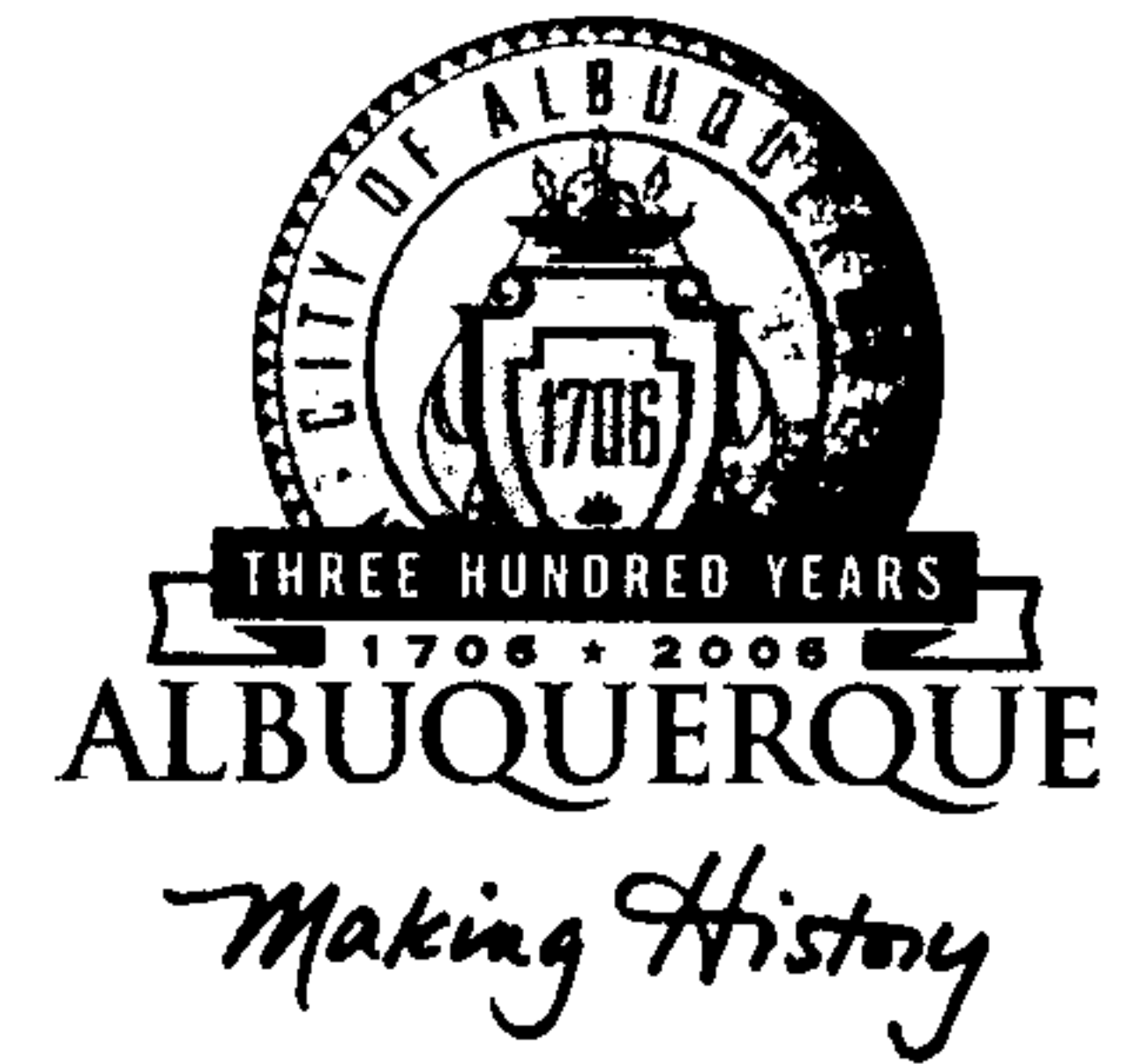


CITY OF ALBUQUERQUE



January 12, 2005

Mr. David Thompson, PE
THOMPSON ENGINEERING CONSULTANTS, INC.
4800 Juan Tabo Blvd. N.E.
Albuquerque, NM 87111

RE: TREMENTINA OESTE SUBDIVISION (C-19/D37)
Engineers Certification for Release of Financial Guaranty
Engineers Stamp dated 01/20/2004
Engineers Certification dated 01/11/2005

Dear Dave:

Based upon the information provided in your Engineer's Certification Submittal dated 01/11/2005, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

