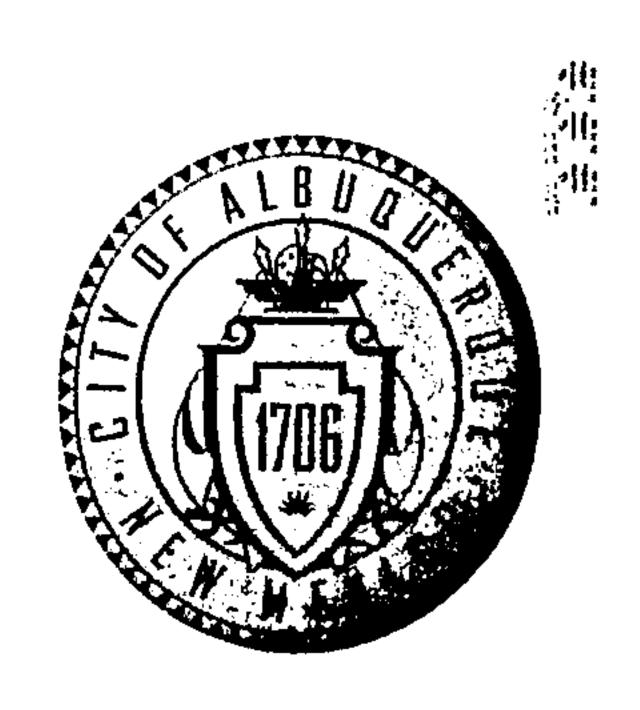
# CITY OF ALBUQUERQUE



September 10, 2009

Tyler Ashton, PE
Wilson & Co.
4900 Lang Ave NE
Albuquerque, NM 87109

Re: Lead & Coal Aves, Broadway to Washington Drainage Report Engineer Stamp date 7-23-09 (K14/D85)

Dear Mr. Ashton,

PO Box 1293

Based on information provided in your submittal dated 7-23-09, the above referenced report is approved for Work Order. Any minor comments on the project can be addressed at DRC.

Albuquerque

If you have any questions, you can contact me at 924-3986.

NM 87103

www.cabq.gov

Sincerely,

Bradley L. Bingham, PE

Principal Engineer, Planning Dept Development and Building Services

C: file



5639 JEFFERSON STREET NE • ALBUQUERQUE, NEW MEXICO 87109 • PHONE (505) 344-4080 • FAX (505) 343-8759

# ENGINEERING FEASIBILITY REPORT

FOR

LEAD COAL IMPROVEMENTS

BROADWAY BOULEVARD TO INTERSTATE 25

CITY PROJECT NO: 5851-01

April 2001

CG PROJECT NO. C03-111-5198

# ENGINEERING FEASIBILITY REPORT

# FOR

# LEAD COAL IMPROVEMENTS

# BROADWAY BOULEVARD TO INTERSTATE 25

CITY PROJECT NO: 5851-01

## **ENGINEER'S STATEMENT**

I certify that I am a Registered Professional Engineer in the State of New Mexico and that this report was prepared by me or under my supervision. I have personally inspected this land, and it appears that no grading, filling, or excavation has occurred thereon since the existing contour map was prepared.

THOMAS B. PONDER, P.E.

# CITY OF ALBUQUERQUE PUBLIC WORKS DEPARTMENT

March 30, 2001

## INTER-OFFICE CORRESPONDENCE

HYDROLOGY DIVISION

TO:

FROM:

Moby Mirza, Project Manager, PWD Transportation
Steve Boberg, Design Section Manager, PWD Hydrology

SUBJECT:

ENGINEERING FEASIBILITY REPORT FOR LEAD COAL IMPROVEMENTS

BROADWAY BOULEVARD TO INTERSTATE 25 - PROJECT NO. 5851-01

After reviewing the referenced report and meeting with the Consulting Engineer, James Kelly, I am satisfied that all drainage concerns have been properly addressed. Therefore, this memo will serve as the Hydrology Division's conceptual approval of the referenced report. As previously discussed with you, the Hydrology Division does not have funds identified for this project. Please note that the Transportation Division should implement the drainage improvements concurrently with the roadway improvements to avoid possible flood damage as a result of the roadway narrowing. I believe this is consistent with the approach taken in the past, i.e., if your project necessitates a change, then the "project" should pay for such in order to meet DPM requirements.

Dan Hogan, Hydrology Division Manager, Public Works Department XC:

# TABLE OF CONTENTS

1.	Purpose	Page 1
2.	Location	Page 1
3.	Existing Site Conditions and Drainage Pattern	Page 1
4.	Proposed Site Conditions and Drainage Pattern	Page 2
5.	Recommendations	Page 3
6.	Method of Analysis	Page 3

# LIST OF APPENDICES

APPENDIX A - MAPS

APPENDIX B - HYDROLOGY & HYDRAULICS

APPENDIX C - RECOMMENDED LAYOUT

## **PURPOSE**

The proposed improvements to Lead Avenue and Coal Avenue include re-striping the pavement to three 11-foot lanes and a 4-foot bike lane. The sidewalk area will be increased to a width between 7'-10" to  $8'-10^{-1}/2$ " on each side of the street. These improvements will require moving the curb and gutter on both sides of each street toward the centerline by  $2'-10^{-1}/2$ ", thereby reducing the cross-sectional area of the streets. The purpose of this report is to determine what effect these changes will have on the street drainage.

## LOCATION

The streets analyzed in this report are Lead Avenue and Coal Avenue from Broadway Boulevard to I-25. The streets are shown on vicinity map K-14.

## EXISTING SITE CONDITIONS AND DRAINAGE PATTERN

The drainage basin for each street is shown on Figure 1 in Appendix A. Section 22.2, Table A-2 of the City of Albuquerque Design Process Manual (DPM) was used to determine the 6-hour rainfall depth of 2.35 inches for the 100-year storm and 1.57 inches for the 10-year storm in Zone 2. AHYMO was used to calculate the runoff flowing down Lead Avenue and Coal Avenue.

# Lead Avenue:

The drainage basin for Lead Avenue is approximately 30 acres. The drainage basin for Lead is bounded on the north by Silver Avenue and on the south by Coal. Mulberry Street captures runoff from the east and is the eastern boundary of the basin. The downstream limit of the proposed improvements is Broadway Boulevard that defines the western boundary of the basin. High points on Arno Street, High Street, Elm Street and Oak Street were also used to define the basin.

The storm drain system on Lead Avenue runs the length of the street from Mulberry Street to Broadway Boulevard. The main line of the storm drain begins as a 15" line and increases to an 18" line west of Edith Boulevard. Slopes of the lines vary between 0.9% and 6.1% according to as-built information.

The main storm drain line is fed by a series of inlets along the length of Lead Avenue. The capacity of the inlets is greater than the capacity of the storm drain, which makes the pipe control the amount of runoff taken from the street. The full flow capacity of a 15" RCP at 0.89% slope is 6.06 cubic feet per second (cfs). The 100-year, 6-hour surface flow of 118.32 cfs on Lead was reduced by this amount and determined to be 112.23 cfs as shown in the AHYMO model in Appendix B.

The 10-year, 6-hour storm has a runoff flow of 71.94 cfs and is reduced to 65.85 cfs by the inlets. These flows were used in Flowmaster models of a typical cross-section of Lead Avenue between Arno Street and Broadway Boulevard. The average slope of 3.6% on Lead Avenue was used in this model. Under existing conditions the water surface for the 100-year storm stays within the street, but the energy grade line is not contained within the right-of-way.

## Coal Avenue:

The drainage basin for Coal is bounded on the north by the north side curb and gutter on Coal. The south boundary is Iron Avenue. A high point on the street about 125 feet to the west of I-25 is the east boundary of the basin. As is the case on Lead, Broadway acts as the west boundary of the basin. The overall basin size is about 14 acres. Unlike Lead, there is no storm drain system running down Coal and consequently all runoff surface flows down Coal. The flows for the 100-yr, 6-hour storm and the 10-year, 6-hour storm were determined to be 57.93 cfs and 35.96 cfs respectively by the AHYMO model, and were used in Flowmaster models of a typical cross-section of Coal Avenue between Arno Street and Broadway Boulevard. The average slope of 3.5% on Coal Avenue was used in this model. Under existing conditions the water surface for the 100-year storm stays within the street, but the energy grade line is not contained within the right-of-way.

## PROPOSED SITE CONDITIONS AND DRAINAGE PATTERN

## Lead Avenue:

The proposed cross-section between Arno Street and Broadway Boulevard was used in a Flowmaster model to determine the effect of moving the curbs toward the centerline on both sides. The total depth of flow from the gutter flow line for the 100-year, 6-hour storm will be 0.52 feet and for the 10-year, 6-hour storm will be 0.43 feet. The water surface in a 100-year storm increases from existing by 0.03 feet or 0.36 inches and stays within the street. The energy grade line increases from existing 0.18 feet or 2.16 inches.

## Coal Avenue:

The proposed cross-section between Arno Street and Broadway Boulevard was used in a new Flowmaster model to determine the effect of moving the curbs toward the centerline on both sides. Thetotal depth of flow from the gutter flow line for the 100-year, 6-hour storm will be 0.48 feet and for the 10-year, 6-hour storm will be 0.41 feet. The water surface in a 100-year storm increases from existing by 0.04 feet or 0.48 inches and stays within the street. The energy grade line increases from existing 0.13 feet or 1.56 inches.

## RECOMMENDATIONS

The minor increases in the water surface elevation do not make the runoff jump the curb on either street. The energy grade line is not confined under the existing conditions and has an insignificant increase with proposed conditions. The energy grade line exceeds the right-of-way elevation and therefore violates current City of Albuquerque DPM criteria. Chavez-Grieves recommends improving the storm drain system for each street.

# Lead Avenue:

The storm pipe should be increased to a 36"RCP from Broadway Boulevard to Arno Street and 30" from Arno Street to Edith Boulevard. The storm drain will be at maximum capacity from Oak Street to High Street. One inlet on each side of the street should be replaced at High Street to pick up additional flows due to the increased capacity downstream of High Street. The inlets at Walter Street should not be replaced due to the storm drain already being at maximum capacity. Three inlets should be constructed on each side of the street at the Edith Boulevard intersection. There should be a minimum of 30' between each inlet. Three inlets should be constructed on each side of the street at and just below the Arno Street intersection. Three inlets should be constructed on each side of the street at and just above the Broadway Boulevard intersection. See Appendix C for recommended inlet layout.

## Coal Avenue:

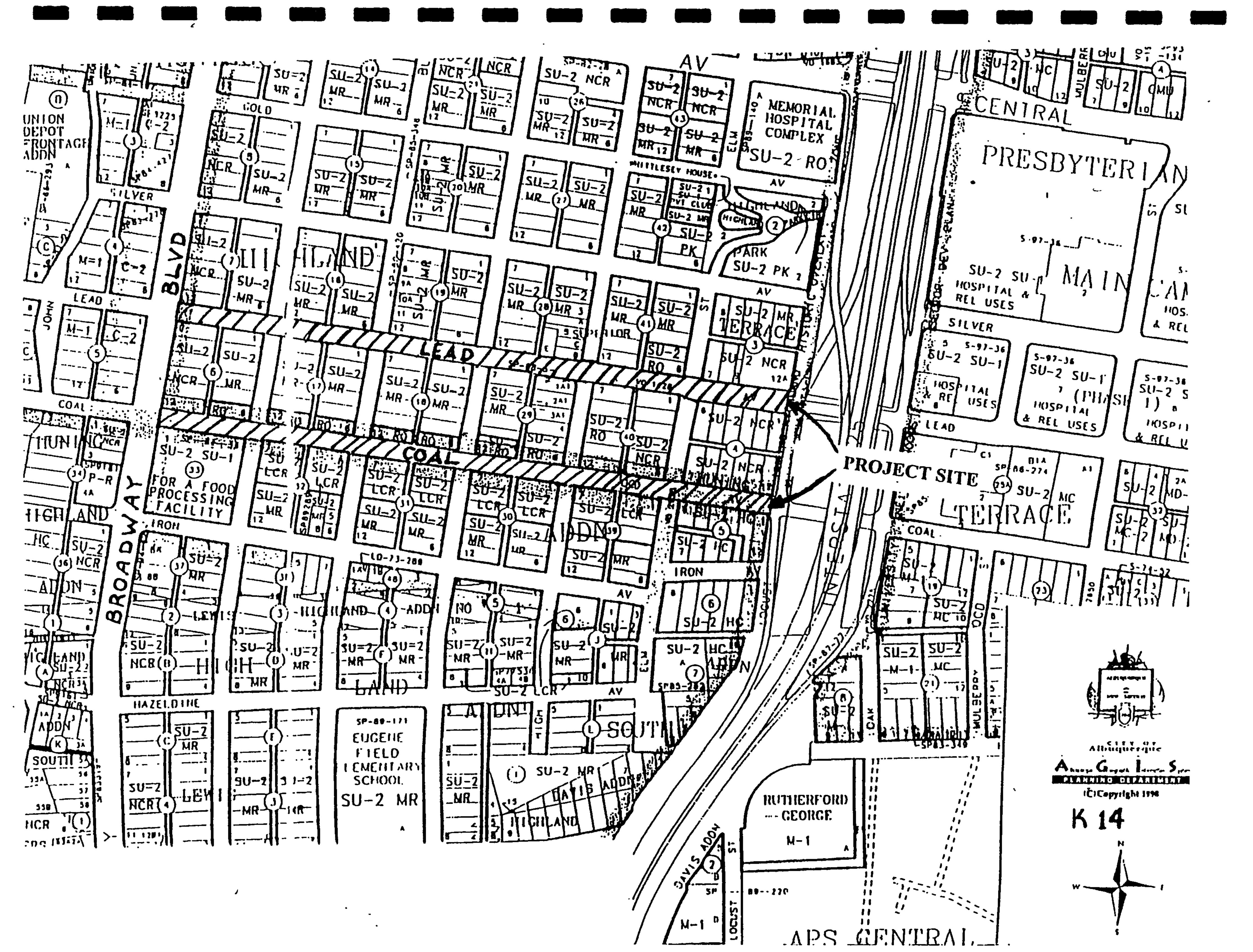
A 30" RCP storm pipe should be installed from Edith Boulevard to Broadway Boulevard. Two inlets should be constructed on each side of the street at or above the Edith Boulevard and Arno Street intersections. Three inlets should be constructed on each side of the street at or just above the Broadway Boulevard intersection. See Appendix C for recommended inlet layout.

