	1.29 ✓	2.03 ✓	2.87 ✓	4.37 ✓
2	1.56	2.28	3.14	4.70
3	1.87	2.60	3.45	5.02
4	2.20	2.92	3.73	5.25

% LAND TREATMENTS				
	TREAT TYPE 1	TREAT TYPE 2	TREAT TYPE 3	TREAT TYPE 4
A	0	0		
B	0	19		
C	10	19		
D	90	62		
S% =	100	100	0	0

PRECIPITATION ZONE: 1 ✓

TREATMENT TYPE 1							
BASIN #	LAND TREATMENT AREAS (Ac)					Q ₁₀₀ (cfs)	REMARKS
	A _{TOTAL}	A _A	A _B	A _C	A _D		
I	0.9165	0	0	0.09	0.82	3.9	MESSINA
J	6.5326	0	0	0.65	5.88	27.6	GIBSON
K	3.2082	0	0	0.32	2.89	13.5	OFFSITE FROM 118TH ST
L	0.4648	0	0	0.05	0.42	2.0	DELGADO ENTRANCE

TREATMENT TYPE 2							
BASIN #	LAND TREATMENT AREAS (Ac)					Q ₁₀₀ (cfs)	REMARKS
	A _{TOTAL}	A _A	A _B	A _C	A _D		
A	9.1551	0	1.74	1.74	5.68	33.3 ✓	
B	9.8077	0	1.86	1.86	6.08	35.7	
C	7.4412	0	1.41	1.41	4.61	27.1	
D	1.4117	0	0.27	0.27	0.88	5.1	
E	1.2392	0	0.24	0.24	0.77	4.5	
F	4.0136	0	0.76	0.76	2.49	14.6	
G	5.4592	0	1.04	1.04	3.38	19.9	
H	5.1307	0	0.97	0.97	3.18	18.7	
2-A	15.2906	0	2.91	2.91	9.48	55.7	PARCEL 2-A

	S = Q ₁₀₀	S BASIN AREAS =
ONSITE BASINS A-H	158.9	43.6584
DELGADO ENTRANCE--BASIN L	2.0	0.4648
GIBSON--BASIN J	27.6	6.5326
MESSINA--BASIN I	3.9	0.9165
OFFSITE 118TH--BASIN K	13.5	3.2082
OFFSITE PARCEL 2-A DEV.--BASIN 2-A	55.7	15.2906
TOTAL	261.5 CFS	70.0711 AC

RUNOFF CALCULATIONS FOR DEVELOPED CONDITIONS (Q₁₀₀)
SUB-BASINS
100-YEAR, 6-HOUR STORM
Per the City of Albuquerque D.P.M. Section 22.2

PROJECT NAME: EL RANCHO GRANDE, UNITS 16 & FUTURE 17
JOB NUMBER: 1349

PRECIP ZONE	Q ₁₀₀ RUNOFF RATES (cfs/Ac)			
	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.70
3	1.87	2.60	3.45	5.02
4	2.20	2.92	3.73	5.25

% LAND TREATMENTS				
	TREAT TYPE 1	TREAT TYPE 2	TREAT TYPE 3	TREAT TYPE 4
A	0	0	0	0
B	0	19	0	0
C	10	19	0	0
D	90	62	0	0
S% =	100	100	0	0

PRECIPITATION ZONE: 1

TREATMENT TYPE 1							
BASIN #	LAND TREATMENT AREAS (Ac)					Q ₁₀₀ (cfs)	REMARKS
	A _{TOTAL}	A _A	A _B	A _C	A _D		
I1	0.224	0	0	0.02	0.20	0.9	
I2	0.097	0	0	0.01	0.09	0.4	
I3	0.397	0	0	0.04	0.36	1.7	
I4	0.066	0	0	0.01	0.06	0.3	
I5	0.132	0	0	0.01	0.12	0.6	
J1	4.713	0	0	0.47	4.24	19.9	
J2	1.307	0	0	0.13	1.18	5.5	
J3	0.125	0	0	0.01	0.11	0.5	
J4	0.388	0	0	0.04	0.35	1.6	
L1	0.3061	0	0	0.03	0.28	1.3	
L2	0.1587	0	0	0.02	0.14	0.7	

TREATMENT TYPE 2							
BASIN #	LAND TREATMENT AREAS (Ac)					Q ₁₀₀ (cfs)	REMARKS
	A _{TOTAL}	A _A	A _B	A _C	A _D		
A1	3.0725	0	0.58	0.58	1.90	11.2	
A2	3.6135	0	0.69	0.69	2.24	13.1	
A3	1.4553	0	0.28	0.28	0.90	5.3	
A4	1.0137	0	0.19	0.19	0.63	3.7	
B1	3.0407	0	0.58	0.58	1.89	11.1	
B2	4.0682	0	0.77	0.77	2.52	14.8	
B3	0.5288	0	0.10	0.10	0.33	1.9	
B4	2.1699	0	0.41	0.41	1.35	7.9	
C1	3.2196	0	0.61	0.61	2.00	11.7	
C2	3.6093	0	0.69	0.69	2.24	13.1	
C3	0.6123	0	0.12	0.12	0.38	2.2	
D1	1.4117	0	0.27	0.27	0.88	5.1	
E1	1.2392	0	0.24	0.24	0.77	4.5	
F1	2.9949	0	0.57	0.57	1.86	10.9	
F2	1.0187	0	0.19	0.19	0.63	3.7	
G1	2.5424	0	0.48	0.48	1.58	9.3	
G2	2.3839	0	0.45	0.45	1.48	8.7	
G3	0.5330	0	0.10	0.10	0.33	1.9	
H1	2.3511	0	0.45	0.45	1.46	8.6	
H2	2.3614	0	0.45	0.45	1.46	8.6	
H3	0.4182	0	0.08	0.08	0.26	1.5	

APPENDIX C

Street Flow Capacity

STREET FLOW DEPTH SUMMARY

STREET	LOCATION	STREET WIDTH	CURB TYPE	SLOPE (ft/ft)	Q ₁₀₀ (cfs)	DEPTH (ft)
CRANDALL RD	AP A1	28' F-F	MTBL	0.033	11.2	0.24
CRANDALL RD	AP A2	28' F-F	STD	0.041	25.3	0.39
CRANDALL RD	AP A3	28' F-F	STD	0.035	29.6	0.41
CRANDALL RD	AP A4	28' F-F	STD	0.018	33.3	0.48
DENTON RD	AP B1	28' F-F	MTBL	0.040	11.1	0.23
DENTON RD	AP B2--INLETS 1 & 2	28' F-F	STD	0.041	25.9	0.39
DENTON RD	AP B3--INLETS 3 & 4	28' F-F	STD	0.043	14.2	0.33
GOLINDA RD	AP C1	28' F-F	MTBL	0.009	11.7	0.31
GOLINDA RD	AP C2--INLETS 5 & 6	28' F-F	STD	0.045	24.8	0.38
GOLINDA RD	AP C3--INLETS 7 & 8	28' F-F	STD	0.025	13.5	0.35
L	AP G1	28' F-F	MTBL	0.035	9.3	0.22
K2	AP G2	28' F-F	MTBL	0.037	8.7	0.22
K2	AP G3	28' F-F	STD	0.017	19.9	0.41
N	AP H1	28' F-F	MTBL	0.018	8.6	0.25
N	AP H2--INLETS 17 & 18	36' F-F	STD	0.021	17.2	0.39
N	AP H3--INLETS 19 & 20	36' F-F	STD	0.026	6.9	0.29
DELGADO DR	AP L1--INLET 22	36' F-F	STD	0.026	1.3	0.18
MESSINA	AP I1--INLETS 9 & 10	32' F-F	STD	0.012	34.2	0.51
MESSINA	AP I2--INLETS 11 & 12	32' F-F	STD	0.012	20.6	0.44
MESSINA	AP I3--INLETS 13 & 14	32' F-F	STD	0.014	24.1	0.45
MESSINA	AP I4--INLETS 15 & 16	32' F-F	STD	0.014	12.4	0.37
GIBSON	AP J1-- NORTH SIDE INLET 27	60' F-F	STD	0.031	23.2	0.40
GIBSON	AP J2--SOUTH SIDE INLET 26	60' F-F	STD	0.031	25.4	0.41
GIBSON	AP J2-- NORTH SIDE INLET 29	60' F-F	STD	0.031	24.0	0.41
GIBSON	AP J3-- SOUTH SIDE INLET 31	60' F-F	STD	0.031	12.4	0.33
GIBSON	AP J3-- NORTH SIDE INLET 30	60' F-F	STD	0.031	10.8	0.32
BOWIE RD	AP F1	28' F-F	MTBL	0.039	10.9	0.23
PANOLA ST	AP F2--INLET 25	28' F-F	STD	0.024	14.6	0.36

APPENDIX D

Rundowns and Sidewalk Culverts

EL RANCHO GRANDE UNIT 17

EL RANCHO GRANDE UNIT 16

RUNDOWN #2
Q100=3.7 CFS

RUNDOWN #1
1-2' SW CULVERT
Q100=4.5 CFS



1"=200'

RUNDOWN EXHIBIT

UNIT 16
RUNDOWN #1

Channel Calculator

Given Input Data:

Shape	Rectangular
Solving for	Depth of Flow
Flowrate	4.5000 cfs
Slope	0.0400 ft/ft
Manning's n	0.0130
Height	0.6700 ft
Bottom width	10.0000 ft