P.O. Box 1293

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

Albuquerque

Sincerely,

New Mexico 87103

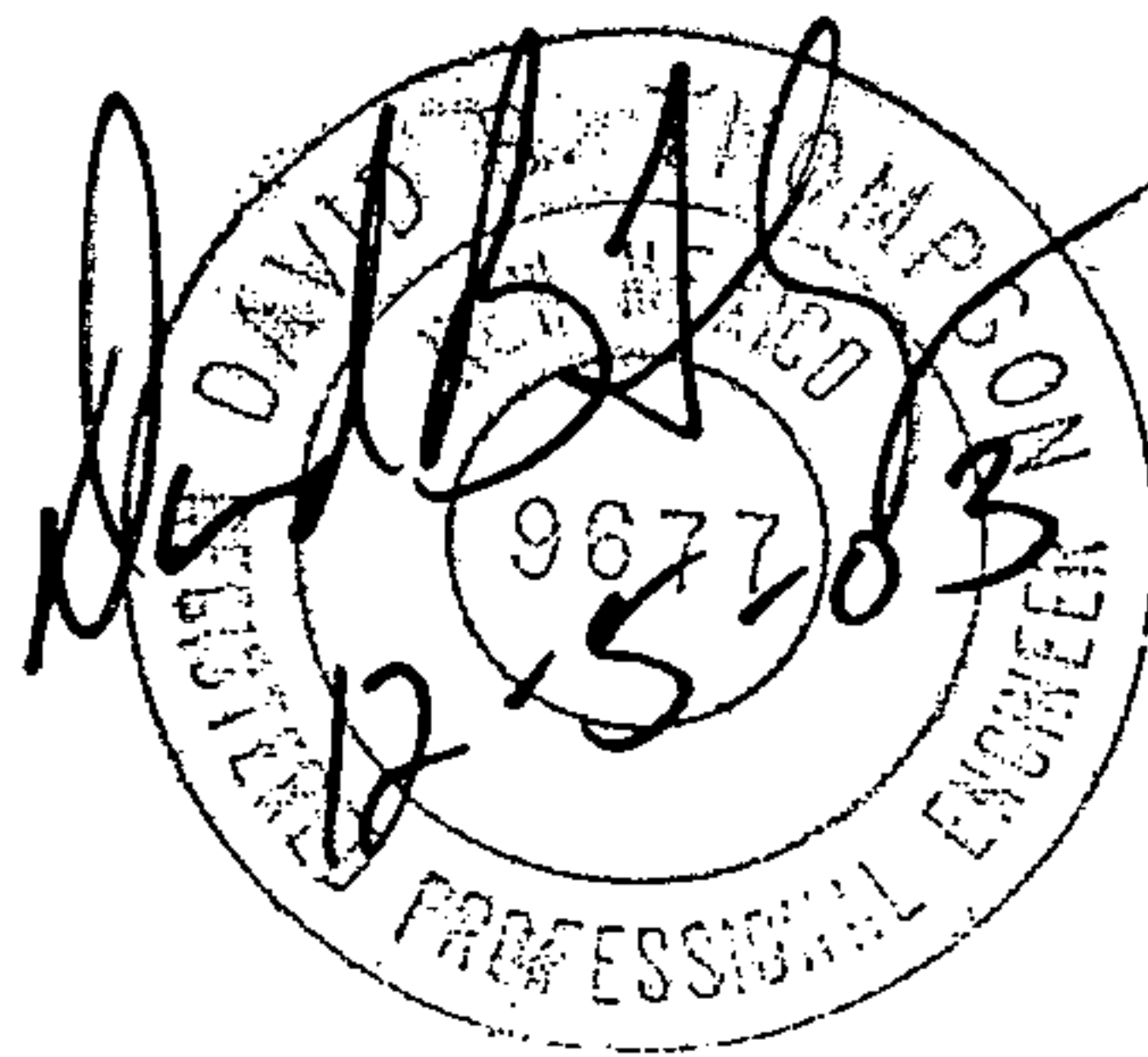
Arlene V. Portillo
Plan Checker, Planning Dept.- Hydrology
Development and Building Services

www.cabq.gov

C: Marilyn Maldonado, COA# 733381
File

DRAINAGE REPORT
FOR
TREMENTINA OESTE
SUBDIVISION

Prepared for:
INTERFIRST PROPERTIES, INC.



Prepared by:
Thompson Engineering Consultants, Inc.
4800 Juan Tabo N.E., Suite C
Albuquerque, NM 87111

December 2003

INTRODUCTION AND SITE LOCATION

The proposed Trementina Oeste Subdivision is located on the south side of Alameda Boulevard between Louisiana Boulevard and Wyoming Boulevard in North Albuquerque Acres. The 2.67-acre site lies just west of Trementina Subdivision and south of the proposed Vista del Agula Unit 3 subdivision. The property will be subdivided into 20 residential lots. The drainage plan for this parcel follows the approved "Drainage Report for Vista del Agula Unit Three & Trementina Subdivision" by Isaacson & Arfman, Inc., dated June 17, 2003. This area is covered under the Final North Albuquerque Acres Drainage Master Plan (NAA DMP) dated October 1998, and is located within drainage basin 117.4. This report specifically addresses the grading and drainage plan and analysis for Trementina Oeste.

METHODOLOGY

The hydrologic and hydraulic criteria in Section 22 of the City of Albuquerque Development Process Manual (DPM), entitled "Drainage, Flood Control, and Erosion Control," was followed to perform the analyses given in this report. The design storm used for both the existing undeveloped and developed conditions of the Tuscany West Unit 5 Subdivision is the 100-year, 6-hour storm event for peak flow computations.

Street capacities were modeled using HEC-RAS to determine normal depths and conjugate depths. A hydraulic analysis of the storm sewer collection system was performed to assist in the sizing of the infrastructure.

EXISTING DRAINAGE CONDITIONS

INTRODUCTION

The site drains from southeast to northwest at an average slope of about 3%. The site is sparsely vegetated with native grasses and scrub brush. This area is included in the Isaacson & Arfman Drainage Report as drainage basin 321. The peak flow from the site is 5.0 cfs. This peak flow drains to the Alameda Right-of-Way and will be collected by the storm drain in Alameda.

The FEMA Flood Insurance Rate Map Number 35001C0137F, effective date November 19, 2003, shown in Figure 1, does not indicate the presence of any floodplains on the site, however, there is a Zone AO flood hazard zone just north of the subdivision.

OFF-SITE FLOWS

There are no offsite flows that reach the site.

ON-SITE FLOWS

For the ~~existing conditions~~ hydrologic analysis, Land Treatment Type A was used to determine peak flows. This agrees with the Isaacson & Arfman Drainage Report. This area is included in the Isaacson & Arfman Drainage Report as drainage basin 321. The peak flow from the site is 5.0 cfs. ~~This peak flow drains to the Alameda Right-of-Way and will be collected by the storm drain in Alameda. The storm drain will be constructed when Trementina Subdivision is constructed to the east.~~ The runoff from Trementina Subdivision will be collected in the storm drain and discharged to a temporary retention pond located west of Trementina Oeste Subdivision. ~~The storm drain in Alameda Boulevard is sized to collect developed flows from Trementina Subdivision, Vista del Aguirre Unit 3 Subdivision, and from Trementina Oeste Subdivision. The storm drain in front of Trementina Oeste is a 36" diameter RGP.~~

Table 1 Existing Drainage Conditions

BASINS	Area (acres)	100yr-6hr Peak Flow (cfs)	100yr- 6hr Runoff Volume (acre-ft)	100yr- 10day Runoff Volume (acre-ft)	Land Treatment
321a	0.52	0.97	0.029	0.029	100%A
321b	1.52	2.84	0.084	0.084	100%A
321c	0.63	1.18	0.035	0.035	100%A
TOTAL	2.67	4.99	0.150	0.150	

DEVELOPED DRAINAGE CONDITIONS

DRAINAGE BASIN DELINEATION

Plate 1 shows that the site is divided into three drainage basins, basins 321a, 321b, and 321c. This area is identified as Basin 321 in the Isaacson & Arfman Drainage Report. Following the Isaacson & Arfman Drainage Report, ~~runoff from all three basins are collected in the Alameda storm drain which discharges to a temporary retention pond west of Trementina Oeste.~~ Basin 321a includes a 32-foot wide strip of the Alameda Boulevard right-of-way and Lot 1-P1 and a portion of Calle Calma. Basin 321b includes the majority of the subdivision from the east boundary to the Calle Alegria hammerhead at the west end of the subdivision. Basin 321c includes the remainder of the subdivision from the west property line to the Basin 321b boundary.

