7 Bar Retail DRAINAGE REPORT

April 2025

City of Albuquerque Planning Department Development Review Services HYDROLOGY SECTION

APPROVED

6/27/2025

B14D010D



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04/29/2025

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1. Executive Summary

This Drainage Report updates the previously approved report for the site and defines the drainage strategy for the proposed 7 Bar Retail development in Albuquerque, NM. The development, envisioned by A Management Inc., aims to integrate a mix of residential and commercial entities, including 14 townhomes, a sit-down restaurant, a cannabis retail outlet, and an office building. Spanning an area of 3.14 acres within the Cottonwood Crossings Major Site Plan, the 7 Bar Retail site is set to leverage existing infrastructure to meet its drainage needs, thereby negating the necessity for additional ponding capacity. The site is located on the west side of Albuquerque west of the intersection of Seven Bar Loop and Coors Bypass. The overall site is partially developed with a Popeye's, a Take-5 car wash, Nusenda Credit Union.

The analysis builds upon previously established drainage frameworks, specifically referencing the Tract 14A and 14B Black Ranch Drainage Report from October 2003. Through detailed study, it is determined that the 7 Bar Retail development will not exceed previously approved discharge rates. This conclusion is supported by a thorough examination of the site's current and developed conditions, including land treatments, precipitation, flood hazard zones, street and storm drain hydraulics and stormwater quality considerations.

This analysis follows the original approval and analysis utilizing the Weighted E methodology, as per the City of Albuquerque's Development Process Manual (Revised September 2020), for runoff and volume calculations. This method, alongside the project's adherence to the city's IDO requirements, ensures that the development's impact on local drainage systems remains within acceptable limits.

Significant findings include the adjustment of on-site drainage basins to reflect recent developments, slight modifications to the drainage basins that ultimately results in a reduction in directed drainage area to the AMAFCA Pond. The original approval for the site allowed a discharge of 46.61 cfs and the updated flow rate shows a reduction of 9.63 cfs to 36.98 cfs., affirming that the current infrastructure is adequately equipped to handle the proposed development's drainage needs without additional modifications. A volume analysis/comparison was also completed via the weighted E method and it has been shown that there is an overall decrease of .05 ac-feet needed. The total volume of the pond remains unaffected.

In conclusion, the 7 Bar Retail Drainage Report presents a well-structured plan that harmonizes new development with existing drainage capabilities, ensuring environmental compliance and sustainable urban growth. The proactive approach to stormwater management exemplified in this report signifies a commitment to responsible development practices, highlighting the project's potential to contribute positively to the Albuquerque community.

2. Introduction

This drainage report is to present a final grading and drainage solution for the proposed mixed-use development of the 7 Bar Retail Development and highlight the effects on the previously approved Drainage Report titled <u>Tract 14A and 14B Black Ranch</u> dated October 2023. The analysis will show that

previous development within the Major Site Plan and the changes brought about by the 7 Bar Retail development to the Major Site Plan require no additional ponding capacity to the existing AMAFCA ponding facility within the Major Site Plan and that previously approved discharge rates are not exceeded.

3. Project Location & Major Site Plan Background

The proposed 7 Bar Retail development is located just East of the intersection of Coors Rd NW and Seven Bar Loop in Northwest Albuquerque. The exact location of the site is shown highlighted in Blue in Figure 1 below, which is wholly within the Cottonwood Crossings Major Site Plan shown in Red. The 7 Bar Retail site totals 3.1388 acres and are zoned MX-T (Mixed Use-Transition) and MX-L (Mixed Use-Low Intensity), legally described as Lot 2-A and 2-B of Lots 2-A, 2-B, 2-C and 2-D Cottonwood Crossing Phase II (Being a Replat of Tract 2 Cottonwood Crossing Phase II).

The limits of the Major Site Plan are located along Coors Blvd. It is bounded by Coors Blvd to the West, an undeveloped MX-T and MX-L lot to the North, Corrales Main Canal and Maintenance road to the East and South East, and a Bernalillo County commercial property to the South. The Major Site Plan is approximately 9.4 acres more or less. A Vicinity map can be seen in **Figure 1** for both the 7 Bar Retail Development and the Cottonwood Crossing Major Site Plan.

Since the approval of the Drainage Report for <u>Tract 14A and 14B Black Ranch</u> and the approval of the Cottonwood Crossing Major Site Plan the following uses have been developed;

Developed

- Commercial Services (Nusenda Bank)
- Fast Food Restaurant (Popeye's)
- Car Wash (Take 5)
- Drainage Pond (AMAFCA)

In addition, Lot 1 of the Major Site Plan is an Archeological Site that has been dedicated to the City of Albuquerque

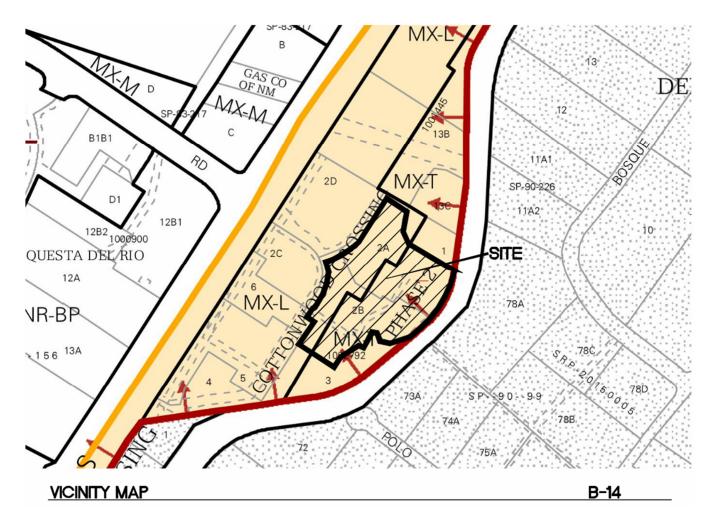


Figure 1 - Vicinity Map



Figure 2 - Vicinity Map with Major Site Plan Boundary Delineated

4. Relevant Drainage Reports & Drainage Plans

- Drainage Report for "Tract 14A and 14B Black Ranch" dated October 2003. prepared by Tierra West LLC.
- Popeye's Chicken Grading and Drainage Plan
- Take 5 Cottonwood Crossings Car Wash Drainage Plan prepared by RESPEC.
- Nusenda Existing Drainage Plan

5. Flood Hazard Zones

The site is located on FEMA Map 35001C0109H as shown in figure 3 below. The map shows that the site lies within an unshaded Zone -X (minimal flood risk), but adjacent to a shaded Zone-X (protected by Levee) and an approximate Zone A (for the AMAFCA Drainage facility).

The following *italicized* text is directly from the Drainage Report for "Tract 14A and 14B Black Ranch" dated October 2003. *The offsite drainage area consists of fourteen (14) sub-basins as outlined in the*

- Alameda West Shopping Center Drainage Report
- Questa Del Rio Drainage Management Plan
- North Coors Drainage Management Plan.

All of the flows from the off-site drainage area are subsequently routed to the AMAFCA detention pond on Tract 14 via a storm sewer system. Nearly half of the off-site flows are collected in a detention pond located in the Alameda West Shopping Center where it is released into the existing storm sewer at a controlled rate of 42.14 cfs. The flow then combines with the peak flow of 66.14 cfs generated by Questa Del Rio and the adjacent sub-basins. The combined peak flow is then routed to Tract 14 for a resulting flow of 103.59 cfs, These flows are then contained in the AMAFCA detention pond where the outflow is controlled to release 14 cfs into the Corrales Main Canal. To our knowledge at the time of this report these off-site flows have not been changed and our project lies outside the limits of the above areas.

Note that the flows entering the AMAFCA pond from the new development on the subject site are shown to be less than the previously approved flows from the original EPC approved Site Plan referenced in the Drainage Report for "Tract 14A and 14B Black Ranch".

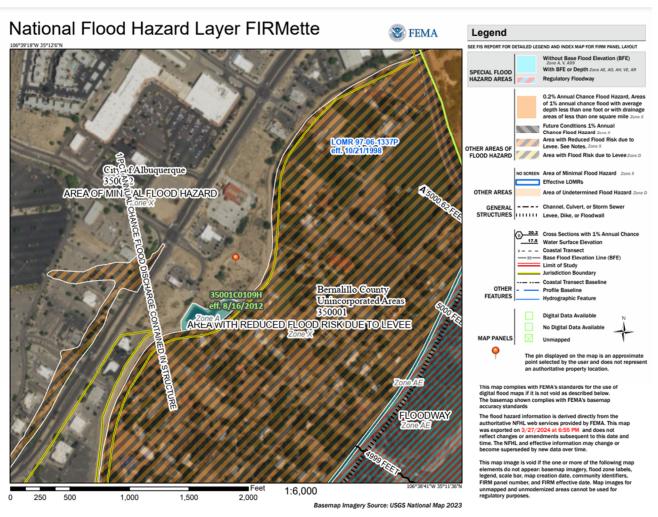


Figure 3 - FEMA FIRMette Map

6. Methodology

This drainage study is based on the procedures as outlined in the City of Albuquerque's Development Process Manual, Revised September 2020. This drainage study uses the Weighted E method and is used to calculate the runoff and volume for the site based on a 100-year, 6-hour storm event. The Weighted E Tables for On-Site and Off-Site flows can be referenced in this report and have also been provided in the Appendices.

7. Precipitation

The 100-yr 6-hr design storm was used for this analysis. These values were obtained from the COA Design Process Manual dated September 4th 2020 from Table 6.2.8 titled Precipitation for Zones 1-4. These values can be found in Appendix A.

8. Land Treatments

The land treatments used in the Weighted E are as described in the City of Albuquerque Development Process Manual, summarized below:

- <u>Land Treatment A</u> Soil uncompacted by human activity with 0 to 10 percent slopes. Native grasses, weeds and shrubs in typical densities with minimal disturbance to grading, groundcover and infiltration capacity. Croplands. Unlined Arroyos.
- <u>Land Treatment B</u> Irrigated lawns, parks and golf courses with 0 to 10 percent slopes. Soil uncompacted by human activity with slopes greater than 10 percent and less than 20 percent.
- <u>Land Treatment C</u> Soil compacted by human activity. Unpaved parking, roads and trail. Most vacant lots. Gavel or rock on plastic (desert landscaping)
- Land Treatment D Impervious areas, pavement and roofs.

The overall project contains a mixed use of proposed developments which includes both commercial, residential, and open space.

9. Approved Conditions

The approved Drainage Report for "Tract 14A and 14B Black Ranch" dated October 2003 which is associated with the Cottonwood Crossing Major Site Plan dated 10-20-2003 shows Eleven (11) drainage basins

associated with the Major Site Plan. Six (6) of these basins are on-site basins totaling 36.29 cfs and Five (5) off-site basins totaling 7.32 cfs for a combined total of 43.61 cfs.

In regards to the on-site basins, the site is divided into Six (6) Sub-Basins with Sub-Basins 1 - 3 sheet flowing to the AMAFCA Detention Pond. The AMAFCA detention pond is itself defined as Basin 5. Basin 4, which is mostly comprised of the Archeological site, also sheet flows into the Corrales Main Canal. It should be noted that in the original Drainage Report for "Tract 14A and 14B Black Ranch" dated October 2003 the flow from the Archeological site was attributed to the AMAFCA pond in error. The total developed discharge into the pond from all six on site basins is 36.29 cfs. Additionally In the above referenced drainage report The on-site AMAFCA Pond is shown to have a total volume of 3.3770 acre-feet | 187,308 ft³

Since the approval of the Cottonwood Crossing Major Site Plan and associated Drainage Report for "Tract 14A and 14B Black Ranch" there have been a number of parcels within the Major Site Plan that had been developed without an update to the Major Site Plan or the above referenced Drainage Report. As noted in Section 3 of this report, the newly developed uses are as follows.

- Commercial Services (Nusenda Bank)
 - Overall Grading Plan shows that Off-Site Basin #5 from DR Tract 14A and 14B Black Ranch now sheet flows north and eventually sheet flows into Corrales Main Canal.
 - Remaining on-site flows sheet flow to the AMAFCA Pond.
- Fast Food Restaurant (Popeye's)
 - On-site flows sheet flow to AMAFCA Pond
- Car Wash (Take 5)
 - On-site flows sheet flow to AMAFCA Pond

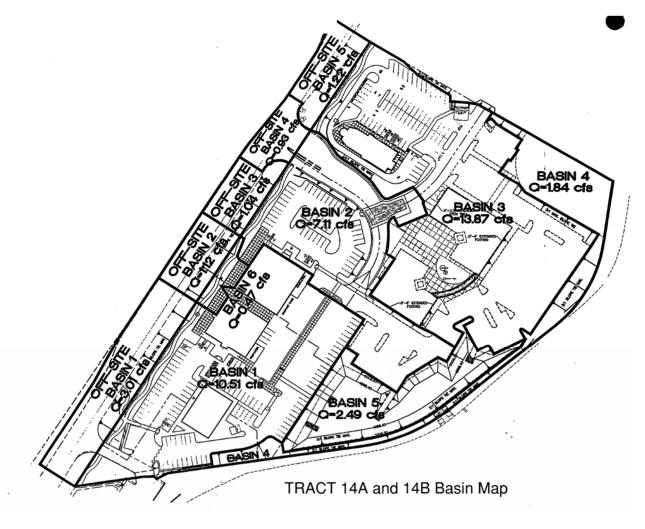


Figure 4: Tract 14A & 14B Basin Map from Original Drainage Report

10. Developed Conditions

The proposed project is a mixed-use development that will be comprised of 3 commercial spaces and 14 townhomes. In relation to Coors Boulevard the 3 proposed commercial spaces are situated approximately 250′-300′ from Coors with 3 existing commercial uses between the site and Coors. The existing buildings west of the proposed development include a fast food drive through, a carwash facility, and credit union with drive through. The new uses to be developed are commercial office, restaurant, cannabis retail and residential town home lots that will include paved roads, curbs, and sidewalks within the Cottonwood Crossings Major Site Plan.

10.1. Basins

Within the recently updated and amended Major Site Plan that reflects recently developed projects and resulting changes to the basins there are now (16) Sixteen total basins within the major site plan boundary (5) five of which are off-site basins with (11) on-site basins. (Reference Basin map in Appendices or Drawing Set)

In regards to the AMAFCA ponding facility, (4) off-site basins and (8) on-site basins are contributing storm water runoff into the facility in the amounts of 6.41 CFS and 30.57 CFS as can be references in Table 1 below. Of the remaining (4) basins 6.41 CFS sheet flow into the Corrales Main Canal via other routes.

It should be noted that the Basin associated with the archeological site as well as the basin comprised of the AMAFCA Access easement along the canal were both removed from the developed conditions that contribute to the pond as the site sheet flows into the Corrales Main Canal. This results in overall less drainage area being directed to the AMAFCA Pond than identified in the previous study.

The on-site basins were figured to have 85% land Treatment D and 15% land Treatment B in line with City of Albuquerque IDO requirements. Note that Basin #9 the AMAFCA Pond was figured at 100% Treatment D to account for the Shotcrete impervious materials. For the (8) Eight on-site basins the resulting developed discharge was calculated to be 30.57 cfs which is 5.72 CFS below the 36.29 CFS originally designed for and approved in the Drainage Report for "Tract 14A and 14B Black Ranch"

Table 1: On-Site Developed Weighted E Table

DPM Weighted E Method

Precipitation Zone 1 COORS BLVD NW RETAIL @ 7BAR

TWLLC Date: 09/25/2024
Reference Document DPM dated 09/2020

xisting	Contributing	Off-Site	Basins
_			

	Basin Descriptions 100										100-Year Excess Precipitation 10-Year Excess Precipitation							
Basin	Descriptor	Area	Area	Area	Treatn	nent A	Treatn	nent B	Treatn	nent C	Treatm	nent D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
ID		(sf)	(acres)	(sq miles)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(in)	(ac-ft)	cfs	(in)	(ac-ft)	cfs
OFF-SITE BASIN #1	Coors Blvd	33,734.50	0.774	0.00121	0%	0.00	0%	0.00	0%	0.00	100%	0.77	2.24	0.14	3.19	1.43	0.09	1.99
OFF-SITE BASIN #2	Coors Blvd	15,064.40	0.346	0.00054	0%	0.00	0%	0.00	0%	0.00	100%	0.35	2.24	0.06	1.42	1.43	0.04	0.89
OFF-SITE BASIN #3	Coors Blvd	11,158.80	0.256	0.00040	0%	0.00	0%	0.00	0%	0.00	100%	0.26	2.24	0.05	1.06	1.43	0.03	0.66
OFF-SITE BASIN #4	Coors Blvd	7,793.50	0.179	0.00028	0%	0.00	0%	0.00	0%	0.00	100%	0.18	2.24	0.03	0.74	1.43	0.02	0.46
Total		67,751.20	1.555	0.00243		0.00		0.00		0.00		1.56	V ₃₆₀ =	0.29	6.41		0.19	4.00

Proposed	Conditions -	Updated	Major S	Site P	lan -	Contributi	ng

Basin Descriptions Control of the Co										100-Year Exce	ss Precip	itation	10-Year Exce	ss Precip	itation			
Basin	Descriptor	Area	Area	Area	Treatr	nent A	Treatn	nent B	Treatr	nent C	Treatn	nent D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
ID		(sf)	(acres)	(sq miles)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(in)	(ac-ft)	cfs	(in)	(ac-ft)	cfs
BASIN #1	Undeveloped	101,659.50	2.334	0.00365	0%	0.00	15%	0.35	0%	0.00	85%	1.98	2.01	0.39	8.93	1.25	0.24	5.38
BASIN #2	Popeyes	25,915.70	0.595	0.00093	0%	0.00	15%	0.09	0%	0.00	85%	0.51	2.01	0.10	2.28	1.25	0.06	1.37
BASIN #3	Take 5	34,146.13	0.784	0.00122	0%	0.00	15%	0.12	0%	0.00	85%	0.67	2.01	0.13	3.00	1.25	0.08	1.81
BASIN #4	Nusenda	60,271.00	1.384	0.00216	0%	0.00	15%	0.21	0%	0.00	85%	1.18	2.01	0.23	5.29	1.25	0.14	3.19
BASIN #5	7 Bar - B, C, TH 8-14	68,859.35	1.581	0.00247	0%	0.00	15%	0.24	0%	0.00	85%	1.34	2.01	0.27	6.05	1.25	0.17	3.65
BASIN #6	7 Bar - Upper Inlet	8,742.27	0.201	0.00031	0%	0.00	15%	0.03	0%	0.00	85%	0.17	2.01	0.03	0.77	1.25	0.02	0.46
BASIN #7	Building A, TH 1-7	12,726.87	0.292	0.00046	0%	0.00	15%	0.04	0%	0.00	85%	0.25	2.01	0.05	1.12	1.25	0.03	0.67
BASIN #9	AMAFCA Pond	33,203.30	0.762	0.00119	0%	0.00	0%	0.00	0%	0.00	100%	0.76	2.24	0.14	3.14	1.43	0.09	1.96
Total		345,524.12	7.932	0.01239		0.00		1.08		0.00		6.86	V ₃₆₀ =	1.35	30.57		0.84	18.49

