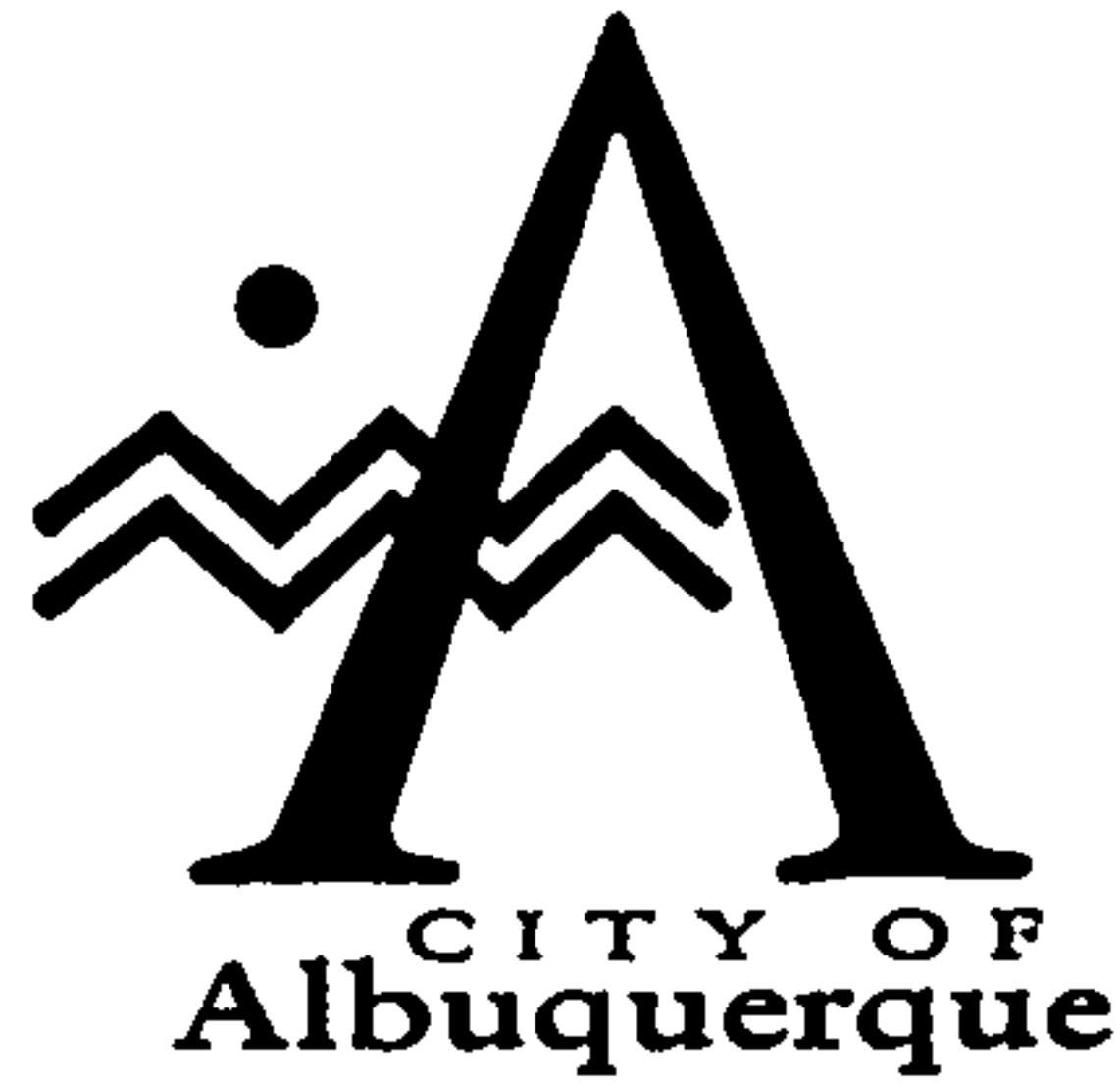




February 9, 1998

Kevin Patton, P.E.
Bohannon-Huston
7500 Jefferson St. NE, Courtyard 1
Albuquerque, New Mexico 87109

RE: Drainage Report and Grading Plan for Tract 15D-1A High Desert, Highlands Unit 4 (E23/D3C) Submitted for Preliminary and Final Plat Approval, and Grading and Paving Permit Approvals, Engineer's Stamp Dated 2/3/98.

Dear Mr. Patton:

Based on the information provided in the submittal of February 4, 1998, the above referenced report and Grading and Drainage Plan are approved for Preliminary Plat action.

The above referenced plan is also approved for Grading Permit release, provided that a top-soil disturbance permit is obtained. Before sign-off of the Final Plat, the subdivision improvements agreement (SIA) must be in place.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Fred Aguirre, DRB 97-535
Jack Eichorn, High Desert Investment Corp.
File



△

DRAINAGE REPORT
FOR
HIGH DESERT - TRACT 15D-1A
(UNIT 4 OF THE HIGHLANDS)

FEBRUARY 3, 1998

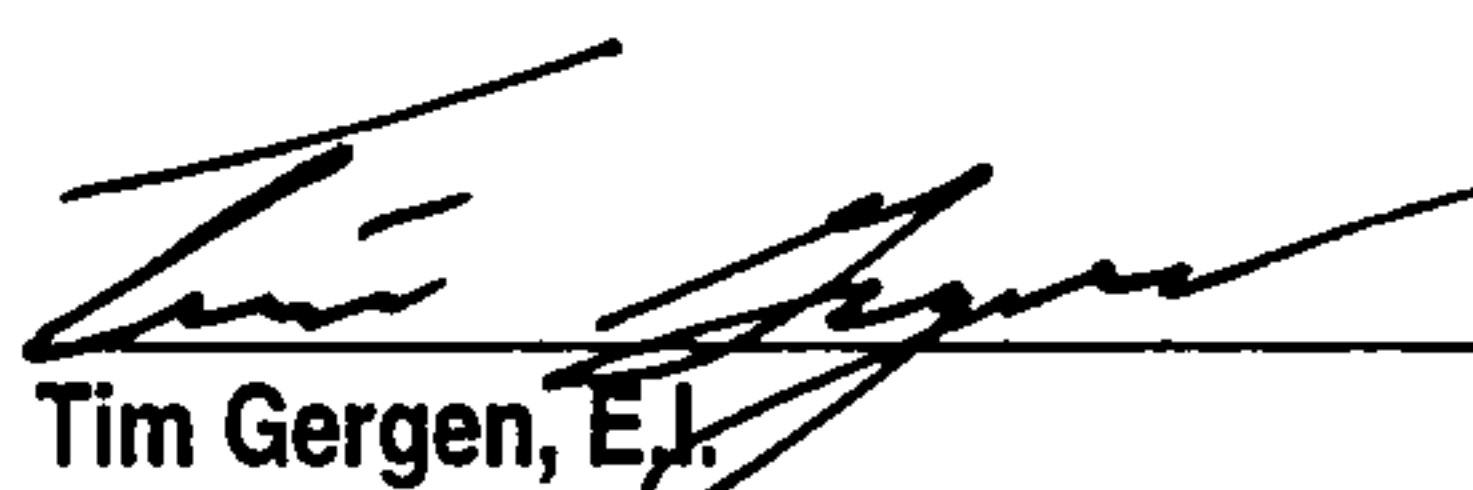
PREPARED BY:

BOHANNAN HUSTON
COURTYARD I, 7500 JEFFERSON STREET N.E.
ALBUQUERQUE, NM 87109

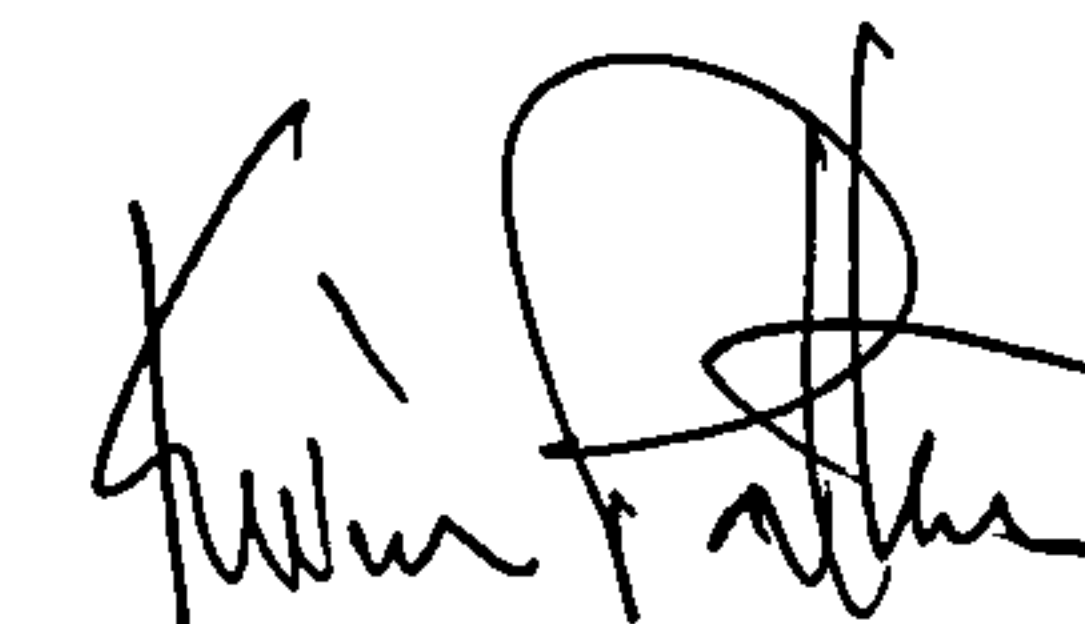
PREPARED FOR:

HIGH DESERT INVESTMENT CORPORATION
13000 ACADEMY ROAD NE
ALBUQUERQUE, NM. 87111

PREPARED BY:

 2/3/98
Tim Gergen, E.I. Date

UNDER THE SUPERVISION OF

 2/3/98
Kevin Patton, P.E. Date



I. PURPOSE

The purpose of this report is to provide site-specific drainage analysis for existing and proposed conditions for the residential development, referred to as Unit 4 of the Highlands at High Desert (Tract 15D-1A). This plan is prepared and submitted to support rough grading, infrastructure design, preliminary and final plat approvals.

This report will reference the following City of Albuquerque and the Albuquerque Metropolitan Arroyo Flood Control Authority (AMAFCA) approved studies prepared for the High Desert Development: 1) the High Desert Drainage Management Master Plan, dated December 1993; 2) the High Desert - Phase I Prudent Line Analysis, dated May 1994; 3) the High Desert - Phase II Prudent Line Analysis, dated August 1995; 4) the High Desert Subdivision South Pino Tributary Storm Drain Design Analysis Report, dated May 1997; and 5) the Final High Desert Subdivision Academy Storm Drain Design Report, dated September 1994.

The High Desert Drainage Management Master Plan, dated December 1993, was prepared to support future drainage plans submitted for the development of individual land parcels within High Desert and to provide design guidance for the design of primary drainage infrastructure to be constructed by High Desert in advance of or simultaneously with individual parcel development. In addition, it provides fully developed flow rates for basins that influence the Highlands Subdivision in the High Desert Development.

The High Desert - Phase I Prudent Line Analysis, dated May 1994, was prepared to establish the prudent lines for the proposed High Desert Development south of the South Pino Tributary Arroyo. The report establishes prudent lines from fully developed flow rates of the basins influencing the Highlands Subdivision in the High Desert Development.

The High Desert - Phase II Prudent Line Analysis, dated August 1995, is a follow-up study to the High Desert - Phase I Prudent Line Analysis, dated May 1994. Phase II establishes prudent lines for the South Pino Tributary Arroyo downstream of the South Pino Diversion to the North

Bear Tributary. The report establishes prudent lines from fully developed flow rates of the basins influencing the Highlands Subdivision in the High Desert Development.

The High Desert Subdivision South Pino Tributary Storm Drain Design Analysis Report, dated May 1997, was prepared to establish a conveyance system for the South Pino Tributary Arroyo from Imperata Street to Tramway Boulevard and to determine the required land area and potential grading for the desiltation pond immediately upstream of Imperata Street. The infrastructure reflected in the above report is currently being constructed under COA Project #571282.

The Final High Desert Subdivision Academy Storm Drain Design Report, dated September 1994, was prepared to determine what drainage infrastructure was required to be in place prior to the development of certain tracts within the High Desert Development. This infrastructure now exists and was approved and accepted by the City of Albuquerque under COA Project #4809.95, Phase 1-B-1.

II. PRUDENT LINES

Please refer to the High Desert - Phase I Prudent Line Analysis, dated May 1994 and High Desert - Phase II Prudent Line Analysis, dated August 1995. The concept of the "prudent line" was established by AMAFCA. The prudent line represents the minimum setback necessary to provide protection for development from an active arroyo. The prudent line concept encompasses not only the flood plain necessary to pass the 100-year storm, but also represents the potential for natural arroyos to move laterally and degrade over time. The long-term effects are based on potential erosion associated with "representative" storm events occurring for a 30-year period.

The Grading and Drainage Plan enclosed contains the prudent lines calculated in the above mentioned report. The prudent lines within Tract 15D-1A, were granted as drainage easements to AMAFCA on July 1, 1996, under Document No. 96073621, Book 96-18, Pages 3732-3779. The building envelopes in Tract 15D-1A are not located within the prudent lines.

III. METHODOLOGIES

Please refer to the above referenced reports for the specific methodologies used in preparing those individual reports or plans.

Site conditions are analyzed for a 100-year, 6-hour storm events in accordance with the City of Albuquerque Drainage Ordinance and the Development Process Manual (DPM), Volume 2, Design Criteria, Section 22.2, Hydrology for the City of Albuquerque, January 1993.

The site, as describe in the 'Site Location and Characteristics' section below, is approximately 27.36 acres. Therefore, Part A of the DPM, Section 22.2, which provides a simplified procedure for projects with sub-basins smaller than 40 acres was used.

The report will reference the High Desert Drainage Management Mater Plan, dated December 1993 (hereafter referred to as the HDDMMP), which was prepared for High Desert Investment Corporation and approved by the City of Albuquerque. That report was prepared to support future drainage plans submitted for the development of individual land parcels within High Desert, and to provide design guidance for the installation of major drainage infrastructure to be constructed in advance of, or simultaneously with individual parcel development. In addition, it provides fully developed flow rates for basins within the High Desert Development.

IV. SUMMARY OF THE RELATED PLATTING AND EASEMENTS

Please refer to the proposed Bulk Land Plat enclosed in the Exhibit section of this report.

The proposed Bulk Land Plat will divide Tract 15D-1 into Tract 15D-1A and Tract 15D-1B. This will support future development of Tract 15D-1A, which will be divided into 28 lots and one Tract referred as 15D-1A-1.

High Desert Investment Corporation will provide a public drainage easement to the City of Albuquerque addressing cross-lot drainage. This easement is identical to the public drainage easement that was granted to the City with the development of Units 1, 2, 2A and 3 of the Highlands at High Desert. As mentioned above, the prudent lines already exist as drainage easements granted to AMAFCA and the Residential Owners Association.

High Desert Investment Corporation has drafted the maintenance agreement, associated with the existing AMAFCA easements mentioned above, defining the different responsibilities required by AMAFCA and the residential Owners Association. The final plat will clearly identify all maintenance responsibilities for all arroyo and tributary easements. AMAFCA has already been provided with the necessary arroyo and tributary easements for this and future projects in the Highlands at High Desert. This agreement is identical to the agreement recorded with the development of Units 1, 2, 2A and 3 of the Highlands at High Desert.

The High Desert Owners Association will be granted the small easements located outside of the existing southern AMAFCA and High Desert Owners Association easement with the filing of the final plat. These easements are shown within lots 118-120, lots 122-123 and lot 126 and will be maintained by the Owners Association. This will be indicated on the preliminary and final plats.

V. SITE LOCATION AND CHARACTERISTICS

For location of the site, please refer to the vicinity map on the grading and drainage plan enclosed with this report.

The site is located east of proposed Imperata Street, north of Unit 1 of the Highlands Development and west of the Cibola National Forest. The site is currently zoned SU-2/HD-R-1 and is approximately 27.36 acres in size. Access to the site will be provided from future Imperata Street.

Vegetation consists primarily of prairie grasses and a few juniper trees. Slopes in the project site range from 2% to 15%, with the majority of the project sloping at 2% to 8%. The Soil Conservation Service has classified the soils on this site as Embudo-Tijeras complex, Embudo gravely fine sandy loam and Tijeras gravely fine sandy loam, all of which correspond to a common hydrological soil group classification B.

VI. EXISTING HYDROLOGIC AND SITE DRAINAGE CONDITIONS

Please refer to the High Desert - Phase I & II Prudent Line Analysis, dated May 1994 and August 1995, respectively, and the Existing Drainage Conditions Map enclosed with this report.

The above referenced reports supports the development of the Highlands at High Desert. The above reports also provides existing and developed flow rates within the prudent lines from the surrounding area. As indicated on the Existing Drainage Conditions Map within the report, the basins north of the site are relatively large due to the existing South Pino Tributary Arroyo Training Dike diverting upland flows to the north of this tract. This Training Dike was built in the mid 1980's and revised in 1995 to prevent the possibility of flows diverting to the North Bear Tributary.

The existing flow rates for the area within and around Tract 15D-1A will vary due to the ongoing construction of individual lots within Units 1 and 3 of the Highlands. Thus, this report will focus on the fully developed conditions, and how it will affect the proposed development within Tract 15D-1A. The Existing Drainage Conditions Map enclosed provides the reader with an idea of what has been platted.

A. FEMA Floodplain

Please refer to the High Desert - Phase I & II Prudent Line Analysis, dated May 1994 and August 1995, respectively. The prudent lines established in the above referenced reports define the boundaries of the drainage easements that exist in High Desert - Tract 15D-1A.

Please reference the Preliminary Plat and the Bulk Land Plat located in the Exhibit section of this report for location information.



Currently, Bohannon-Huston Inc. is preparing a Letter of Map Revision (LOMR) to remove, revise and add floodplains within High Desert submitted by mid-summer of 1998. The portion of the LOMR that will affect this development includes the North Bear Tributary and the South Pino Tributary. It is anticipated that the South Pino Tributary Training Dike mentioned above will remove the North Bear Tributary FEMA floodplain within the High Desert Development from east of Tramway Boulevard to the existing dike. The South Pino Tributary Desiltation Pond will remove the FEMA floodplain that extends to Tramway Boulevard. The Training Dike will also create a FEMA floodplain between the South Pino Tributary Pond (proposed Tract 15D-1A-1) and the Dike. Although, the floodplain will be contained within the existing prudent lines mentioned above.

Flood insurance may be required on lots 118-127 and may no longer be necessary if the LOMR removes the existing floodplain, but lots 127-137 may require flood insurance as a result of the LOMR. Since the LOMR is not complete at this time, the future floodplain limits can not be determined. The future floodplain limits, to be established with the LOMR, will not extend beyond the existing AMAFCA and Owner Association easement. The submittal of this LOMR to FEMA is anticipated in the late summer of 1998.

VII. DEVELOPED HYDROLOGICAL AND HYDRAULIC CONDITIONS

Please refer to the High Desert Drainage Management Master Plan, dated December 1993 and the Grading and Drainage plan enclosed with this report.

A. Cross-Lot Drainage and Building Envelopes

The site proposes to preserve the natural terrain in every way possible. The site contains 28 lots on approximately 27.36 acres. Each lot contains a maximum building



envelope of 12,000 square feet. The site will utilize cross-lot drainage, which will require an easement within each lot in order to legally permit storm water to maintain its natural course across public roadway(s) and through private property. Property owners are required by covenant agreements to build only within their building envelope and to utilize drainage concepts (i.e. water harvesting) that will not produce concentrated flows outside of their envelope limits. Building or non-native landscaping will not be permitted outside building envelopes.

Each lot owner is required to submit a grading and drainage plan, stamped by a professional engineer, to the High Desert New Construction Committee. Prior to final acceptance of the construction of each individual lot by the High Desert New Construction Committee, the lot owner is required to provide the committee with a drainage plan certified by a professional engineer. At that time a pad elevation will be provided by the lot owner when the home is designed. Given the location of this development to Imperata Street, we have provided standard curb and gutter (and rolled curb and gutter) to contain flows within the public roadway. The proposed curb and gutter will guide flows directly into desiltation ponds or via a storm drain system. Flows will be allowed to maintain its natural course across public roadway and through private property until the beginning of rolled curb on Pino Canyon Place, at the northeast corner of lot 125, where the street will start retaining flows and convey the flows to the proposed inlets at the end of Pino Canyon Place. The proposed inlets will capture and carry the flows to the South Pino Tributary Pond. Flows that aren't captured by natural arroyos will be caught by the rolled and standard curb and gutter on Desert Zinnia Court. Desert Zinnia Court will direct flows to the low point in the road where a cobble swale will meet and guide the flows to the North Bear Tributary Pond. The cobble swale will go from the back of the proposed estate curb on Desert Zinnia Court to the existing cobble drop structure in the pond. The cobble line swale is located within an existing AMAFCA and High Desert Owners Association easement and will be maintained by the Owners Association. For more information on the cobble swale please refer to the Appendix at the back of this report. After the Highlands is fully developed, High Desert Investment Corporation will provide the City with one comprehensive grading and drainage plan reflecting the individual lot grading.

The above referenced report (HDDMMP) has projected storm water runoff values for fully developed conditions within the High Desert Development in order to properly size downstream storm drainage structures. This report compares the projected land treatment percentages assumed in the above report with a more accurate estimate from our enclosed preliminary plat layout. The following results indicate approximately the same values with only negligible differences:

	Land Treatment Types (%)				Peak Discharge (cfs/acre)
	A	B	C	D	
HDDMMP 1993	74.56	0.00	8.28	17.15	2.85
Tract 15D-1A (Unit 4)*	92.57	0.27	0.00	7.16	2.42

In determining the land treatment percentages shown above, HDDMMP assumed 1 du/acre (Tract 15D-1A has 0.99 du/acre) while this report calculated an average building envelope of 11,968 square feet within an average lot size of 0.85 acres (36,990 sf). This report assumes that on average, at least 27% of the area within the building envelope will be landscaped (Land Treatment Type B) and 73% (or 8,736 sf) will be impervious (Land Treatment Type D). According to the subdivision guidelines, any portion (of the assumed 27%) of landscaping within the envelope and located outside of any privacy walls must be native landscaping.