HYDROLOGIC ANALYSIS

To determine the peak flows of each basin a hydrologic analysis was performed in accordance to section 22.2 of the Development Process Manual (DPM). The analysis included the 100-year 6-hour storm and the 10-year 6-hour storm. The 100-year 6-hour storm was the basis for determining peak flows to size the storm sewer inlets (see Appendix A). The 10-year 6-hour storm was the basis for determining peak flows to calculate the hydraulic grade line in the proposed storm sewer extension (see Appendix A). The property is located in Zone 3, which has a 100-year 6-hour storm event of 2.54 inches, according to the Isaacson & Arfman Drainage Report.

The site and Alameda Boulevard were assigned land treatment values in accordance with Tables A-4 and A-5 of the DPM's section 22.2. Table 1 shows the Land Treatments and peak flows for each basin. The total peak flow is 11.20 cfs, which is less than the 11.80 cfs allowed in the Isaacson & Arfman Drainage Report. See Appendix A for hydrologic calculations.

Table 2 Developed Drainage Conditions

BASINS	Area (acres)	100yr-6hr Peak Flow (cfs)	100yr- 6hr Runoff Volume (acre-ft)	100yr- 10day Runoff Volume (acre-ft)	Land Treatment
321a	0.52	2.23	0.082	0.135	19%B, 17%C, 64%D
321b	1.52	6.41	0.235	0.381	20%B, 20%C, 60%D
321c	0.63	2.56	0.093	0.146	24%B, 24%C, 52%D
TOTAL	2.67	11.20	0.410	0.660	

DRAINAGE CONCEPT

Introduction

This drainage report addresses the drainage concept for the developed condition of the Trementina Oeste subdivision. The drainage concept follows the Isaacson & Arfman Drainage Report. This subdivision is included as Basin 321 in the Isaacson & Arfman Drainage Report (see Appendix C). ~~The Isaacson & Arfman Drainage Report allows for a total of 11.8 cfs to be discharged from Basin 321 (which includes the subdivision and a portion of the Alameda Blvd. ROW) to the Alameda storm sewer system and discharged to the temporary retention pond just west of Trementina Oeste.~~ The 36" RCP storm drain in Alameda Blvd. that will be constructed with the Trementina subdivision, has been sized to convey the developed runoff from the Trementina Oeste subdivision. The developer of Trementina Oeste has worked out an agreement with the developers of Trementina subdivision and Vista del Aguila Unit 3 subdivision to allow the runoff from Trementina Oeste to be discharged to the temporary retention pond. ~~The temporary~~

~~retention pond, which holds the 100-year, 10-day storm volume, will be expanded by deepening the bottom of the pond to allow for the additional developed runoff from Trementina Oeste.~~ The Trementina Oeste developer will share in the maintenance responsibilities of the pond. The NAA MDP indicates that the Alameda storm drain will be extended downstream from Louisiana Blvd. to San Pedro Blvd.

Street Hydraulic Analysis

A hydraulic analysis of the street flows was completed to determine normal depth and sequent depth of the flow (see Appendix B). The sequent depth must remain within the street right-of-way. Therefore, the sequent depth must be equal to or less than 0.44 feet, since the streets will have 4" mountable curb and gutter. A HEC-RAS model was developed for the east-west portion of Calle Alegria and the hammerhead portion of Calle Alegria. HEC-RAS automatically calculates the energy grade depth, which is always greater than the sequent depth. Therefore, if the energy grade depth is equal to or less than 0.44 feet for a street section with mountable curb and gutter, then the sequent depth is also less than 0.44 feet. On Calle Alegria at the west return of the east-west part of the street, the energy grade depth is 0.44 feet which is equal to the maximum of 0.44 for mountable curb and gutter. For the hammerhead part of Calle Alegria, the energy grade depth is 0.39 feet which is less than the maximum of 0.44 for mountable curb and gutter. Therefore, the only part of the subdivision that requires standard curb and gutter is at the north end of the hammerhead where a storm inlet will be constructed. The Isaacson Arfman Drainage Report analyzed the street flow depth for Alameda adjacent to the subdivision. Their report indicated that adjacent to the subdivision the flowrate is 14.2 cfs and the energy grade depth is 0.58 feet, which is lower than standard curb height of 0.67 feet (see Appendix C). Table 2 shows the results of the analysis including the energy grade depth.

Table 3 Street Hydraulic Analysis

Street	Width (ft)	Slope (%)	Contributing Basins	Flow (cfs)	Normal Depth (ft)	Energy Grade Depth (ft)
Calle Alegria E-W	28	3.73	321b	6.41	0.33	0.44
Calle Alegria N-S	24	0.05	321b & 321c	8.97	0.33	0.39
Alameda Blvd.	60	2.70	Upstream & 321a	14.2 (1/2 street flows)	0.35	0.58

Drainage Description

Following the Isaacson & Arfman Drainage Report, peak flows from the drainage basins will be discharged to the Alameda storm drainage system either within the subdivision or

in Alameda Boulevard. Refer to Plate 1. The runoff from Basin 321a, which includes Alameda Blvd. ROW, will be collected by a double A type storm inlet in Alameda Blvd. toward the west end of the subdivision. The peak runoff from Basin 321a is 2.23 cfs. The runoff from Basins 321b & 321c within the subdivision will be collected in a double C type storm inlet at the north end of the Calle Alegria hammerhead. This storm inlet is in a sump condition. ~~A 24" RCP will carry the flows from the storm inlet to the 36" RCP storm drain in Alameda Blvd.~~ The peak flows from Basins 321b & 321c is 8.97 cfs.

The Alameda storm drain discharges to a retention pond located west of Trementina Oeste. The Isaacson & Arfman Drainage Report shows that the retention pond is sized to store the 100-year, 10-day storm runoff for all basins draining to it. This includes existing conditions runoff volume from Trementina Oeste. In order that the Developed conditions runoff volume from Trementina Oeste can be stored in the retention pond, the pond will require expansion. The hydrology calculations show that the increase in 100-year, 10-day volume from developed conditions as compared to existing conditions is 0.52 acre-feet. To allow for the increase in volume stored, the pond will be deepened by 2 feet. The total volume stored in the pond will be 5.96 acre-feet and the 100-year water surface elevation (WSEL) will be 5302.30.