Non-contributing Basins (Sheet flow to Corrales Main Canal or Retained On-Site)

	Basin Descriptions 100										100-Year Excess Precipitation 10-Year Excess Precipitation							
Basin	Descriptor	Area	Area	Area	Treatr	nent A	Treatn	nent B	Treatr	nent C	Treatn	nent D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
ID		(sf)	(acres)	(sq miles)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(in)	(ac-ft)	cfs	(in)	(ac-ft)	cfs
OFF-SITE BASIN #5	Coors Blvd	14,353.10	0.330	0.00051	0%	0.00	0%	0.00	0%	0.00	100%	0.33	2.24	0.06	1.36	1.43	0.04	0.85
BASIN #8	NR-PO-B	18,807.10	0.432	0.00067	0%	0.00	100%	0.43	0%	0.00	0%	0.00	0.73	0.03	0.93	0.26	0.01	0.35
Access Easement Basins	Access Easement Basins	3,940.00	0.090	0.00014	0%	0.00	0%	0.00	100%	0.09	0%	0.00	0.95	0.01	0.26	0.43	0.00	0.13
Basin #11	TH Backyards	11,121.00	0.255	0.00040	0%	0.00	100%	0.26	0%	0.00	0%	0.00	0.73	0.02	0.55	0.26	0.01	0.21
Total		48,221,20	1.107	0.00173		0.00		0.69		0.09		0.33	V ₃₆₀ =	0.11	3.10		0.06	1.54

10.2. Pond Volume Comparison

Page 15 of the Drainage Report titled $\underline{Tract\ 14A\ and\ 14B\ Black\ Ranch}$ dated October 2023 shows the previous Weighted E Method table for the site post development and the resulting calculated Volume (V₃₆₀) as a result of both the 100-yr event and the 10-year event for the previously approved Site Plan. The existing off-site basins were shown to contribute volumes of 0.27 ac-ft and 0.16 ac-ft for the 100-yr and 10-yr event respectively. The Developed On-Site Sub-Basins, including the sidewalk culvert basins, were shown to contribute 1.43 ac-ft and 0.85 ac-ft for the 100-yr and 10-yr event respectively. In total the contributing flows resulted in a Volume of 1.69 ac-ft for the 100-yr event and 1.01 ac-ft for the 10-yr event.

The updated Weighted E Method table developed for the new site plan (reference Table 1) shows that the existing off-site basins will contribute volumes of 0.29 ac-ft and 0.19 ac-ft for the 100-yr and 10-yr event respectively. The new Developed On-Site Sub-Basins are shown to contribute 1.35 ac-ft and 0.84 ac-ft for the 100-yr and 10-yr event respectively. In total the contributing flows resulted in a Volume of 1.64 ac-ft for the 100-yr event and 1.03 ac-ft for the 10-yr event.

In Summary and as shown in Table 2 below the 100-yr volume from the proposed site plan is shown to have an overall <u>decrease</u> of .05 ac-feet and therefore does not adversely impact the designed storage capacity of the existing AMAFCA facility.

Table 2 Volume Comparison from	Previously Approved Drainage Report
Table 2 - Volume Combanson mon	FIEVIOUSIV ADDITOVEU DI AIIIAGE REDOIT

		Contributing Vol	ume Compari	son					
	New - 7 Bar Old - Cottonwood New - 7 Bar Old - Cottonwo								
Basins		100-yr	10-yr						
Off Site Contributing (ac-ft)	0.29	0.27	0.19	0.16					
On-Site Contributing (ac-ft)	1.35	1.43	0.84	0.85					
	1.64	1.69	1.03	1.01					

10.3. Backyard Ponding

Due to AMAFCA's direction that requires that the fenced in portion of the Private TH's not to drain into the access easement and drainage canal, individual backyard detention ponds have been sized to account for and hold the precipitation for a 100yr-10day rain event. The SF of the Backyard area and the pond depth required to accommodate this precipitation amount is shown in Table 3 - Backyard Pond Size Tables

below. The grading and drainage plan submitted with this narrative reflects backyard ponds with these minimum storage amounts accounted for in the grading and drainage of the properties.

Table 3 - Backyard Pond Size Tables



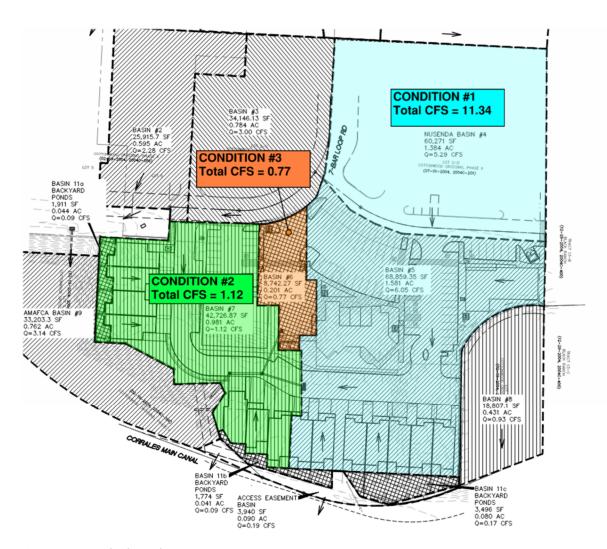
		Backyard	Ponding Requiren	nents	
Townhome	Drainage Area (SF)	Total Volume (CF)	Ponding Area (SF)	Reqd Depth (FT)	Reqd. Depth (in)
TH1	384.4	124.9	384.4	0.3	3.9
TH2	393.4	127.9	393.4	0.3	3.9
TH3	393.4	127.9	393.4	0.3	3.9
TH4	370.6	120.4	370.6	0.3	3.9
TH5	330.7	107.5	330.7	0.3	3.9
TH6	280.1	91.0	280.1	0.3	3.9
TH7	131.3	42.7	131.3	0.3	3.9
TH8	300.6	97.7	300.6	0.3	3.9
TH9	459.2	149.2	459.2	0.3	3.9
TH10	378.7	123.1	378.7	0.3	3.9
TH11	715.5	232.5	715.5	0.3	3.9
TH12	811.8	263.8	811.8	0.3	3.9
TH13	666.9	216.7	666.9	0.3	3.9
TH14	474.5	154.2	474.5	0.3	3.9
Totals	6,091.10	1,979.61	6,091.10		

10.4. Street Hydraulics

For the analysis of Street Hydraulic Design the program Flow Master by Bentley was used and the most conservative street cross sections were used to show compliance with DPM section 6-9(A) Street Hydraulic Design Criteria;

- The calculated hydraulic grade line (HGL) for the 100-year design storm discharge may not exceed curb height.
 - Note that for a sump condition, which is present on the site, the HGL for the 100-year storm may extend to the street ROW.
- The calculated energy grade line (EGL) shall be contained within the street ROW.
- The product of depth x velocity shall not exceed 6.5 in any location in any street in the event of a 10-year design storm.

The design of the site has 3 unique conditions (See Figure 5 below) in which the analysis was performed in accordance with the requirements of section 6-9(A)



GRAPHIC SCALE

Figure 5 - Street Hydraulic Conditions

Condition #1 - Basins 4 & 5

In this condition Basin #4 (Nusenda Basin) sheet flows through and combines with proposed Basin #5. The combined 100-yr Q of these two basins is 11.34 CFS. The cross section 1 shown below occurs just upstream from the inlet and is where the greatest flow would occur. The analysis in flow master shows the following;

100-yr HGL: 3.4in | .28 ft
100-yr EGL: 6.0in | .50 ft

Normal Depth

Depth x velocity: | 3.75ft/s x .22ft = 0.825 < 6.5 OK

Project Description Friction Method Manning Formula Solve For Normal Depth Input Data Channel Slope 0.025 ft/ft

3.4 in

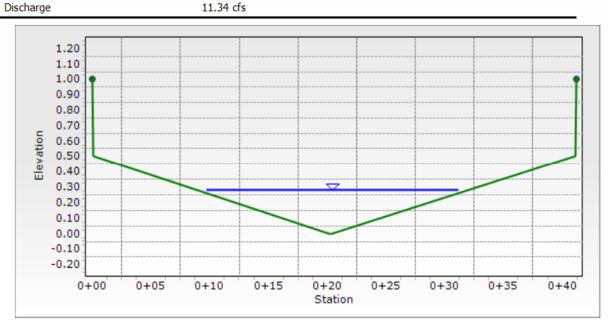


Figure 6 - Street Cross Section and Flow Master Results - Cross Section 1

Condition #2 - Basin #7

In this condition Basin #7 sheet flows through the parking lot and roadway to the drainage inlet. The 100-yr Q of this basins is 1.12 CFS. The cross section shown below occurs just upstream from the inlet and is where the greatest flow would occur. The analysis in flow master shows the following in compliance with 6-9(A);

100-yr HGL: 1.3 in | .11 ft
100-yr EGL: 2.0 in | 0.17 ft

• Depth x velocity: 1.99 ft/s x .11ft = .22 < 6.5 OK

Cross Section for Condition - 2

Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data		
Channel Slope	0.025 ft/ft	
Normal Depth	1.3 in	
Discharge	1.12 cfs	

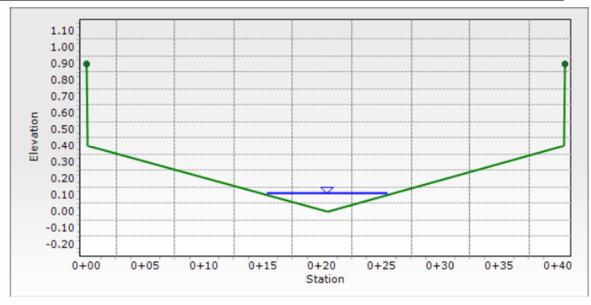


Figure 7 Street Cross Section and Flow Master Results – Cross Section 2

Condition #3 - Basin #6

In this condition Basin #6 sheet flows through the parking lot and drive aisle to the drainage inlet. The 100-yr Q of this basins is 0.77 CFS. The cross section shown below occurs just upstream from the inlet and is where the greatest flow would occur. The analysis in flow master shows the following in compliance with 6-9(A);

100-yr HGL: 1.1in | 0.1 ft
100-yr EGL: 1.92in | 0.16ft

• Depth x velocity: 2.18 ft/s x 0.1ft = .22 < 6.5 OK

Cross Section for Condition - 3

Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data		
Channel Slope	0.040 ft/ft	
Normal Depth	1.1 in	
Discharge	0.77 cfs	

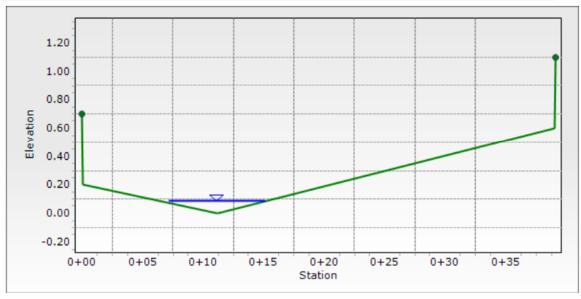
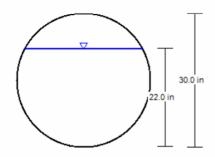


Figure 8 - Street Cross Section and Flow Master Results - Cross Section 3

10.5. Pipe Calculations

Cross	Section	for ST	RM01	-01((30)
-------	---------	--------	------	------	------

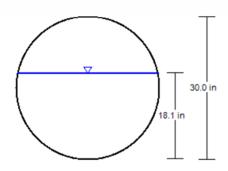
01033 0001011 101 011111101-01(00)			
Project Description			
Friction Method	Manning Formula		
Solve For	Normal Depth		
Input Data Roughness Coefficient	0.017		
Channel Slope	0.002 ft/ft		
Normal Depth	22.0 in		
Diameter	30.0 in		
Discharge	12.46 cfs		



V: 1 \(\sum_{H: 1} \)

Cross Section for STRM01-02(30)

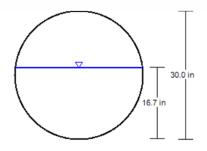
Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data		
Roughness Coefficient	0.017	
Channel Slope	0.004 ft/ft	
Normal Depth	18.1 in	
Diameter	30.0 in	
Discharge	13.23 cfs	



V: 1 ____

Cross	Section	for S	TRM01	1-03/30)
UIU33	Section	101 3	IRIVIO	1-03(30)

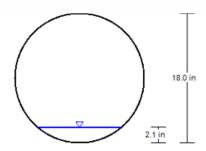
Project Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data Roughness Coefficient	0.017	
Channel Slope	0.017 0.005 ft/ft	
Normal Depth	16.7 in	
Diameter	30.0 in	
Discharge	13.23 cfs	



V: 1 \(\sum_{H: 1} \)

Cross Section for STRM-LAT

Project Description	oject Description	
Friction Method	Manning Formula	
Solve For	Normal Depth	
Input Data		
Roughness Coeffident	0.017	
Channel Slope	0.106 ft/ft	
Normal Depth	2.1 in	
Diameter	18.0 in	
Discharge	0.77 cfs	



10.6. Inlets

Sheet flows will be captured via Type D – inlets at (2) locations. The first location of the drop inlets are located in Basin 6 and receives 0.77 cfs.

The second location straddles Basin #7 and Basin #5 where the inlets will receive a combined 12.46 cfs. We propose to place (2) Type D- Double D inlets such that the normal depth of .28 feet or 3.4 in shown in section 10.4 Street Hydraulics results in a total flow capacity of 38.13 CFS. This is approximately 2.8x over-sized to the 100-year flow and meets the requirement of DPM 6-9(F)(4) 1b in which inlets in a sump condition can be doubled to act as an emergency overflow when grading configuration limit overflow discharge options.

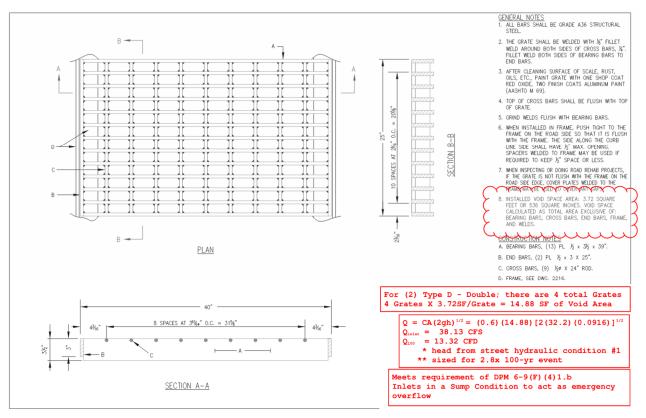


Figure 9 - COA Type D Grate Detail and Q calculation

10.7. Orifice

The storm drain system will convey flows to the AMAFCA pond from the inlets via 30" RCP pipe to a common point and then routed to the AMAFCA pond. The configuration of which can be referenced in the Grading and Drainage plan for the project, note that AMAFCA approved penetration details have

been used in the documents for outlet into the pond. The outlet into the pond has been sized to 30" via the previously provided SD hydraulic analysis above and via the Orifice equation as shown below referenced in the DPM Part 6-16(B). The Orifice flow capacity is shown to be 37.59 CFS, which is approximately 7.02 CFS in excess capacity of the 30.57 cfs generated by the proposed development.

Top of Inlet	5014.1 ft	EQUATION 6.65 Q = CA $(2gh)^{1/2}$
Orrafice Center Elevation	5011.85 ft	Education 0.03 Q - CA (2gii)
Street Hydraulic Head	0.28 ft	where:
Diameter	2.5 ft	
A =	4.90874 ft	C = Discharge coefficient use 0.6. If a discharge coefficient other than 0.6 is to be used, provide justification in the drainage
h =	2.53 ft	submittal.
C =	0.6	A = Area of opening in square feet
g = Q =	32.2 37.5945	 g = 32.2 ft/sec² h = Depth of water measured from the center of the opening

11. Stormwater Quality

The U.S. Environmental Protection Agency (EPA) Report, Estimating Predevelopment Hydrology in the Middle Rio Grande Watershed, New Mexico, TetraTech, April 2014, EPA Publication Number 832R-14-007, yields runoff values of 0.42 inches for the 90th percentile storm. To calculate the required stormwater quality volume (SWQV), we multiply the impervious area by 0.42 inches for new development sites. A summary table of the calculations is provided in Appendix B.

For this project we are seeking cash in-lieu to account for the SWQ treatment. There are numerous constraints on the site that are not typical of other lots seeking to build a mixed use development that hinder the ability to install a storm water quality treatment facility. These constraints include but are not limited to;

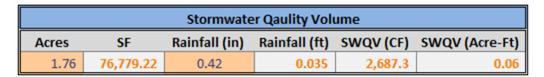
- Irregular lot geometries and reduced buildable areas as a result of
 - Irregular property line created by the adjacent AMAFCA Pond.
 - AMAFCA Access easement running through the eastern portion of the property.
 - PNM utility easement for 750 KV line running through the middle of the MX-T portion of the property and through the southern portion of the MX-L property.
 - MPOS buffer along the Northern portion of the property to protect the existing Archeological Site.

It is also worth noting that the existing pond is acting as a SWQ treatment facility for the flows that it receives.

Referencing the Proposed Conditions portion of the Weighted E table (Table 1) from section 10.1 in this report, it has been shown that the total new impervious area as a result of the new development (Basins

5, 6, and 7) is 1.76 acres. Using the DPM requirement of 0.42in of rainfall to account for the Storm Water Quality Volume of a new development, the resulting volume is 2,687.3 CF or 0.06 Acre-Feet.

Table 4 - SWQV Table



Per the DPM Section 6-12(C)(1) **Payment-in-lieu** The amount of payment in lieu for this project is \$8/cubic-ft of impervious. The total calculated amount for this project is \$21,498.00. The approved SWQV waiver can be found in the appendices.

