PUBLIC WORKS/HYDROLOGY

D20/D3B

0000 0000 0670

D20/D3B

25×10

0000 0000 0671

D20/D3B

Gardner, Mason & Associates, Inc.
ENGINEERS & PLANNERS

2127 Menaul Blvd. NE
Albuquerque, N.M. 87107
(505) 881-3846

132 W. Las Cruces Av.
Las Cruces, N.M. 88001
(505) 525-8057

June 17, 1985

RECEIVED
JUN 18 1985
HYDROLOGY SECTION

Mr. Billy Goolsby
THE CITY OF ALBUQUERQUE
P. O. Box 1293
Albuquerque, New Mexico 87103-1293

RE: Heritage East Unit 4 - Drainage Report

Dear Billy:

This letter answers your questions of June 12, 1985 regarding the drainage report for Heritage East Unit 4. We are enclosing a copy of the preliminary plat for Unit 4. As shown on the plat, the underlying streets were vacated at the time of the Sector Plan approval.

The specific comments you brought up have been addressed as follows:

1. We are designing the Quintana Ventura intersection. The grades for the east side of Ventura will be included in the construction plans for reference.

2. Ray is completing the hydraulic grade line calculations and will submit them to you by Wednesday.

3. We have included an erosion control plan for Unit 4.

4. We have revised the erosion control plan for Unit 5. The disturbed areas of Unit 5 will be reseeded.

5. The crossing structure at Ventura is the responsibility of the City. The downstream channel is an existing 10 feet wide concrete channel extending under the existing bridge. We are proposing a sail cement transition channel for the first 100 feet.

6. Lots 31 and 32 will either be obtained by condemnation or purchased prior to the development of Unit 4.

7. We have labled Plate III as a drainage map.

25×10

0000 0000 0672

STORM DRAINAGE STUDY

ON

HERITAGE EAST UNIT 4

FOR

BELLAMAH COMMUNITY DEVELOPMENT

APRIL 1985

ROBERT D. CARDNER
STATE OF NEW MEXICO
5853
LAND SURVEYOR
REGISTERED PROFESSIONAL ENGINEER

RECEIVED
MAY 08 1985
HYDROLOGY SECTION

GARDNER, MASON & ASSOCIATES, INC.
2127 MENAUL BOULEVARD N.E.
ALBUQUERQUE, NEW MEXICO 87107

25 x 10

0000 0000 0673

TABLE OF CONTENTS

PART ONE - INTRODUCTION AND HISTORY
Location.....I-1
Basin Characteristics.....I-1
Current Development.....I-1
Existing Storm Drainage Facilities.....I-1
Present Drainage Patterns.....I-1
Offsite Flows.....I-1

PART II - GENERAL
Previous Recommendations.....II-1
Improvements to the Arroyo Domingo Baca.....II-1
Interior Drainage.....II-1
Method of Approach.....II-1
Basin Subdivision.....II-1
Perimeter Outlet.....II-2
Crossing Structures.....II-2
Holbrook Division.....II-2

PART III - HYDROLOGY,HYDRAULIC CONVEYANCE, STUDY DESIGN AND STRUCTURAL CONSIDERATIONS

HYDROLOGY.....III-1
PARAMETERS.....III-1
ANALYSIS.....III-1
HYDRAULIC CONVEYANCE.....III-1
Surface Outfall Calculations.....III-1
Calculations.....III-1
Unit 4 Street Flows, 100 year.....III-2
Unit 4 Street Flows, 10 year.....III-4
Pipe Flows.....III-6
Street Flow on Quintana.....III-6
Channel Flow Along Holbrook.....III-7
Channel Analysis Arroyo Domingo Baca.....III-7

APPENDIX.....Plates I,II,III,IV,V

25×10

0000 0000 0674

PART ONE

INTRODUCTION AND HISTORY

Location

Heritage East Units Four and Five are proposed residential subdivisions located in the far Northeast Heights of Albuquerque. The geographical boundaries of this area are Ventura Avenue to the west, Holbrook Avenue on the east, San Francisco on the south and Arroyo Domingo Baca on the north. Figure I-1 shows the location of this area in relation to the adjacent properties.

Basin Characteristics

The study area is typical foothill terrain with average slopes ranging from 2.5 percent to 8 percent. The existing drainage is from east to west to Ventura and into the Heritage Hills subdivision west of Ventura. The northern portion of the study area lies within the flood plain of the Arroyo Domingo Baca.

Current Development

The study area is currently undeveloped. Ventura Road is constructed on the west side only with an existing bridge across the Arroyo Domingo Baca. Holbrook Street is undeveloped and impassable north of San Francisco. The Arroyo Domingo Baca is a natural (braided) channel to the east of Ventura.

Existing Storm Drainage Facilities

There are no existing Storm Drainage facilities within the study area. The existing facilities adjacent to the area consist of a lined concrete channel in the Arroyo Domingo Baca west of Ventura.

Present Drainage Patterns

The present drainage patterns may be delineated from Plates I, II, and III. Small berms along the east side of Ventura detain low flows with major flows entering Ventura. Most of the existing flows in the study area do not enter the Arroyo Domingo Baca.

Offsite Flows

The most significant characteristic of the offsite drainage area is the Arroyo Domingo Baca. The historic flow of the arroyo has been modified by the construction of the South Domingo Baca Dam west of Lowell Street. Flows south of the Domingo Baca enter the site as shown on Plate I.

25x

0000 0000 0675

PART TWO

GENERAL

This section of the report will address the recommended drainage improvements and will select an approach to be used to implement those improvements.

Previous Recommendations

The Drainage and Specific Site Development Conditions Plan shows conceptual drainage patterns that divert the flows north of San Francisco north to the Domingo Baca. Offsite flows will be diverted east of Holbrook south of the North Pino Arroyo. (See sheet 4 of 5 of the Heritage Hills East Sector Development Plan.)

Improvements to the Arroyo Domingo Baca

A concrete lined channel has been proposed in accordance with the Sector Development Plan. This channel will be constructed from Ventura to Holbrook with a soil cement transition just east of Ventura connecting to the existing channel; and a soil cement trainer just west of Holbrook.

Interior Drainage

The interior drainage will utilize street flows to carry the runoff to the interception point on Quintana east of Ventura. The drainage basin will encompass all of Unit 4; Unit 5 south of the Domingo Baca and Tract B of Unit 2. Quintana is a major local street and not subject to one lane dry criteria.

Method of Approach

The storm drainage system studies are predicated on the following assumptions:

1) Flows east of Holbrook will be diverted to the south.

2) Flows within the site will be diverted to the Domingo Baca prior to reaching Ventura.

3) Street and storm sewer flows will meet the present DPM criteria and will comply with the Drainage Ordinance.

Basin Subdivisions

The study area was divided into two watershed zones. These zones were further subdivided into sub-basins. See Plates I,II,IV, and V in the Appendix.

25×10

0000 0000 0676

Perimeter Outlet

A perimeter outlet was established on Quintana 190 feet east of Ventura. Grade restrictions prevented the diversion of upstream flows to the Domingo Baca before this point.

Flood Plain Analysis

The construction of the lined channel for the Arroyo Domingo Baca will allow for the elimination of the flood plain limits shown on Plates II and III.

Crossing Structures

The east crossing structure at Ventura and the structure at Holbrook will be constructed by the City in the future. Temporary soil cement transition channels will be installed at each end of the continuously reinforced channel to allow for the future construction.

Holbrook Diversion

The future development of the lands east of Holbrook will require that the drainage be intercepted east of Holbrook. With this in mind, the temporary swale constructed in Unit Two has been continued adjacent to Unit Four.

25×10

0000 0000 0677

PART THREE

HYDROLOGY, HYDRAULIC CONVEYANCE, STUDY DESIGN AND STRUCTURAL CONSIDERATIONS

HYDROLOGY

Parameters

The following values have been utilized for the hydrologic calculations:

A. Rainfall - A rainfall of 2.5 inches was used in the analysis.

B. Coefficient of Runoff (Existing) - A coefficient of runoff of 0.35 was selected as representative of foothill conditions.

C. Coefficient of Runoff (Developed) - The proposed lot grading utililizing FHA Grading Standards provides for relatively long runoff times allowing additional infiltration and surface retention. A coefficient of runoff of 0.55 has been selected as representative of the developed conditions.

Analysis

The following tables present the flows from each zone and basin for 100 year and 10 year storms. The flows are the accumulation of model analysis to determine peak rates at intersections. See Plates III, IV and V.