Computed Results:

Depth	0.0954 ft
Velocity	4.7148 fps
Full Flowrate	107.8503 cfs
Flow area	0.9544 ft ²
Flow perimeter	10.1909 ft
Hydraulic radius	0.0937 ft
Top width	10.0000 ft
Area	6.7000 ft ²
Perimeter	11.3400 ft
Percent full	14.2454 %

Critical Information

Critical depth	0.1846 ft
Critical slope	0.0045 ft/ft
Critical velocity	2.4373 fps
Critical area	1.8463 ft ²
Critical perimeter	10.3693 ft
Critical hydraulic radius	0.1781 ft
Critical top width	10.0000 ft
Specific energy	0.4409 ft
Minimum energy	0.2769 ft
Froude number	2.6905
Flow condition	Supercritical

FUTURE UNIT 17
RUNDOWN #2

Channel Calculator

Given Input Data:

Shape	Rectangular
Solving for	Depth of Flow
Flowrate	3.7000 cfs
Slope	0.0460 ft/ft
Manning's n	0.0130
Height	0.6700 ft
Bottom width	10.0000 ft

Computed Results:

Depth	0.0813 ft
Velocity	4.5515 fps
Full Flowrate	115.6566 cfs
Flow area	0.8129 ft ²
Flow perimeter	10.1626 ft
Hydraulic radius	0.0800 ft
Top width	10.0000 ft
Area	6.7000 ft ²
Perimeter	11.3400 ft
Percent full	12.1332 %

Critical Information

Critical depth	0.1620 ft
Critical slope	0.0047 ft/ft
Critical velocity	2.2833 fps
Critical area	1.6204 ft ²
Critical perimeter	10.3241 ft
Critical hydraulic radius	0.1570 ft
Critical top width	10.0000 ft
Specific energy	0.4032 ft
Minimum energy	0.2431 ft
Froude number	2.8143
Flow condition	Supercritical

2' SIDEWALK CULVERT
Channel Calculator

Given Input Data:

Shape	Rectangular
Solving for	Flowrate
Slope	0.0200 ft/ft
Manning's n	0.0130
Depth	0.4290 ft
Height	0.6700 ft
Bottom width	2.0000 ft

Computed Results:

Flowrate	6.2186 cfs
Velocity	7.2478 fps
Full Flowrate	11.7833 cfs
Flow area	0.8580 ft ²
Flow perimeter	2.8580 ft
Hydraulic radius	0.3002 ft
Top width	2.0000 ft
Area	1.3400 ft ²
Perimeter	3.3400 ft
Percent full	64.0299 %

Critical Information

Critical depth	0.6698 ft
Critical slope	0.0056 ft/ft
Critical velocity	4.6422 fps
Critical area	1.3396 ft ²
Critical perimeter	3.3396 ft
Critical hydraulic radius	0.4011 ft
Critical top width	2.0000 ft
Specific energy	1.2454 ft
Minimum energy	1.0047 ft
Froude number	1.9509
Flow condition	Supercritical

APPENDIX E

Storm Drain Calculations

SUMP INLETS CALCULATIONS

GRATE OPEN AREA:

(per COA std dwg #2220, single grate)

$$\begin{aligned} \text{GROSS AREA FOR ONE GRATE} &= (25 \text{ in}/12)(40 \text{ in}/12) = & 6.94 \text{ SF} \\ \text{LESS BEARING BARS} &= (0.5 \text{ in}/12)(3.33 \text{ ft})(13) = & 1.80 \text{ SF} \\ \text{LESS CROSS BARS} &= (0.5 \text{ in}/12)(7)[(25 \text{ in}/12)-(13)(0.5 \text{ in}/12)] = & 0.45 \text{ SF} \end{aligned}$$

$$\text{NET GRATE OPEN AREA} = 4.69 \text{ SF}$$

$$\text{GRATE OPEN AREA (assuming 50\% clogging factor)} = 2.35 \text{ SF}$$

ORIFICE EQUATION:

$$Q = CA(2gh)^{1/2}$$

Where:

$$C = 0.67$$

$$A = 2.35 \text{ ft}^2$$

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

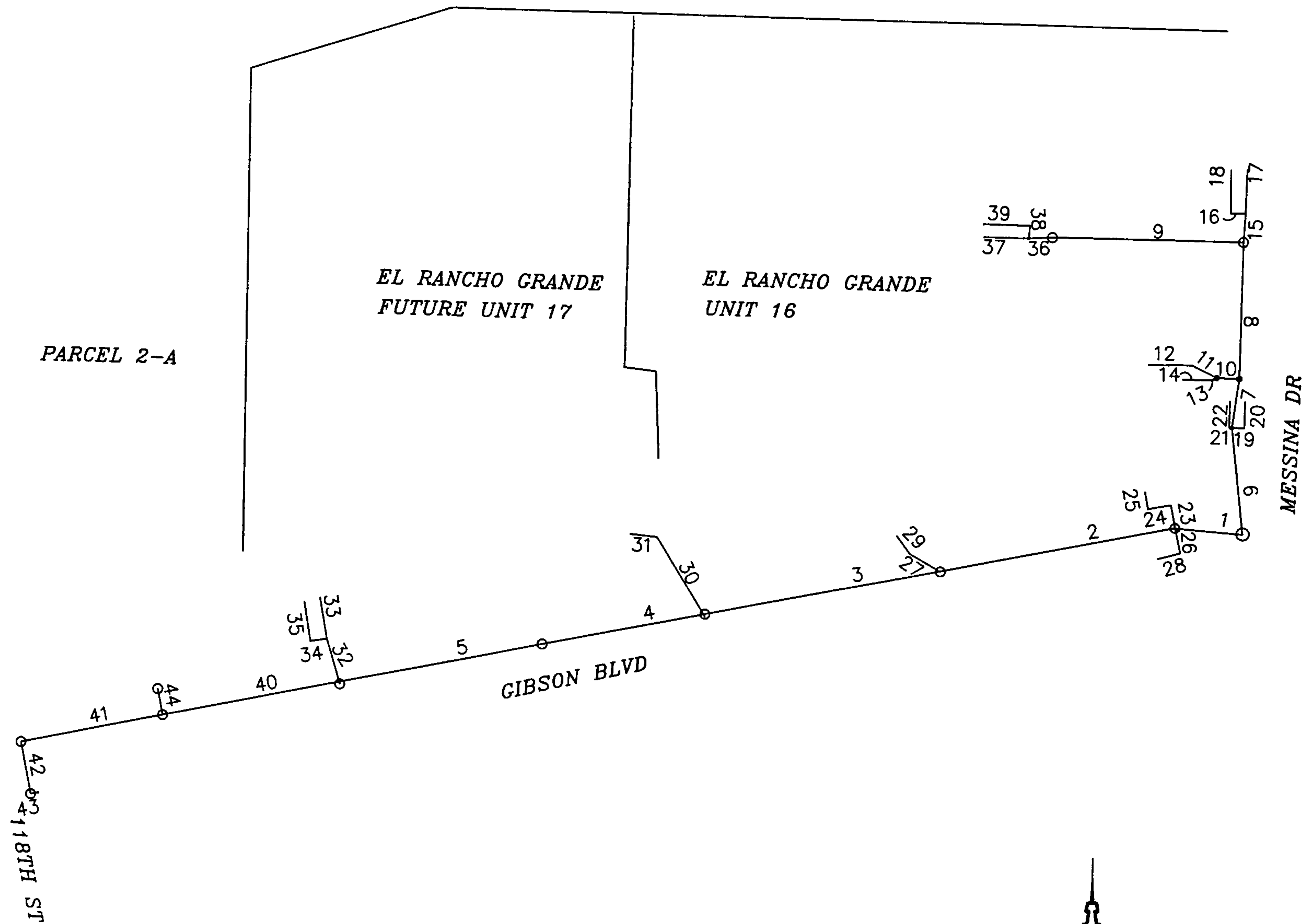
h = height of the water surface above the grate

CAPACITY CALCULATIONS:

INLET #	25
LOCATION:	PANOLA STREET
h =	0.67 ft
Q _(capacity) =	10.32 cfs
REQUIRED Q =	14.6 cfs
NUMBER OF GRATES REQUIRED =	<u>2</u>

INLET #	28
LOCATION:	GARLAND COURT
h =	0.67 ft
Q _(capacity) =	10.32273 cfs
REQUIRED Q =	5.1 cfs
NUMBER OF GRATES REQUIRED =	<u>1</u>

INLET #	21
LOCATION:	FUTURE STREET K2
h =	0.67 ft
Q _(capacity) =	10.32273 cfs
REQUIRED Q =	19.9 cfs
NUMBER OF GRATES REQUIRED =	<u>2</u>



