DRAINAGE REPORT

Phase 1 of the Montano Corridor
From Rio Grande Boulevard to Edith

Prepared By:

WILSON & COMPANY, ENGINEERS & ARCHITECTS

AUGUST 1985
(85-517)
REVISED MARCH 1986

WILSON
& COMPANY
ENGINEERS &
ARCHITECTS

INTRODUCTION

This report outlines the storm water drainage plan for the Montano Corridor from Rio Grande Boulevard to 2nd Street (see Phase 1 on the Location Map). This corridor is in the North Valley where the existing drainage is sheet flow with no defined drainage paths. The major outlets for drainage through this area are the Alameda Drain, the Rio Grande and, to a limited extent, the riverside drains. There are existing storm drains at the 4th Street and 2nd Street intersections. West of 5th Street there are no storm drains with the rainfall runoff ponding in many low areas and sheet flow generally to the river. Several irrigation laterals and drains cross the proposed roadway corridor. The area is currently developed east of Guadalupe, primarily residential with scattered churches and commercial buildings at the 4th Street and 2nd Street intersections. A small shopping center has been constructed in the northeast quadrant of the 4th Street intersection. The area in this phase of the project west of Guadalupe is in the process of being developed with plans for residential, multi-family and commercial development.

The drainage area to the Montano corridor is primarily a strip adjacent to the roadway with a wide sheet flow area to the northeast of Rio Grande Boulevard approximately 3,000 feet (see Figure 3-5). The City's Master Drainage Plan shows an 18-inch storm drain from a low area south of Guadalupe Trail to the Griegos Drain. The proposed drainage plan consists of a storm drain from Rio Grande Boulevard to the Alameda Drain with a pumping station at Rio Grande Boulevard to discharge the storm runoff to the Rio Grande. A tee will be provided at the Guadalupe Trail to receive a sewer draining the low area south of Montano. Approximately 130 cfs will be discharged from the Alameda Drain to the proposed system during high flows in the drain (see attached Plans and Profiles Appendix B).

HYDROLOGY & HYDRAULICS

The design criteria, hydrologic methods and hydraulic computations were in accordance with the City of Albuquerque "Development Process Manual," with Montano a minor arterial. Calculations for the project drainage are included in the Appendix and the results summarized in the following table.

DRAINAGE SUMMARY

Segment Sta. to Sta.	Area No(s).	Drainage Area (Ac.)	Time of Concen-tration (Min.)	Design Flow Without Alameda Drain Flow (cfs) (100-year)	Design Flow With Alameda Drain Flow of 130 cfs (peak) 100-Year (cfs)	Storm Drain Size (Dia. in inches)
156+00 - 164+00	0	3.0(3)**	39	7.7(7)	95	60(-)
136+00 - 156+00	0-1	14.0(3)	39	15.1(8)	95	60(24)
120+00 - 136+00	0-2	15.0(3)	39	24.9(10)	95	66(24)
105+00 - 120+00	0-3	22.0(3)	39	38.6(13)	95	66(30)
76+00 - 105+00	0-4	79.0(3)	39	43.6(18)	95	66(30)
*68+00 - 76+00	5	7.5(3)	9	37.8(29)	95	66(24)
		140.5(18)				

*Segment to be added in Phase 2 of project with the Rio Grande Boulevard overpass.

**Numbers in parentheses reflect areas, flows and pipe sizes considering Roadway only.

Due to the "flat" grades and the sump conditions of the inlets, the 100-year design storm runoff maximum depth of 0.87 foot within the street right-of-way controlled the storm sewer pipe sizes.

RECOMMENDED PLAN

The recommended plan is to provide a storm drain from Rio Grande Boulevard to the Alameda Drain with a pumping station to collect and pump the storm water from Rio Grande Boulevard to the Rio Grande. Approximately 95 cfs will be discharged from the Alameda Drain to the proposed system during high flows. The Montano grade will be "rolled" to obtain minimum grades with inlets constructed in the low points. (See the Plans and Profiles for details of the recommended plan.) The estimated construction cost for the storm drain system for Montano Corridor Phase 1 from Rio Grande to 2nd Street is $2.96 million (see Appendix A).

Detention ponding to control the discharges was not feasible for this project due to: 1) lack of suitable right-of-way, 2) the lack of relief, and 3) the depressed roadway for Montano under Rio Grande Boulevard. Any alternate using detention ponding would require pumps to lift the storm water runoff to the pond.

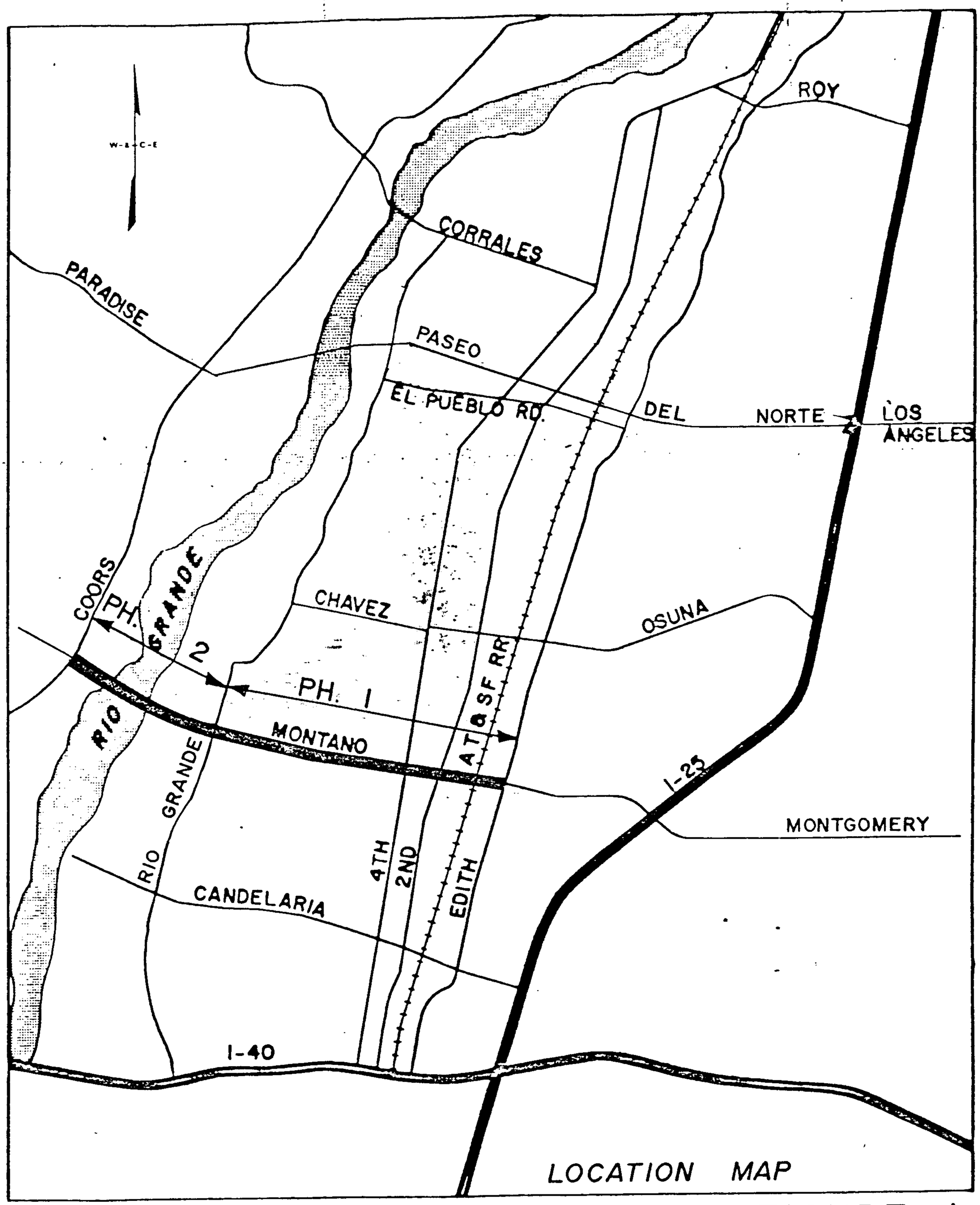
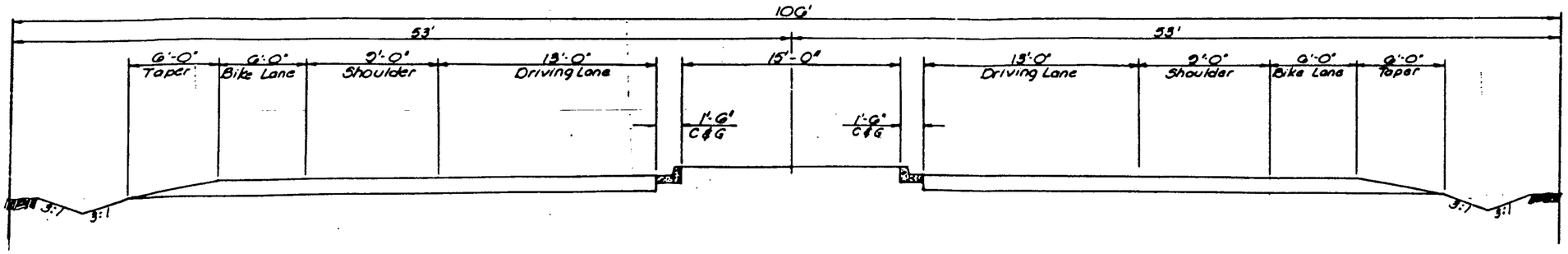
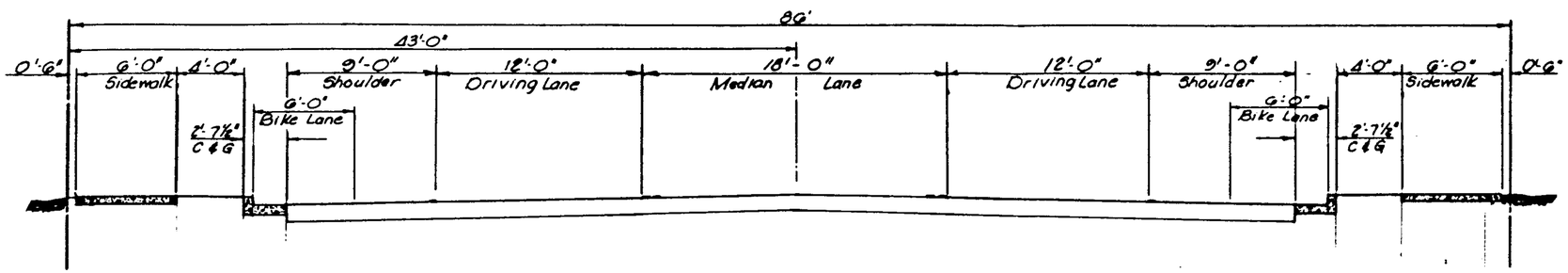

W-E-C-E
ROY
CORRALES
PARADISE
PASEO
EL PUEBLO RD.
DEL
NORTE
LOS ANGELES
COORS
PH. 2
RIO GRANDE
CHAVEZ
OSUNA
PH. 1
MONTANO
ATSF RR
I-25
MONTGOMERY
RIO GRANDE
4TH
2ND
EDITH
CANDELARIA
I-40
LOCATION MAP

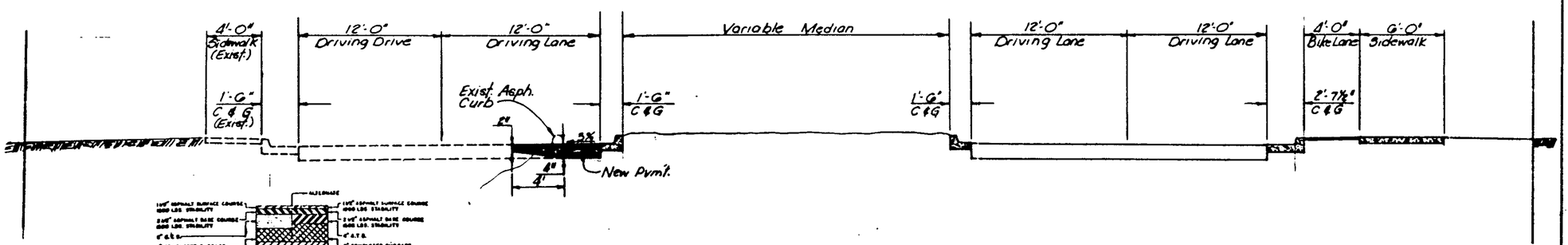
FIGURE 1



MONTANO - 500' EAST OF RIO GRANDE BLVD. TO GUADALUPE

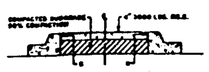


MONTANO - GUADALUPE TO 4th ST.



MONTANO - 4th ST. TO 2nd ST.

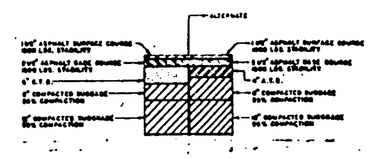
ASPHALT CONCRETE PAVEMENT SECTION



CONCRETE MEDIAN PAVING SECTION

BITUMINOUS MEDIAN PAVING SECTION

ARTERIAL / COLLECTOR STREET SECTION WITH MEDIAN



ASPHALT CONCRETE PAVEMENT SECTION

ARTERIAL / COLLECTOR STREET SECTION WITHOUT MEDIAN

FIGURE 2

AS BUILT INFORMATION

CONTRACTOR
WORK STAKED BY
INSPECTED BY
BACKFILLING BY
FIELD TEST
DOCUMENTATION BY
DRAWINGS CORRECTED
MICRO-FILM INFORMATION
RECORDED BY
NO.