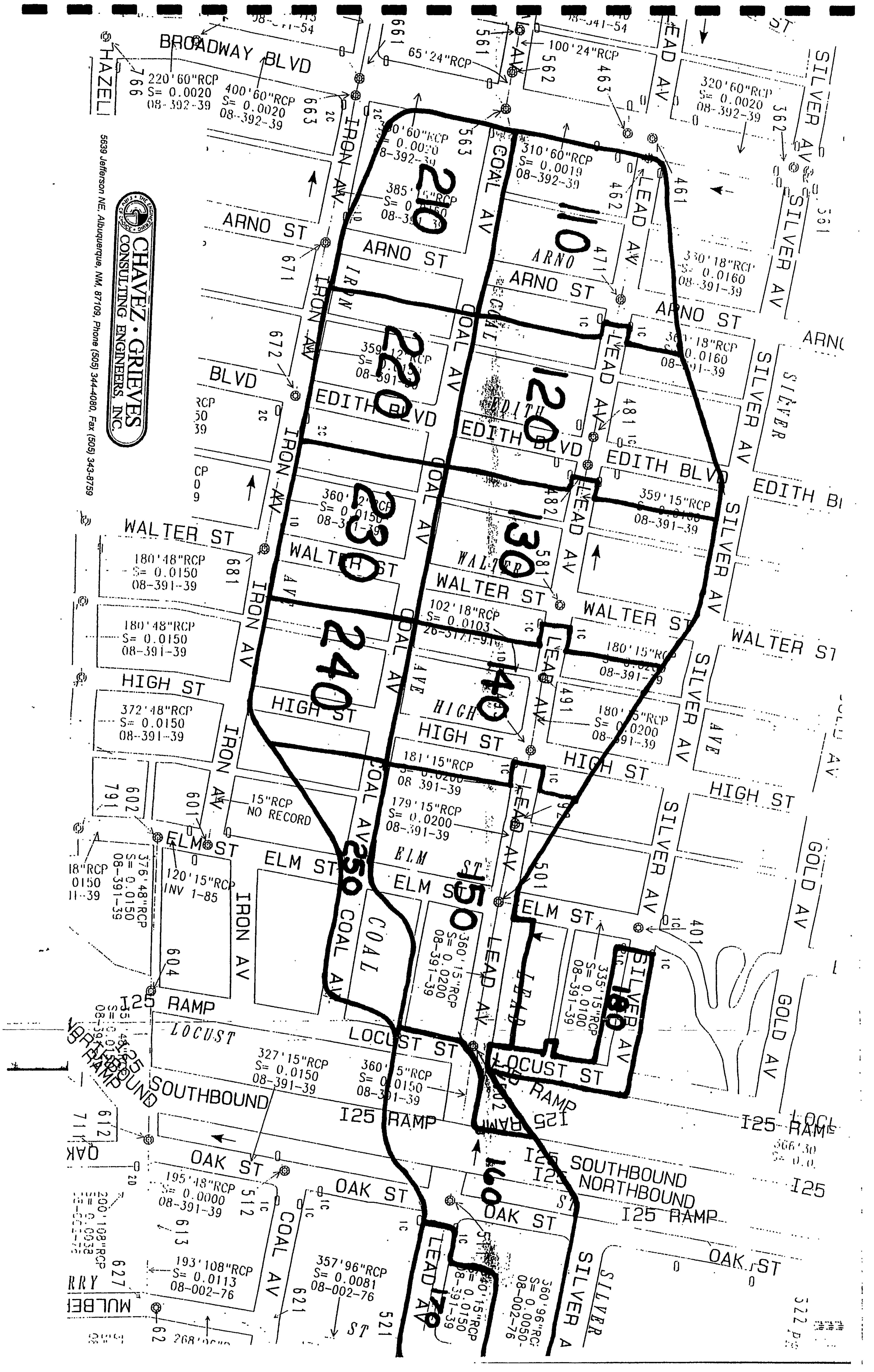
## METHOD OF ANALYSIS

- Hydrology and hydraulic calculations were performed using guidelines in Section 22.2 of the DPM.
- Inlet capacities were calculated using Plate 22.3 D-6 in Section 22.2 of the DPM.
- Street cross-sections and the 15" pipe capacity were analyzed using Flowmaster by Haestad Methods.
- Hydraulic design of the recommended pipe system was performed using the Pipeworks package of the Land Development Desktop by AutoDesk.
- Runoff calculations were performed using AHYMO.

  Note: The basins were not routed through the street sections, which will reduce the time of concentration. This will provide a conservative analysis of the street capacities due to the increase flow rate.

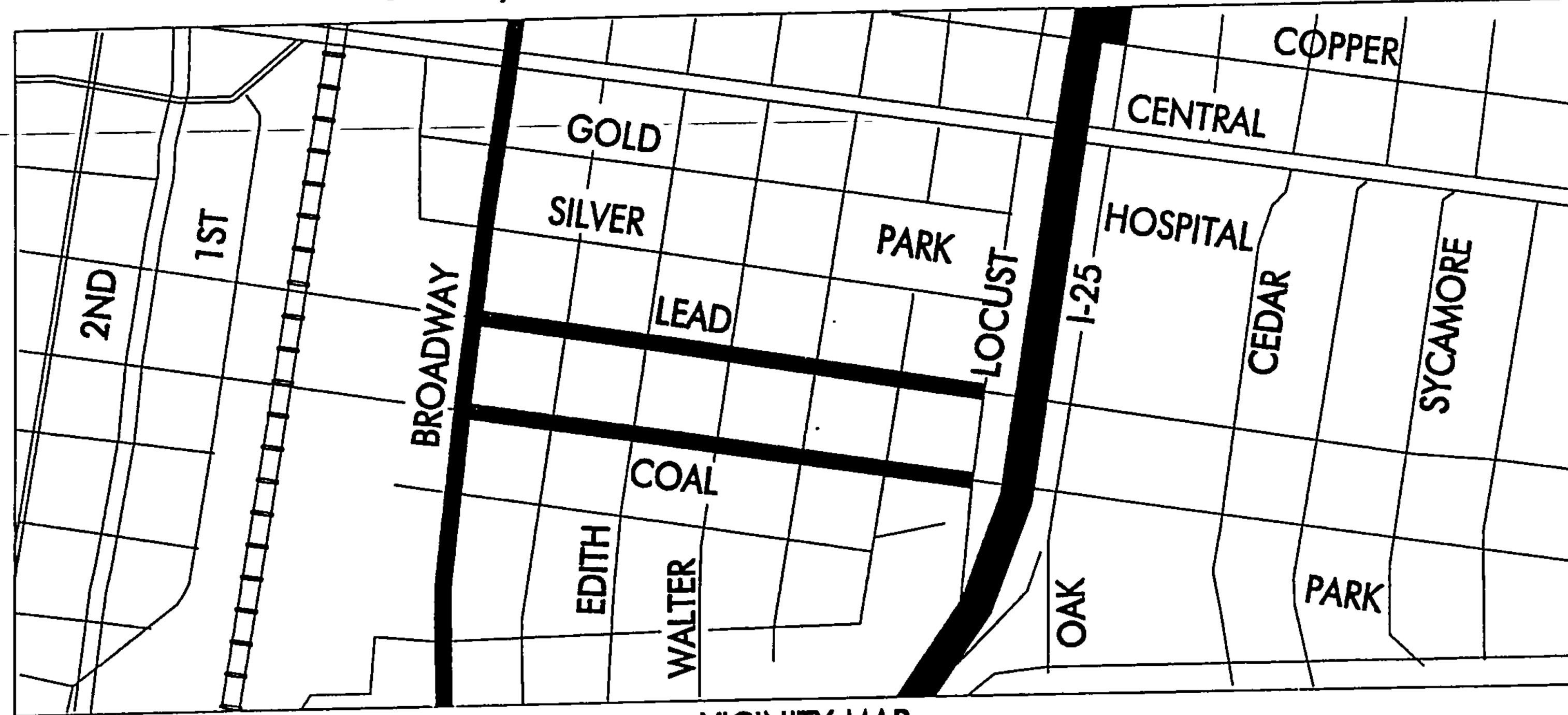
# APPENDIX A MAPS





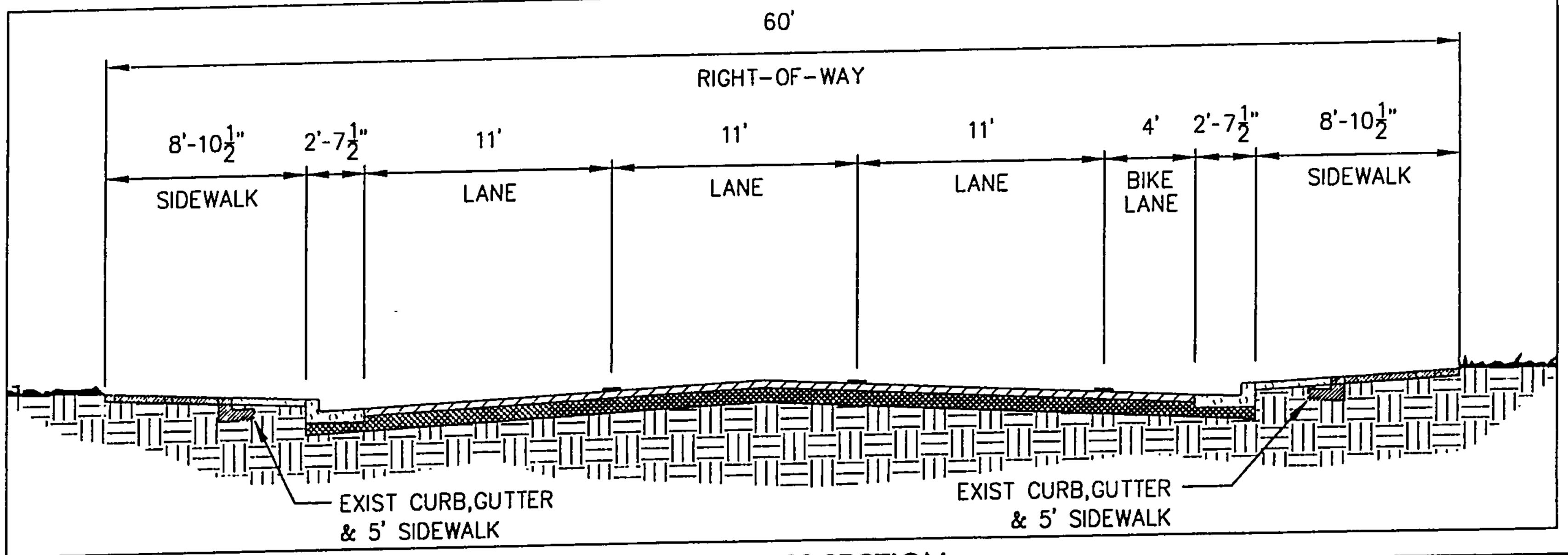
# APPENDIX B HYDROLOGY AND HYDRAULICS

# LEAD/COAL IMPROVEMENTS PHASE I





# VICINITY MAP



PROPOSED CROSS SECTION
LEAD AVENUE LOOKING WEST FROM I-25
COAL AVENUE LOOKING EAST FROM BROADWAY





5639 Jefferson NE, Albuquerque, NM, 87109, Phone (505) 344-4080, Fax (505) 343-8759

SHEET NO. 1 OF 1

JOB: LEAD/COAL

SUBJECT: LAND TREATMENTS

CLIENT: COA JOB NO.: C03-111-5198

BY: JK DATE: 4/2/01

DATE:

CHECKED BY:

ZONE 2			
	AREA	%IMPERVIOUS	TREATMENT
COAL	13.00%	90.00%	FOOD PROCESSING
	43.50%	56.00%	MR
	43.50%	73.00%	LCR

419608 ft<sup>2</sup> 100.00% 67.80% D 16.10% C 16.10% B 0.00% A

6.60% LEAD 90.00% HOSPITAL PARKING 10.20% 73.00% NCR 2.10% 10.00% **I-25 ROW** 81.10% 56.00% MR 746469 ft<sup>2</sup> 100.00% 59.00% D