HYDRAFLOW PLAN VIEW EXHIBIT



Storm Sewer Summary Report

Page 1

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
1	MH 0-1	158.2	42 c	128.0	5196.10	5201.10	3.906	5199.51	5204.51	n/a	5204.51	End
2	MH 1-2	129.6	42 c	450.0	5201.20	5217.50	3.622	5205.95	5220.81	2.21	5220.81	1
3	MH 2-3	108.2	36 c	450.0	5217.60	5228.75	2.478	5220.81*	5232.66*	3.46	5236.12	2
4	MH 3-4	87.60	36 c	310.0	5228.85	5239.15	3.323	5237.38*	5242.73*	0.36	5243.09	3
5	MH 4-5	87.60	36 c	390.0	5239.25	5253.10	3.551	5243.09	5255.93	2.37	5255.93	4
6	MH 0-6	96.20	42 c	205.0	5196.10	5197.33	0.600	5199.13*	5201.21*	1.55	5202.77	End
7	MH 6-7	75.00	36 c	95.0	5197.43	5199.05	1.705	5202.77*	5203.97*	1.75	5205.72	6
8	MH 7-8	50.60	36 c	256.0	5199.15	5201.45	0.899	5206.67*	5208.15*	0.80	5208.94	7
9	MH 8-9	24.20	24 c	365.0	5201.55	5217.39	4.340	5208.94	5219.13	n/a	5219.13	8
10	MH 7-10	24.40	24 c	47.0	5199.15	5200.40	2.660	5206.53*	5207.08*	0.87	5207.95	7
11	INLET 8	11.80	18 c	52.0	5200.70	5203.80	5.961	5208.19*	5208.85*	0.97	5209.82	10
12	INLET 5	6.80	18 c	85.3	5204.00	5208.40	5.158	5210.29*	5210.64*	0.23	5210.87	11
13	INLET 7	12.60	18 c	7.0	5204.00	5208.30	61.426	5208.10	5209.64	n/a	5209.64	10
14	INLET 6	6.80	18 c	49.0	5208.50	5209.80	2.653	5210.30	5210.80	n/a	5210.80	13
15	INLET 11	26.40	24 c	53.0	5202.45	5208.20	10.849	5208.94	5210.00	1.84	5210.00	8
16	INLET 12	13.20	24 c	28.0	5208.40	5208.80	1.428	5210.95*	5211.04*	0.41	5211.46	15
17	INLET 9	7.00	18 c	78.0	5209.00	5212.10	3.974	5210.98	5213.11	n/a	5213.11	15
18	INLET 10	7.00	18 c	78.0	5208.40	5212.10	4.744	5211.49	5213.11	n/a	5213.11	16
19	INLET 16	10.60	18 c	23.0	5198.93	5202.70	16.391	5203.76	5203.94	n/a	5203.94	6
20	INLET 14	6.00	18 c	50.0	5202.90	5206.70	7.601	5204.48	5207.64	n/a	5207.64	19
21	INLET 15	10.60	18 c	5.0	5200.33	5205.90	111.397	5203.76	5207.14	n/a	5207.14	6
22	INLET 13	6.00	18 c	50.0	5206.10	5206.70	1.200	5207.68	5207.72	0.34	5208.06	21
23	INLET 30	16.30	24 c	44.0	5202.70	5206.10	7.727	5208.35*	5208.58*	0.63	5209.21	1
24	INLET 29	11.90	24 c	37.0	5206.30	5206.80	1.351	5209.41*	5209.51*	0.33	5209.84	23
25	INLET 28	5.10	18 c	33.0	5207.00	5207.50	1.515	5209.94*	5210.02*	0.13	5210.14	24
26	INLET 31	12.30	18 c	50.0	5202.70	5207.60	9.800	5208.02	5208.93	n/a	5208.93	1
27	INLET 27	21.40	24 c	70.0	5221.90	5223.10	1.715	5223.16	5224.82	0.43	5225.25	2
28	INLET 26	6.80	18 c	37.0	5207.80	5209.20	3.785	5209.56	5210.20	n/a	5210.20	26
29	INLET 25	14.60	18 c	39.0	5223.30	5224.00	1.795	5225.25*	5226.01*	1.06	5227.07	27
30	INLET 22	20.60	24 c	177.0	5228.85	5233.40	2.571	5239.10*	5240.57*	0.84	5241.40	3
31	INLET 21	19.90	24 c	37.0	5233.60	5238.80	14.053	5241.45*	5241.73*	0.62	5242.36	30
32	INLET 19	18.40	24 c	84.0	5253.20	5254.50	1.547	5257.90*	5258.45*	0.75	5259.20	5
Project File: 1349 SD-R3.stm							Number of lines: 44			Run Date: 04-19-2005		
NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.												

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.
33	INLET 18	5.90	18 c	77.0	5254.70	5260.30	7.272	5259.56	5261.23	n/a	5261.23 j	32
34	INLET 20	8.90	18 c	32.0	5254.70	5255.10	1.250	5259.34*	5259.57*	0.59	5260.16	32
35	INLET 17	5.90	18 c	74.0	5255.30	5260.20	6.622	5260.38	5261.13	n/a	5261.13 j	34
36	INLET 3	24.20	24 c	36.0	5217.89	5223.50	15.583	5219.29	5225.24	n/a	5225.24 j	9
37	INLET 2	6.80	18 c	84.0	5225.50	5230.40	5.833	5226.09	5231.40	n/a	5231.40 j	36
38	INLET 4	12.10	18 c	24.0	5223.70	5224.00	1.249	5225.59*	5225.91*	1.09	5227.00	36
39	INLET 1	6.80	18 c	84.0	5226.00	5230.40	5.238	5227.50	5231.40	n/a	5231.40 j	38
40	MH 5- FUT MH 1	69.20	30 c	365.0	5253.20	5264.61	3.126	5255.93	5267.05	3.13	5267.05	5
41	FUT MH1-2	13.50	24 c	275.0	5264.71	5268.30	1.305	5269.89*	5270.87*	0.29	5271.16	40
42	FUT MH2-3	13.50	24 c	100.0	5268.40	5270.00	1.600	5271.16	5271.35	0.56	5271.91	41
43	FUT INLET 118TH	13.50	18 c	15.0	5270.10	5275.00	32.666	5271.91	5276.37	n/a	5276.37 j	42
44	FUT MH1-2-A	55.70	30 c	50.0	5264.71	5274.00	18.580	5268.18	5276.36	2.09	5276.36	40
Project File: 1349 SD-R3.stm							Number of lines: 44			Run Date: 04-19-2005		
NOTES: c = cir; e = ellip; b = box; Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.												

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	128.0	0.00	0.00	0.00	0.00	0.00	0.0	3.9	0.0	158.2	198.8	16.56	42	3.91	5201.10	5196.10	5204.51	5199.51	5213.56	5208.65	MH 0-1
2	1	450.0	0.00	0.00	0.00	0.00	0.00	0.0	3.4	0.0	129.6	191.5	13.61	42	3.62	5217.50	5201.20	5220.81	5205.95	5227.43	5213.56	MH 1-2
3	2	450.0	0.00	0.00	0.00	0.00	0.00	0.0	2.9	0.0	108.2	105.0	15.31	36	2.48	5228.75	5217.60	5232.66	5220.81	5240.64	5227.43	MH 2-3
4	3	310.0	0.00	0.00	0.00	0.00	0.00	0.0	2.4	0.0	87.60	121.6	12.39	36	3.32	5239.15	5228.85	5242.73	5237.38	5248.46	5240.64	MH 3-4
5	4	390.0	0.00	0.00	0.00	0.00	0.00	0.0	1.9	0.0	87.60	125.7	12.53	36	3.55	5253.10	5239.25	5255.93	5243.09	5262.65	5248.46	MH 4-5
6	End	205.0	0.00	0.00	0.00	0.00	0.00	0.0	2.0	0.0	96.20	77.93	10.44	42	0.60	5197.33	5196.10	5201.21	5199.13	5210.35	5208.65	MH 0-6
7	6	95.0	0.00	0.00	0.00	0.00	0.00	0.0	1.9	0.0	75.00	87.08	10.61	36	1.70	5199.05	5197.43	5203.97	5202.77	5211.67	5210.35	MH 6-7
8	7	256.0	0.00	0.00	0.00	0.00	0.00	0.0	1.3	0.0	50.60	63.22	7.16	36	0.90	5201.45	5199.15	5208.15	5206.67	5214.82	5211.67	MH 7-8
9	8	365.0	0.00	0.00	0.00	0.00	0.00	0.0	0.5	0.0	24.20	47.12	8.01	24	4.34	5217.39	5201.55	5219.13	5208.94	5229.12	5214.82	MH 8-9
10	7	47.0	0.00	0.00	0.00	0.00	0.00	0.0	0.5	0.0	24.40	36.89	7.77	24	2.66	5200.40	5199.15	5207.08	5206.53	5212.12	5211.67	MH 7-10
11	10	52.0	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	11.80	25.64	6.68	18	5.96	5203.80	5200.70	5208.85	5208.19	5213.04	5212.12	INLET 8
12	11	85.3	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.80	23.85	3.85	18	5.16	5208.40	5204.00	5210.64	5210.29	5215.41	5213.04	INLET 5
13	10	7.0	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	12.60	82.30	7.35	18	61.43	5208.30	5204.00	5209.64	5208.10	5212.22	5212.12	INLET 7
14	13	49.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.80	17.10	4.66	18	2.65	5209.80	5208.50	5210.80	5210.30	5213.45	5212.22	INLET 6
15	8	53.0	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	26.40	74.50	8.64	24	10.85	5208.20	5202.45	5210.00	5208.94	5215.05	5214.82	INLET 11
16	15	28.0	0.00	0.00	0.00	0.00	0.00	0.0	0.3	0.0	13.20	27.03	4.20	24	1.43	5208.80	5208.40	5211.04	5210.95	5215.05	5215.05	INLET 12
17	15	78.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	7.00	20.94	4.75	18	3.97	5212.10	5209.00	5213.11	5210.98	5216.05	5215.05	INLET 9
18	16	78.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	7.00	22.87	4.75	18	4.74	5212.10	5208.40	5213.11	5211.49	5216.05	5215.05	INLET 10
19	6	23.0	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	10.60	42.52	6.39	18	16.39	5202.70	5198.93	5203.94	5203.76	5209.90	5210.35	INLET 16
20	19	50.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.00	28.95	4.29	18	7.60	5206.70	5202.90	5207.64	5204.48	5210.71	5209.90	INLET 14
21	6	5.0	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	10.60	110.8	6.39	18	111.40	5205.90	5200.33	5207.14	5203.76	5209.90	5210.35	INLET 15
Project File: 1349 SD-R3.stm																Number of lines: 44				Run Date: 04-19-2005		
NOTES: Intensity = 127 16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs.																						