HYDRAULIC CONVEYANCE

Surface Outfall Versus Storm Drain

The peak flows for the 100 year storm at the intersection of Quintana and Street A is 214 cfs of which 119 cfs enters from Street A. Conceptual design of this street indicates a maximum grade of 0.60 percent. This grade will require a storm sewer in Street A to intercept excess flows. Even if Street A - Unit 5 could be steepened to 1% in order to carry the runoff, two problems occur. One: The outfall channel opening would have to be 50 feet wide to allow for weir construction. Two: The grade change on Quintana would result in a hydraulic jump as the velocity changed from supercritical to subcritical. With this in mind, we have recommended a storm sewer system in Quintana with a stub to the south for Unit Five.

Calculations

Hydraulic calculations were done for the street flows in Unit Four and for Quintana Street. Hydraulic calculations were not done for those streets in Unit Five. Hydraulic calculations were done for pipe flows and Domingo Baca Channel. Following are those calculations.

25×10

0000 0000 0678

HYDROLOGY CALCULATIONS

****EXISTING CONDITIONS****

INTERIOR FLOWS

LOC.	BASIN NO.	DRANG AREA	TRAVEL LENGTH	HIGH ELEV	LOW ELEV	SLOPE	TIME CONCEN	RUNOFF C	I(100)	I(10)	Q(100)	Q(10)	COMMENTS
	I1	63.40	2600	5650	5550	0.04	11.7	0.35	4.99	3.21	108	71	FUTURE UNIT 6 AND CHANNEL
	I2	49.50	3858	5640	5550	0.02	19.1	0.35	3.79	2.49	66	43	UNIT 4
	I3	46.10	3600	5615	5550	0.02	20.0	0.35	3.71	2.44	60	39	UNIT 5

OFFSITE FLOWS

	BASIN NO.	DRNGE AREA	TRAVEL LENGTH	HIGH ELEV	LOW ELEV	SLOPE	TIME CONCEN	RUNOFF C	I(100)	I(10'	Q(100)	Q(10)	COMMENTS
	O1	40	2500	5730	5640	0.04	11.6	0.35	4.90	3.22	68	45	
	O2	9	1250	5684	5640	0.04	6.9	0.35	6.40	4.21	21	14	
	O3	68	4000	5778	5640	0.03	16.9	0.35	4.04	2.65	96	63	
	O4	8	1500	5686	5640	0.03	8.3	0.35	5.80	3.81	16	11	
A1		40	2500	5730	5640	0.04	11.6	0.35	4.90	3.22	68	45	FLOWS
A2		9	1250	5684	5640	0.04	6.9	0.35	6.40	4.21	21	14	DIVERTED BY
A3		77	4000	5778	5640	0.03	16.9	0.35	4.04	2.65	109	72	HOLBROOK
A4		85	4500	5778	5640	0.03	19.4	0.35	3.77	2.48	113	74	TEMPORARY SWALE

##

25×10

HYDROLOGY CALCULATIONS

UNIT 4 ONSITE DRAINAGE AREAS

LOC.	BASIN NO.	DRANG AREA	TRAVEL LENGTH	HIGH ELEV	LOW ELEV	SLOPE	TIME CONCEN	RUNOFF C	I(100)	I(10)	Q(100)	Q(10)	COMMENTS
	1	4.75	1100	5613	5585	0.03	7.0	0.50	5.28	3.47	12.6	8.2	PARK SITE
	2	3.95	928	5[illegible]5	5600	0.03	6.0	0.55	5.28	3.47	11.5	7.5	STREET E
	3	3.31	740	5625	5603	0.03	4.9	0.55	5.28	3.47	9.6	6.3	JACABO
	4	8.30	1331	5640	5608	0.02	8.3	0.55	5.28	3.47	24.1	15.8	STREET C
	5	0.82	564	5600	5585	0.03	4.1	0.90	5.28	3.47	3.9	2.6	QUINTANA
	6	0.62	180	5603	5600	0.02	2.1	0.90	5.28	3.47	2.9	1.9	QUINTANA
	7	0.55	274	5605	5603	0.01	3.9	0.90	5.28	3.47	2.6	1.7	QUINTANA
	8	0.42	280	5609	5605	0.01	3.1	0.90	5.28	3.47	2.0	1.3	QUINTANA
	9	3.91	650	5633	5610	0.04	4.1	0.55	5.28	3.47	11.4	7.5	STREET D
	10	6.19	930	5638	5612	0.03	6.0	0.55	5.28	3.47	18.0	11.8	STREET B
	11	4.39	820	5638	5618	0.02	5.7	0.55	5.28	3.47	12.8	8.4	STREET A
	12	0.34	260	5612	5609	0.01	3.1	0.90	5.28	3.47	1.6	1.1	QUINTANA
	13	0.35	250	5616	5612	0.02	2.7	0.90	5.28	3.47	1.7	1.1	QUINTANA
	14	0.10	85	5618	5616	0.02	1.0	0.90	5.28	3.47	0.5	0.3	QUINTANA
	15	1.34	830	5639	5615	0.03	5.4	0.90	5.28	3.47	6.4	4.2	SAN FRANSISCO
	16	2.14	750	5641	5637	0.01	9.6	0.60	5.28	3.47	9.0	5.9	HOLBROOK SOUTH
	17	0.16	130	5641	5640	0.01	2.2	0.90	5.28	3.47	0.8	0.5	HOLBROOK NORTH

UNIT 4 ACCUMULATED FLOWS

LOC.	BASIN NO.	DRANG AREA	TRAVEL LENGTH	HIGH ELEV	LOW ELEV	SLOPE	TIME CONCEN	RUNOFF C	I(100)	I(10)	Q(100)	Q(10)	COMMENTS
A		4.49	860	5638	5616	0.03	5.8	0.63	5.28	3.47	14.9	9.8	QUINTANA/STREET A
B		11.03	1110	5638	5612	0.02	7.3	0.59	5.28	3.47	34.5	22.7	QUINTANA/STREET B
C		15.28	1370	5638	5609	0.02	9.0	0.59	5.28	3.47	47.5	31.2	QUINTANA STREET D
D		24.00	1650	5638	5605	0.02	10.6	0.58	5.14	3.38	71.6	47.1	QUINTANA/STREET C
E		27.86	1924	5638	5603	0.02	12.3	0.58	4.75	3.12	77.2	50.7	QUINTANA/JACABO
F		32.43	2104	5638	5600	0.02	13.2	0.58	4.58	3.01	86.6	56.9	QUINTANA/STREET E
G		38.00	2668	5638	5585	0.02	15.3	0.58	4.26	2.80	93.8	61.6	QUINTANA/PARK
H	*	44.06	3493	5638	5555	0.02	17.6	0.58	3.96	2.60	100.5	66.0	QUINTANA/UNIT 5
I	*	89.23	3493	5638	5555	0.02	17.6	0.61	3.96	2.60	214.4	140.9	QUINTANA/UNIT 5
J		2.14	750	5641	5637	0.01	9.6	0.80	5.28	3.47	9.0	5.9	HOLBROOK/S FRNSCO
K		0.16	130	5641	5640	0.01	2.2	0.90	5.28	3.47	0.8	0.5	HOLBROOK/CHANNEL

* FLOWS AT NODES H AND I INCLUDE DRAINAGE FROM UNIT 5

0000 0000 0680

HYDROLOGY CALCULATIONS

*** UNIT 5 ONSITE CONCEPTUAL DRAINAGE***

LOC. NO.	BASIN AREA	DRAINAGE LENGTH	TRAVEL ELEV	HIGH ELEV	LOW ELEV	SLOPE	TIME CONCEN	RUNOFF C	I(100)	I(10)	Q(100)	Q(10)	COMMENTS
1	15.7	1200	5615	5572		0.04	6.6	0.80	5.28	3.47	66.4	43.6	FLOWS LISTED
2	2.9	700	5604	5572		0.05	4.0	0.55	5.28	3.47	8.5	5.6	ARE CONCEPTUAL
3	4.4	479	5572	5563		0.02	4.2	0.55	5.28	3.47	12.9	8.5	ONLY AND WILL
4	6.6	1100	5600	5560		0.04	6.1	0.55	5.28	3.47	19.1	12.5	BE REFINED DURING
5	5.4	946	5590	5559		0.03	5.7	0.55	5.28	3.47	15.6	10.2	SUBDIVISION DESIGN
6	0.9	350	5600	5588		0.03	2.6	0.55	5.28	3.47	2.7	1.8	IN THE FUTURE.
7	5.3	940	5590	5557		0.04	5.5	0.55	5.28	3.47	15.5	10.2	
8	4.9	810	5586	5556		0.04	4.8	0.55	5.28	3.47	14.2	9.3	
9	6.1	825	5585	5555		0.04	4.9	0.55	5.28	3.47	17.6	11.6	
10	1.3	200	5555	5554		0.01	3.5	0.55	5.28	3.47	3.8	2.5	