B. The Highlands Ponds, Academy Storm Drain and South Pino Storm Drain

The proposed site (Tract 15D-1A) conveys flows to two detention/desilting ponds which ushers storm water runoff from the Highland's arroyos into the existing Academy Storm Drain and the South Pino Storm Drain which is currently being constructed under COA Project #571282. As stated by the Final High Desert Subdivision Academy Storm Drain Design Report, dated September 1994, the north inlet of the North Bear Tributary Pond is designed to receive 39.9cfs, however only 18.22cfs will drain to the north inlet of

* I believe that this is a conservative estimate due to the fact that the estimate did not take into account that each lot is required to manage storm water flows, using minor detention and water harvesting techniques, within this building envelope, thus reducing peak flow rates indicated above.

the pond as determined by this report. This report, also, determined a discharge of 82.34cfs to the south inlet of the North Bear Tributary pond but the pond's ultimate design flow acceptance of 90.2cfs was used to reflect the more conservative value found in the 1994 report. The North Bear Tributary Pond (Tract 15F), which discharges to the Academy Storm drain was dedicated to the High Desert Residential Owners Association and granted to the City of Albuquerque as a drainage easement. The Academy Storm Drain begins at this pond located within Tract 15F and heads west along the north side of Academy Road until it connects with the Tramway Boulevard storm drain system. The South Pino Storm Drain begins at the South Pino Tributary Pond (Tract 15D-1A-1) located within Tract 15D-1A and heads west along the south side of Blue Grama Road until it connects with the Tramway Boulevard storm drain system. The existing Academy Storm Drain and the current construction of the South Pino Storm Drain are public storm drains owned and maintained by the City of Albuquerque.

As a part of Unit 4 of the Highlands, the developer has decided to construct a bridge across the northern arroyo for access to future unit(s) of the Highlands. The bridge crossing is integral to the drop structure proposed in the South Pino Storm Drain Work Order Project. Therefore, it is anticipated that the bridge will be added to the existing South Pino Storm Drain Work Order Project as a change order. The change order will be submitted to the City Public Works Department for approval upon its completed design. The bridge crossing is on the revised infrastructure list. Constructing the bridge crossing at this time will aid in the development of future units north of Unit 4 and allow the drop structure and the bridge to function together. The roadway and utilities leading up to this bridge will be built with the work order project for Unit 4 of the Highlands. The City of Albuquerque will be responsible for the maintenance of the pond, the drop structures tied to the pond and the bridge located with City rights-of-way. The final plat will indicate where AMAFCA responsibilities end and the City of Albuquerque's begin. Also, a note will be placed on the final plat which identifies the maintenance responsibilities of the City and the High Desert Owners Association within the ponding areas.

VIII. CONCLUSION



The primary goal of this drainage plan for High Desert - Tract 15D-1A, is to provide sound and innovative drainage management schemes that permit preservation of the natural terrain with the least possible impact. The utilization of drainage schemes outlined in this report accomplishes this goal in a safe and adequate manner. We recommend that this plan be approved as requested.

72' ROW

54'

9'

24'

20'

16'

1%

Std. Curb
& Gutter

5:1 (max)
Tie Back

Std. Curb &
Gutter

5:1 (max)
Tie Back

Existing
Grade

Std. Curb
& Gutter

5:1 (max)
Tie Back

Mod. Median
Curb & Gutter

Std. Curb
& Gutter

5:1 (max)
Tie Back

Existing
Grade

2:1 (max)

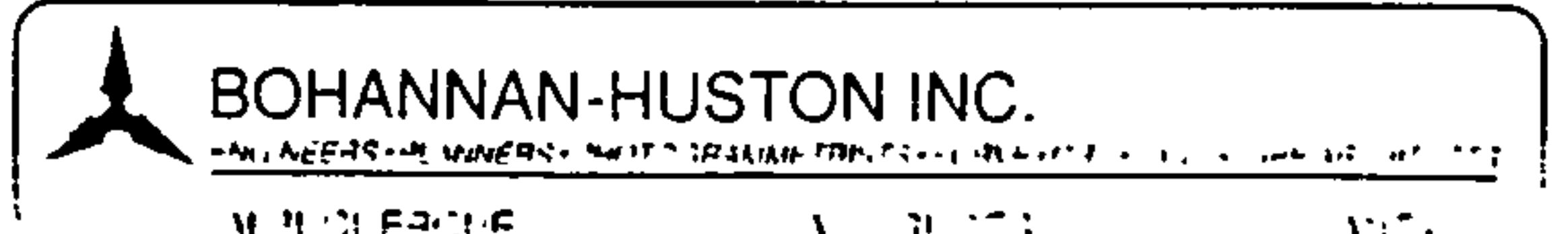
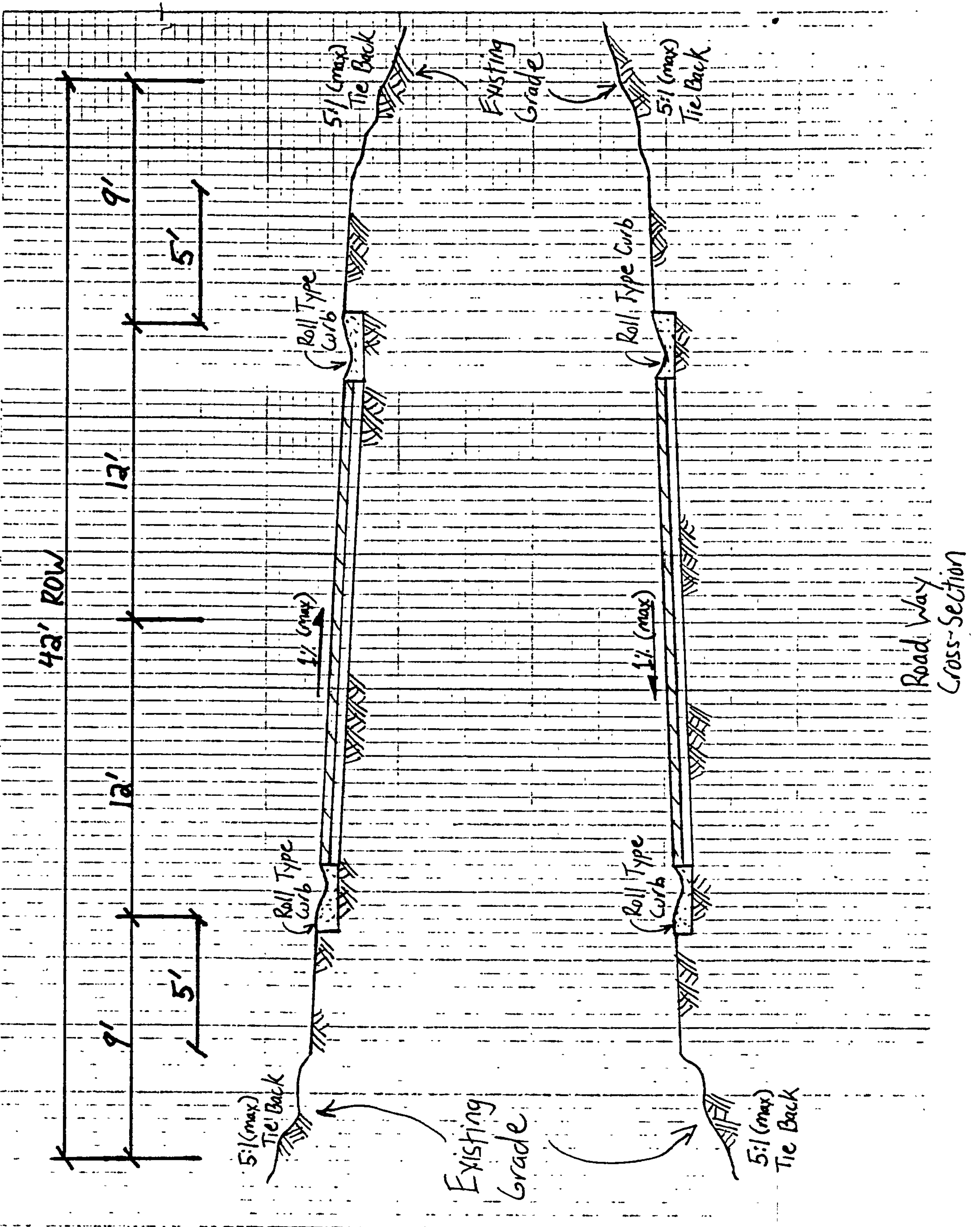
Road Way
Cross-Section

 **BOHANNAN-HUSTON INC.**
ENGINEERS • PLANNERS • PHOTOGRAMMETRISTS • SURVEYORS • INSPECTORS • TESTERS
ALBUQUERQUE _____ LAS CRUCES _____ SANTA FE _____

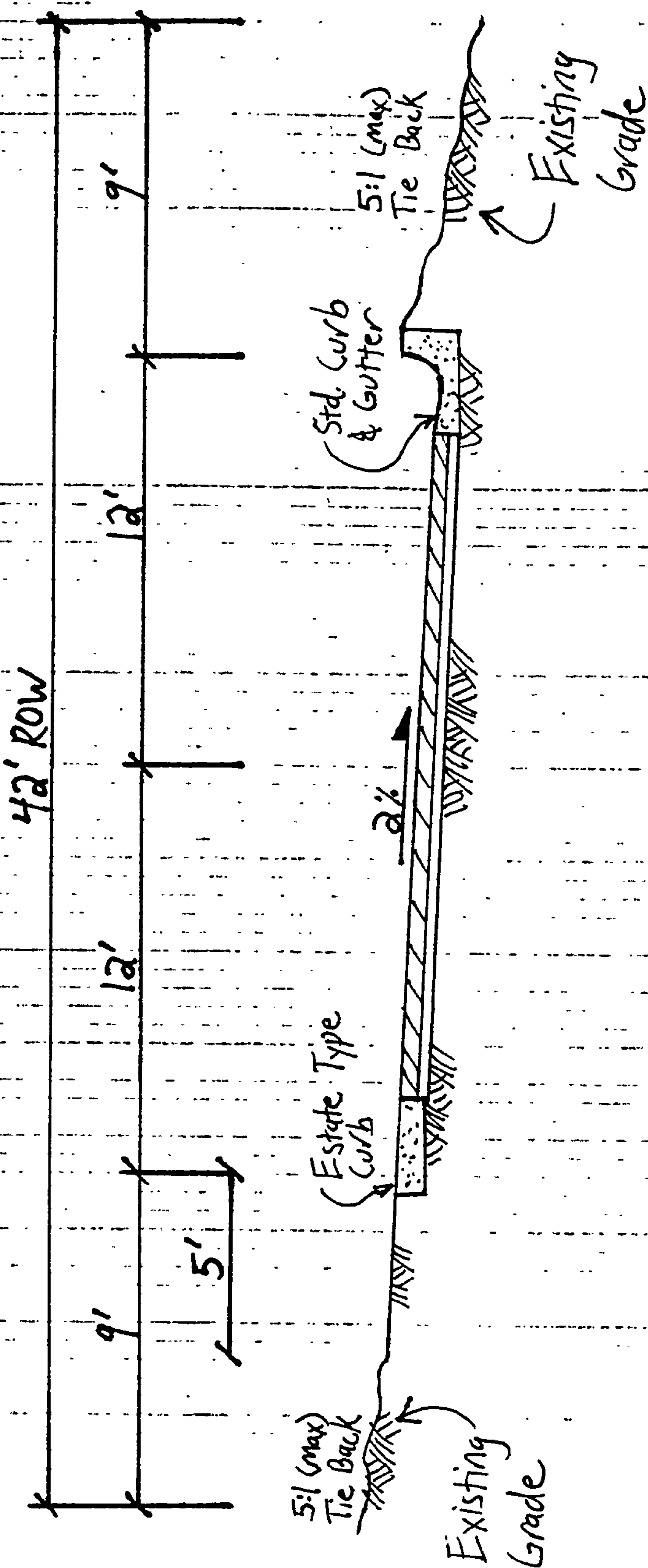
PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____



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SUBJECT	_____	CH'D	_____	DATE	_____



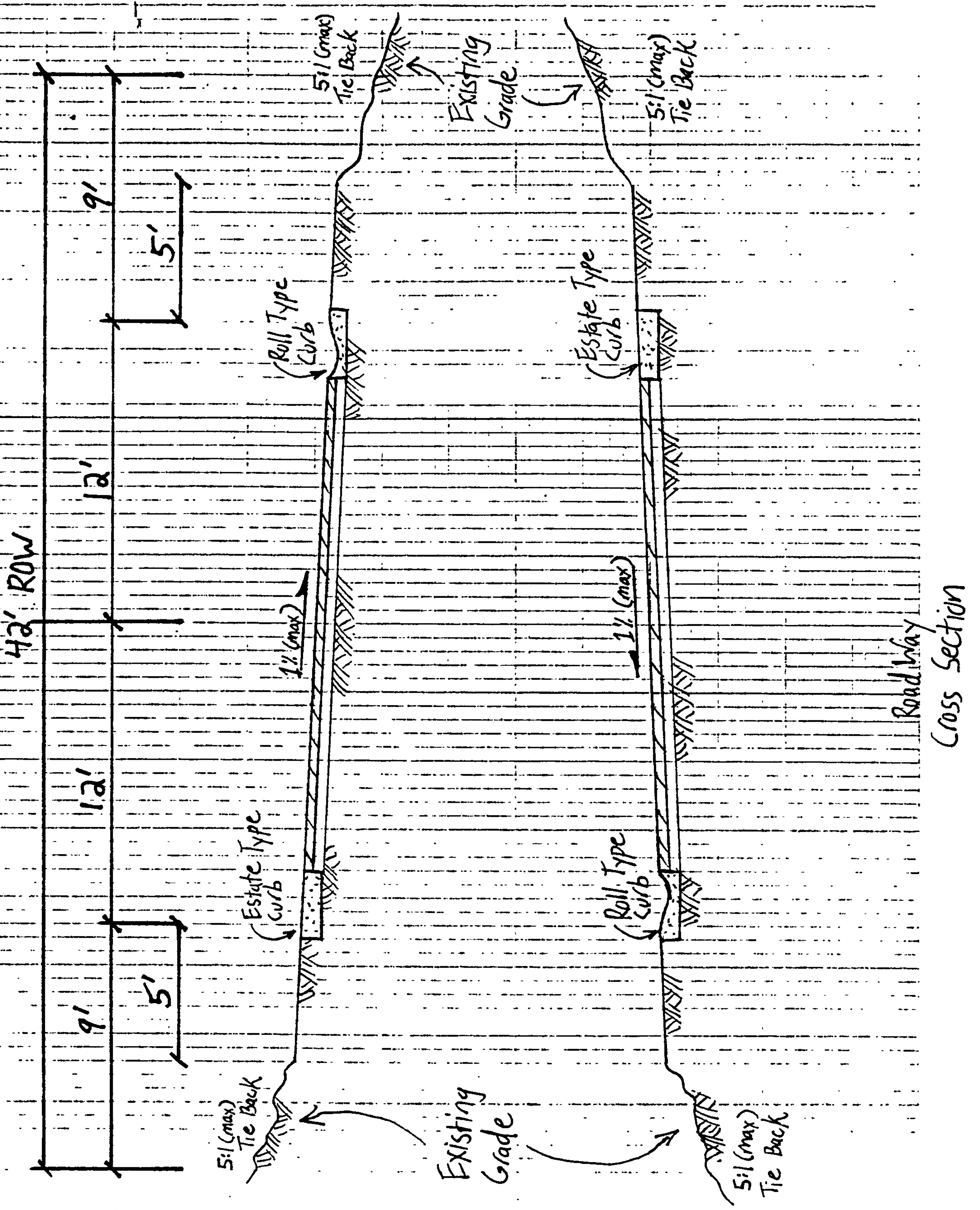
Roadway Cross-Section



PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____



BOHANNAN-HUSTON INC.

ENGINEERS • PLANNERS • PHOTOGRAMMETRISTS • SURVEYORS • LANDSCAPE ARCHITECTS

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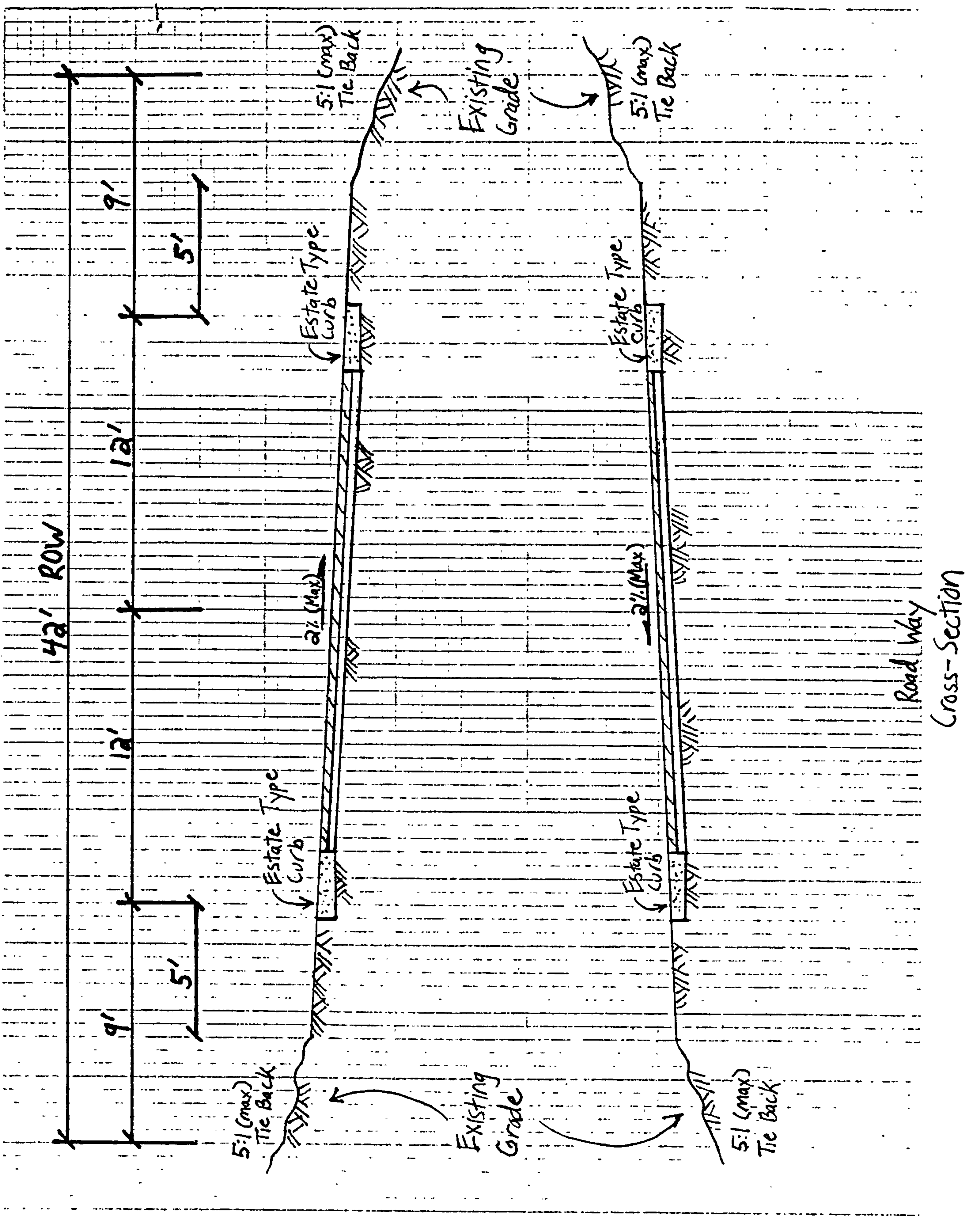
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SUBJECT _____

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DATE _____

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BOHANNAN-HUSTON INC.

ENGINEERS • PLANNERS • PHOTOGRAMMETRISTS • SURVEYORS • LANDSCAPE ARCHITECTS

ALBUQUERQUE LAS VEGAS SANTA FE

PROJECT NAME _____

PROJECT NO. _____

SHEET _____ OF _____

BY _____ DATE _____

CH'D _____ DATE _____

EXISTING CONDITIONS FOR
UNIT 4 OF THE HIGHLANDS AT HIGH DESERT
Jan-98

BASIN NO.	BASIN ID	DISCHARGES TO	AREA (ACRES)	% LAND TREATMENT*				PEAK DISCHARGE - (CFS/ACRE)*				Q(100-YR) UNDEVELOPED (CFS)
				A	B	C	D	A	B	C	D	
30	SPT-1	BASIN 33	133.10	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	302.40
31	SPT-2	BASIN 34	151.00	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	343.07
33	SPT-4	BASIN 35	81.30	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	184.71
34	SPT-5	BASIN 33	103.70	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	235.61
35	SPT-6A	BASIN 37B	30.10	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	68.39
37B	SPT-7A2	TRACT 9A**	19.50	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	44.30
24A1	NBT-1A1	TRACT 9A**	7.34	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	16.68
24B1	NBT-1B1	TRACT 9A**	34.20	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	77.70
TOTALS			533.40									1272.87

NOTES:

*Obtained from Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, January, 1993

** Refer to the drainage report for Sunset Ridge at High Desert, April 1997

PROPOSED CONDITIONS FOR
UNIT 4 OF THE HIGHLANDS AT HIGH DESERT
Jan-98

BASIN NO.	BASIN ID	DISCHARGES TO	AREA (ACRES)	% LAND TREATMENT*				PEAK DISCHARGE - (CFS/ACRE)*				Q(100-YR) DEVELOPED (CFS)
				A	B	C	D	A	B	C	D	
30	SPT-1	BASIN 33	133.10	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	302.40
31	SPT-2	BASIN 34	151.00	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	343.07
33	SPT-4	BASIN 35	81.30	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	184.71
34	SPT-5	BASIN 33	103.70	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	235.61
35	SPT-6A	BASIN 37BR	30.10	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	68.39
37BR	SPT-7A2R	DESILTATION POND	17.58	90.00	10.00	0.00	0.00	2.20	2.92	3.73	5.25	39.94
24A1R	NBT-1A1R	PROP. STORM DRAIN**	5.06	41.99	10.60	0.00	47.41	2.20	2.92	3.73	5.25	18.83
24A2R	NBT-1A2R	IMPERATA ST.***	1.74	41.14	9.52	0.00	49.34	2.20	2.92	3.73	5.25	6.57
24A3R	NBT-1A3R	IMPERATA ST.***	1.51	41.70	5.30	0.00	53.00	2.20	2.92	3.73	5.25	5.82
24A4R	NBT-1A4R	HIGH DESERT ST.***	1.08	45.40	10.20	0.00	44.40	2.20	2.92	3.73	5.25	3.92
24B1R	NBT-1B1R	DESILTATION POND	28.44	81.44	0.00	4.43	14.13	2.20	2.92	3.73	5.25	90.2****
24B2R	NBT-1B2R	BASIN 24B1R	5.83	65.38	5.60	0.00	29.02	2.20	2.92	3.73	5.25	18.22
TOTALS			537.80									1317.68

NOTES:

*Obtained from Section 22.2, Hydrology of the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque, January, 1993

**The proposed storm drain will carry the flows to the South Pino desiltation pond.

***The streets will carry the flows to the existing Academy storm drain system, refer to the drainage report for High Desert Subdivision Academy Storm Drain, Sept. 1994

