DRAINAGE REPORT

FOR

ARROYO VILLAS APARTMENTS

NORTHWEST CORNER OF IRVING BLVD. AND GOLF COURSE ROAD

ALBUQUERQUE NEW MEXICO
JUNE 1994

Prepared by:

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Thomas O. Isaacson Date

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APPENDIX

I. INTRODUCTION

Arroyo Villas Apartments is a planned two-phase apartment complex located at the northwest corner of Irving Blvd. and Golf Course Road. The site consists of Tract T-1A within the Town of Alameda Grant as replatted on April 21, 1994. Tract T-1A has an area of 19.85 acres. See the Vicinity Map, Appendix Page A-1, for location of the project.

This drainage report has been prepared for Phase 1 of the development which consists of 200 apartment units along with a community building. For the purposes of this study only, the southerly 16.63 acres of Tract T-1A has been analyzed; the remaining 3.22 acres, located in the northerly part of the Tract, is unaffected by the proposed construction.

A conceptual grading and drainage plan for the entire Tract has previously been submitted to City Hydrology for site development plan purposes (B-12/D2). This drainage and grading plan and report closely follows the conceptual grading and drainage plan concept and intent.

II. EXISTING SITE CONDITIONS

FLOOD HAZARD. The 100-year floodplain crosses the southeast corner of the site. This floodplain is contained within an existing AMAFCA drainage easement. No development will take place within this easement. See Page A-2 in the Appendix for the Flood Rate Insurance Map.

The northerly tract boundary is coincident with the AMAFCA "Prudent Product Line".

SOILS. Soils are classified as the Bluepoint loamy fine sand (BCC) in the SCS Soil Survey of Bernalillo County. BCC soil is classified as a Hydrologic Soil Group A soil.

TOPOGRAPHY. The site slopes predominately to the north towards the Calabacillas Arroyo. Portions of the site are quite steep with slopes up to 17%. See Appendix Page A-3 for a topographic map of the existing site.

OFFSITE DRAINAGE. Sheetflow from the adjacent property to the west is the only offsite flow entering the site. See Appendix Page A-4 for a map showing the configuration of this offsite drainage.

III. PROPOSED DEVELOPMENT

DRAINAGE CONCEPT. Drainage runoff from the development will be handled in the following manner:

1. The majority of the drainage runoff will be intercepted by a private on-site storm drain system which will be carried to a new public storm drain in Golf Course Road. Our firm is presently working on the design of this public system.

2. Minor amounts of runoff from the project will drain directly south to Irving Blvd. and east to Golf Course Road. These flows will be intercepted by the new public storm drain we are designing

3. Minor flows will sheetflow north to the Calabacillas Arroyo.

GRADING, DRAINAGE & STORM DRAIN PLANS. These plans are found in the rear pocket of this report. The Grading & Drainage Plans show the drainage area boundaries and numbers used in the runoff calculations.

RUNOFF CALCULATIONS. Page A-5 of the Appendix gives the runoff calculations for the existing and developed site. For analysis purposes the

northerly 3.22 acres of the site have been excluded since no construction will take place in this area.

Runoff calculations from Page A-5 are summarized as follows:

Drainage Area No(s)	Drains To	Runoff (cfs)
Existing Site	Calabacillas Arroyo (primarily)	30.87
1-6 (developed)	Private Storm Drain	36.98
7 (developed)	Calabacillas	10.00
8 (developed)	Irving Blvd.	1.77
9 (developed)	Golf Course Road	4.32

PRIVATE STORM DRAIN. Storm drain inlets will be City of Albuquerque standard design. Pages A-6 thru A-10 give the design analysis at each inlet location.

Storm drain mains are sized to carry Q_{100} flows. Hydraulic grade line computations are given on Page A-11.

GRADING DESIGN. The Grading & Drainage Plan show the proposed grading for the project. The maximum slope grade is 3:1.

RUNOFF CALCULATIONS

Zone 1 Used

Precipitation Zone	Q_{100} Runoff Rates (cfs/ac)			
	A	B	C	D
1	1.29	2.03	2.87	4.37
2	1.56	2.28	3.14	4.70
3	1.87	2.60	3.45	5.02
4	2.20	2.92	3.73	5.25

Drainage Area No ⬡	Analysis Point No	Areas (ac)					Q_{100} (cfs)
		A_T	A_A	A_B	A_C	A_D	
Existing Site		16.63	3.90	12.73	-	-	30.87
1		2.08	-	0.33	0.50	1.25	7.50
2		4.24	0.76	0.56	0.83	2.09	13.60
3		1.35	-	0.22	0.32	0.81	4.90
4		1.31	-	0.21	0.31	0.79	4.77
5		1.29	-	0.21	0.31	0.77	4.68
6		0.35	-	-	-	0.35	1.53
7		4.74	2.42	0.17	1.91	0.24	10.00
8		0.54	-	0.06	0.30	0.18	1.77
9		1.49	-	-	1.46	0.03	4.32

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SUBJECT Runoff Calculations JOB NO.