21.00% C 20.00% B 0.00% A

MR = MIXED RESIDENTIAL

NCR = NEIGHBORHOOD COMMERCIAL RESIDENTIAL

LCR = COMMERCIAL RESIDENTIAL

- VERSION: 1997.02c

RUN DATE (MON/DAY/YR) =08/08/2000 USER NO.= AHYMO-I3Chavez-Grieves-C

	FROM TO HYDROGRAPH ID ID FICATION NO. NO.	PEAK AREA DI (SQ MI) (CFS)	RUNOFF SCHARGE VOLUME (AC-FT) (INCHES)	TIME TO CFS PAGE = 1 RUNOFF PEAK PER (HOURS) ACRE NOTATION
*S 100-YEAR, 6-HOUR *S August 8, 2000 START LOCATION				TIME= .00
RAINFALL TYPE= 1 *S LEAD	DEFAULT			RAIN6= 2.350
COMPUTE NM HYD ADD HYD	110.00 - 1 120.00 - 2 130.00 - 3 140.00 - 4 150.00 - 5 160.00 - 6 170.00 - 7 180.00 - 8 100.01 7& 6 20 100.02 20& 8 21 100.03 21& 5 22 100.04 22& 4 23 100.05 23& 3 24 100.06 24& 2 25 100.07 25& 1 26	.00635 15.80 .00738 18.37 .00842 20.95 .00647 16.12 .00790 19.66 .00712 17.73 .00233 5.81 .00155 3.88 .00945 .01101 .01891 .02538 .03380 .04118 .04752	.553 1.63384 .643 1.63384 .733 1.63384 .564 1.63384 .688 1.63384 .621 1.63384 .203 1.63384 .135 1.63384 23.54 .824 27.42 .959 47.08 1.647 63.20 2.211 84.15 2.945 102.52 3.588 118.32 4.141	1.500 3.890 PER IMP= 59.00 1.500 3.889 PER IMP= 59.00 1.500 3.897 PER IMP= 59.00 1.500 3.903 PER IMP= 59.00 1.63378 1.500 3.891 1.63378 1.500 3.891 1.63379 1.500 3.890 1.63379 1.500 3.890 1.63379 1.500 3.890
COMPUTE NM HYD ADD HYD ADD HYD ADD HYD ADD HYD	210.00 - 9 220.00 - 10 230.00 - 11 240.00 - 12 250.00 - 13 200.01 13&12 27 200.02 27&11 28 200.03 28&10 29 200.04 29& 9 30 ************************************	JLTING ENGINEERS, II		1.500 4.063 PER IMP= 67.80 1.500 4.063 PER IMP= 67.80 1.500 4.064 PER IMP= 67.80 1.500 4.064 PER IMP= 67.80 1.500 4.065 PER IMP= 67.80 1.73575 1.500 4.065 1.73575 1.500 4.064 1.73575 1.500 4.064 1.73575 1.500 4.064
*S FILENAME: G:\	**************************************	**************************************	-	•

```
AHYMO PROGRAM (AHYMO 97) -
                                                     - Version: 1997.02c
        RUN DATE (MON/DAY/YR) = 08/08/2000
        START TIME (HR:MIN:SEC) = 11:48:06
                                              USER NO. = AHYMO-I3Chavez-Grieves-C
         INPUT FILE = G:\CO3\111\CALCS\AHYMO.IN
*S 100-YEAR, 6-HOUR STORM
*S August 8, 2000
                   0.00
START
LOCATION
                     ALBUQUERQUE, NEW MEXICO
     Soil infiltration values (LAND FACTORS) for this location are not available.
     The following default values were used.
     Land Treatment
                       Initial Abstr.(in)
                                            Unif. Infilt.(in/hour)
                       0.65
                                             1.67
                                            0.83
                       0.10
                                            0.04
RAINFALL
                     TYPE=1
                             RAIN QUARTER=0 RAIN ONE=2.01
                             RAIN SIX=2.35 RAIN DAY=0 DT=0.03333
              COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
              DT =
                       .033330 HOURS
                                         END TIME =
                                                        5.999400 HOURS
                  .0000
                          .0016
                                 .0033
                                         .0049
                                                 .0066
                                                        .0084
                                                                .0102
                  .0120
                         .0139
                                 .0158
                                         .0178
                                                 .0199
                                                        .0219
                                                                .0241
                  .0263
                         .0286
                                 .0309
                                         .0333
                                                 .0358
                                                         .0384
                                                                .0411
                  .0439
                         .0467
                                 .0497
                                         .0529
                                                 .0561
                                                        .0596
                                                                .0631
                  .0669
                          .0709
                                 .0751
                                         .0807
                                                         .0930
                                                 .0866
                                                                .1066
                  .1371
                         .1840
                                 .2514
                                         .3434
                                                 .4644
                                                        .6186
                                                                .8106
                 1.0449
                        1.2624
                                1.3533
                                        1.4300
                                                .4982
                                                       1.5602
                                                               1.6174
                        1.7200
                 1.6704
                                1.7664
                                        1.8102
                                                1.8514
                                                       1.8904
                                                               1.9273
                        1.9953
                                2.0268
                 1.9622
                                        2.0566
                                               2.0850
                                                       2.0915
                                                               2.0976
                2.1033
                        2.1088
                                2.1140
                                       2.1191
                                               2.1239
                                                       2.1285
                                                               2.1329
                2.1373
                        2.1414
                                2.1454 2.1494
                                               2.1531
                                                       2.1568
                                                               2.1604
                2.1639
                        2.1673
                                2.1706
                                       2.1739
                                               2.1771
                                                       2.1802
                2.1862
                                2.1919
                        2.1891
                                        2.1947
                                               2.1975
                                                       2.2002
                                                               2.2028
                2.2054
                                2.2105
                        2.2080
                                       2.2130
                                               2.2154
                                                       2.2178
                                                               2.2202
                2.2225
                        2.2248
                                2.2270
                                        2.2293
                                               2.2315
                                                       2.2336
                                                               2.2358
                2.2379
                        2.2399
                                2.2420
                                        2.2440
                                               2.2460
                                                       2.2480
                                                               2.2500
                        2.2538
                2.2519
                                2.2557
                                               2.2594
                                        2.2576
                                                       2.2612
                2.2648
                        2.2666
                               2.2684 2.2701
                                               2.2718
                                                       2.2735
                                                               2.2752
                 2.2769
                        2.2785 2.2802 2.2818
                                               2.2834
                                                      2.2850
                        2.2897
                                2.2912 2.2928
                                               2.2943
                 2.2987
                        2.3002
                                2.3017
                                       2.3031
                                               2.3045
                                                       2.3060
                 2.3088
                        2.3102
                               2.3115
                                       2.3129
                                               2.3143
                                                       2.3156
                2.3183
                        2.3196 2.3209
                                               2.3235
                                       2.3222
                                                       2.3248
                2.3273
                        2.3286
                                2.3298
                                        2.3311
                                               2.3323
                                                       2.3335
                2.3360
                        2.3372 2.3384 2.3396
                                               2.3408
                                                       2.3419 2.3431
                2.3443 2.3454 2.3466 2.3477 2.3488 2.3500
*S LEAD
*COMPUTE BASIN 110.00
COMPUTE NM HYD
                           HYD=110.00 DA=0.006345 SQ MI
                      ID=1
                             PER A=0 PER B=20 PER C=21 PER D=59
                             TP=0.133 RAINFALL=-1
     K = .072485HR
                     TP = .133000HR
                                         K/TP RATIO = .545000
                                                                     SHAPE CONSTANT, N = 7.106420
     UNIT PEAK = 14.813 CFS UNIT VOLUME = .9986
                                                                    526.28
                                                                                P60 = 2.0100
     AREA =
                 .003744 SQ MI
                                         .10000 INCHES INF =
                                 IA =
                                                                  .04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330
                     TP = .133000HR
           .119197HR
                                          K/TP RATIO = .896221
                                                                   SHAPE CONSTANT, N = 3.955506
     UNIT PEAK = 6.8888 CFS UNIT VOLUME = .9986
                                                                    352.19
                                                                                P60 = 2.0100
                 .002601 SQ MI
     AREA =
                                         .42317 INCHES INF = 1.03488 INCHES PER HOUR
                                 IA =
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330
PRINT HYD
                      ID=1 CODE=1
                                   PARTIAL HYDROGRAPH 110.00
    RUNOFF VOLUME = 1.63384 INCHES = .5529 ACRE-FEET
    PEAK DISCHARGE RATE = 15.80 CFS AT 1.500 HOURS BASIN AREA =
                                                                          .0063 sq. MI.
```

\*COMPUTE BASIN 120.00
COMPUTE NM HYD ID=2 HYD=120.00 DA=0.007381 SQ MI

# PER A=0 PER B=20 PER C=21 PER D=59 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 17.232 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 2.0100 AREA = .004355 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .119197HR TP = .133000HR K/TP RATIO = .896221 SHAPE CONSTANT, N = 3.955506 UNIT PEAK = 8.0136 CFS UNIT VOLUME = .9987 B = 352.19 P60 = 2.0100 AREA = .003026 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=2 CODE=1

PARTIAL HYDROGRAPH 120.00

RUNOFF VOLUME = 1.63384 INCHES = .6432 ACRE-FEET
PEAK DISCHARGE RATE = 18.37 CFS AT 1.500 HOURS BASIN AREA = .0074 SQ. MI.

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 19.650 CFS UNIT VOLUME = .9988 B = 526.28 P60 = 2.0100 AREA = .004966 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .119197HR TP = .133000HR K/TP RATIO = .896221 SHAPE CONSTANT, N = 3.955506 UNIT PEAK = 9.1384 CFS UNIT VOLUME = .9990 B = 352.19 P60 = 2.0100 AREA = .003451 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=3 CODE=1

PARTIAL HYDROGRAPH 130.00

RUNOFF VOLUME = 1.63384 INCHES = .7334 ACRE-FEET
PEAK DISCHARGE RATE = 20.95 CFS AT 1.500 HOURS BASIN AREA = .0084 SQ. MI.

\*COMPUTE BASIN 140.00 COMPUTE NM HYD ID=4 HYD=140.00 DA=0.006474 SQ MI PER A=0 PER B=20 PER C=21 PER D=59 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 15.114 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 2.0100 AREA = .003820 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119197HR TP = .133000HR K/TP RATIO = .896221 SHAPE CONSTANT, N = 3.955506 UNIT PEAK = 7.0289 CFS UNIT VOLUME = .9986 B = 352.19 P60 = 2.0100 AREA = .002654 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=4 CODE=1

PARTIAL HYDROGRAPH 140.00

RUNOFF VOLUME = 1.63384 INCHES = .5641 ACRE-FEET
PEAK DISCHARGE RATE = 16.12 CFS AT 1.500 HOURS BASIN AREA = .0065 SQ. MI.

\*COMPUTE BASIN 150.00

COMPUTE NM HYD ID=!

ID=5 HYD=150.00 DA=0.007899 SQ MI PER A=0 PER B=20 PER C=21 PER D=59 TP=0.133 RAINFALL=-1

K = .072485HRTP = .133000HRK/TP RATIO = .545000SHAPE CONSTANT, N = 7.106420UNIT PEAK = 18.441 CFS UNIT VOLUME = .9988 526.28 B = P60 = 2.0100.004660 SQ MI AREA = .10000 INCHES IA = INF = .04000 INCHES PER HOUR RUNOFF CCMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119197HR TP = .133000HR K/TP RATIO = .896221 SHAPE CONSTANT, N = 3.955506 UNIT PEAK = 8.5760 CFS UNIT VOLUME = .9989 B = 352.19 P60 = 2.0100 AREA = .003239 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=5 CODE=1

### PARTIAL HYDROGRAPH 150.00

RUNOFF VOLUME = 1.63384 INCHES = .6883 ACRE-FEET
PEAK DISCHARGE RATE = 19.66 CFS AT 1.500 HOURS BASIN AREA = .0079 SQ. MI.

\*COMPUTE BASIN 160.00

COMPUTE NM HYD

ID=6 HYD=160.00 DA=0.007122 SQ MI PER A=0 PER B=20 PER C=21 PER D=59 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 16.627 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 2.0100 AREA = .004202 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K=.119197HR TP = .133000HR K/TP RATIO = .896221 SHAPE CONSTANT, N = 3.955506 UNIT PEAK = 7.7324 CFS UNIT VOLUME = .9987 B = 352.19 P60 = 2.0100 AREA = .002920 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=6 CODE=1

### PARTIAL HYDROGRAPH 160.00

RUNOFF VOLUME = 1.63384 INCHES = .6206 ACRE-FEET
PEAK DISCHARGE RATE = 17.73 CFS AT 1.500 HOURS BASIN AREA = .0071 SQ. MI.

\*COMPUTE BASIN 170.00

COMPUTE NM HYD .. ID=7 HYD=170.00 DA=0.002331 SQ MI PER A=0 PER B=20 PER C=21 PER D=59 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 5.4420 CFS UNIT VOLUME = .9974 B = 526.28 P60 = 2.0100 AREA = .001375 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K=.119197HR TP = .133000HR K/TP RATIO = .896221 SHAPE CONSTANT, N = 3.955506 UNIT PEAK = 2.5308 CFS UNIT VOLUME = .9952 B = 352.19 P60 = 2.0100 AREA = .000956 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=7 CODE=1

PARTIAL HYDROGRAPH 170.00

RUNOFF VOLUME = 1.63384 INCHES = .2031 ACRE-FEET

5.81 CFS AT 1.500 HOURS PEAK DISCHARGE RATE = BASIN AREA = .0023 SQ. MI.

\*COMPUTE BASIN 180.00

COMPUTE NM HYD 1D=8 HYD=180.00 DA=0.001554 SQ MI

PER A=0 PER B=20 PER C=21 PER D=59

TP=0.133 RAINFALL=-1

-545000 K = .072485HRSHAPE CONSTANT, N = 7.106420.133000HR K/TP RATIO =UNIT PEAK = 3.6280 UNIT VOLUME = .9962526.28 CFS P60 = 2.0100AREA = .000917 SQ MI .10000 INCHES INF = .04000 INCHES PER HOUR IA = RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K/TP RATIO = .896221 SHAPE CONSTANT, N = 3.955506 K = .119197HR TP = .133000HR UNIT PEAK = 1.6872 CFS UNIT VOLUME = .9928 B = 352.19P60 = 2.0100.000637 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR AREA = RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=8 CODE=1

PARTIAL HYDROGRAPH 180.00

1.63384 INCHES = RUNOFF VOLUME = .1354 ACRE-FEET PEAK DISCHARGE RATE = 3.88 CFS AT 1.500 HOURS BASIN AREA = .0016 SQ. MI.

ADD HYD PRINT HYD ID=20 HYD=100.01 ID I=7 ID II=6

ID=20 CODE=1

PARTIAL HYDROGRAPH 100.01

1.63378 INCHES = .8237 ACRE-FEET RUNOFF VOLUME = PEAK DISCHARGE RATE = 23.54 CFS AT 1.500 HOURS BASIN AREA = .0095 SQ. MI.

ADD HYD

ID=21 HYD=100.02 ID I=20 ID II=8

PRINT HYD ID=21 CODE=1

PARTIAL HYDROGRAPH 100.02

RUNOFF VOLUME = 1.63376 INCHES = .9591 ACRE-FEET PEAK DISCHARGE RATE = 27.42 CFS AT 1.500 HOURS BASIN AREA = .0110 SQ. MI.