12. Conclusion

This Drainage Report confirms that the 7 Bar Retail development aligns effectively with the existing drainage infrastructure, directing flows to the AMAFCA pond at 30.57 cfs—5.72 cfs below the originally approved 36.29 cfs. The storm drain (SD) system, featuring a 30" RCP pipe and orifice, provides a capacity of 37.59 cfs, exceeding the development's needs by 7.02 cfs, ensuring robust conveyance to the pond.

Street hydraulics analysis, conducted using Flow Master, demonstrates compliance with the City of Albuquerque's Development Process Manual, with hydraulic grade lines below curb height, energy grade lines within the right-of-way, and depth-velocity products well under 6.5 for the 10-year storm across all evaluated sections. The report also verifies a 0.05 acre-foot reduction in 100-year storm volume, negating the need for additional retention facilities.

Due to site constraints—such as irregular lot geometries, utility easements, and proximity to the AMAFCA pond—stormwater quality treatment is addressed through a \$21,498 fee-in-lieu payment, calculated at \$8 per cubic foot for 2,687.3 cubic feet of impervious area runoff, as approved by the City. By adhering to the Weighted E methodology and City standards, this project ensures sustainable stormwater management without surpassing prior discharge limits, facilitating responsible development within the Cottonwood Crossings Major Site Plan.

APPENDIX A

DRAINAGE REPORT FOR

Tract 14A and 14B Black Ranch

Prepared by:

Tierra West, LLC 8509 Jefferson NE Albuquerque, New Mexico 87113

> Prepared for: John Black

October, 2003

I certify that this report was prepared under my supervision, and I am a registered professional engineer in the State of New Mexico in good standing.

onald R. Bohannan PENO. 7868

Job No 220097

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Section I

Report

Prelude

This report is being prepared at the request of the current owner, John Black, who proposes to develop a small commercial center containing three restaurants and three office buildings.

Location

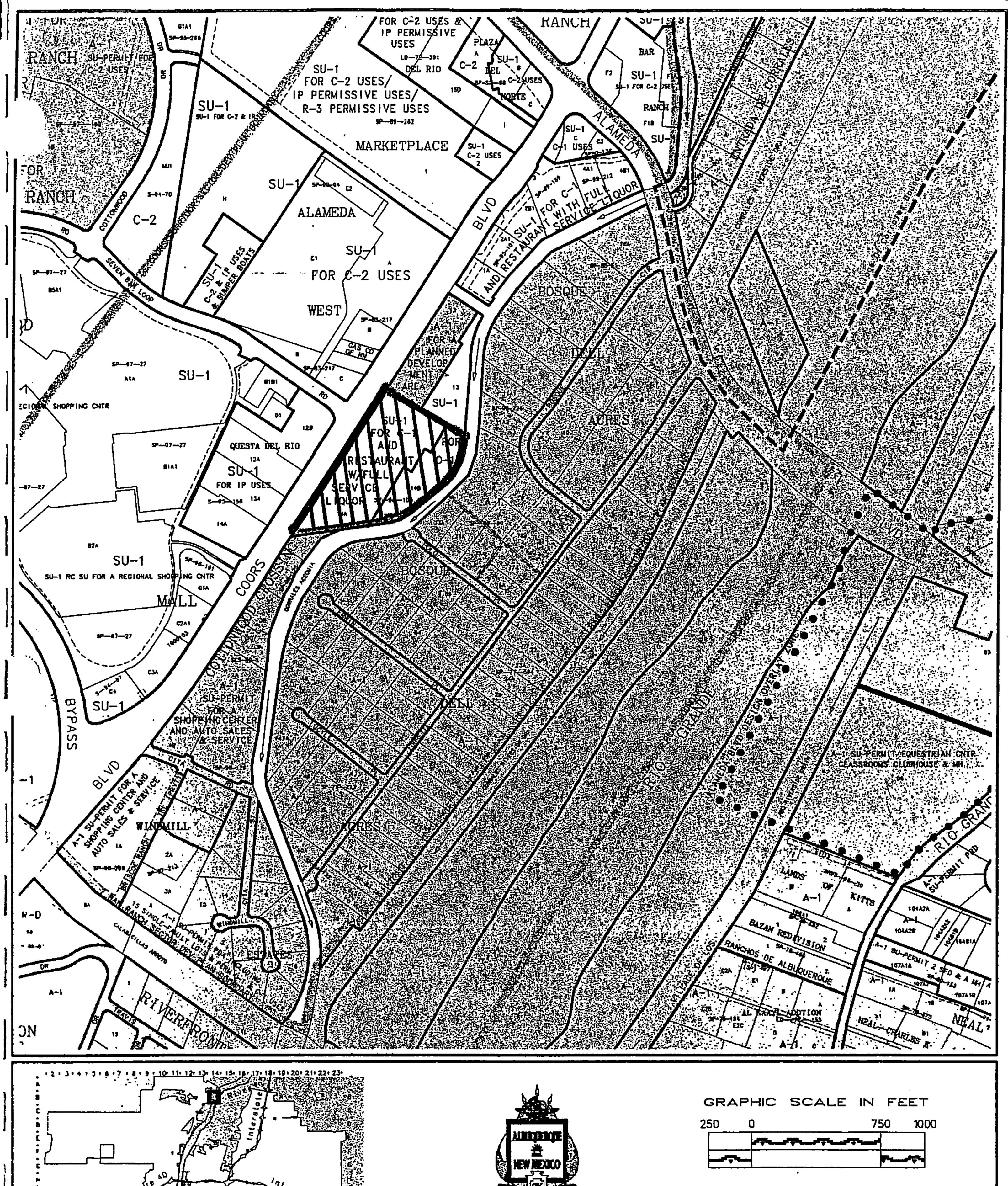
The subject site is located just east of the intersection of Coors Road NW and Seven Bar Loop in Northwest Albuquerque and consists of Tract 14-A and 14-B, Black Ranch. The exact location of the site is shown highlighted on the enclosed Zone Atlas page number B-14. The site will be built in one phase and contains 9.40 acres more or less.

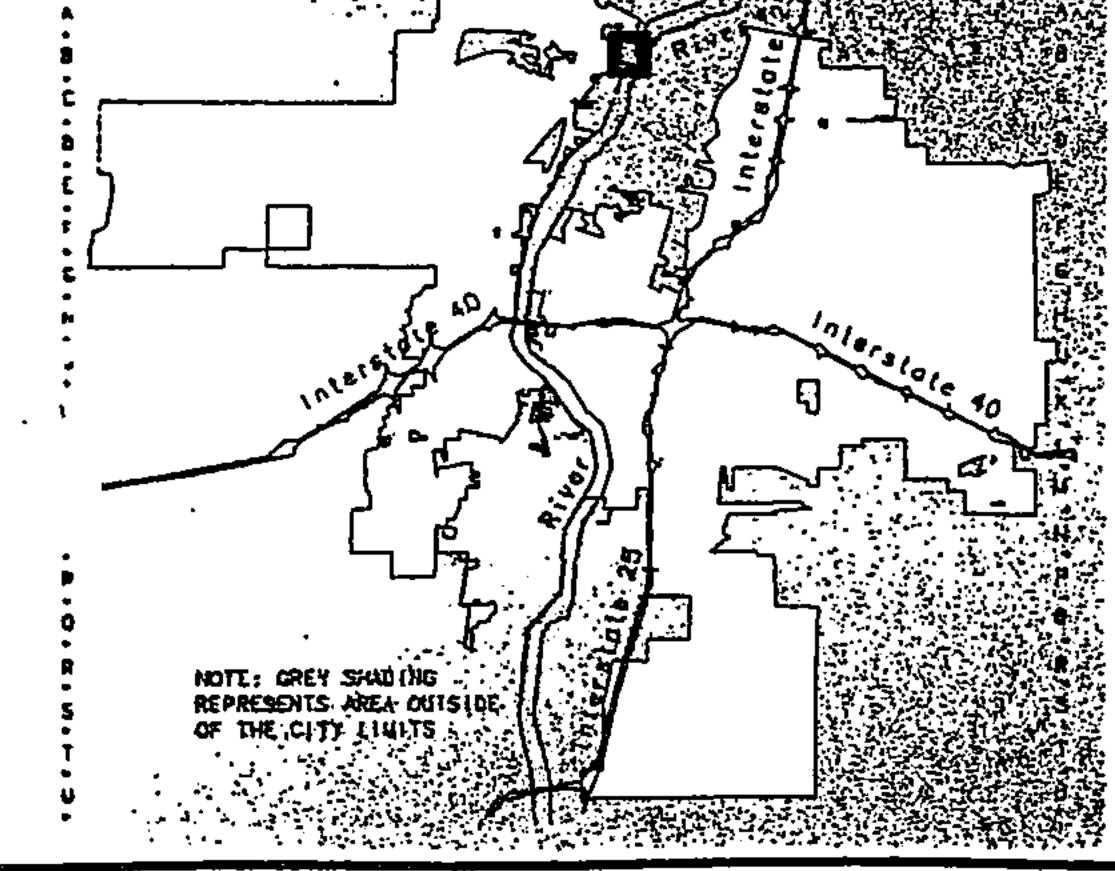
Purpose

The purpose of this drainage report is to present a final grading and drainage solution for the proposed commercial center as well as deal with the off-site flows entering the site. The current pond is detention and is limiting the discharge. This report will also seek to discharge more flows into the Corrales Main Canal to the design capacity of that facility there by reducing the existing detention pond.

Existing Drainage Conditions

The site is currently undeveloped and existed, in the past, as a dairy farm with corrals and barns. Also, a portion of Tract 14 A and B consists of an archeological site believed to be an ancient pueblo.







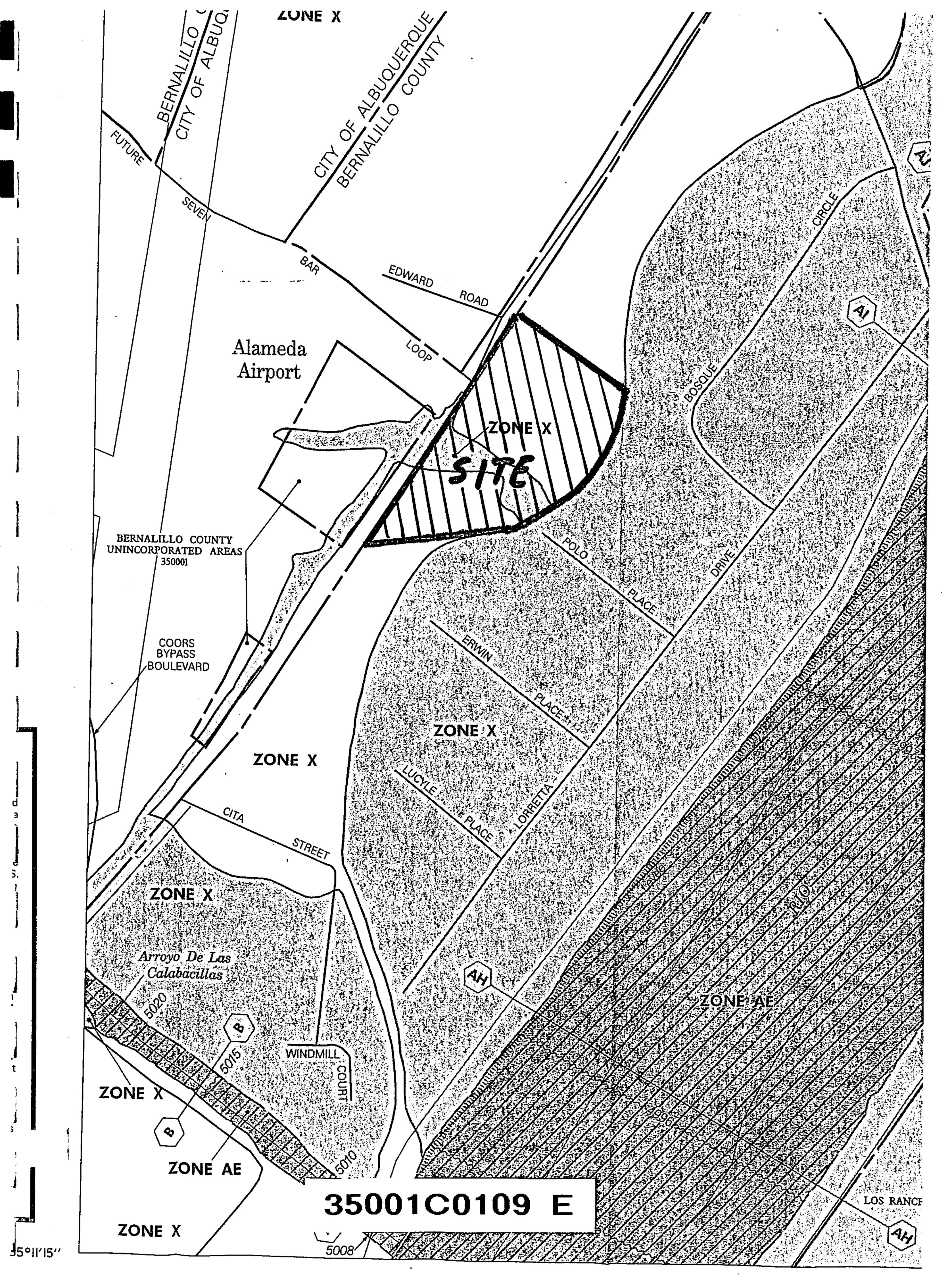
Albuquerque

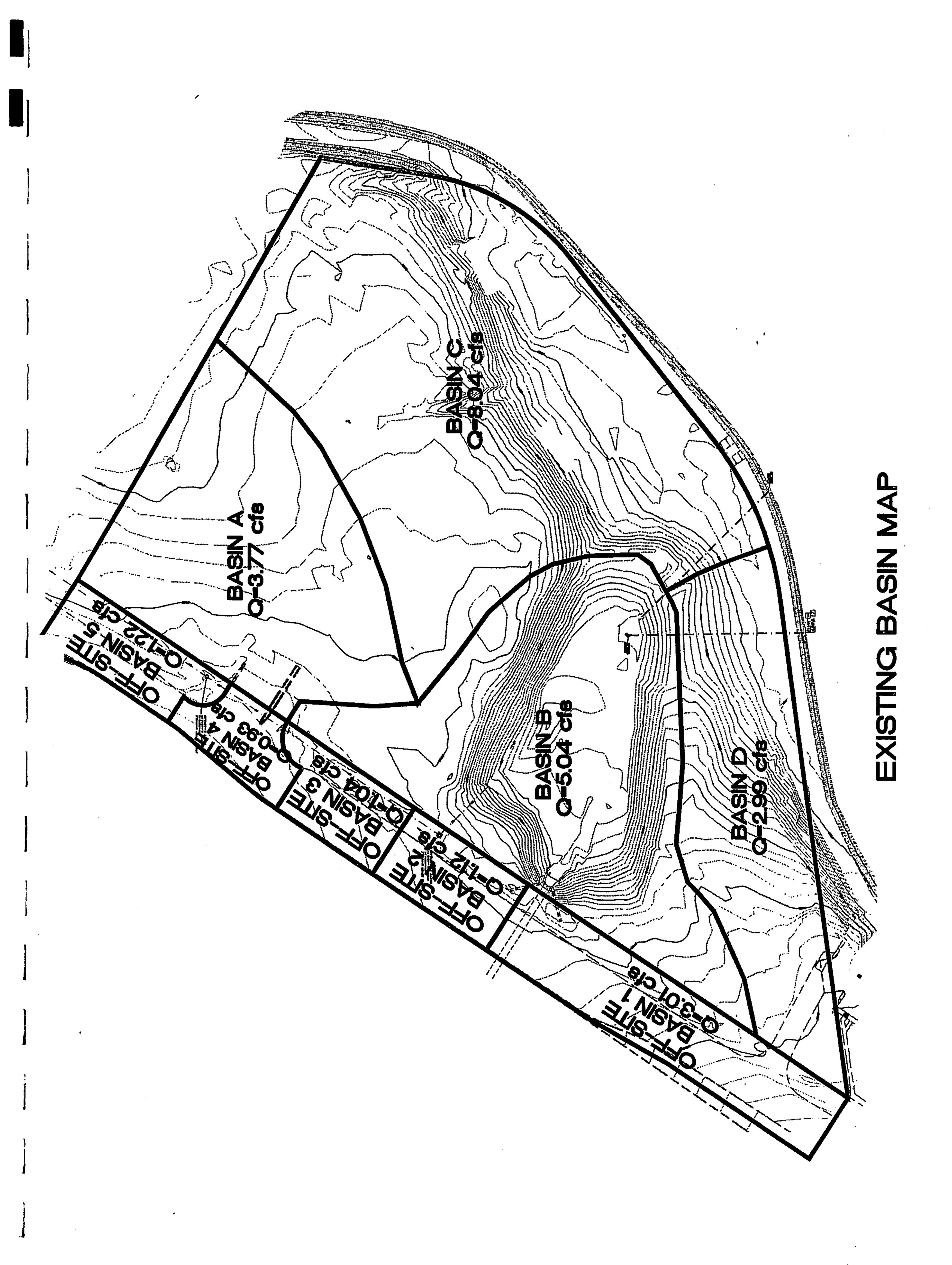
Abuqueque Casographic Information Dystem *PLANNING DEPARTMENT C Copyright 2000

Zone Atlas Page

8-14-7

Map Amended through July 27, 2000





The site currently receives storm runoff from four off-site areas through various storm sewer pipes ranging in size from 18 inches to 60 inches. The offsite drainage area consists of fourteen (14) sub-basins as outlined in the Alameda West Shopping Center Drainage Report, the Questa Del Rio Drainage Management Plan and the North Coors Drainage Management Plan. Exhibits 1 and 2 in Appendix C delineate these basins. All of the flows from the off-site drainage area are subsequently routed to a detention pond on Tract 14 via a storm sewer system. Nearly half of the off-site flows are collected in a detention pond located in the Alameda West Shopping Center where it is released into the existing storm sewer system at a controlled flow rate of 42.14 cfs. This flow then combines with the peak flow of 66.14 cfs generated by Questa Del Rio and the adjacent sub-basins. The combined peak flow is then routed to Tract 14 for a resulting flow of 103.59 cfs. These flow are then contained in a detention pond where the outflow is controlled to release 14 cfs into the Corrales Main Canal. The size of the existing pond is approximately 4.3 acre-feet.

The on-site drainage area consists of Tract 14 with most of the tract sheet flowing into the Corrales Main Canal and the rest draining to the existing pond.

Flood Plain

The site is located on FEMA Map 35001C0109 E as shown on the attached excerpt. The map shows that the site lies in a Zone X shaded area which is defined as areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood. However, the flows that dictate this area are now contained in a pipe and distributed to a new detention pond located on the east side of the property. A LOMR will be completed to revise the flood plain.