BENCH MARKS

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY

REVISIONS

DESIGNED BY — DATE
DRAWN BY — DATE
CHECKED BY — DATE

CITY OF ALBUQUERQUE
TRANSPORTATION DEPARTMENT

MONTANO ROAD PHASE I TYPICAL SECTIONS

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E.-Design			Traffic		
A.C.E.-Hydrology			Water		

DRAWING NO. 2462 | MAP NO. | SHEET OF

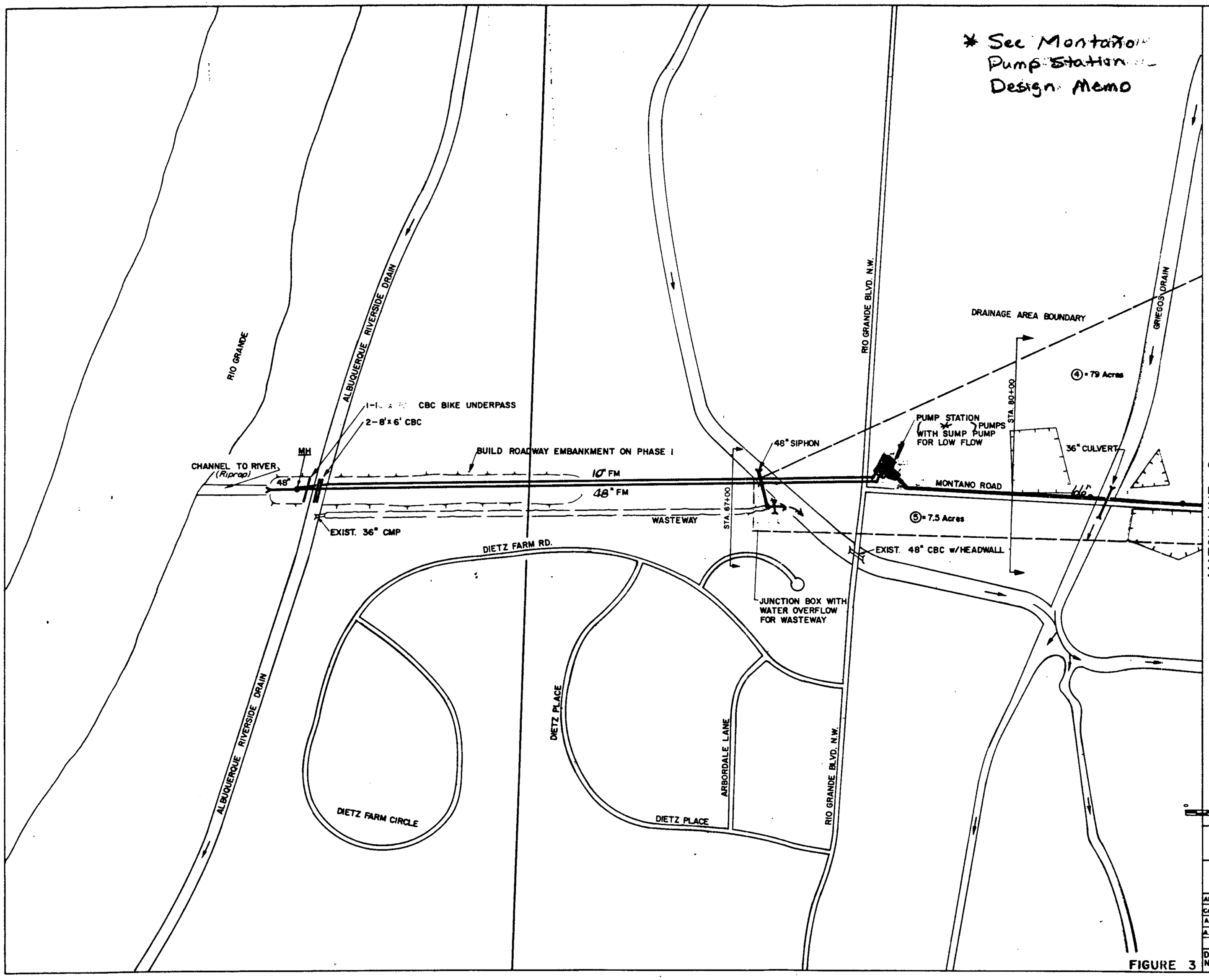


FIGURE 3

AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY
INSPECTOR
ACCEPTANCE BY
DATE
FIELD VERIFICATION BY
DRAWINGS CORRECTED BY
MICRO-FILM INFORMATION
RECORDED BY
NO.

BENCH MARKS

SURVEY INFORMATION
FIELD NOTES
NO. | BY | DATE

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY

REVISIONS

DESIGNED BY — DATE
DRAWN BY — DATE
CHECKED BY — DATE

CITY OF ALBUQUERQUE
TRANSPORTATION DEPARTMENT

MONTANO ROAD DRAINAGE PLAN

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E.-Design			Traffic		
A.C.E.-Hydrology			Water		

DRAWING NO. | MAP NO. | SHEET 1 OF 3

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ALBUQUERQUE NEW MEXICO

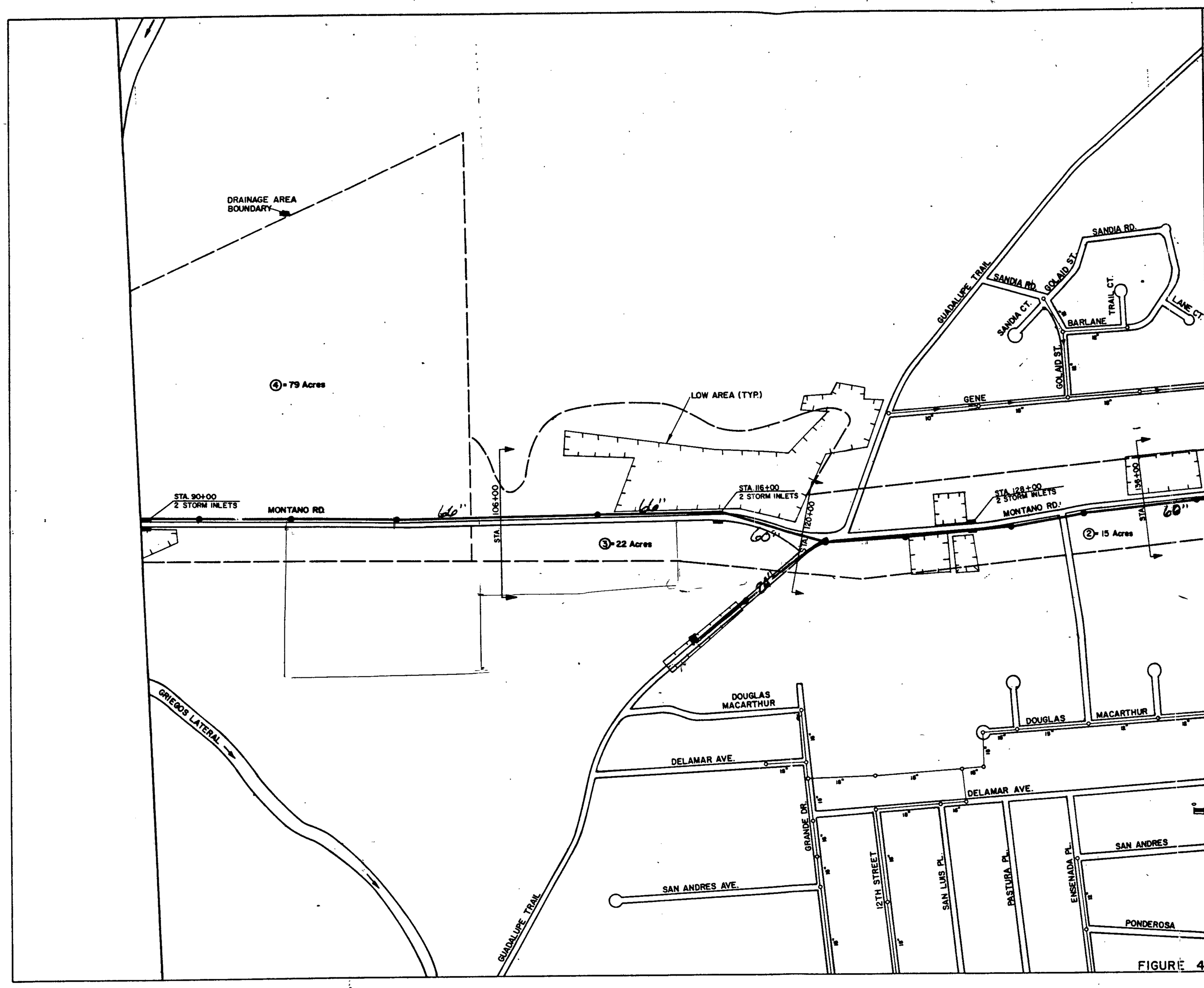

FIGURE 4

AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY
INSPECTOR
ASSEMBLE BY
DATE
FIELD VERIFICATION BY
DRAFTED BY
CORRECTED BY
MICRO-FILM INFORMATION
RECORDED BY
DATE
NO.

BENCH MARKS

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL

REVISIONS
NO. DATE REMARKS BY

DESIGN
DESIGNED BY DATE
DRAWN BY DATE
CHECKED BY DATE

CITY OF ALBUQUERQUE
TRANSPORTATION DEPARTMENT

MONTANO ROAD DRAINAGE PLAN

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E.- Design			Traffic		
A.C.E.-Hydrology			Water		

DRAWING NO.	MAP NO.	SHEET	OF
		2	3

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ALBUQUERQUE NEW MEXICO

FIGURE 5

AS BUILT INFORMATION
CONTRACTOR
TOWER
WORK STAKED BY DATE
INSPECTOR'S ACCEPTANCE BY DATE
FIELD VERIFICATION BY DATE
CORRECTIONS BY DATE
MICRO-FILM INFORMATION
RECORDED BY DATE
NO.

BENCH MARKS

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY

REVISIONS

DESIGN
DESIGNED BY DATE
DRAWN BY DATE
CHECKED BY DATE

CITY OF ALBUQUERQUE
TRANSPORTATION DEPARTMENT

MONTANO ROAD DRAINAGE PLAN

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E.-Design			Traffic		
A.C.E.-Hydrology			Water		

DRAWING NO. | MAP NO. | SHEET 3 OF 3

WILSON & COMPANY
ENGINEERS ARCHITECTS
ALBUQUERQUE NEW MEXICO

FHWA REGION NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	NEW MEXICO		19		

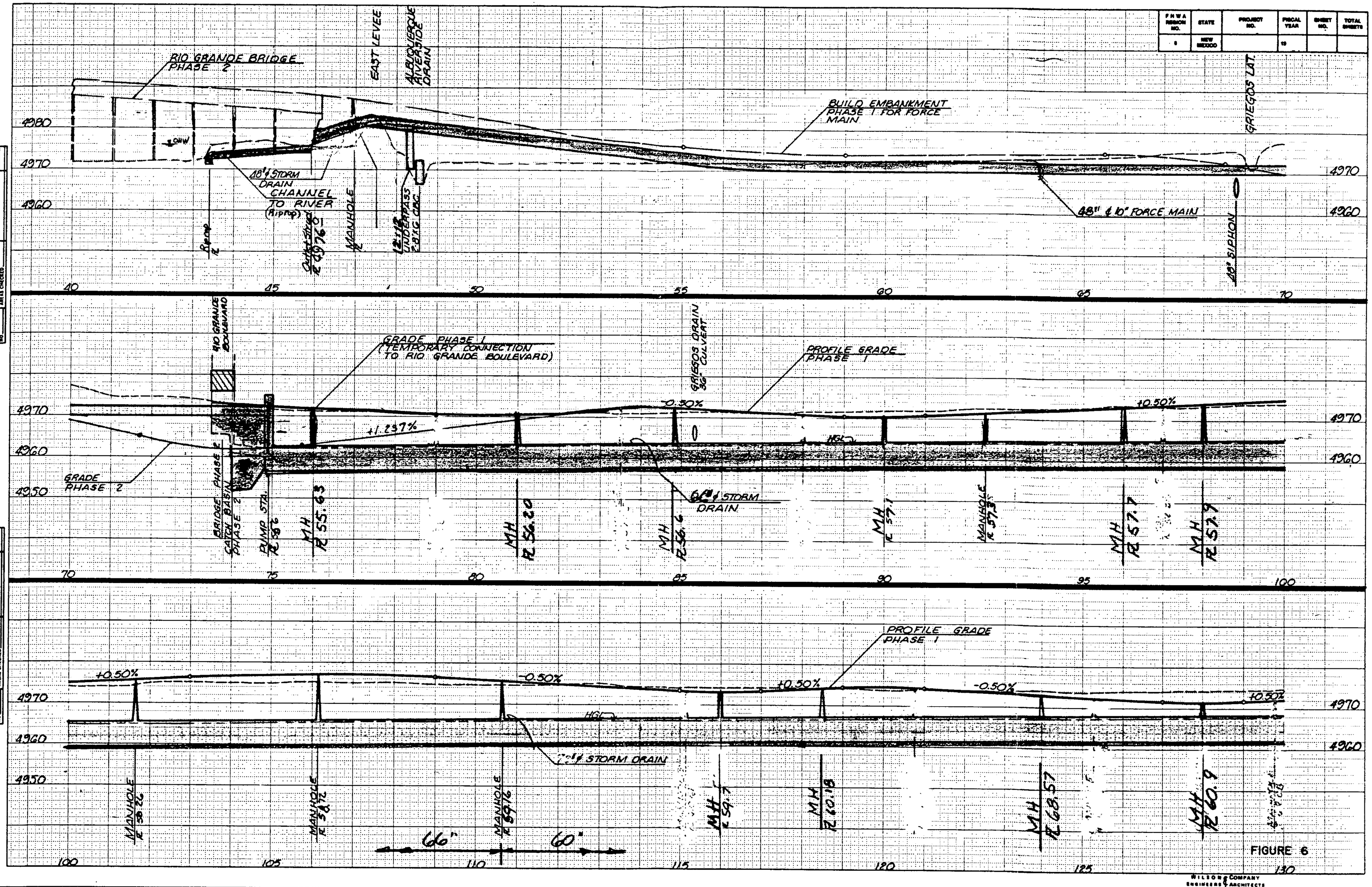

FIGURE 6

WILSON & COMPANY
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ALBUQUERQUE NEW MEXICO

