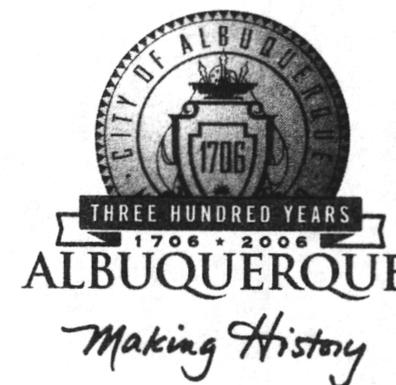


CITY OF ALBUQUERQUE



July 21, 2004

David Soule, PE
Rio Grande Engineering
3500 Comanche NE, Bldg E, Ste 5
Albuquerque, NM 87107

Re: 615 Osuna NE Grading and Drainage Plan
Engineer's Stamp dated 7-2-04 E-16/10023

Dear Mr. Soule,

P.O. Box 1293

Based upon the information provided in your submittal dated 7-21-04, the above referenced plan reduces the runoff to Osuna, thus helping the situation in the area. This is highly acceptable to the City. Once the project is complete, please provide an Engineering Certification for my file.

Albuquerque

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

New Mexico 87103

Sincerely,

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

www.cabq.gov

C: file

DRAINAGE REPORT

for

**615 Osuna
Mc Call Office Complex
Bernalillo County, New Mexico**

Prepared by

Rio Grande Engineering
3500 Comanche Blvd. NE, Suite E-5
Albuquerque, New Mexico 87107

Prepared for
D. Mc Call
Midway Realty
3700 Osuna NE
Albuquerque, New Mexico 87109

June 2004



David Soule P.E. No. 14522

PURPOSE

The purpose of this report is to provide the Drainage Management Plan for the development of 615 Osuna NE. The proposed development will consist of an 18,000 square foot office building, and a 9,000 square foot office building with their associated parking and landscaping areas. This plan will identify the upstream and downstream hydraulic constraints affecting the subject property. This plan was prepared in accordance with Bernalillo County's Drainage Guidelines, as well as the City of Albuquerque's Development Process Manual Drainage Criterion. This report will demonstrate that the proposed improvements do not adversely affect the surrounding properties, nor the upstream or downstream facilities.

INTRODUCTION

The subject of this report, as shown on the Exhibit A vicinity map, is a 3.00-acre parcel of land located on the north side of Osuna between the North Diversion Channel and Edith Boulevard NE. The site is currently partially developed, including a paving, a building and several out buildings. The legal descriptions of the parcels are Tracts E-1-A-1, E-1-A-2 and E-1-A-3, Fruitvale Subdivision. The entire site lies with flood zone x as described by FIRM map 35001C0138E. No significant flows enter the site. The site currently discharges directly to Osuna Boulevard, which is a City of Albuquerque Road, with City maintained drainage facilities. Due to the existing drainage facilities and the fact the site was partially developed, the redevelopment of the site shall maintain the existing drainage patterns and discharge less than the historical rate to an existing Inlet in Osuna.

EXISTING CONDITIONS

The site slopes from northeast to southwest, with general grades between 2 and 3 %. There is visual evidence that the site has been developed in the past. The site currently contains a building, several out buildings and pavement. The majority of the site is hard packed from previous activities. As shown in appendix A, the site has minor flows, totaling 1.34 cfs, entering the site as sheet flow from the residential properties to the north. The site currently generates a peak storm water discharge rate of 7.25 cfs during a 100-year, 6-hours rain event. The flows leaving the site are captured by an inlet adjacent to the site and conveyed downstream by City of Albuquerque Maintained facilities