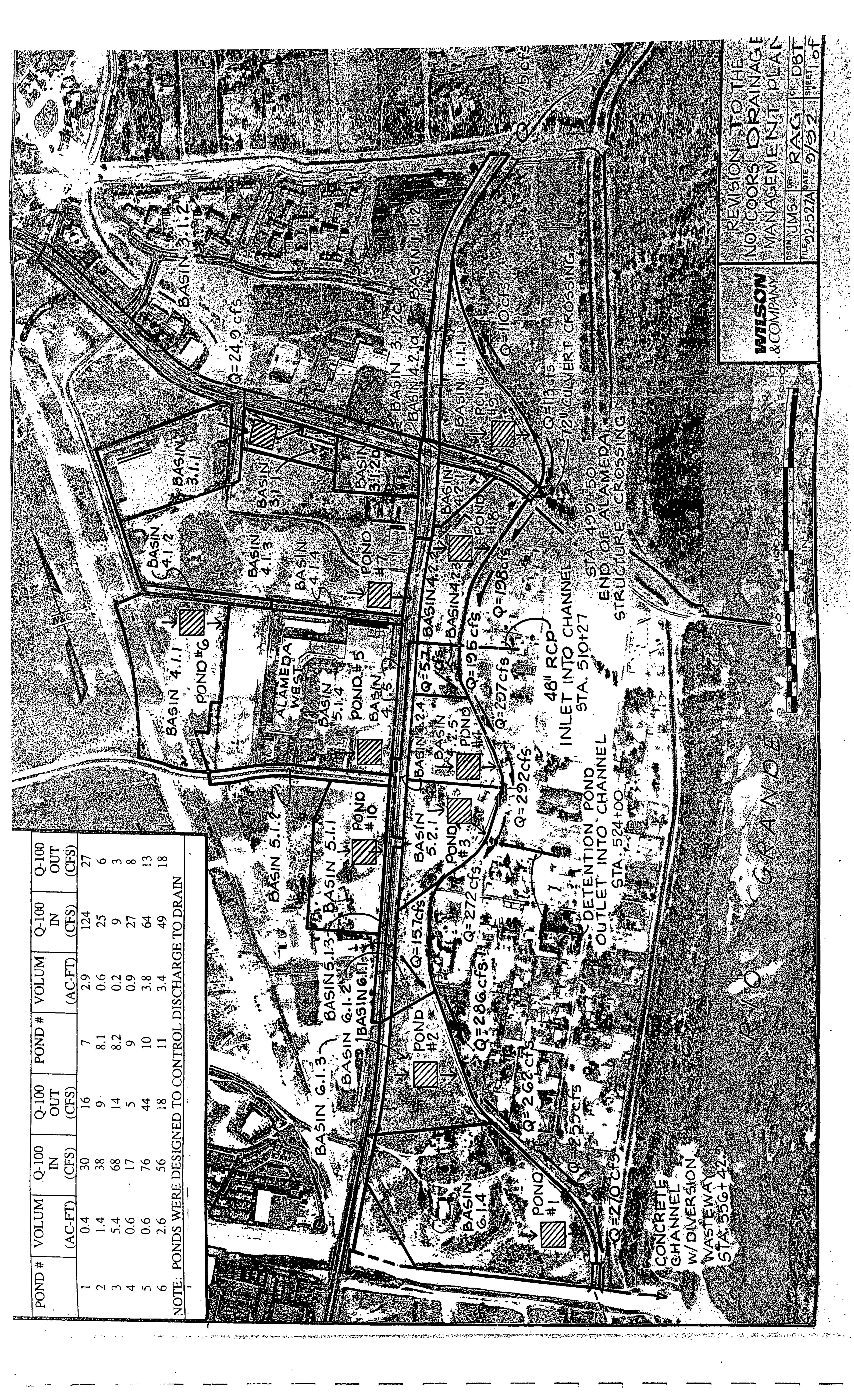
Proposed Conditions and On-Site Drainage Management Plan

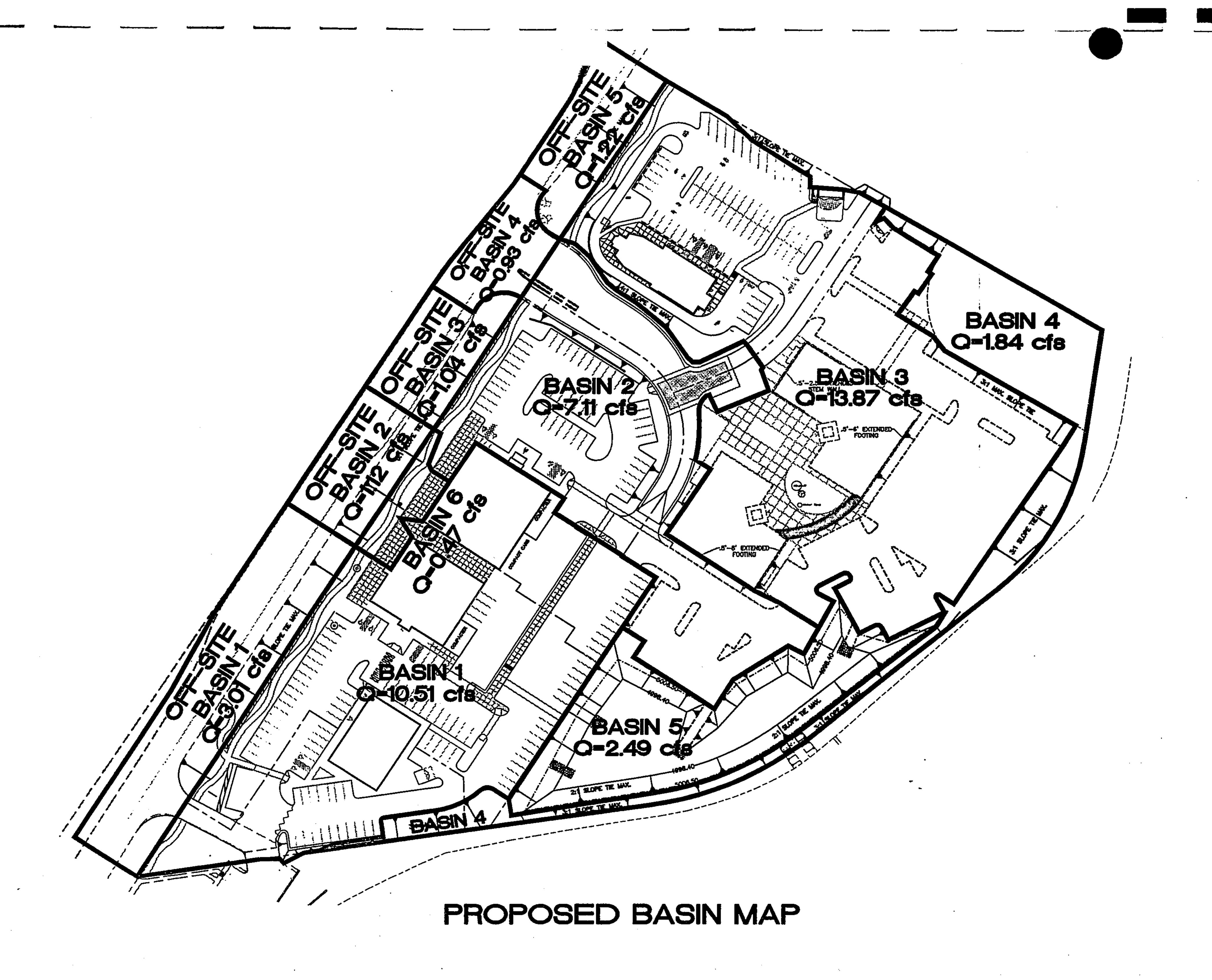
The original detention pond on Tract 14 was required to release only 14 cfs into the canal based on calculations provided in the North Coors Drainage Management Plan (NCDMP) revised September 11, 1992 by Wilson & Co. However, this report will demonstrate that the original drainage solutions changed allowing for a greater discharge rate from Tract 14.

The NCDMP analyzed all of the areas contributing storm runoff to the Corrales Main Canal and assigned developed land treatments of 15% land area "B" and 85% land area "D." Since the report was completed, several of the basins were developed and the individual drainage solutions are different than what was proposed in the North Coors Drainage Management Plan.

According to the NCDMP, Tract 14 falls with in Basin 5.2.1 as well as a portion (approximately one-third) of Basin 4.2.5 as shown on the attached exhibit. Basin 5.2.1 is allowed a discharge rate of 14 cfs while Basin 4.2.5 is allowed a discharge rate of 5 cfs. This combination should allow Tract 14 a combined discharge rate of 15.67 cfs.

Also, the NCDMP shows Basin 6.1.2 and Basin 6.1.3 were allowed to contribute a combined total of 24.7 cfs to the Corrales Main Canal. Basin 6.1.2 was allowed to freely discharge 15.4 cfs directly to the canal while Basin 6.1.3 was allowed to discharge 9 cfs to the canal by way of a detention pond. These basins consist of the Cottonwood Corners commercial center, which was constructed in 1997. According to the approved drainage report completed by Tierra West Development Management Services in January 1996, all of the flows from these basins were captured in a storm sewer and directed to the Calabacillas Arroyo. This would allow for 24.7 cfs assigned to the Corrales Main Canal to be released from another site up stream.





With the assigned discharge of 15.67 cfs for Tract 14 and the 24.7 cfs from Basins 6.1.2 and 6.1.3 Tract 14 should be allowed to discharge 40.37 cfs. A check of the irrigation structure down stream of the site shows there is an additional capacity of 101.33 cfs available, far exceeding the additional 24.7 cfs proposed to pass through the structure. The additional 24.7 cfs only raises the flood elevation six inches.

There is currently an existing 30" RCP stubbed into Tract 14 from the Corrales Main Canal that has capacity for this amount of discharge. The existing canal will not need to be modified in any way to release a higher discharge from Tract 14.

The proposed site is divided into six basins with Basins 1-3 sheet flowing to the new detention pond, which consists of Basin 5. Basin 4 sheet flows into the Corrales Main Canal. A large portion of Basin 4 consists on an archeological site that will be left undisturbed from its present state. Basin 6 is a small Basin along Coors Boulevard that consists of a landscape area that will drain to an area drain and be routed through the storm sewer system to the retention pond. The total developed discharge into the pond from all six basins is 36.29 cfs.

The off-site flows will be collected into one storm sewer pipe and routed to the new detention pond. The new detention pond is sized to contain all of the off-site flows as well as the flows generated on site. The discharge to the Corrales Main Canal will be controlled to release at a rate of approximately 40.31 cfs.

Summary

There are six drainage basins for this tract with the storm runoff being directed to a detention pond on-site. The pond is sized to accept the on-site flows as well as the off-site flows and discharge at a rate of 40.31 cfs into the Corrales Main Canal. Based on the findings of this report

port, and the drainage reports mentioned previously, the pond on Tract 14 should be allowed an increased discharge rate from 14 cfs to 40.37 cfs.

Calculations

The weighted E method from the "City of Albuquerque Development Process Manual Volume 11 – Design Criteria, 1997 Revision" was used to calculate the runoff and volume for the site.

Section II Runoff Calculations

Weigh E Method

Existing O. _..e Basins

	· · · · · · · · · · · · · · · · · · ·						- 					100-Year			10-Year	
Basin	Area	Area	Treat	tment A	Trea	tment B	Treat	ment C	Treat	ment D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
	(sf)	(acres)	%	(acres)	%	(acres)	%	: (acres)	%	(acres)	(ac-ft)	(ac-ft)	cfs	(ac-ft)	(ac-ft)	cfs
Α	80,957	1.86	0%	0	100%	1.86	0%	0.00	0%	0.00	0.670	0.104	3.77	0.220	0.034	1.41
В	108,049	2.48	0%	0	100%	2.48	0%	0.00	0%	0.00	0.670	0.138	5.04	0.220	0.045	1.89
C	172,441	3.96	0%	0	100%	3.96	0%	0.00	0%	0.00	0.670	0.221	8.04	0.220	0.073	3.01
D	64,201	1.47	0%	0	100%		0%	0.00	0%	0.00	0.670	0.082	2.99	0.220	0.027	1.12
Total	425,648	9.77		O		9.77		0.00		0.00		0.546	19.84		0.179	7.43

Existing Off-Site Basins

		· · · · · · · · · · · · · · · · · · ·							,			100-Year		į	10-Year	
Basin	Area (sf)	Area (acres)	Treat %	ment A (acres)	Trea %	tment B (acres)	%	ment C (acres)	%	ment D (acres)	Weighted E (ac-ft)	Volume (ac-ft)	Flow	Weighted E (ac-ft)	Volume (ac-ft)	Flow
1	33,559	0.77	0%	0	20%	0.15	0%	0.00	80%	0.62	1.710	0.110	3.01	1.036	0.067	1.90
2	12,478	0.29	0%	0	20%	0.06	0%	0.00	80%	0.23	1.710	0.041	1.12	1.036	0.025	0.71
3	11,646	0.27	0%	0	20%	0.05	0%	0.00	80%	0.21	1.710	0.038	1.04	1.036	0.023	0.66
4	9,287	0.21	0%	0	0%	0.00	0%	0.00	100%	0.21	1.970	0.035	0.93	1.240	0.022	0.62
5	13,614	0.31	0%	0	20%	0.06	0%	0.00	80%	0.25	1.710	0.045	1.22	1.036	0.027	0.77
Total	80,584	1.85		0		0.33		0.00		1.52		0.268	7.32		0.163	4.65

Developed On-Site Sub-Basins

			<u> </u>		······································		· · · · · · · · · · · · · · · · · · ·	** *** *** *** *** *** *** *** *** ***				100-Year			10-Year	
Basin	Area	Area	Treat	ment A	Trea	tment B	Treat	ment C	Treat	ment D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
	(sf)	(acres)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(ac-ft)	(ac-ft)	cfs	(ac-ft)	(ac-ft)	cfs
1	113,877	2.61	0%	0	15%	0.39	0%	0.00	85%	2.22	1.775	0.387	10.51	1.087	0.237	6.72
2	77,101	1.77	0%	0	15%	0.27	0%	0.00	85%	1.50	1.775	0.262	7.11	1.087	0.160	4.55
3	150,335	3.45	0%	0	15%	0.52	0%	0.00	85%	2.93	1.775	0.510	13.87	1.087	0.313	8.87
4	39,456	0.91	0%	0	100%	0.91	0%	0.00	0%	0.00	0.670	0.051	1.84	0.220	0.017	0.69
5	39,676	0.91	0%	0	70%	0.64	0%	0.00	30%	0.27	1.060	0.080	2.49	0.526	0.040	1.27
6	5,103	0.12	· 0%	0	15%	0.02	0%	0.00	85%	0.10	1.775	0.017	0.47	1.087	0.011	0.30
Total	425,548	9.77		0		2.74		0.00		7.03		1.307	36.29		0.777	22.40

Developed On-Site Sidewalk Culvert Basin

						·			· · · · · · · · · · · · · · · · · · ·			00-Year		n	10-Year	
Basin	Area	Area	Treat	ment A	Treat	lment B	Treatr	nent C	Treat	ment D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
	(sf)	(acres)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(ac-ft)	(ac-ft)	cfs	(ac-ft)	(ac-ft)	cfs
SW	31,330	0.72	0%	0	0%	0.00	0%	0.00			1.970	0.118	3.14	1.240	0.074	2.08

Equations:

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted D * Total Area

Flow = Qa * Aa + Qb * Ab + Qc * Ac + Qd * Ad

Excess Pre	cipitation	, E (inches)								
Zone 1 100-Year 10 - Year										
Ea	0.44	0.08								
Еь	0.67	0.22								
Ec	0.99	0.44								
Εď	1.97	1.24								

Peak Discharge (cfs/acre)											
Zone 1	Zone 1 100-Year										
Qa	1.29	0.24									
Q	2.03	0.76									
ď	2.87	1.49									
Q_d	4.37	2.89									

VOLUME CALCULATIONS

POND

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

Volume = $Ab * D + 0.5 * C * D^2$

C = (At - Ab) / Dt

Ab = 15,208.96

At = 30,100.00

Dt = 8.10

C = 1838.40

ACTUAL	DEPTH	VOLUME	
		VOLUME	Q
ELEV.	(FT)	(AC-FT)	(CFS)
5000.00	0.00	0.00	0.0000
5003.00	3.00	1.0474	21.3924
5004.00	4.00	1.4177	26.2002
5005.00	5.00	1.8302	30.2534
5006.00	6.00	2.2848	33.8243
5007.00	7.00	2.7817	37.0527
5008.10	8.10	3.3770	40.3063

Orifice Equation

Q = CA SQRT(2gH)

C =

0.6

Diameter (in)

24

Area $(ft^2)=$

3.142

g =

32.2

H(Ft) =

Depth of water above center of orifice

Q(CFS)=

Flow

```
TRACT14
        TRACT 14 BLACK RANCH STORM DRAINAGE ANALYSIS
              FOR ON-SITE DETENTION POND
           PROPOSED CONDITIONS (100-YEAR STORM)
START
               TIME=0.0 HR
RAINFALL
            -- TYPE=1 RAIN QUARTER=0.0 IN
               RAIN ONE=1.87 IN RAIN SIX=2.20 IN
               RAIN DAY=0.00 IN DT=0.05 HR
DEVELOPED CONDITION
************************
*
COMPUTE LT TP
               LCODE=1 NK=0 ISLOPE=-1
               LENGTH=750 FT SLOPE=0.015
                                          K = 2.0
               KN=0.033 CENTROID RATIO=0.50
COMPUTE NM HYD
               ID=2 HYD NO=102 AREA=0.005359 SQ MI
              PER A=0 PER B=15.00 PER C=0.00 PER D=85.00
               TP=0 HR MASS RAINFALL=-1
PRINT HYD
               ID=2 CODE=1
*************BASIN 4C ALAMEDA WEST*********************
COMPUTE LT TP
               LCODE=1 NK=0 ISLOPE=-1
               LENGTH=950 FT
                              SLOPE=0.013
                                          K=1.0
               KN=0.033 CENTROID RATIO=0.50
COMPUTE NM HYD
               ID=3 HYD NO=103 AREA=0.005359 SQ MI
               PER A=0 PER B=15.00 PER C=0.00 PER D=85.00
               TP=0 HR MASS RAINFALL=-1
PRINT HYD
               ID=3 CODE=1
COMPUTE LT TP
               LCODE=1
                       NK=0 ISLOPE=-1
               LENGTH=385ft
                             SLOPE=0.028
                                          K=3.0
               KN=0.021 CENTROID RATIO=0.50
COMPUTE NM HYD
               ID=4 HYD NO=104 AREA=0.001016 SQ MI
               PER A=0 PER B=5.00 PER C=0.00 PER D=95.00
              TP=0 HR MASS RAINFALL=-1
PRINT HYD
              ID=4 CODE=1
*
COMPUTE LT TP
               LCODE=1
                       NK=0
                             ISLOPE=-1
               LENGTH=1070 FT
                             SLOPE=0.007
                                         K = 3.0
              KN=0.021 CENTROID RATIO=0.50
COMPUTE NM HYD
              ID=5 HYD NO=105 AREA=0.005531 SQ MI
              PER A=0 PER B=5.00 PER C=0.00 PER D=95.00
              TP=0 HR MASS RAINFALL=-1
PRINT HYD
              ID=5 CODE=1
COMPUTE LT TP
               LCODE=1
                             ISLOPE=-1
                       NK=0
              LENGTH=1220 FT
                             SLOPE=0.016
                                         K = 3.0
              KN = 0.021
                      CENTROID RATIO=0.50
```