ADD HYD

ID=22 HYD=100.03 ID I=21 ID II=5

PRINT HYD ID=22 CODE=1

PARTIAL HYDROGRAPH 100.03

RUNOFF VOLUME = 1.63378 INCHES = 1.6474 ACRE-FEET PEAK DISCHARGE RATE = 47.08 CFS AT 1.500 HOURS BASIN AREA = .0189 SQ. MI.

ADD HYD

ID=23 HYD=100.04 ID I=22 ID II=4

PRINT HYD ID=23 CODE=1

PARTIAL HYDROGRAPH 100.04

RUNOFF VOLUME = 1.63378 INCHES = 2.2115 ACRE-FEET PEAK DISCHARGE RATE = 63.20 CFS AT 1.500 HOURS BASIN AREA = .0254 SQ. MI. ADD HYD PRINT HYD ID=24 HYD=100.05 ID I=23 ID II=3 ID=24 CODE=1

> PARTIAL HYDROGRAPH 100.05

RUNOFF VOLUME = 1.63379 INCHES 2.9449 ACRE-FEET 84.15 CFS AT PEAK DISCHARGE RATE = 1.500 HOURS BASIN AREA = .0338 SQ. MI.

ADD HYD PRINT HYD

ID=25 HYD=100.06 ID I=24 ID II=2

ID=25 CODE=1

PARTIAL HYDROGRAPH 100.06

RUNOFF VOLUME = 1.63379 INCHES 3.5880 ACRE-FEET PEAK DISCHARGE RATE = 102.52 CFS AT 1.500 HOURS BASIN AREA = .0412 SQ. MI.

ADD HYD PRINT HYD

ID=26 HYD=100.07 ID I=25 ID II=1

ID=26 CODE=1

PARTIAL HYDROGRAPH 100.07

RUNOFF VOLUME = 1.63379 INCHES 4.1409 ACRE-FEET PEAK DISCHARGE RATE = 118.32 CFS AT 1.500 HOURS BASIN AREA = .0475 SQ. MI.

\*S COAL

\*COMPUTE BASIN 210.00

COMPUTE NM HYD

ID=9 HYD=210.00 DA=0.004921 SQ MI PER A=0 PER B=16.1 PER C=16.1 PER D=67.8 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 13.202 CFS UNIT VOLUME = .9986 B = 526.28P60 = 2.0100.003336 SQ MI IA =AREA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119497HR TP = .133000HR K/TP RATIO = .898476 SHAPE CONSTANT, N = 3.944947 4.1876 CFS UNIT VOLUME = .9971 B = 351.48UNIT PEAK = P60 = 2.0100AREA = .001585 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=9 CODE=1

PARTIAL HYDROGRAPH 210.00

RUNOFF VOLUME = 1.73582 INCHES = .4556 ACRE-FEET PEAK DISCHARGE RATE = 12.80 CFS AT 1.500 HOURS BASIN AREA = .0049 SQ. MI.

\*COMPUTE BASIN 220.00

COMPUTE NM HYD

ID=10 HYD=220.00 DA=0.004791 SQ MI PER A=0 PER B=16.1 PER C=16.1 PER D=67.8 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 12.853 CFS UNIT VOLUME = .9986 B = 526.28 P60 = 2.0100AREA = .003248 SQ MI IA =.10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119497HR TP = .133000HR K/TP RATIO = .898476 SHAPE CONSTANT, N = 3.944947 UNIT PEAK = 4.0769 CFS UNIT VOLUME = .9971 B = 351.48P60 = 2.0100.001543 SQ MI IA =AREA = .42500 INCHES INF = 1.04000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=10 CODE=1

#### PARTIAL HYDROGRAPH 220.00

RUNOFF VOLUME = 1.73582 INCHES = .4435 ACRE-FEET PEAK DISCHARGE RATE = 12.46 CFS AT 1.500 HOURS BASIN AREA = .0048 SQ. MI.

\*COMPUTE BASIN 230.00
COMPUTE NM HYD ID=11

ID=11 HYD=230.00 DA=0.004532 SQ MI PER A=0 PER B=16.1 PER C=16.1 PER D=67.8 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 12.159 CFS UNIT VOLUME = .9985 B = 526.28 P60 = 2.0100 AREA = .003073 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .119497 Hz TP = .133000 Hz K/TP RATIO = .898476 SHAPE CONSTANT, N = 3.944947 UNIT PEAK = 3.8565 CFS UNIT VOLUME = .9971 B = 351.48 P60 = 2.0100 AREA = .001459 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=11 CODE=1

#### PARTIAL HYDROGRAPH 230.00

RUNOFF VOLUME = 1.73582 INCHES = .4196 ACRE-FEET
PEAK DISCHARGE RATE = 11.79 CFS AT 1.500 HOURS BASIN AREA = .0045 SQ. MI.

\*COMPUTE BASIN 240.00

COMPUTE NM HYD

ID=12 HYD=240.00 DA=0.004403 SQ MI PER A=0 PER B=16.1 PER C=16.1 PER D=67.8 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 11.812 CFS UNIT VOLUME = .9985 B = 526.28 P60 = 2.0100 AREA = .002985 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .119497HR TP = .133000HR K/TP RATIO = .898476 SHAPE CONSTANT, N = 3.944947 UNIT PEAK = 3.7468 CFS UNIT VOLUME = .9968 B = 351.48 P60 = 2.0100 AREA = .001418 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=12 CODE=1

### PARTIAL HYDROGRAPH 240.00

RUNOFF VOLUME = 1.73582 INCHES = .4076 ACRE-FEET
PEAK DISCHARGE RATE = 11.45 CFS AT 1.500 HOURS BASIN AREA = .0044 SQ. MI.

\*COMPUTE BASIN 250.00

COMPUTE NM HYD

ID=13 HYD=250.00 DA=0.003626 SQ MI PER A=0 PER B=16.1 PER C=16.1 PER D=67.8 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 9.7279 CFS UNIT VOLUME = .9983 B = 526.28 P60 = 2.0100 AREA = .002458 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .119497HR TP = .133000HR K/TP RATIO = .898476 SHAPE CONSTANT, N = 3.944947

UNIT PEAK = 3.0856 CFS UNIT VOLUME = .9960 B = 351.48 P60 = 2.0100 AREA = .001168 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=13 CODE=1

PARTIAL HYDROGRAPH 250.00

RUNOFF VOLUME = 1.73581 INCHES = .3357 ACRE-FEET
PEAK DISCHARGE RATE = 9.43 CFS AT 1.500 HOURS BASIN AREA = .0036 SQ. MI.

ADD HYD PRINT HYD ID=27 HYD=200.01 ID I=13 ID II=12

ID=27 CODE=1

PARTIAL HYDROGRAPH 200.01

RUNOFF VOLUME = 1.73575 INCHES = .7433 ACRE-FEET PEAK DISCHARGE RATE = 20.89 CFS AT 1.500 HOURS BASIN AREA = .0080 SQ. MI.

ADD HYD PRINT HYD

ID=28 HYD=200.02 ID I=27 ID II=11

ID=28 CODE=1

PARTIAL HYDROGRAPH 200.02

RUNOFF VOLUME = 1.73575 INCHES = 1.1628 ACRE-FEET
PEAK DISCHARGE RATE = 32.67 CFS AT 1.500 HOURS BASIN AREA = .0126 SQ. MI.

ADD HYD PRINT HYD ID=29 HYD=200.03 ID I=28 ID II=10

ID=29 CODE=1

PARTIAL HYDROGRAPH 200.03

RUNOFF VOLUME = 1.73575 INCHES = 1.6063 ACRE-FEET
PEAK DISCHARGE RATE = 45.13 CFS AT 1.500 HOURS BASIN AREA = .0174 SQ. MI.

ADD HYD PRINT HYD ID=30 HYD=200.04 ID I=29 ID II=9

ID=30 CODE=1

PARTIAL HYDROGRAPH 200.04

RUNOFF VOLUME = 1.73575 INCHES = 2.0619 ACRE-FEET
PEAK DISCHARGE RATE = 57.93 CFS AT 1.500 HOURS BASIN AREA = .0223 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 11:48:06

RUN DATE (MCN/DAY/YR) =08/24/2000 USER NO.= AHYMO-I3Chavez-Grieves-C

	٠,	IVDDOCDA	FRO		ž D		AREA	PEAK	RUNOFF I SCHARGE	VOLUME	TIME TO RUNOFF	CFS	PAGE	•
COMMAND		IYDROGRA FICATION		ID 0. NO.	ID	(SQ MI		(CFS)	(AC-FT)	(INCHES)		ACI	PEAK RE NO	PER
*S 10-YEAR, *S August 16 START				DEEA	1 II T								TIME=	.00
LOCATION RAINFALL TYPE	= 1			DEFA	ULI		•		•				RAIN6=	1.570
COMPUTE NM HYD ADD HYD HYD HYD HYD HYD HYD HYD HYD HYD H		100 100 100 100	.02 .03 .04 .05	1 2 3 4 5 6 7 8 7 8 5 7 8 2 1 2 2 3 8 2 1 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3 2 3	20 21 22 23 24 25 26	.00635 .00738 .00842 .00647 .00790 .00712 .00233 .00155	.0094 .0110 .0189 .0253 .0338 .0411	1 8 0 8	.320 .373 .425 .327 .399 .360 .118 .078 14.31 16.67 28.63 38.42 51.16 62.33 71.94	.94662 .94662 .94662 .94662 .94662 .94662 .956 .954 1.281 1.706 2.079 2.399	1.500 1.500 1.500 1.500	2.365 2.365 2.365 2.365 2.365 2.373 6 4 6 7	PER IMP= PER IMP= PER IMP= PER IMP= 1.500 1.500 1.500 1.500 1.500	59.00 59.00 59.00 59.00 59.00
COMPUTE NM HYR COMPUTE NM HYR COMPUTE NM HYR COMPUTE NM HYR ADD HYD ADD HYD ADD HYD ADD HYD ADD HYD ADD HYD AS************************************	D D	200 200 200	.01 .02 .03	· 9 10 11 12 13 13 13 13 13 13 13 13 13 13 13 13 13	28 29 30	.00492 .00479 .00453 .00440 .00363	.0080 .0125 .0173	6 55 27	.249 .242 .199 12.97 20.28 28.02 35.96		1.500 1.500 1.500 1.500 1.0295 1.0295	2.523 2.523 2.523 2.524 6 6	PER IMP= PER IMP= PER IMP= PER IMP= 1.500 1.500 1.500	67.80 67.80 67.80
*S******* *S*******	**** ****		Al	L: LBUQUE	EAD/C	NEW MI	EXICO	•	*****	********  ******				
*S FILENAM	E: G:\	C03\111	\CA!	LCS\AH	YMO.I	N\OUT			***********	•			•	

```
AHYMO PROGRAM (AHYMO 97) -
RUN DATE (MON/DAY/YR) = 08/24/2000
                                                        - Version: 1997.02c
                                                USER NO.= AHYMO-I3Chavez-Grieves-C
         START TIME (HR:MIN:SEC) = 14:18:13
         INPUT FILE = G:\C03\111\CALCS\10YR.IN
*S 10-YEAR, 6-HOUR STORM
*S August 16, 2000
                    0.00
START
                      ALBUQUERQUE, NEW MEXICO
LOCATION
     Soil infiltration values (LAND FACTORS) for this location are not available.
     The following default values were used.
     Land Treatment
                        Initial Abstr.(in)
                                              Unif. Infilt.(in/hour)
                        0.65
                                               1.67
                                               0.83
                        0.10
                      TYPE=1
RAINFALL
                              RAIN QUARTER=0 RAIN ONE=1.34
                               RAIN SIX=1.57 RAIN DAY=0 DT=0.03333
               COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
                        .033330 HOURS
               DT =
                                                           5.999400 HOURS
                                            END TIME =
                   .0000
                           .0011
                                   .0022
                                           .0034
                                                           .0058
                                                                   .0070
                                                   .0046
                   .0083
                           .0095
                                   .0109
                                                                   .0165
                                           .0122
                                                   .0136
                                                           .0150
                   .0180
                           .0196
                                                                   .0282
                                   .0212
                                           .0229
                                                   .0246
                                                           .0263
                   .0301
                           .0321
                                                           .0408
                                                                   .0433
                                   .0341
                                           .0363
                                                   .0385
                   .0459
                                                                   .0725
                           .0486
                                   .0515
                                           .0552
                                                           .0634
                                                   .0591
                   .0928
                           .1241
                                   .1690
                                           .2304
                                                           .4138
                                                                   .5418
                                                   .3110
                   .6980
                           .8430
                                   .9036
                                           .9547
                                                   .0002
                                                           .0416
                                                                  1.0797
                  1.1150
                          1.1481
                                  1.1790
                                                  1.2357
                                                           .2617
                                           1.2082
                                                                  1.2863
                  1.3096
                          1.3316
                                  1.3526
                                          1.3725
                                                  1.3914
                                                          1.3958
                                                                  1.3999
                          1.4074
                  1.4037
                                  1.4109
                                          1.4143
                                                  1.4175
                                                          1.4206
                                                                   1.4236
                   .4265
                           .4293
                                   1.4320
                                           1.4346
                                                   1.4372
                                                          1.4397
                                                                   .4421
                   .4444
                          1.4467
                                  1.4490
                                          1.4511
                                                  1.4533
                                                          1.4554
                                                                  1.4574
                  1.4594
                          1.4614
                                   1.4633
                                                  1.4670
                                                                  1.4706
                                          1.4652
                                                           .4688
                  1.4724
                          1.4741
                                  1.4758
                                          1.4775
                                                  1.4791
                                                           1.4807
                                                                   1.4823
                           .4854
                   .4839
                                  1.4869
                                           1.4884
                                                   .4899
                                                           1.4914
                                                                   1.4928
                  1.4943
                          1.4957
                                  1.4970
                                          1.4984
                                                  1.4998
                                                          1.5011
                                                                  1.5024
                          1.5050
                  1.5037
                                                          1.5100
                                  1.5063
                                          1.5075
                                                  1.5088
                                                                  1.5113
                   .5125
                          1.5137
                                  1.5148
                                          1.5160
                                                  1.5172
                                                          1.5183
                                                                  1.5195
                  1.5206
                          1.5217
                                                  1.5250
                                  1.5228
                                          1.5239
                                                          1.5261
                   .5282
                          1.5292
                                  1.5303
                                          1.5313
                                                  1.5323
                   .5354
                          1.5363
                                  1.5373
                                          1.5383
                                                  1.5393
                                                          1.5402
                                                                  1.5412
                   .5421
                          1.5431
                                  1.5440
                                                  1.5458
                                                          1.5467
                                          1.5449
                                                                   1.5476
                   .5485
                          1.5494
                                          1.5512
                                                   .5521
                                                           1.5529
                                  1.5503
                                                                   1.5538
                  1.5547
                          1.5555
                                  1.5564
                                          1.5572
                                                   1.5580
                          1.5613
                  1.5605
                                                          1.5645
                                  1.5621
                                          1.5629
                                                  1.5637
                  1.5661
                          1.5669
                                  1.5677
                                          1.5685
                                                  1.5692 1.5700
*S LEAD
*COMPUTE BASIN 110.00
COMPUTE NM HYD
                             HYD=110.00 DA=0.006345 SQ MI
                       ID=1
                               PER A=0 PER B=20 PER C=21 PER D=59
                                TP=0.133 RAINFALL=-1
            .072485HR TP = .133000HR
                                                           .545000
                                             K/TP RATIO =
                                                                        SHAPE CONSTANT, N = 7.106420
      UNIT PEAK = 14.813 CFS UNIT VOLUME = .9986
                                                                 B =
                                                                        526.28
                                                                                    P60 = 1.3400
      AREA =
                  .003744 SQ MI
                                   IA =
                                           .10000 INCHES INF =
                                                                      .04000 INCHES PER HOUR
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330
            .123035HR
                       TP = .133000 KR
                                             K/TP RATIO = .925076
                                                                         SHAPE CONSTANT, N = 3.825191
      UNIT PEAK = 6.7157 CFS
                                    UNIT VOLUME =
                                                   .9983
                                                                        343.34
                                                                                    P60 = 1.3400
                  .002601 SQ MI
      AREA =
                                           .42317 INCHES INF = 1.03488 INCHES PER HOUR
                                 IA =
      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
 PRINT HYD
                       ID=1 CODE=1
                                      PARTIAL HYDROGRAPH 110.00
     RUNOFF VOLUME = .94662 INCHES = .3203 ACRE-FEET
     PEAK DISCHARGE RATE = 9.60 CFS AT 1.500 HOURS BASIN AREA =
                                                                              .0063 SQ. MI.
```