PROPOSED CONDITIONS

The proposed improvements consist of the construction of a two building containing a combined 27,000 square foot of office space, its associated parking and substantial landscaping /ponding areas. As shown on exhibit B, the site will be divided into 3 separate drainage basins. Basin A, which contains the easternmost .75 acres, will drain to a retention pond, as shown in appendix B, this pond was designed to contain the 100-year, 10-day storm water volume. Basin B1 and B2 will discharge a combined peak flow rate of 6.70 cfs to Osuna. Basin B1 flows will enter a detention/ partial retention pond which has a controlled rate throttled to 2.55 cfs. As shown in Appendix B, the reduction in peak flow rate is accomplished by the construction of a weir at the outlet. Basin B2 free discharges directly to Osuna. In the proposed developed condition, the site is predicted to discharge a peak rate of 6.70 cfs via surface flow directly to Osuna, which is less than the existing discharge rate of 7.25 cfs

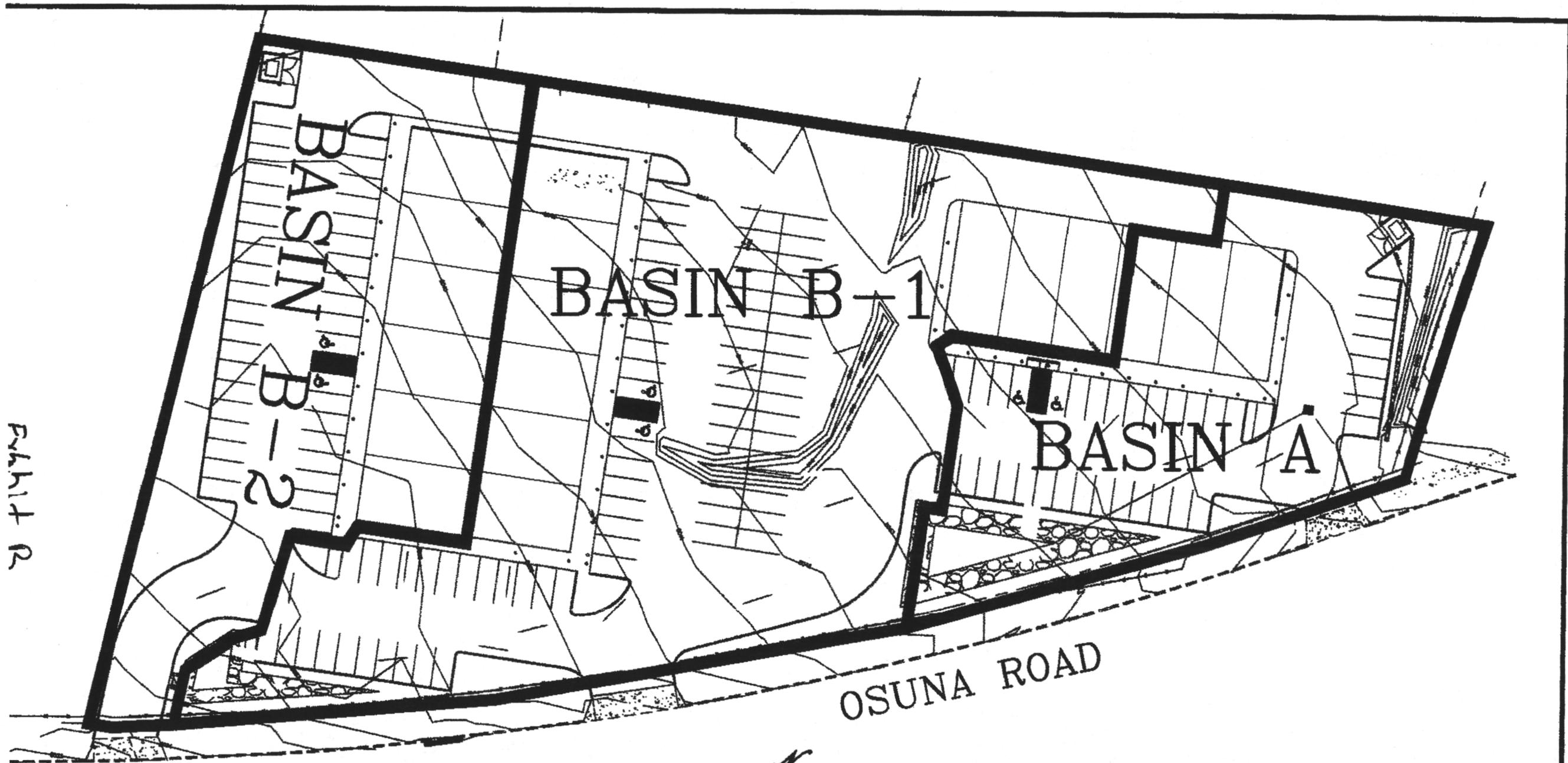
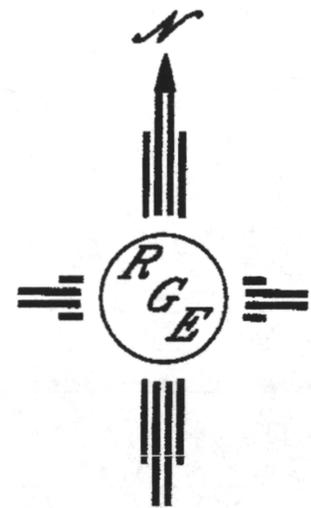
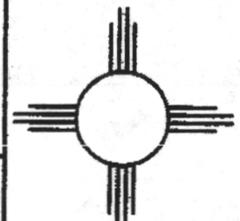