ID=6 HYD NO=106 AREA=0.012547 SQ MI

Page 1

COMPUTE NM HYD

```
TRACT14
                  PER A=0 PER B=5.00 PER C=0.00 PER D=95.00
                  TP=0 HR MASS RAINFALL=-1
 PRINT HYD
                  ID=6 CODE=1
 COMPUTE LT TP
                  LCODE=1
                            NK=0
                                   ISLOPE=-1
                  LENGTH=850 FT
                                   SLOPE=0.012
                                                K = 3.0
                       KN = 0.021
                                   CENTROID RATIO=0.50
 COMPUTE NM HYD
                      HYD NO=107 AREA=0.012375 SQ MI
                  ID=7
                 PER A=0 PER B=5.00 PER C=0.00 PER D=95.00
                 TP=0 HR MASS RAINFALL=-1
 PRINT HYD
                       CODE=1
                  ID=7
*************BASIN 4I ALAMEDA WEST*********************
COMPUTE LT TP
                 LCODE=1 NK=0 ISLOPE=-1
                 LENGTH=280 FT
                                  SLOPE=0.024
                                                K=0.7
                      KN=0.025 CENTROID RATIO=0.50
COMPUTE NM HYD
                 ID=8 HYD NO=108 AREA=0.001313 SQ MI
                 PER A=0 PER B=100.00 PER C=0.00 PER D=0.00
                 TP=0 HR MASS RAINFALL=-1
PRINT HYD
                 ID=8 CODE=1
COMPUTE LT TP
                 LCODE=1 NK=0
                                 ISLOPE=-1
                 LENGTH=320 FT
                                  SLOPE=0.018
                                               K=2.0
                      KN=0.025 CENTROID RATIO=0.50
COMPUTE NM HYD
                 ID=9 HYD NO=109 AREA=0.000938 SQ MI
                 PER A=0 PER B=46.00 PER C=0.00 PER D=54.00
                 TP=0 HR MASS RAINFALL=-1
PRINT HYD
                 ID=9 CODE=1
COMPUTE LT TP
                 LCODE=1 NK=0
                                  ISLOPE=-1
                 LENGTH=500 FT
                                  SLOPE=0.028
                                                K=2.0
                      KN=0.025 CENTROID RATIO=0.50
COMPUTE NM HYD
                 ID=10 HYD NO=110 AREA=0.002422 SQ MI
                 PER A=0 PER B=46.00 PER C=0.00 PER D=54.00
                 TP=0 HR MASS RAINFALL=-1
PRINT HYD
                 ID=10 CODE=1
*************ADD HYDROGRAPHS FOR 4B AND 4E***************
ADD HYD
                 ID=11 HYD=301 ID=2 ID=4
PRINT HYD
                       ID=11 CODE=1
*************ROUTE 301 THROUGH PIPE********************
COMPUTE RATING CURVE CID=1 VS NO=101 CODE=-1 SLP=0.005
                       DIA=1.5 FT N=0.013
-
COMPUTE TRAVEL TIME
                 ID=12 REACH=1 NO VS=1 L=755 SLP=0.005
ROUTE
                            HYD NO=302 INFLOW ID=11
                       ID=12
                                                   DT=0.0333
PRINT HYD
                       ID=12 CODE=1
*************ADD HYDROGRAPHS FOR 302 AND 4G**************
```

```
TRACT14
                         HYD=303 ID=12 ID=6
ADD HYD
                   ID=13
                   ID=13
PRINT HYD
                         CODE=1
**********POND 5 ROUTING********************
                   ID=14 HYD NO=304 INFLOW ID=13 CODE=6
ROUTE RESERVOIR
                   OUTFLOW(CFS)
                                     STORAGE(AC-FT) ELEVATION(FT)
                       0.00
                                         0.000
                                                        5024.30
                        1.05
                                         0.100
                                                        5025.00
                       2.03
                                         0.301
                                                        5026.00
                       2.67
                                         0.648
                                                        5027.00
                        3.19
                                         1.016
                                                        5028.00
                        3.87
                                         1.690
                                                        5029.60
                   ID=14 CODE=1
PRINT HYD
************ROUTE 4C THROUGH 4F*********************
*
COMPUTE RATING CURVE CID=1 VS NO=101 NO SEGS=1
                          MIN ELEV=5031.0 MAX ELEV=5031.63
                          CH SLP=0.005 FP SLP=0.005 N=0.015
                          DIST=65
                          DIST
                                       ELEV
                                       5031.63
                          32.5
                                       5031.00
                          65.0
                                       5031.63
삵
COMPUTE TRAVEL TIME ID=15
                           REACH=4 NO VS=1 L=870 SLP=0.005
ROUTE
                                 HYD NO=401 INFLOW ID=3 DT=0.0
                          ID=15
PRINT HYD
                          ID=15
                                CODE=1
*************ADD HYDROGAPHS FOR 401 AND 4F**************
ADD HYD
                  ID=16 HYD=402 ID=15 ID=5
PRINT HYD
                          ID=16 CODE=1
**************ROUTE 402 THROUGH PIPE******************
*
COMPUTE RATING CURVE CID=1 VS NO=101 CODE=-1 SLP=0.005
                          DIA=2.25 FT N=0.013
*
COMPUTE TRAVEL TIME ID=17 REACH=5 NO VS=1 L=593 SLP=0.005
                    ID=17 HYD NO=403 INFLOW ID=16 DT=0.0
ROUTE
PRINT HYD
                    ID=17 CODE=1
*THIS IS WHERE BASIN 4H IS ROUTED THROUGH THE PARKING POND***
*BEFORE IT IS COMBINED WITH THE FLOWS FROM 4C AND 4F*******
*************PARKING LOT POND ROUTING*****************
*
                   ID=18 HYD NO=501 INFLOW ID=7 CODE=4
ROUTE RESERVOIR
                   OUTFLOW(CFS)
                                     STORAGE (AC-FT)
                                                     ELEVATION(FT)
                       0.00
                                        0.00000
                                                         5028.00
                       4.70
                                        0.07202
                                                         5028.50
                       18.0
                                        0.43354
                                                         5029.00
                       37.0
                                        1.04375
                                                         5029.60
**
*PRINT HYD
                  ID=18
                         CODE=1
```

Page 3

TRACT14

```
*************ADD HYDROGRAPHS FOR PARKING POND AND 403********
                 ID=19 HYD=601 ID=17 ID=18
ADD HYD
                 ID=19 CODE=1
PRINT HYD
*************ADD HYDROGRAPHS FOR 4I AND 601**************
              -- ID=20 HYD=701 ID=8 ID=19
ADD HYD
PRINT HYD
                        ID=20 CODE=1
************ADD HYDROGRAPHS FOR 304 AND 701************
                 ID=21 HYD=801 ID=14 ID=20
ADD HYD
PRINT HYD
                 ID=21 CODE=1
*THIS MARKS THE END OF THE ALAMEDA WEST FLOWS THAT CONTRIBUTE
*TO THE DETENTION POND IN TRACT 14***************
********BEGINNING OF QUESTA DEL RIO HYDROLOGY*********
**********OUESTA DEL RIO*********************
                 ID=22 HYD NO=111 AREA=0.015627 SQ MI
COMPUTE NM HYD
                  PER A=0 PER B=19.00 PER C=12.00 PER D=69.00
                  TP=0.13333 HR MASS RAINFALL=-1
PRINT HYD
                  ID=22 CODE=1
*FROM SEVEN BAR/COORS INTERSECTION TO 1520' WEST OF COORS CL
                  ID=23 HYD NO=112 AREA=0.004828 SQ MI
COMPUTE NM HYD
                  PER A=0 PER B=8.00 PER C=0.00 PER D=92.00
                  TP=0.13333 HR MASS RAINFALL=-1
PRINT HYD
                 ID=23 CODE=1
*********COTTONWOOD MALL BASINS D-1, D-2, D-3**********
                 ID=24 HYD NO=113 AREA=0.004300 SQ MI
COMPUTE NM HYD
                  PER A=0 PER B=15.00 PER C=0.00 PER D=85.00
                 TP=0.13333 HR MASS RAINFALL=-1
PRINT HYD
                  ID=24 CODE=1
*************FLOWS CONVEYED BY MALL TO QUESTA DEL RIO********
                 ID=25 HYD NO=114 AREA=0.000203 SQ MI
COMPUTE NM HYD
                 PER A=0 PER B=15.00 PER C=0.00 PER D=85.00
                  TP=0.13333 HR MASS RAINFALL=-1
PRINT HYD
                  ID=25 CODE=1
*************ADD AUTO CENTER AND SEVEN BAR FLOWS**********
                 ID=26 HYD=201 ID=24 ID=23
ADD HYD
                        ID=26 CODE=1
PRINT HYD
**************ADD FLOWS FROM MALL TO SEVEN BAR FLOWS*********
\ddot{x}
                 ID=27 HYD=202 ID=25 ID=26
ADD HYD
                                   Page 4
```

TRACT14

```
J.
PRINT HYD
                         ID=17
                                CODE=1
***ROUTE 202 THROUGH STORM DRAIN TO 60" RCP UNDER COORS*****
COMPUTE RATING CURVE CID=1 VS NO=101 CODE=-1 SLP=0.010
                         DIA=2.0 FT N=0.013
J.
                          REACH=2 NO VS=1 L=38- SLP=0.10
                   ID=28
ROUTE
                               HYD NO=203 INFLOW ID=27 DT=0.0333
PRINT HYD
                         ID=28
                               CODE=1
*************ADD SD FLOWS (203) TO QUESTA DEL RIO**********
*
ADD HYD
                 ID=29 HYD=204 ID=28 ID=22
PRINT HYD
                         ID=29 CODE=1
COMPUTE NM HYD
                  ID=30 HYD NO=115 AREA=0.002266 SQ MI
                  PER A=0 PER B=26.00 PER C=0.00 PER D=74.00
                  TP=0.13333 HR MASS RAINFALL=-1
PRINT HYD
                  ID=30 CODE=1
*****ADD STREET FLOWS FROM COORS TO FLOWS ENTERING 60" SD****
                 ID=31 HYD=205 ID=30 ID=29
ADD HYD
PRINT HYD
                         ID=31 CODE=1
*****THIS IS THE EXTENT OF THE FLOWS GENERATED BY LANDS*****
******SURROUNDING QUESTA DEL RIO*******************
*************ADD QUESTA DEL RIO AND ALEMEDA WEST FLOWS*******
*
                 ID=32 HYD=206 ID=31 ID=21
ADD HYD
PRINT HYD
                         ID=32 CODE=1
************PROPOSED TRACT 14 FLOW********************
COMPUTE LT TP
                  LCODE=1
                                    ISLOPE=-1
                          NK=0
                  LENGTH=180ft SLOPE=0.010 K=2.0
                  KN=0.033 CENTROID RATIO=0.50
COMPUTE NM HYD
                  ID=33 HYD NO=207 AREA=0.015375 SQ MI
                  PER A=0 PER B=15.00 PER C=0.00 PER D=85.00
                  TP=0 HR MASS RAINFALL=-1
PRINT HYD
                  ID=33 CODE=1
*************ADD TRACT 14 FLOWS TO OFF SITE FLOWS**********
ADD HYD
                  ID=34 HYD=208 ID=33 ID=32
PRINT HYD
                  ID=34 CODE=1
*************POND 3 (TRACT 14)**********************
*
ROUTE RESERVOIR
                  ID=35 HYD NO=1 INFLOW ID=34 CODE=6
                  OUTFLOW(CFS)
                                   STORAGE(AC-FT) ELEVATION(FT)
                      0.00
                                       0.00
                                                    5000.00
                                    Page 5
```

	TRACT14	
21.3924	1.0474	5003.00
26.2002	1.4177	5004.00
30.2534	1.8302	5005.00
33.8243	2.2848	5006.00
37.0527	2.7817	5007.00
40.3063	3.3770	5008.10

PRINT HYD

*

*

*

*

*

FINISH

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - INPUT FILE = C:\AHYMOW~1\TRACT14.txt

FINISH

- VERSION: 1997.02d RUN DATE (MON/DAY/YR) =06/13/2003

USER NO. = AHYMO-S-9702dlTierraW-AH

	HYDROGRAPH	FROM ID	TO ID	AREA	PEAK DISCHARGE	RUNOFF VOLUME	RUNOFF	TIME TO PEAK	CFS PER	PAGE =	= 1
COMMAND	IDENTIFICATION	NO.	NO.	(SQ MI)	(CFS)	(AC-FT)	(INCHES)	(HOURS)	ACRE	NOTATI	ON
START									${f T}$	IME=	.00
RAINFALL TYPE	⊆ = 1								: R	AIN6=	2.200
COMPUTE NM HYI	102.00	_	2	.00536	13.58	.507	1.77241	1.500	3.958 P	ER IMP=	85.00
COMPUTE NM HYI	103.00	_	3	.00536	13.58	.507	1.77241	1.500	3.958 P	ER IMP=	85.00
COMPUTE NM HYI	104.00	-	4	.00102	2.73	.103	1.90254	1.500	4.205 P	ER IMP=	95.00
COMPUTE NM HY	105.00	_	5	.00553	14.82	.561	1.90254	1.500	4.186 P	ER IMP=	95.00
COMPUTE NM HYD	106.00		6	.01255	33.60	1.273	1.90254	1.500	4.184 P	ER IMP=	95.00
COMPUTE NM HYI	107.00	_	7	.01238	33.14	1.256	1.90254	1.500		ER IMP=	95.00
COMPUTE NM HYL	108.00	_	8	.00131	1.70	.047	.66636	1.500	2.022 P	ER IMP=	.00
COMPUTE NM HYI	109.00	_	9	.00094	1.96	.068	1.36903	1.500	3.270 P	ER IMP=	54.00
COMPUTE NM HYD	110.00	· -	10	.00242	5.05	.177	1.36903	1.500		ER IMP=	54.00
ADD HYD	301.00	2& 4	11	.00638	16.31	.610	1.79306	1.500	3.998		
ROUTE	302.00	11	12	.00638	14.82	.610	1.79311	1.532	3.632		
ADD HYD	303.00	12& 6	13	.01892	47.34	1.883	1.86561	1.499	3.909		
ROUTE RESERVOI	R 304.00	13	14	.01892	3.65	1.883	1.86559	2.264	.301 A	C-FT=	1.468
ROUTE	401.00	3	15	.00536	10.40	.507	1.77251	1.550	3.032		
ADD HYD	402.00	15& 5	16	.01089	23.55	1.068	1.83845	1.500	3.379		
ROUTE	403.00	16	17	.01089	23.30	1.068	1.83852	1.550	3.343		
ROUTE RESERVOI	R 501.00	7	18	.01238	16.71	1.256	1.90251	1.650	2.110 A	C-FT=	.398
ADD HYD	601.00	17&18	19	.02327	37.90	2.323	1.87251	1.550	2.546	•	
ADD HYD	701.00	8&19	20	.02458	39.51	2.370	1.80807	1.550	2.512		
ADD HYD	801.00	14&20	21	.04350	42.14	4.253	1.83306	1.565	1.514		
COMPUTE NM HYD	111.00	_	22	.01563	36.93	1.333	1.59944	1.500	3.692 P	ER IMP=	69.00
COMPUTE NM HYD	112.00	_	23	.00483	12.73	.480	1.86350	1.500	4.119 P		92.00
COMPUTE NM HYD	113.00	-	24	.00430	10.90	.406	1.77241	1.500	3.959 P		85.00
COMPUTE NM HYD	114.00	_	25	.00020	.53	.019	1.77241	1.500	4.056 P		85.00
ADD HYD	201.00	24&23	26	.00913	23.62	.886	1.82053	1.500	4.044		
ADD HYD	202.00	25&26	27	.00933	24.15	.905	1.81946	1.500	4.044		
ROUTE	203.00	27	28	.00933	23.99	. 905	1.81949	1.499	4.016		
ADD HYD	204.00	28&22	29	.02496	60.77	2.238	1.68167	1.499	3.805		
COMPUTE NM HYD	115.00	_	30	.00227	5.38	.197	1.62928	1.500	3.713 P	ER IMP=	74.00
ADD HYD	205.00	30&29	31	.02722	66.14	2.435	1.67729	1.499	3.796		
ADD HYD	206.00	31&21	32	.07072	103.59	6.688	1.77310	1.499	2.289		
COMPUTE NM HYD	207.00	_	33	.01538	38.92	1.453	1.77242	1.500	3.955 PI	IR IMP=	85.00
ADD HYD	208.00	33&32	34	.08610	142.37	8.141	1.77297	1.499	2.584		00
ROUTE RESERVOI	R 1.00	34	35	.08610	40.05	8.141	1.77297	2.098	.727 A	C-FT=	3.330

Channel Inlet Capacity

Weir Equation:

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

Q = FlowC = 2.95

L= Length of weir

H = Height of Weir

Irrigation Structure (Corrales Main Canal)