****Refer to the drainage report for the High Desert Subdivision Academy Storm Drain, Sept. 1994

UNIT 4 OF THE HIGHLANDS AT HIGH DESERT

LOT #	LOT AREA		BUILDING ENVELOPE AREA		ENVELOPE TO LOT
	(ACRES)	(SF)	(ACRES)	(SF)	
114	0.5840	25439.1	0.2740	11935.5	46.92%
115	0.6110	26615.3	0.2748	11970.3	44.98%
116	0.6110	26615.3	0.2732	11900.6	44.71%
117	0.6480	28227.0	0.2748	11970.3	42.41%
118	0.7840	34151.2	0.2753	11992.1	35.11%
119	0.6370	27747.8	0.2750	11979.0	43.17%
120	0.9080	39552.6	0.2756	12000.0	30.35%
121	0.7540	32844.4	0.2754	11996.5	36.53%
122	0.8590	37418.2	0.2753	11992.1	32.05%
123	0.8010	34891.7	0.2749	11974.7	34.32%
124	0.8350	36372.7	0.2740	11935.5	32.81%
125	0.8180	35632.2	0.2754	11996.5	33.67%
126	1.5160	66037.2	0.2754	11996.5	18.17%
127	2.2910	99796.4	0.2756	12000.0	12.03%
128	1.0350	45084.8	0.2754	11996.5	26.61%
129	0.7590	33062.2	0.2752	11987.8	36.26%
130	0.7470	32539.5	0.2750	11979.0	36.81%
131	0.6260	27268.7	0.2758	12000.0	44.06%
132	0.6740	29359.6	0.2742	11944.2	40.68%
133	0.6900	30056.5	0.2731	11896.3	39.58%
134	0.6910	30100.1	0.2757	12000.0	39.90%
135	0.6860	29882.3	0.2737	11922.4	39.90%
136	0.7250	31581.1	0.2749	11974.7	37.92%
137	0.9430	41077.2	0.2729	11887.6	28.94%
138	0.7970	34717.5	0.2745	11957.3	34.44%
139	0.8690	37853.8	0.2751	11983.4	31.66%
140	0.8610	37505.3	0.2740	11935.5	31.82%
141	1.0170	44300.7	0.2753	11992.1	27.07%

AVERAGES

0.8492

36990.4

0.2748

11967.7

35.10%

DEVELOPED CONDITIONS FOR EACH LOT

LOT #	AREA (ACRES)	% LAND TREATMENT*				PEAK DISCHARGE - (CFS/ACRE)*				Q(100-YR) DEVELOPED (CFS)
		A	B	C	D	A	B	C	D	
114	0.584	53.08	12.67	0.00	34.25	2.20	2.92	3.73	5.25	1.95
115	0.611	55.03	12.14	0.00	32.83	2.20	2.92	3.73	5.25	2.01
116	0.611	55.29	12.07	0.00	32.64	2.20	2.92	3.73	5.25	2.01
117	0.648	61.62	7.42	0.00	30.96	2.20	2.92	3.73	5.25	2.07
118	0.784	64.89	9.48	0.00	25.63	2.20	2.92	3.73	5.25	2.39
119	0.637	68.26	11.66	0.00	20.08	2.20	2.92	3.73	5.25	1.85
120	0.908	69.64	8.20	0.00	22.16	2.20	2.92	3.73	5.25	2.66
121	0.754	63.48	9.86	0.00	26.66	2.20	2.92	3.73	5.25	2.33
122	0.859	67.95	8.65	0.00	23.40	2.20	2.92	3.73	5.25	2.56
123	0.801	65.68	9.27	0.00	25.05	2.20	2.92	3.73	5.25	2.43
124	0.835	67.19	8.86	0.00	23.95	2.20	2.92	3.73	5.25	2.50
125	0.818	66.33	9.09	0.00	24.58	2.20	2.92	3.73	5.25	2.47
126	1.516	81.84	4.90	0.00	13.26	2.20	2.92	3.73	5.25	4.00
127	2.291	87.97	3.25	0.00	8.78	2.20	2.92	3.73	5.25	5.71
128	1.035	73.40	7.18	0.00	19.42	2.20	2.92	3.73	5.25	2.94
129	0.759	63.74	9.79	0.00	26.47	2.20	2.92	3.73	5.25	2.34
130	0.747	63.19	9.94	0.00	26.87	2.20	2.92	3.73	5.25	2.31
131	0.626	55.94	11.90	0.00	32.16	2.20	2.92	3.73	5.25	2.04
132	0.674	59.32	10.98	0.00	29.70	2.20	2.92	3.73	5.25	2.15
133	0.690	60.42	10.69	0.00	28.89	2.20	2.92	3.73	5.25	2.18
134	0.691	60.10	10.77	0.00	29.13	2.20	2.92	3.73	5.25	2.19
135	0.686	60.10	10.77	0.00	29.13	2.20	2.92	3.73	5.25	2.17
136	0.725	62.08	10.24	0.00	27.68	2.20	2.92	3.73	5.25	2.26
137	0.943	71.35	7.81	0.00	20.84	2.20	2.92	3.73	5.25	2.73
138	0.797	65.56	9.30	0.00	25.14	2.20	2.92	3.73	5.25	2.42
139	0.869	68.34	8.55	0.00	23.11	2.20	2.92	3.73	5.25	2.58
140	0.861	68.18	8.59	0.00	23.23	2.20	2.92	3.73	5.25	2.56
141	1.017	72.93	7.31	0.00	19.76	2.20	2.92	3.73	5.25	2.90
TOTAL	23.777									70.68

NOTES:

*Obtained from Section 22.2, Hydrology of the Development Process Manual, Vol. 2, Design Criteria for the City of Albuquerque, January, 1993
The lots Land Percentage Type was determined by assuming each building envelope to 73% impervious (Type D) and 27% natural (Type B)

SUMMARY OF THE ROADWAY CAPACITY ANALYSIS FOR UNIT 4 OF THE HIGHLANDS AT HIGH DESERT

PINO CANYON PLACE - Drainage Basin 24A1R

Max Q (cfs)=18.83

Station to Station	Roadway Grade (%)	Roadway Cross-slope (%)	Percent of Basin (%)	Q(100 YR) in roadway (cfs)	Depth of water in roadway (ft)	Velocity of storm water in roadway (ft/s)	Top of Curb (ft)	Comments
1+23 to 1+50	4.00	1.87	100.00	18.83	0.44	5.54	0.67	OK
1+50 to 2+00	4.00	2.00 (crown)	100.00	18.83	0.36	4.74	0.67	OK
2+00 to 3+00	5.80	2.00 (crown)	98.00	18.45	0.34	5.40	0.67	OK
3+00 to 4+50	5.10	1.00 (crown)	96.00	18.08	0.31	4.32	0.67	OK
4+50 to 5+50	3.55	1.00	90.00	16.95	0.18	3.66	0.33	OK
5+50 to 6+50	3.00	1.00	86.00	16.19	0.32	4.36	0.33	OK
6+50 to 7+50	4.40	1.00	80.00	15.06	0.29	4.82	0.33	OK
7+50 to 8+50	3.50	0.00	74.00	13.93	0.20	4.33	0.33	OK
8+50 to 9+50	5.10	0.00	67.00	12.62	0.17	4.60	0.33	OK
9+50 to 10+50	4.00	1.00	61.00	11.49	0.28	4.18	0.33	OK
10+50 to 11+50	3.90	1.00	52.00	9.79	0.27	3.95	0.33	OK
11+50 to 12+50	4.60	1.00	44.00	8.29	0.25	4.04	0.33	OK
12+50 to 13+50	5.20	1.00	37.00	6.97	0.23	4.03	0.33	OK

Note:

By observation, the product of the depth times the velocity is below 6.5 for the 100-year design storm, therefore for the 10-year design storm the product of the depth times the velocity will be well below the recommended value of 6.5.

The flow in the roadway and depth of water in roadway calculations are based on the assumption that the inlets are fully clogged

DESERT ZINNIA COURT - Drainage Basin 24B2R

Max Q (cfs)=18.22

Station to Station	Roadway Grade (%)	Roadway Cross-slope (%)	Percent of Basin (%)	Q(100 YR) in roadway (cfs)	Depth of water in roadway (ft)	Velocity of storm water in roadway (ft/s)	Top of Curb (ft)	Comments
1+50 to 2+00	5.40	1.00	3.50	0.64	0.11	2.24	0.33	OK
2+00 to 2+50	5.40	1.00	3.90	0.71	0.12	2.28	0.33	OK
2+50 to 3+50	4.40	1.00	6.67	1.22	0.14	2.41	0.33	OK
3+50 to 5+00	5.20	1.00	12.18	2.22	0.16	2.98	0.33	OK
5+00 to 5+50	9.50	1.00	14.64	2.67	0.16	3.97	0.33	OK
7+70 to 10+50	0.75	2.00	38.00	6.92	0.43	2.31	0.67	OK
10+50 to 11+57	2.25	2.00	6.20	1.13	0.21	2.29	0.67	OK

Note:

By observation, the product of the depth times the velocity is below 6.5 for the 100-year design storm, therefore for the 10-year design storm the product of the depth times the velocity will be well below the recommended value of 6.5.

HIGH DESERT UNIT 4 - PINO CANYON PLACE 1

MANNING'S N = .0170

SLOPE = .0400

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	5	23.00	99.83	9	34.00	100.02
2	0.00	99.33	6	23.00	100.08	10	54.00	100.39
3	2.00	99.46	7	33.00	100.27	11	56.00	100.26
4	22.00	99.83	8	33.00	100.02	12	56.00	100.93

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.38	0.05	0.0	0.0	0.8	1.4	0.77
99.43	0.10	0.1	0.2	1.6	2.3	1.54
99.48	0.15	0.2	0.5	3.2	2.6	3.08
99.53	0.20	0.4	1.2	6.0	2.9	5.78
99.58	0.25	0.8	2.6	8.7	3.4	8.49
99.63	0.30	1.3	5.0	11.5	4.0	11.19
99.68	0.35	1.9	8.5	14.2	4.5	13.89
99.73	0.40	2.6	13.3	17.0	5.1	16.59
99.78	0.45	3.5	19.6	19.8	5.6	19.30
99.83	0.50	4.6	27.6	22.5	6.0	23.00
99.88	0.55	5.7	38.9	23.6	6.8	23.00
99.93	0.60	6.9	52.6	23.7	7.7	23.00
99.98	0.65	8.0	67.9	23.8	8.5	23.00
100.00	0.67	8.5	74.4	23.8	8.8	24.00

Q₁₀₀ = 18.83

HIGH DESERT UNIT 4 - PINO CANYON PLACE 2

MANNING'S N = .0170

SLOPE = .0400

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	6	23.00	100.11	11	54.00	99.46
2	0.00	99.33	7	28.00	100.21	12	56.00	99.33
3	2.00	99.46	8	33.00	100.11	13	56.00	100.00
4	22.00	99.86	9	33.00	99.86			
5	23.00	99.86	10	34.00	99.86			

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOP
(FT)	INC	AREA	RATE	PER	VEL	WID
		(SQ FT)	(CFS)	(FT)	(FPS)	
99.38	0.05	0.0	0.1	1.6	1.4	1.54
99.43	0.10	0.2	0.3	3.3	2.3	3.08
99.48	0.15	0.4	0.9	6.3	2.6	6.00
99.53	0.20	0.8	2.3	11.4	2.9	11.00
99.58	0.25	1.5	5.1	16.5	3.5	16.00
99.63	0.30	2.4	9.6	21.6	4.0	21.00
99.68	0.35	3.6	16.2	26.7	4.6	26.00
99.73	0.40	5.0	25.3	31.8	5.1	31.00
99.78	0.45	6.7	37.2	36.9	5.6	36.00
99.83	0.50	8.6	52.1	42.0	6.1	41.00
99.88	0.55	10.8	70.5	47.2	6.5	46.00
99.93	0.60	13.1	97.0	47.4	7.4	46.00
99.98	0.65	15.4	126.7	47.6	8.2	46.00
100.00	0.67	16.3	139.4	47.6	8.6	46.00

$Q_{100} = 18.83$

HIGH DESERT UNIT 4 - PINO CANYON PLACE 3

MANNING'S N = .0170

SLOPE = .0580

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	6	23.00	100.11	11	54.00	99.46
2	0.00	99.33	7	28.00	100.21	12	56.00	99.33
3	2.00	99.46	8	33.00	100.11	13	56.00	100.00
4	22.00	99.86	9	33.00	99.86			
5	23.00	99.86	10	34.00	99.86			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.38	0.05	0.0	0.1	1.6	1.7	1.54
99.43	0.10	0.2	0.4	3.3	2.7	3.08
99.48	0.15	0.4	1.1	6.3	3.1	6.00
99.53	0.20	0.8	2.8	11.4	3.5	11.00
99.58	0.25	1.5	6.1	16.5	4.2	16.00
99.63	0.30	2.4	11.6	21.6	4.8	21.00
99.68	0.35	3.6	19.6	26.7	5.5	26.00
99.73	0.40	5.0	30.5	31.8	6.1	31.00
99.78	0.45	6.7	44.8	36.9	6.7	36.00
99.83	0.50	8.6	62.7	42.0	7.3	41.00
99.88	0.55	10.8	84.8	47.2	7.9	46.00
99.93	0.60	13.1	116.8	47.4	8.9	46.00
99.98	0.65	15.4	152.5	47.6	9.9	46.00
100.00	0.67	16.3	167.9	47.6	10.3	46.00

$Q_{100} = 18.45$

HIGH DESERT UNIT 4 - PINO CANYON 4

MANNING'S N = .0170

SLOPE = .0510

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	6	23.00	99.91	11	54.00	99.46
2	0.00	99.33	7	28.00	100.01	12	56.00	99.33
3	2.00	99.46	8	33.00	99.91	13	56.00	100.00
4	22.00	99.66	9	33.00	99.66			
5	23.00	99.66	10	34.00	99.66			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.38	0.05	0.0	0.1	1.6	1.6	1.54
99.43	0.10	0.2	0.4	3.3	2.6	3.08
99.48	0.15	0.4	1.0	8.3	2.5	8.00
99.53	0.20	1.0	3.0	18.4	2.9	18.00
99.58	0.25	2.2	7.8	28.5	3.6	28.00
99.63	0.30	3.8	16.2	38.6	4.2	38.00
99.68	0.35	5.9	30.5	44.8	5.1	46.00
99.73	0.40	8.3	51.4	47.0	6.2	46.00
99.78	0.45	10.6	77.1	47.2	7.3	46.00
99.83	0.50	12.9	106.7	47.4	8.3	46.00
99.88	0.55	15.2	140.0	47.6	9.2	46.00
99.93	0.60	17.5	172.1	49.8	9.8	48.00
99.98	0.65	20.0	201.7	55.0	10.1	53.00
100.00	0.67	21.1	214.7	57.0	10.2	55.00

$Q_{100} = 18.08$

HIGH DESERT UNIT 4 - PINO CANYON PLACE 5

MANNING'S N = .0170

SLOPE = .0355

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	2.00	99.73	5	36.03	99.67
2	0.97	99.67	4	35.00	99.73	6	37.00	100.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.72	0.05	0.1	0.1	2.0	1.4	35.01
99.77	0.10	1.5	3.0	35.7	2.0	35.65
99.82	0.15	3.3	11.0	36.0	3.3	35.94
99.87	0.20	5.1	22.6	36.3	4.4	36.24
99.92	0.25	6.9	37.4	36.6	5.4	36.53
99.97	0.30	8.7	55.1	36.9	6.3	36.82
100.00	0.33	9.8	67.0	37.1	6.8	37.00

$Q_{100} = 16.95$

HIGH DESERT UNIT 4 - PINO CANYON PLACE 6

MANNING'S N = .0170

SLOPE = .0300

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	2.00	99.73	5	23.03	99.47
2	0.97	99.67	4	22.00	99.53	6	24.00	99.80

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.52	0.05	0.0	0.0	1.0	1.3	1.01
99.57	0.10	0.2	0.3	5.3	1.5	5.32
99.62	0.15	0.6	1.2	10.5	2.1	10.47
99.67	0.20	1.2	3.3	15.7	2.8	15.62
99.72	0.25	2.1	6.9	21.8	3.2	21.77
99.77	0.30	3.3	13.6	23.3	4.1	23.24
99.80	0.33	4.0	18.6	23.5	4.6	23.41

Q_{1%} = 16.19

.HIGH DESERT UNIT 4 - PINO CANYON PLACE 7

MANNING'S N = .0170

SLOPE = .0440

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	2.00	99.73	5	23.03	99.47
2	0.97	99.67	4	22.00	99.53	6	24.00	99.80

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.52	0.05	0.0	0.0	1.0	1.6	1.01
99.57	0.10	0.2	0.3	5.3	1.8	5.32
99.62	0.15	0.6	1.5	10.5	2.6	10.47
99.67	0.20	1.2	4.0	15.7	3.3	15.62
99.72	0.25	2.1	8.4	21.8	3.9	21.77
99.77	0.30	3.3	16.4	23.3	5.0	23.24
99.80	0.33	4.0	22.5	23.5	5.6	23.41

Q₁₀₀ = 15.06

HIGH DESERT UNIT 4 - PINO CANYON PLACE 8

MANNING'S N = .0170

SLOPE = .0350

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	2.00	99.73	5	23.03	99.67
2	0.97	99.67	4	22.00	99.73	6	24.00	100.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.72	0.05	0.1	0.1	2.0	1.4	22.01
99.77	0.10	1.0	2.0	22.7	2.0	22.65
99.82	0.15	2.1	7.0	23.0	3.3	22.94
99.87	0.20	3.3	14.4	23.3	4.4	23.24
99.92	0.25	4.4	23.8	23.6	5.4	23.53
99.97	0.30	5.6	35.0	23.9	6.2	23.82
100.00	0.33	6.3	42.5	24.1	6.7	24.00

$Q_{100} = 13.93$

HIGH DESERT UNIT 4 - PINO CANYON PLACE 9

MANNING'S N = .0170

SLOPE = .0510

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	2.00	99.73	5	23.03	99.67
2	0.97	99.67	4	22.00	99.73	6	24.00	100.00

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.72	0.05	0.1	0.1	2.0	1.7	22.01
99.77	0.10	1.0	2.4	22.7	2.4	22.65
99.82	0.15	2.1	8.5	23.0	4.0	22.94
99.87	0.20	3.3	17.4	23.3	5.3	23.24
99.92	0.25	4.4	28.7	23.6	6.5	23.53
99.97	0.30	5.6	42.2	23.9	7.5	23.82
100.00	0.33	6.3	51.3	24.1	8.1	24.00

Q₁₀₀ = 12.62

HIGH DESERT UNIT 4 - PINO CANYON PLACE 10

MANNING'S N = .0170

SLOPE = .0400

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	23.03	99.72			
2	22.00	99.78	4	24.00	100.05			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.77	0.05	0.0	0.0	1.0	1.5	1.01
99.82	0.10	0.2	0.3	5.3	1.7	5.32
99.87	0.15	0.6	1.4	10.5	2.5	10.47
99.92	0.20	1.2	3.9	15.7	3.2	15.62
99.97	0.25	2.1	8.1	20.8	3.8	20.76
100.00	0.28	2.8	11.7	23.9	4.2	23.85

$Q_{100} = 11.49$

HIGH DESERT UNIT 4 - PINO CANYON PLACE 11

MANNING'S N = .0170

SLOPE = .0390

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	23.03	99.72			
2	22.00	99.78	4	24.00	100.05			

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOP
(FT)	INC	AREA	RATE	PER	VEL	WID
		(SQ FT)	(CFS)	(FT)	(FPS)	
99.77	0.05	0.0	0.0	1.0	1.5	1.01
99.82	0.10	0.2	0.3	5.3	1.7	5.32
99.87	0.15	0.6	1.4	10.5	2.5	10.47
99.92	0.20	1.2	3.8	15.7	3.1	15.62
99.97	0.25	2.1	8.0	20.8	3.8	20.76
100.00	0.28	2.8	11.5	23.9	4.1	23.85

Q₁₀₀ 9.79

HIGH DESERT UNIT 4 - PINO CANYON PLACE 12

MANNING'S N = .0170

SLOPE = .0460

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	23.03	99.72			
2	22.00	99.78	4	24.00	100.05			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.77	0.05	0.0	0.0	1.0	1.6	1.01
99.82	0.10	0.2	0.3	5.3	1.9	5.32
99.87	0.15	0.6	1.5	10.5	2.7	10.47
99.92	0.20	1.2	4.1	15.7	3.4	15.62
99.97	0.25	2.1	8.7	20.8	4.1	20.76
100.00	0.28	2.8	12.5	23.9	4.5	23.85

Q₁₀₀ 8.29

HIGH DESERT UNIT 4 - PINO CANYON PLACE 13

MANNING'S N = .0170

SLOPE = .0520

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	23.03	99.72			
2	22.00	99.78	4	24.00	100.05			

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOP
(FT)	INC	AREA	RATE	PER	VEL	WID
		(SQ FT)	(CFS)	(FT)	(FPS)	
99.77	0.05	0.0	0.0	1.0	1.7	1.01
99.82	0.10	0.2	0.3	5.3	2.0	5.32
99.87	0.15	0.6	1.6	10.5	2.8	10.47
99.92	0.20	1.2	4.4	15.7	3.6	15.62
99.97	0.25	2.1	9.2	20.8	4.4	20.76
100.00	0.28	2.8	13.3	23.9	4.8	23.85

Q₁₀₀ = 6.97

HIGH DESERT UNIT 4 - DESERT ZINNIA COURT 1

MANNING'S N = .0170

SLOPE = .0540

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	69.03	99.26			
2	68.00	99.32	4	70.00	99.59			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.31	0.05	0.0	0.0	1.0	1.7	1.01
99.36	0.10	0.2	0.3	5.3	2.0	5.32
99.41	0.15	0.6	1.6	10.5	2.9	10.47
99.46	0.20	1.2	4.5	15.7	3.7	15.62
99.51	0.25	2.1	9.4	20.8	4.4	20.77
99.56	0.30	3.3	16.9	26.0	5.1	25.91
99.59	0.33	4.1	22.7	29.1	5.5	29.00

Q₁₀₀ = 0.64

HIGH DESERT UNIT 4 - DESERT ZINNIA COURT 2

MANNING'S N = .0170

SLOPE = .0540

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	23.03	99.72			
2	22.00	99.78	4	24.00	100.05			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.77	0.05	0.0	0.0	1.0	1.7	1.01
99.82	0.10	0.2	0.3	5.3	2.0	5.32
99.87	0.15	0.6	1.6	10.5	2.9	10.47
99.92	0.20	1.2	4.5	15.7	3.7	15.62
99.97	0.25	2.1	9.4	20.8	4.4	20.76
100.00	0.28	2.8	13.6	23.9	4.9	23.85

$Q_{100} = 0.71$

HIGH DESERT UNIT 4 - DESERT ZINNIA COURT 3

MANNING'S N = .0170

SLOPE = .0440

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	23.03	99.72			
2	22.00	99.78	4	24.00	100.05			

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOP
(FT)	INC	AREA	RATE	PER	VEL	WID
		(SQ FT)	(CFS)	(FT)	(FPS)	
99.77	0.05	0.0	0.0	1.0	1.6	1.01
99.82	0.10	0.2	0.3	5.3	1.8	5.32
99.87	0.15	0.6	1.5	10.5	2.6	10.47
99.92	0.20	1.2	4.0	15.7	3.3	15.62
99.97	0.25	2.1	8.5	20.8	4.0	20.76
100.00	0.28	2.8	12.2	23.9	4.4	23.85

Q₁₀₀ = 1.22

HIGH DESERT UNIT 4 - DESERT ZINNIA COURT 4

MANNING'S N = .0170

SLOPE = .0520

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	23.03	99.72			
2	22.00	99.78	4	24.00	100.05			