Exhibit R



ENGINEER'S SEAL	615 OSUNA ROAD	DRAWN BY WCUJ
	BASIN MAP	DATE 7-02-04
		2444-BASIN-7-01-04X
	 Rio Grande Engineering 3500 COMANCHE ROAD NE BUILDING E, SUITE 5 ALBUQUERQUE, NM 87107 (505) 872-0889	SHEET #
DAVID SOULE P.E. #14522		JOB # 2444

SUMMARY AND RECOMMENDATIONS

This site is a previously and still partially developed parcel of land. The site is located within flood zone X, and is not impacted by any significant flows. The site currently discharges 7.25 cfs to Osuna Boulevard during a 100-year, 6-hour storm event. This flow is captured and conveyed downstream via City of Albuquerque Maintained facilities. The proposed development will discharge a peak rate of 6.70 cfs, while maintaining the existing drainage patterns. The grading plan and drainage report was prepared in conformance to Bernalillo County Public Works Departments drainage criteria. The ponding volumes have been calculated using the City of Albuquerque's Weighted E method as prescribed in the DPM. The pond modeling was performed using AHYMO 97. Since the proposed subdivision and the improvements shown within this plan do not adversely affect the upstream or downstream facilities, we recommend approval of the site-grading plan. Since this site encompasses more than 1 acre, a NPDES permit will be required prior to any construction activity.

EXISTING CONDITIONS

The site slopes from northeast to southwest, with general grades between 2 and 3 %. There is visual evidence that the site has been developed in the past. The site currently contains a building, several out buildings and pavement. The majority of the site is hard packed from previous activities. As shown in appendix A, the site has minor flows, totaling 1.34 cfs, entering the site as sheet flow from the residential properties to the north. The site currently generates a peak storm water discharge rate of 7.25 cfs during a 100-year, 6-hours rain event. The flows leaving the site are captured by an inlet adjacent to the site and conveyed downstream by City of Albuquerque Maintained facilities

PROPOSED CONDITIONS

The proposed improvements consist of the construction of a two building containing a combined 27,000 square foot of office space, its associated parking and substantial landscaping /ponding areas. As shown on exhibit B, the site will be divided into 3 separate drainage basins. Basin A, which contains the easternmost .75 acres, will drain to a retention pond, as shown in appendix B, this pond was designed to contain the 100-year, 10-day storm water volume. Basin B1 and B2 will discharge a combined peak flow rate of 6.70 cfs to Osuna. Basin B1 flows will enter a detention/ partial retention pond which has a controlled rate throttled to 2.55 cfs. As shown in Appendix B, the reduction in peak flow rate is accomplished by the construction of a weir at the outlet. Basin B2 free discharges directly to Osuna. In the proposed developed condition, the site is predicted to discharge a peak rate of 6.70 cfs via surface flow directly to Osuna, which is less than the existing discharge rate of 7.25 cfs