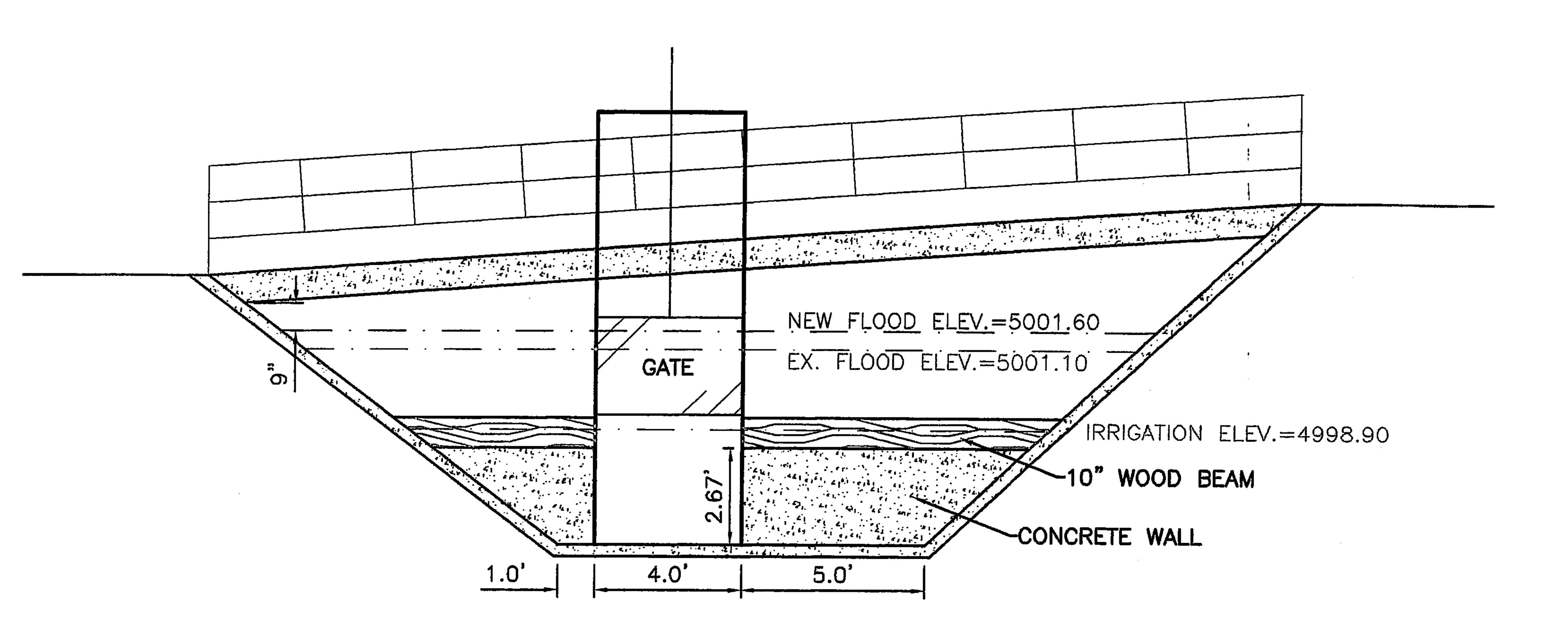
$$Q = 2.95 * 24 * 1.27^{3/2}$$

Q = 101.33 cfs 101.33 cfs > 24.70 cfs Structure has capacity

Emergency Overflow

$$Q = 2.95*100*1.0^{3/2}$$

Q = 295.00 cfs 295.00 cfs > 284.74 cfs Overflow has capacity



CHECK STRUCTURE CAPACITY ANALYSIS

SCALE: NTS

Channel Capacity

	Top Width	Bottom Width	Depth	Area	WP	R	Slope	Q Provided	Q Required	Velocity
	(ft)	(ft)	(ft)	(ft^2)	(ft)		(%)	(cfs)	(cfs)	(ft/s)
Basin 1	4	4	0.5	2.00	5.00	0.4000	50	88.00	13.52	6.76
Basin 2	10	10	0.5	5.00	11.00	0.4545	15	131.21	9.08	1.82
Basin 3	4	4	0.5	2.00	5.00	0.4000	50	88.00	15.09	7.55

Manning's Equation:

 $Q = 1.49/n * A * R^{2/3} * S^{1/2}$

A = Area

R = D/4

S = Slope

n = 0.013

Pipe Capacity

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
1	48	1.28	12.57	1.000	162.95	103.59	8.24
2	18	2	1.77	0.375	14.90	13.52	7.65

Manning's Equation:

 $Q = 1.49/n * A * R^{2/3} * S^{1/2}$

A = Area

R = D/4

S = Slope

n = 0.013

Drop Inlet Calculations

Basin	TYPE OF INLET	AREA (SF)	Q (CFS)	H (FT)	H ALLOW (FT)
1	Single D	4.21	13.52	0.4459	0.67
2	Single C	4.36	9.08	0.1871	0.67
3	Single C	4.36	15.09	0.5167	0.67
6	Grate	0.81	1.59	0.1652	0.92

ORIFICE EQUATION

Q = CA sqrt(2gH)

C =

0.6

g =

32.2

STORM DRAIN INLET EFFECTIVE AREA ASSUMING A 50% CLOGGING FACTOR

DOUBLE D:

Area at the grate:

L =
$$76.75$$
" - 14 (1/2" _{middle bars}) - 6" _{center piece}
= 63.75 "
= 5.3125 '

W =
$$25.5$$
" - $13 (1/2 _{middle bars})$
= 19 "
= 1.583 '

Area =
$$1.583' \times 5.3125'$$

= 8.410 ft^2

Effective Area =
$$8.410 - .5 (8.410)$$

= 4.205 ft^2

Single 'C" Drop Inlet EFFECTIVE AREA

Area at the grate:

W =
$$25.5$$
" - $13(2@_{middle\ bars})$
= 19 "
= 1.583 '

Area =
$$1.583' \times 2.906'$$

= 4.601 ft^2

Effective Area: =
$$4.601$$
- 4.601 (0.5 _{clogging factor}) = 2.30 ft² at the grate

Area at the throat:

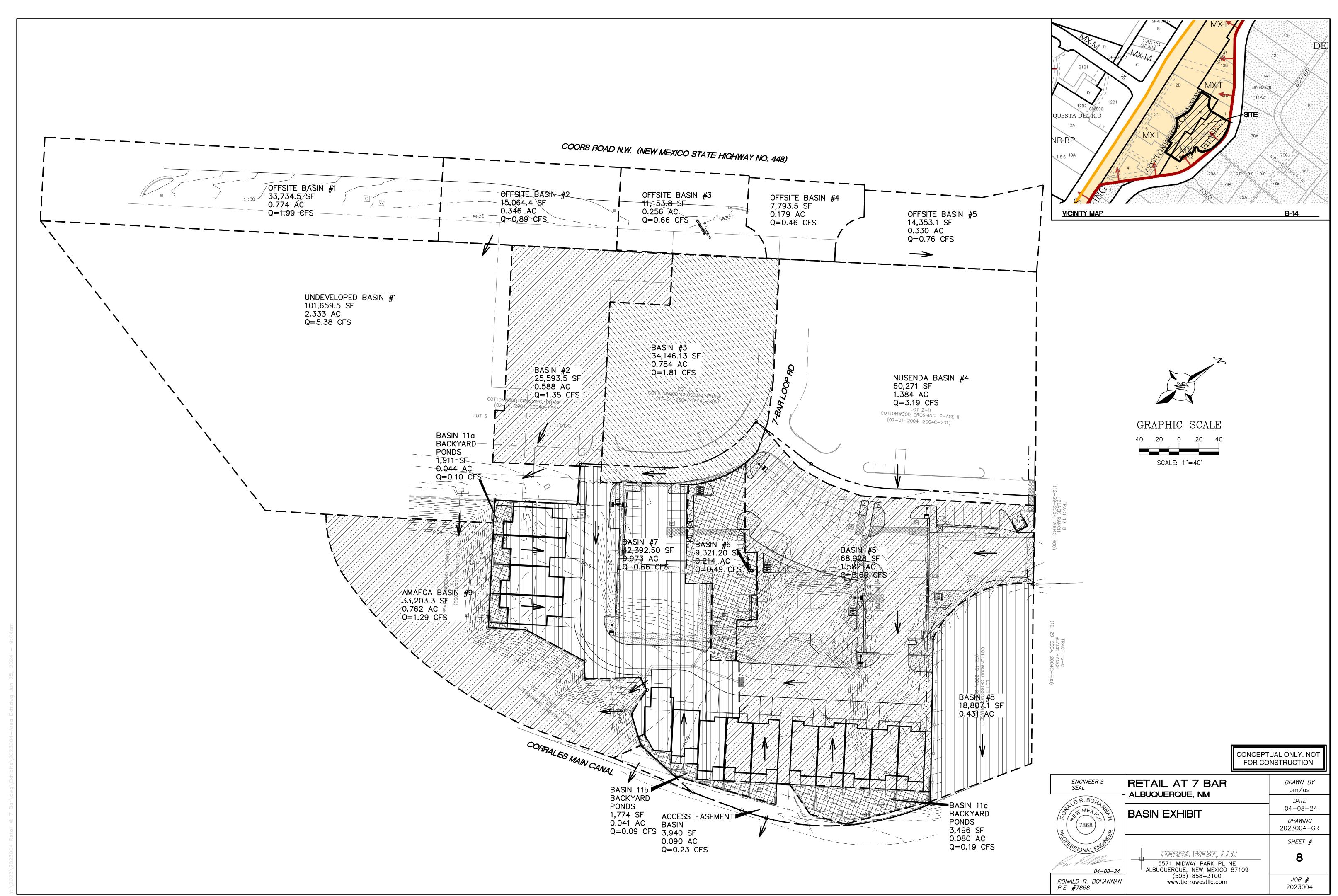
Area =
$$3.95' \times 0.5208'$$

= 2.06 ft^2 at the throat

Total Area:

Area =
$$2.30_{grate}$$
 + 2.06_{throat}
= 4.36 ft^2

APPENDIX B



APPENDIX C

DPM Weighted E Method

Precipitation Zone 1 COORS BLVD NW RETAIL @ 7BAR

TWLLC Date: 06/17/2024
Reference Document DPM Version XX dated 09/2020

Existing Contributing Off-Site Basins

Basin Descriptions Basin Descriptions											100-Year, 6-Hr			10-Year, 6-Hr				
Basin	Descriptor	Area	Area	Area	Treat	ment A	Treat	ment B	Treat	ment C	Trea	tment D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
ID		(sf)	(acres)	(sq miles)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(in)	(ac-ft)	cfs	(in)	(ac-ft)	cfs
OFF-SITE BASIN #1	Coors Blvd	33,734.50	0.774	0.00121	0%	0.000	0%	0.000	0%	0.000	100%	0.774	2.240	0.145	3.19	1.430	0.092	1.99
OFF-SITE BASIN #2	Coors Blvd	15,064.40	0.346	0.00054	0%	0.000	0%	0.000	0%	0.000	100%	0.346	2.240	0.065	1.42	1.430	0.041	0.89
OFF-SITE BASIN #3	Coors Blvd	11,158.80	0.256	0.00040	0%	0.000	0%	0.000	0%	0.000	100%	0.256	2.240	0.048	1.06	1.430	0.031	0.66
OFF-SITE BASIN #4	Coors Blvd	7,793.50	0.179	0.00028	0%	0.000	0%	0.000	0%	0.000	100%	0.179	2.240	0.033	0.74	1.430	0.021	0.46
Total		67,751.20	1.555	0.00243		0.000		0.000		0.000		1.555	V ₃₆₀ =	0.290	6.41		0.185	4.00

Proposed Conditions - Updated Major Site Plan - Contributing

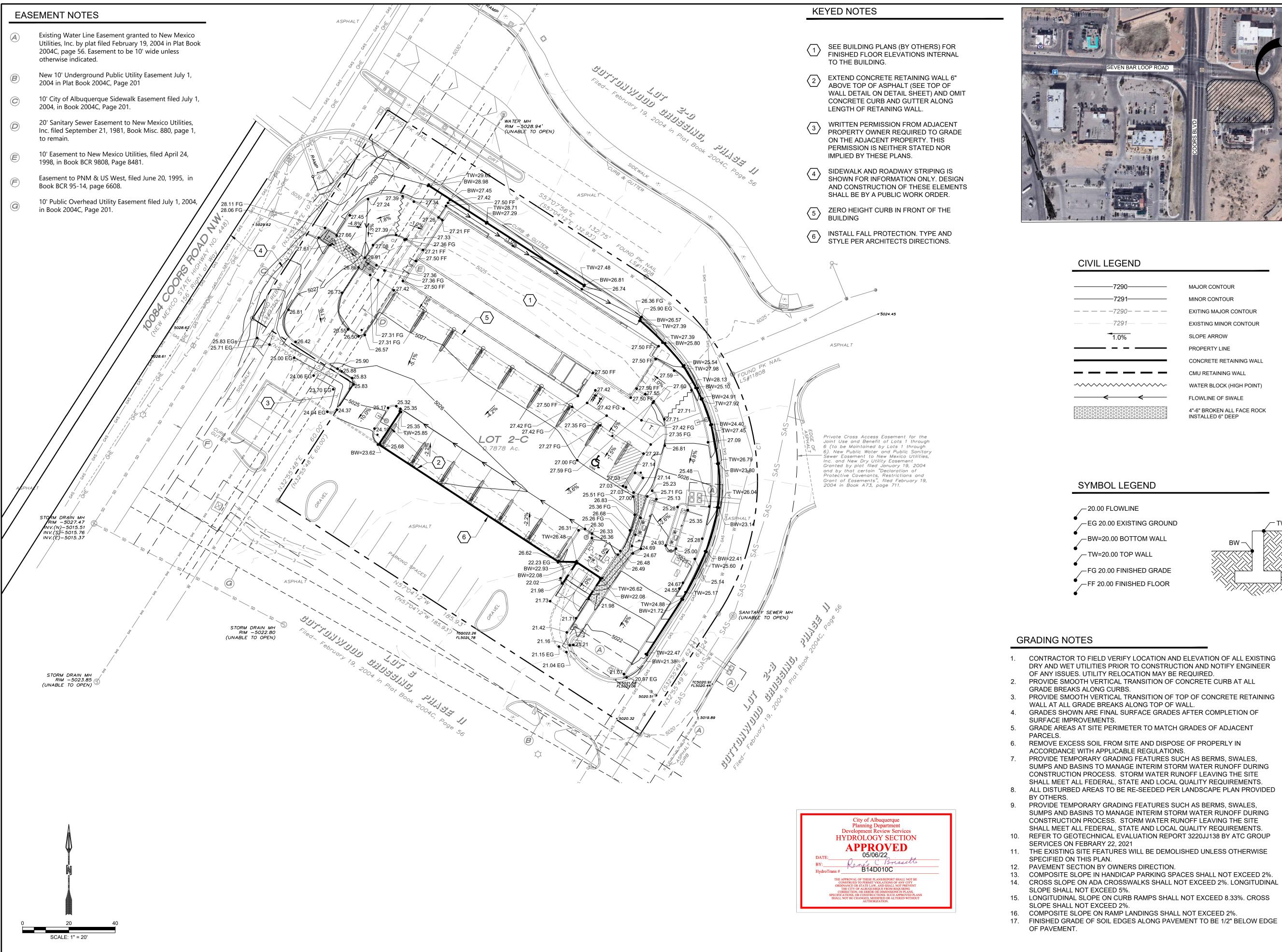
	Basin Descriptions												100-Year, 6-Hr			10-Year, 6-Hr		
Basin	Descriptor	Area	Area	Area	Treat	ment A	Treati	nent B	Treat	ment C	Trea	tment D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
ID		(sf)	(acres)	(sq miles)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(in)	(ac-ft)	cfs	(in)	(ac-ft)	cfs
BASIN #1	Undeveloped	101,659.50	2.334	0.00365	0%	0.000	15%	0.350	0%	0.000	85%	1.984	2.014	0.392	8.93	1.255	0.244	5.38
BASIN #2	Popeyes	25,593.50	0.588	0.00092	0%	0.000	15%	0.088	0%	0.000	85%	0.499	2.014	0.099	2.25	1.255	0.061	1.35
BASIN #3	Take 5	34,146.13	0.784	0.00122	0%	0.000	15%	0.118	0%	0.000	85%	0.666	2.014	0.132	3.00	1.255	0.082	1.81
BASIN #4	Nusenda	60,271.00	1.384	0.00216	0%	0.000	15%	0.208	0%	0.000	85%	1.176	2.014	0.232	5.29	1.255	0.145	3.19
BASIN #5	7 Bar - B, C, TH 8-14	68,928.00	1.582	0.00247	0%	0.000	15%	0.237	0%	0.000	85%	1.345	2.014	0.266	6.05	1.255	0.165	3.65
BASIN #6	7 Bar - Upper Inlet	9,321.20	0.214	0.00033	0%	0.000	15%	0.032	0%	0.000	85%	0.182	2.014	0.036	0.82	1.255	0.022	0.49
BASIN #7	Building A, TH 1-7	12,392.50	0.284	0.00044	0%	0.000	15%	0.043	0%	0.000	85%	0.242	2.014	0.048	1.09	1.255	0.030	0.66
BASIN #9	AMAFCA Pond	33,203.30	0.762	0.00119	0%	0.000	50%	0.381	0%	0.000	50%	0.381	1.485	0.094	2.39	0.845	0.054	1.29
Total		345,515.13	7.932	0.01239		0.000		1.457		0.000		6.475	V ₃₆₀ =	1.297	29.82		0.803	17.82

Non-contributing Basins (Sheet flow to Corrales Main Canal or Retained On-Site)

	Basin Descriptions											100-Year, 6-Hr			10-Year, 6-Hr			
Basin	Descriptor	Area	Area	Area	Treat	ment A	Treatr	nent B	Treati	ment C	Trea	tment D	Weighted E	Volume	Flow	Weighted E	Volume	Flow
ID		(sf)	(acres)	(sq miles)	%	(acres)	%	(acres)	%	(acres)	%	(acres)	(in)	(ac-ft)	cfs	(in)	(ac-ft)	cfs
OFF-SITE BASIN #5	Coors Blvd	14,353.10	0.330	0.00051	0%	0.000	0%	0.000	0%	0.000	100%	0.330	2.240	0.062	1.36	1.430	0.039	0.85
BASIN #8	NR-PO-B	18,807.10	0.432	0.00067	0%	0.000	100%	0.432	0%	0.000	0%	0.000	0.730	0.026	0.93	0.260	0.009	0.35
Access Easement Basins	Access Easement Basins	3,940.00	0.090	0.00014	0%	0.000	0%	0.000	100%	0.090	0%	0.000	0.950	0.007	0.26	0.430	0.003	0.13
Basin #11	TH Backyards	7,181.00	0.165	0.00026	0%	0.000	100%	0.165	0%	0.000	0%	0.000	0.730	0.010	0.36	0.260	0.004	0.13
Total		44,281.20	1.017	0.00159		0.000		0.597		0.090		0.330	V ₃₆₀ =	0.105	2.91		0.055	1.46