UNIT 5 ACCUMULATED FLOWS

LOC. NO.	BASIN AREA	DRANG LENGTH	TRAVEL ELEV	HIGH ELEV	LOW ELEV	SLOPE	TIME CONCEN	RUNOFF C	I(100)	I(10)	Q(100)	Q(10)	
A	18.6	1200	5615	5572		0.04	6.6	0.76	5.28	3.47	74.9	49.2	JACABO/STREET B
B	23.0	1779	5615	5563		0.03	9.7	0.72	5.28	3.47	87.7	57.6	STREET B/STREET A
C	29.6	2129	5615	5560		0.03	11.6	0.68	4.89	3.21	98.8	64.9	STREET C/STREET A
D	35.0	2389	5615	5559		0.02	13.2	0.66	4.59	3.01	106.2	69.8	STREET D/STREET A
E	40.3	2649	5615	5557		0.02	14.7	0.65	4.34	2.85	113.3	74.5	STREET E/STREET A
F	45.2	2909	5615	5556		0.02	16.3	0.64	4.12	2.71	118.7	78.0	STREET F/ STREET A
G	1.3	200	5555	5554		0.01	3.5	0.55	5.28	3.47	3.8	2.5	QUINTANA/VENTURA
H	SEE UNIT 4 FLOWS ON QUINTANA												

25×10

UNIT FOUR STREET FLOWS

I. 100 Year Storm

Location A (Quintana and Street A)

Q = 14.9 cfs, Slope = 2.25%
From Plate 22.3 D-2 D = 0.46 feet
V = 4.4 fps Flow in east half of street

Location B (Quintana and Street B)

Q = 34.5 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.5 feet
V = 3.6 fps Flow now in both sides

Location C (Quintana and Street D)

Q = 47.5 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.6 feet
V = 3.8 fps

Location D (Quintana and Street C)

Q = 71.6 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.65 feet
V = 4.5 fps

Location E (Quintana and Jacabo)

Q = 77.2 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.67 feet
V = 4.6 fps Flow at top of curb

Location F (Quintana and Street E)

Q = 86.6 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.70 feet
V = 4.8 fps

Location G (Quintana and Park Boundry

Q = 93.8 cfs, Slope = 2.40%
From Plate 22.3 D-2 D = 0.64 feet
V = 6.0 fps

25×10

0000 0000 0682

NOTE: For the following locations, the total flow is assumed to be 100.5 cfs.

Location H1 (Quintana at Station 4+36 - 2 type A inlets)

Q = 100.5 cfs, Slope = 3.9%
D = 0.60 feet
V = 7.5 fps
From Plate 22.3 D-5. For S = 4% and D = 0.60
Capacity of Type A inlet is 11 cfs. Use 9 cfs.

Net street flow = 100.5 -18 = 82.5 cfs

Location H2 (Quintana at Station 4+00)

Q_{street} = 82.5 cfs, Slope = 3.9%
D = 0.56 feet
V = 6.8 fps
From Plate 22.3 D-7. For S = 4% and D = 0.56
Capacity of Type B inlet in 18 cfs. Use 14 cfs.

Net street flow = 82.5 - 28 = 54.5 cfs.

Location H3 (Quintana at Station 3+35)

Q = 54.5 cfs, Slope = 3.9%
D = 0.48 feet
V = 6 fps
From Plate 22.3 D-7. For S = 4% and D = 0.48
Capacity of Type B inlet is 15 cfs. Use 12 cfs.

Net street flow = 54.5 -24 = 30.5 cfs.

Location H4 (Quintana at Station 2+75)

Q = 30.5 cfs, Slope = 3.9%
D = 0.36 feet
V = 5.2 fps

From Plate 22.3 D-7. For S = 4% and D = 0.36
Capacity of Type B inlet is 7.8 cfs. Use 5 cfs.

Net street flow = 30.5 - 10 = 20.5 cfs.

This flow for a 100 year storm will continue to Ventura along with flows from Area 10, Unit 5.

25×10

0000 0000 0683

UNIT FOUR STREET FLOWS

II. 10 Year Storm

Location A (Quintana and Street A)

Q = 9.8 cfs, Slope = 2.25%
From Plate 22.3 D-2 D = 0.38 feet
V = 4.0 fps. Flow in east half of street
D x V = 4.0 x 0.38 = 1.52 which is less than 6.5 & ok.

Location B (Quintana and Street B)

Q = 22.7 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.49 feet east, 0.40 feet west
V_E = 3.6 fps; V_W = 3.2 pfs. Flow now in both sides of street-
15 cfs on the east side, 7.7 cfs on the west side.

Location C (Quintana and Street D)

Q = 31.2 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.5 feet
V = 3.7 fps

Location D (Quintana and Street C)

Q = 47.1 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.58 feet
V = 4.0 fps

Location E (Quintana and Jacabo)

Q = 50.7 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.58 feet
V = 4.1 fps

Location F (Quintana and Street E)

Q = 56.9 cfs, Slope = 1.22%
From Plate 22.3 D-2 D = 0.60 feet
V = 4.2 fps

Location G (Quintana and Park Boundry)

Q = 61.6 cfs, Slope = 2.40%
From Plate 22.3 D-2 D = 0.57 feet
V = 5.3 fps

25×10

0000 0000 0684

NOTE: For the following locations, the total flow is assumed to be 100.5 cfs.

Location H1 (Quintana Street at Station 4+36 - 2 Type A Inlets)

Q = 66 cfs, Slope = 3.9%
D = 0.53 feet
V = 6.5 fps
From Plate 22.3 D-5. For S = 4% and D = 0.53
Capacity of Type A inlet in 10 cfs. Use 8 cfs.

Net street flow = 66 - 16 = 50 cfs.

Location H2 (Quintana Street at Station 4+00)

Q_{street} = 50 cfs, Slope = 3.9%
D = 0.48 feet
V = 6.0 fps
From Plate 22.3 D-7. For S = 4% and D = 0.48
Capacity of Type B inlet is 14 cfs. Use 12 cfs.

Net street flow = 50 - 24 = 26 cfs.
NOTE: Assume a 60/40 flow split.

Location H3 (Quintana Street at Station 3+35)

Q = 16 cfs north, Slope = 3.9%
Q = 10 cfs south
V_{north} = 5.6 fps D_{north} = 0.42 feet
V_{south} = 5.1 fps D_{south} = 0.36 feet
From Plate 22.3 D-7. For S = 4% and D = 0.42
Capacity of Type B inlet is 11 cfs. Use 10 cfs.
For S = 4% and D = 0.36; Q = 7.8. Use 7 cfs.

Net street flow = 26 - 17 = 9 cfs.

Location H4 (Quintana Street at Station 2+75)

Q = 6 cfs north, Slope = 3.9%
Q = 3 cfs south
V_{north} = 4.6 fps D_{north} = 0.32 feet
V_{south} = 3.8 fps D_{south} = 0.25 feet
From Plate 22.3 D-7. For S = 4% and D_{north} = 0.32
Capacity of Type B inlet is 6.5 cfs. Use 6 cfs.
For S = 4% and D_{south} = 0.25; Q = 3.5 cfs which is greater that 3.

Net street flow = 9 - 9 = 0 cfs.

This flow from a 10 year storm will not coninue to Ventura along with flows from Area 10, Unit 5.

25×10

0000 0000 0685

III. PIPE FLOWS

A. Location H1 (Quintana Street at Station 4+36)

Two Type A inlets:

Q = 9 cfs for each inlet. Use 18" RCP with minimum slope of 0.91%. Inlet depth = 4.0 feet.

B. Location H2 (Quintana Street at Station 3+70)

$Q_{upstream}$ = 18 cfs. Slope = 4.32%
Required K = $Q / S^{\frac{1}{2}}$ = 86.6 cfs. Use 18 " RCP
Inlets - Two Type B. Q = 14 cfs each.
$Q_{downstream}$ = 18 + 14 + 14 = 46 cfs

C. Location H3 (Quintana Street at Station 1+99)

$Q_{upstream}$ = 46 + 12 + 12 + 5 + 5 = 80 cfs
Slope = 4.32%
Required K = $Q / S^{\frac{1}{2}}$ = 384. Use 30 inch RCP

D. Outfall Line

Total Q_{100} = 214 cfs
Flow in pipe from Unit 4 = 80 cfs.

Flow from Unit 5 = 119 cfs

Street Capacity (S = 0.60%) = 70 cfs

Use 60 inch pipe at 0.25% slope
Pipe capacity = 130 cfs

Pipe flow from Unit % = 130 - 80 = 50 cfs.