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr (min)	Total (min)	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
22	21	50.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.00	11.50	4.04	18	1.20	5206.70	5206.10	5207.72	5207.68	5210.71	5209.90	INLET 13
23	1	44.0	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	16.30	62.87	5.19	24	7.73	5206.10	5202.70	5208.58	5208.35	5211.94	5213.56	INLET 30
24	23	37.0	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	11.90	26.29	3.79	24	1.35	5206.80	5206.30	5209.51	5209.41	5213.42	5211.94	INLET 29
25	24	33.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	5.10	12.93	2.89	18	1.52	5207.50	5207.00	5210.02	5209.94	5211.19	5213.42	INLET 28
26	1	50.0	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	12.30	32.87	7.20	18	9.80	5207.60	5202.70	5208.93	5208.02	5211.83	5213.56	INLET 31
27	2	70.0	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	21.40	29.62	8.84	24	1.71	5223.10	5221.90	5224.82	5223.16	5228.14	5227.43	INLET 27
28	26	37.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.80	20.43	4.66	18	3.78	5209.20	5207.80	5210.20	5209.56	5213.15	5211.83	INLET 26
29	27	39.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	14.60	14.07	8.26	18	1.80	5224.00	5223.30	5226.01	5225.25	5228.00	5228.14	INLET 25
30	3	177.0	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	20.60	36.26	6.56	24	2.57	5233.40	5228.85	5240.57	5239.10	5243.96	5240.64	INLET 22
31	30	37.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	19.90	84.79	6.33	24	14.05	5238.80	5233.60	5241.73	5241.45	5243.57	5243.96	INLET 21
32	5	84.0	0.00	0.00	0.00	0.00	0.00	0.0	0.5	0.0	18.40	28.14	5.86	24	1.55	5254.50	5253.20	5258.45	5257.90	5263.05	5262.65	INLET 19
33	32	77.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	5.90	28.32	4.24	18	7.27	5260.30	5254.70	5261.23	5259.56	5263.88	5263.05	INLET 18
34	32	32.0	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	8.90	11.74	5.04	18	1.25	5255.10	5254.70	5259.57	5259.34	5263.06	5263.05	INLET 20
35	34	74.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	5.90	27.02	4.24	18	6.62	5260.20	5255.30	5261.13	5260.38	5263.78	5263.06	INLET 17
36	9	36.0	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	24.20	89.28	9.32	24	15.58	5223.50	5217.89	5225.24	5219.29	5230.33	5229.12	INLET 3
37	36	84.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.80	25.36	7.99	18	5.83	5230.40	5225.50	5231.40	5226.09	5234.06	5230.33	INLET 2
38	36	24.0	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	12.10	11.74	6.85	18	1.25	5224.00	5223.70	5225.91	5225.59	5230.33	5230.33	INLET 4
39	38	84.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.80	24.03	4.66	18	5.24	5230.40	5226.00	5231.40	5227.50	5234.06	5230.33	INLET 1
40	5	365.0	0.00	0.00	0.00	0.00	0.00	0.0	1.5	0.0	69.20	72.51	14.14	30	3.13	5264.61	5253.20	5267.05	5255.93	5272.00	5262.65	MH 5- FUT MH 1
41	40	275.0	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	13.50	25.84	4.30	24	1.31	5268.30	5264.71	5270.87	5269.89	5280.60	5272.00	FUT MH1-2
42	41	100.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	13.50	28.61	5.14	24	1.60	5270.00	5268.40	5271.35	5271.16	5279.80	5280.60	FUT MH2-3
Project File: 1349 SD-R3.stm																Number of lines: 44				Run Date: 04-19-2005		
NOTES: Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs.																						

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
43	42	15.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	13.50	60.02	7.81	18	32.67	5275.00	5270.10	5276.37	5271.91	5279.50	5279.80	FUT INLET 118T
44	40	50.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	55.70	176.8	11.47	30	18.58	5274.00	5264.71	5276.36	5268.18	5282.00	5272.00	FUT MH1-2-A
Project File: 1349 SD-R3.stm																Number of lines: 44				Run Date: 04-19-2005		
NOTES: Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs.																						

APPENDIX F

Pond Volume, Standpipe and Amole Arroyo Outfall Calculations

POND VOLUMES				
EL RANCHO GRANDE, UNIT 16				
POND 3				
4/15/2005				
ELEV	AREA (SF)	VOLUME (CF)	VOLUME (Ac-ft)	SUM VOL (Ac-ft)
5255	26803.25			
		29972	0.688	
5256	29913.91			0.688
		31527	0.724	
5257	33140.28			1.412
		34811	0.799	
5258	36482.37			2.211
		38211	0.877	
5259	39940.18			3.088 ✓
		REQ'D VOL=2.316 Ac-ft		
		WSEL=5258.1		

12" TEMPORARY PVC STAND PIPE

PERFORATIONS

3" DIA. HOLES AREA (A) = $\pi D^2/4 = 0.05$ SF

ORIFICE EQUATION $Q = CA(2gH)^{1/2}$
ORIFICE COEFFICIENT = C = 0.6

WSEL	H	# OF HOLES	Q (CFS)
5246	0.5	4	0.67
	1.5	4	1.16 ✓
			<u>1.83 cfs</u>
			2.14

TOP OF STAND PIPE

PERIMETER (L)= $\pi D = 3.14$ FT

WEIR EQUATION $Q = CLH^{3/2}$
WEIR COEFFICIENT = C = 3.33

WSEL	H	Q (CFS)
5246	0.5	<u>11.96 cfs</u>

TOTAL CAPACITY

(PERFORATIONS + TOP OF STAND PIPE) * 0.5
0.5 = 50% CLOGGING FACTOR

6.89 cfs

$Q_{reqd} = 5.74$ cfs ok

AMOLE ARROYO OUTFALL--S=0.83%

Channel Calculator

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	58.2000 cfs
Slope	0.0083 ft/ft
Manning's n	0.0300
Height	3.0000 ft
Bottom width	50.0000 ft
Left slope	0.0400 ft/ft (V/H)
Right slope	0.0400 ft/ft (V/H)

Computed Results:

Depth	0.4217 ft
Velocity	2.2797 fps
Full Flowrate	2572.1431 cfs
Flow area	25.5295 ft ²
Flow perimeter	71.1010 ft
Hydraulic radius	0.3591 ft
Top width	71.0841 ft
Area	375.0000 ft ²
Perimeter	200.1200 ft
Percent full	14.0561 %

Critical Information

Critical depth	0.3285 ft
Critical slope	0.0199 ft/ft
Critical velocity	3.0434 fps
Critical area	19.1231 ft ²
Critical perimeter	66.4383 ft
Critical hydraulic radius	0.2878 ft
Critical top width	66.4252 ft
Specific energy	0.5024 ft
Minimum energy	0.4928 ft
Froude number	0.6706
Flow condition	Subcritical

AMOLE ARROYO OUTFALL--S=.333% AT AMOLE ARROYO SIDE BANK

Channel Calculator

Given Input Data:

Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	58.2000 cfs
Slope	0.3333 ft/ft
Manning's n	0.0300
Height	3.0000 ft
Bottom width	75.0000 ft
Left slope	0.0100 ft/ft (V/H)
Right slope	0.0100 ft/ft (V/H)