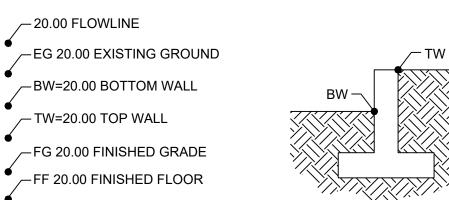
APPENDIX D

APPENDIX E





7290	MAJOR CONTOUR
7291	MINOR CONTOUR
— — — — — — — — — — — — — — — — — — —	EXITING MAJOR CONTOUR
— — —7291— —	EXISTING MINOR CONTOUR
1.0%	SLOPE ARROW
	PROPERTY LINE
	CONCRETE RETAINING WALL
	CMU RETAINING WALL
	WATER BLOCK (HIGH POINT)
	FLOWLINE OF SWALE
	4"-6" BROKEN ALL FACE ROCK INSTALLED 6" DEEP



- CONTRACTOR TO FIELD VERIFY LOCATION AND ELEVATION OF ALL EXISTING DRY AND WET UTILITIES PRIOR TO CONSTRUCTION AND NOTIFY ENGINEER
- PROVIDE SMOOTH VERTICAL TRANSITION OF CONCRETE CURB AT ALL
- PROVIDE SMOOTH VERTICAL TRANSITION OF TOP OF CONCRETE RETAINING
- GRADES SHOWN ARE FINAL SURFACE GRADES AFTER COMPLETION OF

- REMOVE EXCESS SOIL FROM SITE AND DISPOSE OF PROPERLY IN
- SUMPS AND BASINS TO MANAGE INTERIM STORM WATER RUNOFF DURING CONSTRUCTION PROCESS. STORM WATER RUNOFF LEAVING THE SITE SHALL MEET ALL FEDERAL, STATE AND LOCAL QUALITY REQUIREMENTS.
- ALL DISTURBED AREAS TO BE RE-SEEDED PER LANDSCAPE PLAN PROVIDED
- PROVIDE TEMPORARY GRADING FEATURES SUCH AS BERMS, SWALES, SUMPS AND BASINS TO MANAGE INTERIM STORM WATER RUNOFF DURING CONSTRUCTION PROCESS. STORM WATER RUNOFF LEAVING THE SITE
- 10. REFER TO GEOTECHNICAL EVALUATION REPORT 3220JJ138 BY ATC GROUP
- 13. COMPOSITE SLOPE IN HANDICAP PARKING SPACES SHALL NOT EXCEED 2%.
- 15. LONGITUDINAL SLOPE ON CURB RAMPS SHALL NOT EXCEED 8.33%. CROSS
- COMPOSITE SLOPE ON RAMP LANDINGS SHALL NOT EXCEED 2%.
- 17. FINISHED GRADE OF SOIL EDGES ALONG PAVEMENT TO BE 1/2" BELOW EDGE

C-101

SHEET NUMBER:

-DING

BUIL

REVISION

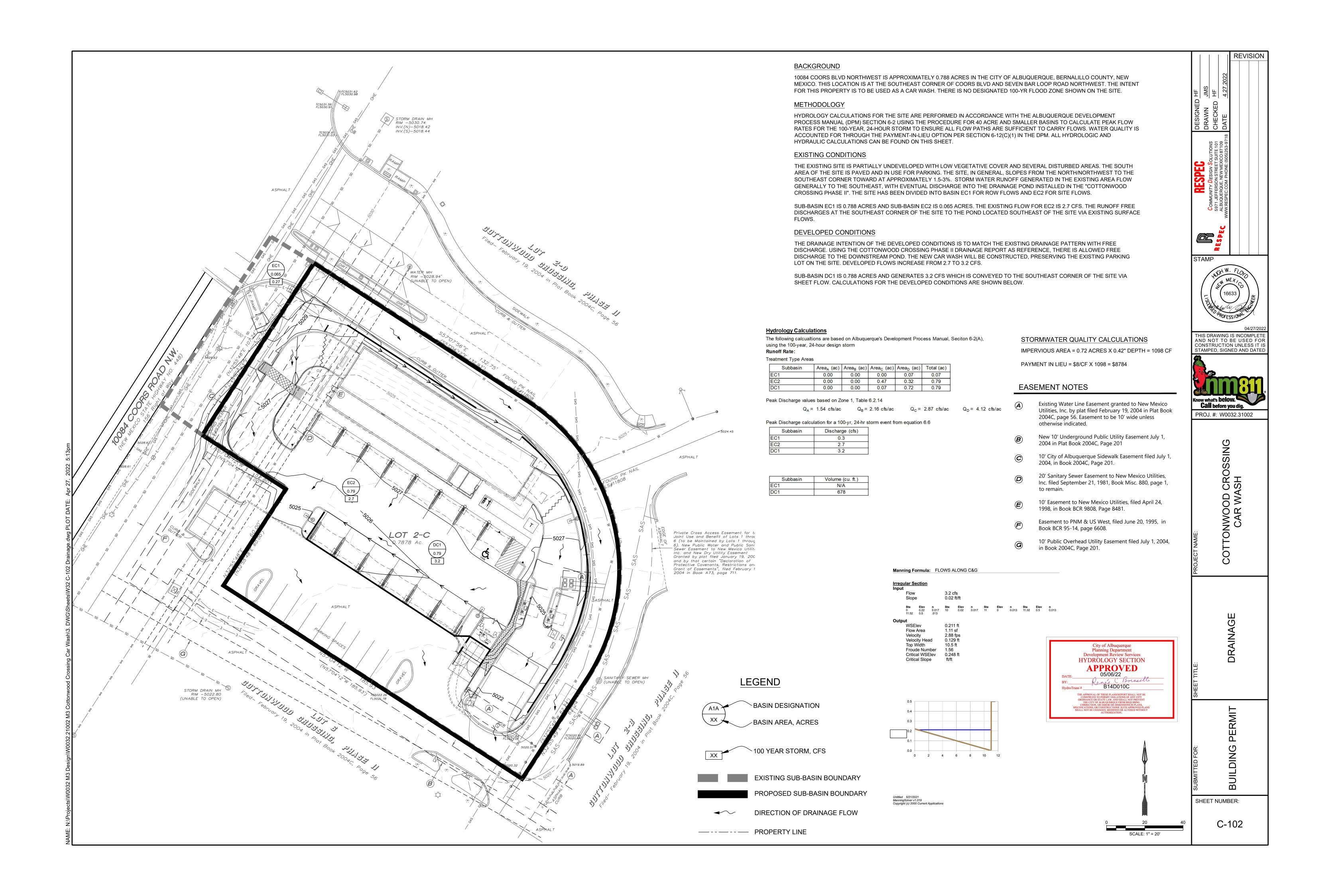
STAMP

THIS DRAWING IS INCOMPLETE AND NOT TO BE USED FOR CONSTRUCTION UNLESS IT IS

STAMPED, SIGNED AND DATED

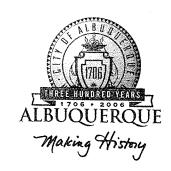
Call before you dig.

PROJ. #: W0032.31002



APPENDIX F

CITY OF ALBUQUERQUE



October 21, 2005

Mr. Ronald Bohannan, PE TIERRA WEST, LLC 8509 Jefferson St. NE Albuquerque, NM 87113

Re:

POPEYE'S CHICKEN 10074 Coors Blvd. NW

Phyllis Villanueva

File

Approval of Permanent Certificate of Occupancy (C.O.)

Engineer's Stamp dated 06/21/2005 (B-14/D10)

Certification dated 10/21/2005

Dear Ron:

C:

P.O. Box 1293

Based upon the information provided in your submittal received 10/21/2005, the above referenced certification is approved for release of Permanent Certificate of Occupancy by Hydrology.

If you have any questions, you can contact me at 924-3982.

Albuquerque

New Mexico 87103

www.cabq.gov

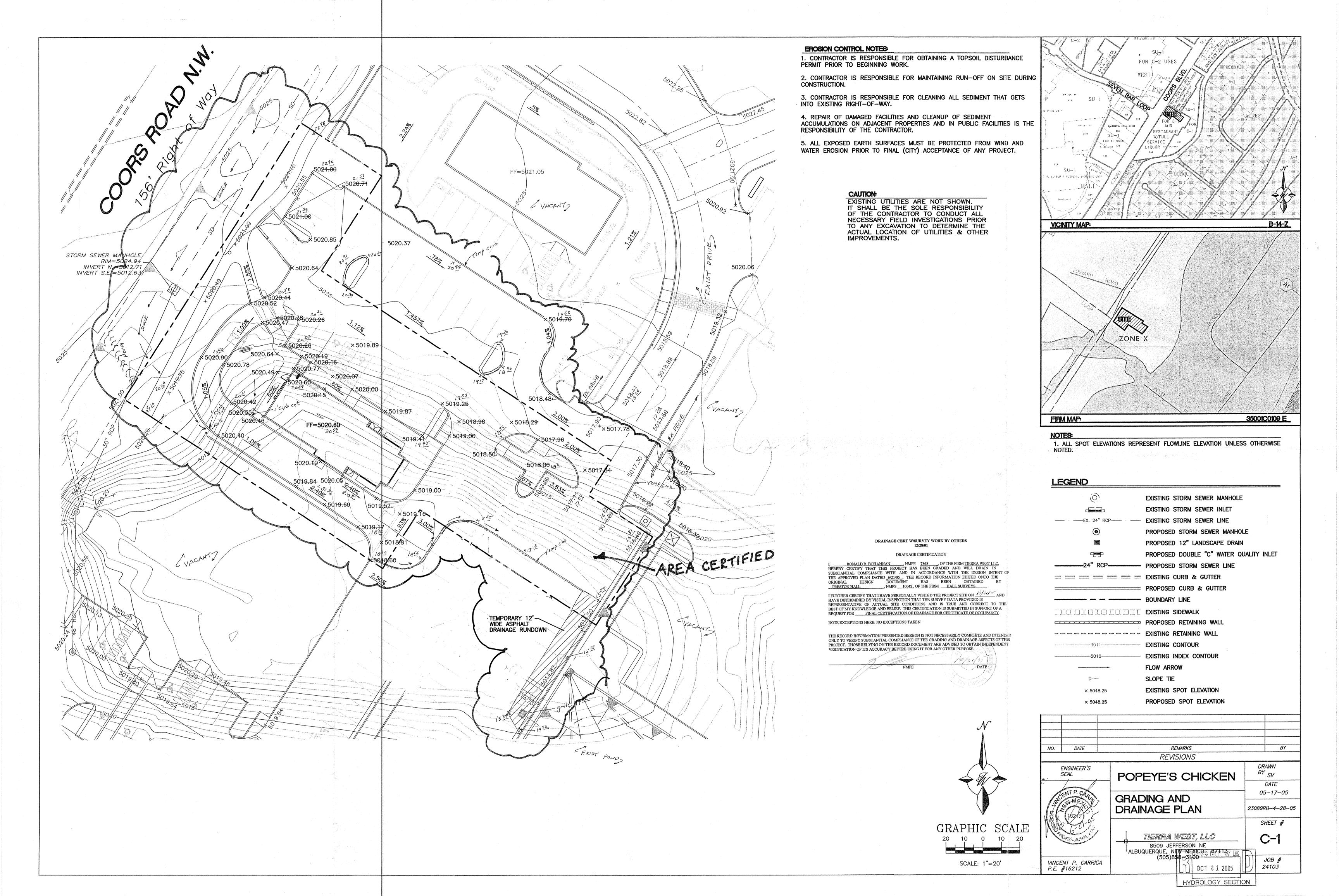
Sincerely,

Arlene V. Portillo

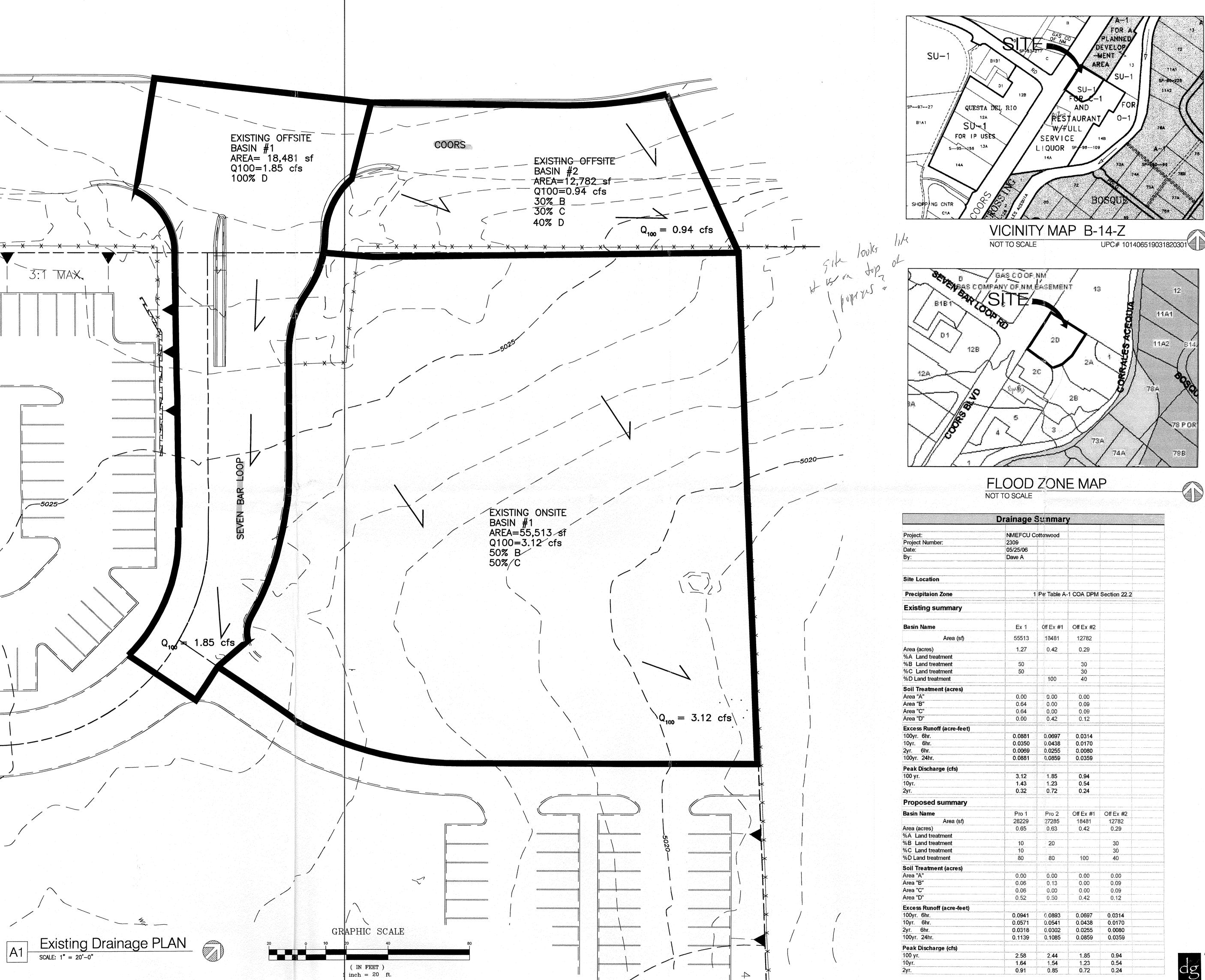
Plan Checker, Planning Dept. - Hydrology

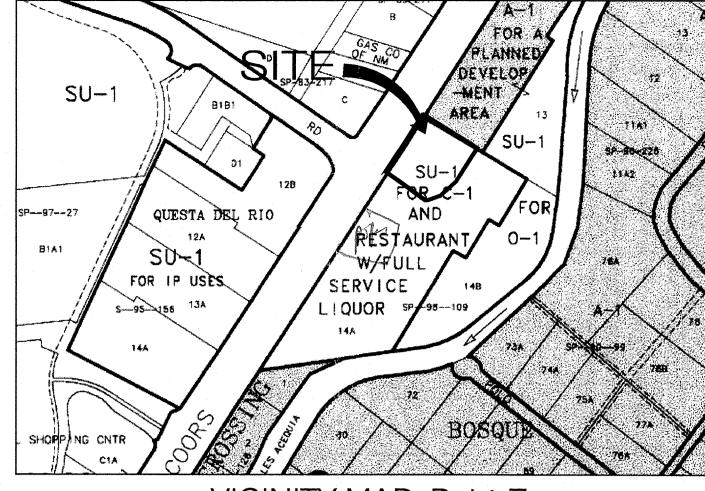
Development and Building Services

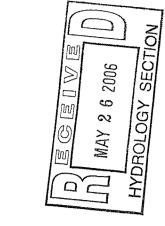
rlene V. Portella



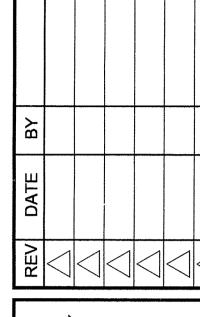
APPENDIX G

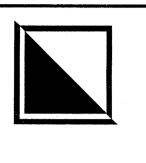












GEORGE RAINHART, ARCHITECT AND ASSOCIATES 2325 SAN PEDRO NE., SUITE 2-B ALBUQUERQUE, NEW MEXICO 87110 PHONE (505) 837-987,

5-25-0C

05-17-06 SCALE: 1"=20'

THE DESIGN GROUP

ARCHITECTS · PLANNERS · INTERIOR DESIGN

202 CENTRAL AVENUE SE SUITE 200

ALBUQUERQUE, NEW MEXICO 87102

PHONE: 505.242.6880 FAX: 505.242.6881

APPENDIX H

Derek Bohannan

From: Jared Romero <jromero@amafca.org>
Sent: Thursday, August 29, 2024 6:35 PM

To: Derek Bohannan

Cc: Ron Bohannan; Nicole M. Friedt; Brissette, Renee C.

Subject: RE: [#2023004] 7 Bar Retail - Revised Conceptual Drainage Report - AMAFCA No

Adverse Comments

Good Evening Derek,

AMAFCA has no further adverse comments on the Conceptual Drainage Report and associated Conceptual Drainage Plan for the 7 Bar Retail Project dated August 2024. Below are items that must be addressed as this project moves into Building and Public Work Order approvals.