\*COMPUTE BASIN 120.00

ID=2 HYD=120.00 DA=0.007381 SQ MI

COMPUTE NM HYD

# PER A=0 PER B=20 PER C=21 PER D=59 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 17.232 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 1.3400 AREA = .004355 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .123035HR TP = .133000HR K/TP RATIO = .925076 SHAPE CONSTANT, N = 3.825191 UNIT PEAK = 7.8122 CFS UNIT VOLUME = .9987 B = 343.34 P60 = 1.3400 AREA = .003026 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=2 CODE=1

### PARTIAL HYDROGRAPH 120.00

RUNOFF VOLUME = .94662 INCHES = .3726 ACRE-FEET

PEAK DISCHARGE RATE = 11.17 CFS AT 1.500 HOURS BASIN AREA = .0074 SQ. MI.

\*COMPUTE BASIN 130.00 COMPUTE NM HYD

ID=3 HYD=130.00 DA=0.008417 SQ MI
PER A=0 PER B=20 PER C=21 PER D=59
TP=0:133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 19.650 CFS UNIT VOLUME = .9988 B = 526.28 P60 = 1.3400 AREA = .004966 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K=.123035HR TP = .133000HR K/TP RATIO = .925076 SHAPE CONSTANT, N = 3.825191 UNIT PEAK = 8.9087 CFS UNIT VOLUME = .9988 B = 343.34 P60 = 1.3400 AREA = .003451 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=3 CODE=1

### PARTIAL HYDROGRAPH 130.00

RUNOFF VOLUME = .94662 INCHES = .4249 ACRE-FEET
PEAK DISCHARGE RATE = 12.74 CFS AT 1.500 HOURS BASIN AREA = .0084 SQ. MI.

\*COMPUTE BASIN 140.00

COMPUTE NM HYD ID=4 H

ID=4 HYD=140.00 DA=0.006474 SQ MI PER A=0 PER B=20 PER C=21 PER D=59 TP=0.133 · RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 15.114 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 1.3400 AREA = .003820 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .123035HR TP = .133000HR K/TP RATIO = .925076 SHAPE CONSTANT, N = 3.825191 UNIT PEAK = 6.8522 CFS UNIT VOLUME = .9983 B = 343.34 P60 = 1.3400 AREA = .002654 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=4 CODE=1

### PARTIAL HYDROGRAPH 140.00

RUNOFF VOLUME = .94662 INCHES = .3268 ACRE-FEET
PEAK DISCHARGE RATE = 9.80 CFS AT 1.500 HOURS BASIN AREA = .0065 SQ. MI.

PER A=0 PER B=20 PER C=21 PER D=59 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 18.441 CFS UNIT VOLUME = .9988 B = 526.28 P60 = 1.3400 AREA = .004660 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K=.123035HR TP = .133000HR K/TP RATIO = .925076 SHAPE CONSTANT, N = 3.825191 UNIT PEAK = 8.3605 CFS UNIT VOLUME = .9988 B = 343.34 P60 = 1.3400 AREA = .003239 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=5 CODE=1

PARTIAL HYDROGRAPH 150.00

RUNOFF VOLUME = .94662 INCHES = .3988 ACRE-FEET
PEAK DISCHARGE RATE = .11.95 CFS AT 1.500 HOURS BASIN AREA = .0079 SQ. MI.

\*COMPUTE BASIN 160.00
COMPUTE NM HYD

ID=6 HYD=160.00 DA=0.007122 SQ MI

PER A=0 PER B=20 PER C=21 PER D=59

TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 16.627 CFS UNIT VOLUME = .9987 B = 526.28 P60 = 1.3400 AREA = .004202 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .123035 HR TP = .133000HR K/TP RATIO = .925076 SHAPE CONSTANT, N = 3.825191 UNIT PEAK = 7.5381 CFS UNIT VOLUME = .9985 B = 343.34 P60 = 1.3400 AREA = .002920 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=6 CODE=1

PARTIAL HYDROGRAPH 160.00

RUNOFF VOLUME = .94662 INCHES = .3596 ACRE-FEET
PEAK DISCHARGE RATE = 10.78 CFS AT 1.500 HOURS BASIN AREA = .0071 SQ. MI.

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 5.4420 CFS UNIT VOLUME = .9974 B = 526.28 P60 = 1.3400 AREA = .001375 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .123035HR TP = .133000HR K/TP RATIO = .925076 SHAPE CONSTANT, N = 3.825191 UNIT PEAK = 2.4672 CFS UNIT VOLUME = .9949 B = 343.34 P60 = 1.3400 AREA = .000956 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=7 CODE=1

PARTIAL HYDROGRAPH 170.00

RUNOFF VOLUME = .94662 INCHES = .1177 ACRE-FEET

PEAK DISCHARGE RATE = 3.53 CFS AT 1.500 HOURS BASIN AREA = .0023 SQ. MI.

\*COMPUTE BASIN 180.00

COMPUTE NM HYD ID=8 HYD=180.00 DA=0.001554 SQ MI

PER A=0 PER B=20 PER C=21 PER D=59

TP=0.133 RAINFALL=-1

.072485HR .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420UNIT PEAK = 3.6280 CFS UNIT VOLUME = .9962 526.28 P60 = 1.3400AREA = .000917 SQ MI .10000 INCHES INF =IA =.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =

K = .123035HR TP = .133000HR K/TP RATIO = .925076 SHAPE CONSTANT, N = 3.825191 UNIT PEAK = 1.6448 CFS UNIT VOLUME = .9925 B = 343.34 P60 = 1.3400 AREA = .000637 SQ MI IA = .42317 INCHES INF = 1.03488 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=8 CODE=1

PARTIAL HYDROGRAPH 180.00

RUNOFF VOLUME = .94662 INCHES = .0785 ACRE-FEET
PEAK DISCHARGE RATE = 2.36 CFS AT 1.500 HOURS BASIN AREA = .0016 SQ. MI.

ADD HYD PRINT HYD ID=20 HYD=100.01 ID I=7 ID II=6

ID=20 CODE=1

PARTIAL HYDROGRAPH 100.01

RUNOFF VOLUME = .94656 INCHES = .4772 ACRE-FEET
PEAK DISCHARGE RATE = .0095 SQ. MI.

ADD HYD PRINT HYD

ID=21 HYD=100.02 ID I=20 ID II=8

ID=21 CODE=1

PARTIAL HYDROGRAPH 100.02

RUNOFF VOLUME = .94654 INCHES = .5557 ACRE-FEET
PEAK DISCHARGE RATE = 16.67 CFS AT 1.500 HOURS BASIN AREA = .0110 SQ. MI.

ADD HYD PRINT HYD

ID=22 HYD=100.03 ID I=21 ID II=5

ID=22 CODE=1

PARTIAL HYDROGRAPH 100.03

RUNOFF VOLUME = .94656 INCHES = .9544 ACRE-FEET
PEAK DISCHARGE RATE = .0189 SQ. MI.

ADD HYD PRINT HYD

ID=23 HYD=100.04 ID I=22 ID II=4

ID=23 CODE=1

PARTIAL HYDROGRAPH 100.04

RUNOFF VOLUME = .94656 INCHES = 1.2813 ACRE-FEET
PEAK DISCHARGE RATE = 38.42 CFS AT 1.500 HOURS BASIN AREA = .0254 SQ. MI.

ADD HYD PRINT HYD ID=24 HYD=100.05 ID I=23 ID II=3 ID=24 CODE=1

PARTIAL HYDROGRAPH 100.05

RUNOFF VOLUME = .94657 INCHES = 1.7062 ACRE-FEET
PEAK DISCHARGE RATE = 51.16 CFS AT 1.500 HOURS BASIN AREA = .0338 SQ. MI.

ADD HYD PRINT HYD

ID=25 HYD=100.06 ID I=24 ID II=2

ID=25 CODE=1

PARTIAL HYDROGRAPH 100.06

RUNOFF VOLUME = .94657 INCHES = 2.0788 ACRE-FEET
PEAK DISCHARGE RATE = 62.33 CFS AT 1.500 HOURS BASIN AREA = .0412 SQ. MI.

ADD HYD PRINT HYD ID=26 HYD=100.07 ID I=25 ID II=1

ID=26 CODE=1

PARTIAL HYDROGRAPH 100.07

RUNOFF VOLUME = .94657 INCHES = 2.3991 ACRE-FEETP
PEAK DISCHARGE RATE = 71.94 CFS AT 1.500 HOURS BASIN AREA = .0475 SQ. MI.

\*S COAL

\*COMPUTE BASIN 210.00

COMPUTE NM HYD ID=9 HYD=210.00 DA=0.004921 SQ MI

PER A=0 PER B=16.1 PER C=16.1 PER D=67.8 TP=0.133 RAINFALL=-1

K = .072485 HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 13.202 CFS UNIT VOLUME = .9986 B = 526.28 P60 = 1.3400 AREA = .003336 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K=.123439HR TP = .133000HR K/TP RATIO = .928113 SHAPE CONSTANT, N = 3.812062 UNIT PEAK = 4.0798 CFS UNIT VOLUME = .9971 B = 342.44 P60 = 1.3400 AREA = .001585 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=9 CODE=1

PARTIAL HYDROGRAPH 210.00

RUNOFF VOLUME = 1.02963 INCHES = .2702 ACRE-FEET
PEAK DISCHARGE RATE = 7.94 CFS AT 1.500 HOURS BASIN AREA = .0049 SQ. MI.

\*COMPUTE BASIN 220.00

COMPUTE NM HYD

ID=10 HYD=220.00 DA=0.004791 SQ MI PER A=0 PER B=16.1 PER C=16.1 PER D=67.8 TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 12.853 CFS UNIT VOLUME = .9986 B = 526.28 P60 = 1.3400 AREA = .003248 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .123439HR TP = .133000HR K/TP RATIO = .928113 SHAPE CONSTANT, N = 3.812062 UNIT PEAK = 3.9720 CFS UNIT VOLUME = .9971 B = 342.44 P60 = 1.3400 AREA = .001543 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=10 CODE=1

PARTIAL HYDROGRAPH 220.00

RUNOFF VOLUME = 1.02963 INCHES = .2631 ACRE-FEET
PEAK DISCHARGE RATE = 7.73 CFS AT 1.500 HOURS BASIN AREA = .0048 SQ. MI.

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 12.159 CFS UNIT VOLUME = .9985 B = 526.28 P60 = 1.3400 AREA = .003073 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .123439HR TP = .133000HR K/TP RATIO = .928113 SHAPE CONSTANT, N = 3.812062 UNIT PEAK = 3.7573 CFS UNIT VOLUME = .9968 B = 342.44 P60 = 1.3400 AREA = .001459 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=11 CODE=1

PARTIAL HYDROGRAPH 230.00

RUNOFF VOLUME = 1.02963 INCHES = .2489 ACRE-FEET
PEAK DISCHARGE RATE = 7.32 CFS AT 1.500 HOURS BASIN AREA = .0045 SQ. MI.

K = .072485 HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 11.812 CFS UNIT VOLUME = .9985 B = 526.28 P60 = 1.3400 AREA = .002985 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

K = .123439HR TP = .133000HR K/TP RATIO = .928113 SHAPE CONSTANT, N = 3.812062 UNIT PEAK = 3.6504 CFS UNIT VOLUME = .9968 B = 342.44 P60 = 1.3400 AREA = .001418 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033330

PRINT HYD

ID=12 CODE=1

PARTIAL HYDROGRAPH 240.00

RUNOFF VOLUME = 1.02963 INCHES = .2418 ACRE-FEET PEAK DISCHARGE RATE = 7.11 CFS AT 1.500 HOURS BASIN AREA = .0044 Sq. MI.