F.H.W.A. REGION NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	NEW MEXICO		19		

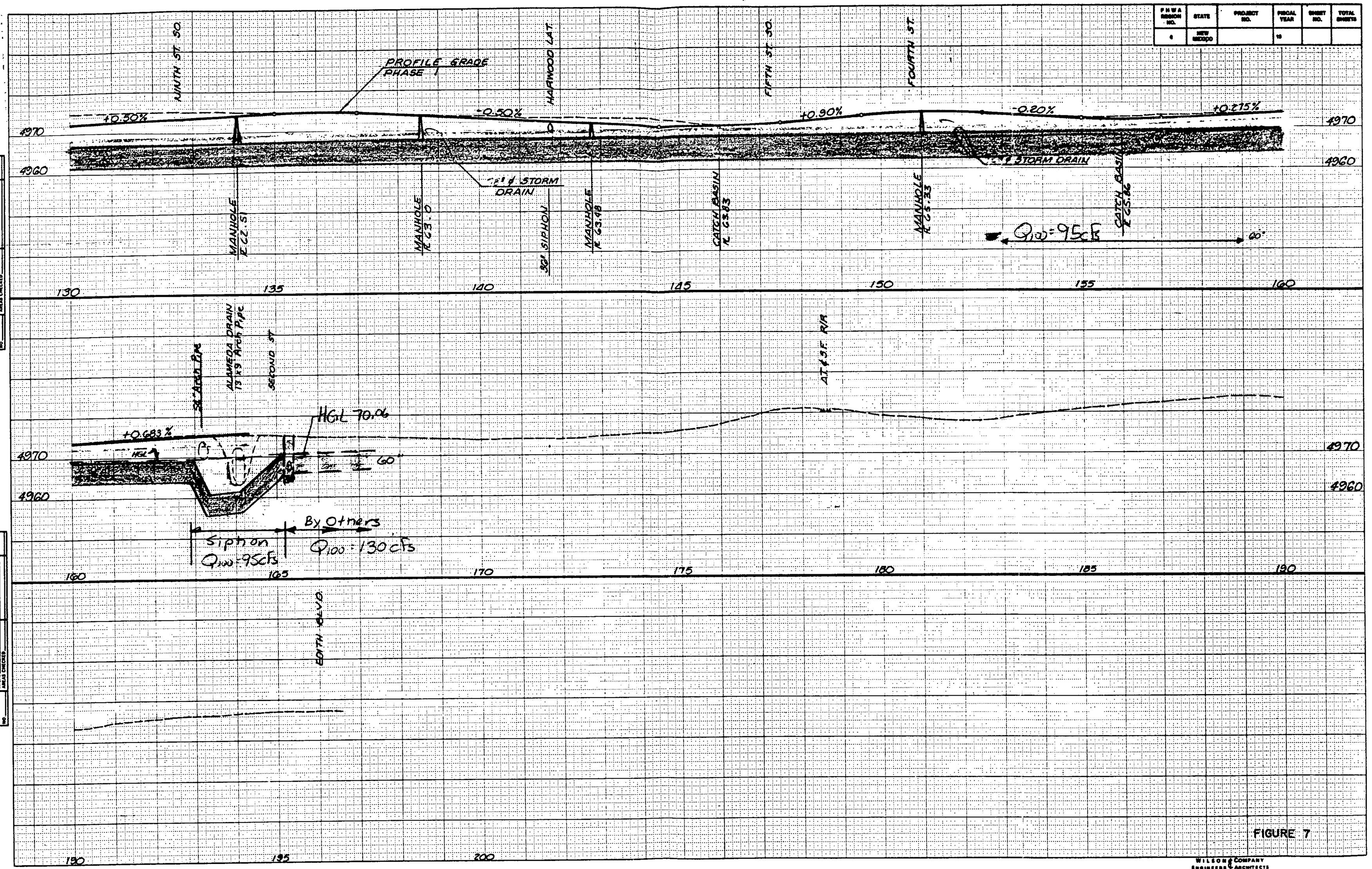

FIGURE 7

WILSON & COMPANY
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ALBUQUERQUE NEW MEXICO

AREA O (Sta. 156+00)

Overland Flow: None (Drainage of roadway only)

Street Flow: L~800' S = 0.005

V = 1.95 fps (From Plate 22.2 B-2 of Albuquerque Municipal Development Department's Development Process Manual, Volume 2)

$$T_c = \frac{800 \text{ ft}}{1.95 \text{ ft/sec} \times 60 \text{ sec/min}} = 6.84 \text{ min.} \sim \underline{7 \text{ minutes}}$$

Drainage Area:

$$\frac{1400' \times 90'}{43{,}560 \text{ Ft}^2/\text{acre}} = 2.89 \text{ acres} \sim \underline{3 \text{ acres}}$$

Curve Number:

Close to 100 (all paved)

Q_{peak} = 7.7 cfs (From Hydrograph Computation Worksheet)

Time of Concentration:

T_c for area only = 6.8 minutes
Approximate travel time to pump = 6.0 + 8.6 + 4.0 + 8.3 + 5.7 = 32.6 min

T_c = 6.8 + 32.6 = 39.4 minutes

AREA 1 (Sta. 146+00)

Overland Flow: L = 200' S~.006 ft/ft

V = 0.45 fps (Plate 22.2 B-1)

$$T_{c1} = \frac{200}{(0.45)(60)} = 7.4 \text{ minutes}$$

Street Flow: L = 1000' S = 0.005 ft/ft

V = 1.95 fps (Plate 22.2 B-2)

$$T_{c2} = \frac{1000}{1.95(60)} = 8.5 \text{ minutes}$$

T_c (for area) = 8.5 + 7.4 = 15.9 minutes
Travel time = 8.6 + 4.0 + 8.3 + 5.7 = 26.6 minutes

Time of Concentration:

T_c = 26.6 + 16 = 42.6 minutes

Drainge Area: 14 acres

Curve Number: 75

Q peak = 7.5 cfs

AREA 2 (Sta. 128+00)

Overland Flow: L = 200' S = 0.02 ft/ft

V = 0.85 fps

$$T_{c1} = \frac{200}{0.85(60)} = 3.92 \text{ minutes}$$

Street Flow: L = 800' S = 0.005 ft/ft

V = 1.95 fps

$$T_{c2} = \frac{800}{1.95(60)} = 6.84 \text{ minutes}$$

T_c (for area) = 3.92 + 6.84 = 10.76 minutes
Travel time = 4 + 8.3 + 5.7 = 18 minutes

Time of Concentration:

28.8 minutes

Drainage Area = 15 acres

Curve Number = 75

Q peak = 11.74 cfs

AREA 3 (Sta. 116+00)

Overland Flow: L = 520' S = 0.0085 ft/ft

V = 0.52 fps

$$T_{c1} = \frac{520}{0.52(60)} = 16.7 \text{ minutes}$$

Street Flow: L = 600' S = 0.005 ft/ft

V = 1.95 fps

$$T_{c2} = \frac{600}{1.95(60)} = 5.13 \text{ minutes}$$

T_c (for area) = 21.8 minutes
Travel time = 8.3 + 5.7 = 14.0 minutes

Time of Concentration: = 35.8 minutes

Drainage Area = 22 acres

Curve Number = 75

Q peak = 13.87 cfs

AREA 4 (Sta. 90+00)

Overland Flow: L = 1790' S = 0.0031 ft/ft

V = 0.34 fps

$$T_{c1} = \frac{1790}{(0.34)(60)} = 87.75 \text{ minutes}$$

Street Flow: L = 1400' S = 0.005 ft/ft

V = 1.95 fps

$$T_{c2} = \frac{1400}{1.95(60)} = 11.97 \text{ minutes}$$

T_c (for area) = 99.7 minutes
Travel time = 5.7 minutes

Time of Concentration: = 99.7 + 5.7 = 105.4 minutes

Drainage Area = 79 acres

Curve Number = 75

Q peak - 17.1 cfs

AREA 5 (Sta. 74+00)

Overland Flow: L = 100' S = 0.0021 ft/ft

V = 0.30 fps

$T_{c1} = \frac{100}{.3(60)} = 5.6$ minutes

Street Flow: L = 700' S = 0.018 ft/ft

V = 3.60 fps

$Tc2 = \frac{700}{3.6(60)} = 3.2$

T_c (for area) = 8.8 minutes
No travel time 0

Time of Concentration: = 8.8 minutes

Drainage Area = 7.5 acres

Curve Number = 85 (mostly road surface)

Q_{peak} = 37.8 cfs

HYDROGRAPH COMPUTATION WORKSHEET

DATE 27 Jul 85
COMPUTED BY WPR
CHECK BY SJM

PROJECT Montana 85-517

LOCATION 11163

ANALYSIS POINT # 0 100 yr.

(DR. AREA) A = 3 ACRES

T_c 10 MIN

POINT RAINFALL 2.2 IN. FROM PLATE 22.2 D-1

CN = 93 FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = 1.97 IN. FROM PLATE 22.2 C-4

COMPUTED T_p = 10 MIN. $T_p = T_c$
(Rounded to even minute)

$q_p = \frac{45.4A}{T_p}$ = — CFS./INCH OF RUNOFF

$(R \times q_p) = Q_{peak}$ = 13.8 CFS

t(COLUMN)=(t/T_p) $t=T_p(t/T_p)$

$y = \frac{Q}{Q_{peak}}$ $Q = y(Q_{peak})$

	(t/T_p)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	1	.03	0.4
3	.2	2	.10	1.4
4	.3	3	.190	2.6
5	.4	4	.310	4.3
6	.5	5	.470	6.5
7	.6	6	.660	9.1
8	.7	7	.820	11.3
9	.8	8	.930	12.8
10	.9	9	.990	13.7
11	1.0	10	1.00	13.8
12	1.1	11	.990	13.7
13	1.2	12	.930	12.8
14	1.3	13	.860	11.9
15	1.4	14	.780	10.8
16	1.5	15	.680	9.4
17	1.6	16	.560	7.7
18	1.7	17	.460	6.3
19	1.8	18	.390	5.4
20	1.9	19	.330	4.6
21	2.0	20	.280	3.9
22	2.2	22	.207	2.9
23	2.4	24	.147	2.0
24	2.6	26	.107	1.5
25	2.8	28	.077	1.1
26	3.0	30	.055	0.8
27	3.2	32	.040	0.6
28	3.4	34	.029	0.4
29	3.6	36	.021	0.3
30	3.8	38	.015	0.2
31	4.0	40	.011	0.2
32	4.5	45	.005	0.1
33	5.0	50	.000	0

Used For Q_{peak}
Check

(.75)(4.3)(3) = 13.8 cfs

PLATE 22.2 F-1

HYDROGRAPH COMPUTATION WORKSHEET

DATE 27 July 85
COMPUTED BY WPR
CHECK BY STM

PROJECT Montano 85-517

LOCATION Albq.

ANALYSIS POINT # (1) 100YR

(DR. AREA) A = 14 ACRES

T_c 16 MIN

POINT RAINFALL 2.2 IN. FROM PLATE 22.2 D-1

CN = 75 FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = 0.5 IN. FROM PLATE 22.2 C-4

COMPUTED T_p = 16 MIN. $T_p = T_c$
(Rounded to even minute)

$q_p = \frac{45.4A}{T_p}$ = 39.7 CFS./INCH OF RUNOFF

$(R \times q_p) = Q_{peak}$ = 19.9 CFS

t(COLUMN)=(t/T_p) $t=T_p(t/T_p)$

$y = \frac{Q}{Q_{peak}}$ $Q = y(Q_{peak})$

	(t/T_p)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	1.6	.03	0.6
3	.2	3.2	.10	2.0
4	.3	4.8	.190	3.8
5	.4	6.4	.310	6.2
6	.5	8.0	.470	9.3
7	.6	9.6	.660	13.1
8	.7	11.2	.820	16.3
9	.8	12.8	.930	18.5
10	.9	14.4	.990	19.7
11	1.0	16.0	1.00	19.9
12	1.1	17.6	.990	19.7
13	1.2	19.2	.930	18.5
14	1.3	20.8	.860	17.1
15	1.4	22.4	.780	15.5
16	1.5	24.0	.680	13.5
17	1.6	25.6	.560	11.1
18	1.7	27.2	.460	9.1
19	1.8	28.8	.390	7.7
20	1.9	30.4	.330	6.6
21	2.0	32.0	.280	5.6
22	2.2	35.2	.207	4.1
23	2.4	38.4	.147	2.9
24	2.6	41.6	.107	2.1
25	2.8	44.8	.077	1.5
26	3.0	48.0	.055	1.1
27	3.2	51.2	.040	0.8
28	3.4	54.4	.029	0.6
29	3.6	57.6	.021	0.4
30	3.8	60.8	.015	0.3
31	4.0	64.0	.011	0.2
32	4.5	72.0	.005	0.10
33	5.0	80.0	.000	0.0