Required pipe size to Unit 5 (Slope = 0.60%) = 36 inch
Net street flow in Street E, Unit 5 = 69 cfs.

Net street flow into Area 10 for 100 year storm =
214 - 130 = 84 cfs

Net street flow into Area 10 for 10 year storm =
141 - 130 = 11 cfs. All from Unit 5.

IV. STREET FLOW (ON QUINTANA STREET FROM STATION 0+00 TO STATION 1+89)

A. Q_{100} = 84 cfs. Peak S = 0.60%
From Plate 22.3 D-2. D = 0.78
V = 3.7 fps

25×10

0000 0000 0686

B. Q_{10} = 11 cfs. Peak S = 0.60%
From Plate 22.3 D-2 D = 0.48 feet
V = 2.5 fps

V. CHANNEL FLOW ALONG EAST SIDE OF HOLBROOK

Trapazoidal channel with 6 feet bottom, 3.0 foot depth
S = 0.50%, N = 0.03%

A = 40.5 ft^2, WP = 28.2 ft, V = 4.46 fps
Capacity = 181 cfs at 3.0 ft. depth
For 100 year storm. Expected flows at point A4 are 113 cfs.

VI. CHANNEL ANALYSIS - ARROYO DOMINGO BACA

A. Channel flows (See Plate I)

1. Developed design flow at Hamilton
100 year = 890 cfs.

2. Developed design flow at Holbrook
100 year = 958 cfs.

3. Developed design flow at Ventura
100 year = 1,142 cfs.

NOTE: The 100 year design flows at Hamilton and Ventura were taken from material supplied by AMAFCA.

B. Channel design

The proposed channel section is a concrete channel with a 12 foot bottom and 2:1 side slopes. Channel depth to be 6 feet.

For design use Q = 1,142 cfs and slope = 2.54%, a channel flow depth of 2.5 feet will occur. Velocity will be 27.4 ft/sec. Froude number for the channel is 3.05.

Detailed grading plan into existing street grades who is designing the channel crossing and how will the upstream tie-in

25×10

0000 0000 0687

We are revising the drainage report to include the hydraulic calculations, the revised drainage maps and to include the erosion control plans. The erosion control plans and the proposed grade for Ventura will also be included in the construction drawings.

We are requesting that approval of the preliminary plat be delegated to your office since we feel that most of your questions have been answered.

Sincerely,

GARDNER, MASON & ASSOCIATES, INC.

Gilbert D. Gardner, P.E.L.S.

GDG/met
Enclosures

25×10

0000 0000 0688

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

June 12, 1985

Mr. Gilbert Gardner
Gardner, Mason & Associates, Inc.
2127 Menaul Boulevard NE
Albuquerque, NM 87108

REF: DRAINAGE REPORT FOR HERITAGE EAST UNIT 4 (D2O-D3B) RECEIVED MAY 8, 1985

Dear Gil:

I have reviewed the above referenced submittal and forward the following discussion.

The submittal, as presented, is confusing. You have requested Preliminary Plat approval and yet the plat in the submittal is identified as a Sketch Plat and also it is unclear as to what is being platted. The zone atlas page for this area, as of 1983, shows public streets on a horizontal plane across this property. What action has taken place to vacate these streets and alignments?

Following are some specific comments for which detailed information will need to be presented for review for granting any approvals.

1. The design of Quintana Drive NE is required to serve this development. Therefore, detailed grades with top of curb and flowline elevations tying into an existing City approved street grade at Ventura will be required.

2. The hydraulic gradeline calculations and profile will need to be provided for both the Domingo Baca Arroyo and the proposed storm drain.

3. An erosion control plan has been provided for the proposed grading off-site but not for the proposed development. A similar on-site erosion control plan is also required for the period of construction.

4. The erosion control plan for the off-site does not seem to extend far enough south. The berm adjacent to Ventura does not extend to the south property line for Unit 5. Also, are there provisions for re-seeding the area to protect against erosion until development

25×10

0000 0000 0684

in this area takes place?

5. Who is going to build the crossing structure for Ventura and how will the improvements for Domingo Baca be handled in the interim? Is the channel below this crossing improved and if not, what will be the impact of the improvements upstream?

6. What is the status of the condemnation of Lots 31 & 32? How will this fit in with this development in the timing?

7. Plate III appears to be a drainage map and not a Sketch Plat.

Based on the comments above, Preliminary Plat approval cannot be granted at this time. Should you have any questions or comments, please call this office.

Sincerely,

Billy J. Goolsby

Billy J. Goolsby, PE
Civil Engineer/Hydrology

BJG:mrk

25×10

0000 0000 0690

DRAINAGE INFORMATION SHEET

PROJECT TITLE: Heritage East #4 ZONE ATLAS/DRNG. FILE #: D-20 / D3B

LEGAL DESCRIPTION: Heritage East Unit #4

CITY ADDRESS: N/A

ENGINEERING FIRM: Gardner-Mason & Assoc. Inc CONTACT: Bill Gardner

ADDRESS: 2127 Menaul Blvd NE PHONE: 881-3846

OWNER: Bellamah Community Ctr. CONTACT: Doug Reynolds

ADDRESS: Box 3300 Albq. NM 87190 PHONE: 884-6606

ARCHITECT: N/A CONTACT:

ADDRESS: PHONE:

SURVEYOR: N/A CONTACT:

ADDRESS: PHONE:

CONTRACTOR: Wylie Corp CONTACT: Jerry Jones

ADDRESS: Wilshire NE 87110 PHONE: 821-3622

PRE-DESIGN MEETING:

X YES

___ NO

___ COPY OF CONFERENCE RECORD SHEET PROVIDED

RECEIVED MAY 08 1985 HYDROLOGY SECTION

DRB NO. 85-160 3/5/85

EPC NO. SD-81-51 2/29/85

PROJ. NO. _____

TYPE OF SUBMITTAL:

X DRAINAGE REPORT

___ DRAINAGE PLAN

___ CONCEPTUAL GRADING & DRAINAGE PLAN

___ GRADING PLAN

___ EROSION CONTROL PLAN

___ ENGINEER'S CERTIFICATION

CHECK TYPE OF APPROVAL SOUGHT:

___ SKETCH PLAT APPROVAL

X PRELIMINARY PLAT APPROVAL

___ SITE DEVELOPMENT PLAN APPROVAL

___ FINAL PLAT APPROVAL

___ BUILDING PERMIT APPROVAL

___ FOUNDATION PERMIT APPROVAL

___ CERTIFICATE OF OCCUPANCY APPROVAL

___ ROUGH GRADING PERMIT APPROVAL

___ GRADING/PAVING PERMIT APPROVAL

___ OTHER _____ (SPECIFY)

DATE SUBMITTED: 5/8/85

BY: Selby S. Gandy

25 × 10

0000 0000 0691

RECEIVED
APR 22 1985
CITY ENGINEER

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE

April 18, 1985

REF. NO.

CAH
JNH
HRO
JF
GICG
File
(Also has Agreement attached)

TO: Gary O'Dowd, City Attorney
Carl P. Rodolph

FROM: Carl P. Rodolph, Director, Municipal Development Department

SUBJECT: Condemnation Action for Lots 31 and 32, Heritage Hills East, Unit IV

The City Administration has been working with the Bellamah Community Development (BCD) for several months concerning the acquisition of land to permit the construction of a concrete hard lined channel, for the reach between Holbrook and Ventura, on the Domingo Baca Arroyo, Heritage Hills East Subdivision, Unit IV.

Specifically, the land is defined as Lots 31 and 32, Block 42, North Albuquerque Acres, and consists of a total of approximately 1.6 acres. BCD has been unable to acquire fee simple title, subject land.

As a result of the compelling need to complete the hard lined channel through this subdivision and to integrate the Domingo Baca Arroyo in-place systems, existing downstream or scheduled for construction, there is sufficient rationale for the City to excercise its condemnation powers to acquire these parcels.

Request you take the necessary actions to immediately acquire Lots 31 and 32 and coordinate directly with the Director, MDD.

CPR/bjg

APPROVED Frank A. Kleinhenz
Frank A. Kleinhenz, Chief Administrative Officer

✓cc: Dwayne Sheppard, City Engineer

(ID2108)

25×10

0000 0000 0692

Bellamah
Community
Development

April 17, 1985

Mr. Carl P. Rodolph, P.E.
Director
Municipal Development Operations
P.O. Box 1293
Albuquerque, New Mexico 87103

SUBJECT: Heritage East Unit IV, Agreement

Dear Carl:

Enclosed is the signed copy of the Heritage East Unit IV Agreement regarding the Domingo Baca Arroyo. We anticipate beginning construction on this project in May and will adjust our contract in the area of Lots 31 and 32 to fit your schedule.