\*COMPUTE BASIN 250.00

COMPUTE NM HYD

ID=13 HYD=250.00 DA=0.003626 SQ MI

PER A=0 PER B=16.1 PER C=16.1 PER D=67.8

TP=0.133 RAINFALL=-1

K = .072485HR TP = .133000HR K/TP RATIO = .545000 SHAPE CONSTANT, N = 7.106420 UNIT PEAK = 9.7279 CFS UNIT VOLUME = .9983 B = 526.28 P60 = 1.3400 AREA = .002458 SQ MI IA = .10000 INCHES INF = .04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

K = .123439HR TP = .133000HR K/TP RATIO = .928113 SHAPE CONSTANT, N = 3.812062

UNIT PEAK = 3.0062 CFS UNIT VOLUME = .9957 B = 342.44 P60 = 1.3400 AREA = .001168 SQ MI IA = .42500 INCHES INF = 1.04000 INCHES PER HOUR RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .0333330

PRINT HYD

ID=13 CODE=1

PARTIAL HYDROGRAPH 250.00

RUNOFF VOLUME = 1.02963 INCHES = .1991 ACRE-FEET
PEAK DISCHARGE RATE = 5.86 CFS AT 1.500 HOURS BASIN AREA = .0036 SQ. MI.

ADD HYD PRINT HYD ID=27 HYD=200.01 ID I=13 ID II=12

ID=27 CODE=1

PARTIAL HYDROGRAPH 200.01

RUNOFF VOLUME = 1.02956 INCHES = .4409 ACRE-FEET
PEAK DISCHARGE RATE = 12.97 CFS AT 1.500 HOURS BASIN AREA = .0080 SQ. MI.

ADD HYD PRINT HYD ID=28 HYD=200.02 ID I=27 ID II=11

ID=28 CODE=1

PARTIAL HYDROGRAPH 200.02

RUNOFF VOLUME = 1.02956 INCHES = .6897 ACRE-FEET
PEAK DISCHARGE RATE = 20.28 CFS AT 1.500 HOURS BASIN AREA = .0126 SQ. MI.

ADD HYD PRINT HYD ID=29 HYD=200.03 ID I=28 ID II=10

ID=29 CODE=1

PARTIAL HYDROGRAPH 200.03

RUNOFF VOLUME = 1.02956 INCHES = .9528 ACRE-FEET
PEAK DISCHARGE RATE = .0174 SQ. MI.

ADD HYD PRINT HYD ID=30 HYD=200.04 ID I=29 ID II=9

ID=30 CODE=1

PARTIAL HYDROGRAPH 200.04

RUNOFF VOLUME = 1.02956 INCHES = 1.2230 ACRE-FEET
PEAK DISCHARGE RATE = 35.96 CFS AT 1.500 HOURS BASIN AREA = .0223 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 14:18:13

# 15" RCP Storm Drain Worksheet for Circular Channel

Project Description	n
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	15" RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data			
Mannings Coefficient	0.013		
Channel Slope	0.0089	00 ft/ft	
Depth	1.25	ft	
Diameter	15.00	in	

Results		
Discharge	6.09	cfs
Flow Area	1.23	ft²
Wetted Perimeter	3.93	ft
Top Width	0.00	ft
Critical Depth	1.00	ft
Percent Fuli	100.00	
Critical Slope	0.0093	57 ft/ft
Velocity	4.97	ft/s
Velocity Head	0.38	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	6.56	cfs
Full Flow Capacity	6.09	cfs
Full Flow Slope	0.0089	00 ft/ft

# 30" RCP Storm Drain Worksheet for Circular Channel

Project Description	n
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	30" RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.0089	00 ft/ft
Diameter	30.00	in

Deculte		
Results		
Depth	2.50	ft
Discharge	38.69	cfs
Flow Area	4.91	ft²
Wetted Perimeter	7.85	ft
Top Width	0.00	ft
Critical Depth	2.10	ft
Percent Full	100.00	
Critical Slope	0.0085	36 ft/ft
Velocity	7.88	ft/s
Velocity Head	0.97	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	41.62	cfs
Full Flow Capacity	38.69	cfs
Full Flow Slope	0.0089	00 ft/ft

# 36" RCP Storm Drain Worksheet for Circular Channel

Project Description	n
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	36" RCP
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.0089	00 ft/ft
Diameter	36.00	in

Results	<del></del>	
Depth	3.00	ft
Discharge	62.92	cfs
Flow Area	7.07	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.55	ft
Percent Full	100.00	
Critical Slope	0.0083	72 ft/ft
Velocity	8.90	ft/s
Velocity Head	1.23	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	67.68	cfs
Full Flow Capacity	62.92	cfs
Full Flow Slope	0.0089	00 ft/ft

# EXISTING CONDITIONS ON LEAD Worksheet for Irregular Channel

Project Descriptio	ח
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Lead - existing
Flow Element	irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

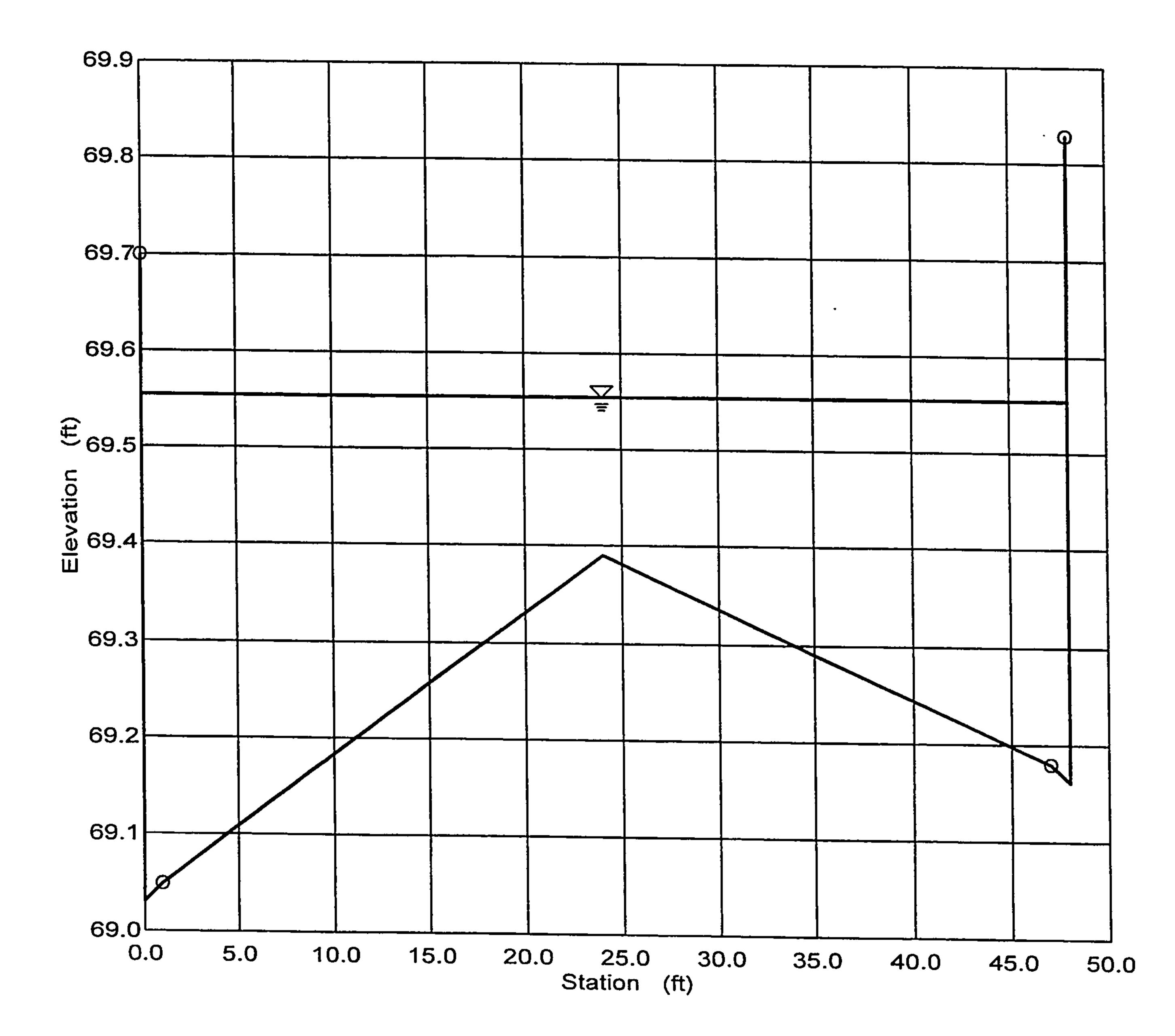
Input Data				
Channel Slope	0.036000 ft	/ft		
Elevation range: 6	9.03 ft to 69.83 ft.			
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	69.70	0.00	1.00	0.013
0.00	69.03	1.00	47.00	0.017
1.00	69.05	47.00	48.00	0.013
24.00	69.39			
47.00	69.18			
48.00	69.16			
48.00	69.83			
Discharge	112.23 c	fs		

Results		
Wtd. Mannings Coefficient	0.017	
Water Surface Elevation	69.55	ft
Flow Area	14.80	ft²
Wetted Perimeter	48.92	ft
Top Width	48.00	ft
Height	0.52	ft
Critical Depth	69.80	ft
Critical Slope	0.0051	68 ft/ft
Velocity	7.58	ft/s
Velocity Head	0.89	ft
Specific Energy	70.45	ft
Froude Number	2.41	
Flow is supercritical.		

# EXISTING CONDITIONS ON LEAD Cross Section for Irregular Channel

Project Description	n
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Lead - existing
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.017	
Channel Slope	0.0360	00 ft/ft
Water Surface Elevation	69.55	ft
Discharge	112.23	cfs



# PROPOSED CONDITIONS ON LEAD, 100-YR Worksheet for Irregular Channel

Project Description	
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Lead - proposed
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

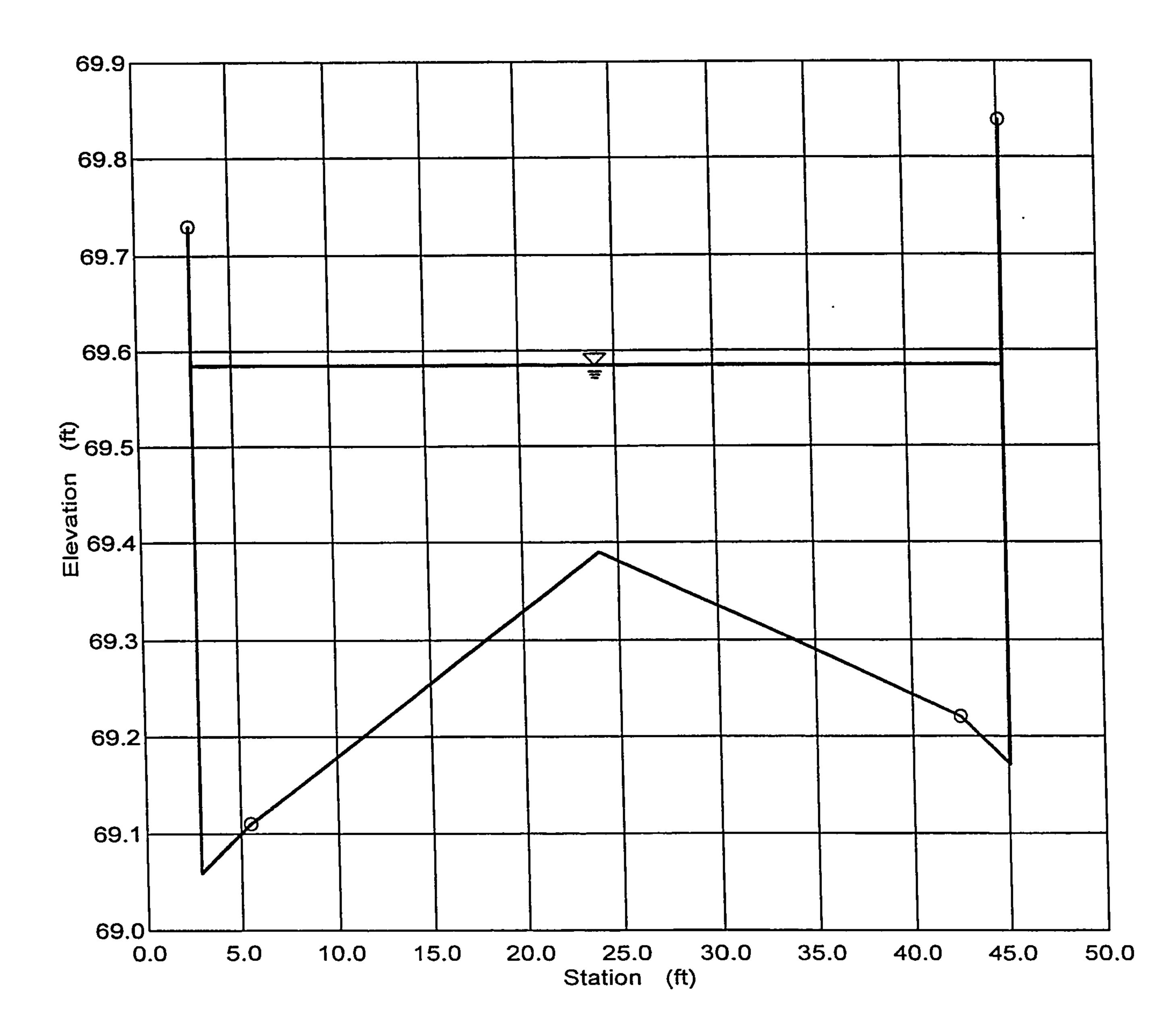
Input Data				
Channel Slope	0.036000 ft/	/ft		
Elevation range: 6	9.06 ft to 69.84 ft.			
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
2.88	69.73	2.88	5.50	0.013
2.88	69.06	5.50	42.50	0.017
5.50	69.11	42.50	45.13	0.013
24.00	69.39			
42.50	69.22			
45.13	69.17			
45.13	69.84			
Discharge	112.23 ct	<u>fs</u>		

Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	69.58	ft
Flow Area	13.69	ft²
Wetted Perimeter	43.19	ft
Top Width	42.25	ft
Height	0.52	ft
Critical Depth	69.86	ft
Critical Slope	0.0047	79 ft/ft
Velocity	8.20	ft/s
Velocity Head	1.04	ft
Specific Energy	70.63	ft
Froude Number	2.54	
Flow is supercritical.		