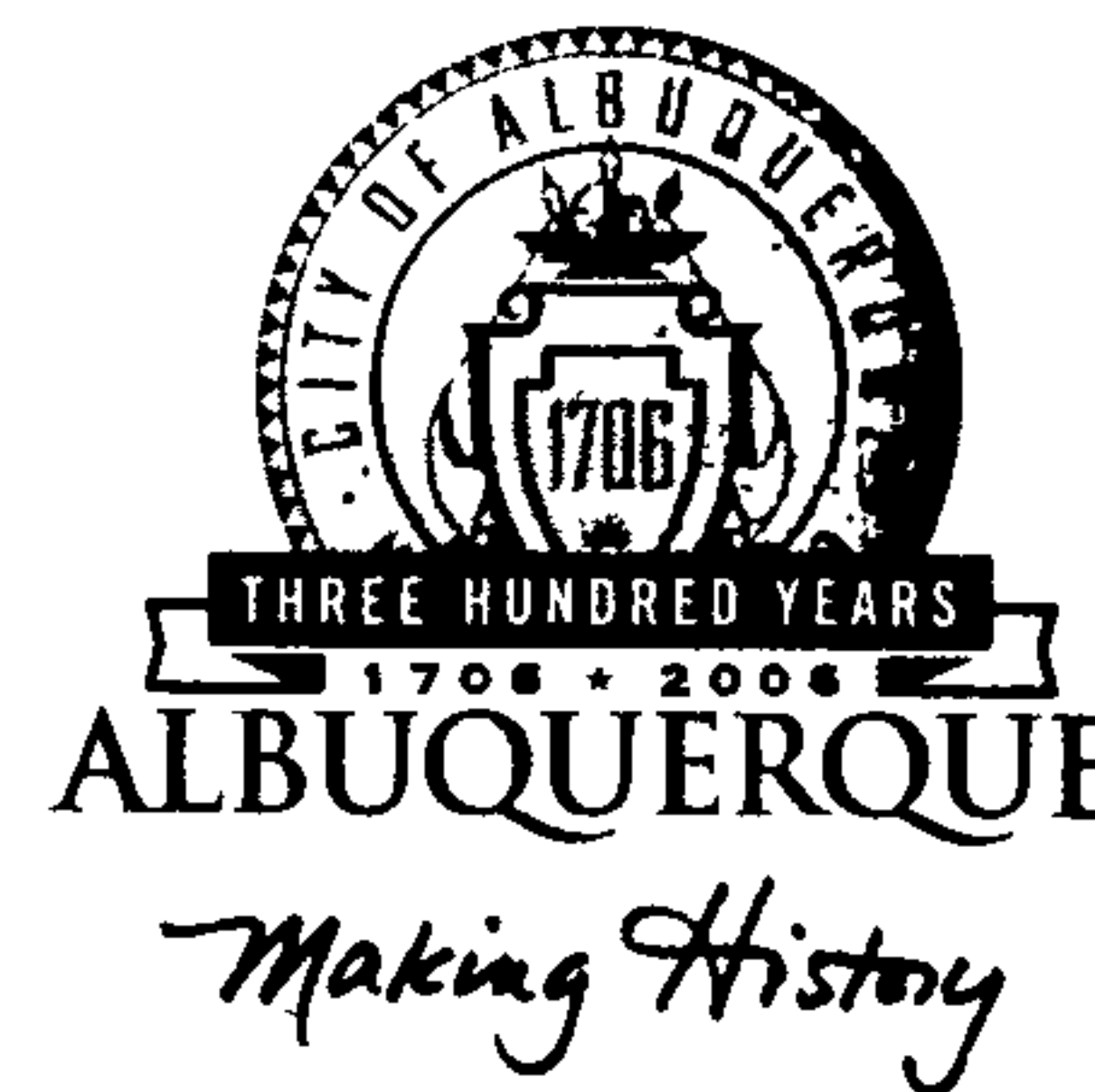
Computed Results:

Depth	0.1110 ft
Velocity	6.0911 fps
Full Flowrate	45222.4444 cfs
Flow area	9.5549 ft ²
Flow perimeter	97.1965 ft
Hydraulic radius	0.0983 ft
Top width	97.1954 ft
Area	1125.0000 ft ²
Perimeter	675.0300 ft
Percent full	3.6992 %

Critical Information

Critical depth	0.2375 ft
Critical slope	0.0228 ft/ft
Critical velocity	2.4818 fps
Critical area	23.4506 ft ²
Critical perimeter	122.4983 ft
Critical hydraulic radius	0.1914 ft
Critical top width	122.4959 ft
Specific energy	0.6876 ft
Minimum energy	0.3562 ft
Froude number	3.4250
Flow condition	Supercritical

CITY OF ALBUQUERQUE



March 3, 2005

Fred Arfman, PE
Isaacson & Arfman
128 Monroe NE
Albuquerque, NM 87108

Re: El Rancho Grande, Units 16 Subdivision Drainage Report
Engineer's Stamp dated 1-6-05, (N9/D4E1)

Dear Mr. Arfman,

P.O. Box 1293

Based upon the information provided in your submittal dated 1-7-05, the above referenced report is approved for Preliminary Plat action by the DRB. Once that board approves the plan, please submit a mylar copy for my signature in order to obtain a Rough Grading Permit.

Albuquerque

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. Refer to the attachment that is provided with this letter for details. If you have any questions please feel free to call the Municipal Development Department, Hydrology section at 768-3654 (Charles Caruso).

New Mexico 87103

If you have any questions, you can contact me at 924-3986.

www.cabq.gov

Sincerely,

Bradley L. Bingham, PE
Principal Engineer, Planning Dept.
Development and Building Services

C: Chuck Caruso DMD
file

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: EL RANCHO GRANDE, UNIT 16

ZONE MAP / DRG. FILE #: N-8 / D3

DRB #: _____ EPC #: _____

WORK ORDER #: _____

LEGAL DESCRIPTION: A portion of Parcel 1, Lands of Rio Bravo Partners

CITY ADDRESS: _____

ENGINEERING FIRM: Isaacson & Arfman, P.A.

ADDRESS: 128 Monroe St. NE

CITY, STATE: Albuquerque, NM

CONTACT: Fred Arfman or Asa Nilsson-Weber

PHONE: 268-8828 or (972) 491-9736

ZIP CODE: 87108

OWNER: Curb, Inc

ADDRESS: _____

CITY, STATE: Albuquerque, New Mexico

CONTACT: Bo Johnson

PHONE: 899-9656

ZIP CODE: _____

ARCHITECT: _____

ADDRESS: _____

CITY, STATE: Albuquerque, New Mexico

CONTACT: _____

PHONE: _____

ZIP CODE: _____

SURVEYOR: Aldrich Land Surveying

ADDRESS: _____

CITY, STATE: Albuquerque, New Mexico

CONTACT: Tim Aldrich

PHONE: 884-1990

ZIP CODE: _____

CONTRACTOR: _____

ADDRESS: _____

CITY, STATE: _____

CONTACT: _____

PHONE: _____

ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

- ☒ DRAINAGE REPORT
☐ DRAINAGE PLAN 1ST *REQUIRES TCL or equal*
☐ DRAINAGE PLAN RESUBMITTAL
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☒ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION (HYDROLOGY)
☐ CLOMR / LOMR
☐ TRAFFIC CIRCULATION LAYOUT (TCL)
☐ ENGINEER'S CERTIFICATION (TCL)
☐ ENGINEER'S CERTIFICATION (DRB APPR, SITE PLAN)
☐ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SIA / FINANCIAL GUARANTEE RELEASE
☒ PRELIMINARY PLAT APPROVAL
☐ S. DEV. PLAN FOR SUB'D APPROVAL
☐ S. DEV. PLAN FOR BLDG. PERMIT APPR.
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY (PERM)
☐ CERTIFICATE OF OCCUPANCY (TEMP)
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☐ OTHER