Your patience in dealing with this agreement is greatly appreciated.

Sincerely,

V.M. Kimmick, P.E.
Chief Development Manager

VMK:rl

New Mexico Division · 6121 Indian School Road NE · PO Box 3300 · Albuquerque, New Mexico 87190 · (505) 884-6606
Arizona Colorado New Mexico Oklahoma Texas

25×10

Agreement between the City of Albuquerque and Bellamah Community Development regarding Heritage East Subdivision.

Part 1: Relating to Park Dedication.

1. The northwesterly boundary will be moved approximately 150 feet southeast, resulting in a final park area of net 4.68 acres.

2. Bellamah Community Development will assume responsibility for the full width improvement of the Domingo Baca Arroyo adjacent to the remaining length of the northern boundary of the park (as committed for the entire reach of the Domingo Baca Arroyo through the Heritage Hills East Sector Plan as approved.

3. Bellamah Community Development will assume the responsibility for the paving of all interior Heritage Hills East streets to include the paving adjacent to the Park Site.

Part 2: Relating to the westerly portion of the Domingo Baca Arroyo.

1. The City will acquire Lots 31 and 32 of Block 42, North Albuquerque Acres. The title to the remaining lands within said Lots 31 and 32, after excluding the right-of-way for the Domingo Baca Arroyo channel, will be transferred to Bellamah Community Development based upon the acquisition of land and court costs. All costs for acquisition, including court costs, will be allocated on a square foot basis; to the gross acreage and square footage acquired. Therefore BCD's allocated cost would be in the same ratio as the net acreage or square footage conveyed.

2. Bellamah Community Development will dedicate the right-of-way for the easterly half of Ventura Boulevard within Lot 32.

3. Bellamah Community Development will construct a concrete lined channel from the east boundary of Lot 31 to the Ventura Boulevard Crossing structure being constructed by the City.

4. The City will construct the easterly half of the Ventura Boulevard crossing structure over the Domingo Baca Arroyo.

5. Cost sharing for Lots 31 and 32 shall be as follows: (As shown in Exhibit "A")

   a. City Responsibility: Costs within said Lots 31 and 32 for Domingo Baca channel right-of-way.

25×10

0000 0000 0694

b. Bellamah Community Development responsibility: All costs for remaining lands within Lots 31 and 32 associated with the total acquisition costs, less land required to construct the Domingo Baca Channel. Permanent improvement of the Domingo Baca Arroyo through Lots 31 and 32 and the land acquisition costs and permanent paving of the easterly one-half of Ventura Boulevard south of the southerly right-of-way line of the Domingo Baca Arroyo and abutting said Lot 32.

c. Subsequent to the acquisition of Lots 31 and 32 by the City and the receipt of bids for construction of the Domingo Baca channel and Quintana Drive, an accounting of all costs incurred shall be verified.

Part 3. Relating to the construction of Palomas Avenue between Ventura and Holbrook Streets

1. Bellamah Community Development acknowledges its responsibility for the permanent paving of one half section (south) of Palomas Avenue. However, this construction will be dependent upon the development planning of the area between Los Angeles and Palomas.

Part 4. Timing of all portions of the Agreement.

1. The improvement of the Domingo Baca Arroyo, adjacent to the City Park, the paving of a full section at Quintana Road, the acquisition of Lots 31 and 32 and the completion of eastern half of the Ventura Boulevard Crossing, over the Domingo Baca Arroyo, shall all occur with the construction of the improvements for Heritage Hills East, Unit IV, or as early as possible.

BELLAMAH COMMUNITY DEVELOPMENT

By: D.T. Robertson
D.T. ROBERTSON
Senior Vice President
and Regional Manager

CITY OF ALBUQUERQUE

By: Frank A. Kleinhenz
FRANK A. KLEINHENZ
Chief Administrative Officer

April 10, 1985

(ID1967D)

25×10

HERITAGE EAST UNIT 4 AGREEMENT-DOMINGO BACA

APRIL 15, 1985
HERITAGE EAST UNIT 4
EXHIBIT "A"

ESTIMATED ACRES TO BE ACQUIRED FOR LOTS 31 AND 31 (APPROX. 300' X 234')	1.6116
ESTIMATED ACRES FOR CHANNEL R/W (APPROX. 100' X 300')	0.6887
ESTIMATED ACRES REMAINING	0.9229
ESTIMATED COST TO ACQUIRE LOTS (INCLUDING COURT COSTS)	90,000.00
CITY EST. OF VALUE FOR ALLOCATED COST OF CHANNEL R/W	38,461.54
BCD ESTIMATE CHANNEL IMPROVEMENTS TO BE USED AS PARTIAL CONSIDERATION FOR EXCHANGE	49,605.50
ESTIMATED VALUE FOR REMAINING USABLE ACREAGE FROM THE CITY OF ALBUQUERQUE	51,538.46
ESTIMATED AMOUNT DUE CITY OF ALBUQUERQUE	51,538.46

EXHIBIT "A"

25X

0000 0000 0696

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

April 10, 1985

D.T. Robertson
Sr. Vice President/Regional Manager
Bellamah Community Development
6121 Indian School Road NE
Albuquerque, New Mexico 87190

Dear Don:

I appreciate your expeditious April, 8, 1985, response concerning the agreement between Bellamah Community Development and the City for Heritage Hills East, Unit IV, Domingo Baca Arroyo Agreement.

Quite frankly, I thought we were just about to finalize subject agreement and the latest version. Part 2. Paragraph 5.C. represents a regression to our last weeks discussion. Specifically, the estimated costs for BCD's construction of a half section of Ventura and the hard lined channel adjacent to Lots 31 and 32 should not be a credit to our agreement. The stated City costs are born by the developers per standard City policies and procedures.

Since BCD had not been able to acquire Lots 31 and 32, the City had agreed to initiate condemnation procedures in an effort to acquire title. Further, the City will donate roughly 0.4 acres of Right-of-Way for the construction of the Domingo Baca Arroyo hard lined channel, south and adjacent to Lots 31 and 32 and tying into the Ventura crossing. BCD will not pay for that parcel.

The City does agree to transfer the remaining portion of Lots 31 and 32 to BCD based upon BCD reimbursing the City for the total acquisition and condmenation costs of subject land. Further, the City will require that BCD not only dedicate sufficient Right-of-Way for the constuction of the east half of Ventura, but that BCD pay for the construction of the stated half section. This is not a problem and subject agreement reflects this understanding.

I am sure that you can appreciate that I must operate within standard City policies and procedures established by the Administration and the City Council. The donation of the necessary Right-of-Way for the construction of the Domingo Baca channel will have a value of approximately $40,000. Further, since the construction of subject channel would permit BCD to reclaim valuable residential property the final expense should be borne by BCD.

MUNICIPAL DEVELOPMENT DEPARTMENT

Carl P. Rodolph, P. E., Director Vern C. Hagen, Deputy Director Telephone: (505) 766-5000

AN EQUAL OPPORTUNITY EMPLOYER

25×10

0000 0000 0697

If you are in agreement, the last sentence of Part 2., Paragraph 5. C. should be modified to end after "should be verified".

Based upon our conversation on April 4, I briefed Frank A. Kleinhenz, Chief Administrative Officer, as to our agreement at that time. The public benefit for the acquisition of private lands for the construction of a hard lined channel for the Domingo Baca, adjacent to the City park can be justified successfully. The reimbursement for the construction of subject reach of the channel which is more of benefit to BCD than the City can by successfully defended. If we can agree on this issue, then the agreement can be signed and we can get on with the construction effort.

Sincerely,

Carl P. Rodolph

Carl P. Rodolph, Director

CPR/bjg

cc: Frank A. Kleinhenz, CAO
Dwayne Sheppard

25×10

0000 0000 0698

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE March 26, 1985 REF. NO._____

TO: C. P. Rodolph, Director of M.D.D.

FROM: C. Dwayne Sheppard, City Engineer

SUBJECT: HERITAGE EAST UNIT IV/DOMINGO BACA ARROYO - CORRESPONDENCE FROM BELLAMAH COMMUNITY DEVELOPMENT DATED MARCH 12, 1985

Following are my comments on the proposed agreement between the City of Albuquerque and Bellamah Community Development regarding the referenced project:

Part 1: Relating to the Park Dedication.

1. I have no way to judge whether the proposed adjustment of the park boundary will result in an area adequate to satisfy the park dedication requirements for the proposed subdivision. Since the land area evidently has been reduced from original 5.8 acres proposed to the present 4.65 acres proposed it would appear that possibly park dedication requirments may be slighted.