BY DATE SHEET NO. OF

Storm Drain Inlet Analysis

Location (1) Basin 1

Line A

(1) 1st Inlet

Q = 7.5 cfs
Street Slope, longitudinal .035
Street Slope, transverse .030
Flow Depth in Gutter .28 ft.
Inlet Type 1A
Inlet Capacity 3.2 cfs
Flow Past Inlet 4.3 cfs

(2) 2nd Inlet

Q = 4.3 cfs
Flow Depth in Gutter 0.23 ft.
Inlet Type 2C
Inlet Capacity 2.2 cfs
Flow Past Inlet 2.1 cfs

3rd Inlet

Q = _____ cfs
Flow Depth in Gutter _____ ft.
Inlet Type _____
Inlet Capacity _____ cfs
Flow Past Inlet _____ cfs

Storm Drain Inlet Analysis

Location (2)

3 1st Inlet
Q = 13.6 cfs
Street Slope, longitudinal 0.020
Street Slope, transverse 0.030
Flow Depth in Gutter 0.39 ft.
Inlet Type A
Inlet Capacity 4.9 cfs
Flow Past Inlet 8.7 cfs

4 2nd Inlet
Q = 8.7 cfs
Flow Depth in Gutter 0.33 ft.
Inlet Type 2C
Inlet Capacity 3.9 cfs
Flow Past Inlet 4.8 cfs

5 3rd Inlet
Q = 4.8 cfs
Flow Depth in Gutter 0.27 ft.
Inlet Type 2C
Inlet Capacity 2.3 cfs
Flow Past Inlet 2.5 cfs

Storm Drain Inlet Analysis

Location (4)

Line B, 1st Inlet

(2) Q = 6.9 cfs (4.8 + 2.1 from (1))
Street Slope, longitudinal 0.050
Street Slope, transverse 0.030 1/30
Flow Depth in Gutter 0.26 ft.
Inlet Type 1A
Inlet Capacity 3.2 cfs
Flow Past Inlet 3.7 cfs

(3) 2nd Inlet
Q = 3.7 cfs
Flow Depth in Gutter 0.22 ft.
Inlet Type 2C
Inlet Capacity 2.2 cfs
Flow Past Inlet 1.5 cfs

3rd Inlet
Q = _____ cfs
Flow Depth in Gutter _____ ft.
Inlet Type _____
Inlet Capacity _____ cfs
Flow Past Inlet _____ cfs

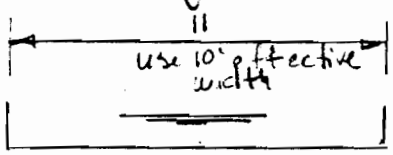
Line 8 Inlet 1

ANALYZE PONDED INLET @ (5)

Q = 4.7 + 1.5 (passing (4)) = 6.2 cfs

Use COA Type A Inlet w/ Double Throat

Compute Flow from weir flow equation for flow entering the throat area



$Q = 3.09 L H^{3/2}$

H	Q
.2	2.76 cfs
.3	5.03
.4	7.8
.35	6.4

Check Flow through Grate for C.F.

A = 3.0' x 2.0' = 6 ☐

less long bars

11 ea x $\frac{.5}{12}$ x 3.0 = 1.38 ☐

less cross bars

7 ea x $\frac{.5}{12}$ x 2.0' = 0.58

4.04 ☐

less 50% Clogging = 2.0 ☐

$Q = CA\sqrt{2gh} = .60 \times 2\sqrt{2 \times 32.7 \times .5} = 6.8$ cfs

OK

Line A Inlet 6

ANALYZE PONDED INLET @ (3)

$Q = 4.9 + 2.5$ passing (2) $= 7.4$ cfs

Weir Flow:

Try 0.39' flow depth

$Q = 3.09 \times 10 \times .39^{1.5} = 7.5$ cfs, OK

Flow Through Grate from previous calc = 6.8 cfs
close enough, adds safety factor

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SUBJECT _____ JOB NO. _____

BY _____ DATE _____ SHEET NO. _____ OF A-11

HYDRAULIC GRADE LINE CALCULATIONS

From	To	Q	Dia	Line Losses			Bend Losses				Manhole Losses				
				L	hf	HG	Δ	Kb	hb	HG	Δ	Kb	hmh	HG	
D1 B1	D2 B2	37	24"	136											Q/Qmax = 37/64 = .58 d = .53 x 2' = 1.06'
															HGL = 62.35 + 1.06 = 63.4
D2 B2	A1 E1	25.4	18"	212	7.9	71.7							0.2	71.9	
A1 E1	A2 E2	18.0	18"	174										80.3	Q/Qmax = 18/22.6 = .80 d = .68 x 1.5 = 1.02 + .2 = 1.2
A2 E2	A3 E1	6.9	15"	139											Q/Qmax = 7/14 = .50 d = .5 x 1.25 = .63 + 1 = .73
A3 E3	A4 E4	5.4	15"	96											Q/Qmax = 5.4/24 = .23 d = .32 x 1.25 + 1 = 0.50
D2	D3	5.4	15"	291											Q/Qmax = 5.2/13.8 = .39 .43 x 1.25 + 1 = .64

Q = $K = \frac{1.486}{n} A R^{2/3} =$ = $S_f^* = \left[\frac{Q}{K}\right]^2$

* Alternative Method: Use Hazen Williams w/ C = 120