WAS A PRE-DESIGN CONFERENCE ATTENDED: *fee Due \$1630.00 pd 1/10/05*

☐ YES

☐ NO

☐ COPY PROVIDED

DATE SUBMITTED: Friday, January 07, 2005

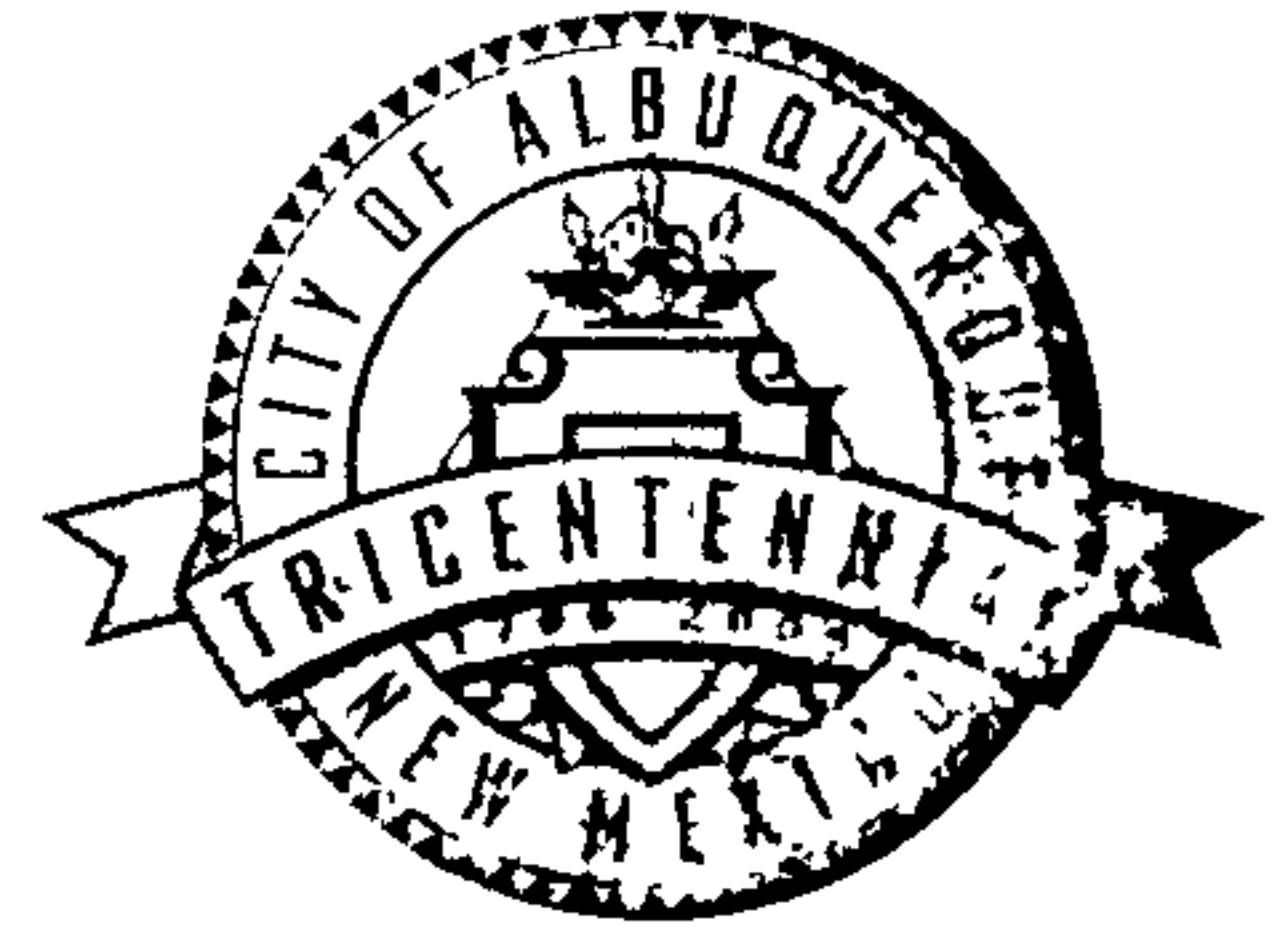
BY: *Asa Nilsson-Weber*

Isaacson & Arfman, P.A.

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

1. Conceptual Grading and Drainage Plan: Required for approval of Site Development Plans greater than five acres and Sector Plans
2. Drainage Plans. Required for building permits, grading permits, paving permits and site plans less than five acres
3. Drainage Report: Required for subdivisions containing more than ten (10) lots or constituting five acres or more.

CITY OF ALBUQUERQUE



February 8, 2007

Fred C. Arfman, P.E.
Isaacson and Arfman, P.A.
128 Monroe NE
Albuquerque, NM 87108

Re: El Rancho Grande Unit 17, Engineer's Certification dated 1-22-07
Request for Release of Financial Guarantee, CPN 7428.82

Dear Mr. Arfman,

Based upon the information provided in your Drainage Certification received on January 23, 2007, one additional item must be revised. Specifically, the certification language must reference the date of the Engineer's Certification on the approved Grading and Drainage plan (6-15-05). Your certification referenced a plan dated 4-21-05.

Sincerely,

Jeremy Hoover, P.E.
Senior Engineer
Hydrology/Section
Development and Building Services

cc: file (N8/D005)

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

CITY OF ALBUQUERQUE



February 8, 2007

Fred C. Arfman, P.E.
Isaacson and Arfman, P.A.
128 Monroe NE
Albuquerque, NM 87108

Re: El Rancho Grande Unit 16, Engineer's Certification dated 1-22-07
Request for Release of Financial Guarantee, CPN 7428.81

Dear Mr. Arfman,

Based upon the information provided in your Drainage Certification received on January 23, 2007, the above referenced plan is approved for release of financial guarantee.

Sincerely,

Jeremy Hoover, P.E.
Senior Engineer
Hydrology Section
Development and Building Services

P.O. Box 1293

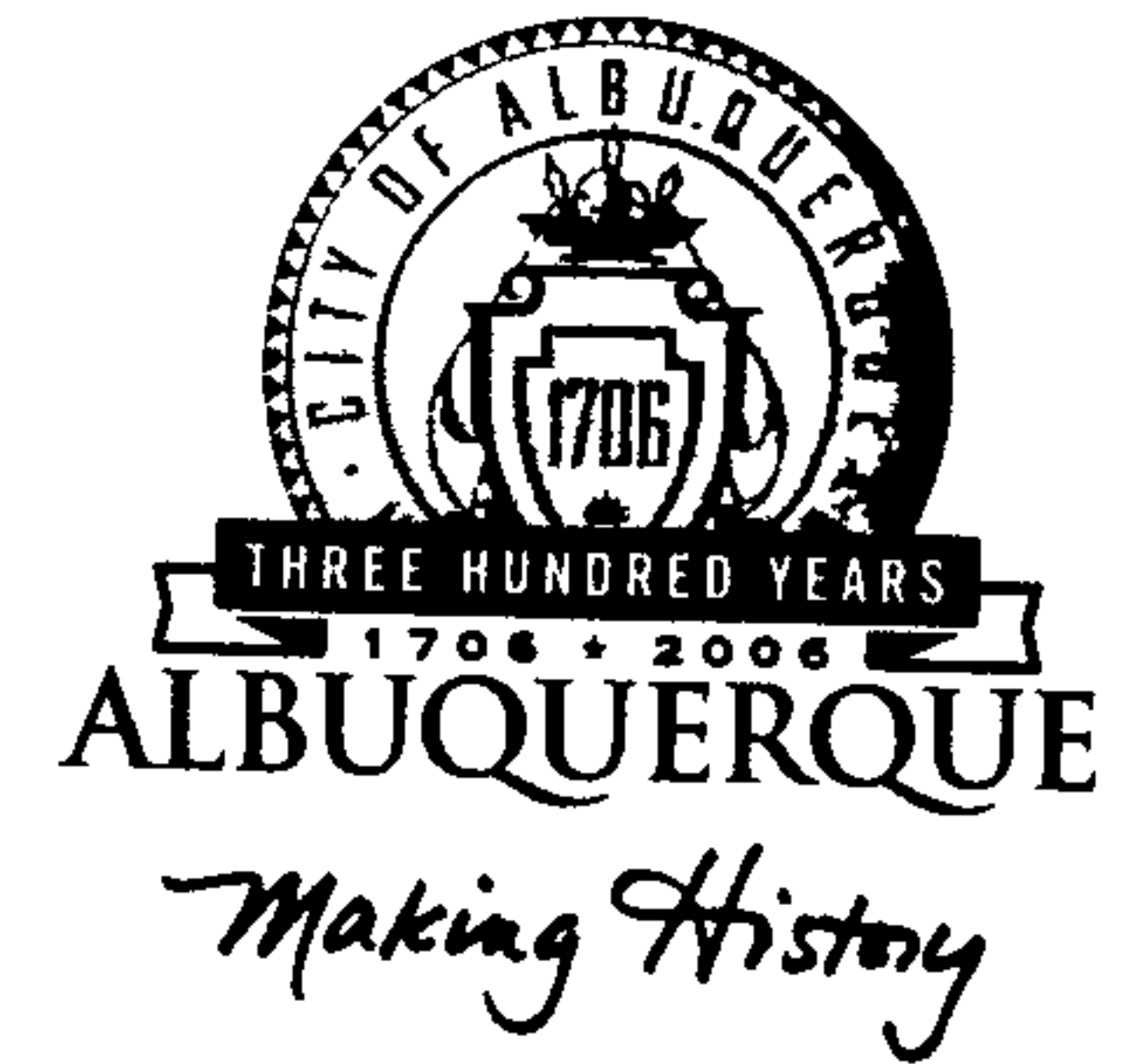
Albuquerque

cc: file (N8/D004)
Marilyn Maldonado

New Mexico 87103

www.cabq.gov

CITY OF ALBUQUERQUE



May 24, 2005

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe Street NE
Albuquerque, NM 87108

**Re: El Rancho Grande, Unit 16, A portion of Parcel I, Lands of Rio Bravo
Partners – Amended Drainage Report
Engineer's Stamp dated 4-21-05 (N8-D4)**

Dear Mr. Arfman,

Based upon information provided in your submittal dated 4-12-05, the above referenced plan is approved as amended. This will be the plan that must be certified for Release of Financial Guaranty. Submit a mylar copy of the grading plan for my signature in order to obtain a Grading Permit.

P.O. Box 1293

If you have any questions, you can contact me at 924-3990.

Albuquerque

Sincerely,

Phillip J. Lovato, E.I.
Associate Engineer, Planning Department
Development and Building Services

New Mexico 87103

www.cabq.gov

C: file

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

N-8/D4

PROJECT TITLE: EL RANCHO GRANDE, UNIT 16 ZONE MAP / DRG. FILE #: N-8/D4
 DRB #: _____ EPC #: _____ WORK ORDER #: _____

LEGAL DESCRIPTION: A portion of Parcel 1, Lands of Rio Bravo Partners
 CITY ADDRESS: _____

ENGINEERING FIRM: Isaacson & Arfman, P.A. CONTACT: Fred Arfman or Asa Nilsson-Weber
 ADDRESS: 128 Monroe St. NE PHONE: 268-8828 or (972) 491-9736
 CITY, STATE: Albuquerque, NM ZIP CODE: 87108

OWNER: Curb, Inc CONTACT: Bo Johnson
 ADDRESS: 5160 San Francisco NE PHONE: 899-9656
 CITY, STATE: Albuquerque, New Mexico ZIP CODE: 87109