2. As stated to you in my response to the December 13, 1984 proposal from Bellamah Community Development it has been my understanding that Bellamah has always had full responsibility for the full width improvement of the Domingo Baca Arroyo throughout the project. This results from the fact that the property is presently encumbered by the historical flood plain and if the flood plain is to be developed, the drainage course must be structured to allow a reduction in flood plain encumburence. The City has no responsibility in this regard.

3. As I indicated in my previous response to the December 13, 1984 proposal, it is my understanding that Bellamah Community Development always had the responsibility to pave the half of Quintana Drive adjacent to the park if the proposed plat configuration is to be approved. Further, I assume that the west half of Quintana, in the proposed reach, will be the responsibility of Bellamah Community Development in the development of what is now detailed "Heritage East Unit 5".

Part 2: Relating to the Westerly Portion of the Domingo Baca Arroyo.

1. If indeed Bellamah Community Development has been unable to acquire easement rights across lots 31 and 32 sufficient to provide for the Domingo Baca Arroyo improvements, it may be appropriate for the City to utilize its powers of eminent

25×10

0000 0000 0699

domain to acquire the necessary rights to public benefit. Since the responsibility to acquire the necessary easements was a condition of the original Heritage East Sector Plan approval and a responsibility of Bellamah Community Development, it is inappropriate for the City to incur any costs in the acquisition of these rights. In my opinion, Bellamah Community Development should be responsible for all costs of obtaining these rights and the City would be in a very vulnerable position if it allowed its powers of eminent domain to be used as a lever to acquire property for a developer at possibly less than asking prices.

2. The City has always had a responsibility to construct the easterly half of the crossing of the Domingo Baca Arroyo at Ventura Blvd. subject to availability of funds and appropriate programming in the Capital Improvements Program. As you know, these funds have not presently been programmed. An alternate might be for Bellamah Community Development to construct the necessary crossing and we can reimburse them under the provisions of the drainage ordinance, however the City cannot at this time guarantee when such reimbursement might be available through the Capital Improvements Program.

3. As stated previously, it is my understanding that Bellamah Community Development has always had the responsibility to construct the necessary drainage improvements if they desired to reduce the flood plain encumbering their property and additionally it was my understanding that it has been the responsibility of Bellamah Community Development to acquire the necessary easements to allow their proposed drainage improvements solutions to function west of the boundary of their property to the Ventura crossing (i.e., through lots 31 and 32). If the property remains in private hands or other than Bellamah's hands, it is the responsibility of the owners of the property to construct any improvements necessary to achieve desired reduction of the encumbered flood plain. Since, as stated previously, funds have not been programmed for the Ventura crossing it may be necessary for Bellamah Community Development to develop an interim solution until such crossing can be constructed.

4. a. I do not agree that the City should have any responsibility for either costs of acquisition of lots 31 and 32 or for necessary easements across these properties. In addition I do not think the City would normally acquire Ventura Blvd. right-of-way in this

25×

0000 0000 0700

manner since it is our normal approach to seek right-of-way dedication upon proposed development of the raw lands. Therefore, I do not feel the City has any responsibility for costs associated with lands or improvements on lots 31 and 32.

b. As stated previously, in my opinion Bellamah Community Development has full responsibility for any desired land, easement, or right-of-way acquisition within lots 31 and 32 and additionally for any improvement costs across those lands. From Item 4b, as stated by Bellamah Community Development, it would appear that Bellamah proposes only to participate in pavement on the south side of the proposed Ventura crossing. The proposed plat, however, would extend north to Palomas and hence would normally require that Bellamah Community Development pave the additional half of Ventura to the northerly boundary of the subdivision. Additionally, the Bellamah proposal does not discuss any responsibility for paving of Palomas itself along the northerly boundary of the tract which would normally be the responsibility of a developer platting property in this manner.

c. In my opinion, the City, if it enters into obtaining lots 31 and 32 by eminent domain, should provide an accounting of all costs incurred including legal fees, title fees and acquisition costs and require that Bellamah Development Community reimburse the City fully. Bellamah Community Development, when ultimately granted ownership of the property, then should be required to dedicate the necessary drainage and street right-of-way for both the proposed Domingo Baca Arroyo improvements and the Ventura Blvd. improvements.

Part 3: Cost Sharing Related to Lots 31 and 32.

1. As I stated previously, since no funds are presently programmed for construction of the Ventura crossing and funds are neither available for nor will be programmed for any improvements to the Domingo Baca Arroyo, it is obvious that the suggested timing by Bellamah Community Development is not appropriate. I reiterate that it is possible for Bellamah Community Development to accomplish construction of the Ventura crossing and seek reimbursement through the

25×10

0000 0000 0701

Capital Improvements Program in accord with the provisions of the drainage ordinance. This obviously will necessitate approval of such reimbursement in development of future capital programs and timing certainly cannot be defined.

Summary:

I may be missing the express intent of the proposed agreement however, from the facts that I am aware of, the proposal does not seem to be in keeping with either City policy nor equitable treatment. I recommend that the existing responsibility of Bellamah Community Development be clarified and that any further proposals be developed in light of those existing responsibilities.

CDS/tsl
1391E

25×10

0000 0000 0702

Bellamah
Community
Development

RECEIVED
MAR 15 1985
MAYOR'S OFFICE

March 12, 1985

Mr. Carl Rodolph
Director
Municipal Development Department
CITY OF ALBUQUERQUE
P.O. Box 1293
Albuquerque, New Mexico 87103

Re: Heritage East IV/Domingo Baca Arroyo

Dear Carl:

Thank you for your letter of February 5, 1985.

During the time from our original proposal, December 13, 1984 and your reply, design of Heritage East Unit 4 has progressed rapidly and the originally proposed moving of the park boundary west is now not possible, since Heritage East Unit IV is being platted and the southeasterly boundary has been fixed. We are therefore proposing moving the northwesterly boundary in the enclosed Agreement.

Enclosed is a signed Agreement for your signature.

Very truly yours,

BELLAMAH COMMUNITY DEVELOPMENT

D.T. Robertson
Senior Vice President and
Regional Manager

DTR:vw

Encl.

cc: Mr. Frank Kleinhenz

New Mexico Division · 6121 Indian School Road NE · PO Box 3300 · Albuquerque, New Mexico 87190 · (505) 884-6606
Arizona Colorado New Mexico Oklahoma Texas

25 × 10

0000 0000 0703

CITY OF ALBUQUERQUE
MUNICIPAL DEVELOPMENT DEPARTMENT
ENGINEERING DIVISION

HYDROLOGY SECTION PROJ. NO. D-20 DATE: 9/12/84

PLANNING DIVISION NO.

CONFERENCE RECAP

SUBJECT: Heritage East Unit IV

WHO	REPRESENTING
ATTENDANCE: Gil Gardner	
Billy Goolsby	

FINDINGS: ① Approved Conceptual Drainage Plan appropriate for ~~Sket~~ Preliminary Plat & Site Development Plan approval.
② Subdivision Improvements agreement required.
③ Channel stability analysis required for Domingo Baca Arroyo.
④ Discharge to be determined by analysis of downstream capacity.

*Please provide a copy of recap w/ submittal

The undersigned agrees that the above findings are summarized accurately and are only subject to change if further investigation reveals that they are not reasonable or that they are based on inaccurate information.

SIGNED: Billy G. Goolsby SIGNED: Arthur D. Goodman

TITLE: CE/Hydrology TITLE: Engineer

DATE: 9/12/84 DATE: 9/12/84

25×10

0000 0000 0109

Gardner, Mason & Associates, Inc.
ENGINEERS & PLANNERS

2127 Menaul Blvd. NE
Albuquerque, N.M. 87107
(505) 881-3846

132 W. Las Cruces Av.
Las Cruces, N.M. 88001
(505) 525-8057

June 20, 1985

Mr. Billy Goolsby, P.E.
Design Hydrology Section
123 Central, N. W.
Albuquerque, New Mexico 87102

RE: Drainage Report for Heritage East Unit 4 (D20-D3B)

Dear Billy:

We have reviewed your specific comments for subject development dated June 12, 1985 and forward the following response:

1. Please refer to attached copy of revised Sheet 10 of construction plan.

2. Please refer to attached hydraulic grade line calculations and Sheets 21, 22 and 23 of construction plan.

3. Attached Erosion Control Plan has been revised to include the construction of erosion control measures for on-site area.

4. The berm adjacent to Ventura has been extended to the south property line of Unit 5 as indicated on Sheet 1 of Erosion Control Plan. Provisions for reseeding are also denoted.

5. The crossing structure at Ventura is the responsibility of the City. The downstream channel is an existing 10 feet wide concrete channel extending under the existing bridge. We are proposing a sail cement transition channel for the first 100 feet.