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOP
(FT)	INC	AREA	RATE	PER	VEL	WID
		(SQ FT)	(CFS)	(FT)	(FPS)	
99.77	0.05	0.0	0.0	1.0	1.7	1.01
99.82	0.10	0.2	0.3	5.3	2.0	5.32
99.87	0.15	0.6	1.6	10.5	2.8	10.47
99.92	0.20	1.2	4.4	15.7	3.6	15.62
99.97	0.25	2.1	9.2	20.8	4.4	20.76
100.00	0.28	2.8	13.3	23.9	4.8	23.85

Q=2.22

HIGH DESERT UNIT 4 - DESERT ZINNIA COURT 5

MANNING'S N = .0170

SLOPE = .0950

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	23.03	99.72			
2	22.00	99.78	4	24.00	100.05			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.77	0.05	0.0	0.1	1.0	2.3	1.01
99.82	0.10	0.2	0.4	5.3	2.7	5.32
99.87	0.15	0.6	2.1	10.5	3.8	10.47
99.92	0.20	1.2	5.9	15.7	4.9	15.62
99.97	0.25	2.1	12.5	20.8	5.9	20.76
100.00	0.28	2.8	18.0	23.9	6.4	23.85

Q₁₀₀ = 2.67

HIGH DESERT UNIT 4 - DESERT ZINNIA COURT 6

MANNING'S N = .0170

SLOPE = .0075

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	24.00	99.43			
2	22.00	99.56	4	24.00	100.10			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.48	0.05	0.0	0.0	0.8	0.6	0.77
99.53	0.10	0.1	0.1	1.6	1.0	1.54
99.58	0.15	0.2	0.2	3.2	1.1	3.00
99.63	0.20	0.4	0.5	5.7	1.3	5.50
99.68	0.25	0.7	1.1	8.3	1.5	8.00
99.73	0.30	1.2	2.1	10.8	1.7	10.50
99.78	0.35	1.8	3.5	13.4	2.0	13.00
99.83	0.40	2.5	5.5	15.9	2.2	15.50
99.88	0.45	3.3	8.0	18.5	2.4	18.00
99.93	0.50	4.3	11.3	21.0	2.6	20.50
99.98	0.55	5.4	15.2	23.6	2.8	23.00
100.00	0.57	5.9	17.0	24.6	2.9	24.00

$Q_{100} \approx 6.92$

HIGH DESERT UNIT 4 - DESERT ZINNIA COURT 7

MANNING'S N = .0170

SLOPE = .0225

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	3	24.00	99.43			
2	22.00	99.56	4	24.00	100.10			

WSEL (FT)	DEPTH INC	FLOW AREA (SQ FT)	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOP WID
99.48	0.05	0.0	0.0	0.8	1.1	0.77
99.53	0.10	0.1	0.1	1.6	1.7	1.54
99.58	0.15	0.2	0.3	3.2	1.9	3.00
99.63	0.20	0.4	0.9	5.7	2.2	5.50
99.68	0.25	0.7	1.9	8.3	2.6	8.00
99.73	0.30	1.2	3.6	10.8	3.0	10.50
99.78	0.35	1.8	6.1	13.4	3.4	13.00
99.83	0.40	2.5	9.5	15.9	3.8	15.50
99.88	0.45	3.3	13.9	18.5	4.2	18.00
99.93	0.50	4.3	19.5	21.0	4.5	20.50
99.98	0.55	5.4	26.4	23.6	4.9	23.00
100.00	0.57	5.9	29.5	24.6	5.0	24.00

$Q_{100} = 1.13$

**DEVELOPED CONDITIONS FOR INLETS IN
UNIT 4 OF THE HIGHLANDS AT HIGH DESERT**

INLET	CONDITION	TYPE	CONTRIBUTING BASIN/INLET	FLOW TO INLET 100-YR (CFS)	STREET DEPTH (FT)	GRATE CAP. (CFS)	RESIDUAL FLOW (CFS)
1	ON 5.80% GRADE	'A' DOUBLE GRATE	BASIN 24A1R	9.42	0.34	6.40	3.02
2	ON 5.80% GRADE	'A' DOUBLE GRATE	BASIN 24A1R	9.42	0.34	6.40	3.02
3	ON 4.00% GRADE	'C' DOUBLE GRATE	INLET 1	3.02	0.26	3.00	0.02
4	ON 4.00% GRADE	'C' DOUBLE GRATE	INLET 2	3.02	0.26	3.00	0.02

NOTES:

Half of the flow from contributing Basin 24A1R is assumed to be directed into each inlet at the end of Pino Canyon Place.

**STORM DRAIN ANALYSIS FOR
UNIT4 OF THE HIGHLANDS AT HIGH DESERT**

PIPE LOCATION	SIZE/ TYPE	LENGTH (ft)	SLOPE (%)	PROPOSED Q (100-YR, CFS)	PIPE CAPACITY (100-YR, CFS)
INLET 1 TO INLET 3	18" RCP	60.00	6.03	6.40	25.79
INLET 2 TO INLET 4	18" RCP	60.00	3.92	6.40	20.80
INLET 4 TO INLET 3	18" RCP	56.00	4.50	9.40	22.28
INLET 3 TO POND	18" RCP	165.00	4.13	18.80	21.35

NOTES:

Inlet 3 will freely discharge to the existing South Pino Desiltation Pond.

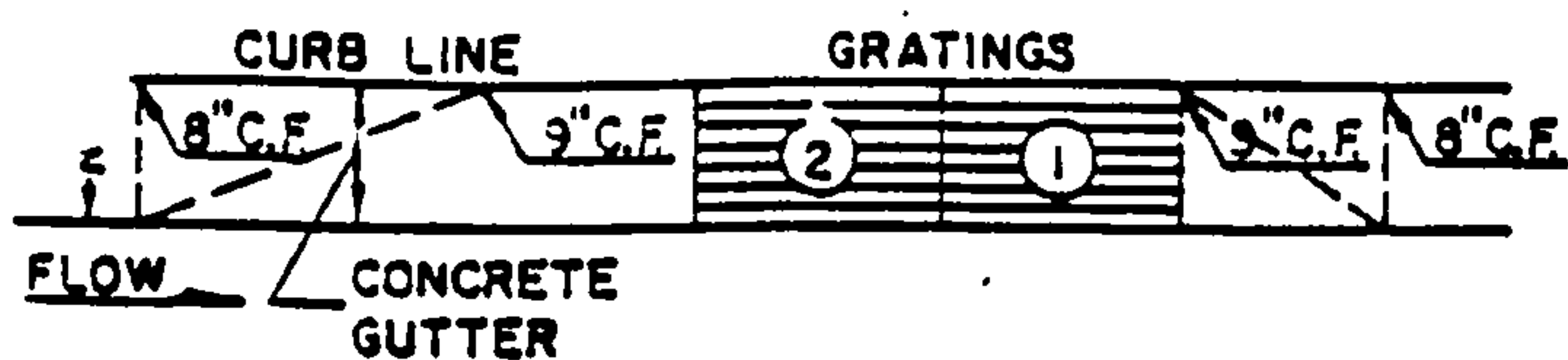
A cobble swail will deliver flows to the invert of the pond to prevent any erosions.

Inlets 1 & 2

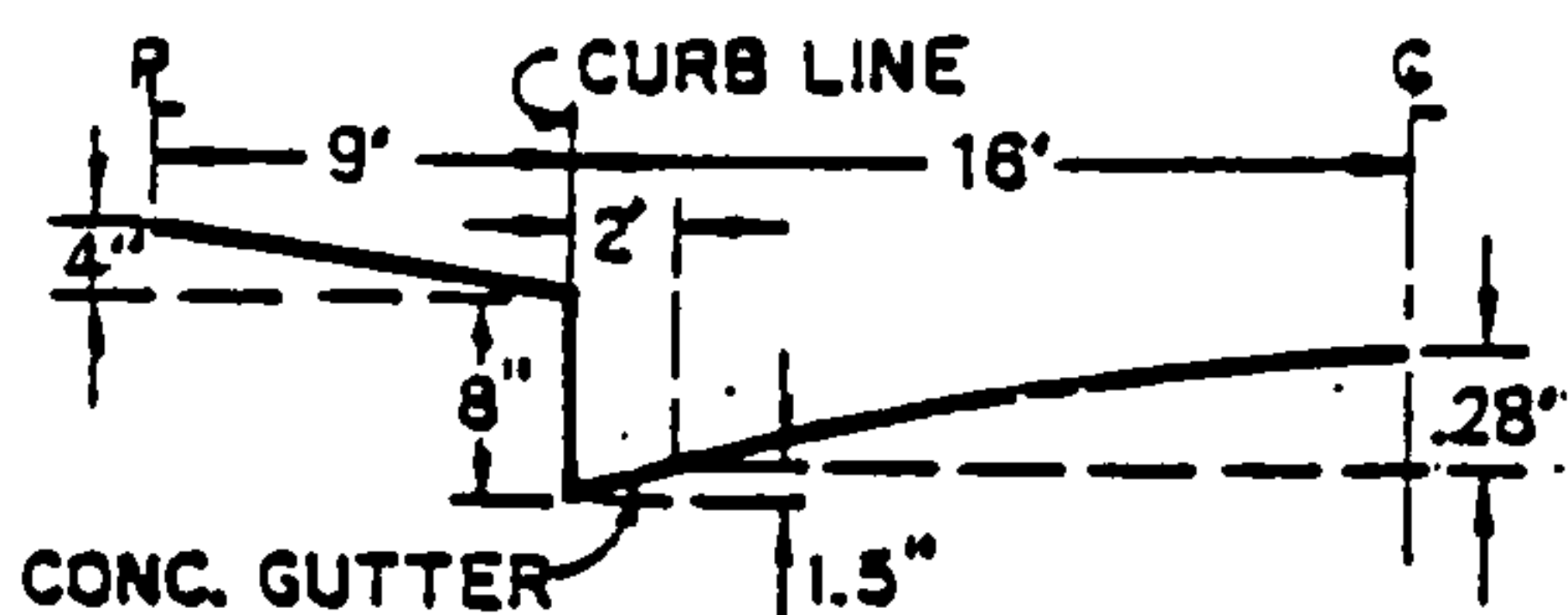
22.3

GRATING CAPACITIES FOR TYPE DOUBLE

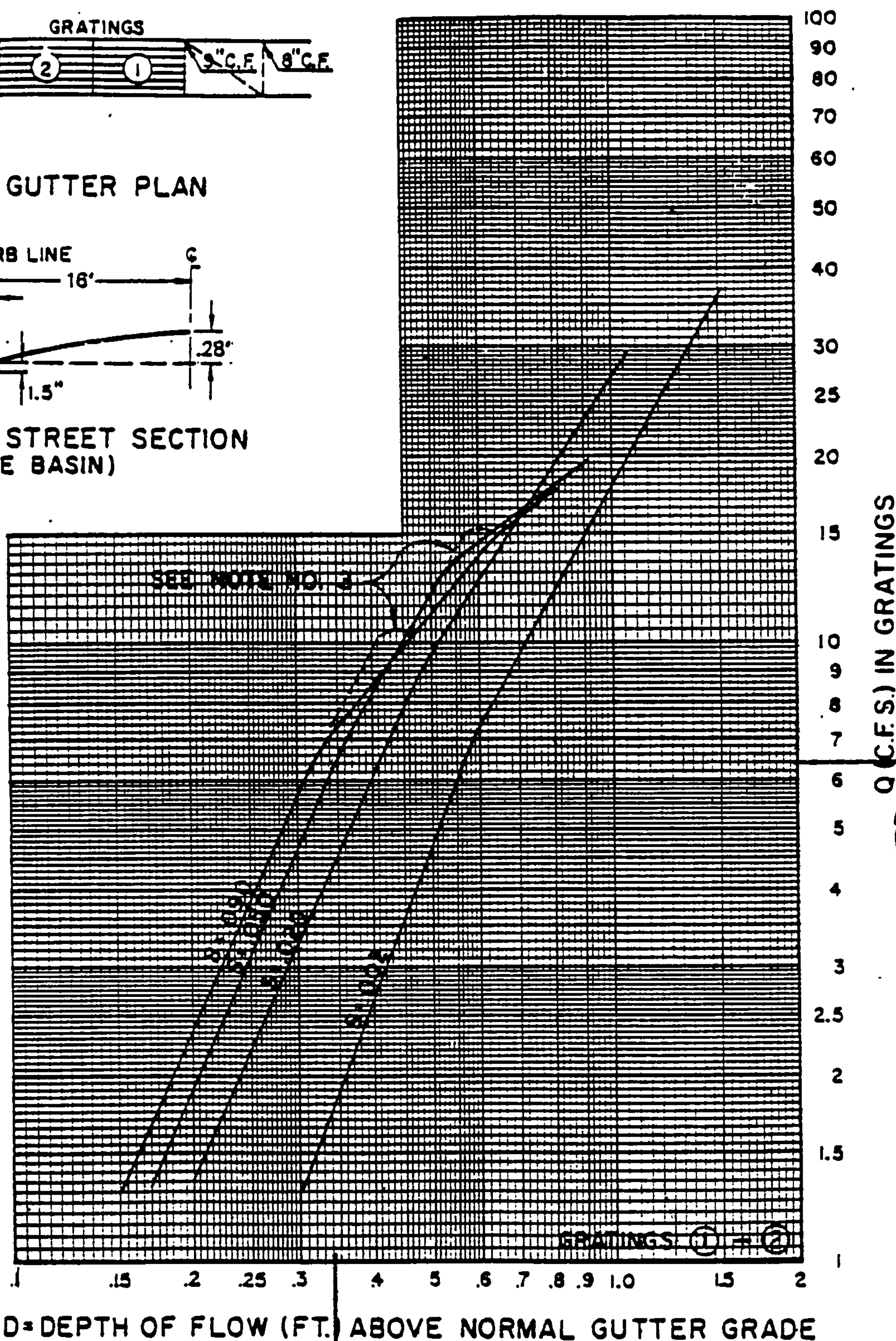
"C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



Roadway Grade 5.80%
 $Q_{100} = 9.42$ cfs (to each inlet)

0.34 ft.
 w/ Q_{100}

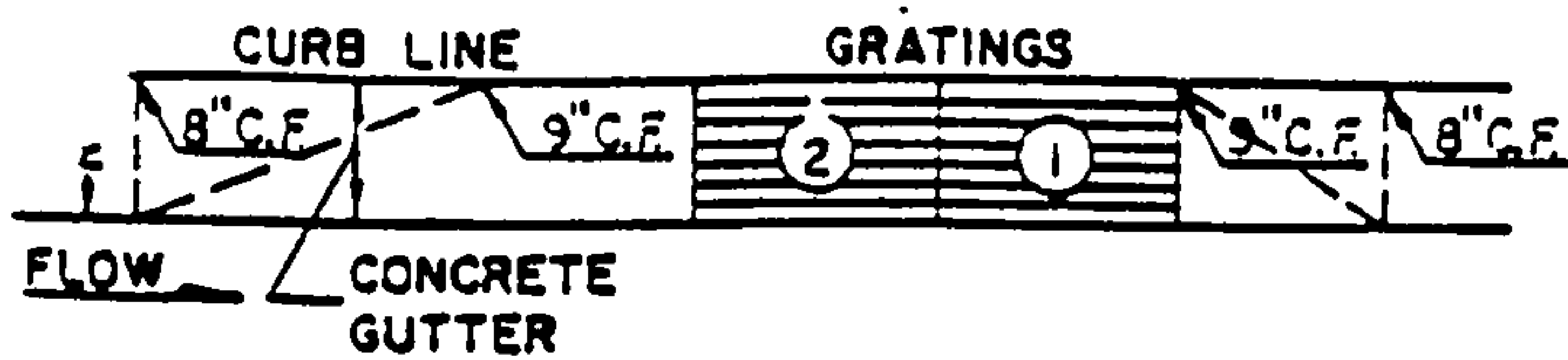
Type 'A'
 Double Grate

Inlets 3&4

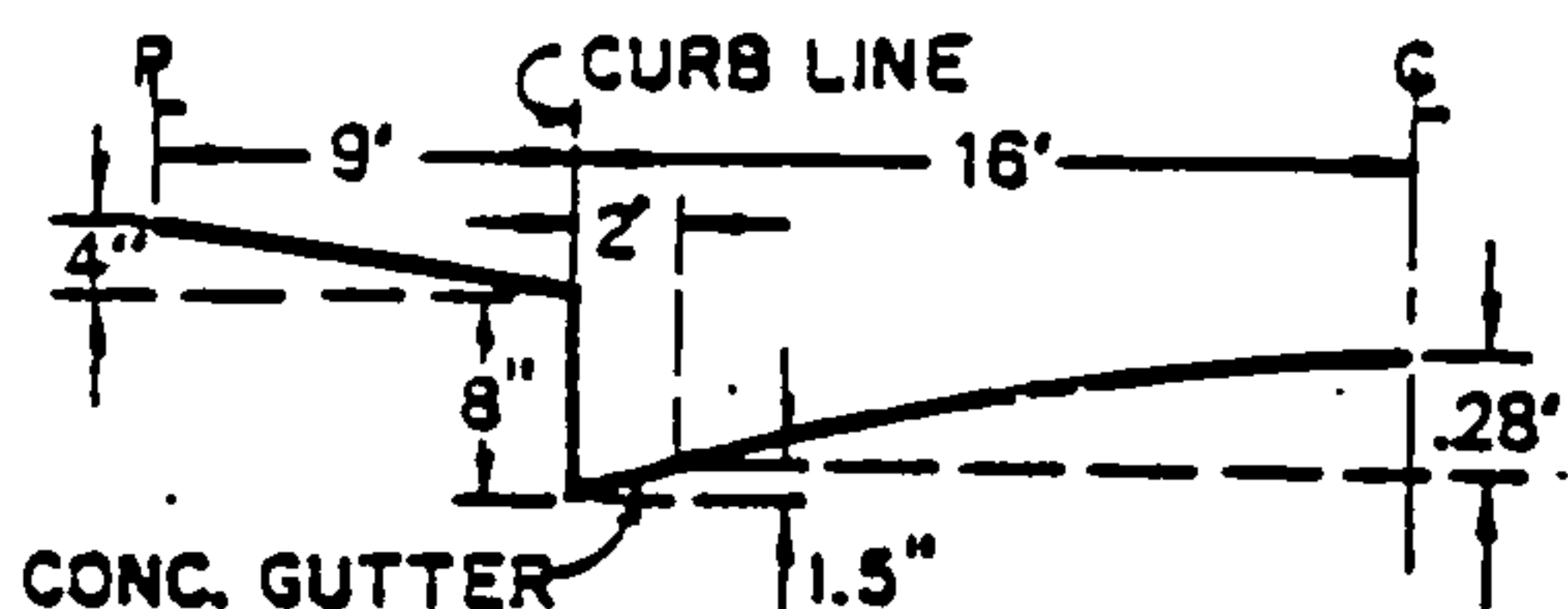
22.3

GRATING CAPACITIES FOR TYPE DOUBLE

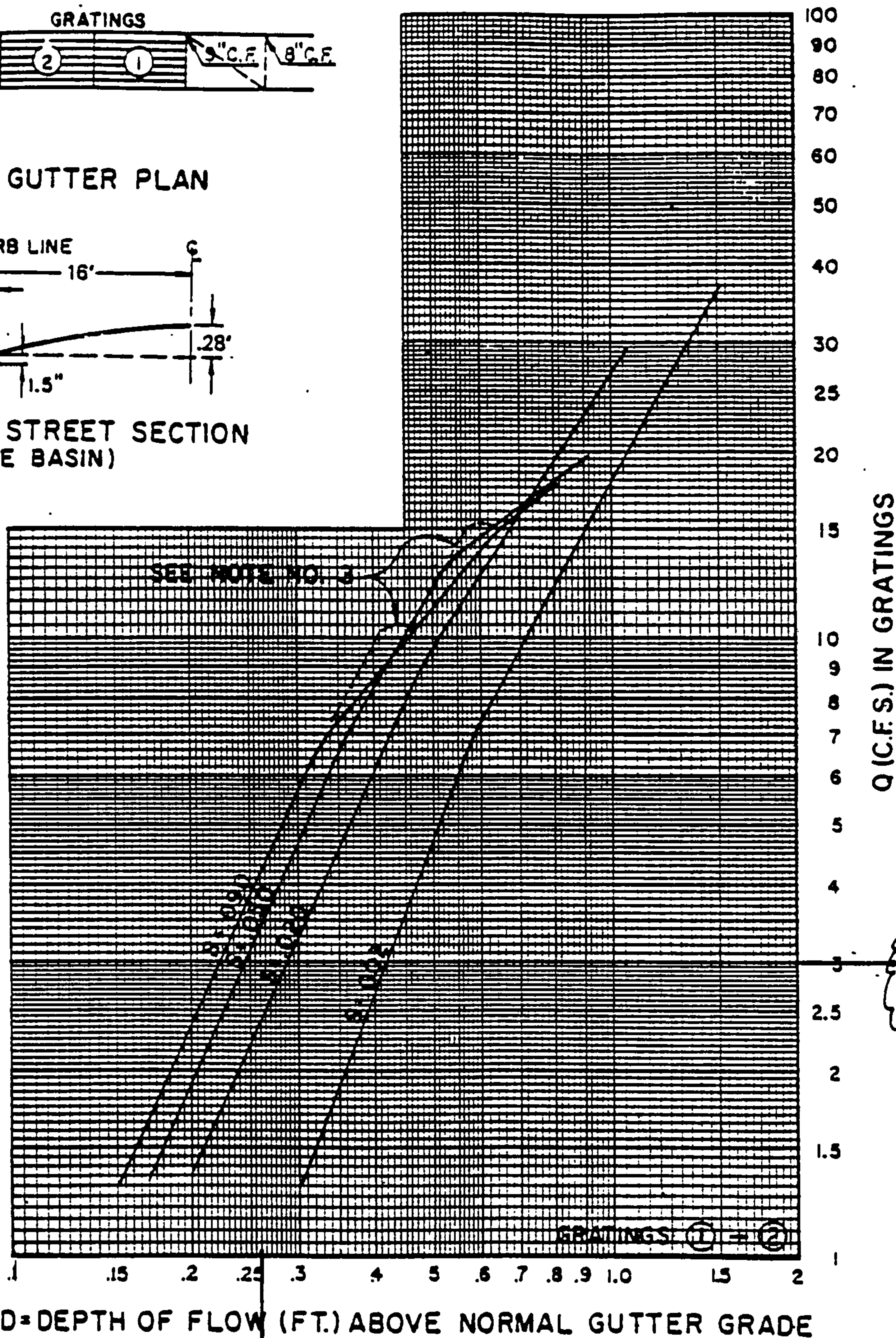
"C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