PLATE 22.2 F-1

HYDROGRAPH COMPUTATION WORKSHEET

DATE 22 July 85
COMPUTED BY WPR
CHECK BY SJM

PROJECT Montana 85-517

LOCATION Alog

ANALYSIS POINT # (2) 100YR

(DR. AREA) A = 15 ACRES

T_c 11 MIN

POINT RAINFALL 2.2 IN. FROM PLATE 22.2 D-1

CN = 75 FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = .5 IN. FROM PLATE 22.2 C-4

COMPUTED T_p = 11 MIN. $T_p = T_c$
(Rounded to even minute)

$q_p = \frac{45.4A}{T_p}$ = 61.9 CFS./INCH OF RUNOFF

$(R \times q_p) = Q_{peak}$ = 31.0 CFS

t(COLUMN)=(t/T_p) $t=T_p(t/T_p)$

$y = \frac{Q}{Q_{peak}}$ $Q = y(Q_{peak})$

	(t/T_p)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	1.1	.03	0.9
3	.2	2.2	.10	3.1
4	.3	3.3	.190	5.9
5	.4	4.4	.310	9.6
6	.5	5.5	.470	14.5
7	.6	6.6	.660	20.4
8	.7	7.7	.820	25.4
9	.8	8.8	.930	28.8
10	.9	9.9	.990	30.6
11	1.0	11.0	1.00	31.0
12	1.1	12.1	.990	30.6
13	1.2	13.2	.930	28.8
14	1.3	14.3	.860	26.6
15	1.4	15.4	.780	24.1
16	1.5	16.5	.680	21.0
17	1.6	17.6	.560	17.3
18	1.7	18.7	.460	14.2
19	1.8	19.8	.390	12.1
20	1.9	20.9	.330	10.2
21	2.0	22.0	.280	8.7
22	2.2	24.2	.207	6.4
23	2.4	26.4	.147	4.6
24	2.6	28.6	.107	3.3
25	2.8	30.8	.077	2.4
26	3.0	33.0	.055	1.7
27	3.2	35.2	.040	1.2
28	3.4	37.4	.029	0.9
29	3.6	39.6	.021	0.7
30	3.8	41.8	.015	0.5
31	4.0	44.0	.011	0.3
32	4.5	49.5	.005	0.2
33	5.0	55.0	.000	0.0

PLATE 22.2 F-1

HYDROGRAPH COMPUTATION WORKSHEET

DATE 22 July 85
COMPUTED BY WPR
CHECK BY SJM

PROJECT Montano 85-517

LOCATION Albq.

ANALYSIS POINT # (3) 100YR

(DR. AREA) A = 22 ACRES

T_c 21.8 MIN

POINT RAINFALL 2.2 IN. FROM PLATE 22.2 D-1

CN = 75 FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = 0.5 IN. FROM PLATE 22.2 C-4

COMPUTED T_p = 22 MIN. $T_p = T_c$
(Rounded to even minute)

$q_p = \frac{45.4A}{T_p}$ = 45.4 CFS./INCH OF RUNOFF

$(R \times q_p) = Q_{peak}$ = 22.7 CFS

t(COLUMN)=(t/T_p) $t=T_p(t/T_p)$

$y = \frac{Q}{Q_{peak}}$ $Q = y(Q_{peak})$

	(t/T_p)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	2.2	.03	0.7
3	.2	4.4	.10	2.3
4	.3	6.6	.190	4.3
5	.4	8.8	.310	7.0
6	.5	11.0	.470	10.7
7	.6	13.2	.660	15.0
8	.7	15.4	.820	18.6
9	.8	17.6	.930	21.1
10	.9	19.8	.990	22.5
11	1.0	22.0	1.00	22.7
12	1.1	24.2	.990	22.5
13	1.2	26.4	.930	21.1
14	1.3	28.6	.860	19.5
15	1.4	30.8	.780	17.7
16	1.5	33.0	.680	15.4
17	1.6	35.2	.560	12.7
18	1.7	37.4	.460	10.4
19	1.8	39.6	.390	8.9
20	1.9	41.8	.330	7.5
21	2.0	44.0	.280	6.4
22	2.2	48.4	.207	4.7
23	2.4	52.8	.147	3.3
24	2.6	57.2	.107	2.4
25	2.8	61.6	.077	1.7
26	3.0	66.0	.055	1.2
27	3.2	70.4	.040	0.9
28	3.4	74.8	.029	0.7
29	3.6	79.2	.021	0.5
30	3.8	83.6	.015	0.3
31	4.0	88.0	.011	0.2
32	4.5	99.0	.005	0.1
33	5.0	110.0	.000	0.0

PLATE 22.2 F-1

HYDROGRAPH COMPUTATION WORKSHEET

DATE 22 July 85
COMPUTED BY WPR
CHECK BY SJM

PROJECT Montano 85-517

LOCATION A169

ANALYSIS POINT # (9) 100YR

(DR. AREA) A = 79 ACRES

T_c 99.72 MIN

POINT RAINFALL 2.2 IN. FROM PLATE 22.2 D-1

CN = 75 FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = 0.5 IN. FROM PLATE 22.2 C-4

COMPUTED T_p = 100 MIN. $T_p = T_c$
(Rounded to even minute)

$q_p = \frac{45.4A}{T_p}$ = 35.9 CFS./INCH OF RUNOFF

$(R \times q_p) = Q_{peak}$ = 17.9 CFS

t(COLUMN)=(t/T_p) $t=T_p(t/T_p)$

$y = \frac{Q}{Q_{peak}}$ $Q = y(Q_{peak})$

	(t/T_p)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	10	.03	0.5
3	.2	20	.10	1.8
4	.3	30	.190	3.4
5	.4	40	.310	5.5
6	.5	50	.470	8.4
7	.6	60	.660	11.8
8	.7	70	.820	14.7
9	.8	80	.930	16.6
10	.9	90	.990	17.7
11	1.0	100	1.00	17.9
12	1.1	110	.990	17.7
13	1.2	120	.930	16.6
14	1.3	130	.860	15.4
15	1.4	140	.780	14.0
16	1.5	150	.680	12.2
17	1.6	160	.560	10.0
18	1.7	170	.460	8.2
19	1.8	180	.390	7.0
20	1.9	190	.330	5.9
21	2.0	200	.280	5.0
22	2.2	220	.207	3.7
23	2.4	240	.147	2.6
24	2.6	260	.107	1.9
25	2.8	280	.077	1.4
26	3.0	300	.055	1.0
27	3.2	320	.040	0.7
28	3.4	340	.029	0.5
29	3.6	360	.021	0.4
30	3.8	380	.015	0.3
31	4.0	400	.011	0.2
32	4.5	450	.005	0.1
33	5.0	500	.000	0.0

PLATE 22.2 F-1

HYDROGRAPH COMPUTATION WORKSHEET

DATE 22 July 85
COMPUTED BY WPR
CHECK BY SJM

PROJECT Montano 85-517

LOCATION Flag

ANALYSIS POINT # (5) 100 yr.

(DR. AREA) A = 11 ACRES

T_c 37.2 MIN

POINT RAINFALL 2.2 IN. FROM PLATE 22.2 D-1

CN = 75 FROM PLATES 22.2 C-2, 22.2 C-3

RUNOFF VOLUME R = 0.5 IN. FROM PLATE 22.2 C-4

COMPUTED T_p = 37 MIN. $T_p = T_c$
(Rounded to even minute)

$q_p = \frac{45.4A}{T_p}$ = 13.5 CFS./INCH OF RUNOFF

$(R \times q_p) = Q_{peak}$ = 6.7 CFS

t(COLUMN)=(t/T_p) $t=T_p(t/T_p)$

$y = \frac{Q}{Q_{peak}}$ $Q = y(Q_{peak})$

	(t/T_p)	t (min.)	y	Q (cfs)
1	0	0	0	0
2	.1	3.7	.03	0.2
3	.2	7.4	.10	0.7
4	.3	11.1	.190	1.3
5	.4	14.8	.310	2.1
6	.5	18.5	.470	3.1
7	.6	22.2	.660	4.4
8	.7	25.9	.820	5.5
9	.8	29.6	.930	6.2
10	.9	33.3	.990	6.6
11	1.0	37.0	1.00	6.7
12	1.1	40.7	.990	6.6
13	1.2	44.4	.930	6.2
14	1.3	48.1	.860	5.8
15	1.4	51.8	.780	5.2
16	1.5	55.5	.680	4.6
17	1.6	59.2	.560	3.8
18	1.7	62.9	.460	3.1
19	1.8	66.6	.390	2.6
20	1.9	70.3	.330	2.2
21	2.0	74.0	.280	1.9
22	2.2	81.4	.207	1.4
23	2.4	88.8	.147	1.0
24	2.6	96.2	.107	0.7
25	2.8	103.6	.077	0.5
26	3.0	111.0	.055	0.4
27	3.2	118.4	.040	0.3
28	3.4	125.8	.029	0.2
29	3.6	133.2	.021	0.1
30	3.8	140.6	.015	0.1
31	4.0	148.0	.011	0.1
32	4.5	166.5	.005	0.0
33	5.0	185.0	.000	0.0

PLATE 22.2 F-1

[redacted] 85-517

WORST CONDITION

Sht___of___

HYDRAULIC GRADE LINE CALCULATION SHEET

PROJECT M. I.

LINE R... 2,...

CALCULATED BY ~~STP~~ JTM

DATE 1-21-87

*Conduit unseals when D is less than d

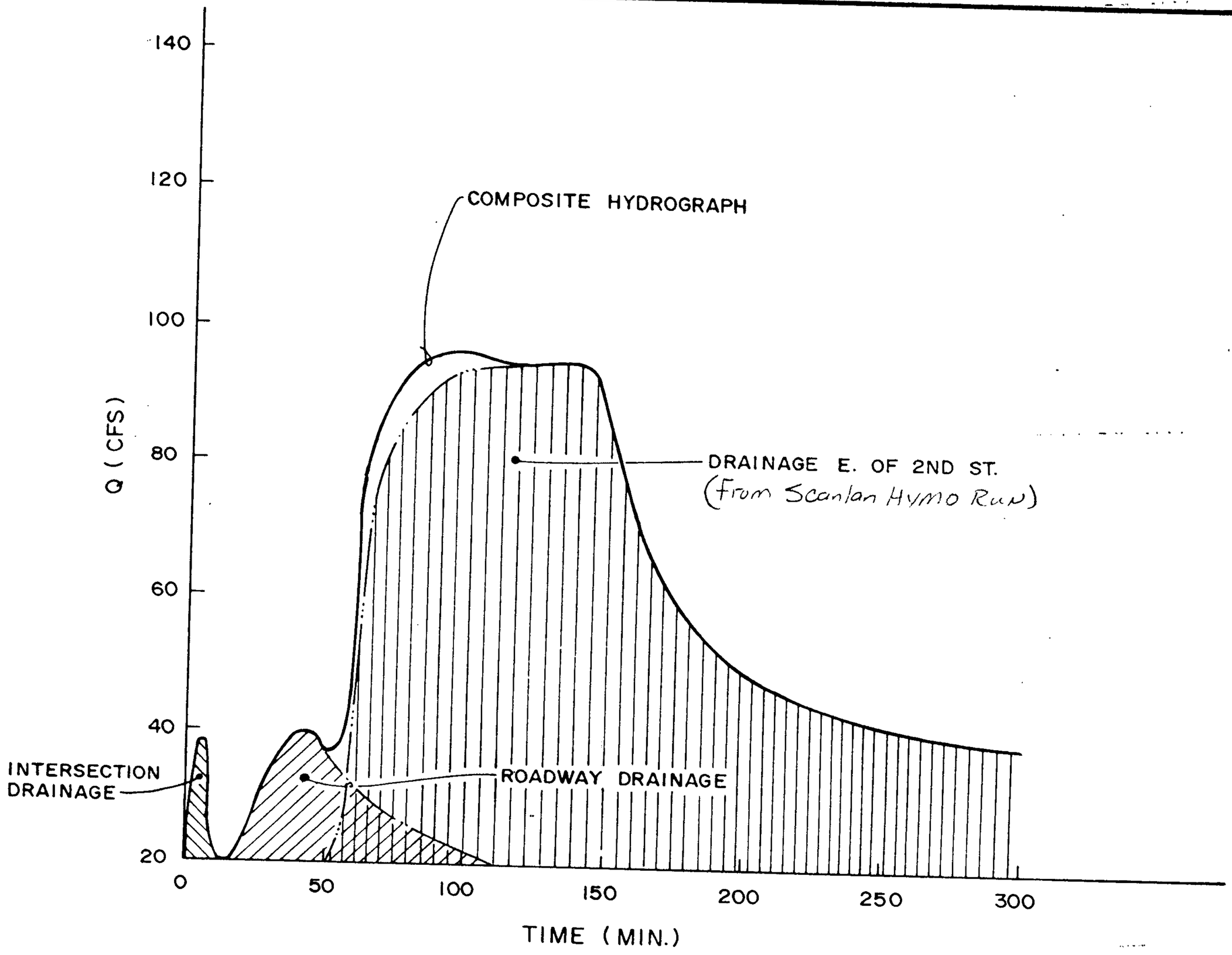
STA.	ELEV. INV.	D*	ELEV. H.G.L.	SECTION	d	A	Q	V	$\frac{v^2}{2g}$	K	S_f	Av. S_f	L	h_f	h_b	h_j	h_t	ELEV. E.G.L.
75+41	55.63	2.66	58.29	66"	5.5	11.27	95	8.43	1.10	1565	.0037							59.39
81+00	56.20		59.80	66"	5.5	18.31	95	5.2	.42				600	1.53	.05		1.58	
84+75	56.58	3.72	60.30	66"	5.5								375	.34	-		.37	61.23
90+00	57.10	3.85	60.95	66"	5.5								525	.47	-		.52	61.75
92+00	57.30	3.88	61.18	66"	5.5								200	.18	-		.20	61.95
96+00	57.70	3.95	61.65	66"	5.5								400	.36	-		.40	62.35
98+00	57.90	3.98	61.88	66"	5.5								200	.18	-		.20	62.55
102+40	58.34	3.97	62.31	66"	5.5								440	.40	-		.44	62.99
106+00	58.70	4.01	62.71	66"	5.5			4.78					360	.32	-		.36	63.35
111+00	59.20	4.01	63.21	66" / 60"	5.5 / 5.0	.97	95	4.78 / 5.29	0.35 / 0.43				500	.50	-		.50	63.85
"E" 116+00	59.70	4.17	63.87			18.30	95	5.2	.42				400	.60			.62	64.47
"E" 118+50	59.95	4.25	64.20			18.3		5.2	.42				250	.30			.32	64.79
E 120+72	60.17	4.34	64.51			18.61		5.1	.40				222	.27	.04		.29	65.08
124+00	60.50	4.43	64.93			18.90		5.03	.39				328	.39			.41	65.49
129+00	60.90	4.53	65.43			19.12		4.96	.38				400	.48			.50	65.99
132+00	61.30	4.61	65.91			19.37		4.90	.37				400	.48			.50	66.49
136+10	61.71	4.67	66.38			19.60		4.85	.36				410	.49			.51	67.00
140+00	62.10	4.74	66.84			19.64		4.84	.36				390	.49			.51	67.51
"E" 145+60	62.60	4.85	67.45								.013	3	500	.65			.67	68.18
E 147+95	62.84	4.87	67.71										245	.32			.34	68.52
E 150+80	63.18	4.94	68.12										335	.44			.46	68.98
E 153+50	63.55	5	68.60			19.64		4.84	.36	2605	.0013		370	.48			.50	69.48
E 157+91	63.89	5	69.05			19.64							341	.44			.46	69.94
162+90	64.39	5	69.71			19.64						.0013	501	.65			.67	70.61
SIPHON 164+22	64.50	5	70.06		5.0	19.64		4.84	.36	2605	.0013	.0013	134	.17	.14		.33	70.94