The developer of Trementina Oeste has worked out an agreement with the developers of Trementina subdivision and Vista del Aguila Unit 3 subdivision to allow the runoff from Trementina Oeste to be discharged to the temporary retention pond. ~~The Trementina Oeste developer will share in the maintenance responsibilities of the pond.~~ The NAA MDP indicates that the Alameda storm drain will be extended downstream from Louisiana Blvd. to San Pedro Blvd.

Storm Sewer Hydraulics Analysis

Once the hydrologic analysis was completed, a hydraulics analysis was performed to size the proposed storm sewer pipe. The storm sewer analysis in the Isaacson & Arfman Drainage Report was used as a starting point. Also, the sump storm inlet and Alameda storm inlet were sized. The hydraulics analysis is shown in Appendix B.

Grading Plan

Plate 1 shows the Mass Grading Plan for the subdivision. The grading plan shows that the subdivision will drain from east to west and into the proposed storm drain in Alameda Blvd. Since the Trementina subdivision retaining wall has not been constructed yet, the retaining wall on the east side of the subdivision can either be constructed separately from the Trementina subdivision retaining wall or the Trementina retaining wall can be deepened by the required retaining wall depth for this subdivision. The retaining wall on the west side of the subdivision will be constructed with the subdivision. A typical retaining wall is shown on Plate 1.

HYDROLOGIC CALCULATIONS
SECTION 22.2 OF THE DPM
3-Dec-03

TREMENTINA OESTE SUBDIVISION
ZONE 3

	6-HOUR	24-HOUR	10-DAY
100-YEAR RAINFALL	2.54	2.93	4.47

	TYPE A	TYPE B	TYPE C	TYPE D
PEAK DISCHARGE	1.87	2.6	3.45	5.02
EXCESS RUNOFF	0.66	0.92	1.29	2.36

BASIN	AREA	LAND TREATMENT				PEAK FLOW	RUNOFF	RUNOFF	RUNOFF	RUNOFF	CFS/AC
	acres	TYPE A	TYPE B	TYPE C	TYPE D	CFS	6-HR ac-ft	24-HR ac-ft	10-DAY ac-ft	10-DAY CF	CFS
EXISTING											
321A	0.520	0.520	0.000	0.000	0.000	0.97	0.029	0.029	0.029	1246	1.87
321B	1.520	1.520	0.000	0.000	0.000	2.84	0.084	0.084	0.084	3642	1.87
321C	0.630	0.630	0.000	0.000	0.000	1.18	0.035	0.035	0.035	1509	1.87
TOTAL	2.670					4.99	0.15	0.15	0.15	6397	1.87
DEVELOPED											
321A	0.520	0.000	0.100	0.090	0.330	2.23	0.082	0.093	0.135	5894	4.28
321B	1.520	0.000	0.310	0.300	0.910	6.41	0.235	0.265	0.381	16611	4.22
321C	0.630	0.000	0.150	0.150	0.330	2.56	0.093	0.103	0.146	6342	4.07
TOTAL	2.670					11.20	0.41	0.46	0.66	28848	4.19

Required increase in volume to retention pond at Louisiana & Alameda	0.52	22451
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HYDROLOGIC CALCULATIONS
SECTION 22.2 OF THE DPM
21-Oct-03

ALAMEDA 18 LOT SUBDIVISION
ZONE 3

	6-HOUR	24-HOUR	10-DAY
100-YEAR RAINFALL	2.54	2.93	4.47

	TYPE A	TYPE B	TYPE C	TYPE D
PEAK DISCHARGE	1.87	2.6	3.45	5.02
EXCESS RUNOFF	0.66	0.92	1.29	2.36

BASIN	AREA	LAND TREATMENT				PEAK	RUNOFF	RUNOFF	RUNOFF	RUNOFF	CFS/AC
	acres	TYPE A	TYPE B	TYPE C	TYPE D	FLOW	6-HR	24-HR	10-DAY	10-DAY	
						CFS	ac-ft	ac-ft	ac-ft	CF	CFS
FUTURE											
202	0.545	0.000	0.240	0.230	1.150	7.19	0.269	0.307	0.454	19787	13.19
311	1.678	0.000	0.350	0.350	0.970	6.99	0.255	0.287	0.411	17913	4.16
321	2.670	0.200	0.390	0.390	1.890	12.22	0.455	0.516	0.759	33040	4.58
TOTAL	4.893					26.40	0.98	1.11	1.62	70741	5.40
DEVELOPED											
202	1.617	1.620	0.000	0.000	0.000	3.03	0.089	0.089	0.089	3881	1.87
311	1.678	0.000	0.350	0.350	0.970	6.99	0.255	0.287	0.411	17913	4.16
321	2.670	2.670	0.000	0.000	0.000	4.99	0.147	0.147	0.147	6397	1.87
TOTAL	5.965					15.01	0.49	0.52	0.65	28191	2.52

Basin 202 - Undeveloped land east of Trementina and south of Alameda (existing conditions volume included in pond volume)

Basin 311 - Alameda ROW, Louisiana to Trementina (developed conditions volume included in pond volume)

Basin 321 - Undeveloped land west of Trementina and south of Alameda (existing conditions volume included in pond volume)

Required increase in volume to retention pond at Louisiana & Alameda	0.98	42549
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Street Hydraulics

HEC-RAS Plan: STREETCAP River: 1 Reach: Street Cap 28 ft

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Street Cap 28 ft	1000	6.41	109.56	109.77	109.84	110.00	0.042513	3.55	1.71	19.09	2.11
Street Cap 28 ft	950	6.41	107.69	107.92	107.98	108.12	0.034003	3.26	1.85	19.78	1.90
Street Cap 28 ft	900	6.41	105.83	106.05	106.12	106.27	0.037108	3.37	1.79	19.44	1.98
Street Cap 28 ft	850	6.41	103.97	104.20	104.26	104.39	0.032604	3.21	1.88	19.95	1.87
Street Cap 28 ft	800	6.41	102.11	102.33	102.40	102.54	0.035412	3.31	1.82	19.64	1.94
Street Cap 28 ft	750	6.41	100.25	100.47	100.54	100.69	0.037904	3.39	1.77	19.37	2.00
Street Cap 28 ft	700	6.41	98.39	98.61	98.68	98.83	0.038825	3.39	1.77	19.76	2.02