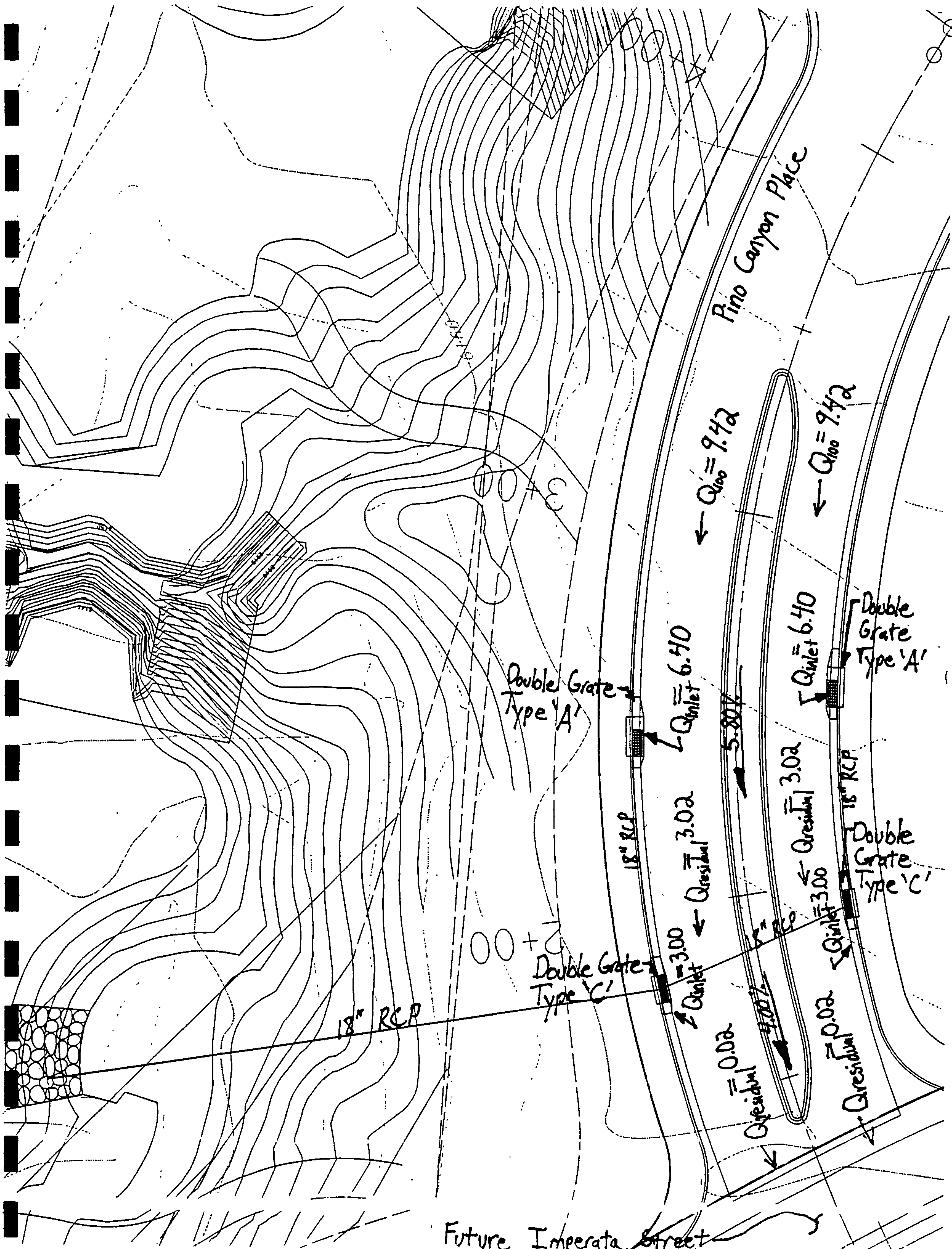


D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE

Roadway Grade 4.00%
 $Q_{100} = 3.02 \text{ cfs}$ (to each inlet)

0.26 ft.
w/ Q_{100}

Type 'C'
Double Grate



Pino Canyon Place

Double Gate Type 'A'

Double Gate Type 'A'

Double Gate Type 'C'

Double Gate Type 'C'

Future Imperata Street

$\leftarrow Q_{100} = 9.42$

$\leftarrow Q_{100} = 9.42$

$\leftarrow Q_{inlet} = 6.40$

$\leftarrow Q_{inlet} = 6.40$

18" RCP

18" RCP

18" RCP

$\leftarrow Q_{residual} = 3.02$

$\leftarrow Q_{residual} = 3.02$

$\leftarrow Q_{inlet} = 3.00$

$\leftarrow Q_{inlet} = 3.00$

$\leftarrow Q_{residual} = 0.02$

$\leftarrow Q_{residual} = 0.02$

00+3

HIGH DESERT UNIT 4 - COBBLE SWALE

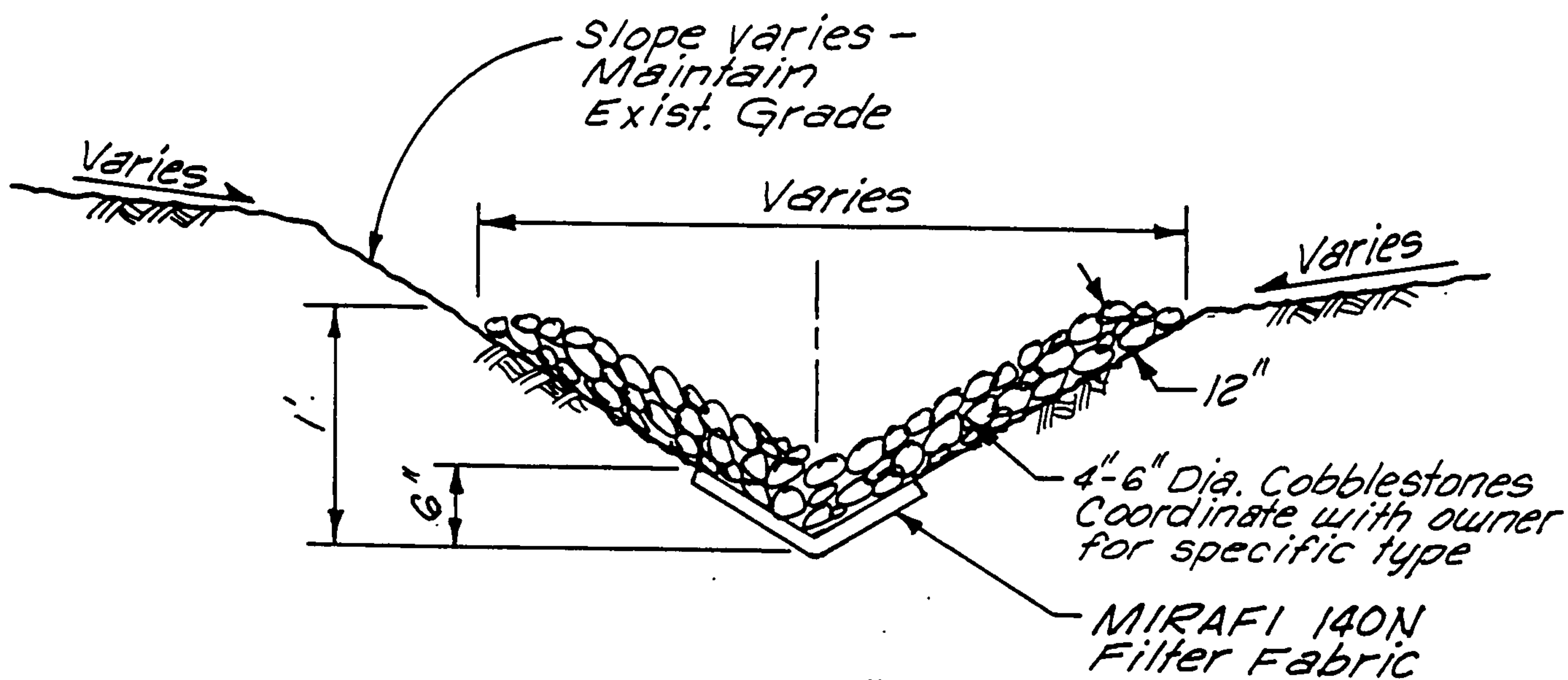
MANNING'S N = .0350

SLOPE = .0450

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1	0.00	100.00	2	20.00	99.00	3	40.00	100.00

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOP
(FT)	INC	AREA	RATE	PER	VEL	WID
		(SQ FT)	(CFS)	(FT)	(FPS)	
99.05	0.05	0.1	0.0	2.0	0.8	2.00
99.10	0.10	0.2	0.2	4.0	1.2	4.00
99.15	0.15	0.5	0.7	6.0	1.6	6.00
99.20	0.20	0.8	1.6	8.0	1.9	8.00
99.25	0.25	1.3	2.8	10.0	2.2	10.00
99.30	0.30	1.8	4.6	12.0	2.5	12.00
99.35	0.35	2.5	6.9	14.0	2.8	14.00
99.40	0.40	3.2	9.8	16.0	3.1	16.00
99.45	0.45	4.1	13.5	18.0	3.3	18.00
99.50	0.50	5.0	17.9	20.0	3.6	20.00
99.55	0.55	6.1	23.0	22.0	3.8	22.00
99.60	0.60	7.2	29.0	24.0	4.0	24.00
99.65	0.65	8.5	35.9	26.0	4.3	26.00
99.70	0.70	9.8	43.8	28.0	4.5	28.00
99.75	0.75	11.3	52.6	30.0	4.7	30.00
99.80	0.80	12.8	62.5	32.0	4.9	32.00
99.85	0.85	14.5	73.5	34.0	5.1	34.00
99.90	0.90	16.2	85.6	36.0	5.3	36.00
99.95	0.95	18.1	98.9	38.0	5.5	38.00
100.00	1.00	20.0	113.4	40.0	5.7	40.00

$Q_{100} = 18.22$



SECTION "A-A"
NTS



Federal Emergency Management Agency

Washington, D.C. 20472

NOV 18 2003

03 NOV 21 AM 8:03
FEMA OFFICE

IN REPLY REFER TO

Case No.: 03-06-2253V

The Honorable Martin Chavez
Mayor, City of Albuquerque
Office of the Mayor
P.O. Box 1293
Albuquerque, NM 87103

Community: City of Albuquerque,
Bernalillo County, New Mexico
Community No. 350002
Effective Date: November 20, 2003
LOMC-VALID

Dear Mayor Chavez:

This letter revalidates the determinations for properties and/or structures in the referenced community as described in the Letters of Map Revision (LOMRs) and Letters of Map Amendment (LOMAs) previously issued by the Federal Emergency Management Agency (FEMA) on the dates listed on the attached pages. As of the above-referenced effective date, these LOMRs and LOMAs will revise the effective National Flood Insurance Program (NFIP) map, dated November 19, 2003, for the referenced community, and will remain in effect until superseded by a revision to the NFIP map panel on which the property is located. The FEMA case numbers (when available), property identifiers, NFIP map panel numbers, and new flood insurance risk zones are listed on the attached pages.

Because these revalidated LOMRs and LOMAs will not be printed or distributed to primary map users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this letter throughout your community so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information.

For information relating to LOMRs or LOMAs that are not listed on the attached pages and to obtain copies of previously issued LOMAs and LOMRs, if needed, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Doug Bellomo, P.E., Acting Chief
Hazard Study Branch
Emergency Preparedness and
Response Directorate

Enclosure

cc: Community Map Repository
Carlos A. Montoya, P.E., Floodplain Administrator, City of Albuquerque

REVALIDATED LETTERS OF MAP CHANGE FOR ALBUQUERQUE, NEW MEXICO

COMMUNITY NO. :350002

CASE NO. : 03-06-2253V

EFFECTIVE DATE : November 20, 2003

Case No.	Date Issued	Identifier	Map Panel No.	New Zone
R6-96-11-058	11/07/96	AMENDED PLAT OF SUNSTAR ADDITION, LOT 13; 3653 SUN STAR LOOP SW	35001C0339E	X (unshaded)
R6-96-12-005	12/04/96	DEL RIO ACRE, A PORTION OF TRACT NUMBER 36; 1838 DEL NORTE DRIVE SW	35001C0339E	X (unshaded)
97-06-118A	01/03/97	BELLHAVEN, BLOCK 7A, LOT 12; 9000 HANNET AVENUE NE	35001C0356E	X (unshaded)
R6-97-03-129	03/17/97	H.C. GONZALES SUBDIVISION, TRACTS 156,157,158, ATRIASO GRANT, LOT 19; 828 DOLORES NW	35001C0327E	X (unshaded)
97-06-197A	04/14/97	REPLAT OF MESA PRIETA SUBDIVISION, LOTS 1-104	35001C0114E	X (shaded)
97-06-297A	04/14/97	TIJERAS CLUB GARDENS, BLOCK A, LOT 1; 9500 HANNETT AVENUE NE	35001C0356E	X (unshaded)
R6-97-06-100	06/18/97	CACY SUBDIVISION, BLOCK E, LOTS 9A, B, C, AND D; PHEASANT AVENUE NW	35001C0327E	X (unshaded)
97-06-344A	07/02/97	VISTA FOUR HILLS, BLOCK 1, LOT 11; 519 NAVARRA WAY SE	35001C0367F	X (unshaded)
97-06-1111A	09/10/97	LOS POBLANOS COURTYARD, LOTS 1-P1, 2-P1, AND 15-P-1	35001C0118E	X (shaded)
98-06-273A	12/30/97	BLUEWATER VILLAGE APARTMENTS, HUBBEL PLAZA, TRACTS A-1A-2B & A-1A-2C, BUILDINGS 2-5 AND 10	35001C0329E	X (unshaded)
98-06-907A	04/07/98	CASA BLANCA ADDITION, LOT 34; 6301 CENTRAL AVENUE NW	35001C0329E	X (unshaded)
98-06-945A	04/13/98	DANIEL G. HERRERA SUBDIVISION, LOT44-A; 900 FIELD STREET SW	35001C0329E	X (unshaded)
98-06-1124A	05/12/98	PRINCESS JEANNE PARK, BLOCK 25-C, LOT 32; 11000 CONSTITUTION AVENUE NE	35001C0357E	X (unshaded)
98-06-1270A	06/03/98	LEE ACRES, BLOCK F, LOT 13; 1036 SOLAR ROAD NW	35001C0119E	X (shaded)
98-06-1164A	06/15/98	PRINCESS JEANNE PARK, BLOCK 55, LOT 8; 1400 MORRIS STREET NE	35001C0357E	X (unshaded)
98-06-1298A	08/05/98	PRINCESS JEANNE PARK, BLOCK 25, LOT 1; 11001 RALPH AVENUE NE	35001C0357E	X (unshaded)
99-06-231A	12/08/98	A PORTION OF SECTION 1, TOWNSHIP 9 NORTH, RANGE 2 EAST; 2915 VIOLA ROAD SW	35001C0337E	X (unshaded)
99-06-866A	04/23/99	TRACT 30-A-4-A; 1562 TRUJILLO ROAD SW	35001C0333E	X (shaded)
99-06-2051A	10/19/99	PRINCESS JEANNE PARK, BLOCK 55-A, LOT 3; 1420 MORRIS STREET NE	35001C0357E	X (unshaded)
00-06-219A	01/13/00	TOWN OF ATRISCO GRANT, UNIT 8, PORTIONS OF TRACTS 344-347	35001C0327E	X (unshaded)
00-06-747A	04/12/00	EMIL MANN ADDTION, LOTS 14-A-1, 14-A-2, 14-A-3, 23-A, 23-B, 24-A, & 24-B; 641, 639, 637, 501, 505 ALCAZAR STREET SE & 7204, 7208 BELL AVENUE SE	35001C0354E	X (unshaded)
00-06-1048A	06/16/00	COUNTRYWOOD SUBDIVISION, LOT 21; 7901 WOODRIDGE DRIVE NE	35001C0141F	X (unshaded)

REVALIDATED LETTERS OF MAP CHANGE FOR ALBUQUERQUE, NEW MEXICO

COMMUNITY NO. :350002

CASE NO. : 03-06-2253V

EFFECTIVE DATE : November 20, 2003

Case No.	Date Issued	Identifier	Map Panel No.	New Zone
00-06-1395A	08/16/00	H.C. GONZALES SUBDIVISION, LOT 60; 800 58TH STREET NW	35001C0327E	X (unshaded)
01-06-212A	01/17/01	ADOBE ACRES SUBDIVISION, UNIT I, BLOCK 8S, LOT 4; 4029 DONALD ROAD SW	35001C0339E	X (shaded)
01-06-134A	02/07/01	DEL RIO ACRES, UNIT 1, PORTION OF TRACT 4; 2421 DEL NORTE DRIVE SW	35001C0339E	X (shaded)
01-06-365A	02/14/01	SCHMILLE ADDITION, TRACTS A & B; 2451 & 2449 CHELWOOD PARK BOULEVARD NE	35001C0357E	X (unshaded)
01-06-988A	05/16/01	TRUMBLE PARK ADDITION, LOTS 1-16	35001C0354E	X (unshaded)
01-06-660A	06/20/01	NORTH ALBUQUERQUE ACRES, TRACT 3, UNIT 3, BLOCK 19, TRACTS A, B, AND C	35001C0141F	X (unshaded)
01-06-204A	08/10/01	STARDUST SKIES, UNIT 2, BLOCK 6, A PORTION OF LOT 1; 3600 STARDUST ROAD NE	35001C0352E	X (unshaded)
01-06-1717A	08/29/01	SARATON HEIGHTS SUBDIVISION, BLOCK 9, LOT 7; 900 LAGUYRA DRIVE NE	35001C0354E	X (unshaded)
02-06-132A	11/07/01	CENTRAL PARK ADDITION, BLOCK 4, LOT 8; 728 ALVARADO DRIVE SE	35001C0354E	X (unshaded)
02-06-535A	02/06/02	MANKIN'S SUBDIVISION, BLOCK 17, LOT 15; 621 ARIZONA STREET SE	35001C0362E	X (unshaded)
02-06-2235A	08/14/02	HERITAGE EAST, UNIT II, BLOCK 14, LOT 17; 9624 BOLACK DRIVE NE	35001C0141F	X (unshaded)
02-06-2290A	08/23/02	BELMONT PLACE, BLOCK 7, LOT 12B; 620 FREEMAN AVENUE NW	35001C0119E	X (unshaded)
02-06-2335A	08/30/02	THE TRILLIUM AT HIGH DESERT, UNIT 1, A PORTION OF TRACT 3B-1	35001C0163F	X (unshaded)
02-06-2229A	10/25/02	VISTA DEL SANDIA, BLOCK 2, LOT 28-A1; 11301 PASEO DEL OSO NE	35001C0144F	X (unshaded)
03-06-212A	11/08/02	KELSEY ACRES SUBDIVISION, LOT 7-A; 3314 ISLETA BOULEVARD SW	35001C0343E	X (shaded)
02-06-2255A	12/06/02	SARATON HEIGHTS SUBDIVISION, BLOCK 8, LOT 7; 900 CARDENAS DRIVE NE	35001C0354E	X (unshaded)
03-06-530A	01/03/03	CHACO RIDGE AT HIGH DESERT, LOT 3-P1; 6508 ANASAZI NE	35001C0163F	X (unshaded)
03-06-649A	01/22/03	FOUR HILLS VILLAGE 29TH INSTALLMENT, UNIT 1, LOTS 1 AND 41	35001C0367F	X (unshaded)
03-06-945A	03/05/03	CARLOS REY SUBDIVISION, BLOCK M, LOT 16; 432 64TH STREET SW	35001C0329E	X (unshaded)
03-06-476A	03/26/03	EMIL MANN ADDITION, BLOCK 4, LOTS 11-A, 11-B, 12-A, AND 12-B	35001C0354E	MULTIPLE
03-06-1657A	05/28/03	NORTH ALBUQUERQUE ACRES, UNIT 1, TRACT 2, BLOCK 12, LOT 31; 11807 CORONA AVENUE NE	35001C0142F	X (unshaded)
03-06-1274A	06/18/03	MESA ARRIBA, BLOCK J, LOT 1; 3404 ESPEJO STREET NE	35001C0356E	X (unshaded)

REVALIDATED LETTERS OF MAP CHANGE FOR ALBUQUERQUE, NEW MEXICO

COMMUNITY NO. :350002

CASE NO. : 03-06-2253V

EFFECTIVE DATE : November 20, 2003

Case No.	Date Issued	Identifier	Map Panel No.	New Zone
03-06-2077A	07/25/03	JOHN BARON BURG PARK, BLOCK 5, LOTS 7-A-1, 8-A-1, AND 9-A-1	35001C0331E	X (unshaded)
03-06-2213A	07/25/03	EMIL MANN ADDITION, BLOCK 4, LOTS 12-A AND 11-B	35001C0354E	X (unshaded)
03-06-1756A	08/06/03	SANTA FE VILLAGE, UNIT 1, BLOCK 11, LOT 1; 6632 CONRAD AVENUE NORTHWEST	35001C0114E	X (unshaded)
03-06-1725A	08/20/03	EL VALLADO SUBDIVISION, LOTS 11 & 12	35001C0386F	X (unshaded)
03-06-2590A	09/12/03	KENSINGTON SUBDIVISION, PHASE 4, BLOCK G, LOT 5; 6603 KESWICK ROAD NORTHWEST	35001C0327E	X (shaded)
03-06-2583A	10/01/03	TRACTS 224 AND 225-B; 1712-1720 ISLETA BOULEVARD	35001C0341E	X (shaded)
04-06-090A	10/31/03	HERITAGE EAST, UNIT 2, BLOCK 14, LOT 20; 9636 BOLACK DRIVE NORTHEAST	35001C0141F	X (unshaded)

Sep 03 02 02:48p

Leg Anixter

5-828-9139

p.2



Federal Emergency Management Agency

Washington, D.C. 20472

August 30, 2002

THE HONORABLE MARTIN CHAVEZ
MAYOR, CITY OF ALBUQUERQUE
ONE CIVIC PLAZA NORTHWEST
P.O. BOX 1293
ALBUQUERQUE, NM 87103

CASE NO.: 02-06-2335A
COMMUNITY: CITY OF ALBUQUERQUE, BERNALILLO
COUNTY, NEW MEXICO
COMMUNITY NO.: 350002

DEAR MAYOR CHAVEZ:

This is in reference to a request that the Federal Emergency Management Agency (FEMA) determine if the property described in the enclosed document is located within an identified Special Flood Hazard Area, the area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood), on the effective National Flood Insurance Program (NFIP) map. Using the information submitted and the effective NFIP map, our determination is shown on the attached Letter of Map Revision based on Fill (LOMR-F) Determination Document. This determination document provides additional information regarding the effective NFIP map, the legal description of the property and our determination.

Additional documents are enclosed which provide information regarding the subject property and LOMR-F's. Please see the List of Enclosures below to determine which documents are enclosed. Other attachments specific to this request may be included as referenced in the Determination/Comment document. If you have any questions about this letter or any of the enclosures, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 12101 Indian Creek Court, Beltsville, MD 20705. Additional information about the NFIP is available on our web site at <http://www.fema.gov/nfip/>.

Sincerely,

A handwritten signature of Matthew B. Miller in dark ink.