6. Lots 31 and 32 will either be obtained by condemnation or purchased prior to the development of Unit 4.

7. Please refer to attached copy of Subdivision Plat Map. Plate III has been revised as Conceptual Drainage Plan.

For your convenience, I have enclosed a copy of specific comments dated June 17, 1985. Your early approval will be appreciated.

Sincerely yours,

Gilbert D. Gardner

Gilbert D. Gardner, P.E.L.S.

GDG/met

25×10

D20/D3B

D.R.C.
#2494

10/2/85

Gil,

The revision as presented for Heritage East Unit 4 is in my opinion a major revision which requires a revised drainage report submittal.

The grade change of the entire site could have a significant impact on the drainage scheme, particularly the carrying capacity of the streets, the interfacing with the arroyo design and the requirements for retaining walls.

I have not had benefit of previous review since I only received this revision yesterday. Consequently, I will not sign the plans until an updated report is submitted & approved.

Should you have any questions or comments, please give me a call.

Billy Goolsby

cc. Bob Ryals
Greg Olson
Fred Aguirre

25×10

0000 0000 0706

D20

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7644

November 28, 1986

David Dellinger
9637 Messervy Street, NE
Albuquerque, New Mexico 87122

Dear Mr. Dellinger:

After investigating your drainage complaint and discussing your problem with the Hydrology Engineer, it has been determined that your situation is a civil matter. The current Drainage Ordinance does not provide for enforcement of grading as designed on single family dwellings, thereby leaving the City at somewhat of a disadvantage in such cases.

The position of the City is that drainage problems of this nature should be arbitrated between the buyer, the builder, and the developer.

Enclosed is a copy of the approved drainage and grading plan, and a copy of the Development Process Manual which gives ponding setback requirements.

If you will require any additional information, you are welcome to come into our office anytime and review our files.

Cordially,

Richard L. Duran

Richard L. Duran
Drainage Inspector

RLD/bsj

Enclosures

PUBLIC WORKS DEPARTMENT
Walter Nickerson, P.E., City Engineer
ENGINEERING GROUP
Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

25 X 10

0000 0000 0707

D20/D36

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

Ken Schultz
Mayor

UTILITY DEVELOPMENT DIVISION
HYDROLOGY SECTION
(505) 768-2650

June 25, 1987

Mr. Pollack
9608 Messervy Avenue, NE
Albuquerque, New Mexico 87109

RE: COPY OF PORTION OF GRADING PLAN FOR HERITAGE EAST UNIT 4

Dear Mr. Pollack:

Enclosed for your information is a copy of the lots in question. As you can see by the grading elevations, your neighbors lot is supposed to pond water in the backyard. Your lot is supposed to be graded so that the water is all routed towards the front yard and into the street.

The current Drainage Ordinance does not provide for enforcement of grading as designed on single family dwellings.

The position of the City is that drainage problems of this nature should be arbitrated between the buyer of the building and the developer.

IF I can be of further assistance, please call me at 768-2650.

Cordially,

Bernie J. Montoya

Bernie J. Montoya, C.E
Engineering Assistant

BJM/bsj

PUBLIC WORKS DEPARTMENT

Walter Nickerson, P.E., City Engineer

ENGINEERING GROUP

Telephone (505) 768-2500

AN EQUAL OPPORTUNITY EMPLOYER

25×10

0000 0000 0708

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION
123 Central NW, Albuquerque, NM 87102
(505) 766-7614

July 2, 1985

Mr. Gilbert Gardner, PE
Gardner, Mason & Associates, Inc.
2127 Menaul Blvd. NE
Albuquerque, NM 87107

RE: REVISED DRAINAGE REPORT FOR HERITAGE EAST UNIT 4 (D2O/D3B) RECEIVED JUNE 18 and JUNE 21, 1985

Dear Gil,

The above referenced drainage report is approved for the purposes of obtaining Preliminary Plat Approval and for submitting the construction plan to DRC for the Work Order process.

Please attach a copy of the appropriate plans to the construction set prior to Hydrology sign-off.

I would also like to request that future submittals be complete prior to submitting to this office. It is very confusing to try to figure out what is current and what is to be thrown out.

Should you have any questions or comments, please call this office at 766-7644.

Cordially,

Billy J. Goolsby
Civil Engineer/Hydrology

BJG/cl

25×10

0000 0000 0709

HERITAGE EAST

UNIT 4

Hydraulic Grade Line
Calculations

GILBERT D. GARDNER
NEW MEXICO
5653
LAND SURVEYOR
REGISTERED PROFESSIONAL ENGINEER

Gardner, Mason & Associates, Inc.
2127 Menaul Blvd., N. E.
Albuquerque, New Mexico 87107
Telephone: (505) 881-3846

25×10

Control Elevation at Sta 0+00 (bridge location) is 5545.33' ; n = 0.013

REACH	SECTION	Q cfs	D_c	S ft/ft	D_n	STA.	Dir of Calc
1	1 12' 1/2	1,142	4.95	0.03	2.42	0+00	Dwnstr.
2	"	1,012	4.65	0.03	2.21	1+61	Dwnstr.
3	"	"	4.65	0.032	2.18	2+00	"
4	"	958	4.52	"	2.10	18+76	"
5	"	"	4.52	0.025	2.25	22+00	"

For Critical depth calc. D_c - Use $\frac{y^2}{2g} = \frac{D}{2} \rightarrow Q = \sqrt{\frac{257.6y^3(6+y)^3}{2(6+2y)}}$

" Normal depth calc D_n - Use $AR^{2/3} = \frac{nQ}{1.49(S)^{1/2}}$

For b = 12' z = 2 (side slope) y = flow depth

$A = y(12+2y)$; $P = 12 + 4.47y$

① $AR^{2/3} = \frac{0.013(1142)}{1.49(0.03)^{1/2}} = 60.88$;

y = 2.3	A = 38.18	P = 22.28	R = 1.71	$AR^{2/3}$ = 54.77
y = 2.5	A = 42.5	P = 23.18	R = 1.83	63.8
y = 2.45	41.41	22.95	1.80	61.49
→ y = 2.42	40.75	22.82	1.79	60.10

② $AR^{2/3} = \frac{0.013(1012)}{1.49(0.03)^{1/2}} = 50.98$

y = 2.28	A = 37.76	P = 22.19	R = 1.70	53.92
y = 2.25	37.13	22.06	1.68	52.56
→ y = 2.2	36.08	21.83	1.65	50.51

③ $AR^{2/3} = \frac{0.013(1012)}{1.49(0.032)^{1/2}} = 49.36$

$y = 2.20$	$A = 36.08$	$P = 21.83$	$R = 1.65$	$AR^{2/3} = 50.51$
$\rightarrow y = 2.18$	35.66	21.74	1.64	49.67

④ $AR^{2/3} = \frac{0.013(958)}{1.49(0.032)^{1/2}} = 46.72$

$y = 2.15$	$A = 35.05$	$P = 21.61$	$R = 1.62$	$AR^{2/3} = 48.46$
$y = 2.10$	34.02	21.39	1.59	46.43

⑤ $AR^{2/3} = \frac{0.013(958)}{1.49(0.025)^{1/2}} = 52.86$

use $y = 2.25'$

INFLOW ANALYSIS @ JUNCTION 1+61.23

@ Sta. 1+61 inflow occurs at a 45° angle

Inflow Data : 60" RCP , $Q_3 = 130$ cfs; $Q_1 = 1012$ cfs, $Q_2 = 1142$ cfs

$D_1 = 2.17'$; $b_1 = b_2 = 12'$; $z_1 = z_2 = 2$; $\theta = 45°$

Using Bourscoulli's Equa.:

$$P_2 + M_2 = P_1 + M_1 + M_3 \cos\theta$$

$$\frac{D_2^2}{6}(3b + 2zD_2) + \frac{Q_2^2}{(b+zD_2)gD_2} = \frac{D_1^2}{6}(3b + 2zD_1) + \frac{Q_1^2}{(b+zD_1)gD_1} + \frac{(Q_2 - Q_1)^2}{A_3 g}\cos\theta$$

$$\frac{D_2^2}{6}(36 + 4D_2) + \frac{1142^2}{(12 + 2D_2)gD_2} = \frac{2.17^2}{6}(36 + 8.68) + \frac{1012^2}{(16.34)(32.2)(2.17)} + \frac{(130)^2(0.71)}{19.6(32.2)}$$

$$0.67D_2^3 + 6D_2^2 + \frac{1142^2}{386.4D_2 + 64.4D_2^2} - 951.1 = 0$$

By trial & error $D_2 = 2.51'$

	2.21		
012	00420	020	01166
013	00492	022	01410
014	00571	025	01821
015	00656	030	02623
016	00746	035	03570