Depth of flow

Calle Allegria East-West

$Q = 6.41 \text{ CFS}$ STA 900 $S = 3.73\%$

Depth of flow = $106.05 - 105.83 = 0.22' < 0.33'$ curb height

Energy Grade = $106.27 - 105.83 = 0.44' \leq 0.44'$ height of ROW

Street Hydraulics

HEC-RAS Plan: Plan 01 River: 1 Reach: Str Cap 24' FF

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chi
Str Cap 24' FF	1000	8.97	109.56	109.88	109.87	109.95	0.005205	1.98	4.40	25.19	0.83
Str Cap 24' FF	950	8.97	109.31	109.64		109.70	0.004719	1.93	4.54	25.24	0.80
Str Cap 24' FF	900	8.97	109.06	109.38		109.45	0.005436	2.01	4.35	25.17	0.85
→ Str Cap 24' FF	850	8.97	108.81	109.14		109.20	0.004497	1.90	4.62	25.50	0.78
Str Cap 24' FF	800	8.97	108.56	108.88		108.95	0.005799	2.05	4.26	25.13	0.87
Str Cap 24' FF	750	8.97	108.31	108.65		108.70	0.004167	1.87	4.76	25.92	0.75
Str Cap 24' FF	700	8.97	108.06	108.37	108.37	108.45	0.006764	2.14	4.06	25.06	0.94

Depth of flow

Calle. Alegria North-South (hammerhead)

$Q = 8.97 \text{ cfs}$ STA 850 $S = 0.58$

Depth of flow = $109.14 - 108.81 = 0.33' \leq 0.33'$ Curb height

Energy Grade $109.20 - 108.81 = 0.39' < 0.44'$ Height of ROW

SUMMARY OF HYDRAULIC CALCULATIONS																				BY:	DBT		
CLOSED CONDUIT																				DATE:	12/4/2003		
PROJECT: TREMENTINA OESTE SUBDIVISION																				SHEET:	1 of 1		
100 year																							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
STATION	STRUCT	D	Q	A	V	K	Sf	L	DELTA	JUNCTION		LOSSES							E.G.	hv	H.G.	GROUND ELEV.	
										D	ANGLE	hf	hb	hj	h _{mh}	ht	h _{misc}	SUM					
ALAMEDA	Pond												0.00				0.00	0.00	5305.04	2.04	5303.00		
		36	81	7.07	11.46	667.28	0.0147	95				1.40						1.40	5306.44	2.04	5304.40		
	MH 1								90	24	0		0.31	0.83	0.00	0.00		1.14	5307.58	1.54	5306.04	5307.50	
		36	70.5	7.07	9.97	667.28	0.0112	267				2.98						2.98	5310.56	1.54	5309.02		
	MH 2									24	90		0.00	0.90	0.00	0.00		0.90	5311.46	1.09	5310.37	5314.50	
		36	59.3	7.07	8.39	667.28	0.0079	78				0.62						0.62	5312.08	1.09	5310.99		
	MH 3												0.00	0.00	0.11	0.23		0.35	5312.43	2.27	5310.16		
		30	59.3	4.91	12.08	410.33	0.0209	445				9.29						9.29	5321.72	2.27	5319.46		
																					5310.37		
SUBD.	MH2												0.00				0.00	0.00	5310.57	0.20	5310.37		
		24	11.2	3.14	3.57	226.29	0.0024	60				0.15						0.15	5310.72	0.20	5310.52	5314.50	
REMARKS:	Manning's n: 0.013																						

Analyze Sump Inlets

GRATE OPEN AREA (single grate)

$$\begin{aligned}\text{Gross Area for single grate} &= (25 \text{ in}/12) \times (40 \text{ in}/12) = 6.94 \text{ SF} \\ \text{Less longitudinal bars} &= (0.5 \text{ in}/12) \times (3.33 \text{ ft}) \times (13) = 1.80 \text{ SF} \\ \text{Less cross bars} &= (0.5 \text{ in}/12) \times (7) \\ &\quad [(25 \text{ in}/12) - (13) \times (0.5 \text{ in}/12)] = 0.45 \text{ SF}\end{aligned}$$

$$\text{Net Grate Opening} = 4.69 \text{ SF}$$

$$\text{Assume 50\% clogging} = 2.35 \text{ SF}$$

ORIFICE EQUATION

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

$$C = 0.67$$

$$A = 2.35 \text{ SF}$$

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

$$h = \text{height of water above opening}$$

Inlet at Calle Alegria

$$h = 0.33 \text{ (mountable curb)}$$

$$Q_{cap} = 7.25 \text{ CFS}$$

$$\text{Required } Q = 8.97 \text{ CFS} \quad \text{USE 2 storm inlets}$$

DRAINAGE REPORT

FOR

**VISTA DEL AGUILA UNIT THREE &
TREMONTINA SUBDIVISION**

**73-LOT & 61-LOT SINGLE FAMILY
RESIDENTIAL SUBDIVISIONS**

**ALBUQUERQUE, NEW MEXICO
MAY 2003**

Prepared by:

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



Genevieve L. Donart
Genevieve L. Donart, PE

5/30/03
Date

REVISED
6/17/03 GLD

V. FUTURE CONDITIONS

In the future, as lots designated as undeveloped in the proposed condition develop, the flows in the system will increase. This report assumes that Basins 201a, 201b, 202, and 321 will have similar land treatments to the basins within the proposed subdivisions. Basin 322 is zoned as SU-2/C-1, so it was assumed that the land treatments will be different from the residential areas. Land treatments for future conditions are as follows:

TABLE 4			
Treatment Type	Percentages		
	Onsite & Offsite*	Basin 322	Alameda
Type A	0%	0%	0%
Type B	14.6%	5%	21%
Type C	14.5%	5%	21%
Type D	70.9%	90%	58%

* Onsite Land Treatments were calculated per the Typical Lot Detail in Appendix B

These land treatments were used to calculate future flows and volumes. (See Runoff Calculations for Future Conditions in Appendix A.) The storm drain in Alameda is sized for the fully-developed condition, but the pond is sized only for the proposed condition. Offsite lots will be required to retain all developed stormwater on their properties.