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Federal Insurance and Mitigation Administration

LIST OF ENCLOSURES:

LOMR-F DETERMINATION DOCUMENT (REMOVAL)

cc: State/Commonwealth NFIP Coordinator
Community Map Repository
Region
Mr. Bruce Anderson
Mr. Gregg Anixter

01/10/2005 13:28 FAX

REMAX MASTERS

Sep 03 02 02:49p

Greg Anixter

505-828-9139

p.3

Page 1 of 2

Date: August 30, 2002

Case No.: 02-06-2335A

LOMR-F



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION BASED ON FILL
DETERMINATION DOCUMENT (REMOVAL)

COMMUNITY AND MAP PANEL INFORMATION		LEGAL PROPERTY DESCRIPTION
COMMUNITY	City of Albuquerque, Bernalillo County, New Mexico	A portion of Tract 3B-1, The Trillium at High Desert, Unit One, as shown on Plat, Instrument No. 95105009, recorded in Volume 95C, Folio 369, filed on October 13, 1995, by the Clerk and Recorder, Bernalillo County, New Mexico; the portion of land to be removed from the SFHA is more particularly described by the following metes and bounds:
	COMMUNITY NO.: 350002	
AFFECTED MAP PANEL	NUMBER: 35001C0163E	
	NAME: Bernalillo County, New Mexico and Incorporated Areas	
	DATE: 04/02/2002	
FLOODING SOURCE: SHEET FLOW		APPROXIMATE LATITUDE & LONGITUDE OF PROPERTY: 35.148, -106.496 SOURCE OF LAT & LONG: MAPBLAST1 DATUM: NAD 83

DETERMINATION

LOT	BLOCK/ SECTION	SUBDIVISION	STREET	OUTCOME WHAT IS REMOVED FROM THE SFHA	FLOOD ZONE	1% ANNUAL CHANCE FLOOD ELEVATION (NGVD 29)	LOWEST ADJACENT GRADE ELEVATION (NGVD 29)	LOWEST LOT ELEVATION (NGVD 29)
—	—	—	—	Portion of Property	X (unshaded)	—	—	—

Special Flood Hazard Area (SFHA) - The SFHA is an area that would be inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood).

ADDITIONAL CONSIDERATIONS (Please refer to the appropriate section on Attachment 1 for the additional considerations listed below.)

LEGAL PROPERTY DESCRIPTION (CONTINUED)
REISSUANCE

This document provides the Federal Emergency Management Agency's determination regarding a request for a Letter of Map Revision based on Fill for the property described above. Using the information submitted and the effective National Flood Insurance Program (NFIP) map, we have determined that the described portion(s) of the property(ies) is/are not located in the SFHA, an area inundated by the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This document revises the effective NFIP map to remove the subject property from the SFHA located on the effective NFIP map; therefore, the Federal mandatory flood insurance requirement does not apply. However, the lender has the option to continue the flood insurance requirement to protect its financial risk on the loan. A Preferred Risk Policy (PRP) is available for buildings located outside the SFHA. Information about the PRP and how one can apply is enclosed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 12101 Indian Creek Court, Beltsville, MD 20705. Additional information about the NFIP is available on our web site at <http://www.fema.gov/nfip/>.

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch
Federal Insurance and Mitigation Administration

Version 1.3.3

381703061696

Page 2 of 2

Date: August 30, 2002

Case No.: 02-06-2335A

LOMR-F



Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION BASED ON FILL
DETERMINATION DOCUMENT (REMOVAL)

ATTACHMENT 1 (ADDITIONAL CONSIDERATIONS)

LEGAL PROPERTY DESCRIPTION (CONTINUED)

Commencing at the Southwest corner of Tract 3B and proceeding N00°01'06"E, 224.17 feet to the Southwest corner of the tract herein described and POINT OF BEGINNING; thence N00°01'06"E, 83.43 feet along western boundary to a point; thence N86°23'10"E, 76.88 feet to a point; thence N37°16'27"E, 141.77 feet to a point; thence N66°42'18"E, 155.48 feet to a point; thence S66°49'29"E, 79.67 feet to a point; thence S48°26'39"W, 117.62 feet to a point; thence S38°27'54"E, 95.79 feet to a point; thence S77°24'55"W, 358.85 feet to the point and POINT OF BEGINNING; containing 1.0671 acres more or less.

REISSUANCE (This additional consideration applies to all properties in the LOMR-F DETERMINATION DOCUMENT (REMOVAL))

The 10/14/1983, National Flood Insurance Program (NFIP) map has since been superseded by a new NFIP map dated 04/02/2002, for this community. Therefore, this document issues a new determination for the subject property based on the new 04/02/2002, NFIP map.

11/30/03

This attachment provides additional information regarding this request. If you have any questions about this attachment, please contact the FEMA Map Assistance Center toll free at (877) 336-2627 (877-FEMA MAP) or by letter addressed to the Federal Emergency Management Agency, 12101 Indian Creek Court, Beltsville, MD 20705. Additional information about the NFIP is available on our web site at <http://www.fema.gov/nfip/>.

Matthew B. Miller

Matthew B. Miller, P.E., Chief
Hazards Study Branch

Federal Insurance and Mitigation Administration

Version 1.3.3

381703061696



Federal Emergency Management Agency

Washington, D.C. 20472

JUN 12 1996

LOMR-F

The Honorable Martin Chavez
Mayor, City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103-1293

IN REPLY REFER TO:

Case No.: 96-06-212A

Community: City of Albuquerque, New Mexico

Community No.: 350002

Map Panel Affected: 0018 C

T-218-65-R

Dear Mayor Chavez:

This is in response to a letter dated February 12, 1996, from Ms. Susan M. Calongne, P.E., City of Albuquerque, Floodplain Administrator, requesting that the Federal Emergency Management Agency determine whether the following property is located in a Special Flood Hazard Area (SFHA), an area that would be inundated by a flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This property has been elevated by the placement of fill after the date of the earliest National Flood Insurance Program (NFIP) map showing the area in the SFHA.

Property Description: A portion of Tract 3B-1, The Trillium at High Desert Unit One, as shown on the Plat recorded as Instrument No. 95105009 in Volume 95C, Folio 369, in the Office of the Clerk and Recorder, Bernalillo County, New Mexico

Community and State: City of Albuquerque, New Mexico

The legal description of the portion mentioned above is as follows:

COMMENCING at the southwest corner of Tract 3B; thence N 00°01'06" E, 224.17 feet to the POINT OF BEGINNING; thence N 00°01'06" E, 83.42 feet; thence N 86°23'10" E, 76.88 feet; thence N 37°16'27" E, 141.77 feet; thence N 66°42'18" E, 155.48 feet; thence S 66°49'29" E, 79.67 feet; thence S 48°26'39" W, 117.62 feet; thence S 38°27'54" E, 95.79 feet; thence S 77°24'55" W, 358.85 feet to the POINT OF BEGINNING.

All fees necessary to process this Letter of Map Revision (LOMR), a total of \$915, have been received.

On May 14, 1996, we received all information necessary to process this request. After comparing this information to the NFIP map for your community, we determined that the property described above would not be inundated by the base flood. Therefore, this letter revises the NFIP map for the City of Albuquerque, New Mexico (NFIP Map Number 350002, Panel 0018 C, dated October 14, 1983), to remove the property from the SFHA. The property is now located in Zone X (unshaded), an area of minimal flooding outside the SFHA. Because portions of the property are in the SFHA, any future construction or substantial improvement on the property remains subject to Federal, State, and local regulations for floodplain management.

Although the criteria for removal of a parcel of land based on fill have been met for this request, we encourage you to require that both the lowest adjacent grade (lowest ground touching the structure) and the lowest floor (including basement) of any structure placed on the property be elevated to a level at or above the base flood elevation.

You should note that this property could be inundated by a flood greater than the base flood or by local flooding conditions not shown on the NFIP map. Also, although we have based our determination on the flood data presently available, we are currently revising the NFIP map for Bernalillo County, New Mexico and Incorporated Areas. New flood data could be generated that may affect this property. When the new NFIP map is issued, it will supersede this letter. The Federal requirement for purchasing flood insurance will then be based on the newly issued NFIP map.

Even though this property is not included in an SFHA, it could be inundated by a flooding event of greater magnitude than the base flood. In fact, more than 25 percent of all losses in the NFIP occur to structures located outside the SFHA in Zones B, C, or X. More than 25 percent of all policies purchased under the NFIP protect structures located in these zones. This clearly illustrates that there is a risk of flooding in non-SFHAs. That risk is just not as great as the flood risk to structures located in SFHAs. To offer flood insurance protection to owners of such structures, the NFIP offers two types of flood insurance. Property owners should discuss their individual flood risk situation and insurance needs with their insurance agent or company before making a final decision regarding flood insurance coverage.

To ensure continued eligibility to participate in the NFIP, your community must enforce its floodplain management regulations using, at a minimum, the flood elevations and zone designations shown on the NFIP map for your community, including the revision effected by this letter. This response is based on the minimum criteria established by the NFIP. State and community officials, based on knowledge of local conditions and in the interest of public safety, may set higher standards for construction in the floodplain. If the State of New Mexico or your community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum Federal criteria.

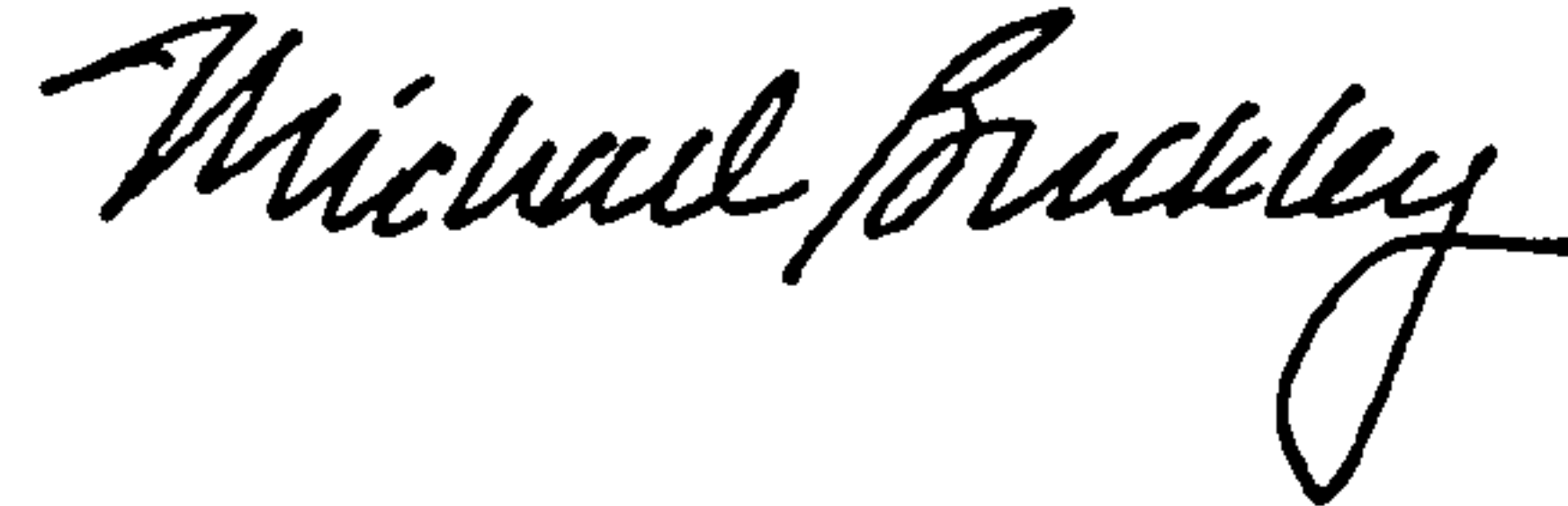
This revision has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

Because this LOMR will not be printed and distributed to primary map users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout your community so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare an article for publication in your community's local newspaper that would describe the changes that have been made and the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps. When, in the future, a sufficient number of revisions have occurred on the affected panel, we will initiate a physical map revision to republish and distribute the panel to incorporate the changes that were made effective by letter.

A copy of this LOMR is being sent to your community's official NFIP map repository where, in accordance with regulations adopted by your community when it made application to join the NFIP, it should be attached to the community's official record copy of the NFIP map, which is available for public inspection.

If you have any questions or if we can be of further assistance, please contact Ms. Agnes De Coca of our staff in Washington, DC, either by telephone at (202) 646-2746 or by facsimile at (202) 646-4596.

Sincerely, -

A handwritten signature in black ink that reads "Michael Buckley". The signature is written in a cursive style with a large, looping "M" and a long, sweeping underline.

Michael K. Buckley, P.E., Chief
Hazard Identification Branch
Mitigation Directorate

cc: Community Map Repository

Ms. Susan M. Calongne, P.E.
Floodplain Administrator
City of Albuquerque



City of Albuquerque

August 13, 1999

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, New Mexico 87108

RE: Grading and Drainage Certification Plan For The Trillium At High Desert Unit Three (E23/D3D) Submitted For Final Release of Financial Guarantees, Engineer's Certification Stamp Dated 8/6/99.

Dear Mr. Arfman:

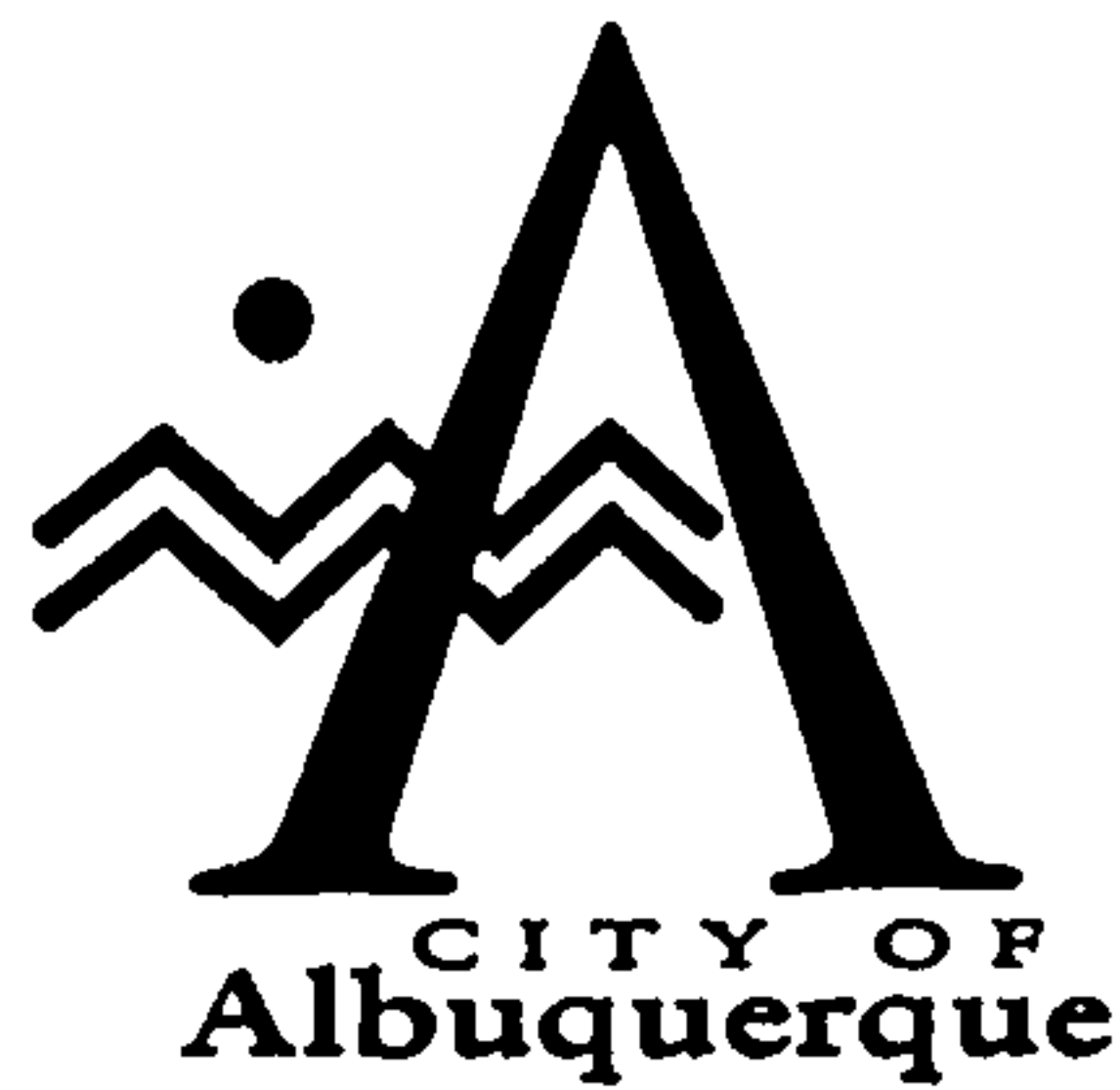
The above referenced plan provided the certification of the walls, and is therefore adequate to satisfy the Grading and Drainage Certification requirement for the release of all financial guarantees for this Unit, per the Infrastructure List signed on April 8, 1997.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin, City Project # 5251.92
File



August 4, 1998

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, New Mexico 87108

RE: Grading and Drainage Certification Plan For The Trillium At High Desert Unit Three (E23/D3D) Submitted For Release of Financial Guarantees, Engineer's Stamp Dated 7/30/98.

Dear Mr. Arfman:

The above referenced plan is adequate to satisfy the requirement for Grading and Drainage Certification for release of financial guarantees for all but the retaining walls, per the Infrastructure List signed on April 8, 1997.

It is my understanding that the financial guarantees will be reduced to acknowledge the retaining walls. The engineer's certification of the walls is required prior to release of the remaining financial guarantees.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Terri Martin (DRB #97-87)
File

Good for You, Albuquerque!





CITY OF
Albuquerque
Public Works Department

May 6, 1997

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, New Mexico 87108

RE: Grading and Drainage Plan For The Trillium At High Desert Units Three & Four (E23/D3D) Submitted For Grading Permit Approval, Engineer's Stamp Dated 4/15/97.

Dear Mr. Arfman:

Based on the information provided in the submittal of April 16, 1997, the above referenced plan is approved for Rough Grading permit release. Prior to grading, however, a top-soil disturbance permit is required.

The Engineer's Grading and Drainage Certification of the plan approved at the DRB will be required prior to release of financial guarantees for these Units.

If you should have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

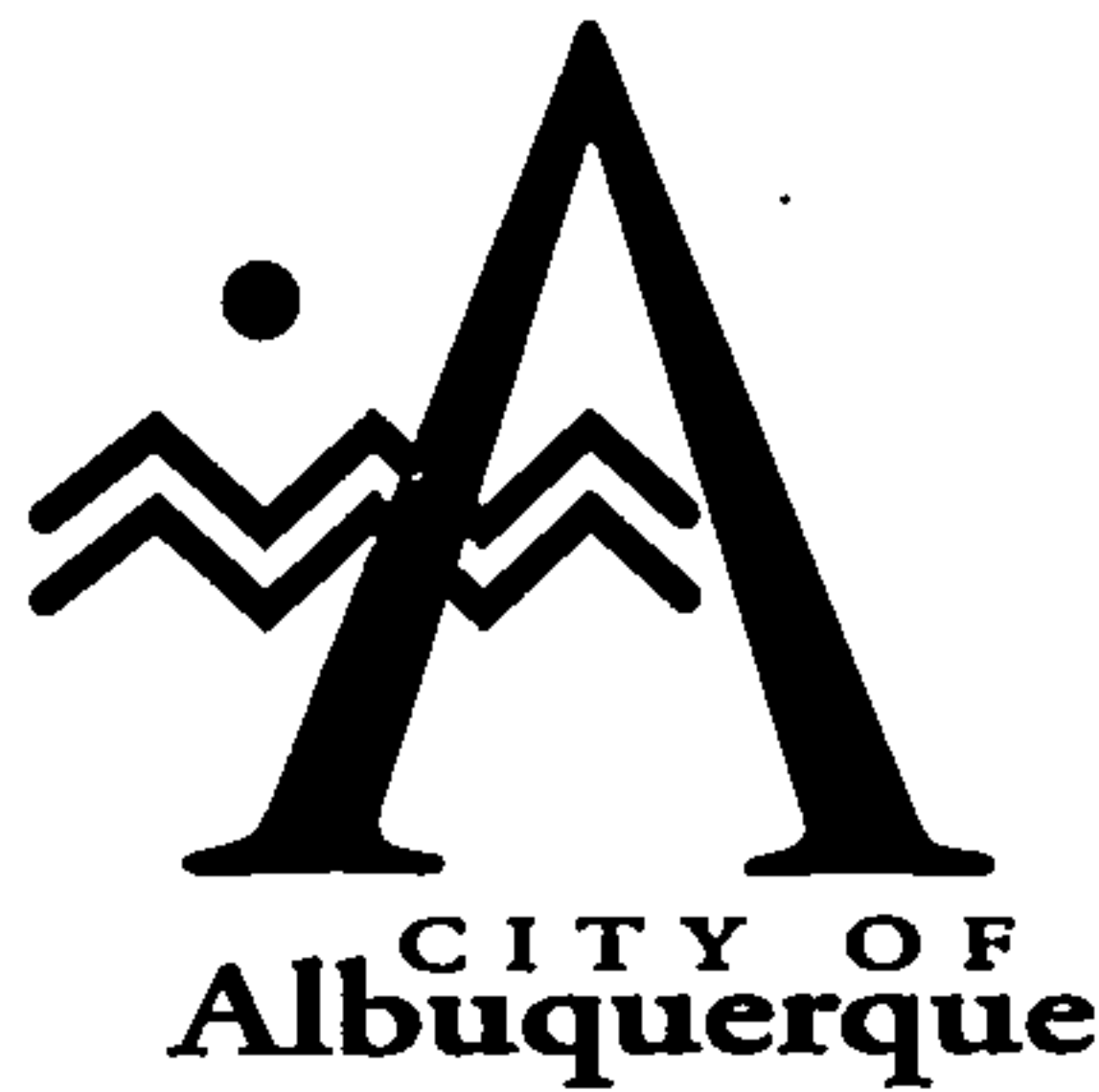
Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Larry Caudill, Environmental Health
File

Good for You, Albuquerque!