#### PROPOSED CONDITIONS ON LEAD, 100-YR Cross Section for Irregular Channel

Project Description	
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Lead - proposed
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data			
Wtd. Mannings Coefficient	0.016		
Channel Slope	0.0360	00 ft/ft	
Water Surface Elevation	69.58	ft	
Discharge	112.23	cfs	



#### PROPOSED CONDITIONS ON LEAD - 10 YR Worksheet for Irregular Channel

Project Description	n
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Lead - proposed (10-yr)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

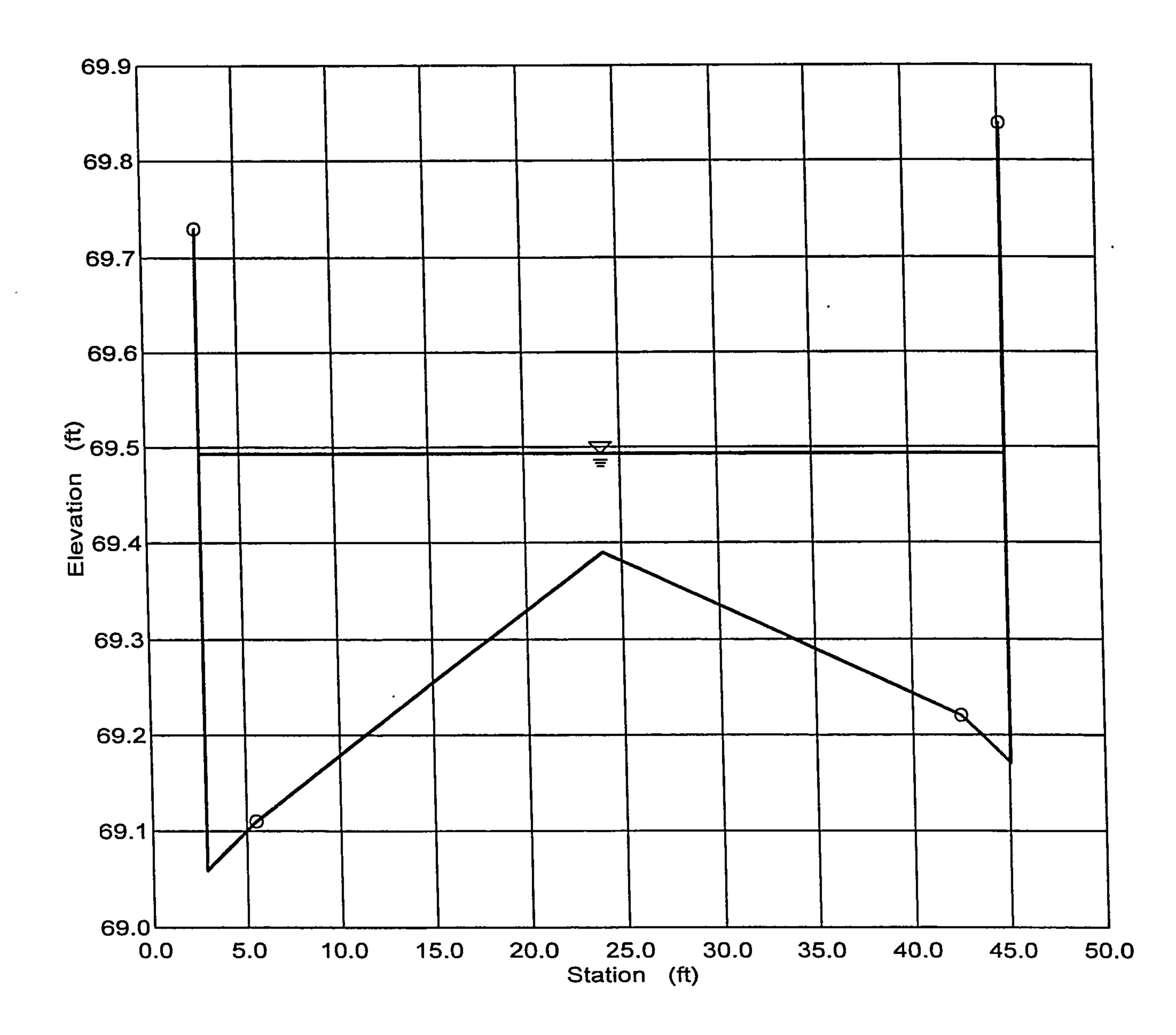
Input Data				
Channel Slope	0.036000 ft/ft			
Elevation range: 6	9.06 ft to 69.84 ft.			
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
2.88	69.73	2.88	5.50	0.013
2.88	69.06	5.50	42.50	0.017
5.50	69.11	42.50	45.13	0.013
24.00	69.39			
42.50	69.22			
45.13	69.17			
45.13	69.84			
Discharge	65.85 cfs	<u> </u>		

Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	69.49	ft
Flow Area	9.81	ft²
Wetted Perimeter	43.01	ft
Top Width	42.25	ft
Height	0.43	ft
Critical Depth	69.68	ft
Critical Slope	0.0052	40 ft/ft
Velocity	6.72	ft/s
Velocity Head	0.70	ft
Specific Energy	70.19	ft
Froude Number	2.46	
Flow is supercritical.		

### PROPOSED CONDITIONS ON LEAD - 10 YR Cross Section for Irregular Channel

Project Description	n
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Lead - proposed (10-yr)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data			
Wtd. Mannings Coefficient	0.016		
Channel Slope	0.0360	00 ft/ft	
Water Surface Elevation	69.49	ft	
Discharge	65.85	cfs	



# EXISTING CONDITIONS ON COAL Worksheet for Irregular Channel

Project Descriptio	n
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Coal - existing
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

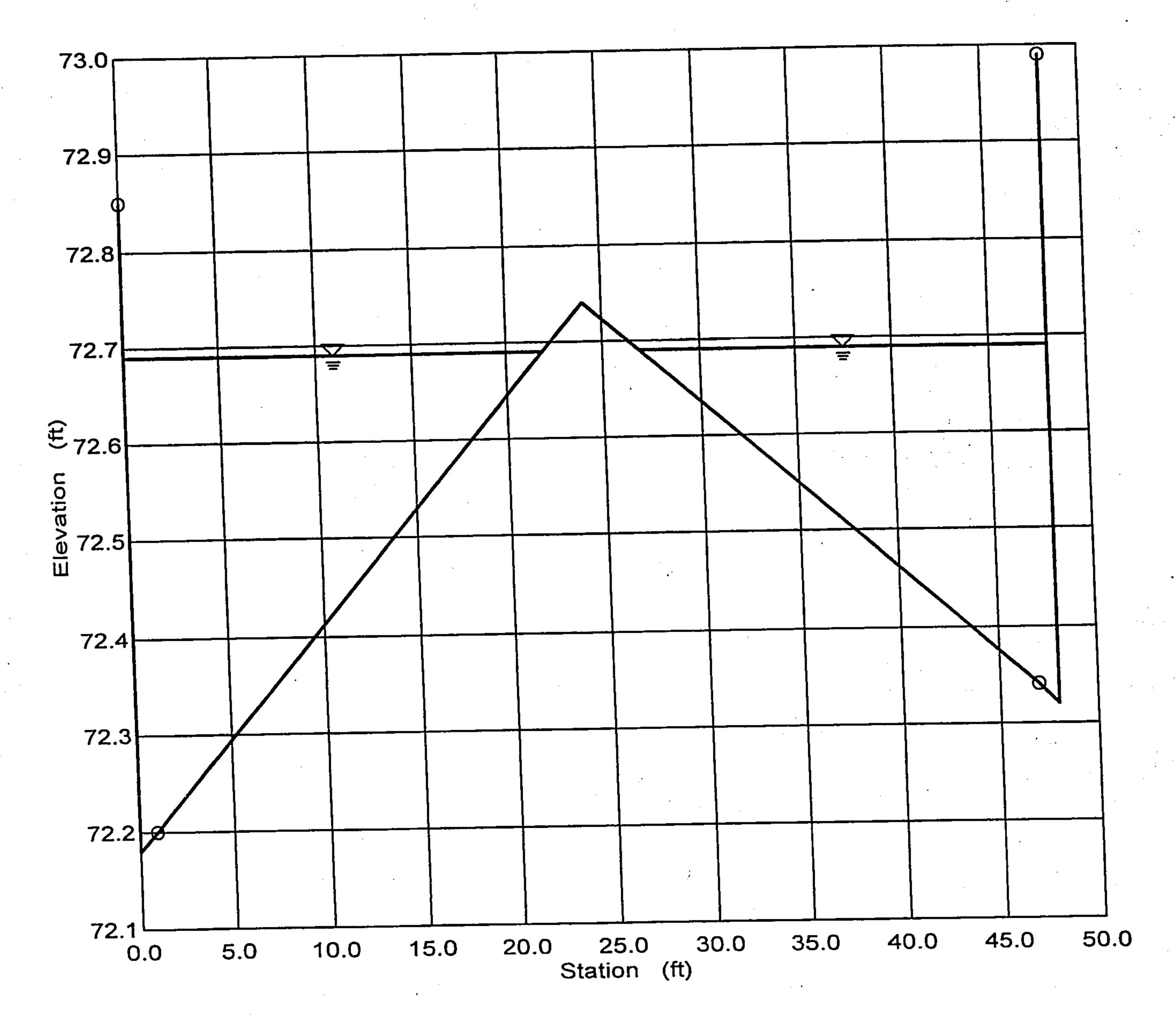
Input Data		· · · · · · · · · · · · · · · · · · ·		•
Channel Slope	0.035000 ft/ft			
Elevation range: 7	2.18 ft to 72.99 ft.			
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	72.85	0.00	1.00	0.013
0.00	72.18	1.00	47.00	0.017
1.00	72.20	47.00	48.00	0.013
24.00	72.74	•	•	
47.00	72.34			
48.00	72.32			
48.00	72.99			•
Discharge	57.93 cfs	<u> </u>		

Results		
Wtd. Mannings Coefficient	0.016	
Water Surface Elevation	72.69	ft
Flow Area	9.45	ft²
Wetted Perimeter	43.79	ft
Top Width	42.90	ft
Height	0.51	ft
Critical Depth	72.85	ft
Critical Slope	0.0059	65 ft/ft
Velocity	6.13	ft/s
Velocity Head	0.58	ft
Specific Energy	73.27	ft
Froude Number	2.30	
Flow is supercritical.	•	
Flow is divided.		<u>-</u>

#### EXISTING CONDITIONS ON COAL Cross Section for Irregular Channel

Project Description	
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Coal - existing
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data		
Wtd. Mannings Coefficient	0.016	
Channel Slope	0.0350	00 ft/ft
Water Surface Elevation	72.69	ft
Discharge	57.93	cfs



# PROPOSED CONDITIONS ON COAL, 100-YR Worksheet for Irregular Channel

Project Description	)n
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Coal - proposed
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data				•
Channel Slope	0.035000 ft/f	t ·	.•	•
Elevation range: 73	2.25 ft to 73.04 ft.			٠,
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
2.88	72.92	2.88	5.50	0.013
2.88	72.25	5.50	42.50	0.017
5.50	72.31	42.50	45.13	0.013
24.00	72.74		· ·	
42.50	72.42		••	
45.13	72.37			
45.13	73.04			
Discharge	57.93 cf	S	<u>, ;</u>	