Once future expansion of the downstream storm drain in Alameda allows for free discharge to the La Cueva Channel, the retention ponds can be removed by a separate grading plan. The City of Albuquerque and AMAFCA will determine when the system is approved for free discharge.

Alameda Blvd:

1. Standard curb on all portions of the street adjacent to the proposed subdivisions.
2. One single-grate storm inlet on the south side of Alameda east of Via Feliz. This system will route through Trementina to the existing Eagle Spring storm drain.
3. Storm drain from Via Feliz to Louisiana Blvd with a double-grate inlet on the north side of Alameda upstream of Via de Paz, and a single-grate inlet on the north side of Alameda adjacent to the ends of Dancing Eagle Ct and Eagle Feather Ct. This system will empty to the retention pond.

In the future, the following items shall be constructed by offsite development:

Future Conditions:

1. Temporary retention ponds on offsite properties to retain the developed volumes for that property.
2. A single-grate inlet on the north side of Alameda between Lots 18 & 19, NAA, Unit 3, Tract 2, Block 4 to capture developed flows from Basin 201A.
3. The first lot within Basin 321 must construct inlets to capture the flows from that basin.
4. Once completion of future expansion of the downstream storm drain in Alameda allows for free discharge to the La Cueva Channel, the retention pond on Basin 322 and any individual lot retention ponds can be removed by separate grading plans. Free discharge and pond removals are subject to City of Albuquerque and AMAFCA approval.
5. When Basin 322 is available to develop, the blanket drainage easement shall be vacated, and an inlet shall be constructed to capture flows from that basin.

SUMMARY OF FLOWS AT ANALYSIS POINTS

100-YEAR, 6-HOUR STORM

Per the City of Albuquerque D.P.M. Section 22.2

FUTURE FLOWS				
BASIN	Q ₁₀₀ (cfs)	CUMULATIVE FLOWS	ANALYSIS PT	Q ₁₀₀ AT AP (cfs)
202	7.18	7.18		
210a	4.29	11.46	AP10	11.46
203	6.53	6.53		
320a	9.11	15.64	AP12	27.11
210b	2.76	2.76		
201	11.83	14.59	AP11	14.59
320b	8.03	8.03		
320c	6.65	14.68	AP20	14.68
301	1.71	1.71		
310	11.10	12.81	AP21	42.09
302a	8.51	8.51		
302b	9.51	18.02		
302c	4.79	22.81	AP30	22.81
303	1.72	1.72		
311	7.02	8.74		
321	11.83	20.57	AP31	85.46
304a	7.56	7.56		
304b	2.93	10.49	AP32	10.49
322	7.77	18.26	AP33	103.73

FUTURE VOLUMES
NOTE: Future Volumes in the retention pond designed by this project are less than the Proposed Volumes. Any lots shown as undeveloped in the Proposed Condition in this report that develop in the future must retain developed volumes on that property until future expansion of the downstream storm drain in Alameda allows for free discharge to the La Cueva Channel. (Free discharge to be approved by the City of Albuquerque and AMAFCA)

RUNOFF CALCULATIONS FOR PROPOSED CONDITIONS (Q_{100})

100-YEAR, 6-HOUR STORM

Per the City of Albuquerque D.P.M. Section 22.2

TREATMENT TYPE 2 (UNDEVELOPED LAND)							
BASIN #	LAND TREATMENT AREAS (Ac)					Q_{100} (cfs)	REMARKS
	A_{TOTAL}	A_A	A_B	A_C	A_D		
201	4.282	4.28	0	0	0	8.0	N. of Alameda, e. of Via Feliz
202	1.617	1.62	0	0	0	3.0	S. of Alameda, e. of Trementina
321	2.665	2.67	0	0	0	5.0	S. of Alameda, w. of Trementina
322	1.612	1.61	0	0	0	3.0	Pond Lots

TREATMENT TYPE 3 (ALAMEDA BLVD)							
BASIN #	LAND TREATMENT AREAS (Ac)					Q_{100} (cfs)	REMARKS
	A_{TOTAL}	A_A	A_B	A_C	A_D		
210a	1.025	0	0.22	0.22	0.59	4.3	Alameda R/W, e. of Via Feliz, n. side
210b	0.661	0	0.14	0.14	0.38	2.8	Alameda R/W, e. of Via Feliz, s. side
310	2.655	0	0.56	0.56	1.54	11.1	Alameda R/W, middle section
311	1.678	0	0.35	0.35	0.97	7.0	Alameda R/W, Louisiana to Trementina

VOLUME CALCULATIONS FOR PROPOSED CONDITIONS (V_{100})

100-YEAR, 6-HOUR STORM

Per the City of Albuquerque D.P.M. Section 22.2

TREATMENT TYPE 2								
BASIN #	LAND TREATMENT AREAS (Ac)					V_{100} (Ac-ft)	V_{100} (cu.ft.)	REMARKS
	A_{TOTAL}	A_A	A_B	A_C	A_D			
201	4.282	4.28	0	0	0	0.2355	10258.8	
202	1.617	1.62	0	0	0	0.0889	3874.0	
321	2.665	2.67	0	0	0	0.1466	6384.8	
322	1.612	1.61	0	0	0	0.0887	3862.0	

TREATMENT TYPE 3								
BASIN #	LAND TREATMENT AREAS (Ac)					V_{100} (Ac-ft)	V_{100} (cu.ft.)	REMARKS
	A_{TOTAL}	A_A	A_B	A_C	A_D			
210a	1.025	0	0.22	0.22	0.59	0.1566	6819.8	
210b	0.661	0	0.14	0.14	0.38	0.1010	4397.9	
310	2.655	0	0.56	0.56	1.54	0.4055	17664.8	
311	1.678	0	0.35	0.35	0.97	0.2563	11164.5	

RETENTION POND VOLUMES
FOR 100-YEAR, 10-DAY STORM

$$\begin{aligned} P_{360} &= 2.54 \text{ in} && (\text{from Fig. C-2, COA DPM}) \\ P_{1440} &= 2.93 \text{ in} && (\text{from Fig. C-3, COA DPM}) \end{aligned}$$

$$\begin{aligned} V_{360} &= 3.1588 \text{ Ac-ft} && (\text{from Volume calcs}) \\ A_D &= 14.2042 \text{ Ac} \end{aligned}$$

$$P_{10\text{day}} = 10 - [24.9/(P_{1440})^{1.4}]$$

$$P_{10\text{day}} = 4.471788 \text{ in}$$

$$V_{10\text{day}} = V_{360} + A_D(P_{10\text{day}} - P_{360})/12$$

$$V_{10\text{day}} = \underline{\underline{5.4454 \text{ Ac-ft} \quad \Rightarrow \quad 237203 \text{ cu. ft.}}}$$