Weighted E Method

Existing Basins

Basin	Area (sf)	Area (acres)									100-Year		
			Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs
			%	(acres)	%	(acres)	%	(acres)	%	(acres)			
OFFSITE	32000.00	0.735	80%	0.5876951	15%	0.110	0%	0	5%	0.037	0.647	0.040	1.34
ONSITE	130680.00	3.000	60%	1.8	10%	0.300	10%	0.3	20%	0.600	0.933	0.233	7.25
Total	162680.00	3.735		2.3876951		0.410		0.3		0.637		0.273	8.59

Proposed Developed Basins

Basin	Area (sf)	Area (acres)									100-Year, 6-hr.			10-day
			Treatment A		Treatment B		Treatment C		Treatment D		Weighted E (ac-ft)	Volume (ac-ft)	Flow cfs	Volume (ac-ft)
			%	(acres)	%	(acres)	%	(acres)	%	(acres)				
A	32859.00	0.754	10%	0.0754339	10%	0.075	17%	0.12824	65%	0.490	1.701	0.107	3.00	0.172
B-1	50227.00	1.153	5%	0.0576527	7%	0.081	13%	0.1499	75%	0.865	1.818	0.175	4.81	0.290
B-2	47594.00	1.093	10%	0.1092608	14%	0.153	16%	0.17482	60%	0.656	1.615	0.147	4.15	0.234
Total	130680.00	3.000		0.2423473		0.309		0.45295		2.011		0.429	11.96	0.70

Equations:

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

$$\text{Volume} = \text{Weighted D} \cdot \text{Total Area}$$

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

Where for 100-year, 6-hour storm

Ea= 0.53	Qa= 1.56
Eb= 0.78	Qb= 2.28
Ec= 1.13	Qc= 3.14
Ed= 2.12	Qd= 4.7

FLOW LEAVING SITE

BASIN B1+B2=	8.96
THROTTLE B-1 TO 2.81	
THROTTLED B-1+B2=	6.96

LESS THAN HISTORICAL

VOLUME CALCULATIONS

POND B-1

Ab - Bottom Of The Pond Surface Area

At - Top Of The Pond Surface Area

D - Water Depth

Dt - Total Pond Depth

C - Change In Surface Area / Water Depth

$$\text{Volume} = \text{Ab} * \text{D} + 0.5 * \text{C} * \text{D}^2$$

$$\text{C} = (\text{At} - \text{Ab}) / \text{Dt}$$

$$\text{Ab} = 225.00$$

$$\text{At} = 1,912.00$$

$$\text{Dt} = 4.00$$

$$\text{C} = 421.75$$

ACTUAL ELEV.	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
33.58	0	0	0.000
34.58	1	0.0052	0.000
35.58	2	0.0152	0.000
36.08	2.5	0.0238	0.000
36.58	3	0.0349	0.000
37.08	3.5	0.0483	0.000
36.68	3.6	0.0513	0.280
36.78	3.7	0.0544	0.792
36.88	3.8	0.0576	1.454
36.98	3.9	0.0609	2.239
37.08	4	0.0642	3.129

wier equation

$$Q = CLH^{1.5}$$

$$C = 2.95$$

$$L = 3$$

$$Q \text{ (CFS)} = \text{Flow}$$

Concrete Channel

Weir Equation:

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

Q = 2.81 cfs

C = 2.95

H = 0.5 ft

L = Length of weir

$$L = \frac{2.81}{2.95(0.5)^{3/2}}$$

L = 2.69 ft

Use **3.0** feet for length of weir

3.0