4-82

160

PLATE 22.8 B-5

22.8



WILSON & COMPANY
ENGINEERS ARCHITECTS

FIGURE 2

HYDROGRAPH AT PUMP STATION-100 YR. STORM

DSGN. M.L.D.	DR. L.C.C.	CK. W.F.Z.
FILE 85-517	DATE 7-86	SHEET

DRAINAGE REPORT

Phase 2 of the Montano Corridor
From Coors Boulevard to Rio Grande Boulevard

Prepared By:

WILSON & COMPANY, ENGINEERS & ARCHITECTS

STEVEN J. METRO
NEW MEXICO
8220
REGISTERED PROFESSIONAL ENGINEER

AUGUST 1985
(85-517)
REVISED MARCH 1986

WILSON
& COMPANY
ENGINEERS
ARCHITECTS

INTRODUCTION

This report outlines the storm water drainage plan and river bridge plan for the Montano Corridor from Coors Boulevard to Rio Grande Boulevard (see Phase 2 of the Location Map). The major drainage feature in this section of the corridor is the Rio Grande Bridge. The drainage area west of the river will drain to a storm drain constructed by AMAFCA in the Montano right-of-way. This project will extend this storm drain to the west bridge abutment where a lined channel will carry the storm water flow to the river's channel. The Montano roadway east of the river is a rural section and storm water runoff will be allowed to follow its existing course. Drainage for the depressed roadway under Rio Grande Boulevard will be drained to the pump station constructed in Phase 1 (see attached Plans and Profiles).

HYDROLOGY AND HYDRAULICS

The design criteria, hydrologic methods and hydraulic computations for the storm drains were in accordance with the City of Albuquerque "Development Process Manual" with Montano a minor arterial.

The water surface elevations for the Rio Grande were computed using the Corps of Engineers' HEC 2 computer program with the following parameters:

Design Flow - 42,000 cubic feet per second (c.f.s.)
Distance between levees - approximately 2,500 feet
N-value channel - 0.02
N-value banks - 0.10
Coefficient of contraction - 0.3 at bridge (0.1 at other locations)
Coefficient of expansion - 0.5 at bridge (0.3 at other locations)
No scour provisions
Pier spacing - 100 feet
Pier width - 2 feet
Trash allowance - 1 foot each side of pier
Skew allowance - 1 foot for each pier

Four runs were made with existing conditions, a 2,500 foot bridge, a 2,000 foot bridge and a 1,500 foot bridge.

A summary of the water surface elevations is shown in Table 1. The Corrales Riverside Drain structure will be a 3-8'x3.5' concrete box culvert (C.B.C.) to allow for the future widening of the drain (reference Scanlon Report for the North Coors Drainage Management Plan). The groundwater at Rio Grande Boulevard was recorded at 10-10.5 feet.

TABLE 1

SUMMARY OF MONTANO BRIDGE OVER RIO GRANDE

WATER SURFACE ELEVATIONS FOR 42,000 C.F.S.

C of E Cross Section Number	Station	Proposed Top of West Levee	Existing Top of East Levee	Existing Conditions No Bridge	Levee to Levee 2,500' Bridge	2,000' Bridge	1,500' Bridge
467	631+70	4980.1	4980.6	4976.36	4976.36	4976.36	4976.36
466	626+60	4980.6	4981.4	4977.09	4977.09	4977.09	4977.09
465	621+70	4980.9	4981.4	4977.30	4977.30	4977.30	4977.30
464	617+30	4981.2	4981.9	4977.76	4977.76	4977.76	4977.76
463	612+10	4981.6	4982.5	4977.96	4978.01	4977.97	4977.94
Bridge							
462	608+50	4981.9	4983.8	4978.53	4978.71	4978.84	4978.96
461	603+90	4982.3	4984.3	4978.79	4978.93	4979.04	4979.13
460	598+60	4982.7	4985.0	4979.69	4979.77	4979.76	4979.79
459	594+20	4983.2	4985.4	4980.43	4980.45	4980.46	4980.48

Water Surface Elevations computed with Corps of Engineers' HEC 2 computer program.

Stations and cross sections were provided by the Corps of Engineers with Station 463 being 50 feet upstream of the bridge.

34,000 to 37,000 c.f.s flows in the channel area of the floodplain.

Velocities in the bank areas are very low (less than 2 f.p.s.). Velocity in the main channel is approximately 8-9 f.p.s.

RECOMMENDED PLAN

The recommended plan for Phase 2 of the Montano Corridor from Coors Boulevard to Rio Grande Boulevard is to:

1. Provide a storm drain on the west side of the river to drain approximately 250 acres west of Taylor Ranch Road. This storm drain will be constructed by AMAFCA prior to the Montano roadway construction from Taylor Ranch Road to immediately east of the west river levee. The Montano roadway project will extend the storm drain to the west bridge abutment. A riprap lined ditch from the storm drain outlet to the river channel will be constructed in the Montano roadway project.

2. Construct a 2,000 foot river bridge with approximately 500 feet of embankment encroachment on the river. This bridge has the following features:

   a. The head loss due to the 2,000 foot bridge is approximately 0.3 foot with the head loss extending 2,000 feet upstream.

   b. The bosque is dense and wide on the west side of the channel and it will tend to hold the channel on its present course.

   c. The estimated construction cost of the 2,000 foot bridge is approximately $1.5 million less than the concept extending a bridge from levee to levee. Funding for this project is limited.

   d. The majority of the flow is in the channel proper (approximately 90 percent) with only minor flows on the west and east banks.

3. Install inlets and a 24-inch storm drain in the depressed roadway section under the Rio Grande Boulevard overpass. This storm drain will run to the pump station constructed in Phase 1. For details, see the Plan and Profile on Figures 5 and 6.

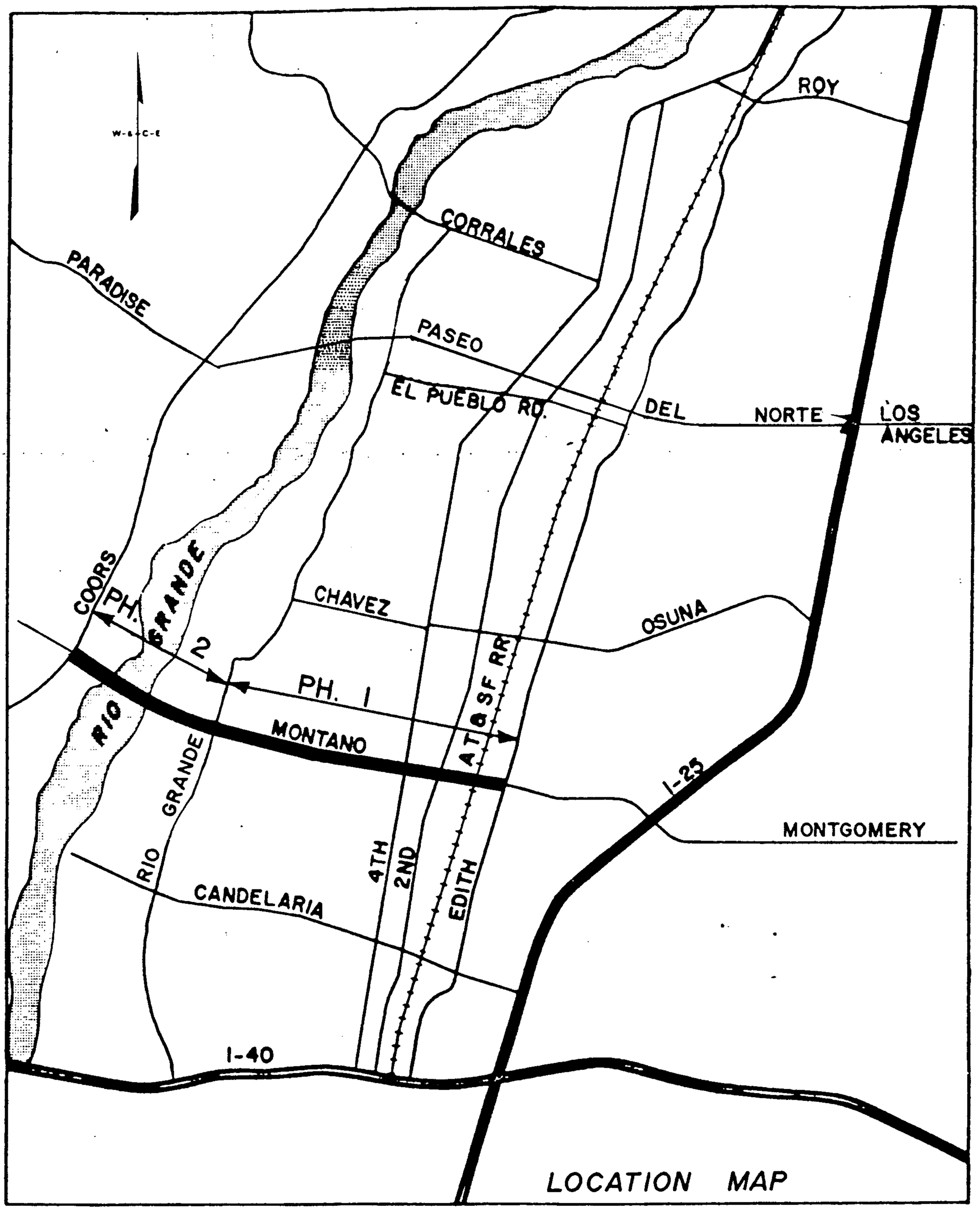

W-E-C-E
ROY
CORRALES
PARADISE
PASEO
EL PUEBLO RD.
DEL
NORTE
LOS ANGELES
COORS
PH. 2
RIO GRANDE
CHAVEZ
OSUNA
PH. 1
MONTANO
A T & SF RR
I-25
MONTGOMERY
RIO GRANDE
4TH
2ND
EDITH
CANDELARIA
I-40
LOCATION MAP

FIGURE 1

APPENDIX A

MONTANO CORRIDOR PHASE 2

COST ESTIMATE

COORS BOULEVARD TO RIO GRANDE BOULEVARD

Phase 2 - Coors to 500' East of Rio Grande Boulevard

Earthwork	$ 230,000
Culverts	120,000
Storm Drainage System	120,000
Surfacing and Curb & Gutter	650,000
Rio Grande Bridge (2,000' bridge)	6,400,000
Rio Grande Boulevard Overpass (includes concrete lining & vertical walls)	440,000
Miscellaneous Items*	40,000

Total Estimated Construction Cost - Phase 2 $ 8,000,000

*Miscellaneous items include traffic control, utility relocations, bike lanes, sidewalks, signalization and other minor items.