RUNOFF CALCULATIONS FOR FUTURE, FULLY-DEVELOPED CONDITIONS (Q_{100})

100-YEAR, 6-HOUR STORM

Per the City of Albuquerque D.P.M. Section 22.2

PROJECT NAME: VISTA DEL AGUILA UNIT 3
JOB NUMBER: 1257

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

% LAND TREATMENTS				
	TREAT TYPE 1	TREAT TYPE 2	TREAT TYPE 3	TREAT TYPE 4
A	0	0	0	0
B	14.6	21	5	0
C	14.5	21	5	0
D	70.9	58	90	0
$\Sigma\% =$	100	100	100	0

PRECIPITATION ZONE: 3

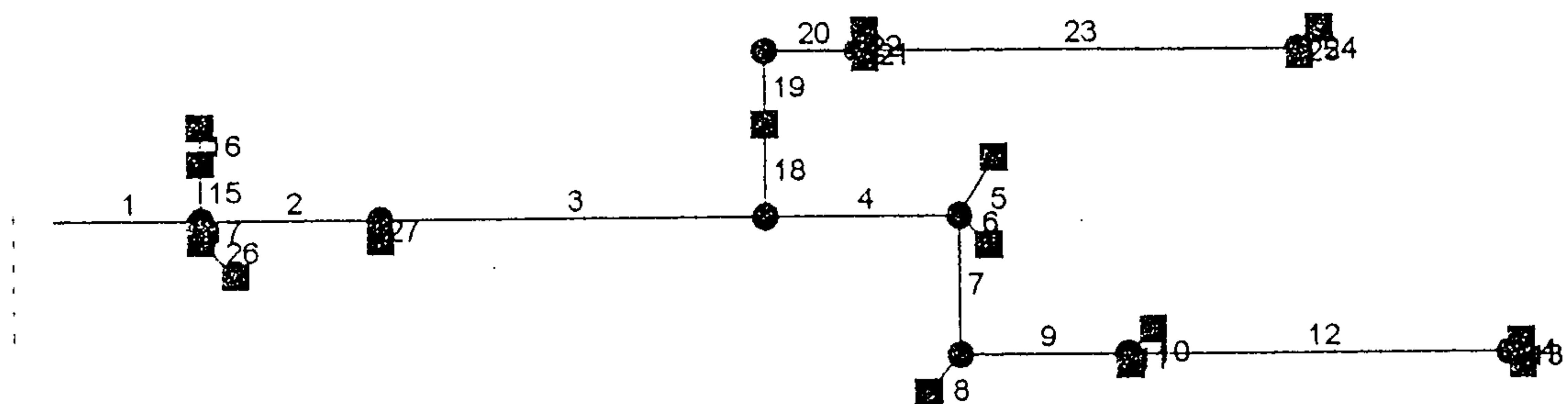
TREATMENT TYPE 1 (DEVELOPED RESIDENTIAL)							
BASIN #	LAND TREATMENT AREAS (Ac)					Q_{100} (cfs)	REMARKS
	A_{TOTAL}	A_A	A_B	A_C	A_D		
201	4.282	0	0.63	0.62	3.04	19.0	N. of Alameda, e. of Trementina
202	1.617	0	0.24	0.23	1.15	7.2	S. of Alameda, e. of Trementina
203	1.472	0	0.21	0.21	1.04	6.5	Trementina-Via Contenta east of 11+50
301	0.385	0	0.06	0.06	0.27	1.7	Vista 3 - Via Feliz
302a	1.917	0	0.28	0.28	1.36	8.5	Vista 3 - Dancing Eagle Ave
302b	2.143	0	0.31	0.31	1.52	9.5	Vista 3 - Dancing Eagle Ave
302c	1.078	0	0.16	0.16	0.76	4.8	Vista 3 - Dancing Eagle Ct
303	0.388	0	0.06	0.06	0.28	1.7	Vista 3 - Eagle Talon Dr
304a	1.704	0	0.25	0.25	1.21	7.6	Vista 3 - Eagle Feather Rd
304b	0.66	0	0.10	0.10	0.47	2.9	Vista 3 - Eagle Feather Ct
320a	2.052	0	0.30	0.30	1.45	9.1	Trementina-Via Contenta (sta 7+00-11+50)
320b	1.81	0	0.26	0.26	1.28	8.0	Trementina-Via Contenta (sta 3+00-7+00)
320c	1.497	0	0.22	0.22	1.06	6.6	Trementina-Via de Paz
321	2.665	0	0.39	0.39	1.89	11.8	S. of Alameda, w. of Trementina

TABLE 5 STREET FLOW DEPTH SUMMARY - ALAMEDA BLVD NORTH SIDE							
STREET	LOCATION	STREET WIDTH	CURB TYPE	SLOPE (ft/ft)	Q ₁₀ (X2) (cfs)	DEPTH (ft)	EGL DEPTH (ft)
Alameda Blvd - north	Sta 31+50 & up (X2)	60' F-F	std	0.0261	10.3	0.32	0.51
Alameda Blvd - north	Sta 30+00 to 31+50 (X2)	60' F-F	std	0.0381	22.7	0.39	0.75
Alameda Blvd - north	Sta 28+50 to 30+00 (X2)	60' F-F	std	0.0427	27	0.40	0.83
Alameda Blvd - north	Sta 27+00 28+50 (X2)	60' F-F	std	0.0377	1.9	0.19	0.30
Alameda Blvd - north	Sta 24+00 to 27+00 (X2)	60' F-F	std	0.0342	13	0.33	0.59
Alameda Blvd - north	Sta 18+00 to 24+00 (X2)(AP21)	60' F-F	std	0.0369	13	0.33	0.60
Alameda Blvd - north	Sta 16+00 to 18+00 (X2)	60' F-F	std	0.0223	6.6	0.29	0.42
Alameda Blvd - north	Sta 12+00 to 16+00 (X2)	60' F-F	std	0.0270	6.6	0.28	0.44
Alameda Blvd - north	Louisiana to Sta 12+00 (X2)	60' F-F	std	0.0261	6.6	0.28	0.43