- AMAFCA will need to review and approve the final G&D and DRC Work Order Plans (for the infrastructure to be assumed by AMAFCA).
 - o AMAFCA will require review of the structural design of the proposed retaining walls prior to building permit approval. There must also be a general note on the G&D stating as such. The design of the retaining wall must include an assumed 6ft CMU garden wall section on top of the retaining wall (above highest FG adjacent to the retaining wall).
 - o Based on discussions with AMAFCA's Operations & Maintenance group, the existing pipe penetrations where the inlet is to be capped may require grout filling to minimize maintenance concerns and potential for pipe failure.
 - O The pipe penetration is proposed to enter the pond at an elevation of 5007'. The 100-yr WSE from the as-builts of the pond is at an elevation of 5006.5' in '29 vertical Datum, putting the WSE in current datum at ~5009.2. If the pipe invert into the pond is below the 100-yr WSE, then it will have to be designed with backflow prevention and assume a higher tailwater condition than shown in the Drainage Report. A profile view showing the HGL & EGL of the pipe network is required. I recommend adjusting the alignment of the storm drain into the pond to be at a 90 degree angle (no skew) to make the connection a little simpler to construct.
- The G&D included in shows a new storm drain penetration into AMAFCA's regional drainage facility. This is subject to review and approval of AMAFCA's Board of Directors as AMAFCA is to assume maintenance of the pipe penetration into the facility via a Turnkey Agreement.
 - O The project was introduced to the AMAFCA Board of Directors at the August 2024 meeting. There will be a subsequent presentation(s) to the Board at a future meeting for consideration of approval of the turnkey agreement. The final Turnkey agreement will need to utilize the final approved DRC plans with AMAFCA and the City 's approval signature.

Please let me know if there are any questions.

Best, Iared

Jared Romero, P.E., CFM

AMAFCA Drainage Engineer Phone: (505) 884-2215 From: Derek Bohannan < dbohannan@tierrawestllc.com>

Sent: Friday, August 16, 2024 9:00 AM **To:** Jared Romero < iromero@amafca.org>

<rbr/>rbrissette@cabq.gov>

Subject: RE: [#2023004] 7 Bar Retail - Drainage Report - AMAFCA Response

Good morning Jared,

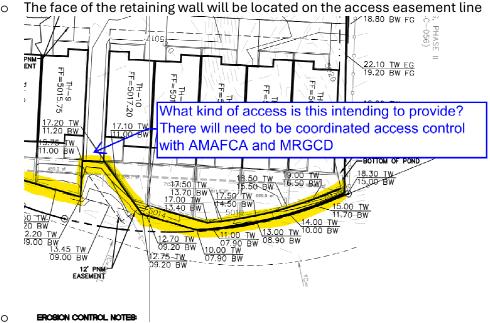
Please see the attached revised drainage report and drawings. (The drawings are in the download link provided) Drawings - https://we.tl/t-m4W5UGdNBh

Report and Appendices Items - https://we.tl/t-x0FyrsPlwT

At a minimum we are seeking a conceptual approval by AMAFCA such that the City of Albuquerque with your conceptual approval can too also provide conceptual approval so that we can start some of the mass grading activities. The need by the project to start moving dirt prior to final grading and drainage is due to the removal, relocation, and realignment of a 750kV line by PNM that needs to be completed prior to our pad and final grading activities.

Changes|Notes

- We take no exception to the bulleted points below.
- Street Hydraulic and Pipe Calculations were added to the report.
- Basin reconfiguration and water blocks added along Seven Bar per COA review/comments.
- Narrative on backyard ponding added to address COA comments.
- Pond Volumetric Comparison from Original Report added.
- Pond invert set to 0.5' above emergency spillway elevation at pond.
- Note that no access is proposed at the location in your drawing notes. This area is for a PNM easement for the relocation of the previously mentioned 750kV line that comes off of the existing OH line at this location.
 - The existing PNM drop and pole are to remain as currently located on the site with guy wire.



• Single wall configurations along the pond have been called out as noted with L-footers to be wholly contained on the proposed developments property.

If you require any additional information please do not hesitate to contact me at anytime.

Thank you!

Derek R Bohannan.

From: Jared Romero romero@amafca.org>

Sent: Tuesday, July 9, 2024 1:24 PM

To: Derek Bohannan < dbohannan@tierrawestllc.com>

Cc: Ron Bohannan <rrb@tierrawestllc.com>; Nicole M. Friedt <nfriedt@amafca.org>; Brissette, Renee C.

<rbr/>rbrissette@cabq.gov>

Subject: RE: [#2023004] 7 Bar Retail - Drainage Report - AMAFCA Response

Good Afternoon Derek,

Below is a link to download AMAFCA's comments on the compiled Drainage Report for the 7 Bar Retail Project. Like we have discussed in the past, conceptually, AMAFCA does not have any adverse comments to the overarching plan for the subdivision, but there is cleanup in the report and plans that is needed. Below are also questions/conditions that will need to be addressed as this project advances (we've already discussed most of these, so they should not be surprising).

7 Bar Retail - Dranage Report - AMAFCA Comments.pdf

- It's a little unclear if Lot 2 is intended to be subdivided further. If so, AMAFCA will need to review the plat when prepared.
- AMAFCA will need to review the final G&D, DRC Work Order Plans (for the infrastructure to be assumed by AMAFCA), and the revised Drainage Report.
- The G&D included in shows a new storm drain penetration into AMAFCA's regional drainage facility. This is subject to review and approval of AMAFCA's Board of Directors as AMAFCA is to assume maintenance of the pipe penetration into the facility via a Turnkey Agreement.
 - O The project will first have to be introduced to the AMAFCA Board of Directors at a regular meeting. Should the Board be in favor, there will be a subsequent presentation to the Board at a future meeting for consideration of approval of the turnkey agreement.
 - o The project can be introduced with a preliminary G&D; however the final Turnkey agreement will need to utilize the final approved plans with AMAFCA and the City 's approval signature.

Please let me know if you have any questions.

Best, Jared

Jared Romero, P.E., CFM

AMAFCA Development Review Engineer

Phone: (505) 884-2215

From: Derek Bohannan <dbohannan@tierrawestllc.com>

Sent: Friday, June 28, 2024 10:59 AM **To:** Jared Romero < jromero@amafca.org>

Cc: Ron Bohannan < rrb@tierrawestllc.com>

Subject: RE: [#2023004] 7 Bar Retail - Drainage Report - Review request

I guess the link would help https://we.tl/t-FRM4eJIFPc

Derek.

From: Derek Bohannan

Sent: Friday, June 28, 2024 10:47 AM

To: Jared Romero < <u>iromero@amafca.org</u>>
Cc: Ron Bohannan < <u>rrb@tierrawestllc.com</u>>

Subject: [#2023004] 7 Bar Retail - Drainage Report - Review request

Good afternoon Jared,

Can you begin to review the attached report for the 7 Bar Retail Mixed Use Development that we had previously discussed. This is the site located at 7 Bar and Coors Blvd. Renee at the City has stipulated that I need your approval prior to being able to re-submit to her department.

As discussed we are planning on creating an HOA to service and maintain all items/areas that are located within the access easement on the east side of the property adjacent to the canal. Also we are reviewing the turnkey agreement and will have one created for your review once we've been through this review and have everything to where you need it.

In the link below you will find the narrative and appendix items broken out individually, I've also created one PDF that has all items compiled into a single PDF. I'm not sure which of these is your preference for reviewing items so I thought I'd provide it to you both ways.

Please feel free to reach out to me anytime.

Derek R Bohannan.

APPENDIX I

Worksheet for STRM01-01(30)

Project Description		· ,
1 Toject Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
30176 1 01	Поппаг Берит	
Input Data		
Roughness Coefficient	0.017	
Channel Slope	0.002 ft/ft	
Diameter	30.0 in	
Discharge	12.46 cfs	
Results		
Normal Depth	22.0 in	
Flow Area	3.9 ft ²	
Wetted Perimeter	5.1 ft	
Hydraulic Radius	9.0 in	
Top Width	2.21 ft	
Critical Depth	14.2 in	
Percent Full	73.4 %	
Critical Slope	0.008 ft/ft	
Velocity	3.23 ft/s	
Velocity Head	0.16 ft	
Specific Energy	2.00 ft	
Froude Number	0.431	
Maximum Discharge	15.09 cfs	
Discharge Full	14.03 cfs	
Slope Full	0.002 ft/ft	
Flow Type	Subcritical	
GVF Input Data	0.0.	
Downstream Depth	0.0 in	
Length	0.0 ft	
Number Of Steps	0	
GVF Output Data		-
Upstream Depth	0.0 in	
Profile Description	N/A	
Profile Headloss	0.00 ft	
Average End Depth Over Rise	0.0 %	
Normal Depth Over Rise	50.5 %	
Downstream Velocity	Infinity ft/s	
Upstream Velocity	Infinity ft/s	
Normal Depth	22.0 in	
Critical Depth	14.2 in	
Channel Slope	0.002 ft/ft	
Critical Slope	0.008 ft/ft	

Worksheet for STRM01-02(30)

Project Description		
i Tojeot Description		
Friction Method	Manning Formula	
Solve For	Normal Depth	
Solve I of	поппаг Берит	
Input Data		
Roughness Coefficient	0.017	
Channel Slope	0.004 ft/ft	
Diameter	30.0 in	
Discharge	13.23 cfs	
Results		
Normal Depth	18.1 in	
Flow Area	3.1 ft ²	
Wetted Perimeter	4.4 ft	
Hydraulic Radius	8.3 in	
Top Width	2.45 ft	
Critical Depth	14.7 in	
Percent Full	60.2 %	
Critical Slope	0.008 ft/ft	
Velocity	4.28 ft/s	
Velocity Head	0.29 ft	
Specific Energy	1.79 ft	
Froude Number	0.672	
Maximum Discharge	21.07 cfs	
Discharge Full	19.59 cfs	
Slope Full	0.002 ft/ft	
Flow Type	Subcritical	
GVF Input Data		
·	0.0.5	
Downstream Depth	0.0 in	
Length	0.0 ft	
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.0 in	
Profile Description	N/A	
Profile Headloss	0.00 ft	
Average End Depth Over Rise	0.0 %	
Normal Depth Over Rise	57.2 %	
Downstream Velocity	Infinity ft/s	
Upstream Velocity	Infinity ft/s	
Normal Depth	18.1 in	
Critical Depth	14.7 in	
Channel Slope	0.004 ft/ft	
Critical Slope	0.008 ft/ft	

Worksheet for STRM01-03(30)

Project Description		
i ioleer nescribrion		
Friction Method	Manning	
Solve For	Formula Normal Depth	
Solve Fol	ногтаг Берит	
Input Data		
Roughness Coefficient	0.017	
Channel Slope	0.005 ft/ft	
Diameter	30.0 in	
Discharge	13.23 cfs	
Results		
Normal Depth	16.7 in	
Flow Area	2.8 ft ²	
Wetted Perimeter	4.2 ft	
Hydraulic Radius	8.0 in	
Top Width	2.48 ft	
Critical Depth	14.7 in	
Percent Full	55.6 %	
Critical Slope	0.008 ft/ft	
Velocity	4.72 ft/s	
Velocity Head	0.35 ft	
Specific Energy	1.74 ft	
Froude Number	0.782	
Maximum Discharge	23.86 cfs	
Discharge Full	22.18 cfs	
Slope Full	0.002 ft/ft	
Flow Type	Subcritical	
GVF Input Data		
Downstream Depth	0.0 in	
Length	0.0 ft	
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.0 in	
Profile Description	N/A	
Profile Headloss	0.00 ft	
Average End Depth Over Rise	0.0 %	
Normal Depth Over Rise	43.2 %	
Downstream Velocity	Infinity ft/s	
Upstream Velocity	Infinity ft/s	
Normal Depth	16.7 in	
Critical Depth	14.7 in	
Channel Slope	0.005 ft/ft	
Critical Slope	0.008 ft/ft	

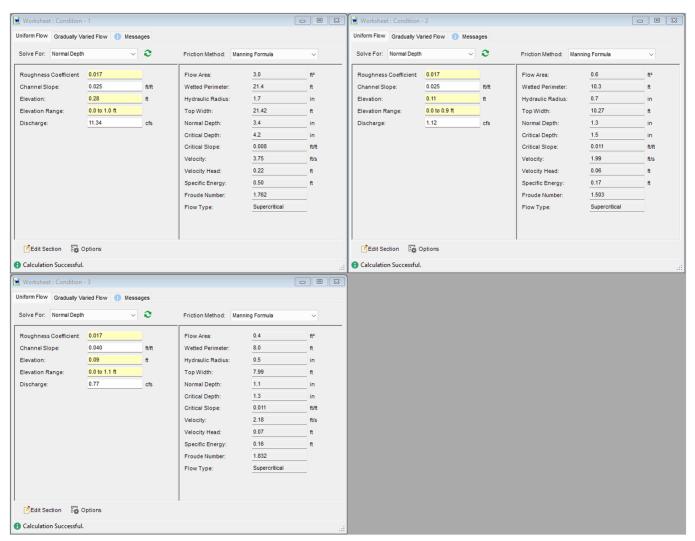
Worksheet for STRM-LAT

Project Description		
Friction Method	Manning	
	Formula	
Solve For	Normal Depth	
Input Data		
Roughness Coefficient	0.017	
Channel Slope	0.106 ft/ft	
Diameter	18.0 in	
Discharge	0.77 cfs	
Results		
Normal Depth	2.1 in	
Flow Area	0.1 ft ²	
Wetted Perimeter	1.1 ft	
Hydraulic Radius	1.3 in	
, Top Width	0.97 ft	
Critical Depth	3.9 in	
Percent Full	11.8 %	
Critical Slope	0.009 ft/ft	
Velocity	6.59 ft/s	
Velocity Head	0.67 ft	
Specific Energy	0.85 ft	
Froude Number	3.340	
Maximum Discharge	28.18 cfs	
Discharge Full	26.20 cfs	
Slope Full	0.000 ft/ft	
Flow Type	Supercritical	
GVF Input Data		
Downstream Depth	0.0 in	
Length	0.0 ft	
Number Of Steps	0	
GVF Output Data		
Upstream Depth	0.0 in	
Profile Description	N/A	
Profile Headloss	0.00 ft	
Average End Depth Over Rise	0.0 %	
Normal Depth Over Rise	11.8 %	
Downstream Velocity	Infinity ft/s	
Upstream Velocity	Infinity ft/s	
Normal Depth	2.1 in	
Critical Depth	3.9 in	
Channel Slope	0.106 ft/ft	
Critical Slope	0.009 ft/ft	

Appendix I.

Flow Master Inputs and Results for Street Hydraulic Calculations and Pipe Hydraulics

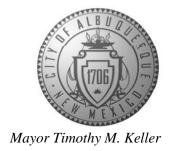
Street Hydraulics



APPENDIX J

CITY OF ALBUQUERO

Planning Department Alan Varela, Director



October 01, 2024

Ronald Bohannan, P.E. Tierra West, LLC 5571 Midway Park Place NE Albuquerque, NM 87109

RE: Retail at Bar 7

Conceptual Grading Plan and Conceptual Drainage Report

Engineer's Stamp Date: 09/25/2024

Hydrology File: B14D010D

Dear Mr. Bohannan:

PO Box 1293

Based upon the information provided in your submittal received 09/27/2024, the Conceptual Grading Plan and Conceptual Drainage Report are preliminarily approved for action by the Development Facilitation Team (DFT) on the Site Plan for a Building Permit.

PRIOR TO BUILDING PERMIT / WORK ORDER:

Albuquerque

1. Please submit a more detailed Grading & Drainage Plan to Hydrology for review and approval. This digital (.pdf) is emailed to PLNDRS@cabq.gov along with the Drainage Transportation Information Sheet.

NM 87103

www.cabq.gov

As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Doug Hughes, PE, jhughes@cabq.gov, 505-924-3420) 14 days prior to any earth disturbance.

If you have any questions, please contact me at 505-924-3362 or <u>richardmartinez@cabq.gov</u>.

Sincerely,

Richard Martinez, P.E. Senior Engineer, Hydrology Planning Department

filled the



City of Albuquerque

Planning Department
Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (DTIS)

Project Title: 7 Bar Retail	Hydrology File # B14D010D							
Project Title: 7 Bar Retail Legal Description: Lot 2-A and 2-B Lots 2-A, 2-B, 2-C and 2-D Cottonwood Crossing Phase II (Being a Replat of Tr 2 Cottonwood Crossing Phase II)								
City Address, UPC, OR Parcel: 1014065215312	20323							
Applicant/Agent: Tierra West, LLC	Contact: Derek Bohannan							
Address: 5571 Midway Park Pl NE, ABQ NM 8	7109 Phone: 505-858-3100							
Email: dbohannan@tierrawestllc.com								
Applicant/Owner:	Contact:							
Address:	Phone:							
Email:								
(Please note that a DFT SITE is one that needs Site Plan	Approval & ADMIN SITE is one that does not need it.)							
TYPE OF DEVELOPMENT: PLAT (#of lots)	 							
DFT SITE	ADMIN SITE							
RE-SUBMITTAL: 🗸 YES 🗌 NO								
DEPARTMENT: TRANSPORTATION	✓ HYDROLOGY/DRAINAGE							
Check all that apply under Both the Type of Submitta	al and the Type of Approval Sought:							
TYPE OF SUBMITTAL:	TYPE OF APPROVAL SOUGHT:							
ENGINEER/ARCHITECT CERTIFICATION	BUILDING PERMIT APPROVAL							
PAD CERTIFICATION	CERTIFICATE OF OCCUPANCY							
CONCEPTUAL G&D PLAN	CONCEPTUAL TCL DFT APPROVAL							
GRADING & DRAINAGE PLAN	PRELIMINARY PLAT APPROVAL							
DRAINAGE REPORT	FINAL PLAT APPROVAL							
DRAINAGE MASTER PLAN	SITE PLAN FOR BLDG PERMIT DFT							
CLOMR/LOMR	APPROVAL							
TRAFFIC CIRCULATION LAYOUT (TCL)	SIA/RELEASE OF FINANCIAL GUARANTEE							
ADMINISTRATIVE	FOUNDATION PERMIT APPROVAL							
TRAFFIC CIRCULATION LAYOUT FOR DFT APPROVAL	GRADING PERMIT APPROVAL							
TRAFFIC IMPACT STUDY (TIS)	SO-19 APPROVAL							
STREET LIGHT LAYOUT	PAVING PERMIT APPROVAL							
OTHER (SPECIFY)	GRADING PAD CERTIFICATION							
	WORK ORDER APPROVAL							
	CLOMR/LOMR							
	OTHER (SPECIFY) EPC Signoff							
DATE SUBMITTED: <u>09/25/2024</u>								

7 Bar Retail CONCEPTUAL DRAINAGE REPORT

August 2024



PREPARED FOR:

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