Estimated Project Costs - Phase 2

Construction Costs	$ 8,000,000
Engineering	350,000
Inspection	450,000
Right-of-Way	150,000

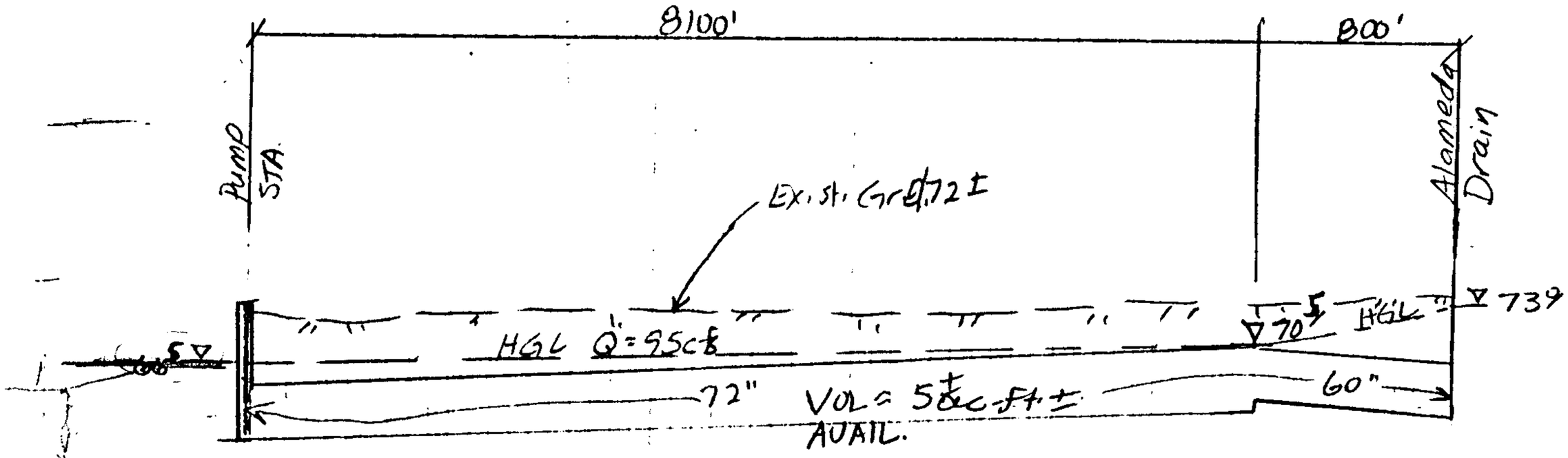
Total Estimated Project Costs - Phase 2 $ 8,950,000

COMP. STM
CK. WPR
DATE 3/86

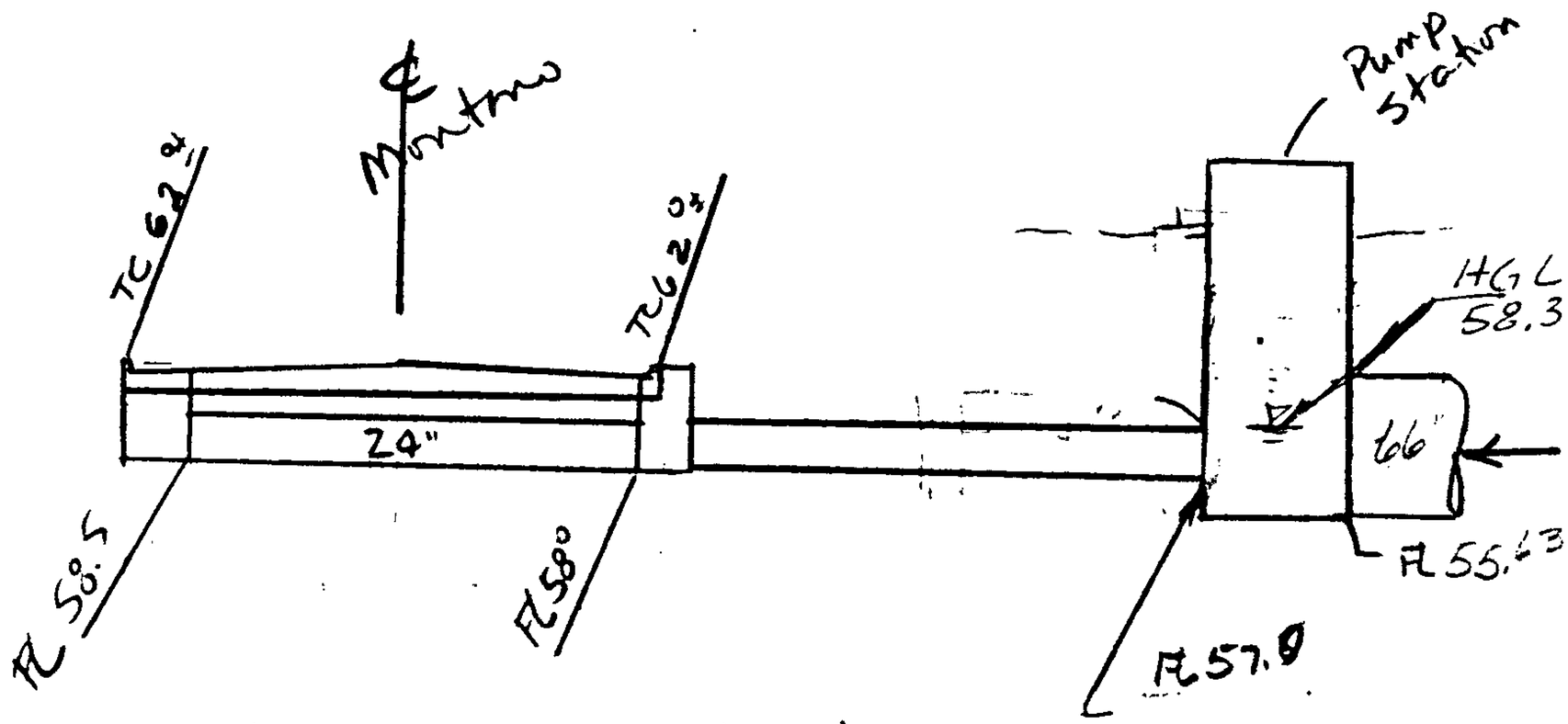
WILSON & COMPANY
ENGINEERS ARCHITECTS

LOC. ALQ
PROJ. Montana
SUBJ. Pump Sta. Sizl

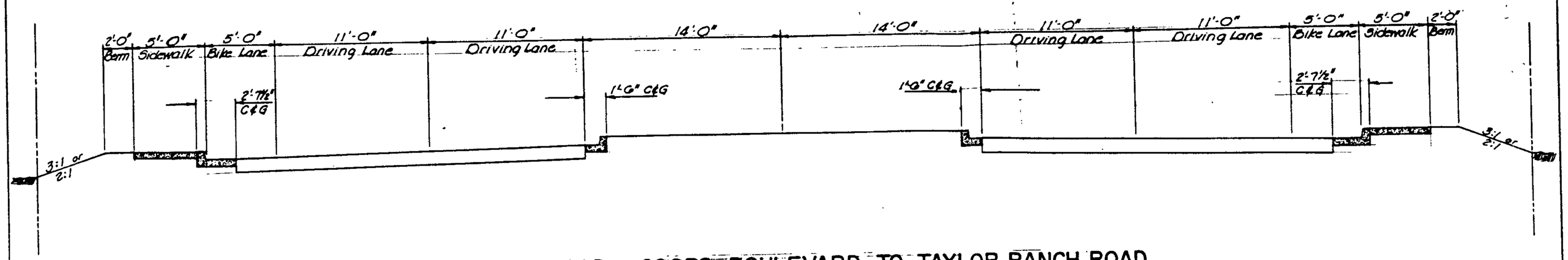
FILE 85-517
SHEET
OF



∴ DESIGN PUMPS for Q = 95 cfs

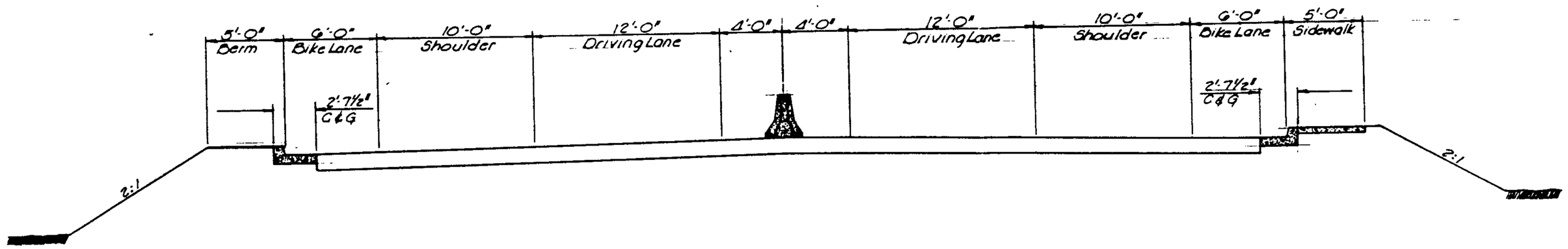


Vol. R.O. is sump ≈ 0.4 ac-ft.



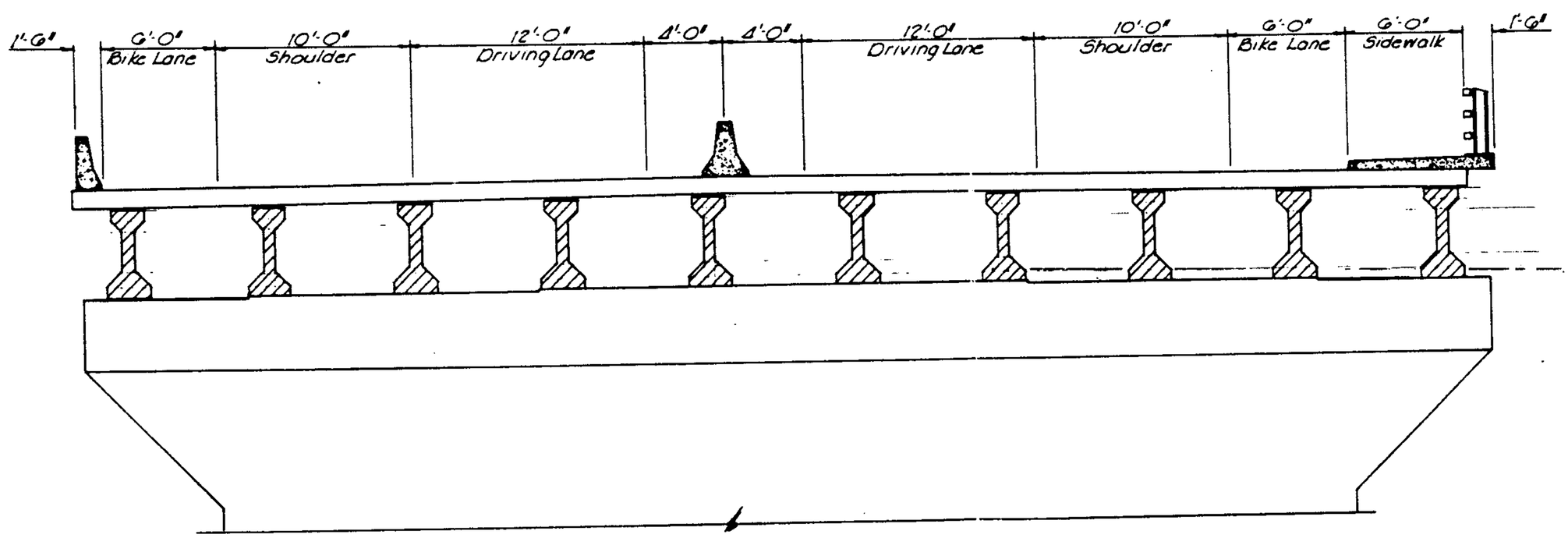
1

MONTANO ROAD — COORS BOULEVARD TO TAYLOR RANCH ROAD



2

MONTANO ROAD — TAYLOR RANCH ROAD TO RIO GRANDE BRIDGE CROSSING



3

MONTANO ROAD — RIO GRANDE BRIDGE CROSSING SECTION

FIGURE 2

AS BUILT INFORMATION
CONTRACTOR
WORK STAKED BY
INSPECTORS
ACCEPTANCE BY
DATE
VERIFICATION BY
DATE
CORRECTED BY
DATE
MICRO-FILM INFORMATION
RECORDED BY
DATE
NO.

BENCH MARKS

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY

REVISIONS

WILSON & COMPANY, ENGINEERS & ARCHITECTS
DESIGNED BY DATE
DRAWN BY DATE
CHECKED BY DATE

CITY OF ALBUQUERQUE
TRANSPORTATION DEPARTMENT

TYPICAL SECTION

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E.-Design			Traffic		
A.C.E.-Hydrology			Water		

DRAWING NO. | MAP NO. | SHEET OF

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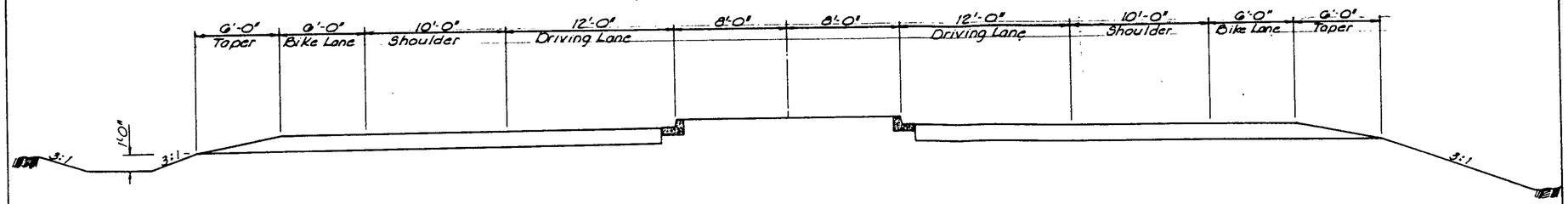
ALBUQUERQUE NEW MEXICO