TABLE 6**STREET FLOW DEPTH SUMMARY - ALAMEDA BLVD SOUTH SIDE**

STREET	LOCATION	STREET WIDTH	CURB TYPE	SLOPE (ft/ft)	Q₁₀ (X2) (cfs)	DEPTH (ft)	EGL DEPTH (ft)
Alameda Blvd - south	Sta 31+50 & up (X2)	60' F-F	std	0.0261	19.3	0.39	0.64
Alameda Blvd - south	Sta 30+00 to 31+50 (x2)	60' F-F	std	0.0381	22.7	0.39	0.75
Alameda Blvd - south	Sta 28+50 to 30+00 (X2)	60' F-F	std	0.0427	22.7	0.38	0.78
Alameda Blvd - south	Sta 27+00 28+50	60' F-F	std	0.0377	22.7	0.39	0.75
Alameda Blvd - south	Sta 24+00 to 27+00 (X2)	60' F-F	std	0.0342	7	0.28	0.47
Alameda Blvd - south	Sta 18+00 to 24+00 (AP21) (X2)	60' F-F	std	0.0369	7	0.27	0.48
Alameda Blvd - south	Sta 16+00 to 18+00 (X2)	60' F-F	std	0.0223	11.4	0.34	0.51
Alameda Blvd - south	Sta 12+00 to 16+00 (X2)	60' F-F	std	0.0270	14.2	0.35	0.58
Alameda Blvd - south	Louisiana to Sta 12+00	60' F-F	std	0.0261	10.4	0.32	0.51

Hydraflow Plan View



Project file: 1257-Louis future.stm

IDF file: sampleFHA.IDF

No. Lines: 27

05-28-2003

Hydraflow Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID	
Line	To Line		Incr (ac)	Total (ac)		Incr (min)	Total (min)	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)		
1	End	153.0	0.00	0.00	0.00	0.00	0.00	0.0	3.3	0.0	96.57	160.3	13.66	36	5.78	5300.10	5291.26	5305.71	5302.50	5308.06	5303.50	Alameda & Louisi	
2	1	186.0	0.00	0.00	0.00	0.00	0.00	0.0	3.1	0.0	69.57	65.88	14.17	30	2.58	5305.00	5300.20	5311.06	5305.71	5313.05	5308.06	Alameda	
3	2	403.0	0.00	0.00	0.00	0.00	0.00	0.0	2.5	0.0	57.74	65.50	11.76	30	2.55	5315.38	5305.10	5319.06	5311.06	5323.28	5313.05	Alameda	
4	3	202.0	0.00	0.00	0.00	0.00	0.00	0.0	2.0	0.0	34.91	40.85	11.19	24	3.26	5321.97	5315.38	5323.89	5319.06	5329.97	5323.28	Alameda	
5	4	72.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	5.55	22.21	4.08	18	4.47	5325.29	5322.07	5326.19	5323.89	5331.06	5329.97	Alameda connect	
6	4	43.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	5.55	34.79	4.08	18	10.98	5326.79	5322.07	5327.69	5323.89	5331.06	5329.97	Alameda connect	
7	4	148.0	0.00	0.00	0.00	0.00	0.00	0.0	1.7	0.0	23.81	26.88	8.01	24	1.41	5324.11	5322.02	5325.84	5323.89	5329.11	5329.97	Via de Paz	
8	7	52.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.65	9.44	3.89	18	0.81	5324.68	5324.26	5326.01	5325.84	5327.77	5329.11	Via de Paz conne	
9	7	173.0	0.00	0.00	0.00	0.00	0.00	0.0	1.4	0.0	17.16	16.11	9.71	18	2.35	5328.33	5324.26	5330.46	5325.84	5336.70	5329.11	Via Contenta	
10	9	36.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	4.02	19.65	3.35	18	3.50	5329.74	5328.48	5330.51	5330.46	5338.03	5336.70	Via Contenta con	
11	9	11.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	4.02	22.62	2.28	18	4.64	5328.99	5328.48	5330.48	5330.46	5336.95	5336.70	Via Contenta con	
12	9	396.0	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	9.12	20.67	5.71	18	3.88	5343.78	5328.43	5344.93	5330.46	5351.63	5336.70	Via Contenta	
13	12	18.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	4.56	32.93	4.14	18	9.83	5345.70	5343.93	5346.52	5344.93	5351.81	5351.63	Via Contenta con	
14	12	20.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	4.56	31.24	4.14	18	8.85	5345.70	5343.93	5346.52	5344.93	5352.26	5351.63	Via Contenta con	
15	1	61.0	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	14.86	16.13	4.73	24	0.51	5300.56	5300.25	5305.97	5305.71	5307.83	5308.06	Eagle Feather co	
16	15	39.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	10.49	18.72	5.94	18	3.18	5302.30	5301.06	5306.36	5305.97	5307.07	5307.83	Eagle Feather co	
17	1	23.0	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	12.14	36.71	6.87	18	12.22	5303.06	5300.25	5306.02	5305.71	5308.06	5308.06	Alameda connect	
18	3	99.0	0.00	0.00	0.00	0.00	0.00	0.0	2.2	0.0	22.83	29.15	4.65	30	0.51	5315.93	5315.43	5319.36	5319.06	5321.80	5323.28	Dancing Eagle Ct	
19	18	79.0	0.00	0.00	0.00	0.00	0.00	0.0	1.9	0.0	18.04	15.89	5.74	24	0.49	5316.67	5316.28	5319.87	5319.36	5322.83	5321.80	Dancing Eagle Ct	
20	19	98.0	0.00	0.00	0.00	0.00	0.00	0.0	1.8	0.0	18.04	16.02	10.21	18	2.33	5319.10	5316.82	5322.76	5319.87	5327.10	5322.83	Dancing Eagle Av	
21	20	22.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	4.76	21.36	2.69	18	4.14	5320.16	5319.25	5322.80	5322.76	5327.70	5327.10	Dancing Eagle co	
Project File: 1257-Louis future.stm									IDF File: sampleFHA.IDF							Total number of lines: 27				Run Date: 05-28-2003			
NOTES: Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs. ; Initial tailwater elevation = 5302.50 (ft)																							

Proposed Basin Map

VISTA DEL AGUIL

Plan 00.31
REV-07.28 (4/73)

Plan 01.83
REV-00.00

LOUISIANA BLVD

VIA DE PAZ