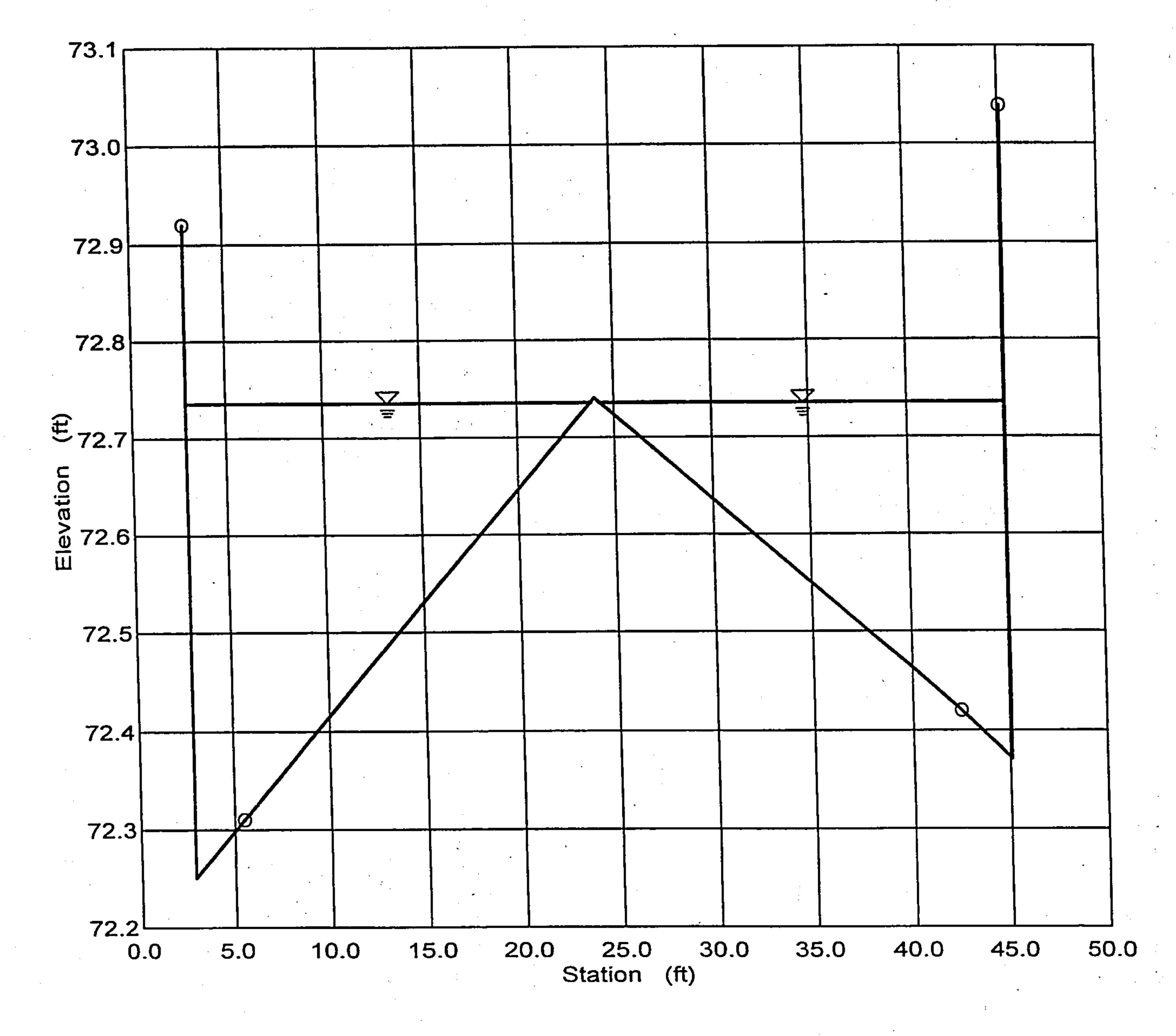
Results	·	
Wtd. Mannings Coefficient	0.015	
Water Surface Elevation	72.74	ft
Flow Area	8.85	ft²
Wetted Perimeter	42.62	ft
Top Width	41.77	ft
Height	0.49	ft
Critical Depth	72.91	ft
Critical Slope	0.0052	16 ft/ft
Velocity	6.55	ft/s
Velocity Head	0.67	ft
Specific Energy	73.40	ft
Froude Number	2.51	
Flow is supercritical.		•
Flow is divided.		

Haestad Methods, Inc.

## PROPOSED CONDITIONS ON COAL, 100-YR Cross Section for Irregular Channel

Project Description	
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Coal - proposed
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	•	
Wtd. Mannings Coefficient	0.015	
Channel Slope	0.0350	00 ft/ft
Water Surface Elevation	72.74	ft
Discharge	57.93	cfs



# PROPOSED CONDITIONS ON COAL - 10 YR Worksheet for Irregular Channel

Project Description	ີ
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Coal - proposed (10-yr)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

					•
Input Data				•	
Channel Slope	0.035000	ft/ft	•	•	
Elevation range: 7	2.25 ft to 73.04 ft.				
Station (ft)	Elevation (ft)		Start Station	End Station	Roughness
2.88	72.92		2.88	5.50	0.013
2.88	72.25		5.50	42.50	0.017
5.50	72.31		42.50	45.13	0.013
24.00	72.74		•		
42.50	72.42	•	1	•	
45.13	72.37				
45.13	73.04				
Discharge	35.96	cfs			•

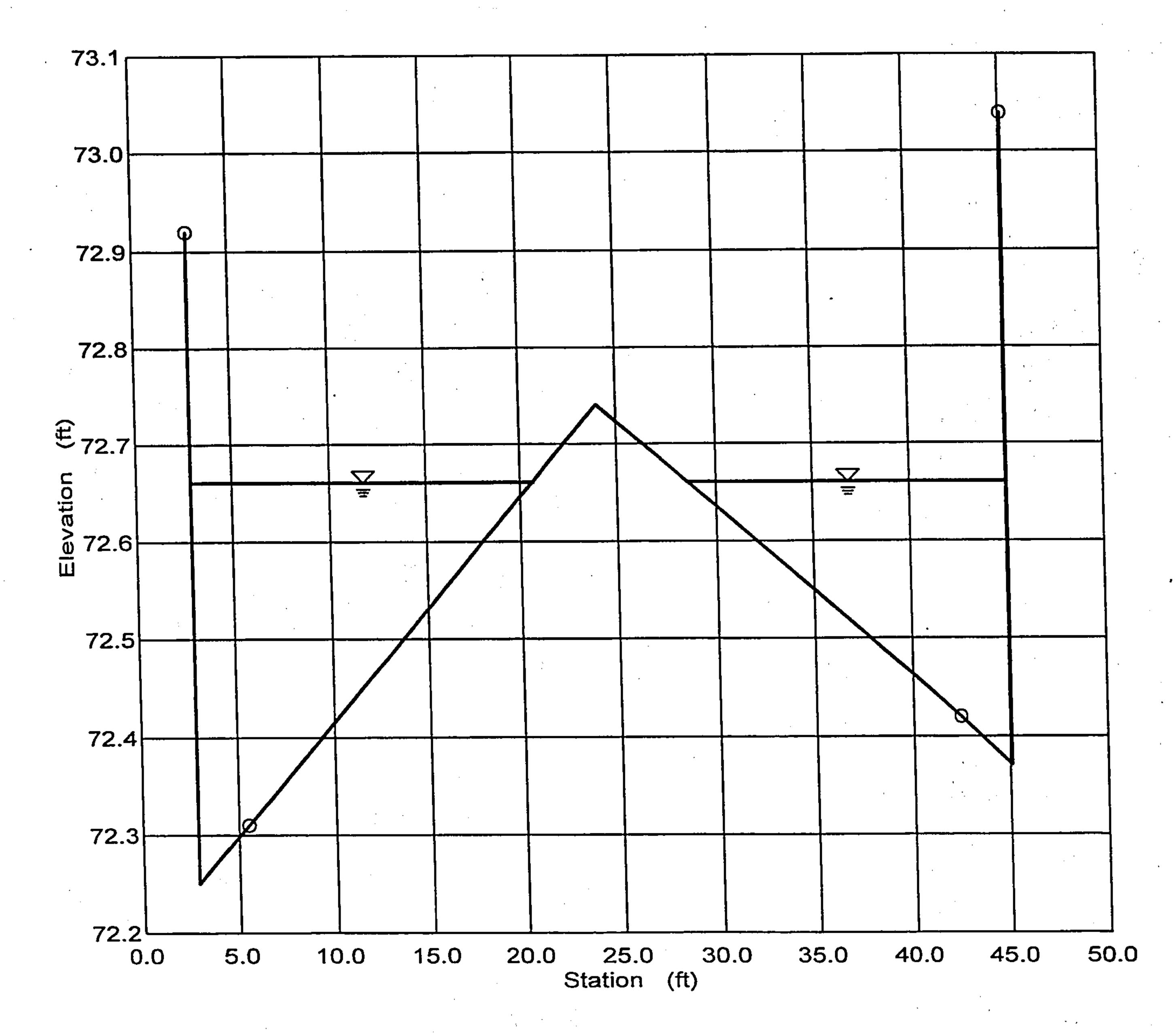
Results		<u> </u>	_
Wtd. Mannings Coefficient	0.014	•	
Water Surface Elevation	72.66	ft	
Flow Area	6.04	ft²	
Wetted Perimeter	35.04	ft	
Top Width	34.33	ft	
Height	0.41	ft	
Critical Depth	72.81	ft	
Critical Slope	0.0054	73 ft/ft	
Velocity	5.95	ft/s	
Velocity Head	0.55	ft	•
Specific Energy	73.21	ft	
Froude Number	2.50		
Flow is supercritical.			
Flow is divided.			



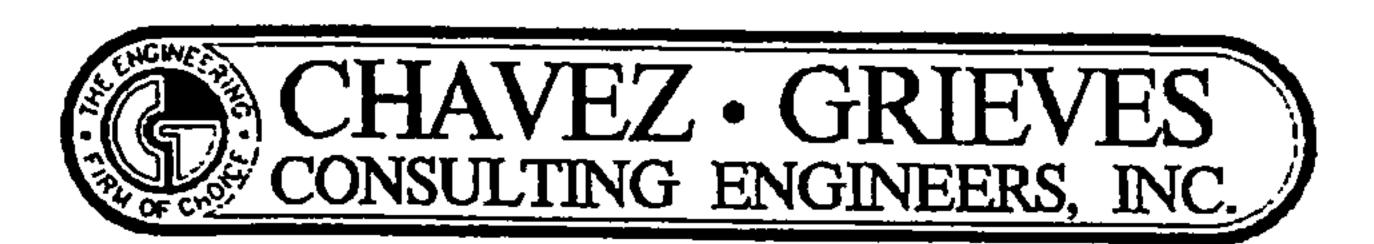
# PROPOSED CONDITIONS ON COAL - 10 YR Cross Section for Irregular Channel

Project Description	า
Project File	g:\c03\111\calcs\lc032301.fm2
Worksheet	Coal - proposed (10-yr)
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data			
Wtd. Mannings Coefficient	0.014	•	
Channel Slope	0.0350	00 ft/ft	
Water Surface Elevation	72.66	ft	
Discharge	35.96	cfs	



#### APPENDIX C RECOMMENDED LAYOUT



5639 Jefferson NE, Albuquerque, NM, 87109, Phone (505) 344-4080, Fax (505) 343-8759

SHEET NO. OF JOB: LEAD/COAL

SUBJECT: INLETS ON COAL AVE.

CLIENT: COA BY:

JK

JOB NO.: C03-111-5198 DATE: 4/2/01

CHECKED BY:

DATE:

10 YEAR DESIGN FLOW WILL NOT CROSS BROADWAY BLVD.

EDITH BLVD.

5.86 CFS + 7.11 CFS + 7.32 CFS = 20.29 CFS

DEPTH	GRATE CAPACITY	FLOW COLLECTED	SURFACE FLOW	TO
			20.29 CFS	STREET
0.30'	4 CFS	8 CFS	12.29 CFS	STREET
0.26'	3 CFS	6 CFS	6.29 CFS	ARNO STREET

**ARNO STREET** 

6.29 CFS + 7.73 CFS = 14.02 CFS

DEPTH	GRATE CAPACITY	FLOW COLLECTED	SURFACE FLOW	TO
			14.02 CFS	STREET
0.27'	3.25 CFS	6.5 CFS	7.52 CFS	STREET
0.22'	2.15 CFS	4.3 CFS	3.22 CFS	BROADWAY BLVD

**BROADWAY BLVD** 

3.22 CFS + 7.94 CFS = 11.16 CFS

DEPTH	GRATE CAPACITY	FLOW COLLECTED	SURFACE FLOW	TO
			11.16 CFS	STREET
0.25'	2.6 CFS	5.2 CFS	5.96 CFS	STREET
0.20'	1.7 CFS	3.4 CFS	2.56 CFS	STREET
0.16'		REMAINING RUNOFF	COLLECTED	



5639 Jefferson NE, Albuquerque, NM, 87109, Phone (505) 344-4080, Fax (505) 343-8759

SHEET NO.	1	OF		1	
JOB:	LEAD/COAL	<b>-</b>		. <u> </u>	
SUBJECT:	INLETS ON LEAD AVE.				
CLIENT:	COA JOB NO.: C03-111-519				
BY:	JK	DATE:		4/2/01	

CHECKED BY: DATE:

10 YEAR DESIGN FLOW WILL NOT CROSS BROADWAY BLVD.

OAK STREET

3.35 CFS

DEPTH	GRATE CAPACITY	FLOW COLLECTED	SURFACE FLOW	TO
			3.53 CFS	STREET
.017'	1.55 CFS	3.1 CFS	0.43 CFS	LOCUST STREET

LOCUST STREET

0.43 CFS + 10.78 CFS = 11.21 CFS TO HIGH ST.

2.36 CFS TO PIPE FROM SILVER AVE.

**REMOVE INLETS** 

HIGH STREET

11.21 CFS + 11.95 CFS = 23.16 CFS

DEPTH	GRATE CAPACITY	FLOW COLLECTED	SURFACE FLOW	TO
			23.16 CFS	STREET
0.31'	4.4 CFS	6 CFS*	17.16 CFS	WALTER STREET

\* PIPE CAPACITY RESTRICTED TO ACCEPT 6 CFS

WALTER STREET

17.16 CFS + 9.8 CFS = 26.96 CFS TO EDITH BLVD.

REMOVE INLETS

EDITH BLVD

26.96 CFS + 12.74 CFS = 39.7 CFS

DEPTH	<b>GRATE CAPACITY</b>	FLOW COLLECTED	SURFACE FLOW	TO
			39.7 CFS	STREET
0.37'	7 CFS	14 CFS	25.7 CFS	STREET
0.33'	4.9 CFS	9.8 CFS	15.9 CFS	STREET
0.28'	3.4 CFS	6.8 CFS	9.1 CFS	ARNO STREET

ARNO STREET

9.1 CFS + 11.17 CFS = 20.27 CFS

DEPTH	<b>GRATE CAPACITY</b>	FLOW COLLECTED	SURFACE FLOW	TO
			20.27 CFS	STREET
0.30'	4.3 CFS	8.6 CFS	11.67 CFS	STREET
0.25'	2.95 CFS	5.9 CFS	5.77 CFS	STREET
0.20'	1.7 CFS	3.4 CFS	2.37 CFS	ARNO STREET

**BROADWAY BLVD** 

2.37 CFS + 9.6 CFS = 11.97 CFS

DEPTH	<b>GRATE CAPACITY</b>	FLOW COLLECTED	SURFACE FLOW	TO
			11.97 CFS	STREET
0.26'	3.3 CFS	6.6 CFS	5.37 CFS	STREET
0.20'	1.7 CFS	3.4 CFS	1.97 CFS	STREET
0.15'		REMAINING RUNOFF	COLLECTED	