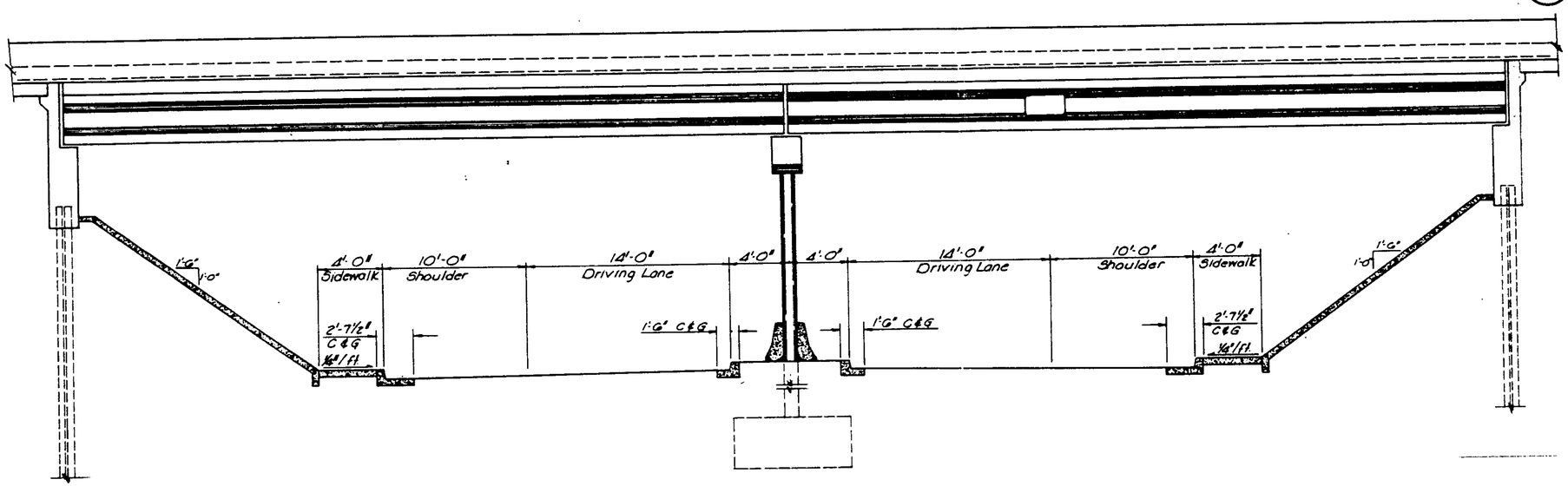
85-517

4



MONTANO ROAD — RIO GRANDE BRIDGE CROSSING TO 500' WEST OF RIO GRANDE BOULEVARD

5



MONTANO ROAD — 500' WEST and 500' EAST OF RIO GRANDE BOULEVARD

FIGURE 3

AS BUILT INFORMATION

CONTRACTOR | DATE
WORK STAKED BY | DATE
STAKING INSPECTION | DATE
INSPECTOR'S ACCEPTANCE BY | DATE
FIELD VERIFICATION BY | DATE
DRAWINGS MARKED FOR MICRO-FILM BY | DATE
RECORDED BY | DATE
NO.

BENCH MARKS

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY

REVISIONS

WILSON & COMPANY, ENGINEERS & ARCHITECTS

DESIGNED BY | DATE
DRAWN BY | DATE
CHECKED BY | DATE

CITY OF ALBUQUERQUE
TRANSPORTATION DEPARTMENT

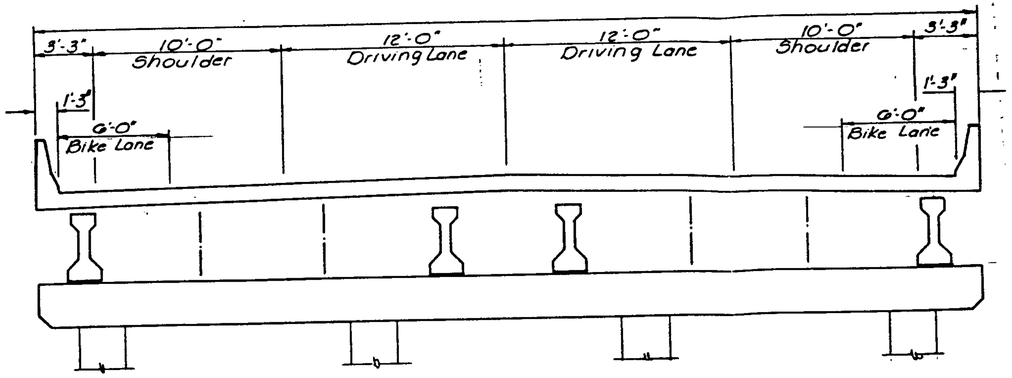
TYPICAL SECTION

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E.- Design			Traffic		
A.C.E.-Hydrology			Water		

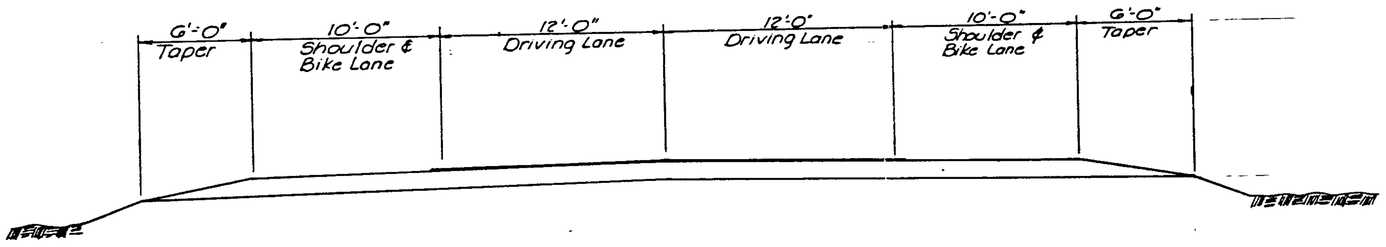
DRAWING NO. | MAP NO. | SHEET OF

WILSON & COMPANY
ENGINEERS ARCHITECTS
ALBUQUERQUE NEW MEXICO

85-517



RIO GRANDE BLVD. BRIDGE OVER MONTANO



RIO GRANDE BLVD. – NORTH & SOUTH OF MONTANO

AS BUILT INFORMATION

CONTRACTOR
WORK STAKED BY — DATE
STAKE CHECKED BY — DATE
ACCEPTANCE BY — DATE
FIELD VERIFICATION BY — DATE
DRAWINGS CORRECTED BY — DATE
MICRO-FILM INFORMATION
RECORDED BY — DATE
NO.

BENCH MARKS

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

ENGINEER'S SEAL

REVISIONS

NO.	DATE	REMARKS	BY

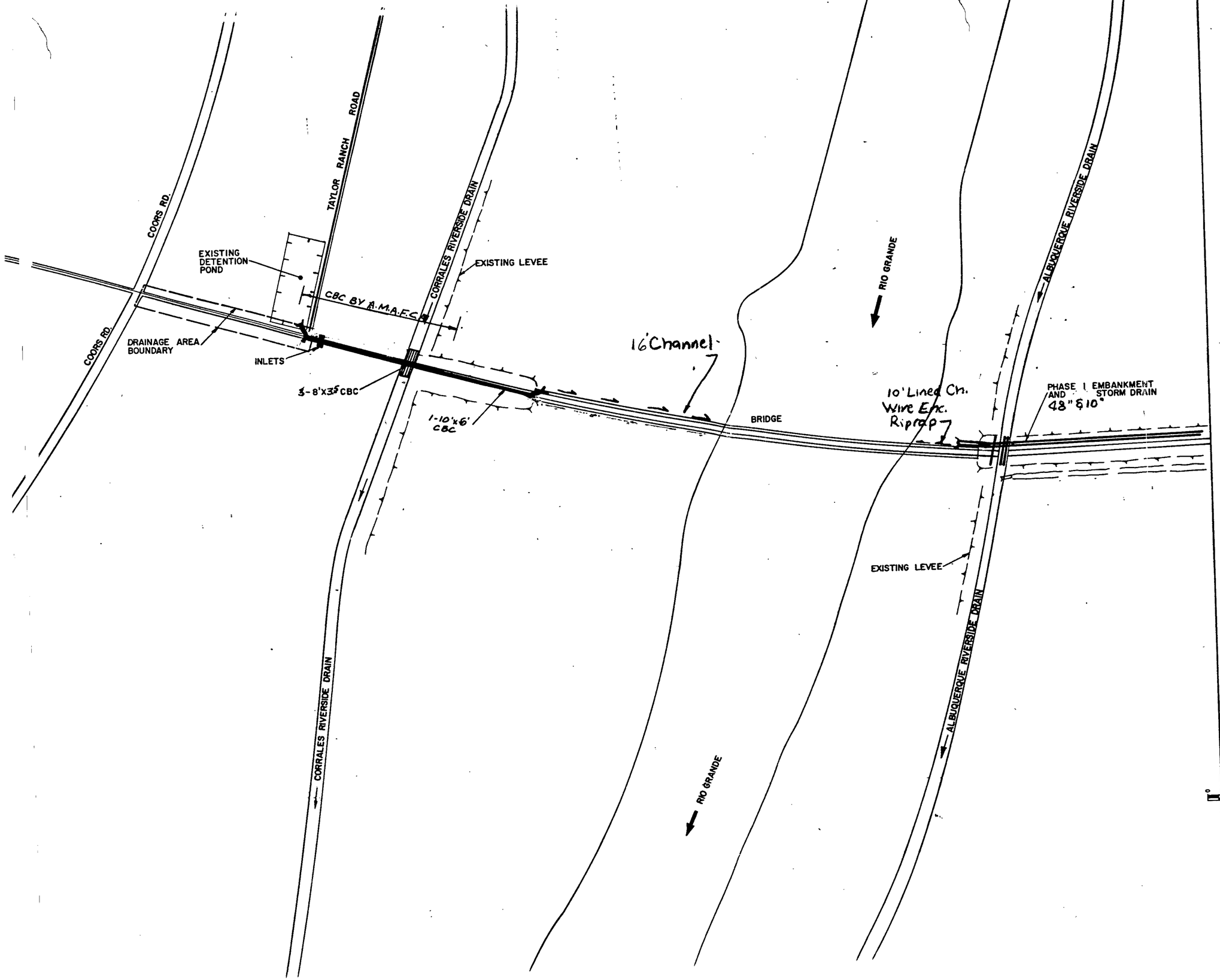
DESIGN

DESIGNED BY — DATE
DRAWN BY — DATE
CHECKED BY — DATE

CITY OF ALBUQUERQUE
TRANSPORTATION DEPARTMENT

RIO GRANDE BLVD.
PHASE II TYPICAL SECTIONS

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E.- Design			Traffic		
A.C.E.-Hydrology			Water		



AS BUILT INFORMATION
CONTRACTOR
STARTED
COMPLETED
STAKED BY
DATE
INSPECTORS
DATE
BACKFILLING BY
DATE
VERTICAL INSPECTION BY
DATE
CORRECTED BY
MICRO-FILM INFORMATION
RECORDED BY
DATE
NO.

BENCH MARKS

SURVEY INFORMATION
FIELD NOTES
NO. | BY | DATE

ENGINEER'S SEAL

NO.	DATE	REMARKS	BY

REVISIONS

DESIGN
DESIGNED BY — DATE
DRAWN BY — DATE
CHECKED BY — DATE

0 20 40 60 80
SCALE IN FEET

CITY OF ALBUQUERQUE
TRANSPORTATION DEPARTMENT

MONTANO ROAD DRAINAGE PLAN

APPROVALS	ENGINEER	DATE	APPROVALS	ENGINEER	DATE
City Engineer			Liquid Waste		
A.C.E.- Design			Traffic		
A.C.E.-Hydrology			Water		