P.O. Box 1293, Albuquerque, New Mexico 87103





December 11, 1996

Martin J. Chávez, Mayor

Fred Arfman
Isaacson & Arfman
128 Monroe St. NE
Albuquerque, NM 87108

**RE: THE TRILLIUM AT HIGH DESERT, UNIT TWO (E23-D3D). DRAINAGE PLAN
FOR FINAL PLAT AND GRADING PERMIT APPROVALS. ENGINEER'S STAMP
DATED 12-10-96.**

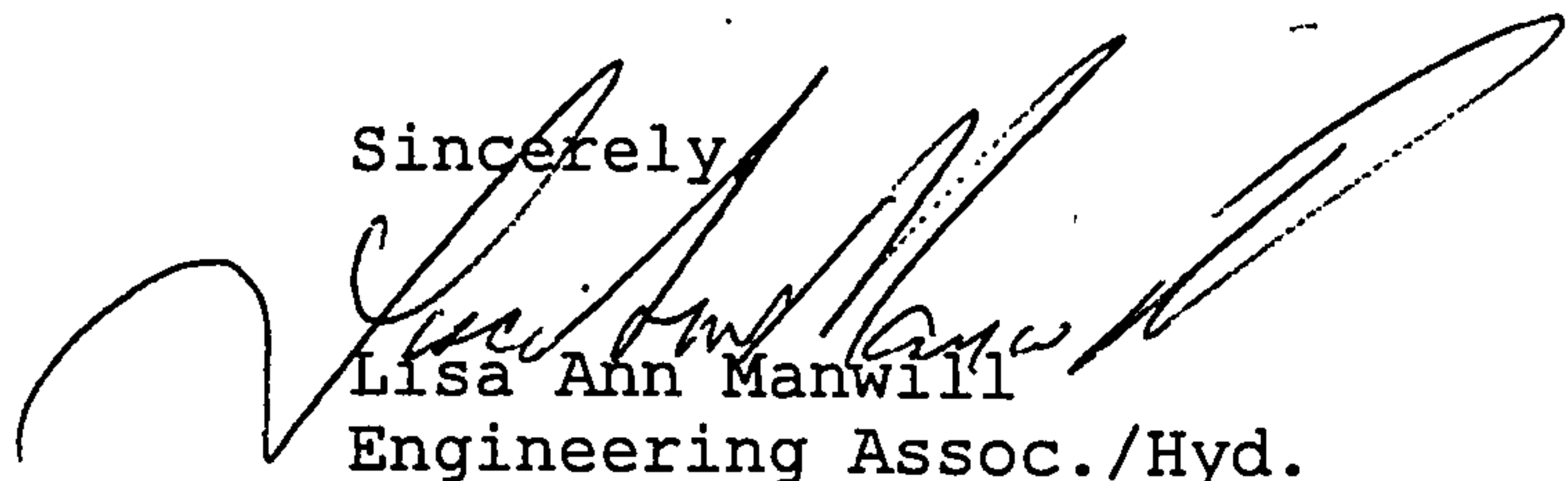
Dear Mr. Arfman:

Based on the information provided on your November 29, 1996
submittal, the above referenced project is approved for Final Plat
and Grading Permit.

An Engineer's Certification for grading and drainage will be
required prior to any other City issued permits being granted for
these lots.

If I can be of further assistance, please feel free to contact me at
768-3622.

Sincerely,



Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Greg Anixter - Trillium Development Ltd.
Fred Aguirre - City of Albuquerque
Andrew Garcia - City of Albuquerque
File

Good for You, Albuquerque!





City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 21, 1995

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, New Mexico 87108

RE: GRADING PLAN FOR THE TRILLIUM AT HIGH DESERT (E23/D3D)
SUBMITTED FOR FINAL PLAT APPROVAL, ENGINEER'S STAMP
DATED 7/24/95.

Dear Mr. Arfman:

Based on the information provided in the submittal of August 15, 1995, the above referenced plan is approved for Final Plat action. The rear yard and side yard swales which carry flows across lots must be within private drainage easements on the final plat. The temporary retention pond just off of Purple Aster must be within a temporary public drainage easement until Unit 2 is constructed.

The Work Order plans have been approved and signed.

As you are aware, prior to release of the financial guarantees, the Engineer's Certification per the D.P.M. checklist and the Letter of Map Revision will be required.

If you have any questions, please do not hesitate to call me.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Andrew Garcia, City Hydrology
File



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 21, 1995

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, New Mexico 87108

RE: GRADING PLAN FOR THE TRILLIUM AT HIGH DESERT (E23/D3D)
SUBMITTED FOR FINAL PLAT APPROVAL, ENGINEER'S STAMP
DATED 7/24/95.

Dear Mr. Arfman:

Based on the information provided in the submittal of August 15, 1995, the above referenced plan is approved for Final Plat action. The rear yard and side yard swales which carry flows across lots must be within private drainage easements on the final plat. The temporary retention pond just off of Purple Aster must be within a temporary public drainage easement until Unit 2 is constructed.

The Work Order plans have been approved and signed.

As you are aware, prior to release of the financial guarantees, the Engineer's Certification per the D.P.M. checklist and the Letter of Map Revision will be required.

If you have any questions, please do not hesitate to call me.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Andrew Garcia, City Hydrology
(File)

DRAINAGE REPORT

FOR

THE TRILLIUM AT HIGH DESERT UNITS ONE & TWO

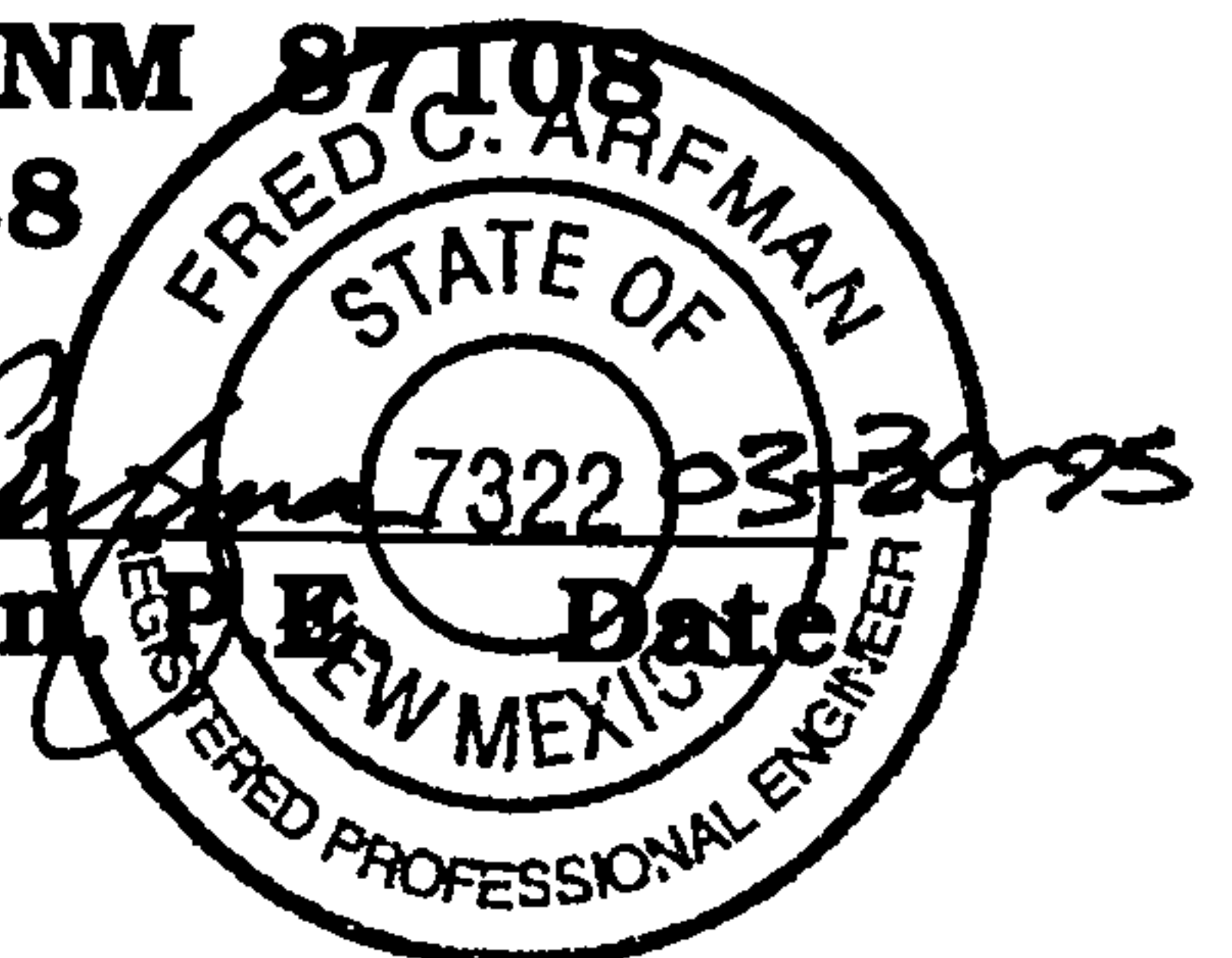
**A 128 LOT (TWO PHASE) SINGLE
FAMILY RESIDENTIAL SUBDIVISION**

**ALBUQUERQUE NEW MEXICO
MARCH 1995**

Prepared by:

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

Fred C. Arfman
Fred C. Arfman, P.E.



I. PROJECT INFORMATION

LEGAL DESCRIPTION: A parcel of land situate with the Elena Gallegos Grant, being Tracts 3B through 3C, of "Plat of Tracts 3A, 3B, 3C, and 3D, High Desert as filed in the records of the County Clerk of Bernalillo County on February 9, 1995 in Volume 95C, Folio 47.

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

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

BENCHMARK: ACS Brass Tablet Stamped "Tumble" located west of Tramway Blvd. approximately 2,800 feet north of Academy Road NE.
Elevation: 6009.155

ZONING: SU-2 HD•R-T (for detached houses, minimum net lot area shall be 5,000 sq. ft. and the minimum width shall be fifty (50) feet as found in Volume One, Sector Plan, High Desert, May 3, 1993).

NUMBER OF EXISTING TRACTS: 2
Tract 3B: 20.0 Ac.
Tract 3C: 5.0 Ac.

NUMBER OF PROPOSED LOTS:

Unit One: 69
Unit Two: 59
Total: 128

TOTAL AREA: 25.00 Ac.
1,089,000 Sq. Ft.

II. SITE CHARACTERISTICS

FLOOD HAZARD: A portion of Tract 3B is affected by flood hazard designations as determined by Panel No. 350002-00¹⁸ of the October 14, 1983 edition of the F.E.M.A. maps. This parcel is contained within Phase Two of the proposed development and was defined as an easement of the aforementioned plat which created Tracts 3B and 3C.

EXISTING CONDITIONS: The site is currently undeveloped and undisturbed with native grasses and bushes as ground cover. Private High Desert Open Space borders the site on the south. The open space contains a portion of the Bear Arroyo which was granted to the City of Albuquerque as a drainage easement. Tramway Blvd. right-of-way lies to the immediate west and the fully developed roadway of Cortaderia Street borders the subdivision easterly property line.

Tract 3A, a residential zoned parcel borders on the north and is currently undeveloped.

Tracts 3B and 3C do not accept any offsite storm water flows. Cortaderia Street intercepts and conveys 100% of the upland flows to the south where they are intercepted by the existing storm drain system in Cortaderia Street, just north of Spain Road.

All storm waters generated onsite currently overland flow onto the right-of-way of Tramway Blvd. or are channelized within the Bear Arroyo easement. Those storm waters exit the site in a concentrated flow and are then accepted by an existing 60" diameter RCP storm drain culvert. All storm waters generated from the subject site (Basin 21 of the Drainage Management Plan, Phase II: Development Condition, High Desert Subdivision) are conveyed by the culvert to the existing Tramway Channel located parallel and to the west of Tramway Blvd. and eventually are accepted by the John Robert Dam.

The current Basin Hydrology and Storm Drain Hydraulics as established by the above aforementioned Master Drainage Plan and accepted by the City is as follows:

1. Basin 21 (26.2 Ac.), actual site (25.07 Ac.).

2. Discharges to existing 60" culvert under Tramway Blvd.

3. Established runoff values.

Unbulked Q_{10} = 67 cfs	Bulked Q_{10} = 68 cfs
Q_{100} = 110 cfs	Q_{100} = 112 cfs

4. A.P.11 has the contributing basin of the subject site and that portion of Tramway Blvd. capable of discharging storm waters to the 60" culvert.

5. A.P.11: Bulk Combined Basins (21 and 22) Q_{10} = 73 cfs,
 Q_{100} = 122 cfs.

6. 60" RCP culvert capacity = 230 cfs.

PROPOSED CONDITIONS: The Trillium at High Desert is a two phase development. The northerly 69 lots will comprise Unit One and cover approximately 14 acres. The remaining acreage (Unit Two) includes the existing drainage easement for a portion of a tributary to the Bear Arroyo. This easement was created by the Plat creating Tract 3B and is also recognized as F.E.M.A. Flood Hazard Area. The elimination of this easement will be contingent upon the following scenario:

1. Mass Grading - Unit One: Unit One will generate a surplus of earth material which will be deposited into the fill areas of the easement.

2. Unit One grading certification shall include the confirmation of the raised grades within and surrounding the easement area. The certification of the easements revised rough grades shall precede the final certification on Unit One in order to avoid the time delay of certification of the retaining walls and other related items associated with the required grading certification.
3. A L.O.M.R. shall be prepared and submitted to F.E.M.A. for their review, processing, and approving of the Flood Hazard Area removal from their established maps. ✓
4. Unit Two platting process shall include a vacation request of the platted easement.

The development will consist of fee simple lots with an average size of 50' x 110'. The roadways are private with a proposed overlay easement for private storm waters and public utilities. All storm waters discharging onto and conveyed by the roadways and related storm drain system shall remain as "private" storm waters until they discharge the site via storm drain at the southwest corner of Tract 3B.

All storm waters generated by the individual lots shall discharge onto the private road system either by routing flows around the detached structures and across the front yard areas or by having designated lots rear yard storm water being collected by a rear lot line drainage

rundown. Those storm waters would then discharge onto the private roads via a sidewalk culvert.

The exception to the above are those lots fronting on Tramway Blvd. There are 24 lots (both phases) whose rear yards areas will discharge the storm waters to five private retention ponds/wells outside of the developments perimeter wall but inside the subdivision boundary.

These lots shall be covered by a private drainage easement allowing cross lot line conveyance of storm waters. A detail of a typical pond/well is found in the appendix of this report.

owners maintain

The resulting capturing of developed, clean storm waters and their introduction into the down grade sub-strata is consistent with the Water Harvesting Recommendation found in the Sector Development Plan. The plan does not state a percentage of the developed storm water be surcharged into the ground, but a goal in the range of 5-8% of the total site runoff will be set. Each pond shall have at least one accompanying dry well to assist in the ground acceptance of the storm water. These dry well will penetrate the compacted fill embankment down to natural earthen densities.

PROPOSED STORM DRAIN IMPROVEMENTS: The westerly most north-south roadway is Silver Leaf Trail. This road accepts all of the subdivision developed storm waters with the exception of those rear

yard areas draining to the Water Harvesting Ponds. Silver Leaf Trail will have a private storm drainage system from Trillium Trail to the south cul-de-sac bulb. This system will be constructed to City of Albuquerque standards.

Catch basins will be extended easterly in Trillium Trail and Purple Clover Way to prevent the occurrence of hydraulic jumps at the intersections. The storm drain will convey and accept additional storm water to the south. The most southerly manhole at the cul-de-sac shall serve as a manifold to split off a portion of the clean runoff and directing those minor flows to the south and into the private open space area.

The manifold or splitter manhole will be designed to pass the initial storm waters which may contain silt and/or surface contaminant. A conceptual design of the manhole is found in the appendix.

The storm water flows split off into the open space will enter into a series of relocation trenches running parallel to the open space contours. Once all of the voids and the immediately surrounding subsoil is saturated, all other storm water will be allowed to discharge the site via the conventional storm drain.

The connection to the existing 60" diameter RCP culvert shall require a manhole with a beehive grate (or similar) set in a sump. This will allow all of the storm waters generated in the Tramway Blvd. right-of-way to be accepted as in the undeveloped condition.

PHASING: As discussed previously in this report, only a limited portion of the Unit Two area shall be disturbed by the Phase One construction. The phase line is indicated on the grading plan found accompanying this report.

Other storm drainage/grading improvements outside of the limits of Unit One are described below:

1. Building up of the offsite embankment along Tramway Blvd.
2. Construction of the main truck of the storm drain (this is required to provide a storm water outfall of Unit One flows. ? show this)
3. Grading of a 20 foot wide strip along the perimeter wall location. This will allow the Master Developer (High Desert Development Corp.) to construct the entire perimeter wall. ✓
4. Open Space Water Harvesting improvements.

5. A temporary retention pond at the southern terminus of Purple Aster Lane sized to accept 100% of the developed storm waters generated from Lots 1-6 of Block B.

*Wildflower Trail?
Silver Leaf?*

III. HYDROLOGY

The hydrological calculations for this report were computed using AHYMO.

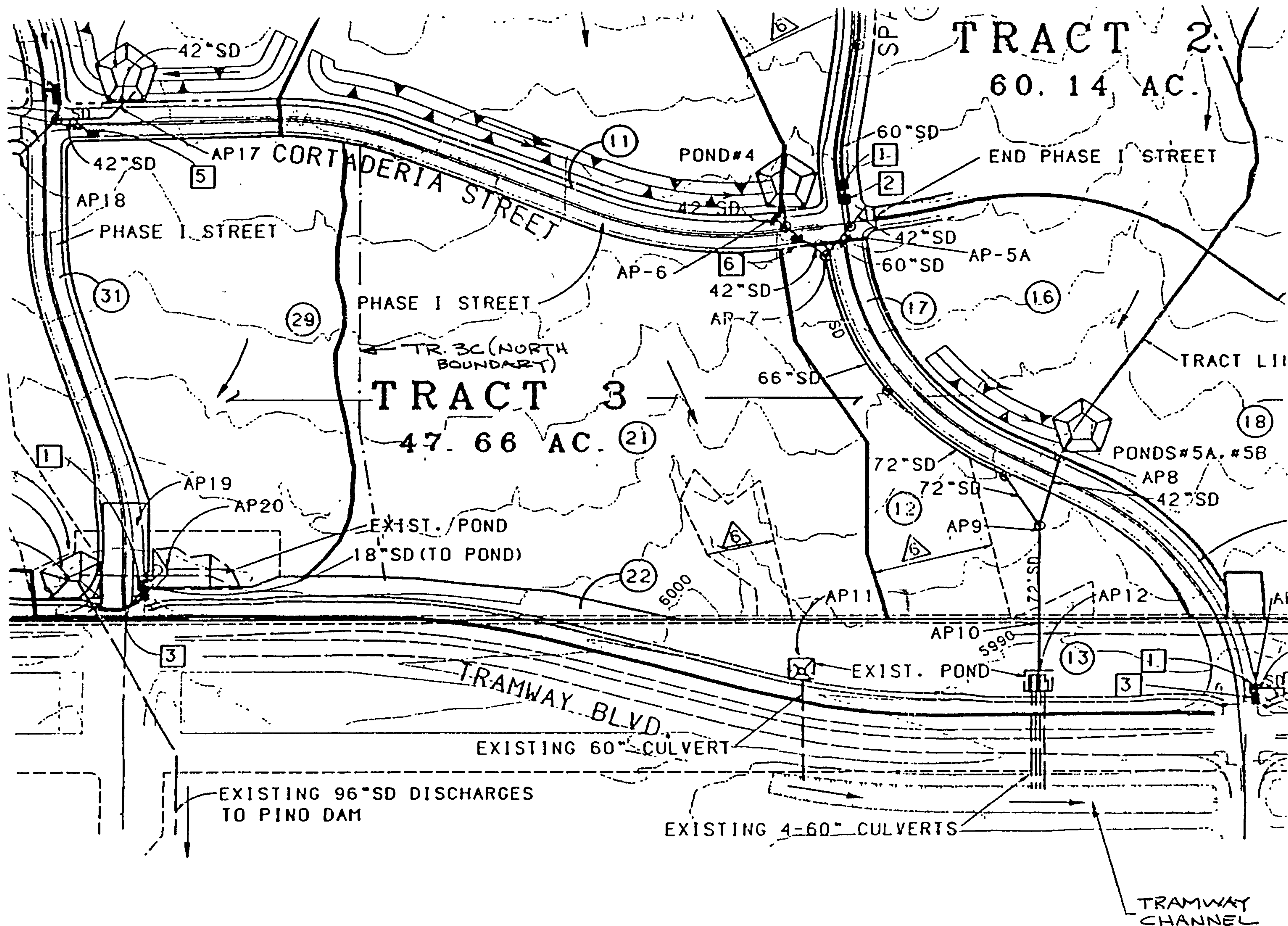
Two models were created for the Unit 1 and Unit 2 developments.

Both are included in the appendix.

Trillium 1 models the Unit 1 development. Five analysis points are identified on the Basin Identification Map showing flows at important locations. The Unit 2 property is assumed undeveloped for this model and a typical 6 lot "cell" is included as Basin 900 to calculate the flow into the landscaped ponding areas along the west side of the property.

Trillium 2 models the Unit 2 development. Three additional analysis points are identified on the Basin Identification Map. Flows from Unit 1 are not taken into account. The storm drain shall be designed using the results from both models.