ARCHITECT: _____ CONTACT: _____
 ADDRESS: _____ PHONE: _____
 CITY, STATE: _____ ZIP CODE: _____

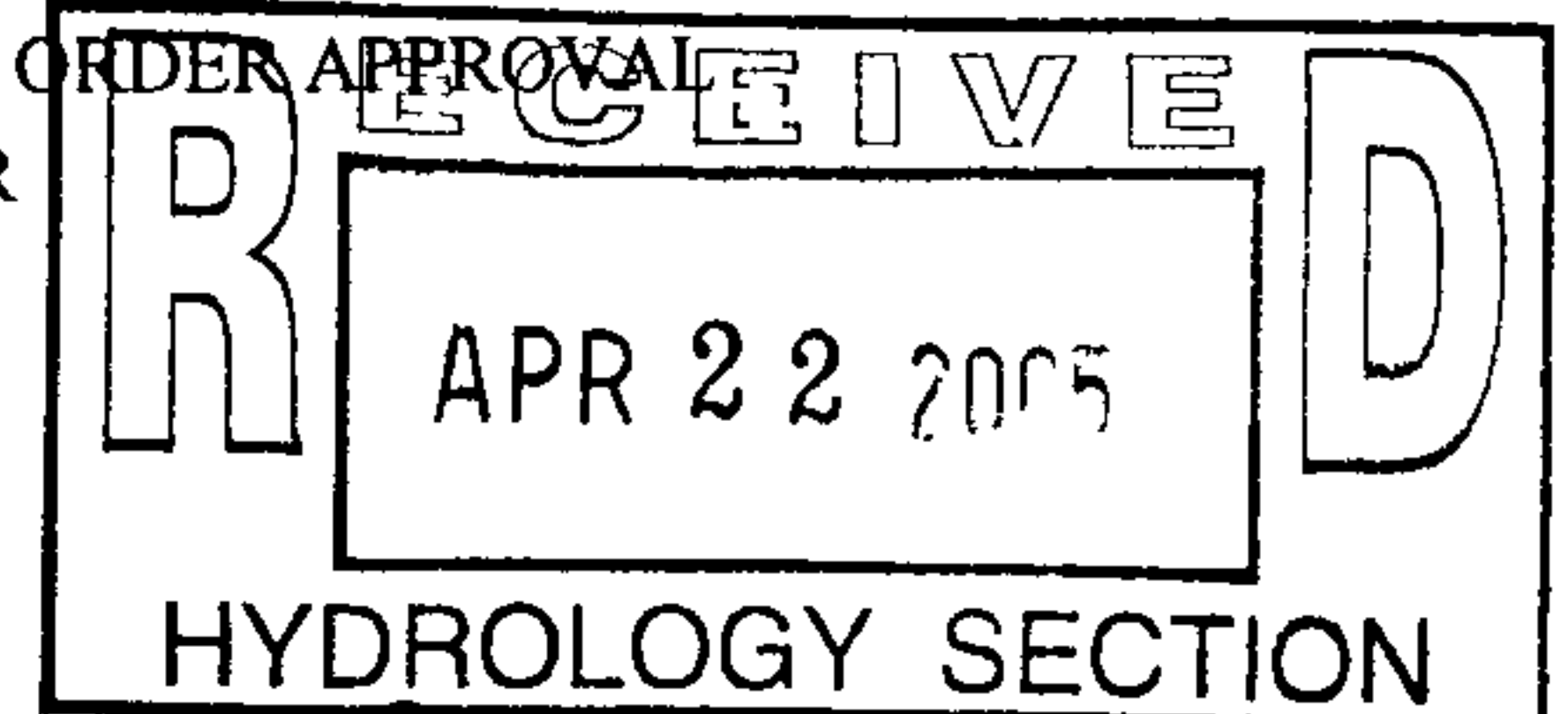
SURVEYOR: Aldrich Land Surveying CONTACT: Tim Aldrich
 ADDRESS: P.O.Box 30701 PHONE: 884-1990
 CITY, STATE: Albuquerque, New Mexico ZIP CODE: 87190

CONTRACTOR: _____ CONTACT: _____
 ADDRESS: _____ PHONE: _____
 CITY, STATE: _____ ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:
☒ DRAINAGE REPORT **(RESUBMITTAL)**
☐ DRAINAGE PLAN 1ST *REQUIRES TCL or equal*
☒ DRAINAGE PLAN RESUBMITTAL
☐ CONCEPTUAL GRADING & DRAINAGE PLAN
☒ GRADING PLAN
☐ EROSION CONTROL PLAN
☐ ENGINEER'S CERTIFICATION (HYDROLOGY)
☐ CLOMR / LOMR
☐ TRAFFIC CIRCULATION LAYOUT (TCL)
☐ ENGINEER'S CERTIFICATION (TCL)
☐ ENGINEER'S CERTIFICATION (DRB APPR, SITE PLAN)
☐ OTHER

WAS A PRE-DESIGN CONFERENCE ATTENDED:
☐ YES
☐ NO
☐ COPY PROVIDED

CHECK TYPE OF APPROVAL SOUGHT:
☐ SIA / FINANCIAL GUARANTEE RELEASE
☒ PRELIMINARY PLAT APPROVAL **(MINOR REVISION)**
☐ S. DEV. PLAN FOR SUB'D APPROVAL
☐ S. DEV. PLAN FOR BLDG. PERMIT APPR.
☐ SECTOR PLAN APPROVAL
☐ FINAL PLAT APPROVAL
☐ FOUNDATION PERMIT APPROVAL
☐ BUILDING PERMIT APPROVAL
☐ CERTIFICATE OF OCCUPANCY (PERM)
☐ CERTIFICATE OF OCCUPANCY (TEMP)
☒ GRADING PERMIT APPROVAL
☐ PAVING PERMIT APPROVAL
☐ WORK ORDER APPROVAL
☐ OTHER



DATE SUBMITTED: Tuesday, April 12, 2005 BY: FRED C. ARFMAN
 Isaacson & Arfman, P.A.

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

1. Conceptual Grading and Drainage Plan: Required for approval of Site Development Plans greater than five acres and Sector Plans
2. Drainage Plans: Required for building permits, grading permits, paving permits and site plans less than five acres
3. Drainage Report: Required for subdivisions containing more than ten (10) lots or constituting five acres or more.



ISAACSON & ARFMAN, P.A.

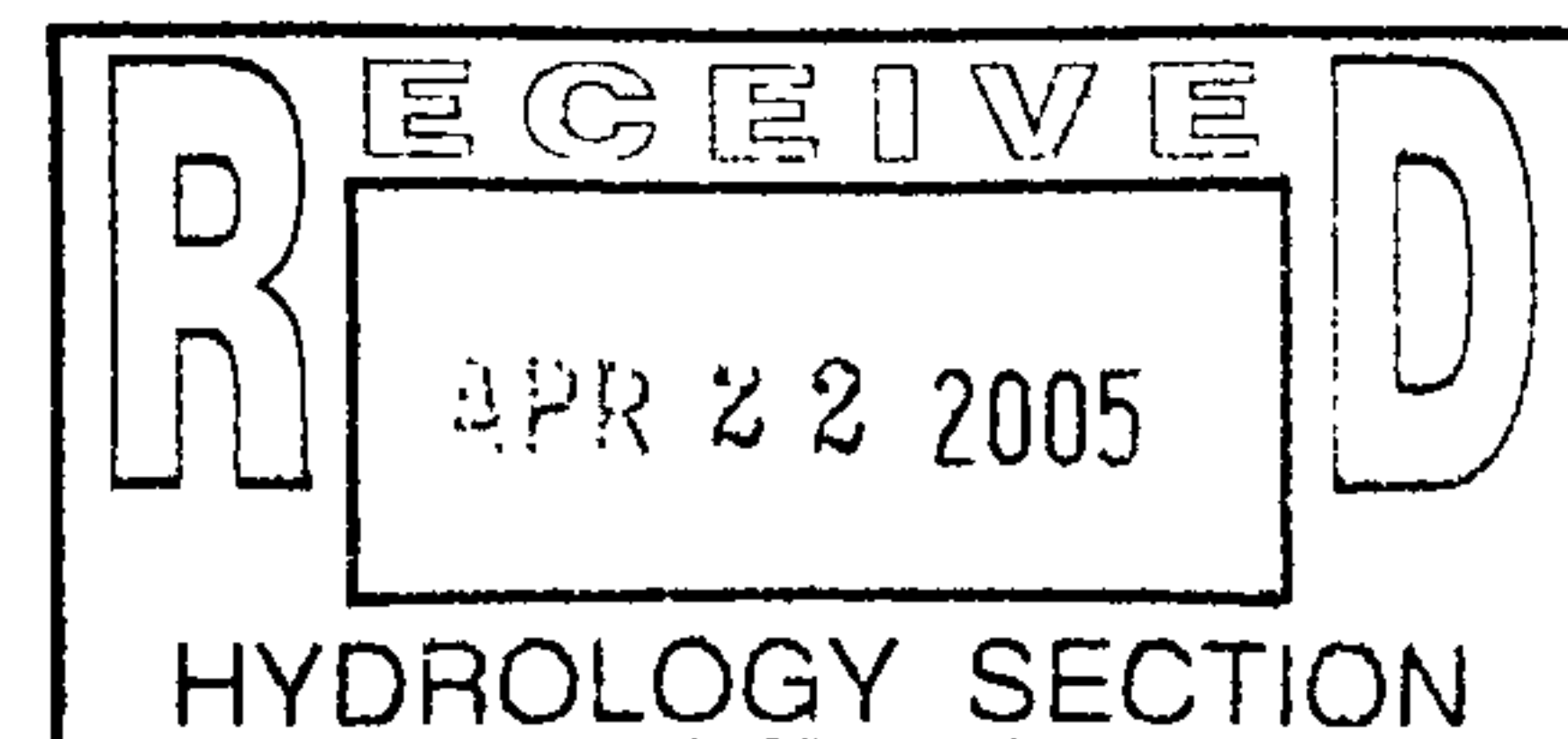
Consulting Engineering Associates

*Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE*

April 18, 2005

Mr. Brad Bingham, PE
Senior Engineer
Hydrology Development Section
Development & Building Services Division
Planning Department
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87102

**RE: Revised Drainage Report
for El Rancho Grande, Unit 16
DRB #1003874
Hydrology File #N9/D4E1**



Dear Mr. Bingham:

Isaacson & Arfman, P.A., as agents for Curb Inc., is submitting a revised drainage report for El Rancho Grande, Unit 16.