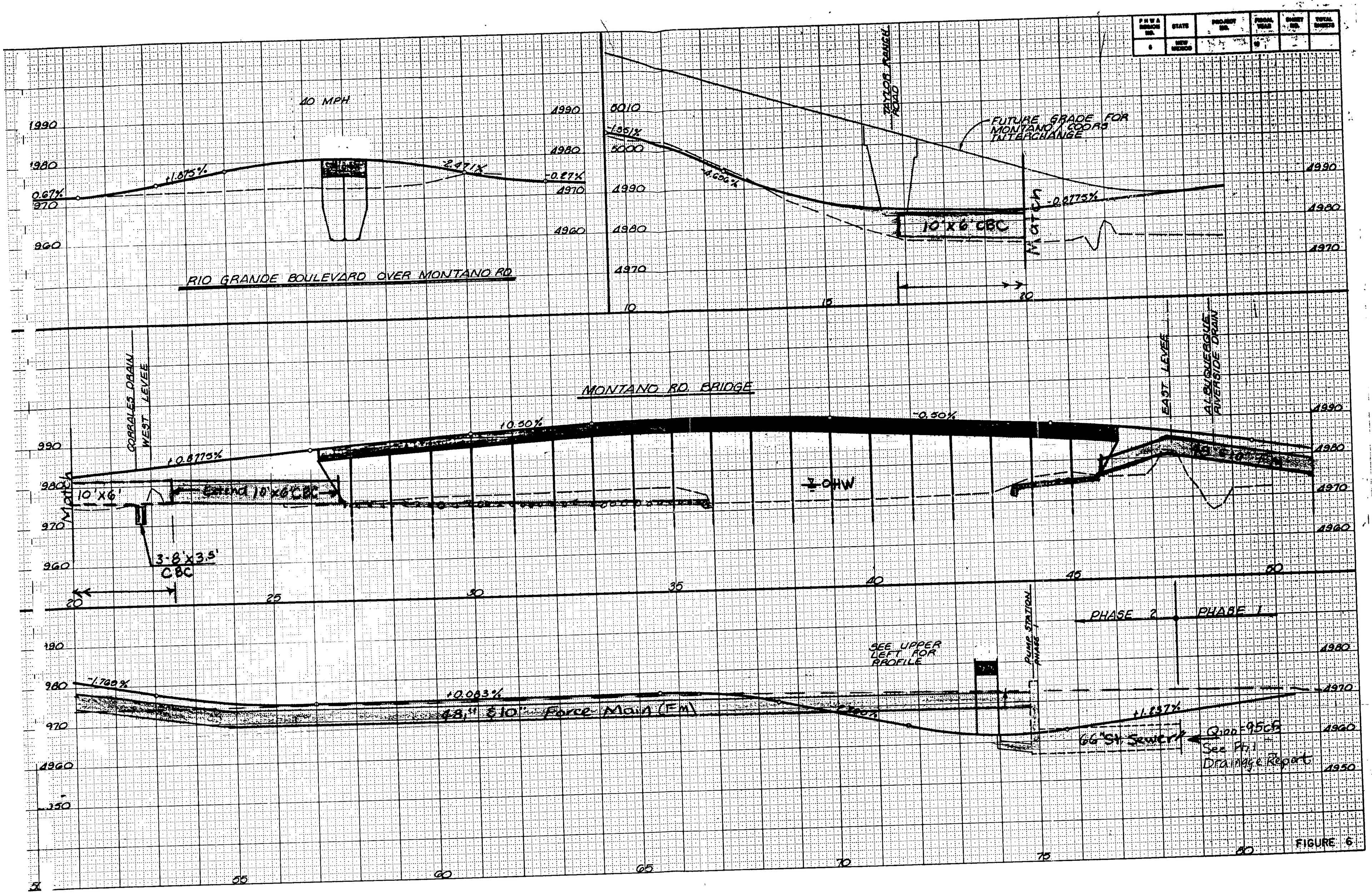

F.H.W.A. REGION NO.
STATE
PROJECT NO.
FINAL YEAR
SHEET NO.
TOTAL SHEETS
6
NEW MEXICO
40 MPH
RIO GRANDE BOULEVARD OVER MONTANO RD.
+1.075%
2.471%
-0.27%
-1.351%
-4.606%
TAYLOR RANCH ROAD
FUTURE GRADE FOR MONTANO / COORS INTERCHANGE
10 x 6' CBC
MATCH
-0.2775%
MONTANO RD. BRIDGE
CORRALES DRAIN
WEST LEVEE
+0.50%
-0.50%
+0.8775%
Extend 10'x6' CBC
10'x6'
3-8'x3.5' CBC
HW
EAST LEVEE
ALBUQUERQUE RIVERSIDE DRAIN
PHASE 2
PHASE 1
PUMP STATION PHASE 1
SEE UPPER LEFT FOR PROFILE
-1.700%
+0.083%
48" & 10" Force Main (FM)
+1.237%
66" St. Sewer
Q100=95cfs
See Pt. 1 Drainage Report

FIGURE 6

HYDROLOGIC AND HYDRAULIC CALCULATIONS

FOR

GUADALUPE TRAIL, N.W. STORM DRAIN

FROM

DELAMAR AVENUE TO MONTANO ROAD

Prepared By:

DMJM
November 24, 1986

DMJM ALBUQUERQUE	PROJECT Guadalupe Trail Storm Drain Douglas MacArthur to Montano Rd.	PROJECT NO. 4635-03-01		PAGE 1
		BY: CB	DATE: 11-20-86	

SUBJECT Drainage Calcs.

Area 'A' = 11.9 □" x $\frac{200^2}{43560}$ = 10.9 Ac

'B1' = 5.34 □" x $200^2/43560$ = 4.9 Ac

'B2' = 3.75 □" x $200^2/43560$ = 3.4 Ac

'C' Value

Area 'A' ≈ 20% impervious 'C' = (.2)(.95)+(.8)(.25) = 0.39

Area 'B1' ≈ 40% impervious 'C' = (.4)(.95)+(.6)(.40) = 0.62

Area 'B2' ≈ 30% impervious 'C' = (.3)(.95)+(.7)(.40) = 0.56

T_c Time of Concentration

Area 'A' slope = $1.4/850$ = 0.0016 ft/ft

Grassed Park area (use short Grass feature for cultivated Row Crops)

from Chart V ≈ 0.55 ft/sec

T_c = $850/0.55/60$ = 25.8 min

Area 'B1' slope ≈ $1/600$ = 0.0018 ft/ft

Mostly Paved Parking lot (use Paved Area)

V ≤ 0.8 use 0.75 ft/sec

$600/.75/60$ = 13.3 min

DMJM ALBUQUERQUE	PROJECT	PROJECT NO. 4655-03-01		PAGE 2
		BY: ab	DATE: 11-20-86	

SUBJECT

Area 'B2' Slope : 1/400 = 0.0025 ft/ft

Mostly Paved w Dirt Roadway

use Paved Area V = 0.75 ft/sec

450 / .75 / 60 = 8.8 min use 10 min.

Rainfall Intensity

100 year 6hr Rainfall 2.2"

$I = (\text{6hr Rainfall})(6.84)(t_c^{-.51})$

I at t_c = 25 min.

$I_{25} = (2.2)(6.84)(25^{-.51})$

$= 2.87$ in/hr

$I_{13} = 2.2(6.84)(13.3^{-.51})$

$= 4.02$ in/hr

$I_{10} = 2.2(6.84)(10^{-.51})$

$= 4.65$ in/hr

DMJM ALBUQUERQUE	PROJECT	PROJECT NO. 4655-03-01		PAGE 3
		BY: CB	DATE: 11-20-86	

SUBJECT

Peak Flow

Area 'A'

$Q = C I A$

$Q = (.39)(2.87)(10.9)$

$= 12.2$ cfs

Area 'B1'

$Q = (0.62)(4.02)(4.9)$

$= 12.2$ cfs

Area 'B2'

$Q = (0.56)(4.05)(3.4)$

$= 8.8$ cfs

Area A + B1

T_c of Area A @ B1 $= 25.8$ min $+ 610/3.8$ — flow time

$= 28.5$ min

Area weighted T_c : $\dfrac{(10.9)(28.5) + (4.9)(13.3)}{10.9 + 4.9}$

$= 23.8$ min

$I_{23} = 2.2\,(6.84)(23.8^{-.51})$

$= 2.99$ in/hr

Weight 'C' : $\dfrac{(10.9)(.39) + 4.9(.62)}{10.9 + 4.9}$

$= .46$

DMJM ALBUQUERQUE	PROJECT	PROJECT NO. 4655.03.01		PAGE 4
		BY: CB	DATE: 11-20-86	

SUBJECT

Peak Q_{A+B1} : $(0.46)(2.99)(15.8)$

$= 21.7$ cfs

Area A + B1 + B2

T_c @ B2 for A + B1 + B2

travel time B1 to B2 $283/6.9 = .7$ min.

T_c of A + B1 : $23.8 + .7 = 24.5$ min

Area weighted $T_c = \dfrac{15.8(24.5) + 3.4(10)}{15.8 + 3.4}$

$= 21.9$ min.

$I = 2.2(6.84)(21.9^{-.51})$

$= 3.12$ in/hr

weighted 'c' : $\dfrac{15.8(.46) + 3.4(.56)}{15.8 + 3.4}$

$= 0.47$

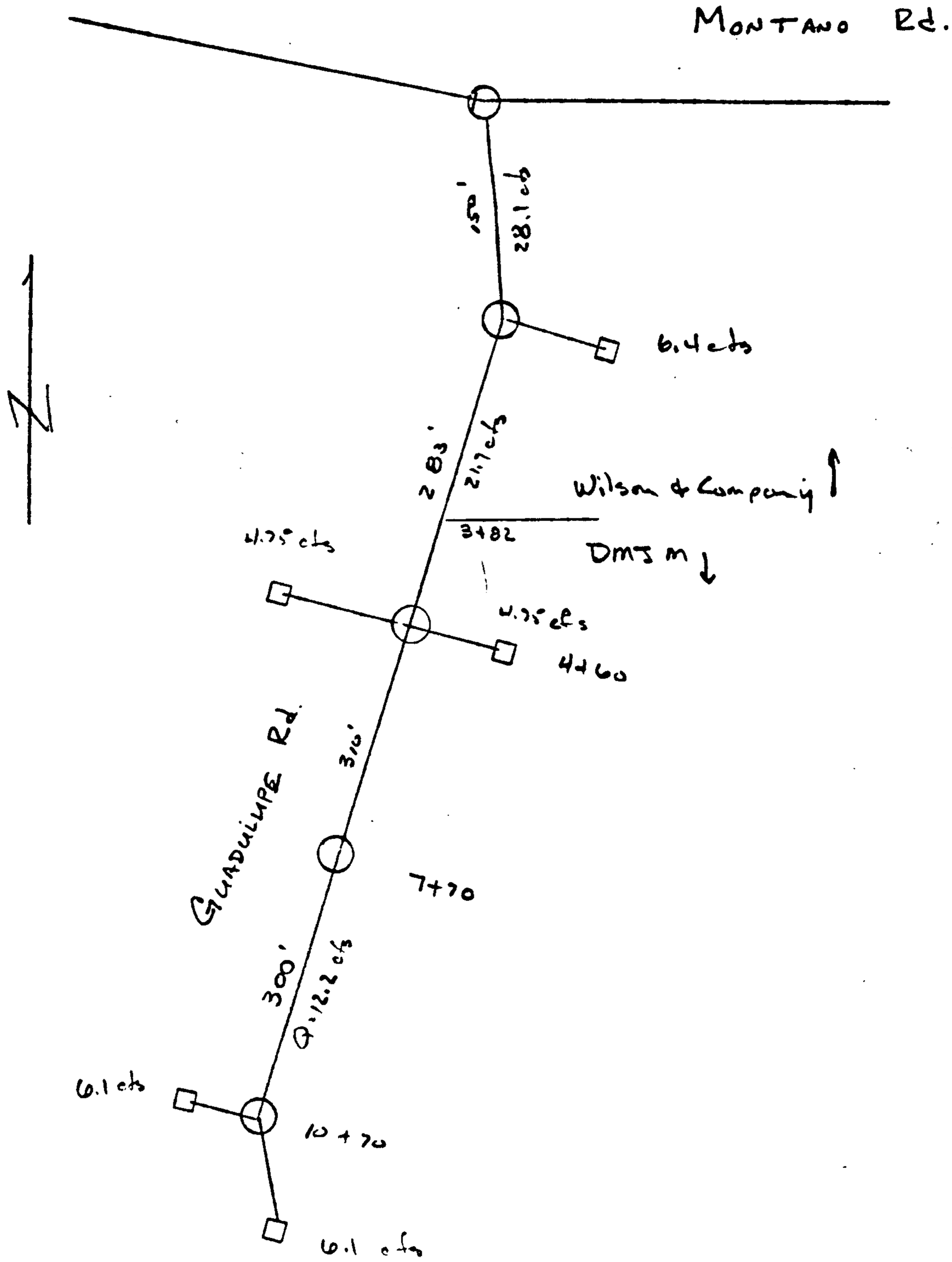
$Q_{A+B1+B2} = (0.47)(3.12)(19.2)$

$= 28.1$ cfs

vs 35.2 by Alex G. 7/11/86

DMJM ALBUQUERQUE	PROJECT Guadalupe Trail Storm Drain	PROJECT NO. 4655-03-01		PAGE 5
		BY: CB	DATE: 11-20-86	

SUBJECT Storm Drain Sketch



DOUGLAS MACARTHUR

DMJM

PROJECT Guadalupe Trail Storm Drain
Douglas MacArthur to Montana Rd.

PROJECT NO. 4655-03-01
BY: CB
DATE: 11-20-86
SHEET 1 OF

SUBJECT 100 HGL Assuming 30" for first Leg.

STRUCTURE	STATION	S.D. SIZE	Q	A	V	K	S_F	L	Δ	LOSSES H_F	H_B	H_J	H_T	H_{MH}	H_{MISC}	ΣH_L	E.G.	h_v	H.G.
MH	49+50		Manhole at Good Trail + Montana Rd.																
		30	28.1	4.91	5.72	410.2	0.00469	150		0.70						0.70	65.01	0.51	64.50 ±
MH	48+05		Wilbur's site.						10°			0.31		inc.		0.31	65.71	0.51	65.20
		24	21.7	3.14	6.91	226.22	0.0092	283		2.60						2.60	66.02	0.74	65.28
MH	4+60											0.51		inc		0.51	68.62	0.74	67.88
		24	12.2	3.14	3.88	226.22	0.0029	300		0.87						0.87	69.13	0.23	68.90
MH	7+60													0.03		0.03	70.00	0.23	69.77
		24	12.2	3.14	3.88	226.22	0.0029	310		0.90						0.90	70.03	0.23	69.80
MH	10+70								20°			0.30		inc		0.30	70.93	0.23	70.70
		18"	6.1	1.77	3.45	105.04	0.00337	50		0.17						0.17	71.23	0.19	71.04
Catch Basin	11+25																71.40	0.19	71.21

OK

Page 6

DMJM

PROJECT Guadalupe Trail Storm Drain
Douglas MacArthur to Montana Rd.

PROJECT NO. 4655.03-01
BY: CPS
DATE: 11-20-86
SHEET 1 OF

SUBJECT 100 year HGL Assuming 24" throughout

STRUCTURE	STATION	S.D. SIZE	Q	A	V	K	S_F	L	Δ	LOSSES H_F	H_B	H_J	H_T	H_{MH}	H_{MISC}	ΣH_L	E.G.	h_v	H.G.
MH	0+00	Montana Rd Storm Drain															65.74	1.24	64.5
		24"	28.1	3.14	8.94	226.22	0.0543	150		2.31						2.31	65.74		
MH	1+50	Williams Project							10°			0.53		inc		0.53	68.05	1.24	66.81
		24	21.7	3.14	6.94	226.22	0.009201	283	–	2.60						2.60	68.58	0.74	67.84
MH	4+60	DMJM's sta.										0.52		inc		0.52	71.18	0.74	70.44
		24	12.2	3.14	3.88	226.22	0.002908	300	–	0.87						0.87	71.70	0.23	71.47
MH	7+60													0.03		0.03	72.57	0.23	72.34
		24	12.2	3.14	3.88	226.22	0.002908	310		0.90						0.90	72.60	0.23	72.37
MH	10+70																73.50	0.23	73.27

To High

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