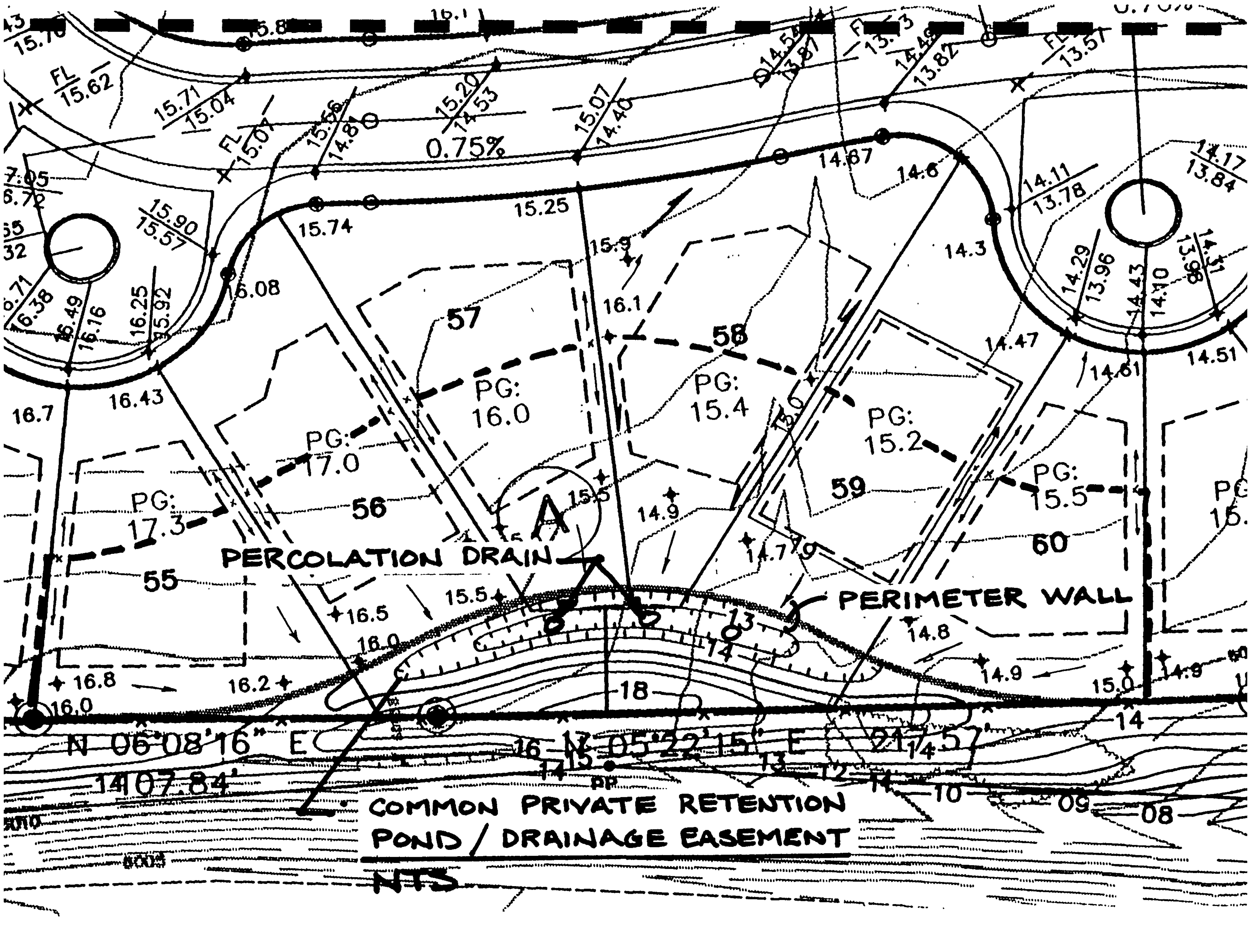
** Assumes all flows from
Unit 1 are w/in SD
System*



HIGH DESERT - PHASE I BASIN SUMMARY

BASIN NO.	BASIN NAME	AREA (SQ.MILES)	LAND TREATMENT TYPES (%)				100 YEAR to
			A	B	C	D	
1	NMBA-1A	0.1386	59.32	31.85	8.83	0.00	0.149
2	NMBA-1B	0.1050	83.48	10.20	3.75	2.57	0.195
3	NMBA-1C	0.0720	85.00	15.00	0.00	0.00	0.199
4	NMBA-2A	0.0260	98.00	2.00	0.00	0.00	0.133
5	NMBA-2B	0.0130	98.00	2.00	0.00	0.00	0.133
6	NMBA-2C	0.0410	98.00	2.00	0.00	0.00	0.133
7	NMBA-2D	0.0040	0.00	35.00	0.00	65.00	0.133
8	NMBA-4A	0.0120	71.00	15.00	0.00	14.00	0.133
9	NMBA-4B	0.0090	0.00	22.34	8.93	68.74	0.133
10	NMBA-4C	0.0350	0.00	22.88	9.15	67.97	0.133
11	NMBA-4D	0.0050	0.00	35.00	0.00	65.00	0.133
12	NMBA-5	0.0143	90.50	3.33	0.00	6.17	0.133
13	NMBA-6	0.0060	0.00	100.00	0.00	0.00	0.133
14	SMBA-1A	0.0550	98.00	2.00	0.00	0.00	0.133
15	SMBA-1B	0.0020	0.00	46.00	0.00	54.00	0.133
16	SMBA-2A	0.0120	46.00	13.14	6.57	34.29	0.133
17	SMBA-2B	0.0010	0.00	35.00	0.00	65.00	0.133
18	SBA-1	0.0170	0.00	37.88	12.63	49.50	0.133
19	SBA-2	0.0103	0.00	37.88	12.63	49.50	0.133
20	SBA-3	0.0107	0.00	37.88	12.63	49.50	0.133
21	NBA-1	0.0410	0.00	37.88	12.63	49.50	0.133
22	NBA-2	0.0050	0.00	100.00	0.00	0.00	0.133
23	NBT-1A	0.0780	93.49	1.76	2.72	2.03	0.208
24	NBT-1B	0.0040	74.85	0.00	8.00	17.15	0.133
25	NBT-2A	0.0110	88.32	4.64	1.84	5.20	0.186
26	NBT-2B	0.0830	96.00	2.00	2.00	0.00	0.142
27	NBT-4	0.0030	0.00	100.00	0.00	0.00	0.133
28	SBT-3	0.0400	100.00	0.00	0.00	0.00	0.133
29	SBT-4	0.0230	0.00	37.88	12.63	49.50	0.133
30	SBT-5	0.0050	0.00	36.26	0.00	63.24	0.133
31	SBT-6	0.0020	0.00	37.00	0.00	63.00	0.133





AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
INPUT FILE = TRILIUM1.DAT

RUN DATE (MON/DAY/YR) =03/29/1995
USER NO.= S_MCGEE_.S92

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
*S TRILIUM1 MODELS THE UNIT 1 DEVELOPMENT & UNDEVELOPED UNIT 2										RAIN6= 2.900
RAINFALL TYPE= 1										
*S BASIN 100 IS THE BLOCK OF LOTS AROUND PURPLE ASTER LN (NORTH)										
COMPUTE NM HYD	100.00	-	1	.00580	15.48	.586	1.89340	1.500	4.171	PER IMP= 49.50
*S TOTAL FLOW @ AP1										
*S ROUTE THE FLOW IN A 39' SECTION (W/ 5' MEDIAN) OF TRILLIUM TRAIL, S=6.0%										
ROUTE	100.20	1	2	.00580	15.29	.586	1.89344	1.533	4.119	
*S BASIN 200 IS THE BLOCK OF LOTS AROUND PURPLE ASTER LN (SOUTH)										
COMPUTE NM HYD	200.00	-	3	.00280	7.49	.283	1.89340	1.500	4.177	PER IMP= 49.50
*S SIZE THE TEMPORARY POND BASED THE ABOVE DISCHARGE & VOLUME										
*S BASIN 300 IS THE BLOCK OF LOTS AROUND AUTUMN SAGE LN										
COMPUTE NM HYD	300.00	-	4	.00640	17.08	.646	1.89340	1.500	4.171	PER IMP= 49.50
*S TOTAL FLOW @ AP2										
*S ROUTE THE FLOW IN SILVER LEAF TRAIL (29' SECTION)										
ROUTE	300.10	4	5	.00640	16.90	.646	1.89344	1.533	4.126	
*S BASIN 400 IS THE SMALL AREA THAT DRAINS TO WILDFLOWER TRAIL										
COMPUTE NM HYD	400.00	-	6	.00080	2.15	.081	1.89340	1.500	4.205	PER IMP= 49.50
*S ADD THE FLOW FROM BASIN 400 TO THE ROUTED FLOW FROM BASIN 100										
ADD HYD	400.10	2& 6	7	.00660	17.43	.666	1.89333	1.500	4.127	
*S TOTAL FLOW @ AP3										
*S ROUTE THE TOTAL FLOW 220' IN A 29' SECTION										
ROUTE	300.10	7	19	.00660	17.58	.666	1.89341	1.533	4.162	
*S THE TOTAL FLOW @ AP4										
*S BASIN 500 IS THE GROUP OF LOTS THAT DRAIN TO TRILLIUM TRAIL										
COMPUTE NM HYD	500.00	-	8	.00210	5.62	.212	1.89340	1.500	4.181	PER IMP= 49.50
*S ADD THE FLOW FROM BASIN 500 TO THE ROUTED FLOW FROM BASIN 300										
ADD HYD	500.10	5& 8,	9	.00850	22.38	.858	1.89335	1.500	4.114	
*S BASINS 600 INCLUDES THE PARK AND TRILLIUM TRAIL NE (& 4 FUTURE UNIT 2 LOTS)										
COMPUTE NM HYD	600.00	-	10	.00210	4.88	.173	1.54568	1.500	3.629	PER IMP= 30.00
*S ADD THE FLOW FROM BASIN 600 TO THE FLOW FROM 300 & 500										
ADD HYD	600.10	9&10	11	.01060	27.26	1.031	1.82445	1.500	4.018	
*S BASIN 700 IS THE BLOCK OF LOTS THAT DRAIN TO THE SILVER LEAF CUL-DE-SAC										
COMPUTE NM HYD	700.00	-	12	.00100	2.69	.101	1.89340	1.500	4.199	PER IMP= 49.50
*S ADD THE FLOW FROM BASIN 700 (TOTAL FLOW @ AP5)										
ADD HYD	700.10	11&12	13	.01160	29.94	1.132	1.83037	1.500	4.033	
*S BASIN 800 IS THE UNDEVELOPED PHASE 2 AREA										
COMPUTE NM HYD	800.00	-	14	.01740	35.13	1.093	1.17831	1.500	3.155	PER IMP= .00
*S BASIN 900 IS A TYPICAL 6 LOT "CELL" THAT DRAINS TO LANDSCAPED PONDS										
COMPUTE NM HYD	900.00	-	15	.00091	2.31	.084	1.72996	1.500	3.959	PER IMP= 39.00
FINISH										

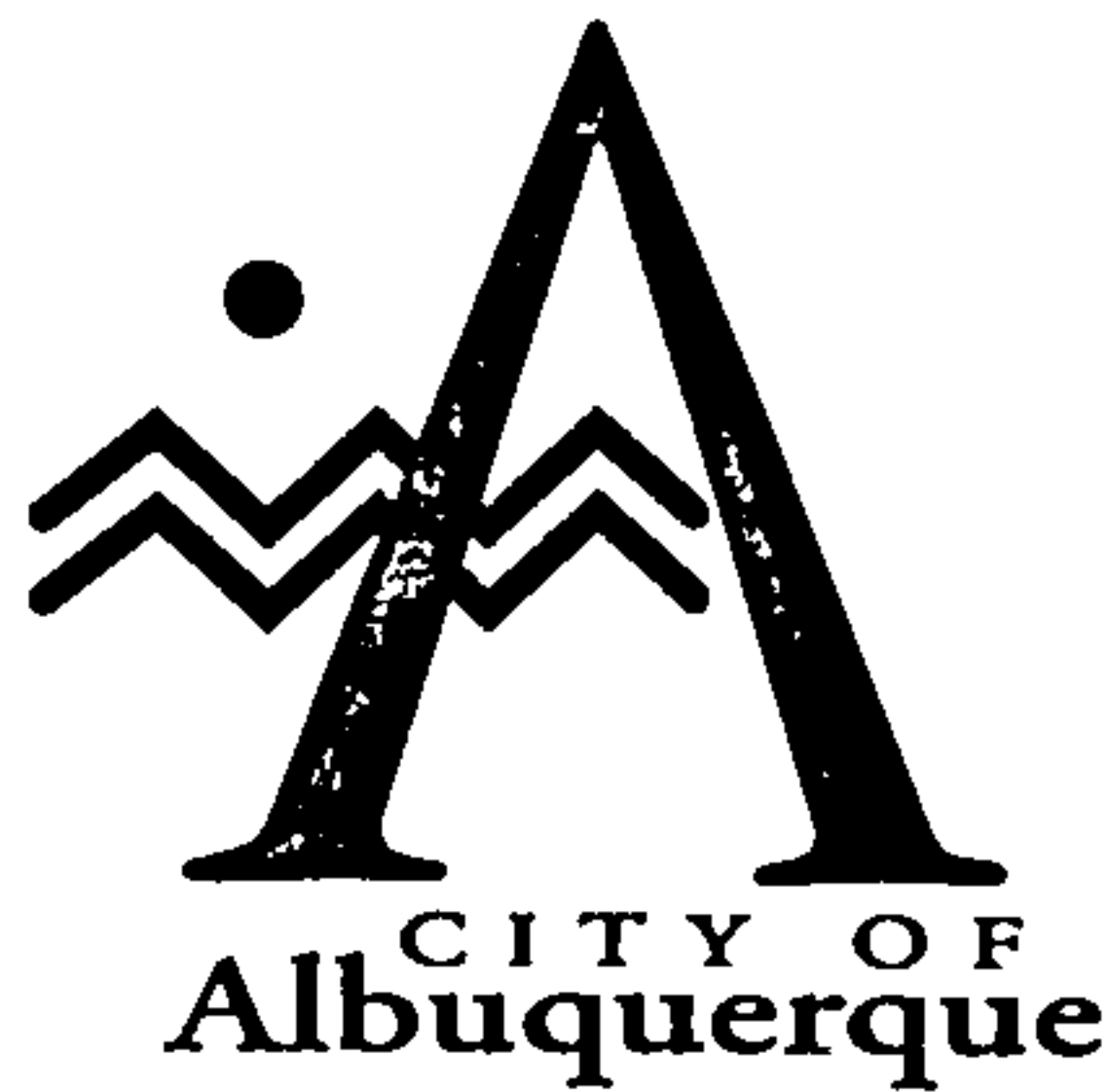
TRILLIUM 1

AHYMO SUMMARY TABLE (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
INPUT FILE = TRILIUM2.DAT

RUN DATE (MON/DAY/YR) =03/29/1995
USER NO.= S_MCGEE_.S92

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
*S TRILIUM2 MODELS THE UNIT 2 DEVELOPMENT										RAIN6= 2.900
RAINFALL TYPE= 1										
*S BASIN 100B IS THE BLOCK OF LOTS THAT DRAIN TO PRARIE CLOVER WAY										
COMPUTE NM HYD	100.00	-	1	.00404	10.79	.408	1.89340	1.500	4.174	PER IMP= 49.50
*S BASIN 200 (FROM UNIT 1) IS THE BLOCK OF LOTS AROUND PURPLE ASTER LN (SOUTH)										
COMPUTE NM HYD	200.00	-	2	.00280	7.49	.283	1.89340	1.500	4.177	PER IMP= 49.50
*S ADD THE FLOWS TO GET THE TOTAL FLOW @ AP6										
ADD HYD	200.10	1& 2	3	.00684	18.28	.691	1.89333	1.500	4.175	
*S ROUTE IN PRARIE CLOVER WAY (29' SECTION) S=2.5%										
ROUTE	200.20	3	4	.00684	18.08	.691	1.89341	1.500	4.129	
*S BASIN 200B IS THE BLOCK OF LOTS THAT DRAIN TO WILDFLOWER TRAIL										
COMPUTE NM HYD	300.00	-	5	.00542	14.47	.547	1.89340	1.500	4.172	PER IMP= 49.50
*S ADD THE FLOWS TO GET THE TOTAL FLOW @ AP7										
ADD HYD	300.10	4& 5	6	.01226	32.55	1.238	1.89335	1.500	4.148	
*S BASIN 300B IS THE BLOCK OF LOTS THAT DRAIN TO SILVER LEAF TRAIL										
COMPUTE NM HYD	400.00	-	7	.00244	6.53	.246	1.89340	1.500	4.179	PER IMP= 49.50
*S ADD THE FLOW FROM BASIN 300B TO THE FLOW @AP7										
ADD HYD	400.10	6& 7	8	.01470	39.07	1.484	1.89334	1.500	4.153	
*S ROUTE IN SILVER LEAF TRAIL (29' SECTION) S=0.7%										
ROUTE	400.20	8	9	.01470	39.02	1.484	1.89337	1.533	4.147	
*S BASIN 400B IS THE GROUP OF LOTS THAT DRAIN TO THE SILVER LEAF CUL-DE-SAC										
COMPUTE NM HYD	500.00	-	10	.00220	5.89	.222	1.89340	1.500	4.181	PER IMP= 49.50
*S ADD THE FLOW FROM BASIN 500 TO THE TOTAL (AP8)										
ADD HYD	500.10	9&10	11	.01690	44.67	1.707	1.89334	1.533	4.130	
FINISH										

TRILIUM 2



Martin J. Chávez, Mayor

June 18, 1996

Fred C. Arfman, P.E.
Isaacson & Arfman, P.A.
128 Monroe St. NE
Albuquerque, New Mexico 87108

RE: ENGINEER'S CERTIFICATION FOR THE TRILLIUM AT HIGH DESERT, UNIT ONE
(E23/D3D) ENGINEER'S STAMP DATED 5/15/96.

Dear Mr. Arfman:

Based on the information provided in the submittal of May 16, 1996, the above referenced plan is adequate to satisfy the requirement for Subdivision Certification for release of financial guarantees per the Infrastructure List dated April 25, 1995.

Attached is a copy of the Letter of Map Revision from the Federal Emergency Management Agency which removes the floodplain from the Trillium property. The condition that financial guarantees for Unit 2 be withheld until this letter is received has already been satisfied and therefore guarantees should not be withheld for this condition.

If you should have any questions, or if I may be of further assistance to you, please call me.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: (with attachments)
Terri Martin (work order #5251.90)
File





Federal Emergency Management Agency

Washington, D.C. 20472

JUN 12 1996

The Honorable Martin Chavez
Mayor, City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103-1293

IN REPLY REFER TO:
Case No.: 96-06-212A
Community: City of Albuquerque, New Mexico
Community No.: 350002
Map Panel Affected: 0018 C

T-218-65-R

Dear Mayor Chavez:

This is in response to a letter dated February 12, 1996, from Ms. Susan M. Calongne, P.E., City of Albuquerque, Floodplain Administrator, requesting that the Federal Emergency Management Agency determine whether the following property is located in a Special Flood Hazard Area (SFHA), an area that would be inundated by a flood having a 1-percent chance of being equaled or exceeded in any given year (base flood). This property has been elevated by the placement of fill after the date of the earliest National Flood Insurance Program (NFIP) map showing the area in the SFHA.

Property Description: A portion of Tract 3B-1, The Trillium at High Desert Unit One, as shown on the Plat recorded as Instrument No. 95105009 in Volume 95C, Folio 369, in the Office of the Clerk and Recorder, Bernalillo County, New Mexico

Community and State: City of Albuquerque, New Mexico

The legal description of the portion mentioned above is as follows:

COMMENCING at the southwest corner of Tract 3B; thence N 00°01'06" E, 224.17 feet to the POINT OF BEGINNING; thence N 00°01'06" E, 83.42 feet; thence N 86°23'10" E, 76.88 feet; thence N 37°16'27" E, 141.77 feet; thence N 66°42'18" E, 155.48 feet; thence S 66°49'29" E, 79.67 feet; thence S 48°26'39" W, 117.62 feet; thence S 38°27'54" E, 95.79 feet; thence S 77°24'55" W, 358.85 feet to the POINT OF BEGINNING.

All fees necessary to process this Letter of Map Revision (LOMR), a total of \$915, have been received.

On May 14, 1996, we received all information necessary to process this request. After comparing this information to the NFIP map for your community, we determined that the property described above would not be inundated by the base flood. Therefore, this letter revises the NFIP map for the City of Albuquerque, New Mexico (NFIP Map Number 350002, Panel 0018 C, dated October 14, 1983), to remove the property from the SFHA. The property is now located in Zone X (unshaded), an area of minimal flooding outside the SFHA. Because portions of the property are in the SFHA, any future construction or substantial improvement on the property remains subject to Federal, State, and local regulations for floodplain management.

Although the criteria for removal of a parcel of land based on fill have been met for this request, we encourage you to require that both the lowest adjacent grade (lowest ground touching the structure) and the lowest floor (including basement) of any structure placed on the property be elevated to a level at or above the base flood elevation.

You should note that this property could be inundated by a flood greater than the base flood or by local flooding conditions not shown on the NFIP map. Also, although we have based our determination on the flood data presently available, we are currently revising the NFIP map for Bernalillo County, New Mexico and Incorporated Areas. New flood data could be generated that may affect this property. When the new NFIP map is issued, it will supersede this letter. The Federal requirement for purchasing flood insurance will then be based on the newly issued NFIP map.

Even though this property is not included in an SFHA, it could be inundated by a flooding event of greater magnitude than the base flood. In fact, more than 25 percent of all losses in the NFIP occur to structures located outside the SFHA in Zones B, C, or X. More than 25 percent of all policies purchased under the NFIP protect structures located in these zones. This clearly illustrates that there is a risk of flooding in non-SFHAs. That risk is just not as great as the flood risk to structures located in SFHAs. To offer flood insurance protection to owners of such structures, the NFIP offers two types of flood insurance. Property owners should discuss their individual flood risk situation and insurance needs with their insurance agent or company before making a final decision regarding flood insurance coverage.

To ensure continued eligibility to participate in the NFIP, your community must enforce its floodplain management regulations using, at a minimum, the flood elevations and zone designations shown on the NFIP map for your community, including the revision effected by this letter. This response is based on the minimum criteria established by the NFIP. State and community officials, based on knowledge of local conditions and in the interest of public safety, may set higher standards for construction in the floodplain. If the State of New Mexico or your community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum Federal criteria.

This revision has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

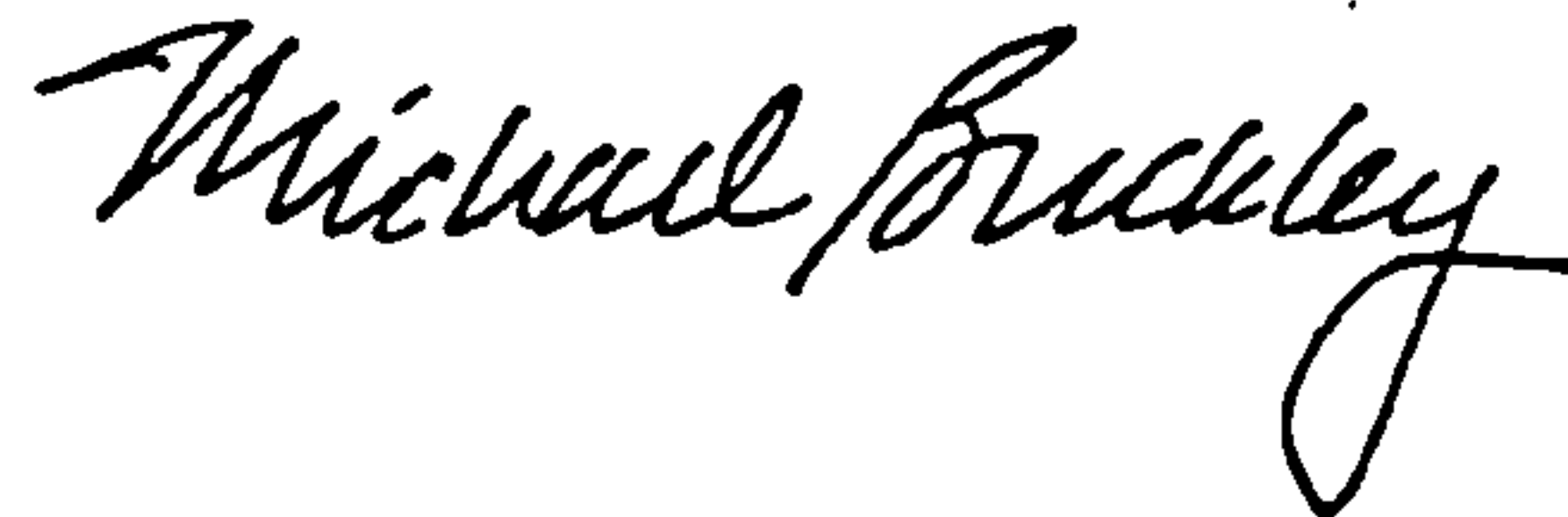
Because this LOMR will not be printed and distributed to primary map users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout your community so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare an article for publication in your community's local newspaper that would describe the changes that have been made and the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps. When, in the future, a sufficient number of revisions have occurred on the affected panel, we will initiate a physical map revision to republish and distribute the panel to incorporate the changes that were made effective by letter.

A copy of this LOMR is being sent to your community's official NFIP map repository where, in accordance with regulations adopted by your community when it made application to join the NFIP, it should be attached to the community's official record copy of the NFIP map, which is available for public inspection.

3

If you have any questions or if we can be of further assistance, please contact Ms. Agnes De Coca of our staff in Washington, DC, either by telephone at (202) 646-2746 or by facsimile at (202) 646-4596.

Sincerely, -

A handwritten signature in cursive script that reads "Michael Buckley". The signature is written in black ink and is positioned above the printed name and title.

Michael K. Buckley, P.E., Chief
Hazard Identification Branch
Mitigation Directorate

cc: Community Map Repository

Ms. Susan M. Calongne, P.E.
Floodplain Administrator
City of Albuquerque