WATER SURFACE COMPUTATION SHEET

6/19/85

Project HERITAGE EAST #4
Reach DOMINGO BACA ARROYO

$S_f = \left[\frac{2gn^2}{2.21}\right]\frac{H_v}{R^{4/3}}$ or $\left[\frac{1}{K'}\right]^2 X^2$, $H_v = \frac{V^2}{2g}$, $L = \frac{\Delta E}{S - S_{fav}}$

$X = \frac{Qn}{b^{8/3}} = \frac{Qn}{d^{8/3}}$ n: 0.013

S=Channel Slope, E=D+H_v

$\Delta E = L(S - S_{fav})$

Sheet 1 of 1
Calc ____ Date ____
Check ____ Date ____
Ref ____

Station (L)	Invert Elev	D	WS Elev	Q	Section	Area	V	H_v (ΔH_v)	EG Elev	wp D/b	R $(1/K')^2$	$R^{4/3}$ X^2	S_f (S_{fav})	S	$S-S_{fav}$	E (ΔE)	h_f	h_i	EG Elev
25+50	621.05	2.25	623.30	958	z=2 b=12'	37.13	25.8	10.34	633.64	22.05	1.68	2.0	0.0254						633.64
5													.0254				0.12		
25+45	620.92	2.25	623.17	958	"	37.13		10.34	633.51	22.05	1.68		.0254						633.51
345													.0257				0.86		
22+00	611.98	2.24	614.22	958	"	36.93		10.46	624.67	22.01	1.68		.0259						624.64
																	2.50		
21+00	608.96	2.15	611.11	958	"	35.05		11.60	622.71	21.61	1.62		.0300						621.24
√∞																	15.2		
16+00	593.02	2.15	595.17	958	"	35.05		"	606.77	"	"		"						606.84
1350													.0312				12.11		
2+50	549.93	2.17	552.10	1012	"	35.46		12.65	564.74	21.70	1.63		.0324						564.72
89																	2.89		
1+61	547.16	2.17	549.33	1012	"	"		"	561.98	21.70	1.63		.0324						561.82
P+M																	—		
1+61	547.16	2.51	549.67	1142	"	42.72		11.10	560.77	23.22	1.84		.0243						560.77
61													.0248				1.51		
1+00	545.33	2.48	547.81	1142	"	42.06		11.45	559.25	23.09	1.82		.02540						559.25
50													.0258				1.29		
0+50	543.83	2.46	546.29	1142	"	41.62	27.44	11.69	557.98	23.00	1.81		.0261						557.96

GARDNER MASON & ASSOC.

4-82

161

PLATE 22.8 B-6

22.3

25X10

HYDRAULIC GRADE LINE CALCULATION SHEET

STORM DRAIN Sht 1 of 1

PROJECT: HERITAGE EAST UNIT 4

LINE:

CALCULATED BY: Gardner Mason & Assoc.

DATE:

$S_f = S_o = \left(\frac{Q}{K}\right)^2$

*Conduit unseals when D is less than d

	STA.	ELEV. INV.	D*	ELEV. H.G.L.	SECTION	d	A	Q	V	$\frac{V^2}{2g}$	K	S_f	Av. S_f	L	h_f	h_b	h_j	h_l	ELEV. E.G.L.
																			53.62
LINE "A"	2+27	49.90	5.0	52.94		60"	19.64	130	6.62	0.68	2604	.0005		52	0.13				53.75
						"	"	"	"	"	"	"				AP + M.H.	0.13		53.88
	1+75 OUT	47.94	5.13	53.07		"	"	"	"	"	"	"		195	0.44				54.32
	1+75 IN	48.04	5.16	53.20		"	"	"	"	"	"	"		0		A.P. →	0.2	0.35	54.87
	0+00 OUT	48.45	5.16	53.64		"	"	"	"	4.14	410.1	.0381		171	6.52				61.39
STA. 1+99 = QUINTANA LINE	1+99 IN	48.60	2.13	50.73		30"	490	80	16.3	"	"	"	0					0.25	61.64
	3+70 OUT	54.50	2.75	57.25		"	"	"	"	1.61	105	.0294		66	1.94				63.58
	3+70 IN	54.65	5.38	60.03		18	1.767	18	10.2	"	"	"							
	4+36	57.50	4.47	61.97		"	"	"	"	"	"	"							

4-82

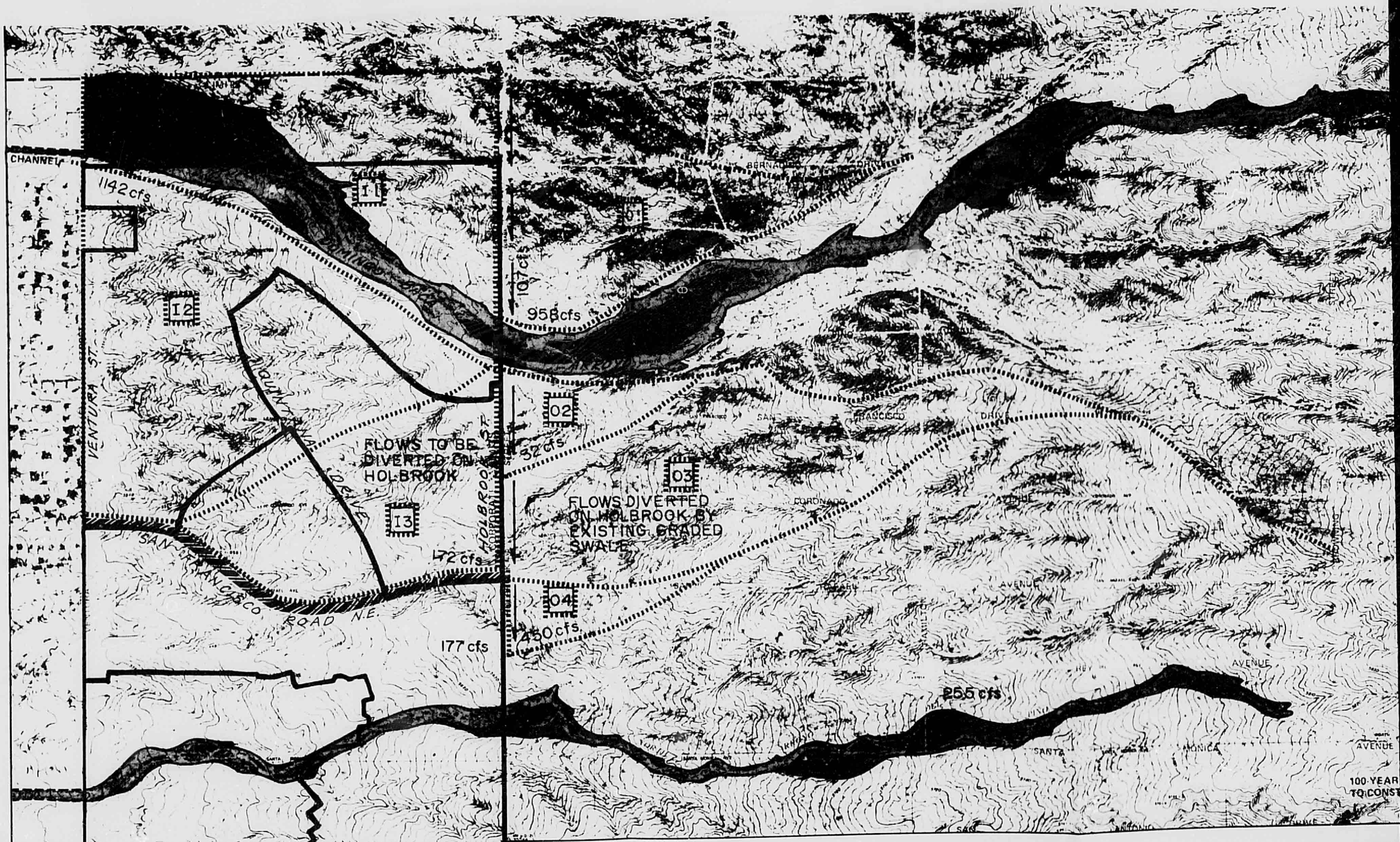
160

PLATE 22.8 B-5

25×10

0000 0000 0714

THIS MICROIMAGE IS THE BEST POSSIBLE
REPRODUCTION DUE TO THE POOR QUALITY
OF THE ORIGINAL DOCUMENT.



OFF-SITE DRAINAGE
SCALE 1" = 500'

PLATE

25×10 32×10 25×10

0000 0000 0715

PLANS/PLATS ON FILE

FILE DESC: D20/D3B

PLANS/PLATS 6

25×10

0000 0000 0118

25×10