The site was re-graded to minimize retaining walls and earthwork. All building pads were reduced by 5' in depth, and some lots were reduced from 105 feet to 100 feet and some were increased to 110 feet in depth in order to gain grade by sloping in the backyards. One lot was also added, resulting in a total of 159 lots. A revised grading and drainage plan and retaining wall plan for Unit 16 are included in the revised drainage report. The following is a list of the changes from the original drainage report.

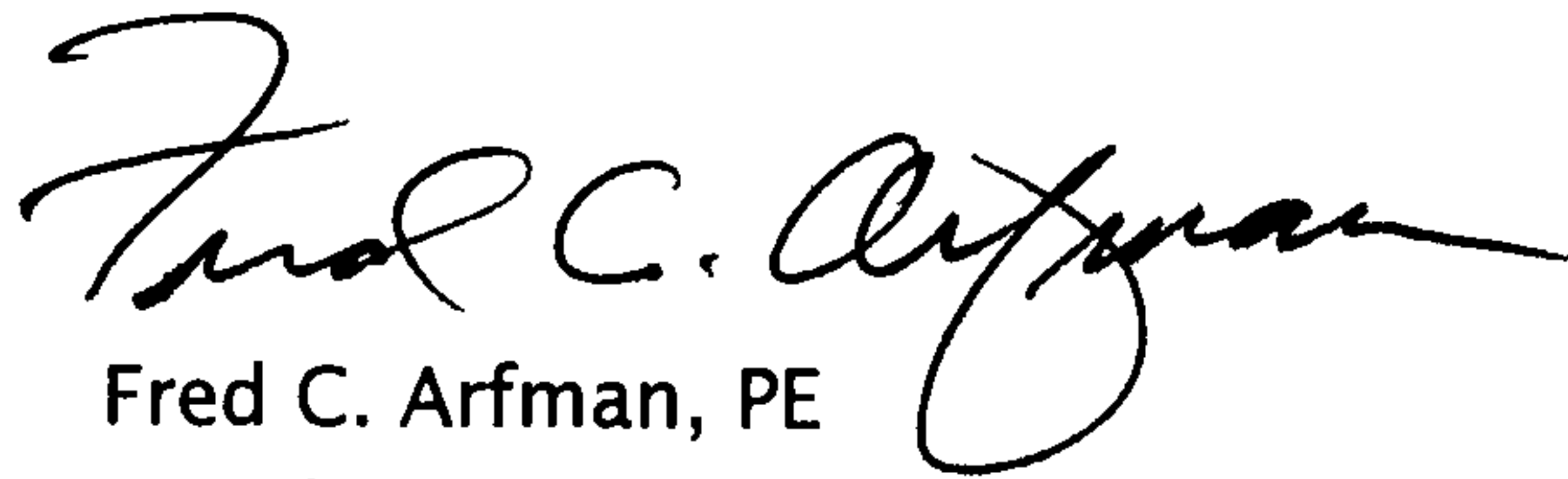
1. By reducing the building pads, land treatment Type D was reduced from 65% to 62%.
2. Because of shifts in street high points, basin areas changed slightly, but the overall drainage scheme stayed the same. Runoff and street flow capacities were re-calculated based on the new basin areas, land treatment percentages and street slopes.
3. The rundown and sidewalk culverts at end of Street 'K2' conveying the flows to the Delgado entrance were eliminated and replaced with a sump inlet. Three of the inlets previously shown at the Delgado entrance were also eliminated.
4. The storm drain calculations were modified based on new inverts.

Mr. Brad Bingham, PE
April 18, 2005
Page 2

5. By re-grading the site, a cluster of 18 lots located south of Golinda Road and west of Delgado Drive now fall within the Zone 2W water pressure zone. Excess material from Unit 16 will be used to fill in and rough grade the future unit.
6. The temporary retention ponds on the future unit were redesigned. Pond 1 has an outfall to the Amole Arroyo. Ponds 2 and 3 were shifted west to be located outside the future unit.

If you have questions or comments regarding this re-submittal, please call me at 268-8828.

Sincerely,
ISAACSON & ARFMAN, P.A.

A handwritten signature in black ink, appearing to read "Fred C. Arfman". The signature is fluid and cursive, with a large, stylized "F" and "A".

Fred C. Arfman, PE
FCA/ânw
Attachments

ONE STOP SHOP
CITY OF ALBUQUERQUE PLANNING DEPARTMENT
Development & Building Services

PAID RECEIPT

APPLICANT NAME CURB INC
AGENT ISAACSON & ARFMAN
ADDRESS _____
PROJECT & APP # 1003874
PROJECT NAME El Rancho Grande 16

\$ _____ 441032/3424000 Conflict Management Fee
\$ _____ 441006/4983000 DRB Actions
\$ _____ 441006/4971000 EPC/AA/LUCC Actions & All Appeals
\$ _____ 441018/4971000 Public Notification
\$ 1630.00 441006/4983000 DRAINAGE PLAN REVIEW OR TRAFFIC IMPACT STUDY***
() Major/Minor Subdivision () Site Development Plan () Bldg Permit
() Letter of Map Revision () Conditional Letter of Map Revision
() Traffic Impact Study

\$ 1630.00 TOTAL AMOUNT DUE

***NOTE: If a subsequent submittal is required, bring a copy of this paid receipt with you to avoid an additional charge.

CURB, INC.
PH. 881-9190
5160 SAN FRANCISCO NE
ALBUQUERQUE, NM 87109

6527

95-660/1070
2025113388

DATE 1-10-05

PAY TO THE ORDER OF City of Albuquerque

One thousand six hundred & thirty dollars

1630.00

CITY OF ALBUQUERQUE
TREASURY DIVISION

1/10/2005 3:02PM LOC: ANNEX
RECEIPT# 00033725 WSH 006 TRANS# 0058
Amount 441006 Fund 0110
441006/4983000 TRSE: A

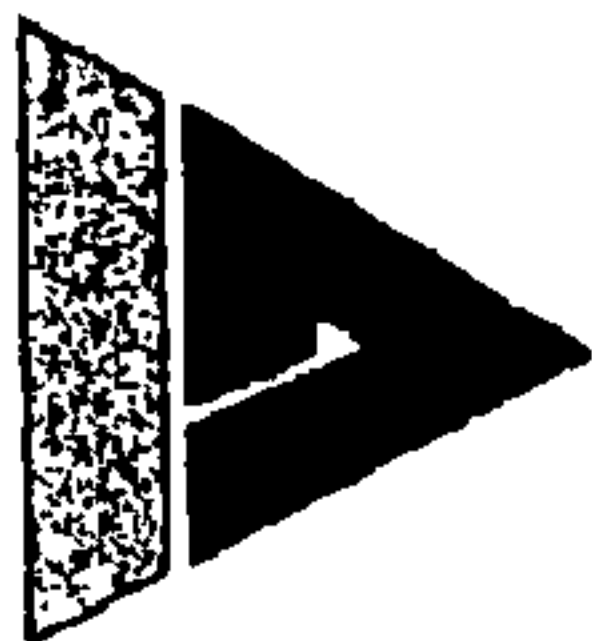
Trans Amt \$1,630.00
J24 Misc \$1,630.00
LK \$0.00
CHANGE

MEMO CLRG 16-E-N8-0003

1070066061 2025113388

BANK OF ALBUQUERQUE
Albuquerque, New Mexico
www.bankofalbuquerque.com

Counterrecel



ISAACSON & ARFMAN, P.A.

Consulting Engineering Associates

Thomas O. Isaacson, PE & LS • Fred C. Arfman, PE
Scott M. McGee, PE

FAX NO. (505) 268-2632

*** FAX TRANSMITTAL MEMO ***

TO: Andrew DATE: 4/22/05
Front Counter CC: _____
FAX #: 924-3864
FROM: Ruth, Isaacson & Arfman, P.A.
REFERENCE: El Rancho Grande Unit 16 1003874
Drng Plan Fee
TOTAL NUMBER OF PAGES (INCLUDING COVER) 2

☐ Hard copy to follow via mail.

MESSAGE:

Have a good weekend!

This fax is intended only for the personal and confidential use of the addressee or addressees named above. It contains information that is privileged and confidential. Any unauthorized review, disclosure, copying or dissemination of this transmission is strictly prohibited. If you have received this transmission in error, please notify the sender by telephone immediately so that we can arrange for its return to us. Thank you for your cooperation.

IN CASE OF DIFFICULTY, PLEASE CALL THE NUMBER LISTED BELOW

128 Monroe St. NE • Albuquerque, NM 87108 • (505) 268-8828 • FAX (505) 268-2632